# How to deliver cardiac rehabilitation to a patient with Acute Coronary Syndrome

## STATE OF THE ART

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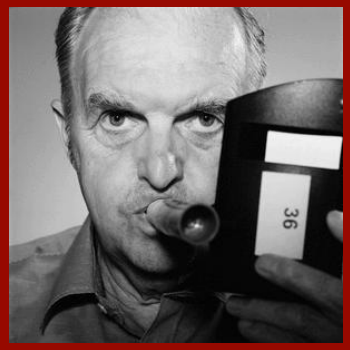
Declaration of interest: None







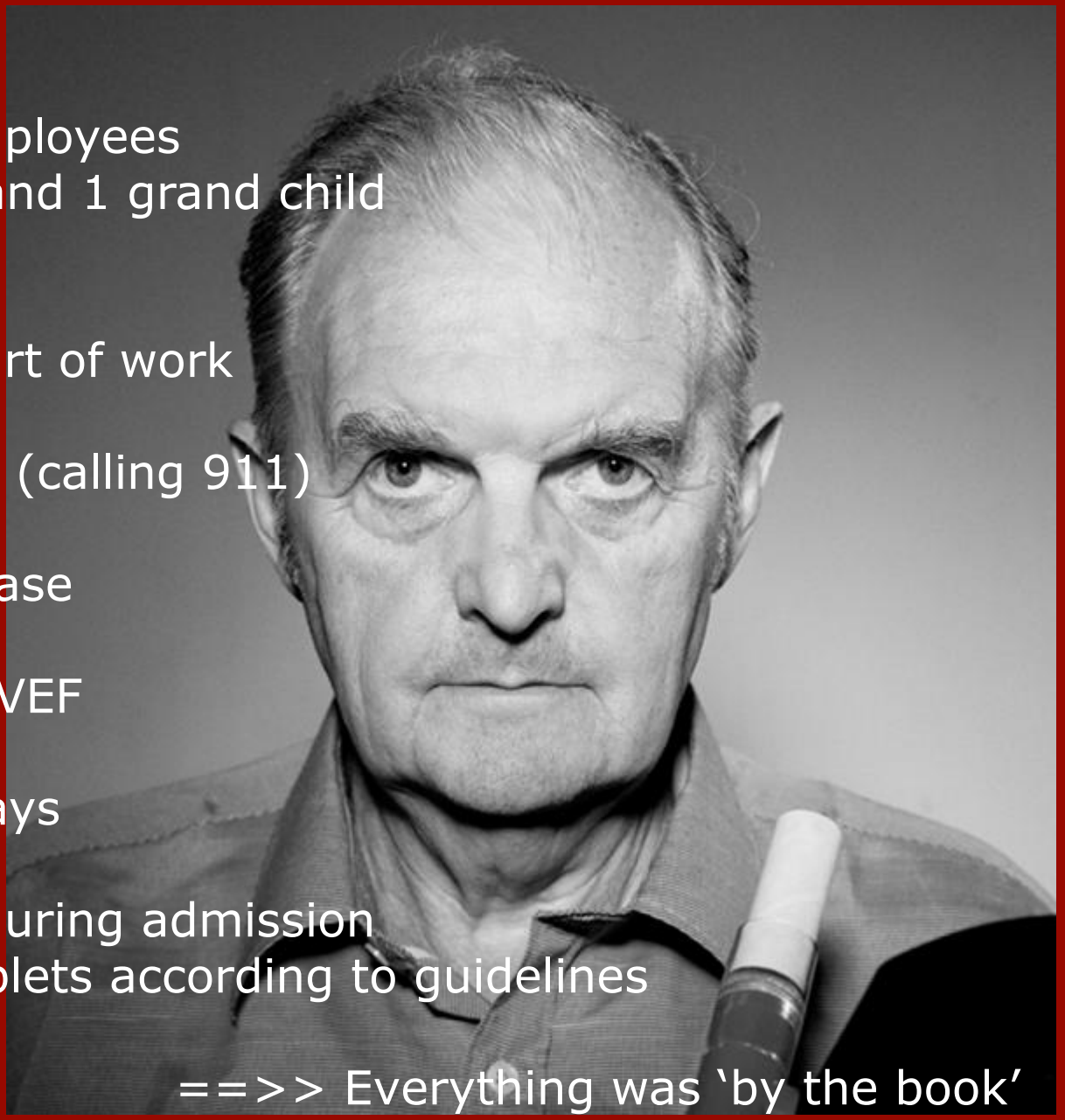
# Acute Coronary Syndrome (STEMI, Non-STEMI, UAP)

64 years old
Carpenter with 3 employees
Married, 2 children and 1 grand child

Smoker
Physical active as part of work

First time chest pain (calling 911)
ECG showed STEMI
KAG one vessel disease
Primary PCI
No angina, normal LVEF

Submitted after 5 days
Well information
Smoking cessation during admission
Medicated with 5 tablets according to guidelines



==>> Everything was 'by the book'

*Model*

# Position paper EACPR

Wolters Kluwer Health | Lippincott Williams & Wilkins

EUROPEAN SOCIETY OF CARDIOLOGY®

**Review**

## Secondary prevention through cardiac rehabilitation: from knowledge to implementation. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation

Massimo Francesco Piepoli, Ugo Corrà, Werner Benzer, Birna Bjarnason-Wehrens, Paul Dendale, Dan Gaita, Hannah McGee, Miguel Mendes, Josef Niebauer, Ann-Dorthe Olsen Zwisler and Jean-Paul Schmid

Piepoli MF et al. EJCPR 2010:1-17

# Definition

Cardiac rehabilitation is a multifaceted and multidisciplinary intervention, which improves functional capacity, recovery and psychological well-being.

Adapted by WHO

Piepoli MF et al. EJCPR 2010:1-17

# Evidence-based intervention

| | Oldridge 1988 | Cochrane 2001 | Taylor 2003 | Cochrane 2011 |
|---|---|---|---|---|
| Diagnosis | AMI | CHD | CHD | CHD |
| Trials | 19 | 34 | 48 | 47 |
| CR ex-only/CCR | - | 20/14 | 30/18 | 17/29 |
| Patients | 4347 | 7996 | 8940 | 10,794 |
| Age (mean) | | 55<br>48-71 | 55<br>(48-71) | 57<br>(46-84) |
| Women % | 2,9% | 9% | 20% | 20 |
| Outcome | Survival | Survival<br>Riskfactors<br>HRQL | Survival<br>Riskfactors<br>HRQL | Survival<br>MI<br>Re-hospitalisations<br>HRQL |

# Weakness of evidence

- Selected study-population (men, STEMI, <65 years)
- Quality of trials have been questioned
- Most trials conducted before 1995
- Duration, follow-up and interventions vary markedly
- No descriptions of the intervention

