Cost-effectiveness analysis of a complementary health intervention: the case of smoking relapse prevention

Chirikos T N, Herzog T A, Meade C D, Webb M S, Brandon T H

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
Several smoking relapse prevention strategies, complementary to smoking cessation therapies, were examined. The strategies were:

- repeated mailings condition (high contact/high content), in which participants received a series of eight booklets distributed over the course of a year;
- massed mailings condition (low contact/high content), in which participants received all eight booklets at once;
- repeated letters condition, in which participants received a single booklet (equivalent to the first in the series of eight), followed by seven brief supportive letters distributed throughout the year; and
- minimal contact comparison condition, in which participants simply received a single booklet, the same one sent first to the three other groups.

Type of intervention
Primary prevention.

Economic study type
Cost-utility analysis.

Study population
The study population comprised patients who had recently quit smoking cigarettes.

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

Dates to which data relate
The effectiveness and resource use data were derived, in part, from studies published between 1986 and 2000. The price year was 2000.

Source of effectiveness data
The effectiveness evidence came from a synthesis of published studies.

Outcomes assessed in the review
The outcomes estimated from the literature were:
the quit rates of formal cessation methods, which were derived from a published trial (the Forever Free study);
the estimated quality-adjusted life-years (QALYs) attributable to successful smoking cessation (by age and gender); and
the relapse rate associated with smoking cessation and smoking cessation plus relapse interventions (where only massed mailings and repeated mailings were considered because they yielded a statistical significant reduction in relapse rates).

**Study designs and other criteria for inclusion in the review**
It would appear that the primary studies were identified selectively and a systematic review of the literature was not undertaken to identify primary studies. Most of the data came from the Forever Free trial, for which the main characteristics of the sample and design were provided. The QALYs were derived from published life-table parameters.

**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**
Not stated.

**Number of primary studies included**
It seems that 4 primary studies have been used to derive the clinical data.

**Methods of combining primary studies**
Not stated.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The quit rates were:

- 5% with no smoking cessation method (natural or unaided quit);
- 10.2% with OTC NRT alone;
- 11.6% with Rx NRT or Rx pharmacotherapy alone;
- 16.7% with OTC and Rx NRT/pharmacotherapy combination only;
- 14.5% with all other combinations with OTC or Rx NRT/pharmacotherapy; and
- 7.4% with all other categories and combinations.

Overall, the average (weighted) mean quit rate was 10.1% when including natural or unaided quits and 11.4% when excluding natural or unaided quits.
The estimated QALYs attributable to successful smoking cessation for all age and gender groups were 2.2465 when discounted at 4% and 1.2584 when discounted at 8%.

The relapse rate was 0.333 with smoking cessation alone, 0.211 with smoking cessation plus repeated mailings, and 0.219 with smoking cessation and massed mailings.

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

The summary benefit measure used was the expected number of QALYs. This was calculated as the product of the quit rate, the QALY estimate, and one minus the relapse rate, which had all been derived from the literature. The utility values used to derive the QALYs were obtained from the literature. Two discount rates (4 and 8%) were applied.

**Direct costs**

Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The health services included in the economic evaluation were relapse prevention interventions (including direct expenses of the materials, overhead expenses, and personnel time to deliver the intervention) and smoking cessation interventions. The cost/resource boundary of the payer was adopted. The costs came from Medicare reimbursement rates and national discount prices. The estimation of the costs took the potential failure to complete the intervention into consideration. Resource use appears to have been mainly derived from the clinical trial used to derive some of the clinical data, as well as from other published sources. The manufacturer’s recommendations for dosages were used. All the costs were adjusted to 2000 values using the Consumer Price Index.

**Statistical analysis of costs**

The costs were treated deterministically.

**Indirect Costs**

The indirect costs were not included in the economic evaluation.

**Currency**

US dollars ($).

**Sensitivity analysis**

Sensitivity analyses were not carried out.

**Estimated benefits used in the economic analysis**

The final QALY estimates were not reported.

**Cost results**

The incremental cost was $383 with smoking cessation alone over no intervention, $427 with smoking cessation plus repeated mailings over smoking cessation alone, and $404 with smoking cessation plus massed mailings over smoking cessation alone.

**Synthesis of costs and benefits**

An incremental cost-utility ratio was calculated to combine the costs and QALYs of the alternative strategies.

Using a 4% discount rate for QALYs, the incremental cost per QALY was $2,530 with smoking cessation alone over no intervention, $2,385 with smoking cessation plus repeated mailings over smoking cessation alone, and $2,280 with
smoking cessation plus massed mailings over smoking cessation alone.

Using an 8% discount rate for QALYs, the incremental cost per QALY was $4,518 with smoking cessation alone over no intervention, $4,258 with smoking cessation plus repeated mailings over smoking cessation alone, and $4,070 with smoking cessation plus massed mailings over smoking cessation alone.

Authors' conclusions
Relapse interventions added to typical smoking cessation therapies were highly cost-effective because they reduced the incremental cost-utility ratio more than the prevention intervention cost. Thus, the relapse prevention interventions paid for themselves.

CRD COMMENTARY - Selection of comparators
The authors justified their choice of the comparators, which represented commonly used smoking cessation therapies and relapse prevention interventions. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data came from published evidence. However, it was unclear whether a systematic review of the literature had been undertaken to identify relevant studies. A detailed description of the clinical trial that was the main source of the data was provided, but there was limited information on the design of the other sources. The methods used to extract and then combine the primary estimates were not reported.

Validity of estimate of measure of benefit
The use of QALYs as the summary benefit measure was appropriate as QALYs incorporate the impact of the intervention on life expectancy and quality of life. The source of the utility values was not reported. Similarly, the approaches used to derive the utility weights were not discussed. Discounting was applied and two different rates were used in the analysis. QALYs are comparable with the benefits of other health care interventions.

Validity of estimate of costs
The authors stated explicitly which perspective was adopted in the study. As such, it appears that all the relevant categories of costs have been included in the analysis. However, details of the unit costs and quantities of resources used were not provided, which reduces the possibility of replicating the study results. The costs were treated deterministically and were specific to the study setting. The source of the data was provided. The price year was reported, which enhances the possibility of performing reflation exercises in other settings.

Other issues
The authors did not make extensive comparisons of their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. In fact, sensitivity analyses were not performed, which reduces the external validity of the analysis. The authors noted some limitations of their study. For example, the use of a 24-month relapse rate and the selection of a minimum intervention as the control arm in the Forever Free trial. A further limitation was the fact that participants enrolled on the Forever Free trial could not be representative of the general population of quitters targeted by relapse prevention interventions.

Implications of the study
The study results supported the use of relapse prevention interventions. The authors stressed that future studies should investigate the likely magnitude of the “natural” relapse rate and the degree to which it may be reduced by relapse prevention interventions. Further, indirect costs of smoking cessation (i.e. the time opportunity costs of quitters) should be carefully estimated.
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Other publications of related interest


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