Pharmacoeconomic analysis of smoking-cessation interventions
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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
Smoking cessation interventions.

Type of intervention
Treatment; prevention.

Economic study type
Cost-benefit analysis.

Study population
Adult smokers who are in full time work.

Setting
Community. The economic study was carried out in Philadelphia, USA.

Dates to which data relate
The effectiveness data were obtained from 3 studies published from 1990 to 1995 (two meta-analyses and one national survey). Cost data were retrieved from 3 studies published between 1981 and 1985. Additional costs were obtained from a telephone survey (no date given) and from national prescription data (Jan-Mar 1994). Costs were inflated to 1994 prices.

Source of effectiveness data
Effectiveness data were derived from a review of previously completed studies.

Modelling
A decision tree model was used to estimate the costs and benefits of the different interventions.

Outcomes assessed in the review
Outcomes assessed in the review were quit rates resulting from smoking cessation programmes after 6 months.

Study designs and other criteria for inclusion in the review
No inclusion criteria were explicitly stated.

Sources searched to identify primary studies
No details of any literature search to identify studies for the paper were provided.

Criteria used to ensure the validity of primary studies
Not stated.

Number of primary studies included
Three studies provided effectiveness data (2 meta-analyses and 1 national survey). One of the meta-analyses, which examined the efficacy of nicotine patches, was published in 1994. The second meta-analysis, examining various methods of smoking cessation, was published in 1992. A national survey of the effectiveness of a nicotine patch, with pharmacists' smoking-cessation consultation in the practice setting, published in 1995 also provided effectiveness data.

Methods of combining primary studies
Primary studies were not combined for this paper: the 2 existing meta-analyses and one primary study were used to provide effectiveness data for different smoking cessation interventions.

Investigation of differences between primary studies
Not stated.

Results of the review
The meta-analysis of various smoking cessation methods gave the following results (number of studies combined, quit rates & 80% confidence intervals):

Self care (24 studies) 15% (80% CI: 3% - 27%);
Five day behavioural programme (25 studies) 26% (80% CI: 14% - 38%);
Group withdrawal clinic (46 studies) 30% (80% CI: 15% - 45%);

The meta-analysis of nicotine patch studies gave the following results (number of studies combined, quit rates and 95% confidence intervals):

Nicotine patch and weekly group counselling (4 studies) 26% (95% CI: 22% - 31%);
Nicotine patch and weekly individual counselling (7 studies) 20% (95% CI: 18% - 23%);

The national survey of nicotine patch use gave the following results (quit rates and 95% confidence intervals):

Nicotine patch and minimal/no counselling 15% (95% CI: 11% - 17%);
Nicotine patch and pharmacist consultation 31% (no CI given);
Nicotine patch with pharmacist consultation and comprehensive behavioural programme 44% (no CI given).

Measure of benefits used in the economic analysis
The measure of benefits used in the economic analysis was the monetary benefit to employers resulting from the various quit rates.

Direct costs
The costs of the smoking cessation interventions were estimated. Costs were not discounted. As well as costs for the
specific programmes, the costs of nicotine patches and the average number of weeks of treatment required were estimated. Costs for the smoking cessation programmes were derived from telephone interviews with organisations offering such programmes (year not given). The average cost of nicotine patches was determined from analysis of national prescription cost data (Jan-Mar 1994). The costs of writing prescriptions for patches were not included as the authors felt that the prescription would be a secondary treatment. The average length of treatment with nicotine patches was assumed to be 5 weeks (based on the national survey used to provide effectiveness data). The method of estimating the costs of individual and group counselling sessions and pharmacist counselling was not provided.

**Indirect Costs**

The monetary benefit to the employer of a non-smoking employee was based on a 1983 study (costs were adjusted to 1994 prices). Specifically these costs included reduced insurance costs, reduced risk of liability for employee exposure to second-hand smoke, increased productivity and decreased incidence of smoking-related illnesses and sick days. Patient costs were not included in the analysis.

**Currency**

US dollars ($).

