

University of Pisa



School of Medicine

Department of Internal Medicine

**Appropriate ways of adopting the HbA_{1c}
standardisation in clinical practice:
the diabetologist's view**

Ele Ferrannini, M.D.

Milano, 6 November 2007

Outline

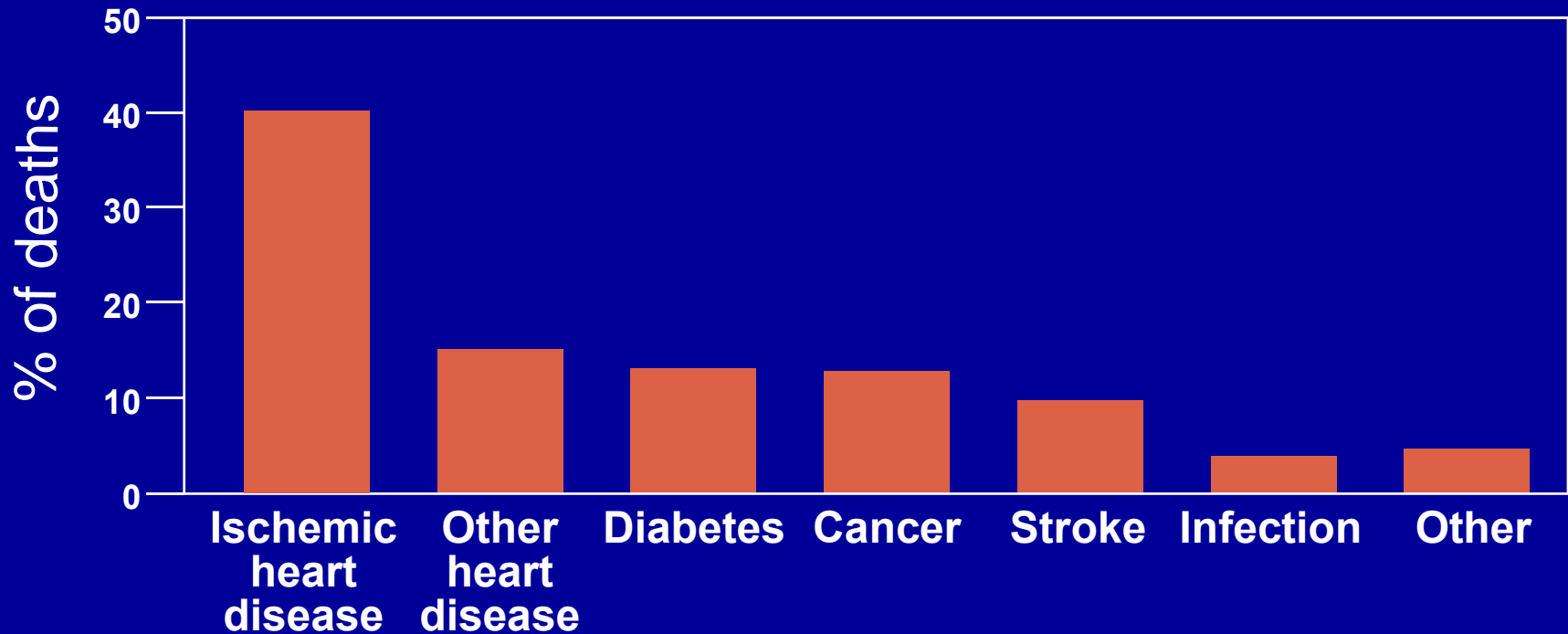
- **Epidemiology of cardiovascular disease**
- **Epidemiology of microvascular complications**
- **Risk reduction**
- **The unknowns**

Outline

- **Epidemiology of cardiovascular disease**
- Epidemiology of microvascular complications
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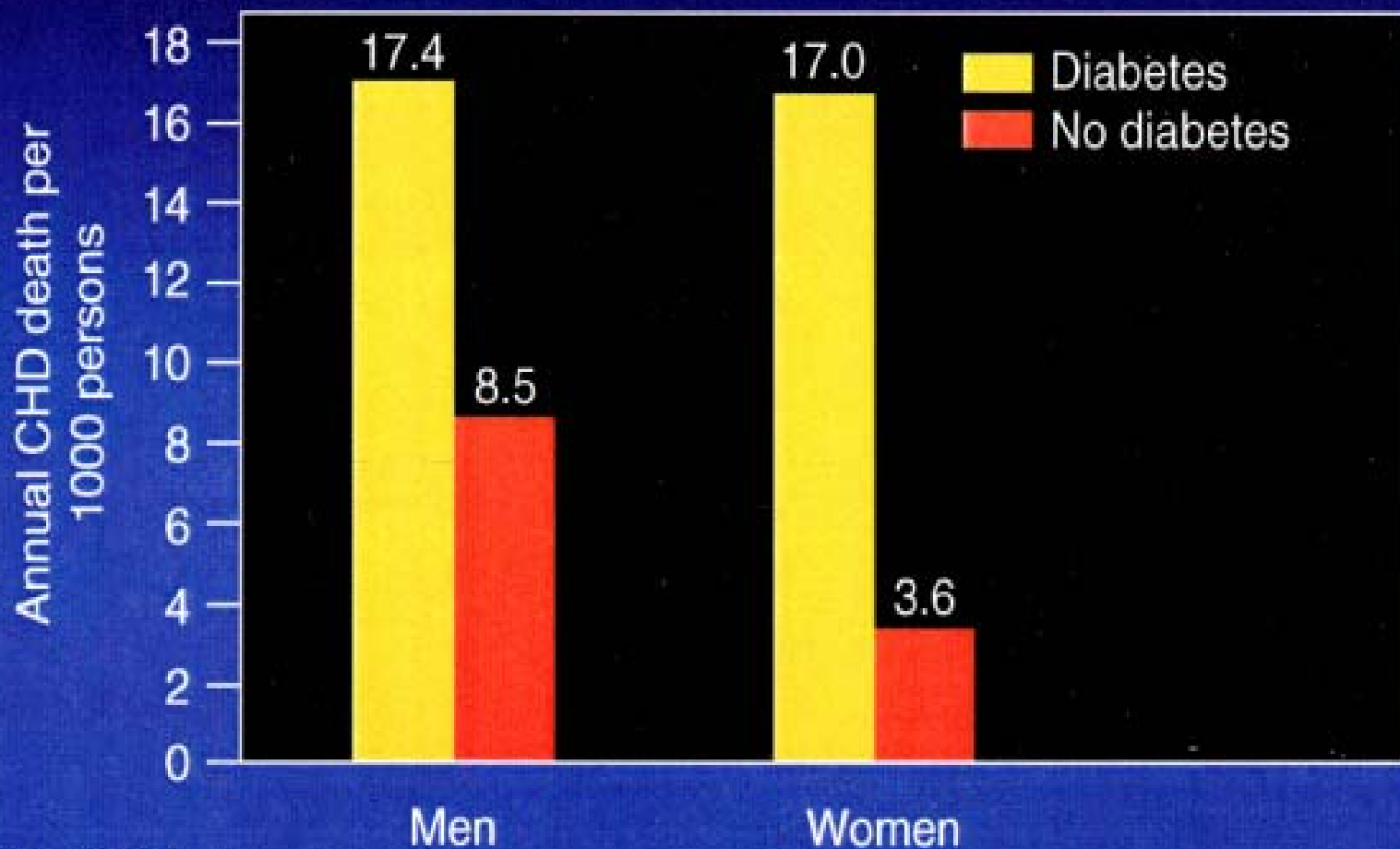
Mortality in People with Diabetes