# Evidence-based intervention

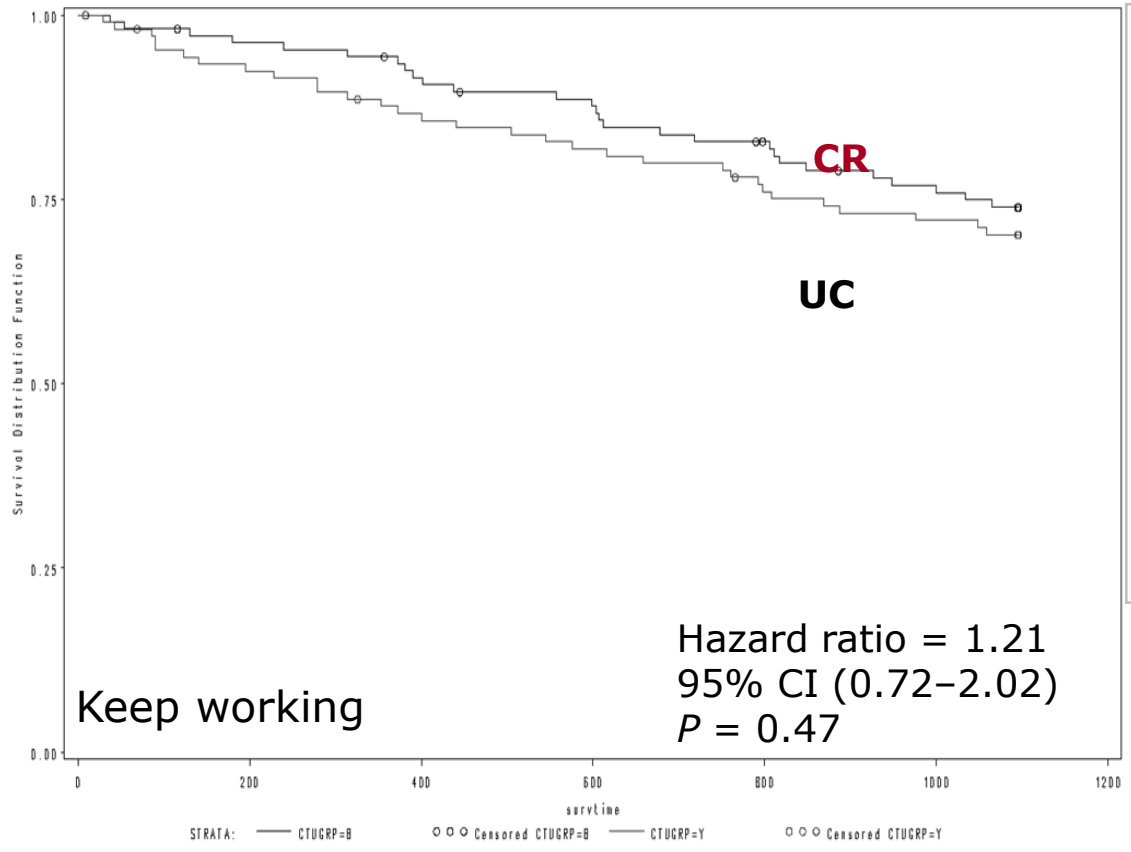
| Effekt CHD | Alle forsøg |
|---|---|
| Trials | 47 |
| Numbers of patients | 10.794 |
| Mortality (OR) | 0,87 (0,75-0,99)* ▼ |
| Cardiovascular motality (OR) | 0,74 (0,63-0,87)* ▼ |
| Re-hospitalisation (short term) | 0,69 (0,51-0,93)* ▼ |
| Blood preasure dia. (WMD mmhg) | -0,56 (-1,68-0,69) |
| T- Colesterol (WMD mmhg) | -0,36 (-0,60--0,12)* ▼ |
| HDL Colesterol (WMD mmhg) | 0,04 (-0,03-0,11) |
| LDL Colesterol (WMD mmhg) | -0,19 (-0,47-0,08) |
| Triglycerid (WMD mmhg) | -0,20 (-0,35-0,07)* ▼ |
| Smoking (OR) | 0,73 (0,60-0,89)* ▼ |
| HQRL | Improvment (7/10 trials) ▲ |

Cochrane –review CHD 2001

Cochrane-review 2011

# Return to work and sick leave

Register-based 3 years follow-up




| | Poisson (95% CI)* p-value |
|---|---|
| CR reference group | 1.00 (ref) |
| **Days recieving Sickness benefits** | 1.19 (1.16-1.22) <0.01 |
| **Days of Unemployment** | 1.04 (1.01-1.07) <0.01 |

* Zero-inflated Poisson model

Unpublished data

# Phases of rehabilitation

| | |
|---|---|
| Phase I | Inpatient rehabilitation |
| Phase II | Early outpatient rehabilitation |
| Phase III | Long-term outpatient rehabilitation |

Piepoli MF et al. EJCPR 2010:1-17

# Core components

- Individual assessment
- Physical counselling and exercise training
- Smoking cessation
- Dietary counselling
- Patient education and psychosocial support
- Risk-factor management, medication and clinical follow-up

Piepoli MF et al. EJCPR 2010:1-17

# Individual assessment

- Clinical history, co-morbidity and current symptoms
- Adherence to medical regimes
- ECG, echocardiography, blood testing
- Physical activity level and measurement of exercise capacity
- Smoking habits
- Dietary habits
- Self-assessed health
- Screening for psychological distress

Interview vs.
standardized measurement tools

Piepoli MF et al. EJCPR 2010:1-17

# Physical counselling

- A 30–60 minutes/daily moderately intense aerobic activity life long
- Emphasize sedentary lifestyle as risk factor, and benefits of physical activity
- Recommend gradual increases in daily lifestyle activities over time, and how to incorporate it into daily routine
- Advise individualize physical activity according to patient's age, past habits, co-morbidities, preferences and goals
- Reassure regarding the safety of the recommended protocol
- Encourage involvement enjoyable activities

Piepoli MF et al. EJCPR 2010:1-17

# Exercise training

- Prescribed on an individualized approach according to capacity and risk-factors
- Supervised 12 weeks of aerobic exercise training at least 3 times pr. week
- Starting at 50% of maximal work load or V02 peak and increasing to 70%
- Resistance training is recommended 1 h/week

Special recommendations for patients with CHF and low LVEF

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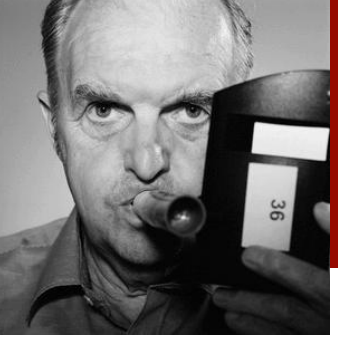


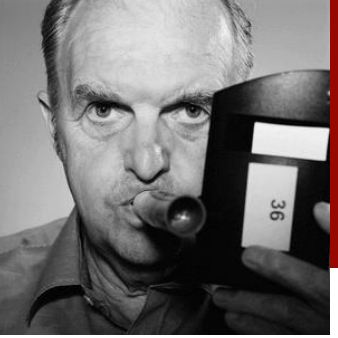
# Smoking cessation

- All smokers should permanently stop smoking
- Importance of structured approaches should be emphasized
- Should be advised by cardiologists and general practitioner
  (OR 1.69 ((1.45-1.98))
- Behavioral advice and counseling is corner-stone (3 – 4 visits)
- Pharmacoterapy 2-3 month

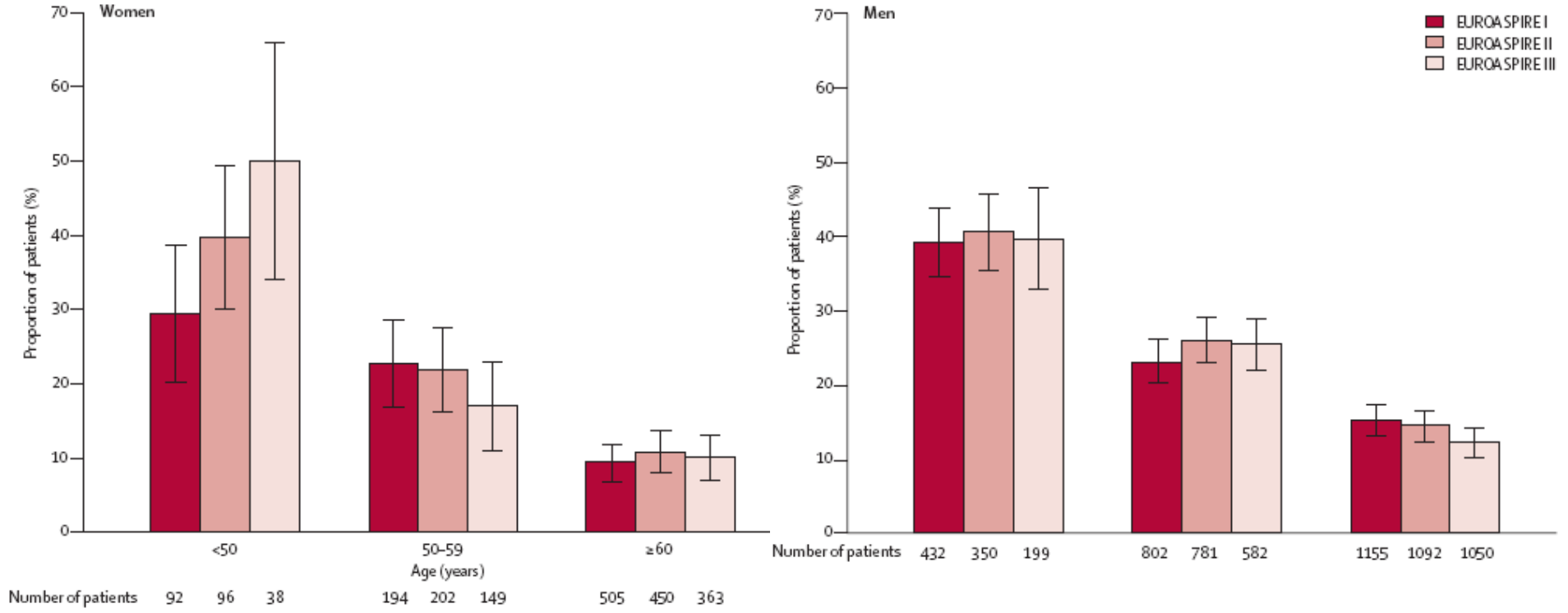
  Nikotine (OR 1.73 (1.62-1.85))
  Vareniclin (OR 3.22 (2.43-4.27))
  BupropionSR (OR 1.97 (1.67-2.34))

