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
Several drug therapies for hypertension to prevent coronary heart disease and stroke were considered in the study: hydrochlorothiazide 100 mg/day (diuretic), nifedipine 40 mg/day (calcium antagonist), propranolol 320 mg/day (beta-blocker), captopril 225 mg/day (angiotensin-converting enzyme (ACE) inhibitor), and prazosin 12 mg/day (alpha-adrenergic blocker) for patients with moderate/severe hypertension, and hydrochlorothiazide 75 mg/day, nifedipine 30 mg/day, propranolol 320 mg/day, captopril 75 mg/day, and prazosin 12 mg/day for patients with mild hypertension.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with moderate/severe hypertension (diastolic arterial pressure equal to or greater than 105 mmHg) or with mild hypertension (diastolic arterial pressure between 95-104 mmHg).

Setting
The setting was primary care. The economic study was carried out in Catalonia, Spain.

Dates to which data relate
Effectiveness evidence and data on resource use were obtained from studies published between 1977 and 1990. The price year was 1998.

Source of effectiveness data
The effectiveness data were derived from a review of the literature.

Outcomes assessed in the review
The outcomes assessed from published studies were reduction rates of diastolic arterial pressure with each therapy, life expectancy and prevalence of risk factors in Catalonia.

Study designs and other criteria for inclusion in the review
The primary study used as the main source of the effectiveness data was a meta-analysis including only randomised, placebo-controlled, clinical trials.
Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Four primary studies were used to derive the effectiveness evidence.

Methods of combining primary studies
Narrative methods were used.

Investigation of differences between primary studies
Not stated.

Results of the review
Reduction rates of diastolic arterial pressure were 13.4% with hydrochlorothiazide, 17% with nifedipine, 21.4% with propranolol, 17.3% with prazosin, and 18.3% with captopril for patients with moderate/severe hypertension;

7.4% with hydrochlorothiazide, 10% with nifedipine, 9.8% with propranolol, 8.1% with prazosin, and 4.9% with captopril for patients with mild hypertension.

Life expectancy and prevalence of risk factors in Catalonia were not reported.

Measure of benefits used in the economic analysis
The benefit measure used in the analysis was the number of life-years gained with the pharmacological treatments. A 5% discount rate was used.

Direct costs
Unit costs and quantities of resources used were reported for only a few items. The treatment-related costs included in the analysis were clinic screening of hypertension, drug costs, physician visits, and follow-up. Costs of treatment for coronary cardiopathy comprised drugs, physician visits, and hospitalisation due to myocardial infarction, unstable and stable angina, death and no-death, and coronary bypass. The cost/resource boundary was not stated. Costs were based on actual data, derived from hospitals, Ministry of Health, and retail prices. A 5% discount rate was used due to the long time horizon of the analysis. The price year was 1998.

Statistical analysis of costs
No statistical analysis of costs was carried out.

Indirect Costs
Indirect costs were not included.
Currency
Spanish pesetas (Pta).

Sensitivity analysis
Sensitivity analyses were carried out to assess the consistency of the results to variations in the following parameters: drug costs, rate of reduction of diastolic arterial pressure, treatment cost for coronary cardiopathy, participation cost, and discount rate.

Estimated benefits used in the economic analysis
Not reported.

Cost results
Annual treatment costs amounted to Pta 9,730 with hydrochlorothiazide, Pta 23,840 with nifedipine, Pta 29,560 with propranolol, Pta 33,210 with prazosin, and Pta 169,710 with captopril for patients with moderate/severe hypertension; and

Pta 7,300 with hydrochlorothiazide, Pta 17,880 with nifedipine, Pta 29,560 with propranolol, Pta 33,210 with prazosin, and Pta 56,570 with captopril for patients with mild hypertension.

Costs of follow-up and control were Pta 19,730.

Synthesis of costs and benefits
Average and incremental cost-effectiveness analyses were carried out to combine costs and benefits.

