An economic analysis of implementing the SIGN third molar guideline: implications for the design and analysis of implementation studies

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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.

Health technology
The implementation of the third molar guideline published by the Scottish Intercollegiate Guideline Network (SIGN) in 2000 was examined. Four implementation strategies were evaluated. In the first strategy (group 1), general dental practitioners (GDPs) were exposed to postgraduate and continuing education (PGCE) courses only. Group 2 GDPs were exposed to PGCE courses plus audit and feedback. Group 3 GDPs were exposed to PGCE courses plus additional guidance through a specifically designed computer-aided learning and decision support package. Group 4 GDPs were exposed to PGCE courses, participated in audit and feedback sessions, and received computer-assisted learning and decision support backup.

Type of intervention
Treatment and management.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with third molar.

Setting
The setting of the study is likely to have been primary care. The economic study was carried out in Scotland, UK.

Dates to which data relate
The effectiveness and resource use data appear to have been collected during the study, but the authors did not explicitly report the date of the study. The price year was 2000.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample as that used in the effectiveness study.

Study sample
A total of 11,600 third molar patients were included in the study. The number of patients was the product of the number of dentists in Scotland, which was assumed to be 2,000, and the expected number of patients per dentist. Fifty-one volunteer practices were randomly allocated to the four groups. Twelve practices were in group 1, and 13 were in
each of the other three groups.

**Study design**
The study was a randomised controlled clinical trial that was carried out in multiple centres. The GDPs were randomised into four groups. A detailed description of the trial was given elsewhere (Bahrami et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details).

**Analysis of effectiveness**
The basis for the analysis of effectiveness (intention to treat or treatment completers only) was not reported. The primary health outcomes were the probability that the GDP provided EBP for each patient, as assessed by two independent clinicians.

**Effectiveness results**
The patients were divided into two types, the average-signal type and the low-signal type. The authors graphically reported the probabilities of EBP for both type, before and after the intervention.

For the "average-signal" type of patient, the no implementation group generated significant improvements in EBP at a 5% level. For the "low-signal" type of patient, groups 1, 2 and 3 generated significant improvements in EBP at the 5% level.

**Clinical conclusions**
The effectiveness of the guideline depended upon the type of patient treated.

**Modelling**
A regression model was built to estimate the probability of EBP. The regression model was used because it was able to capture the hypothesis that patient type had an impact on the effects of the guideline. Another regression model was used to estimate the case-mix adjusted costs per patient for "average signal" type.

**Measure of benefits used in the economic analysis**
The measure of benefit used was the increase in the number of patients receiving EBP (or the increased probability of receiving EBP).

**Direct costs**
The perspective of a purchaser of dental services was adopted in the economic evaluation. The costs at the intervention level included those of SIGN development and management, and those for each intervention. The costs of development and intervention comprised the opportunity costs of labour and leisure time. The cost data came from the records of the treatment of third molar patients submitted by recruited GDPs, plus the menu of reimbursed National Health Service dental treatments in the Statement of Dental Remuneration. A regression model was conducted to control for case-mix differences between the groups and for the correlation of costs between practices. At the implementation group level, a formula that considered intervention-specific, dentist-specific and patient-specific costs was used to calculate the cost per patient. The unit costs were not presented separately from the quantities of resources used, but the authors stated that a detailed costing was available. Discounting was not performed as it was irrelevant with the short time horizon. The price year was 2000.

**Statistical analysis of costs**
A statistical analysis of the costs was not performed.
Indirect Costs
The author did not explicitly report the indirect costs.

Currency
UK pounds sterling (€).

Sensitivity analysis
A one-way sensitivity analysis was performed to illustrate the importance of considering patient type in the economic analysis. The proportion of low-signal patients was varied.

Estimated benefits used in the economic analysis
Five hundred and sixty more low-signal patients received EBP after the intervention in group 1, and 602 received it in group 3. The results of groups 1 and 2 were not reported because both groups were strictly dominated by group 1.

Cost results
For average-signal types, the case-mix adjusted average costs per patient were:

- 135.96 for group 1, 83.56 for group 2, 88.34 for group 3 and 124.17 for group 4 before intervention; and
- 142.87 for group 1, 195.02 for group 2, 140.60 for group 3 and 180.03 for group 4 after intervention.

The differences before and after the intervention were 6.91 for group 1, 111.46 for group 2, 52.26 for group 3 and 55.86 for group 4.

Synthesis of costs and benefits
The policy cost-effectiveness (PCE) ratio for groups 1 and 3 was 12,525 per additional patient.

The sensitivity analysis indicated that the PCE ratio decreased as the proportion of low-signal patients increased, but the ratio was over 7,000 per additional patient.

Authors' conclusions
The type of patients presenting for treatment could influence the effectiveness and cost-effectiveness and, therefore, policy conclusions.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. The implementation strategies represented usual interventions in the authors' setting. You should verify whether these health technologies are relevant to your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data were derived from a randomised controlled trial in which GDPs were randomly allocated to four groups. The patients were not randomised. This study design was appropriate to investigate the influence of the guideline. The authors stated that the details of the trial had been reported elsewhere (Bahrami et al. 2004).

Validity of estimate of measure of benefit
The increase in the number of patients receiving EBP was used appropriately as the summary benefit measure. The
estimate of benefit was derived from a regression model, which was appropriate for capturing the impact of patient type on the effect of the guideline. The benefit measure was specific to the intervention and, therefore, cannot be compared with other health care programmes.

Validity of estimate of costs
The authors explicitly stated the perspective adopted in the study. It appears that all the relevant categories of costs have been included in the analysis. In addition, the authors conducted a regression model to control for case-mix difference between the groups and for the correlation of costs between practices. The costs and the quantities of resources used were not reported separately, thus limiting the reproducibility of the study in other settings, although the price year was reported. The costs were treated deterministically. Discounting was not performed as it was irrelevant.

Other issues
The authors compared their findings with those from other studies. The issue of the generalisability of the results to other settings was not addressed. The authors’ conclusions reflected the scope of the analysis. The results do not appear to have been presented selectively.

Implications of the study
The study results suggested that the appropriate use of formal interaction tests may be a more efficient solution to estimating the impact of a clinical guideline. The results also suggested that subsidies for cost-effective treatments may be better targeted towards providers than towards patients.

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Other publications of related interest


Chalkley M, Tilley C. Treatment intensity and provider remuneration: dentists in the British NHS. Dundee Discussion

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