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**International Task Force for Prevention  
Of Coronary Heart Disease**

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*Clinical management of risk factors  
of coronary heart disease and stroke*

*Economic analyses of primary prevention of  
coronary heart disease (CHD) and stroke*

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**Economic analyses  
of primary prevention of CHD and Stroke  
at an individual level**

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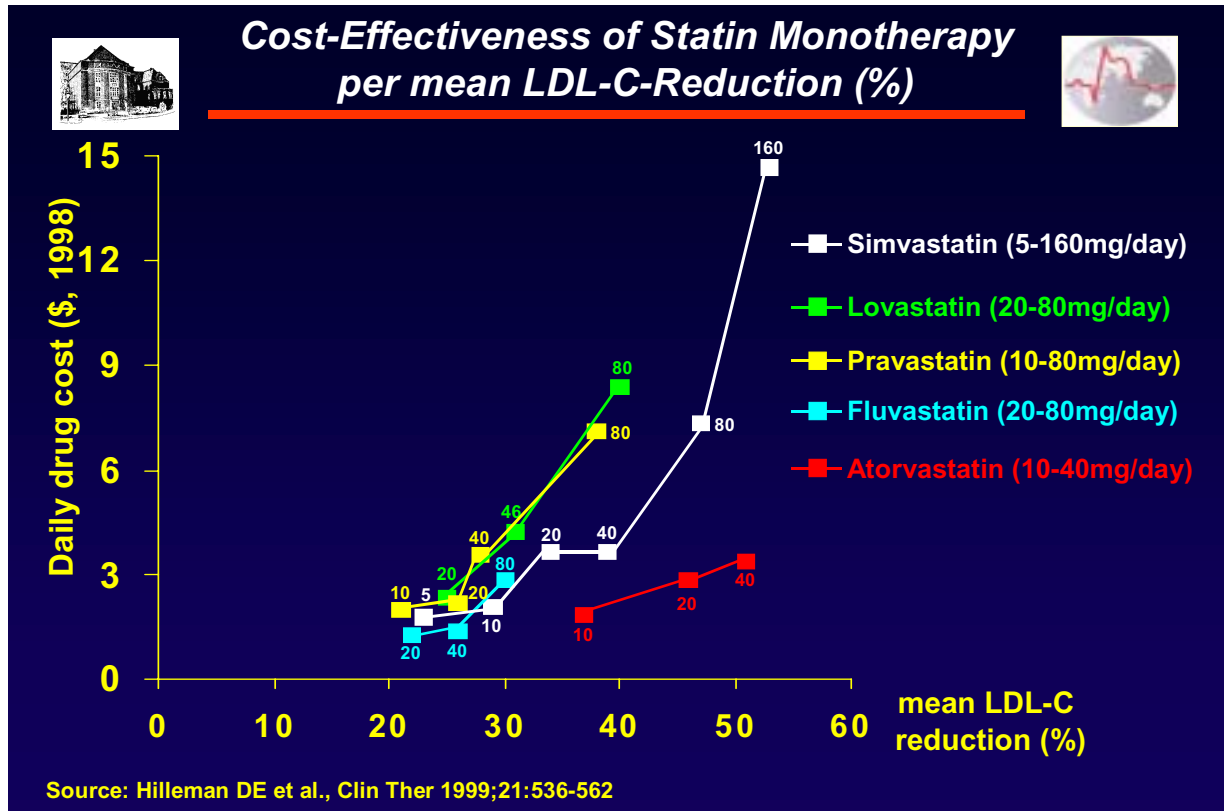
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Slide 1:

## Cost-effectiveness of statin monotherapy per mean LDL-C-reduction



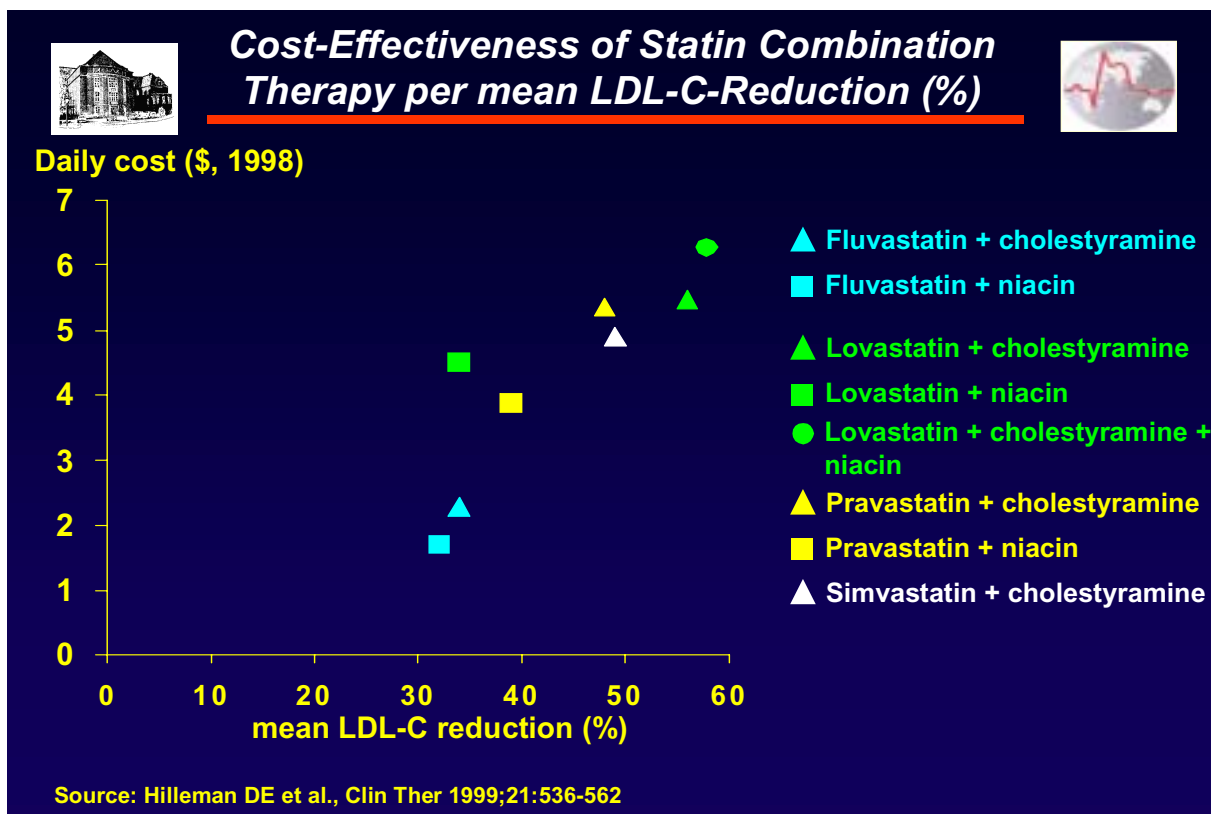
### Cost-effectiveness of statin monotherapy per mean LDL-C-reduction

This meta-analysis by Hilleman et al. included 56 clinical trials with 101 cohorts which employed monotherapy with 1 of 5 HMG-CoA reductase inhibitors. Acquisition cost of the lipid-lowering drugs was based on 1998 average wholesale prices. The perspective of a third party payer was chosen.

This graph shows the dose-related daily drug costs per mean LDL cholesterol reduction of monotherapy with 5 different HMG-CoA reductase inhibitors. Atorvastatin 10mg/day was the most cost-effective drug treatment in monotherapy followed by fluvastatin 40 mg/day and 20 mg/day, atorvastatin 20 mg/day and 40 mg/day, pravastatin 20 mg/day and simvastatin 10 mg/day.

Slide 2:

## Cost-effectiveness of statin combination therapy per mean LDL-C-reduction

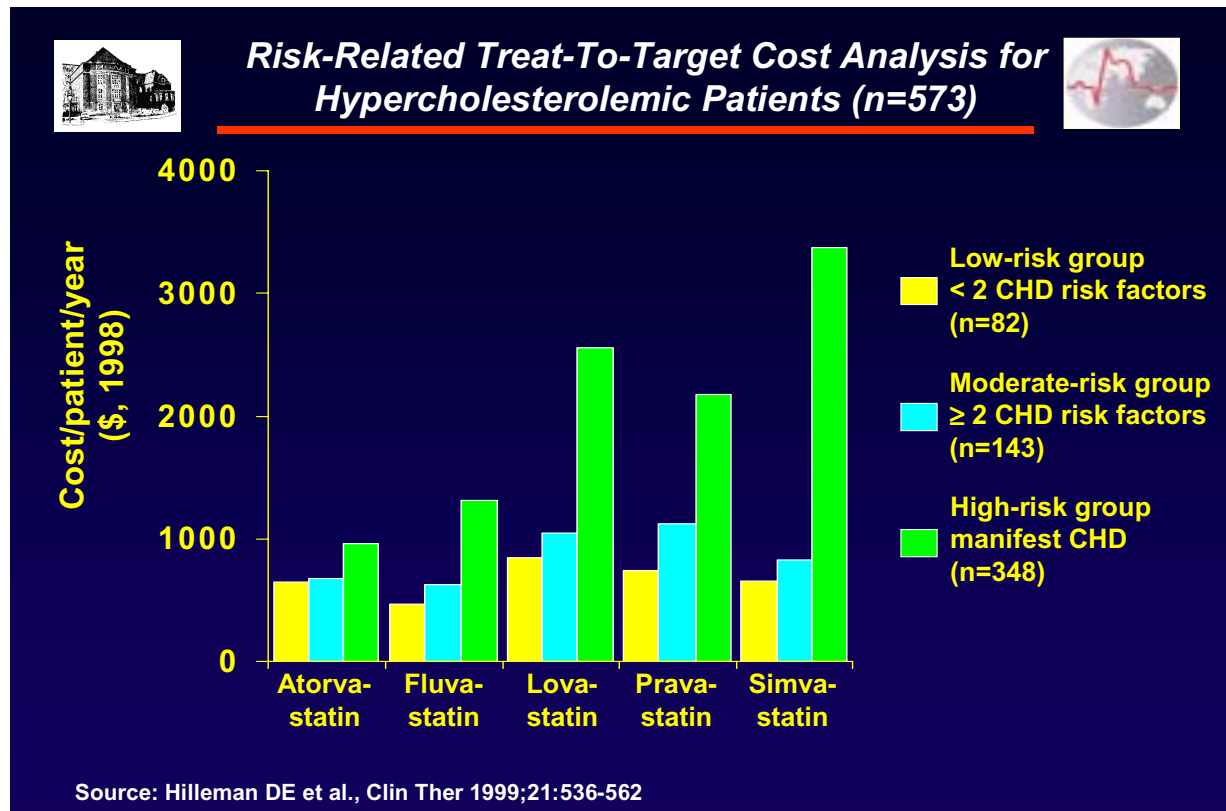


### Cost-effectiveness of statin combination therapy per mean LDL-C-reduction

The meta-analysis by Hilleman et al. included also 20 clinical trials with 31 cohorts receiving combination therapy. This graph shows the daily cost per mean % LDL cholesterol reduction of 8 different combination therapies. The most cost-effective drug combinations were fluvastatin plus niacin and fluvastatin plus cholestyramine. The fluvastatin-niacin combination was more cost-effective than fluvastatin alone, the only combination that was more cost-effective than the respective monotherapy (see slide B1).

