Cost effectiveness of lowering cholesterol

Cost consequence analysis may be more useful to decision makers

EDITOR,—If economic analyses are to provide guidance on population health strategies they should consider all relevant costs and consequences associated with medical interventions. We have identified five methodological deficiencies in the economic analysis of P D P Pharoah and W Hollingworth.¹

Firstly, their study examines the impact of treatment only on death; it ignores the value of averting non-fatal consequences such as unstable angina, myocardial infarction, revascularisation procedures, and stroke. These consequences decrease both the length and quality of patients' lives.^{2,3} By failing to account for these supplementary outcomes, the analysis underestimates the reduction in risk attributed to treatment and the associated incremental life years gained.

Secondly, the net intervention cost may not adequately reflect the true number of myocardial infarctions averted. Seven myocardial infarctions would be averted for every four lives saved over six years in the population of the Scandinavian simvastatin survival study⁴, and 20 non-fatal myocardial infarctions would be averted for every seven lives saved over five years in the west of Scotland coronary prevention study.⁵ These results yield higher proportion ratios than the 0.28 non-fatal myocardial infarctions prevented for each life year saved used by Pharoah and Hollingworth.

Thirdly, the analysis does not capture the costs of unstable angina or stroke.

Fourthly, the authors focus only on the cost of the initial clinical events or revascularisation procedures, without accounting for the long term follow up costs of treating the event and subsequent clinical complications.

Finally, considerable patient withdrawal rates were observed in the Scandinavian and Scottish studies—10% and 30% respectively—which would decrease the overall cost of the intervention as some patients were not being dispensed the study drug.

Thus, the current analysis fails to account for the survival and quality of life benefits incurred by averting non-fatal clinical events; it underestimates the costs of treating these events and overestimates the cost of providing the preventive interventions. The net result of these methodological deficiencies is to overestimate significantly the incremental cost effectiveness ratios. Pharoah and Hollingworth attempt to perform an assessment of statin treatment without access to the clinical event datasets associated with the specific studies, making it difficult to conduct an analysis that is accurate and reflective of the true economic value of either prevention strategy. Since the intention of the west of Scotland coronary prevention study was to evaluate the avoidance of all coronary events, as opposed to death alone, a cost consequence analysis may be more informative to decision makers. We are currently engaged in conducting such an exhaustive analysis of this study population.

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Advice to authors

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When deciding which letters to publish we favour originality, assertions supported by data or by citation, and a clear prose style. Wit, passion, and personal experience also have their place.

Letters should have fewer than 400 words (please give a word count) and no more than five references (including one to the *BMJ* article to which they relate); references should be in the Vancouver style. We welcome pictures.

Letters should be typed and signed by each author, and each author's current appointment and address should be stated. We encourage you to declare any conflict of interest.

Please enclose a stamped addressed envelope if you would like to know whether your letter has been accepted or rejected.

Letters will be edited and may be shortened.

- 1 Pharoah PDP, Hollingworth W. Cost effectiveness of lowering cholesterol concentration with statins in patients with and without pre-existing coronary heart disease: life table method applied to health authority population. *BMJ* 1996;312:1443-8. (8 June.)
- 2 Sigurdsson E, Sigfusson N, Agnarsson U, Sigvaldason H, Thorgeirsson G. Long-term prognosis of different forms of coronary heart disease: the Reykjavik study. *Int J Epidemiol* 1995;24:58-68.
- 3 Visser MC, Koudstaal PJ, Erdman RAM, Deckers JW, Passchier J, Gijn J, et al. Measuring quality of life in patients with myocardial infarction or stroke: a feasibility study of four questionnaires in the Netherlands. *J Epidemiol Community Health* 1995;49:513-7.
- 4 Scandinavian Simvastatin Study Group. Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian simvastatin survival study (4S). *Lancet* 1994;344:1383-9.
- 5 Shepherd JS, Cobbe SM, Ford I, Isles CG, Lorimer AR, MacFarlane PW, et al for the west of Scotland Coronary Prevention Study Group. Prevention of coronary heart disease with pravastatin in men with hypercholesterolemia. *N Engl J Med* 1995;333:1301-7.

Study greatly underestimates the cost effectiveness of statin treatment

EDITOR,—The analysis of P D P Pharoah and W Hollingworth of the cost effectiveness of reducing cholesterol concentration is flawed.¹

With respect to secondary prevention, the authors do not take account of the significant reductions in the incidence of strokes and transient ischaemic attacks, chronic heart failure, and unstable angina requiring admission with simvastatin in the Scandinavian simvastatin survival study.² Although strokes and transient ischaemic attacks and chronic heart failure are

comparatively infrequent events, they are expensive. In the placebo group, for example, stroke accounted for 1280 days in hospital compared with 4473 for acute myocardial infarction. Admission for angina is both common and expensive. In the Scandinavian study the number of hospital admissions for angina (401 in the placebo group) was second only to that for acute myocardial infarction (630 in the placebo group). The number of days spent in bed by patients with unstable angina was 1585.

With regard to primary prevention, few physicians would advocate anything but "high risk" primary prevention—for example, treating men with two or more risk factors—in which the clinical benefits of treatment are substantial.^{3,4} Consequently, the authors' analysis is irrelevant for ordinary clinical practice.

Lastly, Pharoah and Hollingworth seem to assume 100% compliance with treatment and the costs associated with that. Many patients do not comply, especially those receiving primary prevention. For example, in the west of Scotland coronary prevention study 31% of patients had withdrawn from the active treatment group by the end of five years of follow up, many voluntarily.⁵ If prescriptions are not collected, there is no treatment cost. Consequently, Pharoah and Hollingworth's analysis will have substantially reduced the cost effectiveness of treatment, especially as the incremental cost effectiveness ratio is likely to be most sensitive to the cost of treatment (effectively reduced by up to one third if non-compliance is accounted for).

- 1 Pharoah PDP, Hollingworth W. Cost effectiveness of lowering cholesterol concentration with statins in patients with and without pre-existing coronary heart disease: life table method applied to health authority population. *BMJ* 1996;312:1443-8. (8 June.)

- 2 Pedersen TR, Kjekshus J, Berg K, Olsson AG, Wilhelmsen L, Wedel H, et al for the Scandinavian Simvastatin Survival Study Group. Cholesterol lowering and the use of health care resources: results of the Scandinavian Simvastatin Survival Study. *Circulation* 1996;93:1796-802.
- 3 Davey Smith G, Song F, Sheldon T. Cholesterol lowering and mortality: the importance of considering initial level of risk. *BMJ* 1993;306:1367-73.
- 4 Haq IU, Jackson PR, Yeo WW, Ramsay LE. Sheffield risk and treatment table for cholesterol lowering for primary prevention of coronary heart disease. *Lancet* 1995;346:1467-71.
- 5 Shepherd J, Cobbe SM, Ford I, Isles CG, Lorimer AR, MacFarlane PW, et al for the West of Scotland Coronary Prevention Study Group. Prevention of coronary heart disease with pravastatin in men with hypercholesterolemia. *N Engl J Med* 1995;333:1301-7.

Study did not take account of confounders

EDITOR,—We welcome the approach taken by P D P Pharoah and W Hollingworth in using life tables to evaluate the cost effectiveness of reducing cholesterol concentration.¹ This approach has been widely used elsewhere² and is a valuable technique for evaluating health service interventions aimed at modifying the risk profiles of a population. Unfortunately, however, their analysis may be flawed as such analyses depend on obtaining an accurate assessment of the overall manner in which population death rates are influenced by the intervention being evaluated. Such relations are extremely complex as they