Causes of Death



Adapted from Geiss LS et al. In *Diabetes in America*. 2nd ed. 1995: chap 11.

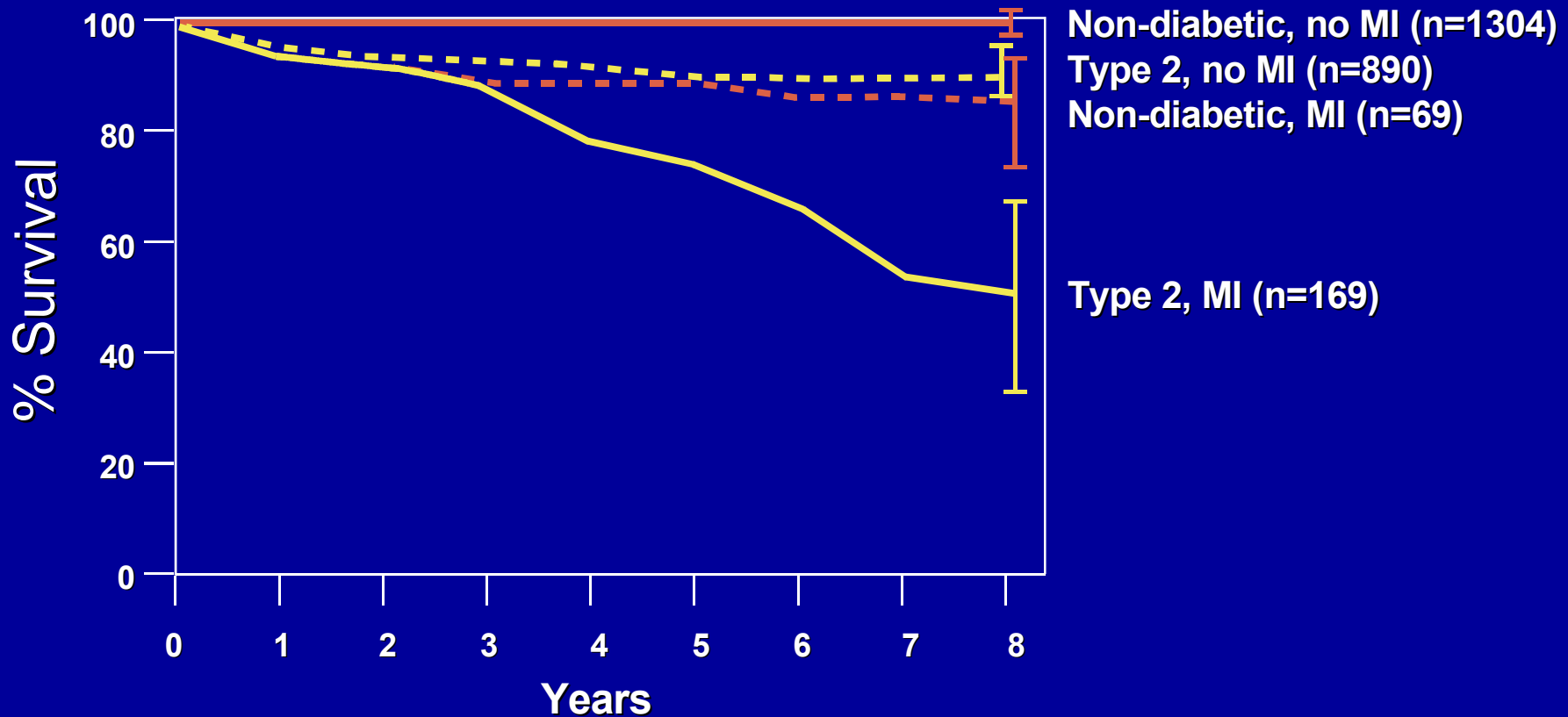
Framingham Study: DM and CHD Mortality — 20-Year Follow-Up