Slide 3:

## Risk-related treat-to-target cost-analysis in hypercholesterolemic patients (n=573)



### Risk-related treat-to-target cost-analysis in hypercholesterolemic patients (n=573)

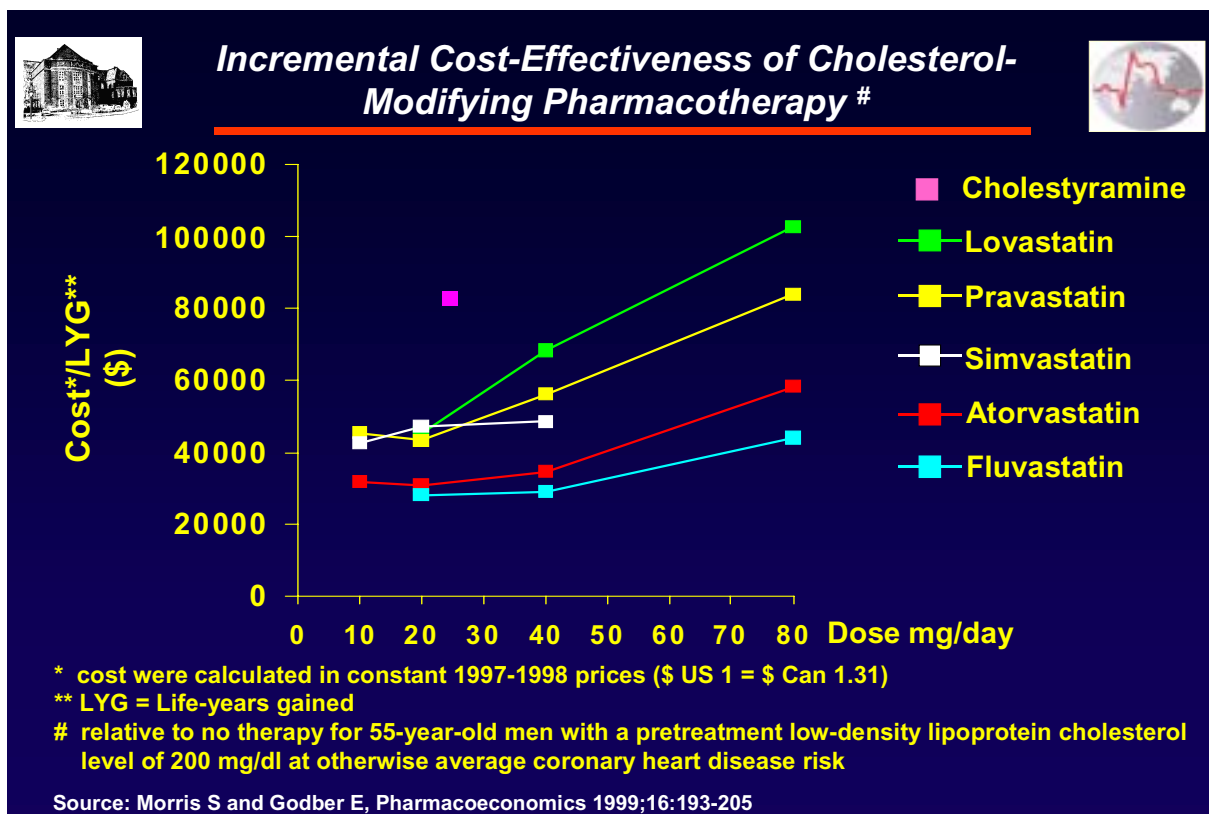
Cost-effectiveness in dollars per percentage of LDL-C reduction is of little value in estimating the cost of treating populations of patients with varied baseline levels of LDL-C and different treatment goals. The US National Cholesterol Education Program Adult Treatment Panel II (NCEP ATP-II) guidelines were the target for a risk-related treat-to-target cost analysis in hypercholesterolemic patients from the perspective of a third party payer.

This graph summarizes the respective costs (wholesale prices 1998, drug costs, clinic visit, lipid profile) of treating patients at high risk (patients with CHD), moderate risk (< 2 risk factors for CHD) and low risk (< 2 risk factors for CHD) in step-therapy after 8 weeks of dietary intervention. This treat-to-target analysis assumed availability of only 1 HMG-CoA reductase inhibitor, unless treatment goals could not be achieved at that drug's maximal effect as part of combination therapy. Patients who failed to achieve NCEP ATP-II LDL-C goals with combination therapy including 1 HMG-CoA reductase inhibitor were switched to another HMG-CoA reductase inhibitor with greater efficacy.

In the risk-related treat-to-target analysis, atorvastatin was the most cost-effective drug for high-risk patients, whereas fluvastatin was the most cost-effective agent for low-risk patients and moderate-risk patients.

Slide 4:

## Incremental cost-effectiveness of cholesterol-modifying pharmacotherapy



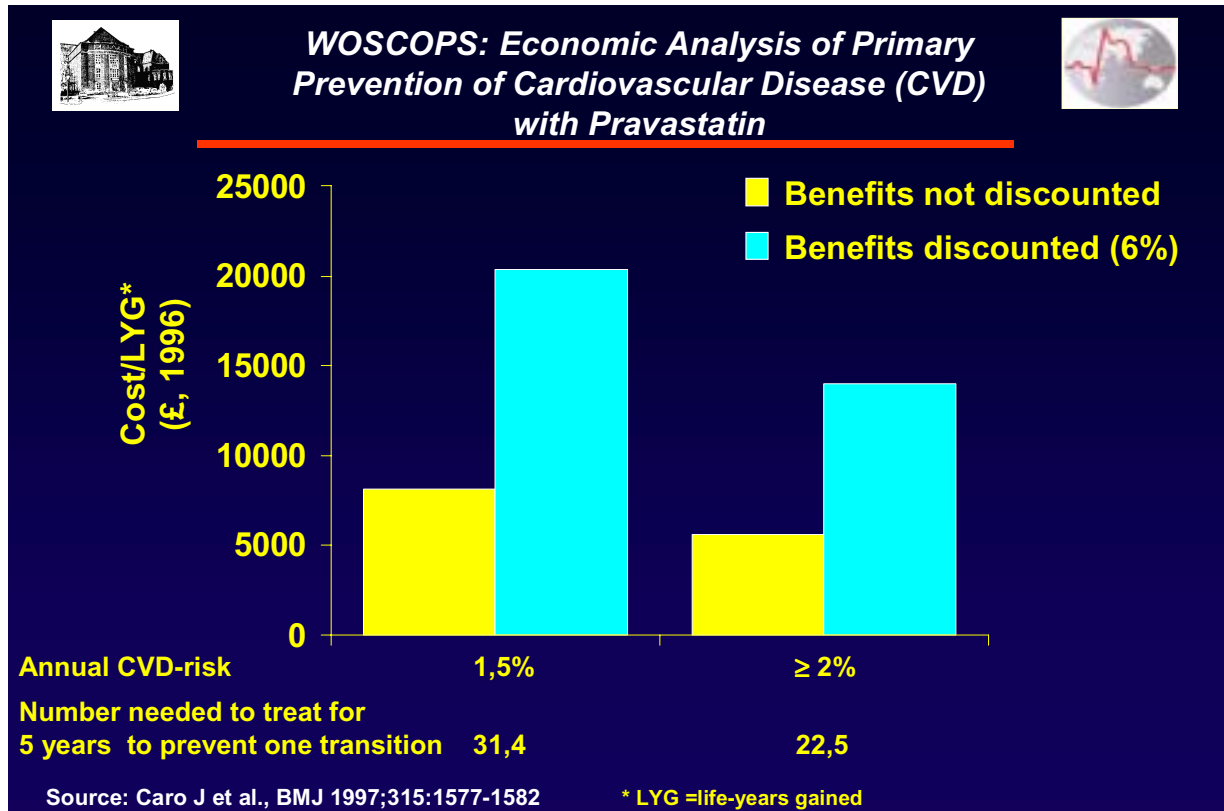
### Incremental cost-effectiveness of cholesterol-modifying pharmacotherapy

Morris and Godber compared incremental cost-effectiveness of cholesterol-modifying pharmacotherapy in primary prevention of coronary heart disease (CHD) in Canada (see also slide A4). Epidemiological data for the risk factors used in the CHD risk model were obtained from the Canadian Heart Health Survey. Data from 116 clinical studies were included in the study. The choice of perspective was that of the Canadian public healthcare system. Costs were estimated in Canadian dollars (\$US1 = \$Can1.31) and calculated in constant 1997 to 1998 prices. Included cost components were initiation to therapy, drug therapy, monitoring of therapy and costs from treatment of CHD events.

