An ABCD program to increase access to dental care for children enrolled in Medicaid in a rural county

Kaakko T, Skaret E, Getz T, Hujoel P, Grembowski D, Moore C S, Milgrom P

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.

Health technology
The implementation of an Access to Baby and Child Dentistry (ABCD) programme, focusing mainly on the provision of early intervention by dentists in private practice to prevent and control major dental problems. The four components initially developed were outreach, training and certification of dental professionals, enhanced dental benefits, and enhanced dental fees. Enrolled children were covered for three fluoride varnish treatments per year, fluoride-releasing glass ionomer materials used as sealants and fillings in primary teeth, and family preventive, oral health instruction once per year.

Type of intervention
Primary prevention, secondary prevention and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised children aged 1 to 4 years old, from low-income families. Children were excluded if their families had never used Medicaid benefits or they were not currently residents of the town.

Setting
The setting was secondary care. The economic study was performed in Stevens County, Washington, USA.

Dates to which data relate
The effectiveness data appear to have been collected between 1 February 1997 and 31 May 1999. The cost data were collected between 1 February 1997 and 31 July 1999, although the authors only considered cost data until 31 May 1999. The price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was carried out on the same sample population as that used in the effectiveness analysis. It was unclear whether the costing was performed prospectively or retrospectively.

Study sample
No power calculations to determine the sample size were reported in the planning phase of the study, in order to assure
a certain power. All children listed in Medicaid files in February 1997, who were born between 1 January 1993 and 31 December 1996, were considered. Among 955 children selected, 525 (55%) had working telephone numbers. Among the families of these children, 67 refused to participate and 21 could not be contacted. In total, 438 families consented to participate and their children were finally considered for the effectiveness analysis. Eighty children were considered ineligible. In total, 216 children in the ABCD programme, and 221 children in the Medicaid dental programme, were included in the final study sample.

Study design
The study design was a multi-centred, randomised controlled trial. The unit of randomisation was the family (so that children from the same family were assigned to the same dental programme). A random number function was used to allocate children between the groups. The duration of follow-up was approximately 2 years (after the implementation of the programme), plus 5 months before the programme (to show there were no differences in utilisation between the groups before the programme started). Two periods were considered at analysis. The first was between 1 February 1997 and 31 January 1998, while the second was from 1 February 1998 to 31 May 1999.

Analysis of effectiveness
The basis for the effectiveness analysis was intention to treat. The primary health outcomes assessed in the effectiveness analysis were:

- the utilisation rates, in terms of the percentage of children that had at least one dental claim, by time period and group assignment, and by year of birth and group assignment;
- the percentage of children in both groups who had visited the dentist more than once;
- the percentage of children who received at least one fluoride treatment, and the percentage of them that received this treatment more than once;
- the percentage of children who received family oral health education at least once, and more than once.

The authors also assessed oral health, in terms of the percentage of children who were caries free and the percentage of them presenting teeth with initial caries. Two periods were considered at analysis. The first was from 1 February 1997 to 31 January 1998, while the second was from 1 February 1998 to 31 May 1999. Only 276 children could be examined after 2 years in order to assess the oral health. Of these, 123 were from the ABCD group and 153 from the standard Medicaid group. The authors reported that the utilisation rates before the programme started, were similar between groups.

Effectiveness results
Among the children born between 1 February 1997 and 31 January 1998, 34% in the ABCD group and 24.7% in the standard Medicaid dental group had at least one dental claim, (p=0.03). Among the children born between February 1 1998 and May 31 1999, there were 35.4% receiving the ABCD programme who had at least one dental claim during the study period, versus 35.6% for the standard Medicaid group, (p=0.52).