DM = diabetes mellitus

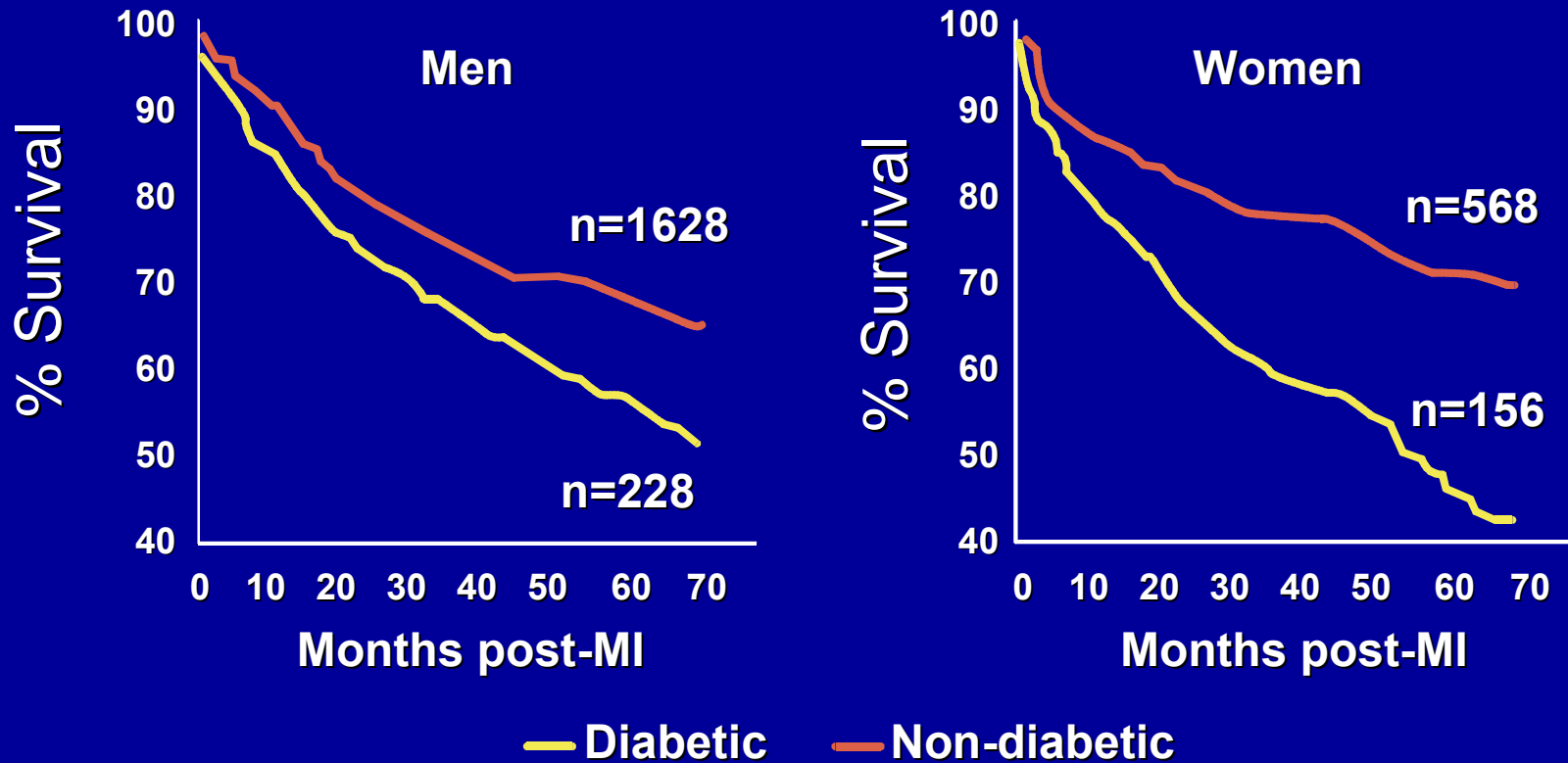
Kannel WB, McGee DL *JAMA* 1979;241:2035-2036.

CHD Mortality in Type 2 Diabetics with and without Prior MI



Adapted from Haffner SM et al *New Engl J Med* 1998;339:229-234.