The graph shows incremental cost per life-year gained of cholesterol-modifying pharmacotherapy relative to no therapy for 55 year old men with a pretreatment low-density lipoprotein cholesterol level of 200 mg/dl and at otherwise average coronary heart disease risk.

Slide 5:

**WOSCOPS: Economic analysis of primary prevention of cardiovascular disease (CVD) with pravastatin**



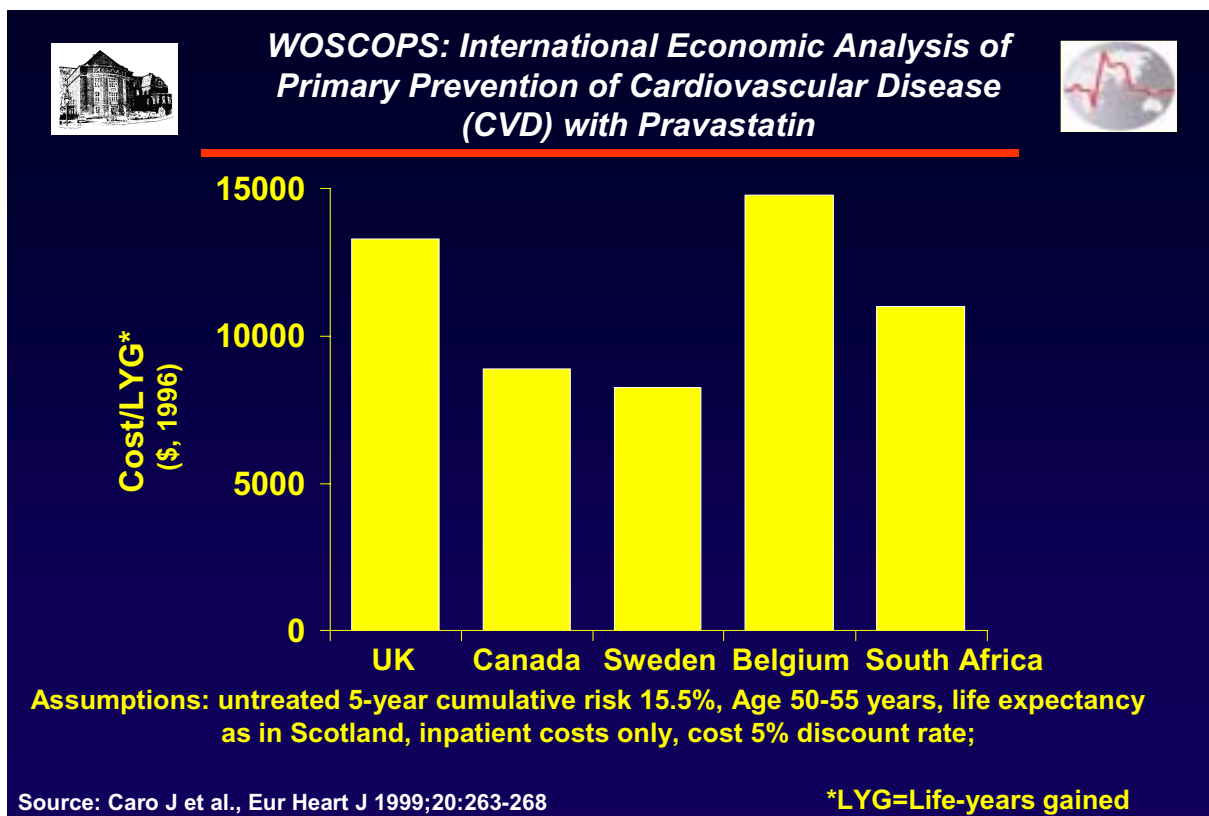
**WOSCOPS: Economic analysis of primary prevention of cardiovascular disease (CVD) with pravastatin**

Based on data from the West of Scotland Coronary Prevention Study (WOSCOPS) Caro et al. estimated the economic efficiency of using pravastatin to prevent the transition from health to cardiovascular disease (CVD) in men with hypercholesterolemia. The WOSCOPS study randomised 6595 Scottish men aged 45-64 years with a mean cholesterol concentration of 7.0 mmol/l and no evidence of previous myocardial infarction to either placebo or pravastatin 40 mg/day, both in addition to dietary advice. After an average 4.9 years of follow-up the drug reduced the risk of non-fatal myocardial infarction or death from coronary disease by 31 % (95 % CI 17-43 %).

The main premise of this economic model of prevention of cardiovascular disease is that an initial cardiovascular event constitutes an irreversible transition from health to sickness and that society values the avoidance of this transition. The cost of a transition was based on the average direct 1996 cost of initial management of each type of event. Drug costs and monitoring costs were included. All cost were discounted at 6 %. This graph shows cost per life-year gained for 1.5% and 2% annual CVD risk based on WOSCOPS data.

Slide 6:

## WOSCOPS: International economic analysis of primary prevention of cardiovascular disease (CVD) with pravastatin



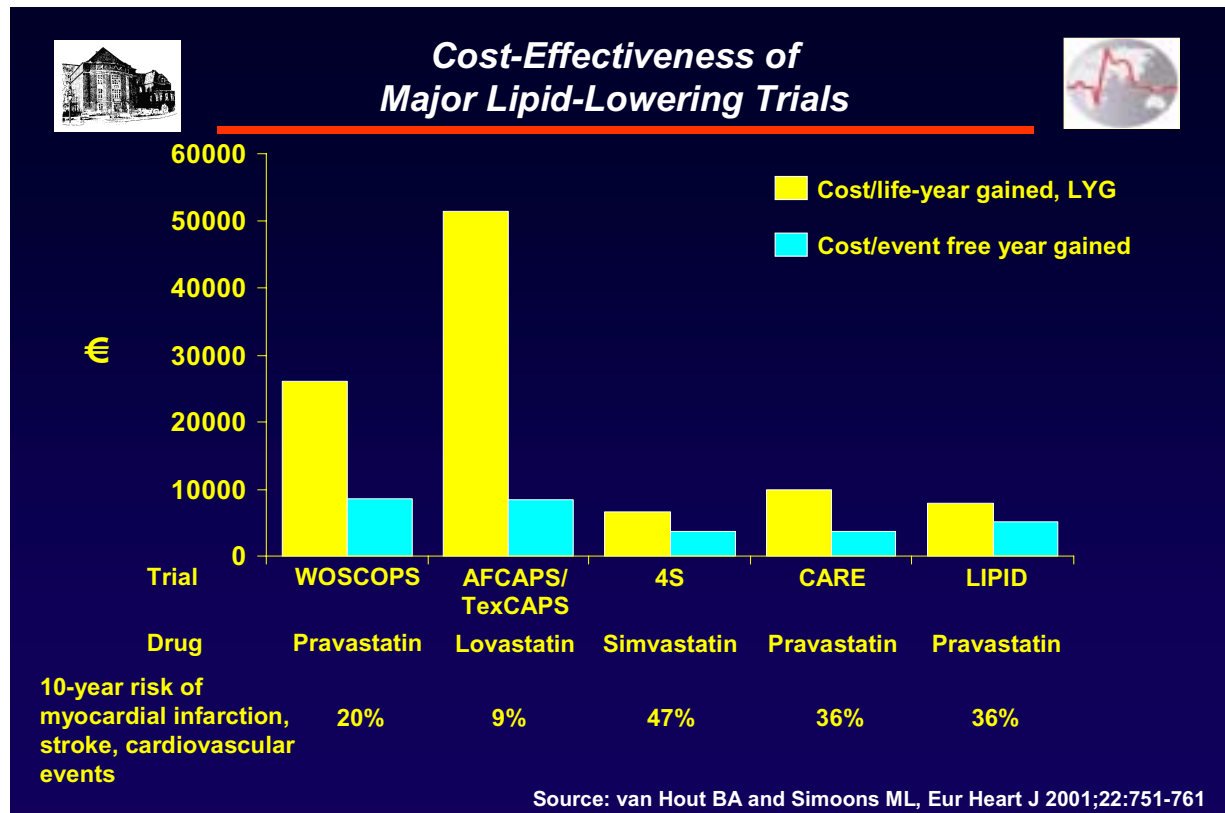
### WOSCOPS: International economic analysis of primary prevention of cardiovascular disease (CVD) with pravastatin

This study assesses the economic efficiency of primary prevention of cardiovascular disease in hypercholesterolemic men with pravastatin in a range of countries. The aim was to generalise the results of WOSCOPS to the perspective of any national health service or other organisation responsible for societal health care costs. For this purpose, a formula was derived based on data from the United Kingdom. The formula was validated by comparing the obtained results with those of the original United Kingdom model and a separate Canadian model. In addition, sample calculations were made for three further countries: Sweden, Belgium and South Africa. The model follows a cohort of hypercholesterolemic men over a given period quantifying the effect in terms of the avoidance of cardiovascular disease based on treatment-specific risks derived from WOSCOPS data and extensive record-linkage data on disease-specific survival. Country-specific costs are accounted for by expressing all such parameters in terms of the ratio of monthly treatment to that of managing a myocardial infarction. Cost elements (cost of treatment and offsetting cost due to events prevented) were expressed in terms of local cost of one year's supply of pravastatin 40 mg per day including any required monitoring. Costs presented in 1996 US\$ were discounted at an annual rate of 5%.

This graph shows cost-effectiveness ratios for patients (aged 50-55 years, life expectancy as in Scotland) of the same baseline risk of cardiovascular disease (untreated 5 year cumulative risk of 15.5%) for the United Kingdom, Canada, Sweden, Belgium and South Africa.

Slide 7:

## Cost-effectiveness of major lipid-lowering trials



### Cost-effectiveness of major lipid-lowering trials

Following a modelling approach, cost effectiveness was analysed as a function of a patients initial risk for new coronary heart disease events, combining results from 4S, CARE, LIPID, WOSCOPS and AFCAPS with Dutch cost data. Only direct costs of health care were included. Costs and effects were extrapolated for life-long treatment (25 years treatment), assuming that patients would continue to take the drugs and that the additional benefits would persist. Both costs and effects are discounted with a 5 % discount rate.

