A comparison of the cost-effectiveness of a high- and a low-intensity smoking cessation intervention in Sweden: a randomized trial

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Record Status
This is an economic evaluation that meets the criteria for inclusion on NHS EED.

CRD summary
The study evaluated the cost-effectiveness of low and high intensity smoking cessation programmes. The authors concluded low intensity treatment was less costly and more effective than no intervention, and high intensity treatment was cost-effective compared to low intensity treatment. The model structure, parameters, and assumptions beyond the clinical effectiveness from the trial were minimally discussed, which limits assessment of model validity. However, the extensive sensitivity analysis and discussion of comparable studies helps support the conclusions reached.

Type of economic evaluation
Cost-utility analysis

Study objective
The study evaluated the cost-effectiveness of low and high intensity smoking cessation programmes.

Interventions
All interventions were delivered by dental hygienists in a dental office setting. The low intensity smoking cessation treatment programme (LIT) consisted of one counselling session of up to 45 minutes that introduced patients to an eight week conventional self-help programme. The high intensity smoking cessation treatment programme (HIT) consisted of eight individual sessions totalling 3.5 hours of behaviour therapy, coaching and pharmacological advice over 4 months. The comparator was no intervention.

Location/setting
Sweden/ Public Health

Methods
Analytical approach:
The evaluation was based on data from a published randomised controlled trial (RCT) (Nohlert et al. 2009) which was used to provide new inputs for a published micro-simulation model (Johansson et al. 2005). The model simulated the long-term costs and health effects of potential future smoking related lung cancer, chronic obstructive pulmonary disease (COPD), and cardiovascular disease, including stroke. The model estimated costs and outcomes for patients between the age of 20 and 85. The study perspective was societal, though some sensitivity analyses were conducted from a NHS perspective.

Effectiveness data:
The effectiveness data included point prevalence of smoking cessation, which was defined as patients not having smoked over the previous seven days at 12 month follow-up; and continuous abstinence, defined as not one puff of smoke during the past 6 months. The base-case was based on point prevalence outcomes.

The model used age and gender specific disease risks conditional on smoking status and time since cessation. Patients were simulated in five year age bands from age 15 to 85. Full details of the model were not presented in this paper.

Monetary benefit and utility valuations:
Utility valuations from the original published model were used for different disease states. It is unclear from the reporting in this paper how these were derived.

Measure of benefit:
Quality-adjusted life-years were the summary measure of benefit. Benefits were discounted at 3% annually.

Cost data:
Intervention costs were collected prospectively by interviewing the three dental hygienists carrying out the work, the project leader and coordinator. Cost data included health services expenditures for staff, support materials and pharmaceuticals; as well as patient costs for time, travel and parking involved with programme participation. Additionally, some programme costs were shared between the interventions.

The model was used to calculate costs related to future illness, though the details of these costs were reported elsewhere. Costs were reported in 2004 SEK, and discounted at 3% annually.

Analysis of uncertainty:
Probabilistic, one-way and scenario sensitivity analyses were undertaken. One-way analyses were conducted for disease risk, death risk, risk fractions for disease after quitting, costs, quality of life, and discount rates. Scenario analyses included best and worst case scenarios (low risk/low cost vs. high risk/high cost), including medical treatment costs in years of added life, and including societal costs in added years of life. Cost-effectiveness results were also run using six-month continuous abstinence as the measure of cessation intervention effectiveness.

Results
Both LIT and HIT led to increased quality of life, and decreased societal costs when compared to no intervention.

In an incremental analysis, compared to LIT, HIT produced 3.94 incremental QALYs at a cost increase of SEK 377,800: producing an ICER of SEK 95,900/QALY.

This ICER was well below the SEK 500,000/QALY threshold reported in the paper for all sensitivity analyses. Sensitivity analysis using six-month abstinence as the measure of cessation resulted in an ICER of SEK 53,100/QALY for HIT. Probabilistic sensitivity analysis indicated that HIT was the preferred programme at thresholds above SEK 50,000/QALY.

Authors’ conclusions
The authors concluded that low intensity treatment was less costly and more effective than no intervention, and that high intensity treatment was cost-effective compared with low intensity treatment.

CRD commentary
Interventions:
The interventions were sufficiently described and appear appropriate. The interventions were delivered by dental hygienists in a dental environment, which may limit the generalisability of the study population, and the study results.

Effectiveness/benefits:
The effectiveness measured used for smoking cessation in the model were well-defined, but details of the model were not presented. So a full critique was not possible. It is unclear why the point prevalence measure of cessation was selected as the primary outcome, rather than the continuous abstinence at 12 month outcome. It is possible that its use may overestimate benefits. Overall, the lack of clarity in reporting made a full critique implausible.

Costs:
Costs from the trial were well defined, but additional costs included in the original model were reported elsewhere. An overview of what costs were included in the model would have aided transparency. The authors acknowledged that some costs were protocol driven, and the assumption that cost-sharing between the two study arms may under-represent the cost of HIT. Intervention costs were reported from the societal perspective and the health services perspective, which is useful.

Analysis and results:
The results were well reported with sufficient analysis of uncertainty. The authors undertook analyses under a number of methodological standards which should increase the generalisability of the results. The probabilistic sensitivity analysis was given in little detail, making it unclear if it was comprehensive or selected in the parameters which were
varied. Given that no sensitivity analysis produced results that were out of line with cost-effectiveness in Sweden, the authors' conclusions appear appropriate.

The authors conducted extensive discussion of limitations of the model, and assessed the generalisability and external validity of the model appropriately.

Concluding remarks:
The model structure, parameters, and assumptions beyond the clinical effectiveness from the trial were minimally discussed, which limits assessment of model validity. However, the authors did provide extensive sensitivity analysis, and discussion of comparable studies which helps support the conclusions reached.

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