Cost effectiveness of interventions to reduce relapse to smoking following 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.

CRD summary
The objective was to estimate the cost-effectiveness of three interventions for preventing relapse to smoking in abstinent smokers. The authors concluded that bupropion, nicotine replacement therapy, and varenicline appeared to be cost-effective at preventing relapse to smoking in newly abstinent smokers. The methods were appropriate and were relatively well reported. Given the scope of the analysis, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to estimate the cost-effectiveness of three interventions for preventing relapse to smoking in abstinent smokers.

Interventions
The three interventions were nicotine replacement therapy, bupropion, and varenicline. These were compared with no drug therapy.

Location/setting
UK/primary care.

Methods
Analytical approach:
A cohort simulation was used to estimate the cost-effectiveness of each strategy. A lifetime horizon, with six-month cycles, was considered and the authors reported that a health service provider (UK NHS) perspective was adopted.

Effectiveness data:
The effectiveness data were from a variety of sources. The efficacies, measured by abstinence rates at zero, six, and 12 months, with each of the three treatments were the key model inputs. These values were from a systematic review that identified four trials for bupropion and nicotine replacement therapy, and one trial for varenicline. Mortality was from UK Life Tables and a health survey. The prevalence of smoking-related morbidities was from various published studies.

Monetary benefit and utility valuations:
The utility values for five major smoking-related morbidities (lung cancer, stroke, coronary heart disease, myocardial infarction, and chronic obstructive pulmonary disease) and for no comorbidities were from a variety of published studies.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary measure of benefit and they were discounted at an annual rate of 3.5%.

Cost data:
The economic analysis included drug costs and smoking-related morbidity costs. The drug costs were from the British National Formulary, and the average annual morbidity costs were from a variety of published sources. The price year was 2008 and all costs were reported in UK £. They were discounted at an annual rate of 3.5%.
Analysis of uncertainty:
A one-way sensitivity analysis was carried out, varying the key model inputs including the cost and efficacy estimates.

Results
Compared with no intervention, bupropion provided an additional 0.07 QALYs and was £68 cheaper. Bupropion dominated no intervention, as it was less costly and more effective.

Nicotine replacement therapy provided an additional 0.04 QALYs and cost an additional £12; its incremental cost-effectiveness ratio was £265 per QALY gained. Varenicline provided an additional 0.04 QALYs and cost an additional £90; its ICER over no intervention was £2,106 per QALY gained.

In general, the results were robust to changes in the model estimates. The cost-effectiveness ratios exceeded £20,000 per QALY gained when the drug treatment effects were assumed to last no longer than one year, and at the lower 10% limit of observed effectiveness for varenicline or nicotine replacement therapy.

Authors’ conclusions
The authors concluded that bupropion, nicotine replacement therapy, and varenicline appeared to be cost-effective at preventing relapse to smoking in newly abstinent smokers.

CRD commentary
Interventions:
The three interventions were clearly described and relevant; a systematic review had found that they might be effective in reducing relapse to smoking. It was unclear whether other relevant interventions could have been included.

Effectiveness/benefits:
No systematic literature review was reported to identify the relevant sources of evidence, but the sources seem to have been appropriate. For instance, the efficacy of the interventions was from a published systematic review of trials, which should have provided valid evidence. QALYs were an appropriate outcome measure, capturing the impact of the intervention on both quality and length of life and allowing comparisons with other diseases. The authors reported that the data sources and the methods used to combine data from these sources were described in detail in another publication (Coleman, et al. 2010, see ‘Other Publications of Related Interest’ below for bibliographic details).

Costs:
The perspective was stated and the relevant costs appear to have been included. The sources for the cost data were reported and were appropriate for the UK. The smoking-related morbidity costs were reported as category totals rather than as individual cost items, reducing the transparency of the analysis. Other details, such as the price year and discount rate, were reported.

Analysis and results:
The model structure was described and a Markov model appears to have been used, but this was not explicitly reported. An incremental analysis was conducted, comparing each intervention with no intervention, rather than with each other, making it impossible to identify the preferred strategy. One-way sensitivity analyses were conducted to assess which parameters had the greatest impact on the results. These go some way towards evaluating uncertainty, but a probabilistic sensitivity analysis could have more thoroughly investigated the overall model uncertainty. The authors acknowledged some limitations to their analysis and these mainly related to a lack of relevant data.

Concluding remarks:
The methods were appropriate and were relatively well reported. Given the scope of the analysis, the authors’ conclusions appear to be appropriate.

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