Survival Post-MI in Diabetic and Non-Diabetic Men and Women



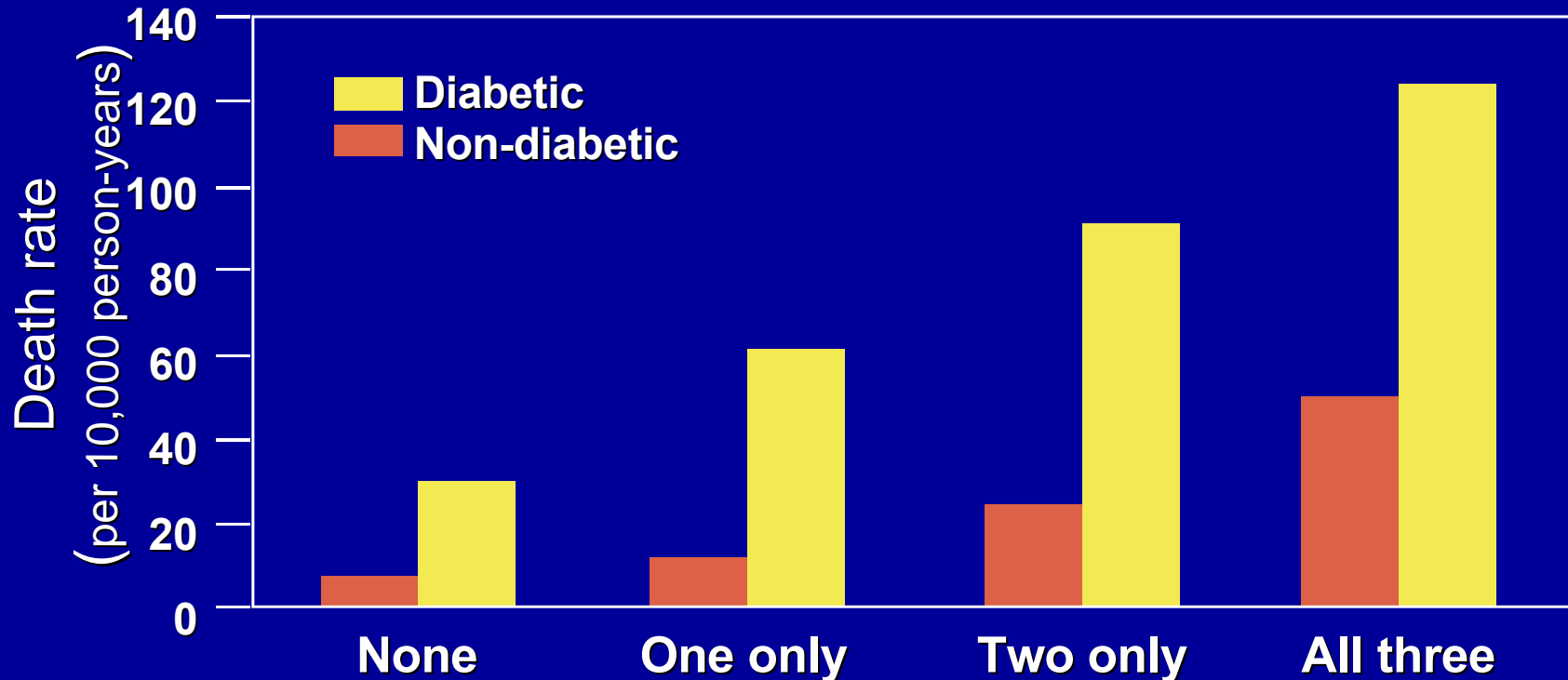
Facts

- **Large excess of CVD in diabetes**
- **More severe CVD in diabetic women vs diabetic men**
- **Worse prognosis in diabetics post-MI**
- **Worse prognosis in diabetes even when CVD clinically silent**

UKPDS: Major Identified Risk Factors for CHD Risk Reduction

- LDL cholesterol
- Diastolic blood pressure
- Smoking
- HDL cholesterol
- HbA_{1c}

Influence of Multiple Risk Factors* on CVD Death Rates in Diabetic and Non-Diabetic Men

