Cost-benefit analysis of sustained-release bupropion, nicotine patch, or both for smoking cessation

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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
Sustained-release bupropion, nicotine patch, or both for smoking cessation.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of smokers who were enrolled on a smoking cessation programme, the details of which were reported in a study published in 1999.

Setting
The study setting was community. The economic study was carried out in the USA.

Dates to which data relate
The indirect cost data, in terms of savings to the employer, and the effectiveness data were taken from a study published in 1999. The price data for the drugs were taken from a source published in 1998. The price year was 1998.

Source of effectiveness data
The effectiveness data were derived from one clinical efficacy study.

Modelling
A decision-tree analysis was used to determine the effect of the four treatment strategies on the costs to the employer.

Outcomes assessed in the review
The review assessed quit rates by point prevalence of abstinence at 6 and 12 months.

Study designs and other criteria for inclusion in the review
Details of the study designs and inclusion criteria were not provided, although effectiveness estimates were taken from a double-blind, placebo-controlled trial.
Sources searched to identify primary studies
Not stated.

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

Methods used to judge relevance and validity, and for extracting data
Summary statistics from individual studies were used.

Number of primary studies included
One primary study was included.

Methods of combining primary studies
Not applicable.

Investigation of differences between primary studies
Not stated.

Results of the review
The quit rates were 15.6% for placebo, 16.4% for NTP, 30.3% for bupropion, and 35.5% for the bupropion-NTP combination.

Measure of benefits used in the economic analysis
The measure of benefit was quit rate.

Direct costs
The direct costs were not discounted since the time horizon was less than one year. Drugs costs were reported; the quantities and average wholesale price (AWP) were reported separately. In addition, the cost to the employer of the health care provider visit, namely $0 to $75, was taken into consideration. The quantity/cost boundary adopted was that of the employer. The estimation of quantities and costs was based on the clinical efficacy trial. The price year was 1998. The cost figures were adjusted to 1998 using the Consumer Price Index general inflation rate.

Statistical analysis of costs
The authors reported mean drug costs.

Indirect Costs
The savings to the employer were estimated, based on the model of McGhan and Smith (see Other Publications of Related Interest). They were reported, not as a cost, but as savings per successful quitter, i.e. a cost-effectiveness ratio. They were deemed to originate from a reduction in absenteeism, medical care, workers' compensation costs and lost productivity. The cost of lost work time due to health care provider visits was also considered. This varied from $0 in the base-case scenario to $50, i.e. twice the cost of a 2-hour visit at $12.50/hour, which was just over the median hourly wage across all jobs in 1997 according to the Bureau of Labor Statistics. The price year was 1994. This was adapted to 1998 by adjusting to 1997 using the Consumer Price Index, then adding an estimate of 3% for 1998.
Currency
US dollars ($).

Sensitivity analysis
One-way sensitivity analyses were conducted on:

- drug costs, varied from the AWP by plus or minus 25%;
- quit rates, varied over the 95% confidence interval (CI) range;
- the cost of lost time from work to visit a health care provider;
- the cost of the health care provider visit; and
- the savings to the employer, varied from $0 to the base-case assumption of $1,654.

Estimated benefits used in the economic analysis
See results reported previously.

Cost results
The drug costs amounted to $0 for placebo, $245.22 for NTP, $163.49 for bupropion, and $408.71 for the bupropion-NTP combination. The net savings per employee who attempted to quit in the first post-quit year was $258 for placebo, $26 for NTP, $338 for bupropion, and $178 for the bupropion-NTP combination. If the quit rate was above 20.4% for the placebo arm, or less than 25.5% for the bupropion arm, the placebo would be more cost-saving than bupropion.

Synthesis of costs and benefits
The base-case value of savings per successful quitter was $1,483. If the savings to the employer were less than $1,112 per successful quitter, the placebo would be more cost-beneficial than any of the active treatment arms.

Authors' conclusions
From an employer's perspective, 300 mg/day bupropion for 9 weeks is a more cost-beneficial smoking cessation intervention than the NTP. Bupropion is also more cost-beneficial than placebo under most scenarios.

CRD COMMENTARY - Selection of comparators
No justification was given for the comparator used. Bupropion was chosen as the only non-nicotine-containing pharmacological intervention. You, as a user of the database, should decide if these health technologies are relevant to your setting.

Validity of estimate of measure of effectiveness
There was no evidence that the authors undertook a literature review to derive effectiveness estimates and only one study was used. The validity of the results was enhanced by sensitivity analyses to account for variability in the estimates. No p-values were reported.

Validity of estimate of measure of benefit
See comments on measure of effectiveness. The analysis would have been improved by a measure of the impact on quality of life or individual preferences for quitting.
Validity of estimate of costs
The drug quantities were reported separately from prices, which enhanced the generalisability to other settings. The inclusion of other resources, for example staff time, would have been appropriate, and the source of the cost of the health care provider visits was not reported. The price year was reported. The costs associated with adverse events were not considered, and it may have been inappropriate to assume the time costs were zero in the base-case. The validity of cost results was enhanced by appropriate sensitivity analyses and, although these seemed quite arbitrary, it should be feasible to apply prices relevant to one's own setting.

Other issues
The authors made appropriate comparisons of their findings with those from other studies and addressed the issue of generalisability to other settings. The authors did not present their results selectively. The study considered participants enrolled on a smoking cessation programme, although no details were provided of the participant characteristics in the efficacy study. The authors noted that the quit rates used in the study may be overestimated, compared with those obtained in real-life settings. The model did not consider would-be quitters who attempt, unsuccessfully, to quit smoking several times before ultimately succeeding. The authors also alluded to their use of point-prevalence abstinence rates rather than continuous abstinence rates. The model did not predict benefits beyond the short-term horizon of one year.

Implications of the study
The authors note that, from an employer's perspective, 300 mg/day bupropion for 9 weeks is a more cost-beneficial smoking cessation intervention than the NTP, and under most scenarios, bupropion is also more cost-beneficial than placebo. In reality, "cost-benefit" meant cost-saving, given that the health impact was not converted into a monetary amount. This is therefore, not a cost-benefit study. With the given data it would have been more useful had the authors conducted an incremental analysis of the increase in total costs, i.e. net savings, associated with an increase in quit rate when moving from one technology to another, for example NTP to bupropion. From a wider perspective, for example from that of the National Health Service, the health impact would require valuation. Thus, a cost increase might be considered acceptable.

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Other publications of related interest

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MeSH
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