Authors' objectives
To assess the efficacy of individualised dietary advice for lowering blood total cholesterol concentration in free-living people, and to assess the efficacy of different dietary recommendations.

Searching
MEDLINE, Human Nutrition, EMBASE and AMED were searched from 1966 for trials published in any language. In addition, the American Journal of Clinical Nutrition was handsearched, the bibliographies of review articles and randomised trials were examined, and experts were consulted for further information.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were considered.

Specific interventions included in the review
Individualised counselling on one of the following four target diets.

1. Step 1 diet of the American Heart Association or its equivalent: less than 30% of the total energy intake as fat, with 8 to 10% as saturated fat; ratio of polyunsaturated to saturated fat greater than 1.0; cholesterol intake less than 300 mg/day; and energy intake to achieve desirable body weight.

2. Step 2 diet of the American Heart Association or its equivalent: less than 30% of the total energy intake as fat, with 7% or less as saturated fat; ratio of polyunsaturated to saturated fat greater than 1.4; cholesterol intake less than 200 mg/day; and energy intake to achieve desirable body weight.

3. Diet to increase the ratio of polyunsaturated to saturated fatty acids, with little or no change in the total fat content.

4. Low total fat diets, without changing the proportions of the different fats consumed.

The amount of advice given to achieve dietary change was categorised as intensive, moderate or brief, based on the amount of contact with the counsellor (number of hours, contacts and duration).

Participants included in the review
Free-living people, including children and those with existing coronary heart disease, raised cholesterol or raised blood-pressure, and healthy volunteers.

Outcomes assessed in the review
The principal end point was the percentage reduction in cholesterol concentration at the end of the intervention, or at 12 months, whichever was the sooner. Compliance with dietary advice was also estimated.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The authors noted the overall incidence of reporting the method of randomisation and blinding of the assessors. The percentage of randomised participants in each trial who were reported in the final analysis was also given. The authors
do not state how the validity assessment was performed.

**Data extraction**
Two reviewers independently extracted data from each identified trial onto a standard form, and any disagreements were resolved by a third reviewer.

**Methods of synthesis**
How were the studies combined?
For each comparison within each trial, the absolute difference (in mmol/L) in the mean change in blood total cholesterol values (baseline minus final value) between the intervention and control group was calculated; no distinction was made between serum or plasma cholesterol values. The standard error (SE) for each comparison within each trial was calculated using a given formula; where the values for the standard deviation were not given they were imputed. Similar methods were used to assess changes in the reported dietary intake.

The summary effect for each grouping of different trials was derived from the average of the means of each separate trial, weighted by the reciprocal of SE² for each trial. For studies with more than one intervention group, the SEs were adjusted to take account of the control group being used more than once. The results were presented as the mean percentage changes in blood total cholesterol concentration, with 95% confidence intervals (CIs). All analyses were performed using the regression techniques available in the statistical software SAS (version 6.07).

How were differences between studies investigated?
Statistical heterogeneity was explored by comparing the observed results in different categories of trials, grouped according to diet, intensity of advice and type of patient. Tests for heterogeneity were performed using the regression techniques available in the statistical software SAS (version 6.07).

**Results of the review**
Nineteen RCTs (8,550 participants) yielding 28 comparisons were eligible for inclusion in the review; information from one trial was included in 3 publications, whilst another trial included 7 different dietary comparisons.

The overall weighted mean reduction in blood total cholesterol concentration across all dietary comparisons was 5.7% (95% CI: 5.2, 6.3).

From trials of at least 6 months' duration (22 comparisons), the weighted mean reduction in blood total cholesterol concentration across all dietary comparisons was 5.3% (95% CI: 4.7, 5.9). On the assumption that participants lost to follow-up experienced no change, the mean reduction was 4.5% (95% CI: 3.9, 5.1).

The statistical heterogeneity observed in the individual comparisons of more than 6 months was not explained by grouping the trials according to the category of diet.

The differences between the reductions in blood cholesterol concentration observed with the 4 different diets were significant (p<0.001).

From trials of at least 6 months' duration, the reduction in blood total cholesterol concentration found with diet type 1 (n=2,860) was 3.0% (95% CI: 1.8, 4.1), with no significant heterogeneity (p>0.1). The reduction found with diet type 2 (n=2,457) was 5.6% (95% CI: 4.7, 6.5), with significant heterogeneity (p<0.001); this may be explained by the inclusion of the only study in children, which had a smaller effect size. The reduction was 7.6% (95% CI: 6.2, 9.0) for diet type 3 (n=2,163), with significant heterogeneity (p<0.001), and 5.8% (95% CI: 3.8, 7.8) with diet type 4 (n=941), with no significant heterogeneity (p value not given).

Compliance with dietary advice: in general, the dietary targets were not achieved. Among the comparisons of diet type 1, only 2 trials met the targets for both saturated fat and the ratio of polyunsaturated fat to saturated fat; both trials also achieved the largest reductions in blood total cholesterol concentration. Among the comparisons of diet type 2, only one trial met dietary targets. All comparisons of diet type 3 achieved an increase in the ratio of polyunsaturated to saturated
fat but the targets varied; similarly all comparisons of diet type 4 reduced total and saturated fat intake but the targets differed. Dietary compliance was not found to be higher in those with existing coronary heart disease.

**Authors' conclusions**
Dietary advice to free-living people can be expected to reduce blood total cholesterol by only 3 to 6%. More intensive diets, such as the step 1 and step 2 diets of the American Heart Association, achieve a greater reduction in serum cholesterol concentration. Difficulties in complying with the prescribed dietary change probably explain this limited efficacy. It is important to be realistic about the reductions in cardiovascular risk that can be achieved by individual dietary counselling.

**CRD commentary**
The review was well written and seemed to use a good literature search to identify trials, although the search terms used were not listed. Comprehensive details of the studies included were provided and clear inclusion criteria were given. Some assessment of validity, including intention to treat analysis, was reported and the grouping of comparisons seemed appropriate. The authors' conclusions appear useful and valid.

**Implications of the review for practice and research**
The authors state that more research is required to develop better methods of communicating dietary advice and maintaining compliance with such advice.

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**Bibliographic details**

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http://www.bmj.com/content/316/7139/1213

**Other publications of related interest**
Oliver MF. Advice should now be to increase intake of vegetable oils and fish. BMJ 1998;317:1253.

These additional published commentaries may also be of interest. Johnson K. Review: dietary advice leads to a modest reduction in blood cholesterol concentration. Evid Based Nurs 1999;2:18.

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Subject indexing assigned by NLM

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.