==>> 1 year cessation rate 15-35 %

Piepoli MF et al. EJCPR 2010:1-17



# Smoking cessation – could we do better?



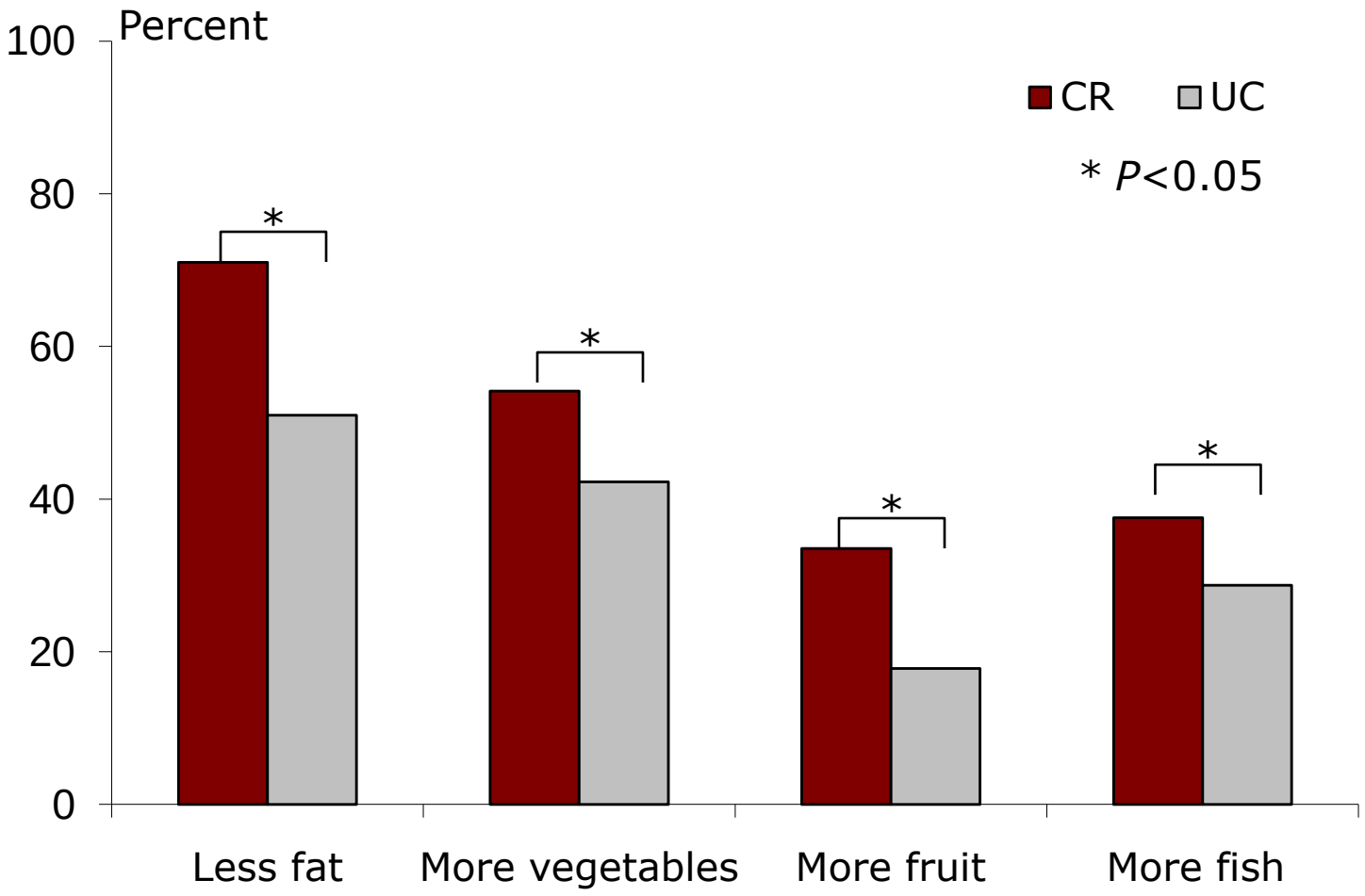

Kotseva k et all. Lancet 2009;373:929-40

# Dietary counselling

- Daily caloric intake, content of nutrients (fat, vegetables, fruit and fish) should assessed systematically
- Caloric intake should be balanced by energy expenditure to avoid weight gain
- Mediterranean diet with low level of saturated fat, high level of fibre, fruit, vegetables and fish (omega-3 fatty acids)

Piepoli MF et al. EJCPR 2010:1-17

# Dietary counselling - does it matter?




Zwisler et al. Am Heart J, 2008

# Effect of multiple lifestyle changes

**Epidemiology and Prevention**

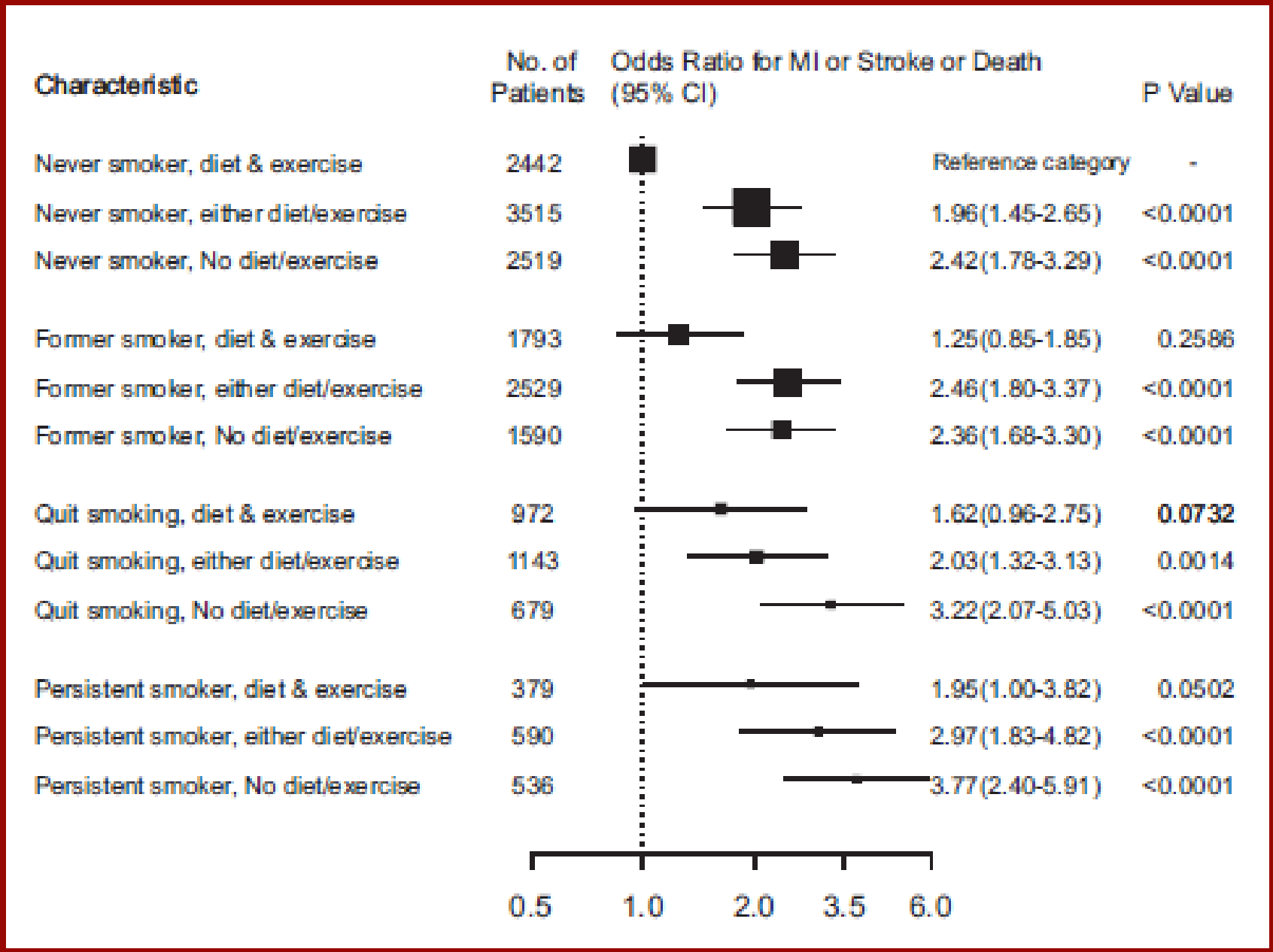
## Association of Diet, Exercise, and Smoking Modification With Risk of Early Cardiovascular Events After Acute Coronary Syndromes

Clara K. Chow, MBBS, FRACP, PhD; Sanjit Jolly, MD, MSc, FRCPC; Purnima Rao-Melacini, MSc; Keith A.A. Fox, BSc (Hons), MB, ChB, FRCP, FESC, FMedSci; Sonia S. Anand, MD, PhD, FRCPc; Salim Yusuf, DPhil, FRCPC, FRSC