This graph shows costs per life-year gained (LYG) and costs per event-free year gained. The costs per LYG are under 10.000 € for the secondary prevention trials (4S, CARE, LIPID). The primary prevention trials WOSCOPS with an estimated cost-effectiveness of 26.013 € and AFCAPS 51.400 € are less cost-effective. But focusing on the cost per event-free years gained, the differences in cost-effectiveness are less pronounced.

Slide 8:

## The CELL-study: Cost effectiveness of cholesterol-lowering through advice for lifestyle change and pravastatin treatment



### ***The Cell-Study: Cost-effectiveness of Cholesterol-Lowering through Advice for Lifestyle Change and Pravastatin Treatment***



#### **Intensive advice vs no treatment**

<b>Net cost</b>	<b>1,251 US \$</b>
<b>Life-years gained</b>	<b>0.0056</b>
<b>Cost per life-year gained</b>	<b>223,000 US \$</b>

#### **Usual advice and drug vs no treatment**

<b>Net cost</b>	<b>1,557 US \$</b>
<b>Life-years gained</b>	<b>0.0255</b>
<b>Cost per life-year gained</b>	<b>61,000 US \$</b>

#### **Usual advice and drug vs intensive advice**

<b>Incremental net cost</b>	<b>306 US \$</b>
<b>Incremental life-years gained</b>	<b>0.0199</b>
<b>Incremental cost per life-year gained</b>	<b>15,000 US \$</b>

**384 men aged 30-59 y with moderate primary hyperlipidaemia with at least one other cardiovascular risk factor; treatment duration: 2 years, 5 % discount rate; 1991 US\$;**

Source: Jönsson B, Lancet 2001;358:1251-1256

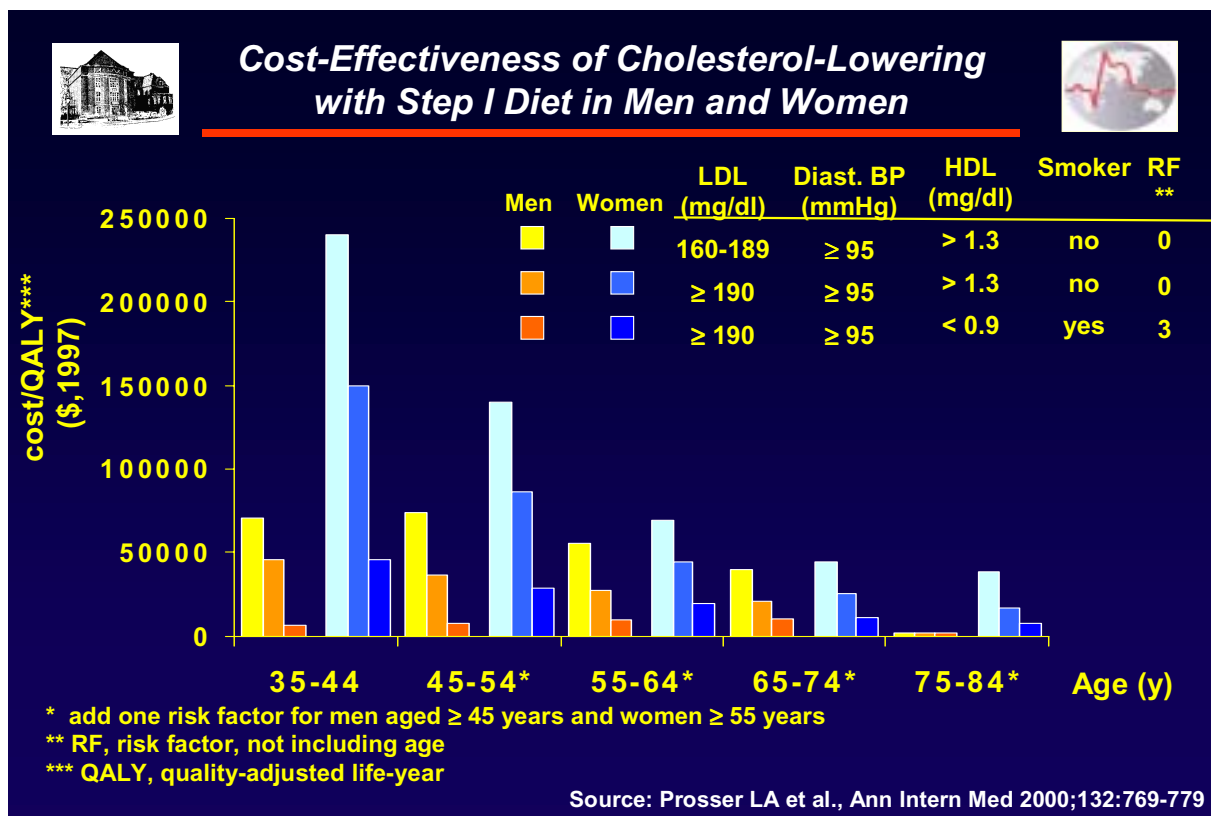
### **The CELL-study: Cost effectiveness of cholesterol-lowering through advice for lifestyle change and pravastatin treatment**

Non-pharmacological treatment should be the first option in primary prevention. In both primary and secondary prevention, drug treatment is only indicated for those who could not reduce lipid concentrations to defined objectives by any other method. The CELL study investigated the effect of advice and pharmacological medication on reduction of cholesterol concentrations in 384 men aged 30-59 years with moderate hyperlipidaemia and at least one other cardiovascular risk factor. Randomly advised to four treatment groups they received two types of advice (usual and intensive) for alteration of life style with and without drug treatment (pravastatin). Treatment goal was a 15 % reduction in total cholesterol levels. 92 % completed the 18-month follow-up.

Serum cholesterol fell significantly from baseline in all groups except in those who were given only usual advice to change their life style. Intensive advice and drug treatment was most effective in reducing cholesterol level. The table shows the results of the cost effectiveness analysis, which calculated costs per life-year gained (LYG) for those with intensive advice only, those given usual advice and drugs, and the baseline alternative of no treatment. Costs are in US dollars and were converted from 1991 Swedish crowns at the exchange rate of June 1999. Of the four treatment alternatives only usual advice plus drug is deemed to be cost effective.

Slide 9:

## Cost-effectiveness of cholesterol-lowering with Step I diet in men and women



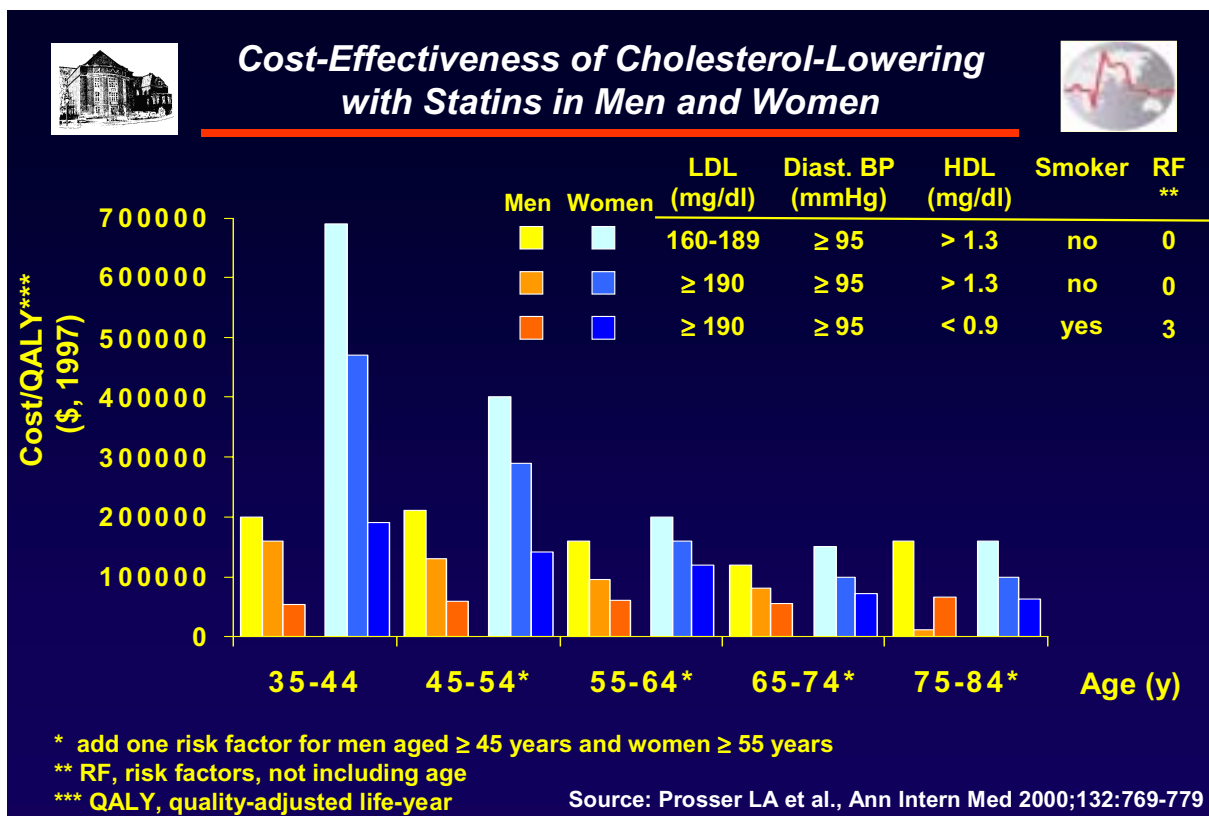
### Cost-effectiveness of cholesterol-lowering with Step I diet in men and women

The target population of this study were men and women aged 35 to 84 years with LDL cholesterol levels ≥ 160 mg/dl, divided into 240 risk subgroups according to age, sex and the presence or absence of four risk factors of coronary heart disease (smoking status, blood pressure, LDL and HDL cholesterol). Published data were modelled for a time horizon of 30 years. Total costs were calculated as the sum of interventions costs, costs of coronary heart disease care, and costs of non-coronary heart disease health care (societal perspective). All costs were converted to 1997 US dollars by using the Medical Care Component of the Consumer Price Index and were discounted at an annual rate of 3%. Incremental cost-effectiveness ratios for primary prevention with step I diet for the 240 risk subgroups ranged from \$1900 per quality-adjusted life-year (QALY) gained to \$ 500 000 per QALY depending on risk subgroup characteristics.