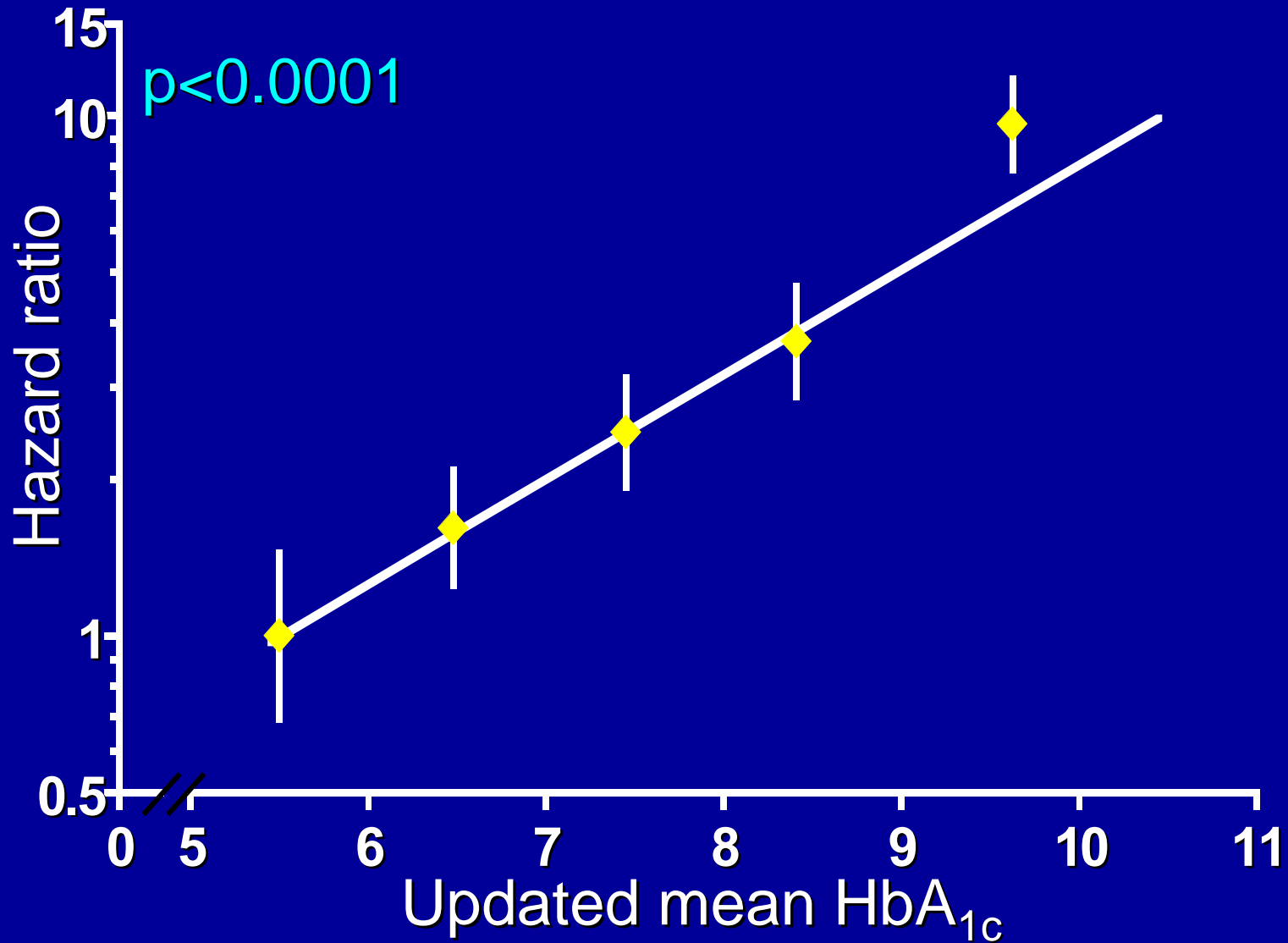


*Serum cholesterol >200 mg/dl, smoking, systolic blood pressure >120 mmHg
Adapted from Stamler J et al *Diabetes Care* 1993;16:434-444.

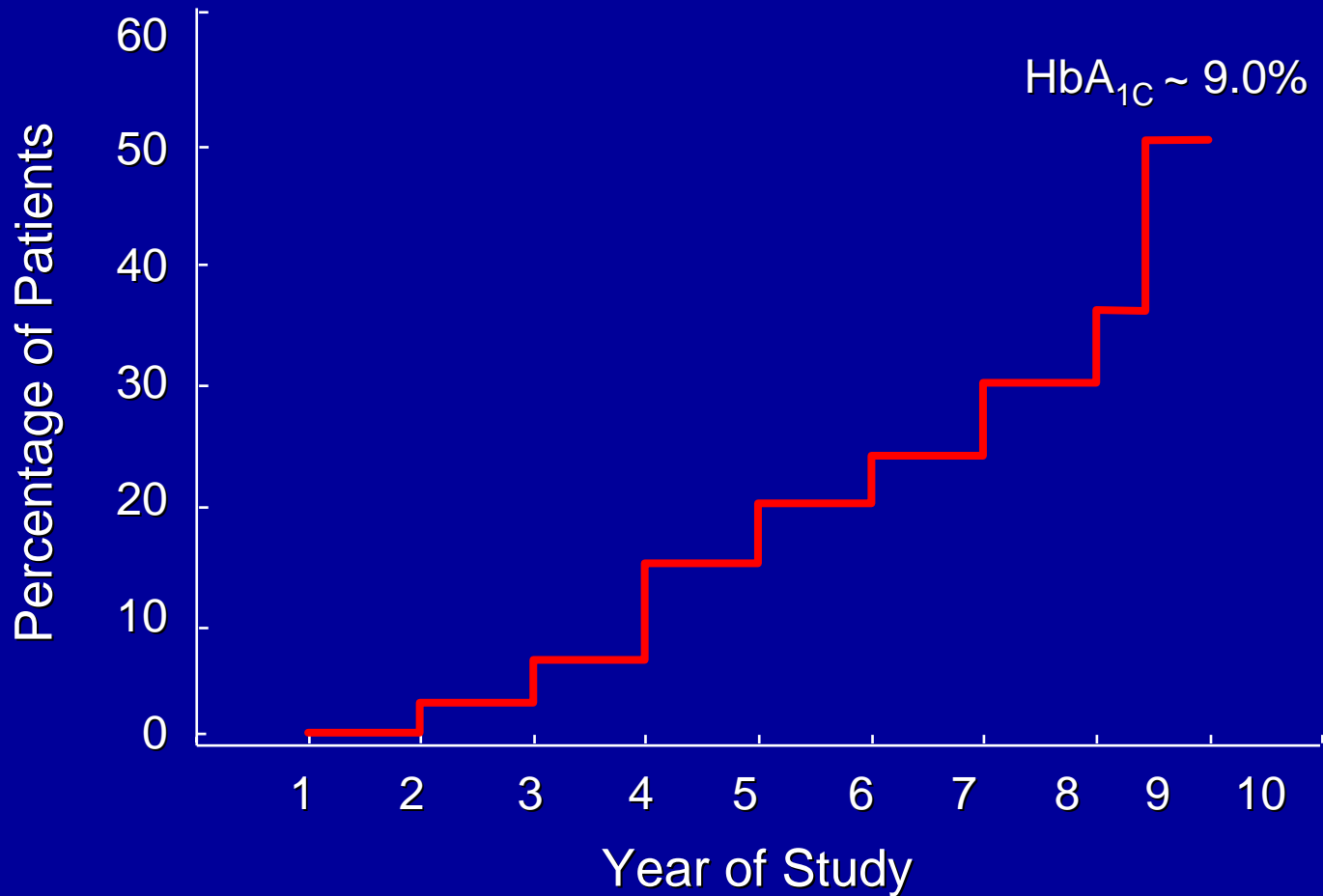