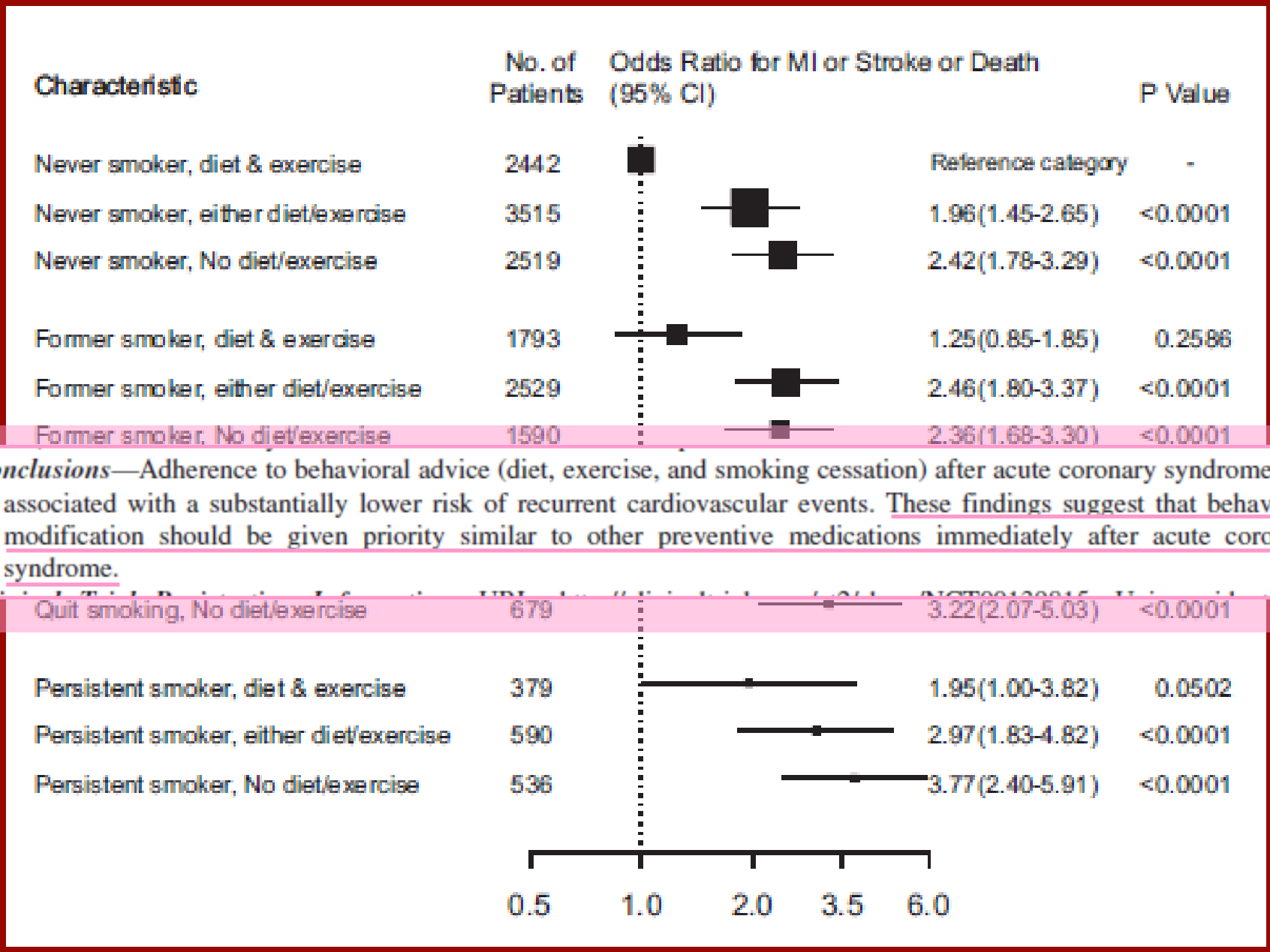
***Background***—Although preventive drug therapy is a priority after acute coronary syndrome, less is known about adherence to behavioral recommendations. The aim of this study was to examine the influence of adherence to behavioral recommendations in the short term on risk of cardiovascular events.

***Methods and Results***—The study population included 18 809 patients from 41 countries enrolled in the Organization to Assess Strategies in Acute Ischemic Syndromes (OASIS) 5 randomized clinical trial. At the 30-day follow-up, patients reported adherence to diet, physical activity, and smoking cessation. Cardiovascular events (myocardial infarction, stroke, cardiovascular death) and all-cause mortality were documented to 6 months. About one third of smokers

Chow et al. Circulation. 2010;121:750-758




Chow et al. Circulation. 2010;121:750-758




*Conclusions*—Adherence to behavioral advice (diet, exercise, and smoking cessation) after acute coronary syndrome was associated with a substantially lower risk of recurrent cardiovascular events. These findings suggest that behavioral modification should be given priority similar to other preventive medications immediately after acute coronary syndrome.

Chow et al. Circulation. 2010;121:750-758

# Patient education

- Patient education is an important part of rehabilitation and should approach the themes:

*Information on the disease, treatment and medication, compliance, lifestyle changes, re-laps, coping with chronic disease, sexual dysfunction, social isolation, return to work, driving licence, insurance, travel etc.*

13 RCTs involving 68,556 patients

*Conclusion:* There was some evidence to suggest that education may improve HRQL and reduce overall healthcare costs. Whilst our findings are generally supportive of current guidelines that CR should include not only exercise, lifestyle changes and psychological interventions, further research into education is needed.

Cochrane review: Brown et al. Patient education in the management of coronary heart disease. 2011

Piepoli MF et al. EJCPR 2010:1-17

# Psychosocial support

- Assessment of psychosocial parameters is recommended alongside intervention approaching anxiety and depression

24 RCTs involving 9,296 patients

*Conclusion:* We found evidence that psychological interventions may produce small to moderate reductions in depression and anxiety, and may also reduce cardiac mortality. Uncertainly remains regarding the subgroups of patients who would benefit most from treatment and the characteristics of successful interventions.

Cochrane review: Whalley et al. Psychological interventions for coronary heart disease. 2011