This graph shows cost-effectiveness ratios of cholesterol-lowering therapy with step I diet in men and women aged 35 to 84 years according to three selected risk profiles. Primary prevention with a step I diet seems to be cost-effective for most risk subgroups but may not be cost-effective for otherwise healthy young women.

Slide 10:

## Cost-effectiveness of cholesterol-lowering with statin in men and women

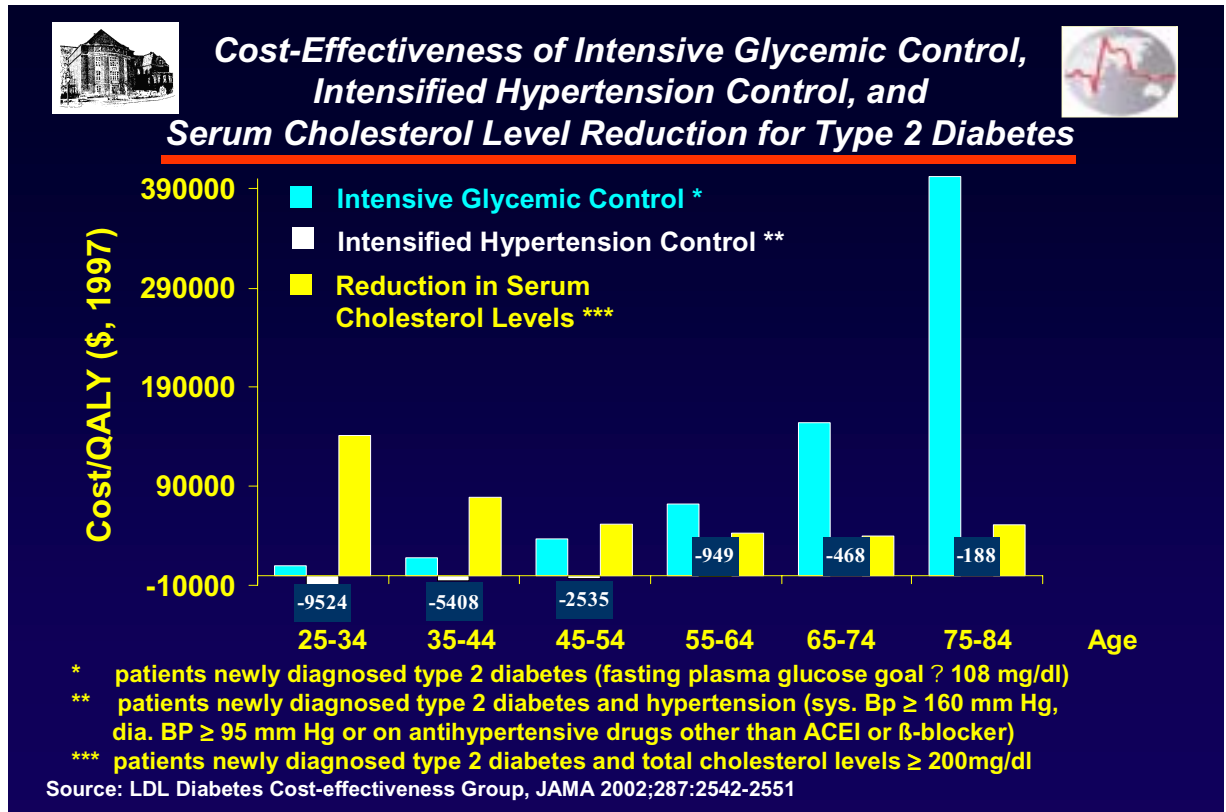


### Cost-effectiveness of cholesterol-lowering with statin in men and women

This graph shows cost-effectiveness ratios of cholesterol-lowering therapy with statin in men and women included in the same study according to the three selected risk profiles. Drug costs were calculated by using the average wholesale prices. Drug compliance was assumed to be 95 %. While cost-effectiveness ratios for these 3 risk profiles for step I diet range between 1,900 and 240,000 \$/QALY (previous slide), the ratios for statin therapy are between 54,000 and 690,000 \$/QALY.

Slide 11:

**Cost-effectiveness of intensive glyceimic control, intensified hypertension control, and serum cholesterol level reduction for type 2 diabetes**



**Cost-effectiveness of intensive glyceimic control, intensified hypertension control, and serum cholesterol level reduction for type 2 diabetes**

The objective of this study was to estimate the incremental cost-effectiveness of several treatment interventions, which can reduce complications of type 2 diabetes such as intensive glyceimic control (relative to conventional control), intensified hypertension control, and reduction in serum cholesterol level for patients with type 2 diabetes. The analysis is based on a hypothetical cohort of individuals living in the United States, aged 25 years or older, who were newly diagnosed as having type 2 diabetes. For the model of disease progression and treatment patterns results of the United Kingdom Prospective Diabetes Study (UKPDS) and other studies were used.

The interventions were insulin or sulfonylurea therapy for intensive glyceimic control (treatment goal: fasting plasma glucose concentration 108 mg/dL), angiotensin-converting enzyme inhibitor (ACEI) or β-blocker for intensified hypertension control (in persons with systolic blood pressure of 160 mm Hg; diastolic blood pressure of 95 mm Hg or on antihypertensive drugs other than ACEI or β-blocker) and pravastatin for reduction of serum cholesterol level (in persons with a total cholesterol level of 200 mg/dL or higher).

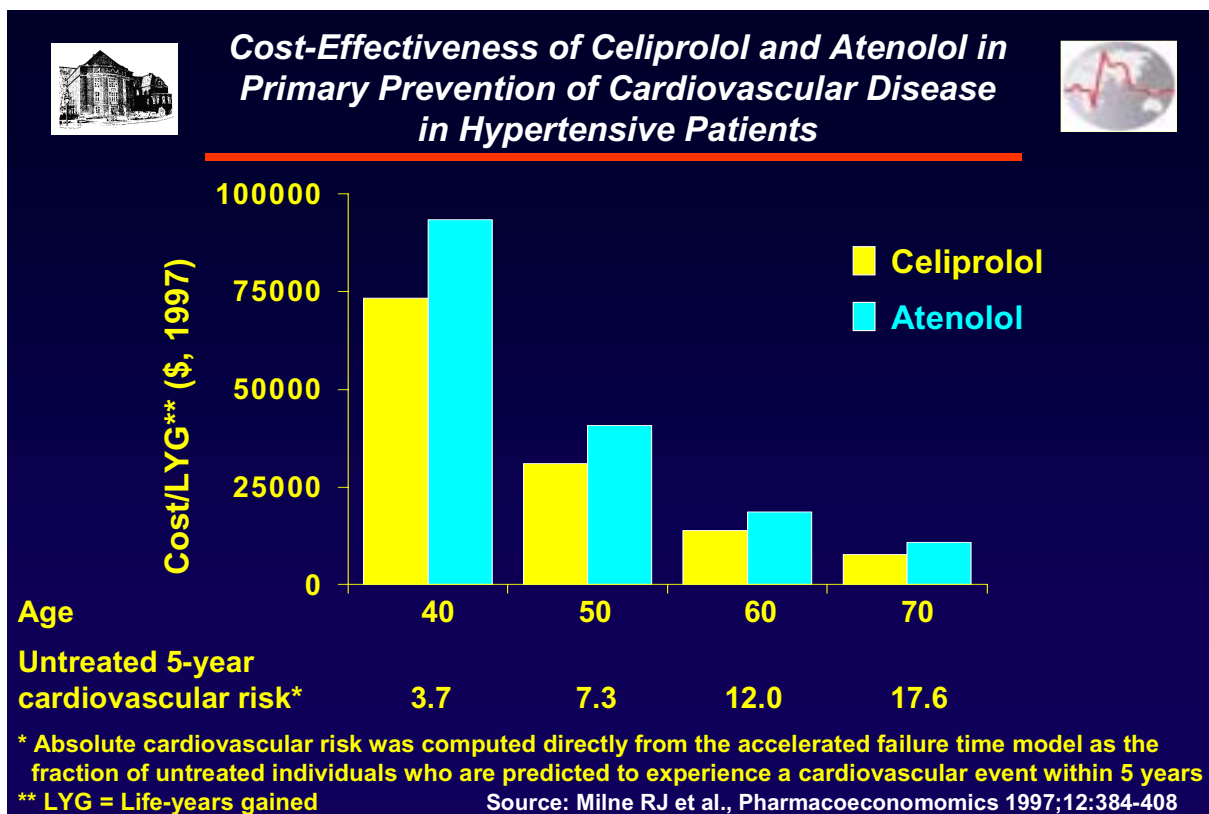
The effect of intensive glyceimic control was accounted for by adjustment of baseline hazard rates using the ratio of glyceimic level under conventional treatment raised to an exponent that varies across complication progression paths and stages. Intensified hypertension control was assumed to reduce stroke risk by 44% relative to moderate hypertension control. Pravastatin was assumed to reduce risk of coronary heart disease (CHD) by 31 % in persons without CHD and by 25 % in persons with CHD.

Costs (in 1997 US dollars) were measured from the perspective of the health care system, based on those used in community practices in the United States. Costs and quality-adjusted life years were discounted at an annual rate of 3%.

This graph shows the incremental cost-effectiveness ratios for intensive glyceimic control, intensified hypertension control and reduction in serum cholesterol levels in persons aged 25-84 years, who were newly diagnosed as having type 2 diabetes. Intensified hypertension control reduces costs and improves health outcomes relative to moderate hypertension control. Intensive glyceimic control and reduction in serum cholesterol level increase costs and improve health outcomes. The cost-effectiveness ratios for these 2 interventions are comparable with those of several other frequently adopted health care interventions.

