Strategies for reducing coronary risk factors in primary care: which is most cost-effective?

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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.

Health technology
Screening and intervention strategies for preventing coronary heart disease in primary care. The study looked at six prevention strategies ranging from targeting a small high risk group to an unselective strategy including the whole population aged 35-64 years.

Type of intervention
Screening, primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population was a cohort of patients (aged 35-64 years) who attended a first health check before February 1993 as part of a trial of modifying coronary heart disease risk factors in primary care (the OXCHECK trial).

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

Dates to which data relate
The clinical effectiveness data were hypothetical. No dates were given for costs.

Source of effectiveness data
The effectiveness data was based on opinion.

Methods used to derive estimates of effectiveness
Mean reduction of diastolic blood pressure; 12 month sustained rate of stopping smoking; decrease in cholesterol levels were considered. The authors stated that the effectiveness of the interventions were assumed to be 'intermediate between that reported by one of the studies and that in two recently published trials'.

Estimates of effectiveness and key assumptions
Treatment of diastolic blood pressure >95 mm Hg would achieve a mean reduction of 5 mm Hg; the 12-month sustained rate of stopping smoking among smokers would be 5%; patients with total cholesterol concentrations above 8.5 mmol/l would achieve a mean fall of 15%; 20% would achieve this by dietary change alone, the remainder would be prescribed long-term lipid-lowering drugs; patients with a total cholesterol concentration of 7.5 - 8.5 mmol/l would achieve a mean fall of 5% by dietary change alone.
Measure of benefits used in the economic analysis
The number of life years gained by averting premature death from coronary heart disease. Benefits were discounted at 6%. The Framingham parametric model was used to determine the probability of death from coronary heart disease.

Direct costs
The cost of each strategy included the costs of the initial screening, further tests for subjects at high risk and the specific interventions. The cost of treating raised blood pressure was not included as it was a fixed cost. It was assumed that: a qualified G grade nurse conducted the health checks, the time required for collecting information on diet was 5 minutes, the time required for screening for other risk factors (smoking, body mass index, family history) was 2 minutes each, the time required for taking a blood sample was 5 minutes and the cost of measuring cholesterol concentration was 4.80. Life-style advice for patients found to be at risk was assumed to require four 15 minute sessions of nurse time plus 40 minutes of nurse organisational time. Subjects with a high cholesterol level would be given advice over 3 months; subjects whose cholesterol concentration did not fall below 8mmol/l took lipid-lowering drugs, the GP would spend 9 minutes each year advising a patient and prescribing a drug and a typical drug would cost 235 a year (synvastatin 20mg/daily). Future costs were discounted at 6% a year.

Currency
UK pounds sterling (£)

Sensitivity analysis
A sensitivity analysis testing a best and worst scenario was carried out. For the best scenario it was assumed that among cigarette smokers the 12 months sustained rate of stopping smoking would be 10%; all patients with a total cholesterol concentration above 8.5 mmol/l would achieve a mean fall of 20% (25% would achieve this by dietary change alone); and patients with a total cholesterol concentration of 7.5-8.5 mmol/l would achieve a mean fall of 10% by dietary change alone. For the worst scenario it was assumed that the 12 month sustained rate of stopping smoking would be 3%; all patients with a total cholesterol concentration above 8.5 mmol/l would achieve a mean fall of 10% (15% by dietary change alone) and patients with a total cholesterol concentration of 7.5-8.5 mmol/l would achieve a mean fall of 3% by dietary change alone.

Estimated benefits used in the economic analysis
Both the years of life saved and the years of life saved discounted at 6% a year were calculated. Estimated years of life gained for CHD risk reduction in 7840 men and women aged 35-64 was as follows. The undiscounted years of life saved ranged from 132 (strategy 1: measurement of blood pressure and ask about personal history) to 227 (strategy 6: including strategy 1 plus gaining information about smoking, height and weight, dietary assessment and blood cholesterol) for men; and from 78 (strategy 1) to 133 (strategy 6) for women. If discounted, these figures become 97 to 287 (for men) and 206 to 503 (for women).

Cost results
Costs for each of the strategies were not reported quantitatively. The percentage of costs attributable to cholesterol-lowering drugs was more than two-thirds of the total cost for all strategies.

Synthesis of costs and benefits
The cost-effectiveness of each strategy was calculated as the ratio of cost to life years gained. Under the undiscounted scenario, the cost-effectiveness ratio (1000 life year gained) ranged from 0.73 (strategy 1) to 1.27 (strategy 6) for men, and from 2.65 to 3.78 for women. Under the discounted scenario, these figures become 1.24 to 2.18 (for men) and 4.73 to 6.85 (for women).

In men the worst scenario resulted in a higher cost per year gained, and a greater difference between strategy 1 and 6. This effect was much greater in women. None of the assumptions changed the relative position of the six strategies, or
the difference with sex.

**Authors' conclusions**
Strategies to reduce coronary heart disease in primary care were most cost effective if they were limited to patients with raised blood pressure or a history of coronary heart disease. These initiatives were more cost effective in men than women, and in older rather than younger subjects.

**CRD Commentary**
As the authors noted their assumptions about the effectiveness of primary care interventions were more optimistic than those reported recently and it is impossible to determine the true predictive value of the Framingham model (US) in a British population. The data did not define an ideal screening policy or provide exact figures for the cost of different preventive strategies but rather presented the comparative cost-effectiveness of different strategies. The sensitivity analysis was not performed on the assumptions made about the resource use. A more thorough literature review of the effectiveness would have been more reliable.

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