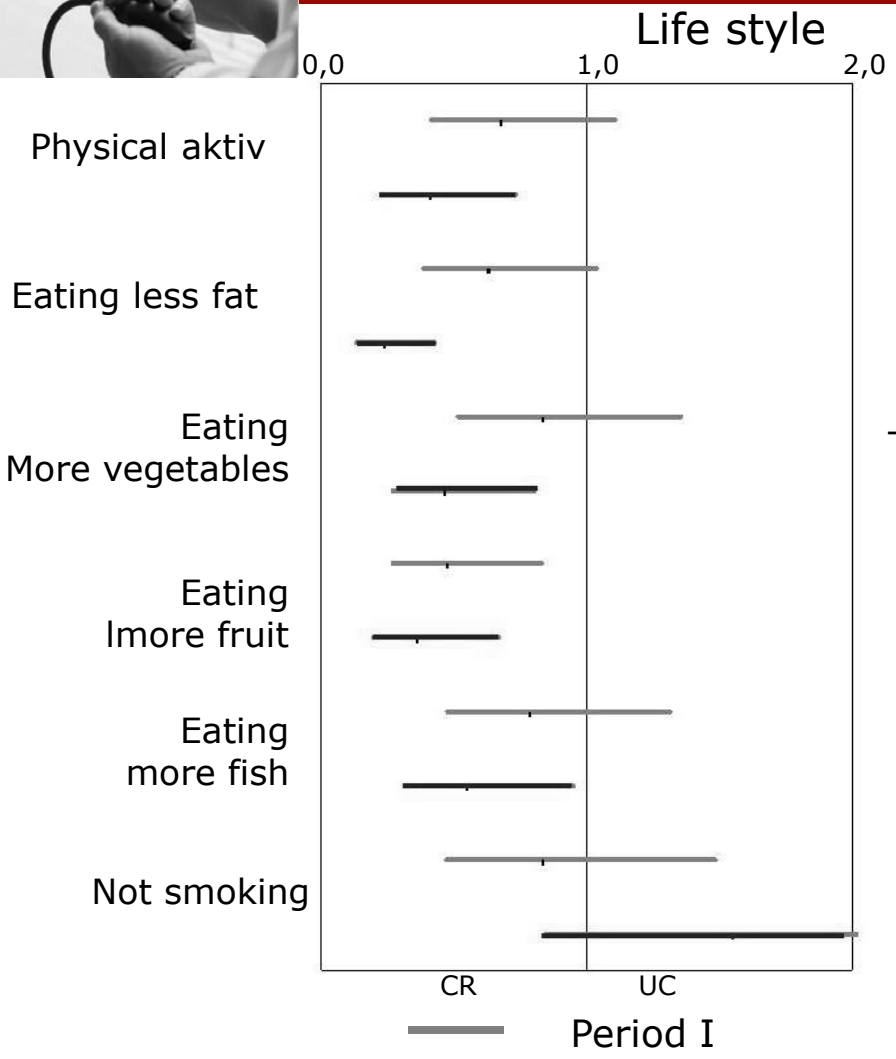
Piepoli MF et al. EJCPR 2010:1-17

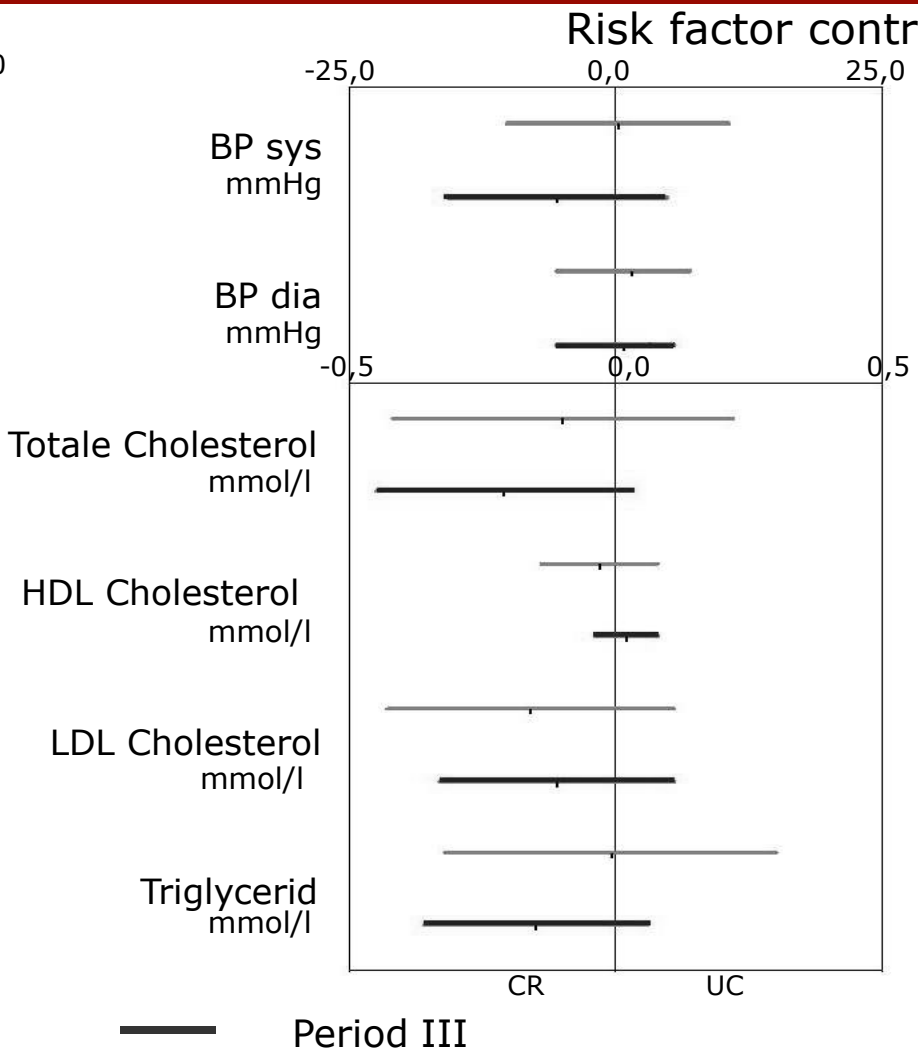
# Risk-factor management, medication and clinical follow-up

| Target | No T2DM | T2DM |
|---|---|---|
| Symptoms | CCS 0, NYHA I-II | |
| BT | 130/80 | <130/80 (125/75) |
| Lipids<br>*T-cholesterol*<br>*LDL* | <br><4,5 (4,0) mmol/l<br><2,5 (2,0) mmol/l | <br><4,0 mmol/l<br><2,0 mmol/l |
| Fasting glucose | Fasting glucose< 6 mmol/l<br>HbA1C < 6,5% | |
| Medication | ASA<br>B-blokker<br>Statin<br>(ACE-hæmmer) | ASA<br>Statin<br>B-blokker<br>ACE-hæmmer |

Piepoli MF et al. EJCPR 2010:1-17

# Effect of goal setting

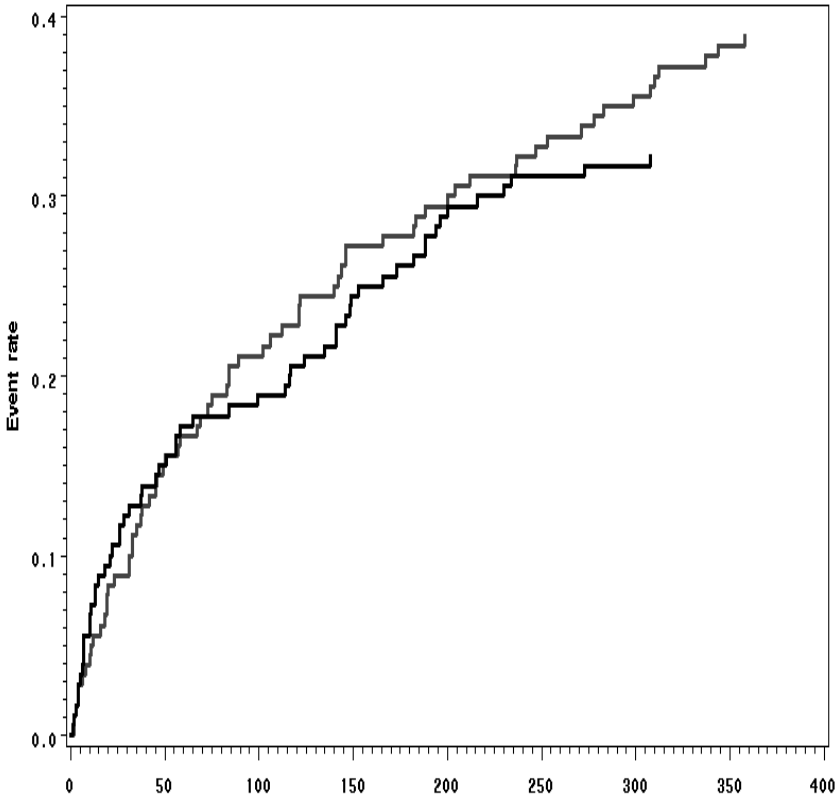


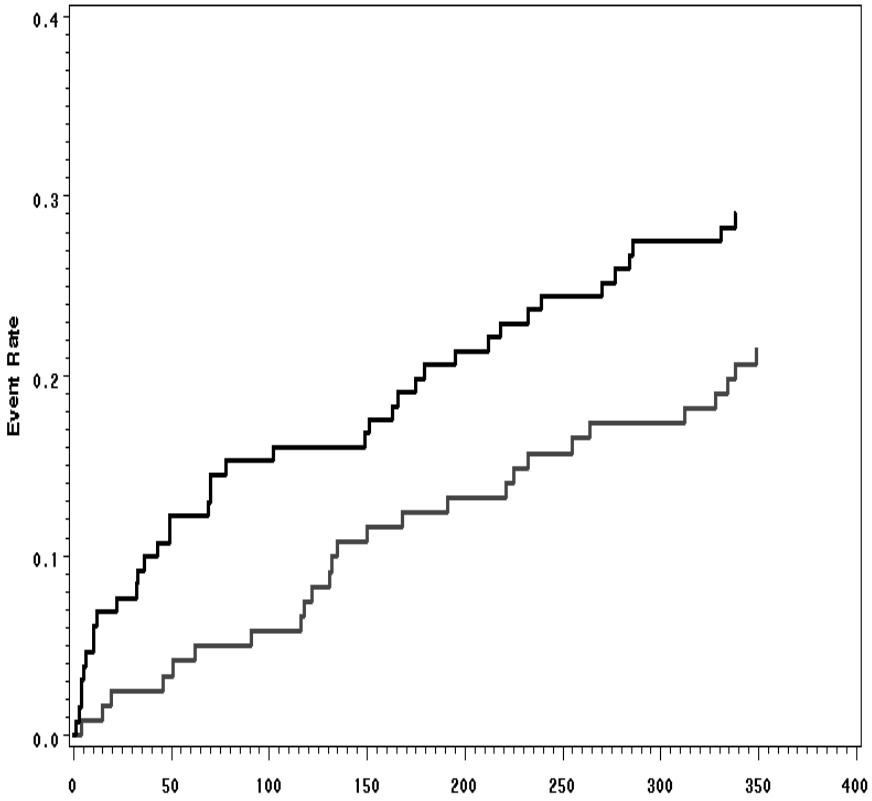

[Cardiac rehabilitation – a health technology assessment]. National Board of Health, Denmark, 2006