**Sensitivity analysis**

One way sensitivity analysis was performed to measure the effect of treatment costs on the net benefit to employers. Specifically the analysis was conducted on the cost of a visit to prescriber (0 to $75), cost of nicotine patch treatment ($100 to $200), cost of smoking cessation behavioural programmes (0 to $250) and the costs of pharmacist smoking cessation consultations ($50 to $150). Additionally sensitivity analysis also examined quit rates for nicotine patches with pharmacist consultation (0 to 60%) and the level of net resource savings to employers (0 to $4000).

**Estimated benefits used in the economic analysis**

The estimated benefits were the net benefit to the employer per employee who stops smoking.

**Cost results**

The costs of the smoking cessation programmes were estimated as follows:

- Self care $26 (mean of three programmes);
- Five day behavioural programme or group withdrawal clinic $148 (mean of 6 programmes);
- Nicotine patches and weekly counselling $276;
- Nicotine patch and weekly individual counselling $203;
- Nicotine patch and no or minimal counselling $128;
- Nicotine patch and pharmacist consultations $203; and
- Nicotine patch, pharmacist consultations and comprehensive behavioural programme $351.

The annual net costs to an employer for an employee who smokes were estimated to be $1,483. Specifically these costs were (1) absenteeism $173, (2) medical care $716, (3) workers' compensation or accidental injury $235 and (4) lost productivity $359.

**Synthesis of costs and benefits**

The value of each programme was determined in terms of the benefit to the employer per employee who quits smoking.
The nicotine patch with pharmacist's smoking cessation consultation and patient participation in a formal smoking cessation programme was found to be the most cost-effective option in the baseline analysis. The cost of the programme was $351 with a $302 net benefit to the employer for the first year that the employee does not smoke and $1,483 for every year thereafter. The annual benefit to the employer in the years following treatment were the same for each intervention (i.e. $1,483).

The costs and net benefits in year 1 of the other interventions were as follows.

Self help: cost $26; net benefit $196;

Five day behavioural programme: cost $148; net benefit $267;

Nicotine patch/minimal counselling: cost $128, net benefit $94;

Nicotine patch/group counselling: cost $203; net benefit $183;

Nicotine patch/individual counselling: cost $203; net benefit $94;

Nicotine patch/pharmacists' consultation: cost $203; net benefit $257.

The sensitivity analysis determined that the nicotine patch with pharmacists' smoking cessation consultation and patient participation in a formal smoking cessation programme remained the most cost-beneficial option at pharmacist consultation fees of up to $109 and behavioural smoking cessation programme costs of up to $193. All other things being equal, the nicotine patch with pharmacists' smoking cessation consultation alone was the most cost beneficial option at quit rate of over 34%. As the net benefit to the employer decreases the less expensive smoking cessation interventions become the preferred options.

Authors' conclusions
A smoking cessation programme consisting of nicotine patches, pharmacists' consultations and comprehensive behavioural therapy is most cost-beneficial to employers.

CRD Commentary
Selection of comparators.

The choice of comparators for the study seem appropriate as the interventions compared were taken from 2 meta-analyses of smoking cessation studies, in addition to a primary study, although further detail regarding these studies would have been desirable.

Validity of estimate of measure of benefit.

The estimates of benefits used in the model were based on 2 meta-analyses and 1 primary study. It is not clear how valid these estimates are, as no information regarding how these studies were identified or evaluated was provided in the paper. Furthermore, very little detail was provided regarding the methodologies used in the studies themselves, especially the meta-analyses. In addition, there was no discussion of the problems and potential bias introduced when using different studies to estimate the effectiveness of different interventions and then combining them together in a single model.

Validity of estimate of costs.

The cost estimates used in the model do not appear to be valid or adequate. A wide variety of sources were used to provide costs including previous cost studies. No detail regarding the methods used in these studies was provided and the reader has no feel for how accurate they may be. In addition little detail is provided regarding the primary cost estimation that was conducted for the model.
Other issues.

Methodological flaws in the study make it difficult to draw any strong conclusions regarding which smoking cessation intervention is the most effective or cost beneficial. Only one-way sensitivity analyses were used and no incremental analysis appears to have been conducted. No generalisability issues were addressed, but it is unlikely that these results could be generalised in any way.

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