Slide 12:

## Cost-effectiveness of celiprolol and atenolol in primary prevention of cardiovascular disease in hypertensive patients



### Cost-effectiveness of celiprolol and atenolol in primary prevention of cardiovascular disease in hypertensive patients

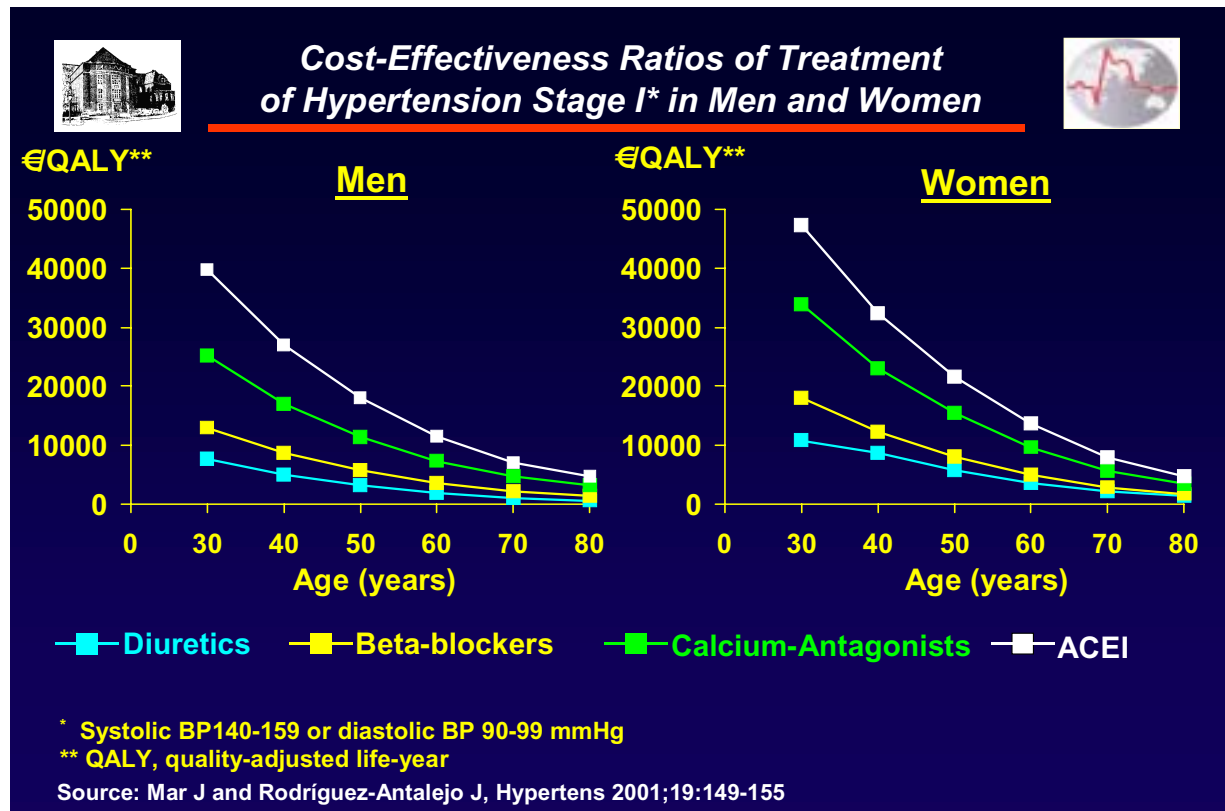
This pooled analysis of 16 published studies compared the antihypertensive and lipid modifying effects of treatment of mild to moderate hypertension with the betablockers celiprolol (271 mg/day) or atenolol (77.4 mg/day). Milne et al. modelled the 5-year cardiovascular risk reduction and the cost effectiveness of monotherapy from a partial societal perspective. Direct medical costs included drug treatment and costs of acute care for initial coronary or cerebrovascular events deferred by therapy over the 5-year treatment period. Costs are in 1997 \$US and were converted from New Zealand\$ (1\$NZ = 0.69540 \$US). Costs have been adjusted to the 1997 March quarter values using the healthcare component of the consumer price index. Costs and life-years gained were discounted at an annual rate of 5 %.

Cost per life-year gained (LYG) by treatment with celiprolol was significantly lower than with atenolol. Celiprolol has a larger effect than atenolol on coronary risk, since celiprolol has a more favourable effect on the serum lipid profile than atenolol. Celiprolol reduces, but atenolol increases the ratio of total cholesterol to HDL cholesterol. The number of individuals that would have to be treated for 5 years to avoid 1 coronary event is about 30 for celiprolol versus 70 for atenolol.

Treatment of patients with a 5-year absolute cardiovascular risk greater than 10 % seems to be cost-effective with both drugs. In the lowest risk base case (60-year-old men who are nondiabetic and nonsmokers with a systolic blood pressure of 160 mm Hg, a total cholesterol of 6.0 mmol/L, a HDL-cholesterol level of 1.10 mmol/L and a 5-year absolute cardiovascular risk of 12 %), celiprolol is 2-fold more effective than atenolol in reducing coronary event risk, and equally effective in reducing cerebrovascular event risk. This slide shows cost/LYG of treatment with celiprolol and atenolol for this risk base case according to different age groups. In patients with mild to moderate hypertension and without overt coronary heart disease the risk of coronary events can be reduced substantially by replacing atenolol with celiprolol at no additional direct medical cost over a 5-year treatment, while the effects of these drugs on stroke risk are similar.

Slide 13:

## Cost-effectiveness ratios of treatment of hypertension stage I in men and women





### Cost-effectiveness ratios of treatment of hypertension stage I in men and women

This graph shows cost-effectiveness ratios of treatment of hypertension stage I (systolic blood pressure 140-159 or diastolic blood pressure 90-99 mm Hg) with four different drugs (diuretics, beta-blockers, calcium-antagonists and angiotensin converting enzyme inhibitors (ACEI)) in men and women aged 30 to 80 years. A Markov model combines absolute risks for stroke, coronary heart disease and all causes of death with relative risks from clinical trials and observational studies. Data on health costs were collected from hospitals and primary care settings in the Basque Country (Spain): The viewpoint of this study is from the perspective of the health system (arterial hypertension treatment costs and their consequences on the cardiovascular morbidity costs). Costs of side effects of treatment with diuretics were considered. Costs were discounted at an annual rate of 3%. Compliance was assumed to be 100%. For all types of drugs the same efficacy of preventing CHD was assumed.

Based on the average reduction of blood pressure achieved by diuretics and the other drugs the following relative risks of CHD due to arterial hypertension among treated patients versus non-treated were used: with diuretics (1.22), beta-blockers (1.17), calcium antagonists (1.17) and ACEI (1.27). It was also assumed that arterial hypertension treatment, with any drug, reduces the risk of stroke to that of non-hypertensive patients. The differences of the cost-effectiveness ratios between drugs are almost proportional to the annual cost of each drug, since differences in cost are much larger than those in effectiveness. The graph shows that arterial hypertension treatment is more cost-effective in men compared with women, and improves with age.

Slide 14:

## Cost-effectiveness of warfarin and aspirin for prophylaxis of stroke in patients with nonvalvular atrial fibrillation

**Cost-Effectiveness of Warfarin and Aspirin for Prophylaxis of Stroke in Patients with Nonvalvular Atrial Fibrillation**

	<b>Annual risk of stroke</b>	<b>Marginal cost/QALY saved vs. aspirin*, \$</b>	<b>Marginal cost/QALY saved vs. no therapy**, \$</b>
<b>High risk</b>	<b>5.3 (4.9-17.6)</b>	<b>Warfarin preferred to aspirin</b>	<b>Warfarin preferred to no therapy</b>
<b>Medium risk</b>	<b>3.6 (2.6-4.6)</b>	<b>8000 (200-30000)</b>	<b>Warfarin preferred to no therapy (Warfarin preferred - 3700)</b>
<b>Low risk</b>	<b>1.6 (1.1-2.1)</b>	<b>370000 (66000-aspirin preferred)</b>	<b>14000 (7700-24000)</b>

\* The cost per quality-adjusted life-year (QALY) saved by prescribing warfarin instead of aspirin during the next 10 years (with range of cost-effectiveness estimates shown in parentheses). Preferred therapies resulted in greater quality-adjusted survivals and lower costs. The marginal cost-effectiveness cannot be calculated precisely from the table because cost and QALY estimates are shown only in three significant figures.

\*\* The cost per QALY saved by prescribing warfarin as opposed to no therapy during the next 10 years. (with range of cost-effectiveness estimates shown in parentheses) Preferred therapies resulted in greater quality-adjusted survivals and lower costs.