# Effect of goal setting

Period I



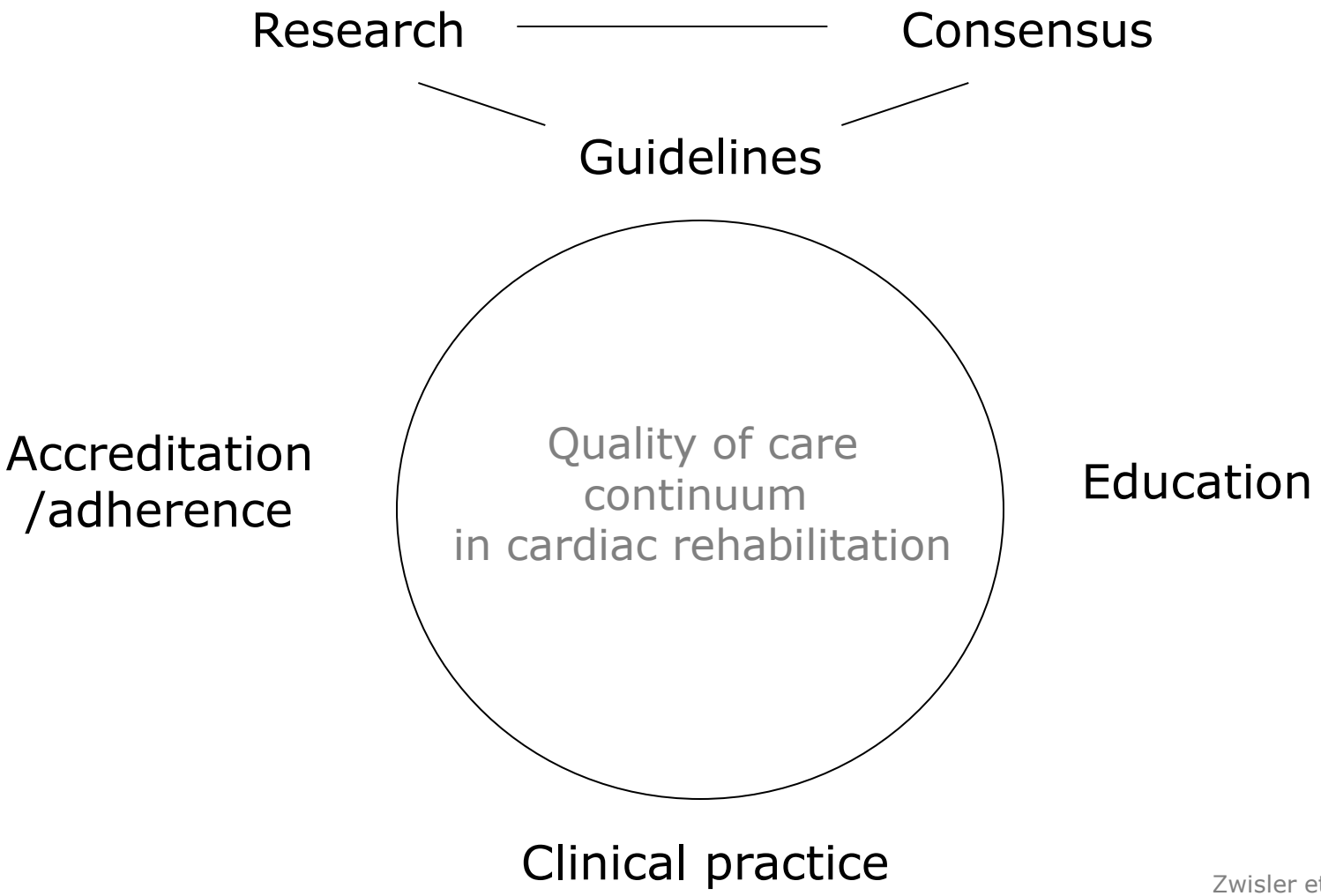

Period III




Composite outcome of death, re-infarction and rehospitalisation

[Cardiac rehabilitation – a health technology assessment]. National Board of Health, Denmark, 2006

# Quality of care continuum




Zwisler et al. EJCPR, 2011
Adapted from the EuroHeart Survey Programme

# Implementing 'performance measures'

It is anticipated that the implementation of CR performance measure sets will

a) stimulate changes in the clinical practice

b) Improve patient participation

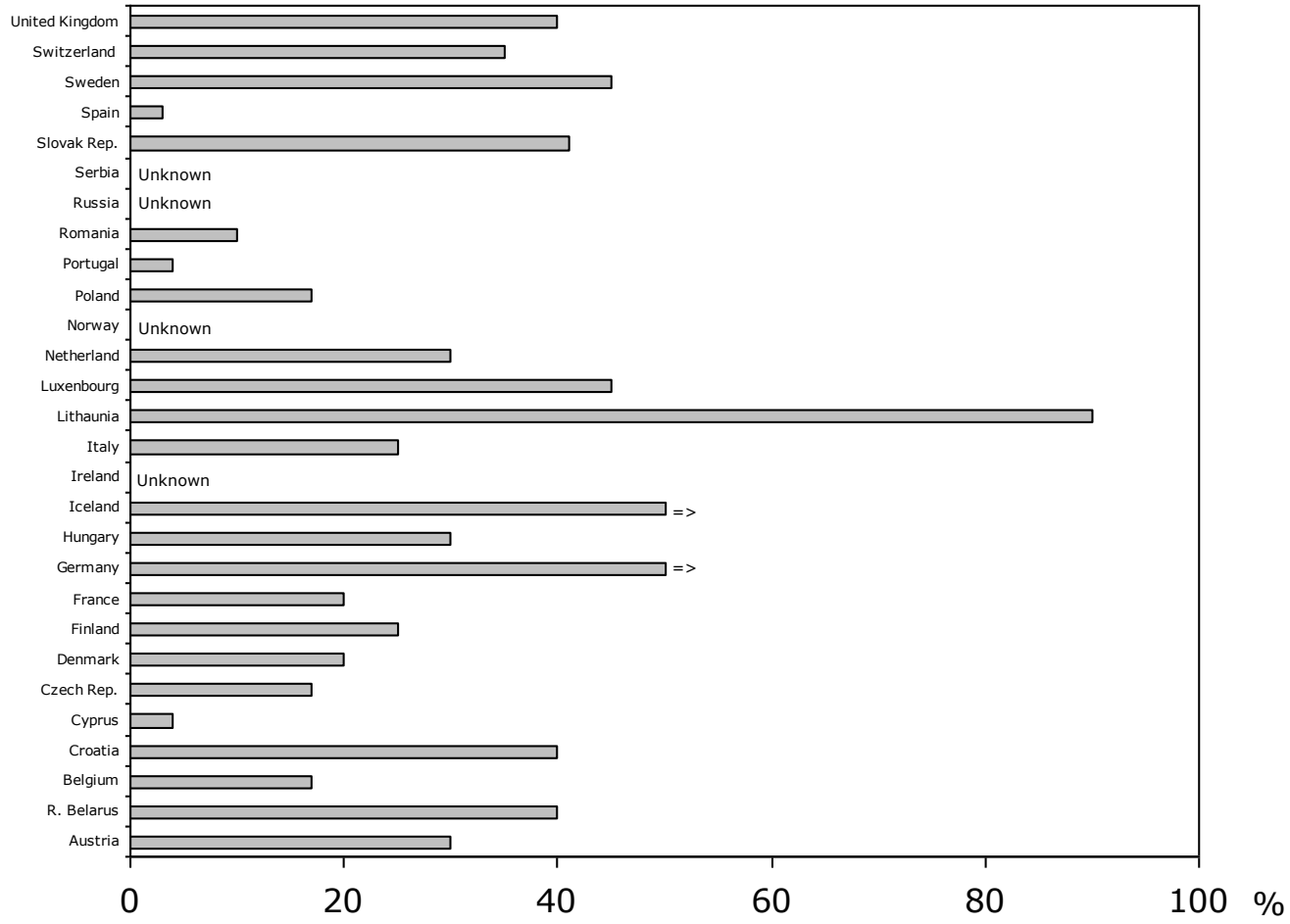
AACVPR/ACC/AHA 2007 Performance Measures. JCRP, 2007