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- **Epidemiology of microvascular complications**
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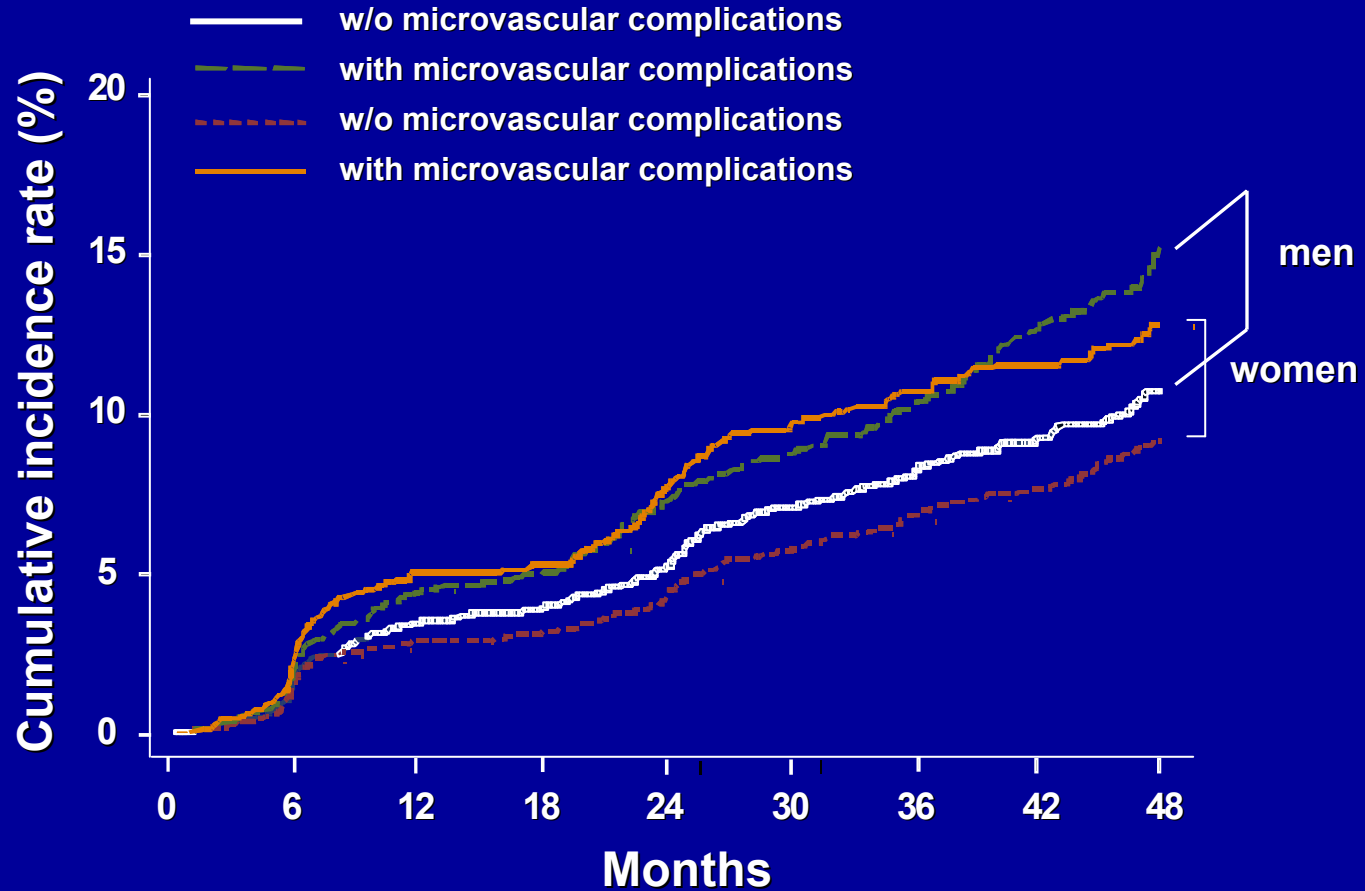
Microvascular Endpoints