When the year of birth was considered, the number (and percentage) of children who used any dental service between 1 February 1997 and 31 May 1999, were:

- for those children born in 1996, 19 (35.8%) in the ABCD group versus 12 (19.7%) in the standard Medicaid managed group, (p=0.05);
- for those children born in 1995, 15 (35.7%) in the ABCD group versus 23 (37.7%) in the standard Medicaid managed group, (p=0.83);
- for those children born in 1994, 27 (54.0%) in the ABCD group versus 28 (60.9%) in the standard Medicaid managed group, (p=0.49);
for those children born in 1993, 42 (62.7%) in the ABCD group versus 33 (64.7%) in the standard Medicaid managed group, (p=0.82); and

for children born between 1993 and 1996, 103 (48.6%) in the ABCD group versus 96 (43.8%) in the standard Medicaid managed group, (p=0.33).

During the first period, the percentage of children who had visited the dentist more than once, among those who had at least one visit, was 3.3% (70 out of 212) in the ABCD group and 21.5% (47 out of 219) in the standard Medicaid managed group, (p=0.01). There were no significant differences during the second period.

In total, 43% of children in the ABCD group received at least one fluoride treatment, and 22% of them received more than one fluoride treatment. During the first period, 36% of children in the ABCD group received at least one fluoride treatment. This percentage was significantly higher than the percentage of children receiving at least one fluoride treatment in the standard Medicaid managed group, (21%), (p=0.01). During the second period, there were no statistically significant differences.

In the ABCD group, 39% of children received family oral health education at least once, and 20% of them received it more than once.

In terms of oral health, 34.1% (n=94) of children in the ABCD group were free of caries in the dentine, compared with 39.9% (n=110) in the standard Medicaid programme, (p=0.39).

The percentage of children who were free of caries in the enamel was 23.6% (n=65) in the ABCD group and 24.6% (n=68) in the standard Medicaid programme, (p=0.17).

There were statistically significantly fewer teeth with initial caries in the ABCD group (mean = 1.09; standard deviation = 1.7) in comparison with the standard Medicaid managed group (mean = 1.59; standard deviation = 2.1), (p=0.03).

**Clinical conclusions**

There were differences in the utilisation rates during the first period for the youngest cohort of patients. However, utilisation in the second year remained at the level of the first year for ABCD children, eliminating the differences in utilisation between the groups. There were no significant differences in the oral health of children under the ABCD or the standard Medicaid programmes in terms of the percentage of children free of caries, although children under the ABCD programme presented less teeth with caries than those under the standard Medicaid programme.

**Measure of benefits used in the economic analysis**

The authors used the difference existing between the ABCD and standard Medicaid managed group in terms of the teeth with initial caries as the measure of benefit. The justification given for this choice was that it was a health outcome that presented statistically significant differences between both groups of children.

**Direct costs**

The resource quantities and the costs were not reported separately. The authors did not report in detail the direct costs that they considered at analysis. Some of the direct costs included were the training and outreach costs per child, which were $5.76 (training) and $15.72 (outreach), respectively, for the ABCD programme. The authors reported the annual dental care expenditures per child for both the ABCD and Medicaid groups. The Medicaid claims were used as a source of the resource utilisation and costs. It appears that discounting was not performed, although the study period was approximately 2 years which makes discounting unnecessary. The price year was not reported.

**Statistical analysis of costs**

The authors stated that chi-squared tests and a one-way analysis of the variance were performed.
Indirect Costs
No indirect costs were reported.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was reported.

Estimated benefits used in the economic analysis
The authors reported a benefit of 0.5, in terms of the teeth saved from initial caries, favouring children under the ABCD programme (see 'Effectiveness Results' section).

Cost results
During the first period, the annual dental care expenditure was $67.32 for ABCD children and $52.44 for standard Medicaid children, \( p=0.35 \). Expenditures for preventive dental services were greater for the ABCD group ($18.37) than for the Medicaid group ($11.38), \( p=0.05 \).

The mean dental care expenditure per child for the 29 months considered in the analysis (including the 5 months of baseline analysis) was $181.41 in the ABCD programme and $192.50 in the standard Medicaid programme.