Source: Gage BF et al., JAMA 1995;274:1839-1845

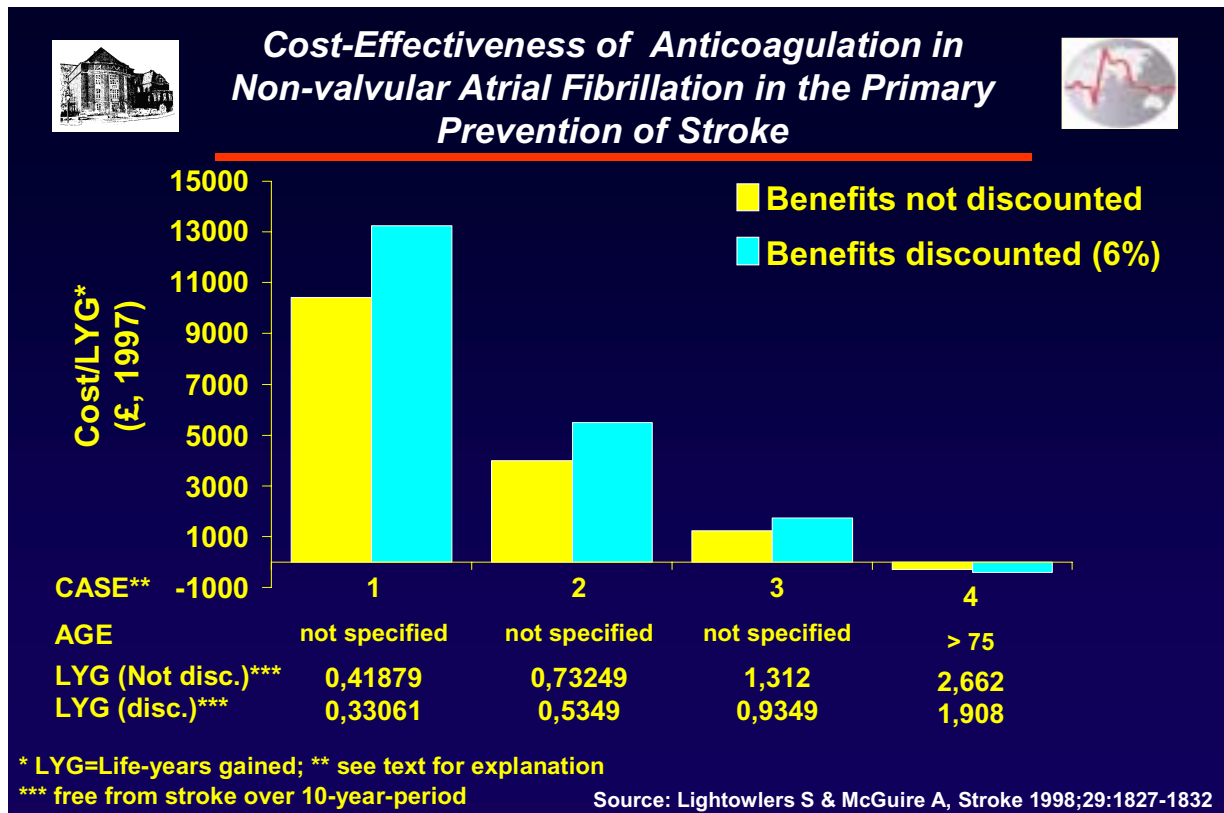
### Cost-effectiveness of warfarin and aspirin for prophylaxis of stroke in patients with nonvalvular atrial fibrillation

Gage et al. examined the cost-effectiveness of prescribing warfarin sodium in patients who have nonvalvular atrial fibrillation (NVAF) with or without additional stroke risk factors (a prior stroke or transient ischemic attack, diabetes, hypertension, or heart disease). The probabilities for stroke, hemorrhage, and death were obtained from published randomised controlled trials. The quality-of-life estimates were obtained by interviewing 74 patients with atrial fibrillation. Costs were estimated from literature review, phone survey, and Medicare reimbursement. Net-costs were estimated from a societal perspective for a 10 year-period in 1994 US dollars. All future costs and life-years were discounted at a rate of 5 % per annum. Gage et al. constructed a Markov model to analyse the expected outcomes of three treatment alternatives – warfarin, aspirin and no therapy – during a 10-year-period in patients with chronic NVAF. Patients in the low risk group (aged 60-69 years) had no additional risk factor for stroke, patients in the medium risk group (aged 65 years) had one and in the high risk group two or more additional stroke risk factors.

This table shows the estimated cost-effectiveness of three treatment options in stroke prevention - warfarin, aspirin and no therapy. For the high risk group no cost-effectiveness was estimated because warfarin was cost saving even if the annual rate of stroke was varied throughout its high risk range. In the medium risk group marginal cost-effectiveness of warfarin compared with aspirin therapy was \$8000 per quality-adjusted life-year gained. Both warfarin and aspirin were preferred to the no-therapy option based on cost and quality-adjusted survival. In the low risk group warfarin therapy provided a minimal health advantage, if any, at a significant cost per quality-adjusted life-year saved. Aspirin was preferred to the no-therapy option based on both cost and quality-adjusted survival. The authors conclude that warfarin treatment of patients (aged 65 years) with NVAF is cost saving in high risk patients and cost-effective in medium risk patients.

Slide 15:

**Cost-effectiveness of anticoagulation in nonrheumatic atrial fibrillation (NRAF) in the primary prevention of stroke**



**Cost-effectiveness of anticoagulation in nonrheumatic atrial fibrillation (NRAF) in the primary prevention of stroke**

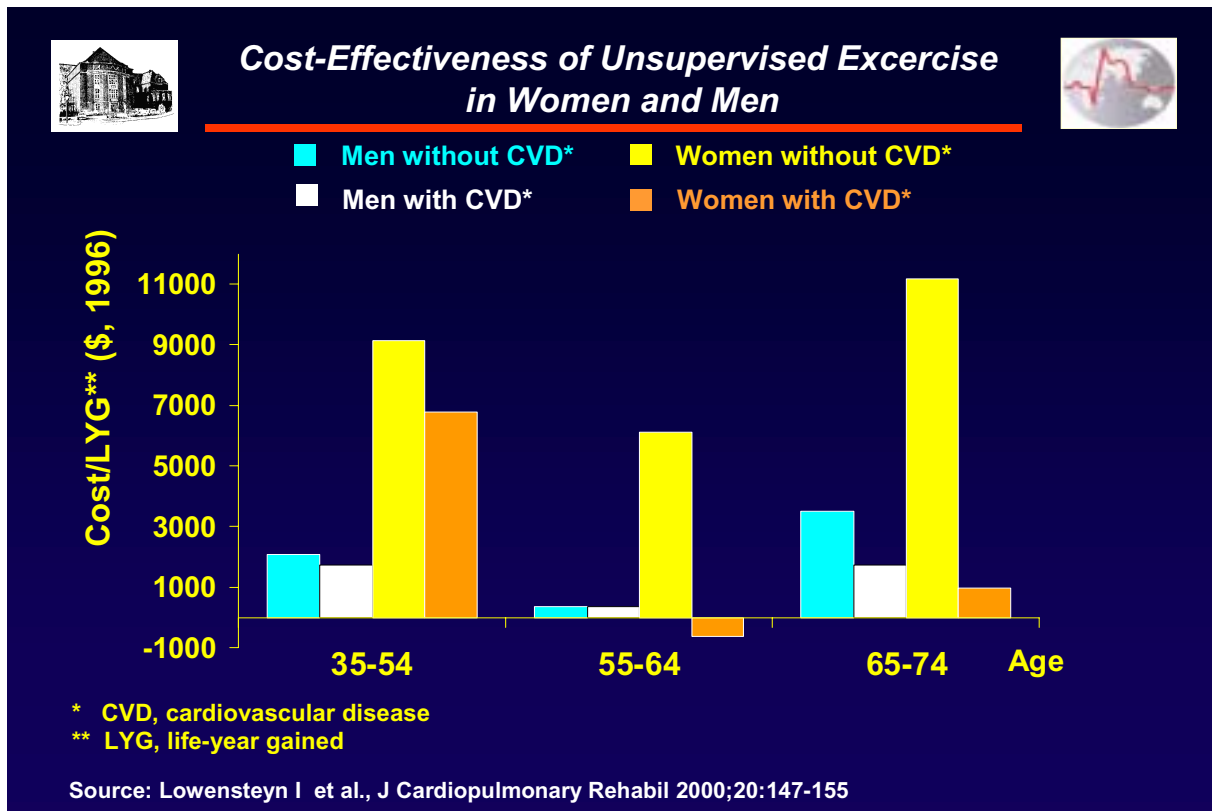
Lightowlers and McGuire assessed the cost-effectiveness of anticoagulation in nonrheumatic atrial fibrillation with particular reference to the very elderly (aged >75 years) who have a higher incidence of bleeding events while undergoing anticoagulation. The authors chose the view of a third-party payer (the National Health Service [NHS]) and calculated only direct costs. Costs considered were the costs incurred by treatment with warfarin, costs of treating side effects of warfarin (bleeding events) and the cost of treatment of bleeding events and strokes that occurred within a 10-year period. Cost data were obtained from a district general hospital and review of the literature. Costs are in 1997 prices and were discounted at an annual rate of 6 %.

Incremental cost per life-year gained were calculated for 4 base cases. For case 1 and 2 efficacy data were used from the Boston Area Anticoagulation Trial for Atrial Fibrillation (BAATAF; 420 subjects) and for case 3 and 4 (group aged >75) data were obtained from a meta-analysis of 5 nonrheumatic atrial fibrillation trials (mean age 69 years). In case 1, the within-period hazard rates remained constant from the end of the fourth year to the 10<sup>th</sup> year in both treatment groups. In case 2, the mean of the within-period hazard rates from years 1 to 4 was used from years 5 to 10 in both treatment groups. In case 3, hazard rates for stroke of 0.045 for the control group and 0.015 for the warfarin group were used. These are the reported hazard rates for the whole of each treatment group from the meta-analysis data. In case 4, hazard rates for stroke of 0.081 for the control group and 0.012 for the warfarin group were used, which were the reported hazard rates for the group aged >75 years in the meta-analysis data. Life-years gained were estimated as the difference between the extrapolated cumulative survival curves for the warfarin treatment group and the no-treatment group in the 4 different base cases.

This slide shows cost per life-year and life-years gained for each base case. For medical and economic reasons, anticoagulation treatment in the prevention of ischemic stroke is justified. Anticoagulation in the primary prevention of ischemic stroke is cost-effective and even cost-saving in patients aged >75 years. Although subjects in the group aged >75 years are more at risk of adverse events while undergoing anticoagulation, anticoagulation is more cost-effective in this group, presumably because the subjects have a higher incidence of stroke.