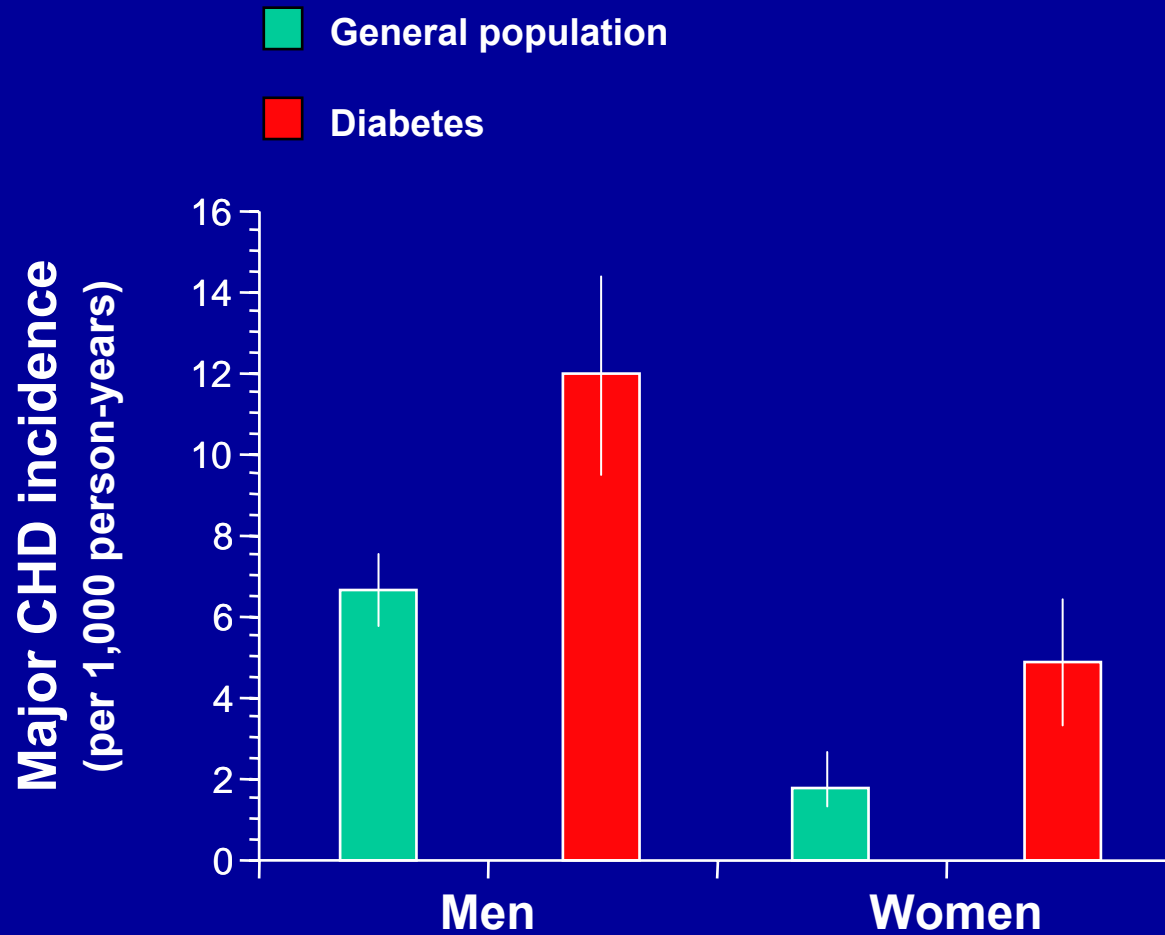
Retinopathy



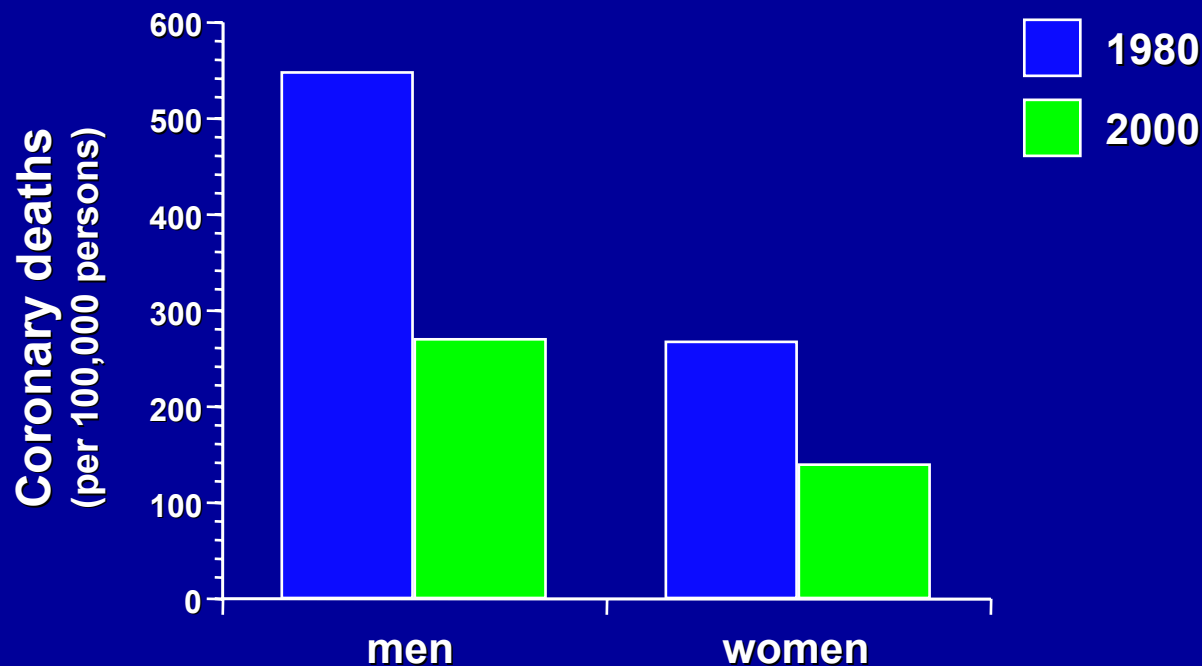
Microvascular disease and CHD risk



The good news