Piepoli et al. Secondary prevention through cardiac rehabilitation. EJCPR, 2010

# Patient participation

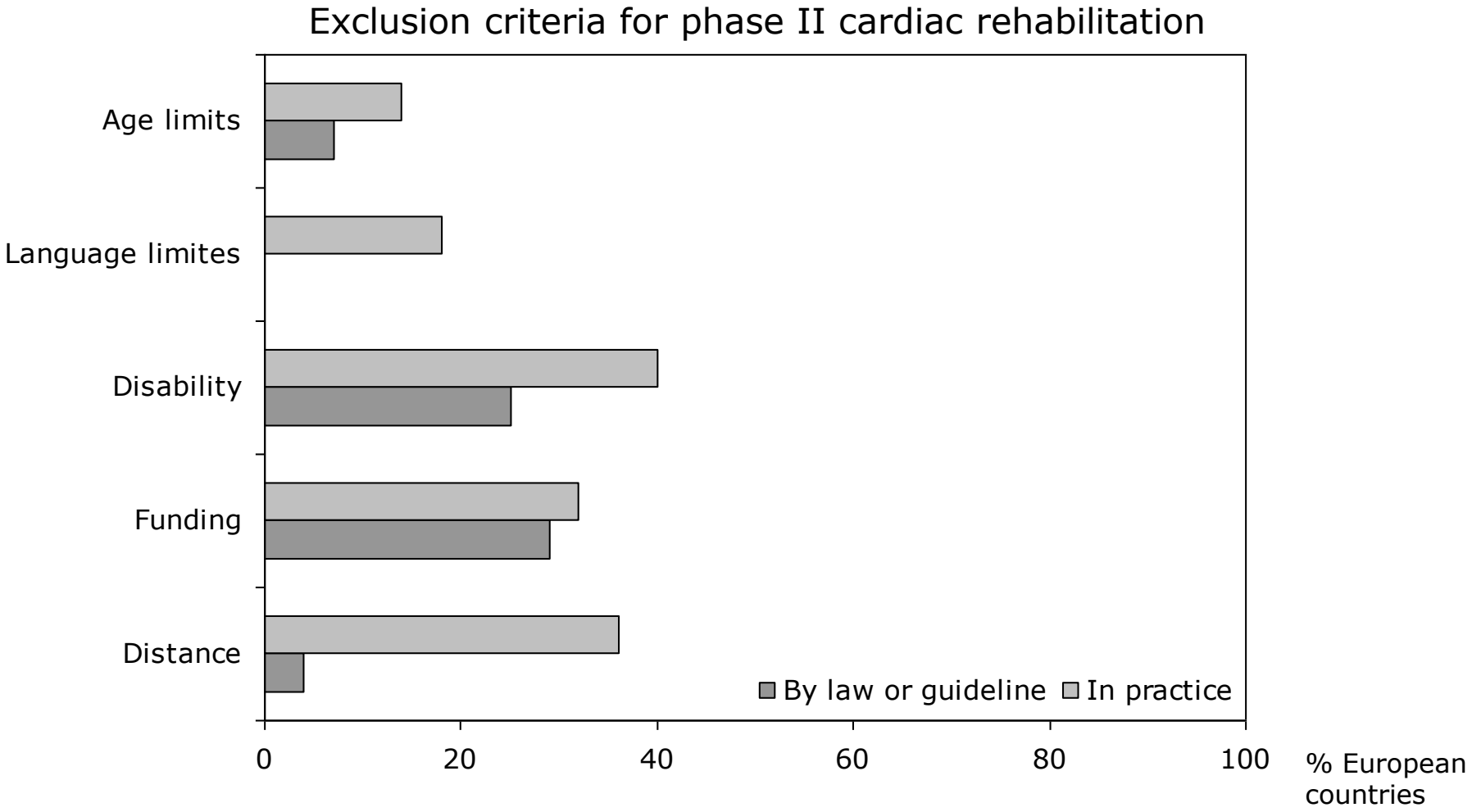
# Underutilisation

## Numbers of eligible patients participating in phase II cardiac rehabilitation




Bjarnason-Wehrens et al. Cardiac rehabilitation in Europe. EJCPR, 2010

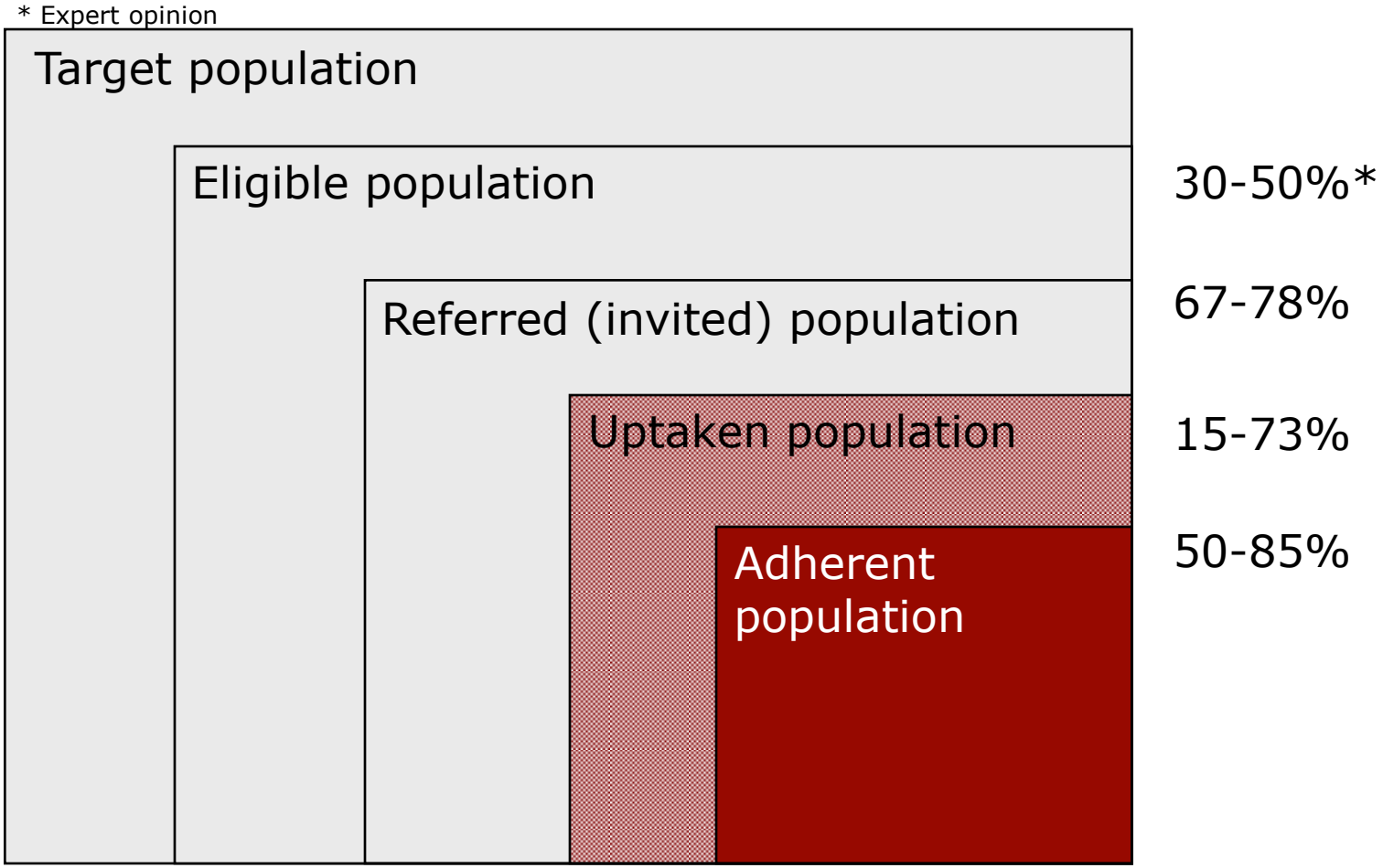
# Eligibility across Europe




Bjarnason-Wehrens et al. Cardiac rehabilitation in Europe. EJCPR, 2010

# Patient-participation

## No common definition



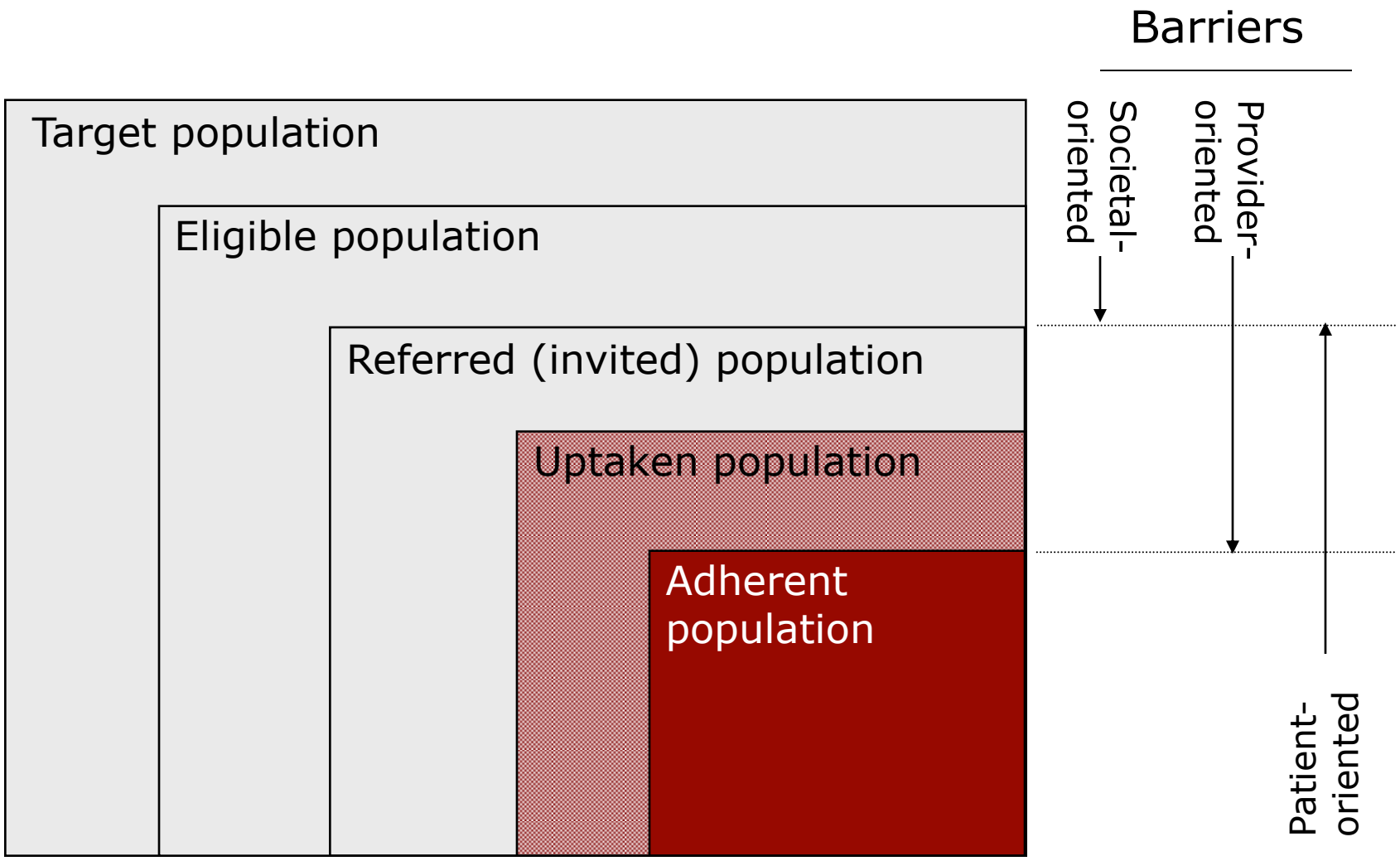

Zwisler et al. [Cardiac Rehabilitation. A Health Technology Assessment]. National Board of Health, Denmark. 2006

# Barriers to participation

- Societal / health care system barriers
- Provider oriented barriers
- Patient oriented barriers

AACVPR/ACC/AHA 2007 Performance Measures. JCRP, 2007

# Patient-participation




Zwisler et al. [Cardiac Rehabilitation. A Health Technology Assessment]. National Board of Health, Denmark. 2006

# Referred (invited) population

- > 22 % of eligible patients were not invited[1]
- Non-invited/referred tends to be older and female[1,2]
- The main predictor of referral was the physician's endorsement and attitude towards effectiveness of CR[2]
- Referral rate varies from 10% to 60% with highest referrals rates in studies with automatic referral process[3]

[1]Beswick et al. Provision, uptake and cost of cardiac rehabilitation. Health Technology Assessment, 2004