Slide 16:

## Cost-effectiveness of unsupervised exercise training in women and men



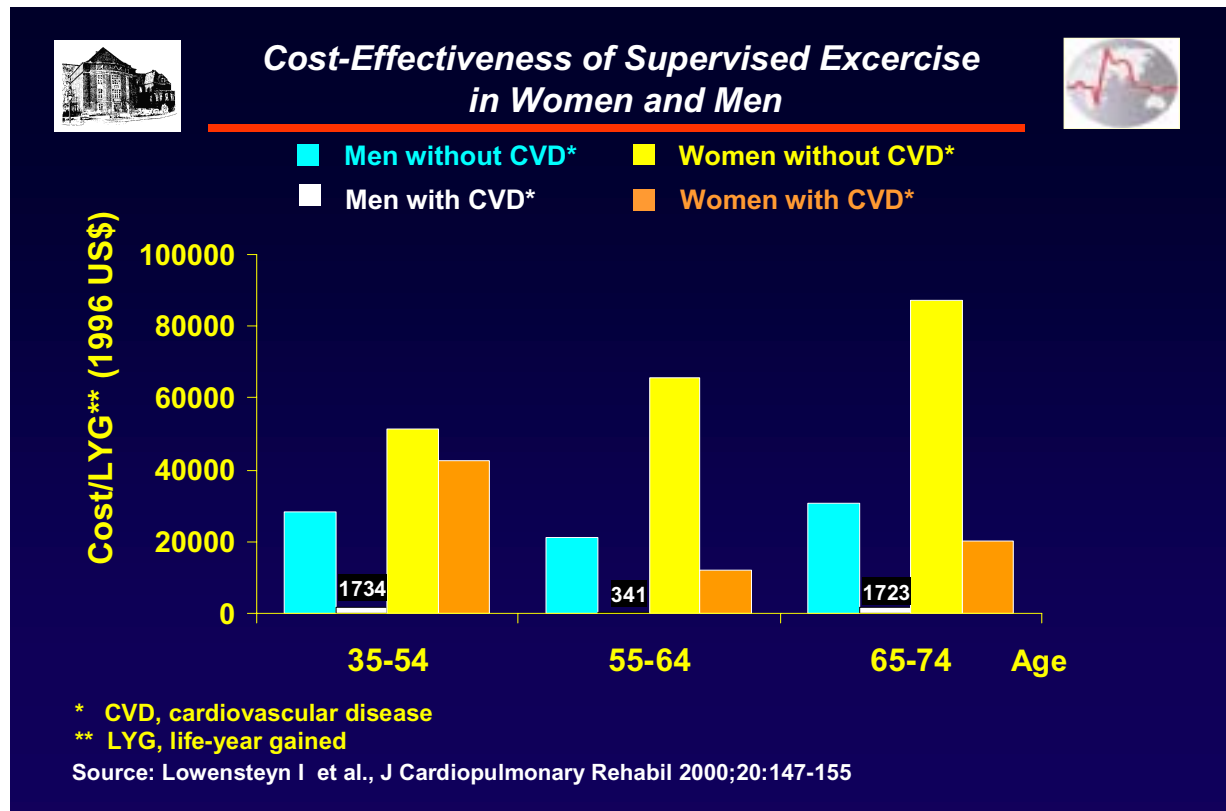
### Cost-effectiveness of unsupervised exercise training in women and men

Using the Cardiovascular Disease Life Expectancy model Lowensteyn et al. estimated the long-term cost-effectiveness of exercise training of average 35 to 74-year old Canadians. Risk factor data representative of the Canadian population with and without cardiovascular disease (CVD) was obtained from the Canadian Heart Health Survey. The impact of exercise training on cardiovascular risk factors was estimated as a 4 % decrease in low-density lipoprotein cholesterol, a 5 % increase in high-density lipoprotein cholesterol and a 6 mmHg decrease in both systolic and diastolic blood pressure. Adherence to the exercise training was assumed to be 50 % for the first year and 30 % for all remaining years. Costs were calculated at 1996 Canadian prices and converted to US dollars at the 1996 exchange rate. Treatment costs include hospitalisation costs, physician fees, as well as outpatient and emergency services when applicable. Benefits were assumed to stop at age 75 years, whereas the costs of the exercise program would continue until death. All future costs and benefits (life-years gained, LYG) were discounted at an annual rate of 3 %. The costs of two different types of exercise programs were evaluated. For an unsupervised program, the costs were estimated at \$311 for the first year and \$73 for all additional years.

This graph shows the cost-effectiveness of unsupervised exercise training (unsupervised walking program) in men and women with and without CVD. Given the relatively few risks and many benefits, unsupervised exercise training can be highly cost-effective (< \$12,000/LYG) for all individuals with and without CVD.

Slide 17:

## Cost-effectiveness of supervised exercise training in women and men

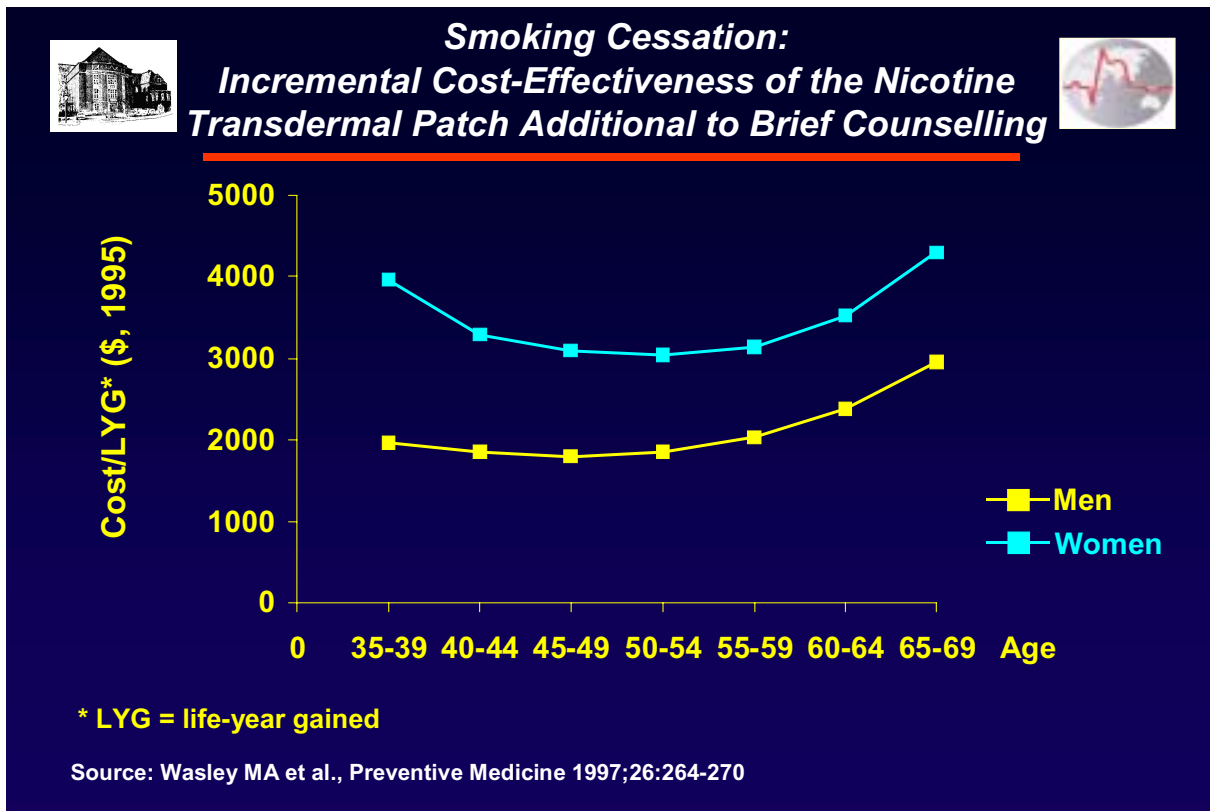


### Cost-effectiveness of supervised exercise training in women and men

This graph shows the cost-effectiveness of a more expensive supervised exercise training in men and women with and without cardiovascular disease (CVD). Costs for a supervised exercise program were estimated at \$605 for the first year (medical evaluation, stress test, exercise prescription, and program costs) and \$367 for all additional years (program costs). Supervised exercise is highly cost-effective (< \$20,000/LYG) for all men with CVD and women with CVD between 55 and 64 years of age, relatively cost-effective (\$20,000-\$40,000/LYG) for younger men without CVD and older women with CVD and borderline or expensive (> \$40,000/LYG) for all others.

Slide 18:

## Smoking cessation: Incremental cost-effectiveness of the nicotine transdermal patch additional to brief counselling



### Smoking cessation: Incremental cost-effectiveness of the nicotine transdermal patch additional to brief counselling

Smoking is one of the most important risk factors for CHD and, unlike some other preventive strategies, smoking cessation is unlikely to impose long term health risks and is highly cost-effective compared to other preventive strategies (e.g. statin therapy). Wasley et al. examined the cost-effectiveness of the nicotine transdermal patch as an adjunct to brief physician counselling during routine office visits. The choice of perspective is of a third party payer considering costs of physician time and patch prescriptions. Costs are in US\$ (1995). The cost of the nicotine transdermal patch is an average retail price, not discounted. Benefits are discounted at an annual rate of 5%. The incremental cost-effectiveness is quantified as cost per additional life-year gained (LYG) when patch plus counselling is compared with brief physician counselling alone.

Efficacy data of brief physician counselling and brief counselling plus patch were obtained from a meta-analysis of six clinical trials and a meta-analysis from 13 studies respectively. Of a hypothesized sample of 400 established smokers (>20 cigarettes/day) (group I) who received brief counselling and the nicotine patch 17.6% were assumed to quit smoking for at least 1 year, of which 65% (11.4) will continue to remain abstinent throughout their lives. Compared with brief counselling alone (a second hypothetical sample of 400 smokers, group II) 8.5 additional smokers will quit and remain abstinent, when the patch is added to brief counselling. For brief counselling alone average costs per LYG for men ranges from \$362 to \$594 and for women from \$612 to \$884 (benefits discounted). This graph shows the incremental cost per LYG when the patch is added to brief counselling. The graph indicates that men between the ages of 45 and 49 and women between 50 and 54 years receive the optimal benefit from the nicotine patch as an adjunct to brief counselling.