Long-term effectiveness and cost-effectiveness of smoking cessation interventions in patients with COPD

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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
This study assessed the cost-effectiveness of smoking cessation interventions for patients with chronic obstructive pulmonary disease (COPD), from the perspective of the health care system. The authors concluded that all the interventions were cost-effective, compared with usual care, and pharmacotherapy with intensive counselling provided the greatest value for money. The methods were valid, as were the sources, which were extensively described and synthesised. The authors' conclusions appear to be robust.

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

Study objective
This study assessed the cost-effectiveness of smoking cessation interventions for patients with chronic obstructive pulmonary disease (COPD).

Interventions
Four categories of interventions were considered; usual care, minimal counselling, intensive counselling, and pharmacotherapy with counselling. Usual care involved no counselling, no pharmacotherapy, and no other smoking cessation intervention. Minimal or brief counselling lasted less than 90 minutes and intensive counselling lasted 90 minutes or more. For pharmacotherapy with counselling, any pharmacotherapy was combined with intensive counselling.

Location/setting
Netherlands/primary care.

Methods
Analytical approach:
The analysis was based on a published dynamic model that considered the total Dutch population of 306,000 COPD patients, in 2000. A 25-year time horizon was considered. The authors stated that the perspective of the health care system was adopted.

Effectiveness data:
A literature search was performed in MEDLINE. Only randomised controlled trials (RCTs), published in English, of smoking cessation interventions for COPD patients were included for the data on the treatment effect. Reference lists of retrieved articles were searched, as well as those of published systematic reviews. Estimates from multiple sources were pooled, using random-effects meta-analysis. Published instruments were used to evaluate the quality of the selected trials. Quit rates were a key input and the two definitions were 12 months continuous abstinence and abstinence at 12 months. Abstinence was validated by biochemical tests. The prevalence of disease and the impact of smoking cessation on a patient's health were from published Dutch cohort studies, statistics, and databases, such as the Dutch Foundation for Smoking and Health (STIVORO).

Monetary benefit and utility valuations:
The utility values for COPD conditions were from a published study that used the European Quality of life (EQ-5D) instrument.
Measure of benefit:
Quality-adjusted life-years (QALYs) and life-years were the summary benefit measures and they were discounted at an annual rate of 1.5%.

Cost data:
The economic analysis included two groups of costs; those for the smoking cessation interventions, and those for COPD treatment. The unit costs for the interventions were reported and were from official Dutch sources. They were combined with resource use data from the trials that supplied the clinical inputs. All costs were in Euros (EUR) and they were discounted at an annual rate of 4%. The price year was 2007.

Analysis of uncertainty:
A deterministic sensitivity analysis focused on varying the abstinence rates, within published confidence intervals, and the intervention costs, between minimum and maximum values. One-way sensitivity analyses were carried out on the abstinence rates at 12 months, no discounting, the use of network instead of random-effects meta-analysis, the assumption of no new COPD cases during the simulation, and the exclusion of pharmacotherapy studies of nortriptyline.

Results
The base case considered the continuous abstinence rates during one year of the interventions for 50% of eligible patients, over 25 years. Compared with usual care, the incremental life-years were 210 with minimal counselling, 690 with intensive counselling, and 1,590 with pharmacotherapy. The QALYs were 280 with minimal counselling, 960 with intensive counselling, and 2,240 with pharmacotherapy.

The additional intervention costs (in millions) were EUR 6.8 with minimal counselling, EUR 15.6 with intensive counselling, and EUR 23.2 with pharmacotherapy. The savings in COPD costs (in millions) were EUR 2.0 with minimal counselling, EUR 7.6 with intensive counselling, and EUR 17.9 with pharmacotherapy.

Compared with usual care, the incremental cost per life-year gained was EUR 22,400 with minimal counselling, EUR 11,600 with intensive counselling, and EUR 3,300 with pharmacotherapy. The incremental cost per QALY gained was EUR 16,900 with minimal counselling, EUR 8,200 with intensive counselling, and EUR 2,400 with pharmacotherapy.

The incremental cost per QALY gained was EUR 4,600 with intensive counselling versus minimal counselling, and pharmacotherapy was dominant over intensive counselling as it saved costs and was more effective.

The alternative scenarios considered in the sensitivity analysis did not change the ranking of the interventions and did not have a substantial impact on the cost-effectiveness ratios. The most sensitive parameter was the treatment effect, but all interventions remained cost-effective, compared with no intervention, at standard Dutch thresholds.

Authors’ conclusions
The authors concluded that all the smoking cessation interventions were cost-effective, compared with usual care. Pharmacotherapy with intensive counselling provided the greatest value for money.

CRD commentary
Interventions:
Four interventions were considered to represent different intensities of smoking cessation intervention. The authors acknowledged that there was some heterogeneity between the trials in the intensity of their programmes and the type of pharmacotherapy, but few articles were selected and further division into subgroups based on interventions was impossible.

Effectiveness/benefits:
A valid approach was used to identify the clinical inputs for the model. The inclusion of clinical trials for the treatment effect, ensures the validity of the clinical estimates due to the study design. The quality of these sources was assessed, using validated instruments and the details of each trial were provided. A valid approach was used to pool the evidence from multiple sources, taking account of heterogeneity between trials, and an alternative approach was tested in the
sensitivity analysis. Other data were from appropriate Dutch sources. Both benefit measures captured the impact of the disease on the patients’ health and allowed cross-disease comparisons. The use of the EQ-5D for the utility weights was valid, but no other details were provided.

Costs:
The cost categories were appropriate for the perspective stated. A breakdown of cost items was presented for the interventions, but limited information on COPD treatment costs was given. This information might have been from the previous dynamic model. It was unclear whether the resource use from the clinical trials was representative of real Dutch practice. The price year and discounting were clearly reported. The impact of varying the intervention costs was investigated in the sensitivity analyses.

Analysis and results:
The results were extensively presented. The costs and benefits were synthesised, using an incremental approach. Alternative scenarios were considered in the deterministic sensitivity analyses, which focused on variations in the key individual inputs. The dynamic model incorporated changes in population characteristics over time. The analysis appears to have been specific to the Netherlands and the transferability of the results was not discussed.

Concluding remarks:
The methods were valid, as were the sources, which were extensively described and synthesised. The authors’ conclusions appear to be robust.

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