Medicaid-based child restraint system disbursement and education and the Vaccines For Children program: comparative cost-effectiveness

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 a child restraint system (CRS) disbursement and education programme, and compared this with the cost-effectiveness of the Vaccines For Children programme, both for children of low-income families in the USA. The authors concluded that the cost-effectiveness of a Medicaid-funded CRS programme was comparable to that of federal vaccination programmes targeted at similar populations. The study was based on valid methodology and was generally well reported. The authors’ conclusions are valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of child restraint system (CRS) disbursement and education compared with no intervention, and compared this with the cost-effectiveness of the Vaccines For Children programme, both for children of low-income families in the USA.

Interventions
The two strategies were no CRS disbursement or education (the current practice in the USA) compared with a universal Medicaid-based disbursement and education programme.

Location/setting
USA/community.

Methods
Analytical approach:
This economic evaluation was based on a decision model with an eight-year time horizon. The authors stated that the analysis was carried out from the perspectives of both society and the third-party payer (Medicaid).

Effectiveness data:
The clinical data came from a selection of known, relevant studies and databases such as the Partners for Child Passenger Safety database (an ongoing child-focused database created by The Children's Hospital of Philadelphia and State Farm Mutual Automobile Insurance Company) and the Fatality Analysis Reporting System. The methods of data collection for these databases were described. The key clinical endpoint was the efficacy of the CRS programme, which was obtained from a review by the Task Force on Community Preventive Services that included 11 studies.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The summary benefit measures were deaths averted, life-years (LYs), and serious injuries averted. These benefits were discounted at 3% per annum.

Cost data:
The economic analysis included the costs of the CRS programme, child seats, and outcome-associated costs, which
included both the direct medical costs (acute physician care and hospital services, emergency transport, emergency medical technician services, and rehabilitation), and productivity costs (future productivity losses and parental work losses). Outcome-associated costs were derived from a recently published study, which examined the crash-associated costs by location and severity of injury. Data on the cost of the CRS programme were derived from two recently implemented federally supported programmes in Illinois and Texas. The costs of child seats were based on competitive consumer non-bulk prices. All costs were in US dollars ($) and a 3% annual discount rate was applied to future costs. The price year was 2002.

Analysis of uncertainty:
Some key model inputs were varied in a deterministic one-way sensitivity analysis, using plausible ranges of values. Best- and worst-case scenarios were also considered. Programme efficacy, mortality estimates, and programme costs were varied in a three-way sensitivity analysis.

Results
In a hypothetical cohort of 100,000 low-income children, the programme prevented 17 deaths, saved 564 LYs, and prevented 400 injuries (81 consequential injuries and 319 minor injuries).

Assuming an eight-year programme, this reduced societal costs by $3,841,000 annually ($1,022,000 in medical costs, $94,000 in parental work losses, and $2,726,000 in future productivity costs). However, the programme became cost-saving per death averted or LY saved from a societal perspective six years after implementation.

From the societal perspective, after eight years, the programme was dominant (i.e. less expensive and more effective). From the Medicaid perspective, the incremental cost per death averted was $561,534 and the incremental cost per LY gained was $16,928.

The sensitivity analysis showed that these findings were quite robust to variation in the key model parameters and, in most cases, the incremental cost per LY gained remained below $50,000. For example, when varying the programme efficacy from 1% to 100% (24% in the base case), the incremental cost per LY varied between $3,100 and $23,000 from the Medicaid perspective and from cost-saving to $23,000 from the societal perspective.

Authors' conclusions
The authors concluded that the cost-effectiveness of a Medicaid-funded CRS disbursement and education programme in low-income children was comparable to that of federal vaccination programmes targeted at similar populations.

CRD commentary
Interventions:
The selection of the comparator was appropriate because it represented the actual pattern of care in the authors’ setting.

Effectiveness/benefits:
A selective approach for identifying the relevant sources of data was justified given that the authors used valid databases to derive the clinical inputs for the model. The key details of the methodology used to gather information in the primary databases, and of the approaches used to extract the data and adapt them to the model, were provided. In general, the sources of evidence appear to have been appropriate. The impact of the interventions on patients’ health was assessed using validated benefit measures, which allow comparisons to be made with the benefits of other health care interventions.

Costs:
The two perspectives were appropriate for decision makers, who might be interested in different types of costs. Total costs were reported for macro-categories and the unit costs and resource quantities were not reported. This was because most of the economic data were derived from published studies. The methodologies of these studies were not described. In general, the economic analysis appears to have been valid. The price year and the use of discounting were reported, and the key cost estimates were varied in the sensitivity analysis.

Analysis and results:
The analysis was carried out using valid methodology and the findings were presented clearly. The costs and benefits were synthesised in an incremental analysis. The analysis of uncertainty considered the individual model inputs, but a more comprehensive approach would have been more appropriate. The analysis highlighted the most influential model inputs. The results were compared with those of other preventive measures for children (vaccines), which showed comparable findings. The authors stated that their results might have been conservative as not all the benefits associated with the programme were considered. For example, the disutility associated with minor or major injuries was not estimated.

**Concluding remarks:**
The study was based on valid methodology and was generally well reported. The authors’ conclusions are valid.

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