In patients with moderate/severe hypertension, the average cost per life-year gained was Pta 976,500 with hydrochlorothiazide, Pta 999,700 with propranolol, Pta 1,103,200 with nifedipine, Pta 1,316,700 with prazosin, and Pta 4,467,800 with captopril for men; and

Pta 1,786,500 with hydrochlorothiazide, Pta 1,804,200 with propranolol, Pta 1,986,000 with nifedipine, Pta 2,407,100 with prazosin, and Pta 8,102,700 with captopril for women in the age class of 30-39 years.

In patients with mild hypertension, the average cost per life-year gained was Pta 1,578,300 with hydrochlorothiazide, Pta 1,607,400 with propranolol, Pta 2,154,900 with nifedipine, Pta 2,759,800 with prazosin, and Pta 6,824,600 with captopril for men; and

Pta 2,853,900 with hydrochlorothiazide, Pta 3,036,100 with propranolol, Pta 3,961,000 with nifedipine, Pta 5,249,900 with prazosin, and Pta 12,699,000 with captopril for women in the age class of 30-39 years.

Similar rankings were observed in the class ages 40-49 years, 50-59 years, and 60-69 years.

The incremental analysis showed that the most cost-effective treatments (with the lowest cost per additional life-year gained) were hydrochlorothiazide (Pta 745,900 for men and Pta 958,500 for women) and propranolol (Pta 762,500 for men and Pta 1,000,600 for women) for patients with moderate/severe hypertension; and hydrochlorothiazide (Pta 1,190,600 for men and Pta 1,542,800 for women) and nifedipine (Pta 1,356,600 for men and Pta 1,678,300 for women) for patients with mild hypertension in the class-age of 50-59 years (but similar results were obtained in the remaining age classes).

The estimated cost-effectiveness ratios were sensitive to variations in drug costs, rate of reduction of diastolic arterial pressure and discount rate.
Authors' conclusions
The authors concluded that hydrochlorothiazide and propranolol were the most cost-effective therapies for patients with moderate/severe hypertension, while hydrochlorothiazide and nifedipine represented the most cost-effectiveness interventions for patients suffering from mild hypertension.

CRD COMMENTARY - Selection of comparators
The interventions compared in the analysis were selected because they represented widely used therapies for hypertension. You, as a user of this database, should assess whether they are currently used in your own setting.

Validity of estimate of measure of effectiveness
The bulk of the effectiveness evidence was derived from a meta-analysis considering only randomised, placebo-controlled trial, and thus having high internal validity. However, data estimated from the other published studies were not reported. It was not clear whether the authors considered the differences in the primary studies when combining effectiveness data.

Validity of estimate of measure of benefit
The life-years gained with the antihypertension therapies was used as the benefit measure. It appears to have been appropriate and comparable with the benefits obtained with other interventions implemented in the health system. However, the actual number of life-years gained was not reported and the procedure to calculate them was not stated.

Validity of estimate of costs
The perspective adopted in the study did not reflect the cost items included in the analysis. Unit costs and details on resource use were not satisfactorily reported. Costs were treated deterministically and few sensitivity analyses were carried out. Cost estimates appear to have been specific to the Catalan setting.

Other issues
The authors made some comparisons of their results with those from other studies. Although the issue of generalisability was not directly addressed, the authors performed sensitivity analyses on key variables. The study considered patients with moderate/severe and mild hypertension and this was reflected in the authors’ conclusions. Some limitations of the study were reported: estimated costs and benefits were calculated on the basis of Catalan data and generalising to other settings could be problematic; more recent effectiveness analyses suggested that the considered treatments were equally effective; and health benefits were not directly measured, but were calculated using the Framingham equation.

Implications of the study
The study results suggest that diuretics (hydrochlorothiazide) and beta-blockers (propranolol) should be used for the management of patients with moderate/severe hypertension, while diuretics (hydrochlorothiazide) and calcium antagonists (nifedipine) should be used for the treatment of patients with mild hypertension.

Source of funding
None stated.

Bibliographic details