[2]Jackson et al. Getting most out of rehabilitation. Heart, 2005
[3]Cortes et al. Determinants of referral to cardiac rehabilitation. Am Heart J, 2006

# How to improve participation?

## Positive results in non-randomised trials

| Provider-oriented approaches | Patient-oriented approaches |
|---|---|
| Automatic referral strategies | Physicians endorsement |
| Optimisation of referral procedures | Former CR lay volunteers |
| Coordination of patient pathways | Written agreement on treatment goals |
| Physicians attitude toward CR | Spouse involvement |
| Motivational communication strategies | Psychosocial support |
| | Gender-focused intervention |
| | Focus on ethnicity (language, culture, religion) |

[1]Beswick et al. Provision, uptake and cost of cardiac rehabilitation. Health Technology Assessment, 2004
Zwisler et al. [Cardiac Rehabilitation. A Health Technology Assessment]. National Board of Health, Denmark. 2006

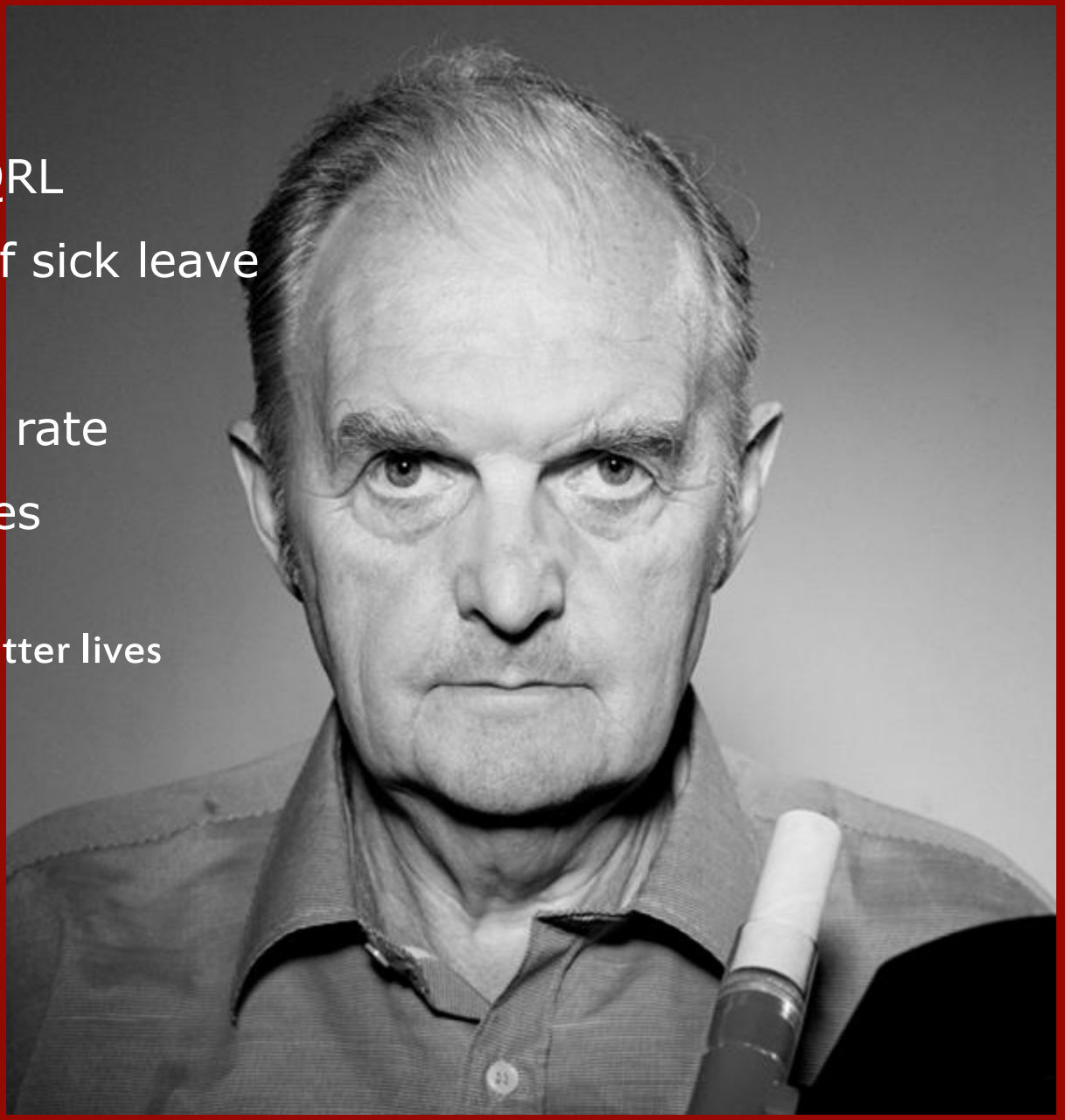
7 RCTs involving 903 patients
*Conclusion:* Some evidence suggest that interventions to increase uptake of cardiac rehabilitation can be effective. Further high quality research is needed.

Davies et al. Promoting patient uptake and adherence in cardiac rehabilitation. Cochrane review, 2010

# What to expect from rehabilitation in ACS patients

- Improvement in HQRL
- Reduction in days of sick leave
- Return to work
- Lower re-admission rate
- Lower mortality rates

==>> Living better lives



*Model*