Synthesis of costs and benefits
The authors reported that, for every health outcome that was statistically significant, the difference between the average expenditures for the two groups was divided by the difference in the average outcomes in the two groups, to obtain the average cost of an additional unit of benefit from the intervention. The cost per unit of benefit (considering the difference of 0.5 in the teeth with initial caries between both ABCD and standard Medicaid groups as the summary measure of health benefit) was $31.44.

Authors' conclusions
Children enrolled in the Access to Baby and Child Dentistry (ABCD) programme presented higher utilisation rates during the first year of the study, with a higher number of claims for preventive services, compared to children enrolled in the standard Medicaid programme. During the second year, the differences in utilisation disappeared, maintaining a level of utilisation equal to that of the ABCD children during the first period. The overall average cost of care was not significantly different for the two groups, even when the expenditure for preventive services was higher in the ABCD group.

CRD COMMENTARY - Selection of comparators
The comparator used was justified on the grounds that it was the current practice in the authors' setting. You should consider whether the health technology of your own setting is similar to the regular Medicaid dental care programme used in the study.

Validity of estimate of measure of effectiveness
The analysis used a randomised controlled trial, which seems to have been appropriate for the study question. The study sample is likely to have been representative of the study population. The study attempted to consider all the children from a rural town, but not all of the families could be contacted and, among those contacted, not all of them agreed to participate. Therefore, there may have been some degree of selection bias. The patient groups were shown to have been comparable at analysis in terms of the utilisation rates before the ABCD programme was implemented, but not in terms...
of factors such as age and gender.

**Validity of estimate of measure of benefit**
The estimation of benefits was obtained directly from the effectiveness analysis. This choice of estimate was justified because it was a health outcome that was significantly different between the groups. This measure appeared to reflect the relevant consequences of the analysis, since the authors reported that one of the objectives of the programme was to reduce the proportion of children aged 2 to 4 years with dental caries experience.

**Validity of estimate of costs**
The reporting of the costs was rather brief and, therefore, it is difficult to determine whether all the categories relevant to the perspective adopted were included in the analysis. The resource quantities were not reported separately from the costs, thus introducing uncertainty into the reliability of the conclusions. The price year was not given, hindering reflation exercises to other settings. Discounting was not performed. However, it was unclear whether it was relevant since the study considered 29 months of follow-up, although the first 5 months were considered as an initial period before the implementation of the ABCD programme.

**Other issues**
The authors made appropriate comparisons of their findings with those from other studies. There were similar findings in terms of higher utilisation for children under the ABCD programme compared with children under the standard Medicaid programme. It was reported that a higher percentage of children in the standard Medicaid programme were found to visit the dentist at least once. The authors did not address the issue of generalisability, although it should be noted that the study population (children of low-income families) and the setting in which the study was performed (a rural town) may have influenced the results obtained.

**Implications of the study**
The authors highlight the fact that many parents may have been unaware of the benefits to which their children were entitled, and therefore, the utilisation rates were not as high as expected. Moreover, most of them may respond only to emergency conditions. Therefore, the authors emphasise that more efforts should be put into preventive visits by outreach workers in order to achieve one of the stated aims of Healthy People 2020 (to reduce the proportion of children aged 2 to 4 years with dental caries experience to no more than 11%).

**Source of funding**
Supported in part by the National Institute of Dental and Craniofacial Research, NIH, grant numbers #R01 DE0982 and #P30 DE09743 (RCDRC).

**Bibliographic details**

**PubMedID**
14700089

**Other publications of related interest**


Indexing Status
Subject indexing assigned by NLM

MeSH
Child, Preschool; Cohort Studies; DMF Index; Dental Care for Children /economics /utilization; Health Expenditures; Health Promotion; Health Services Accessibility; Health Services Needs and Demand; Health Status; Humans; Infant; Insurance Benefits; Insurance Claim Reporting; Medicaid /economics; Oral Health; Poverty; Preventive Dentistry /economics; Rural Health Services /economics /utilization; United States; Washington

AccessionNumber
22002002033

Date bibliographic record published
31/07/2003

Date abstract record published
31/07/2003