Simulation-based estimates of effectiveness and cost-effectiveness of smoking cessation in patients with chronic obstructive pulmonary disease

Atou K, Chouaid C, Hejblum G

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 assess the effectiveness and cost-effectiveness a smoking cessation programme for patients with chronic obstructive pulmonary disease (COPD). The authors concluded that smoking cessation in English COPD patients was cost-effective and this supported the creation of cessation programmes specifically for these patients. The methods and reporting of the results were appropriate, but key details were omitted, such as which costs were included, and this makes it difficult to assess the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to assess the effectiveness and cost-effectiveness of a smoking cessation programme for patients with chronic obstructive pulmonary disease (COPD).

Interventions
A specific cessation programme was compared with no intervention.

Location/setting
UK/community care.

Methods
Analytical approach:
A multi-state decision-analytic Markov model, with a Monte Carlo cohort of one million patients, was developed to assess the costs and outcomes for the two interventions. Patients were categorised by age (40 to 89 years), smoking status, and COPD disease severity, defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) stage (one to four). The time horizon was the lifetime of the patient and the authors reported that the perspective was that of society.

Effectiveness data:
The clinical and effectiveness data were from published studies. The main estimates were the annual probabilities of smoking cessation and of relapse after smoking cessation. These were from a published Dutch study. Other parameters included the transition rates between COPD severity states, exacerbation rates, mortality, and smoking status.

Monetary benefit and utility valuations:
The utility estimates for GOLD stages one to four, for patients with stable COPD (exacerbation free for one year), were from one published study and those for patients with unstable COPD were from another published study.

Measure of benefit:
The summary measures of benefit were life-years and quality-adjusted life-years (QALYs). These were discounted at an annual rate of 3.5%.

Cost data:
The direct and indirect costs were from a Swedish study (Jansson, et al. 2002, see ‘Other Publications of Related
Interest below for bibliographic details). All costs were converted into UK pounds sterling (£), using the Big Mac index published by the Economist. The price year was 2010 and future costs were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
One-way sensitivity analyses were performed by varying the costs of the smoking cessation programme, the effectiveness of the programme, the transition rates from one disease stage to another, mortality and the exacerbation rate, the treatment costs, the discount rate, and the smoking cessation rates.

Results
The average life-years per patient were 16.51 with no intervention, and 17.78 with the intervention; an additional 1.27 life-years. The average QALYs were 8.810 with no intervention, and 9.489 with the intervention; an additional 0.679 QALYs.

The average cost per patient was £28,013 with no intervention, and £26,189 with the intervention; a saving of £1,824.

The smoking cessation programme was dominant, over no intervention, as it was more effective and less costly.

The sensitivity analyses showed that the smoking cessation programme produced cost savings, whatever its cost. In all the scenarios tested, it was cost-effective, at the UK National Institute for Health and Clinical Excellence (NICE) recommended cost-effectiveness threshold.

Authors’ conclusions
The authors concluded that smoking cessation in English COPD patients was cost-effective and this supported the creation of cessation programmes specifically for these patients.

CRD commentary
Interventions:
The content of the smoking cessation programme (for example, pharmacotherapy or counselling) was not reported, making it difficult to judge its relevance to the setting, and its generalisability to other settings.

Effectiveness/benefits:
The clinical and effectiveness parameters were from published studies and these sources were reported. Some of the disease progression parameters were from countries other than the UK, such as the Netherlands or Sweden, and no systematic literature review was reported to identify the studies. As a result, it is unclear if all the best available evidence was used. QALYs were an appropriate measure of benefit given the impact of COPD on both survival and quality of life; the sources were given. The utility values for each health state were reported, but their elicitation methods were not, making it difficult to fully assess their relevance to the setting.

Costs:
Both direct and indirect costs were analysed, and these were from a published study, but the main cost categories and individual cost items were not reported. It is not possible to judge whether all the relevant costs were included. The COPD costs were from Sweden, and they are unlikely to have been transferable between settings (countries). The time horizon, discount rate, currency conversions, and price year were all reported.

Analysis and results:
The costs and outcomes were appropriately synthesised in a multi-state decision-analytic Markov model. The details of the model structure and a diagram were given. One-way sensitivity analyses were undertaken to assess the impact of uncertainty on the model’s results. This type of analysis goes some way towards assessing uncertainty, but a probabilistic sensitivity analysis could have more thoroughly evaluated the overall model uncertainty. The authors reported that the main limitation to their study was that some clinical, effectiveness, outcome, and cost data were from non-English populations.

Concluding remarks:
The study methods and the reporting of the results were appropriate, but key details were omitted, such as which costs were included, and the content of the intervention. This makes it difficult to assess the authors’ conclusions.
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