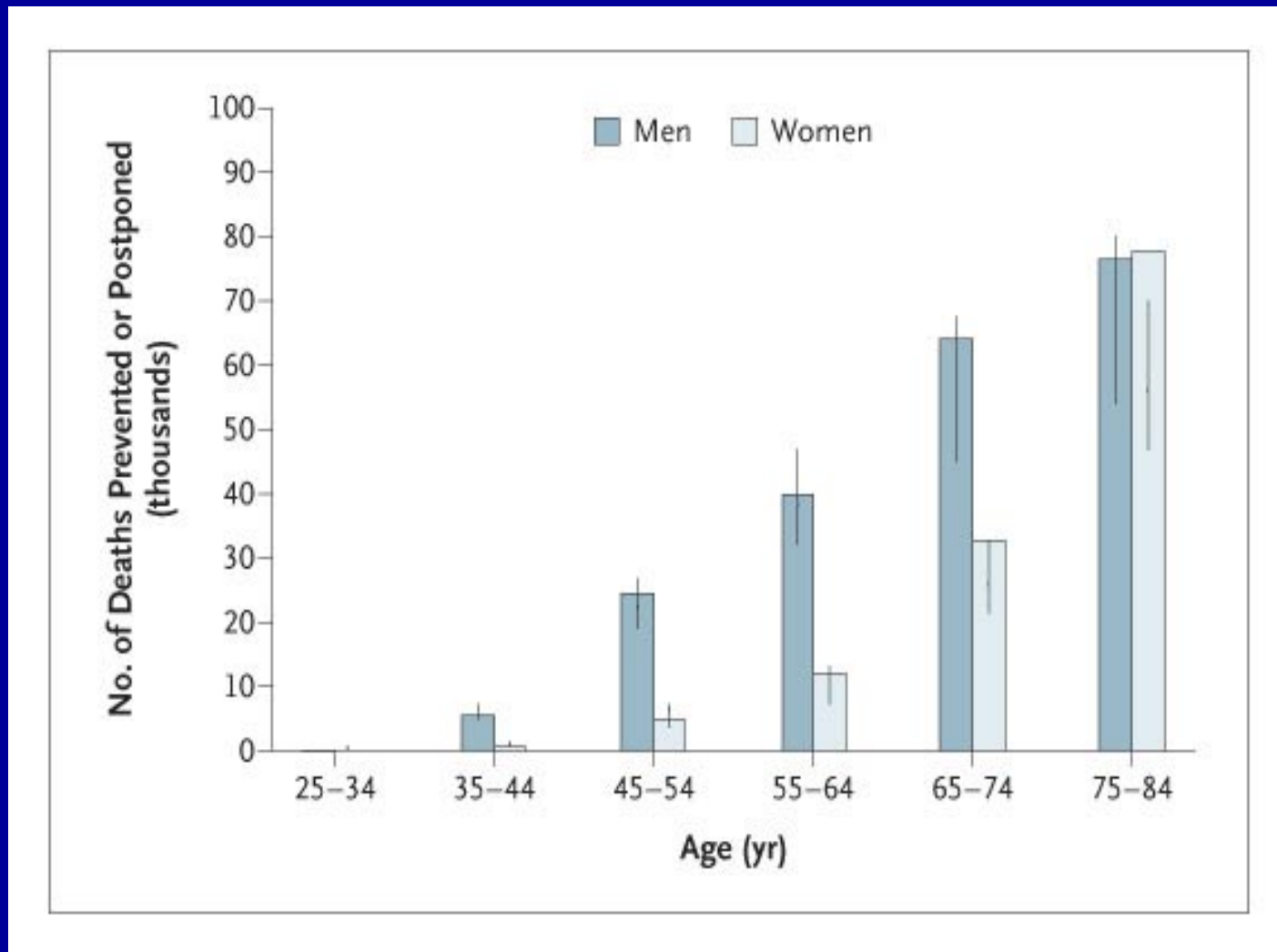


Decrease in U.S. deaths from coronary disease, 1980-2000

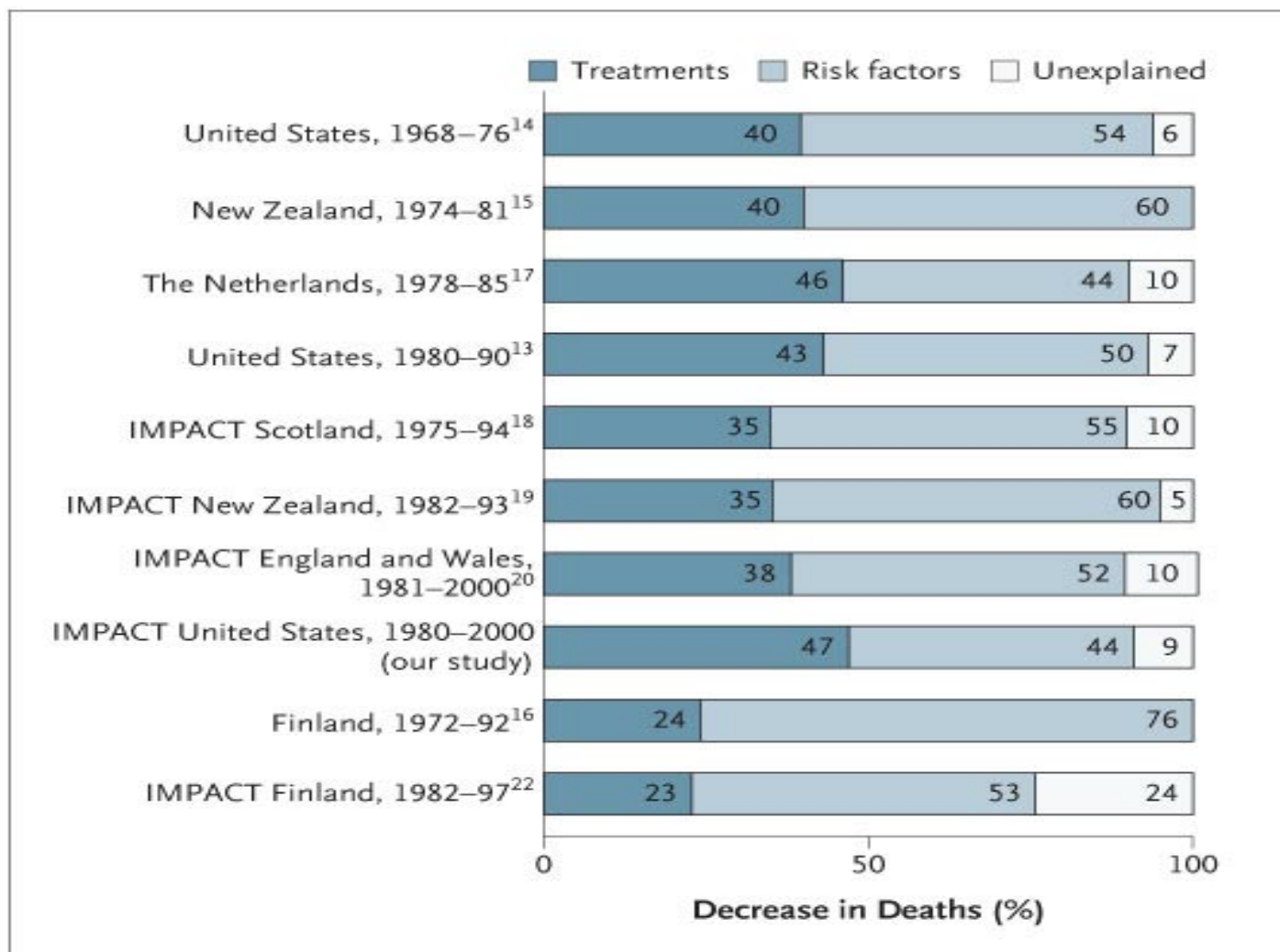


$\Delta = 341,745$ deaths

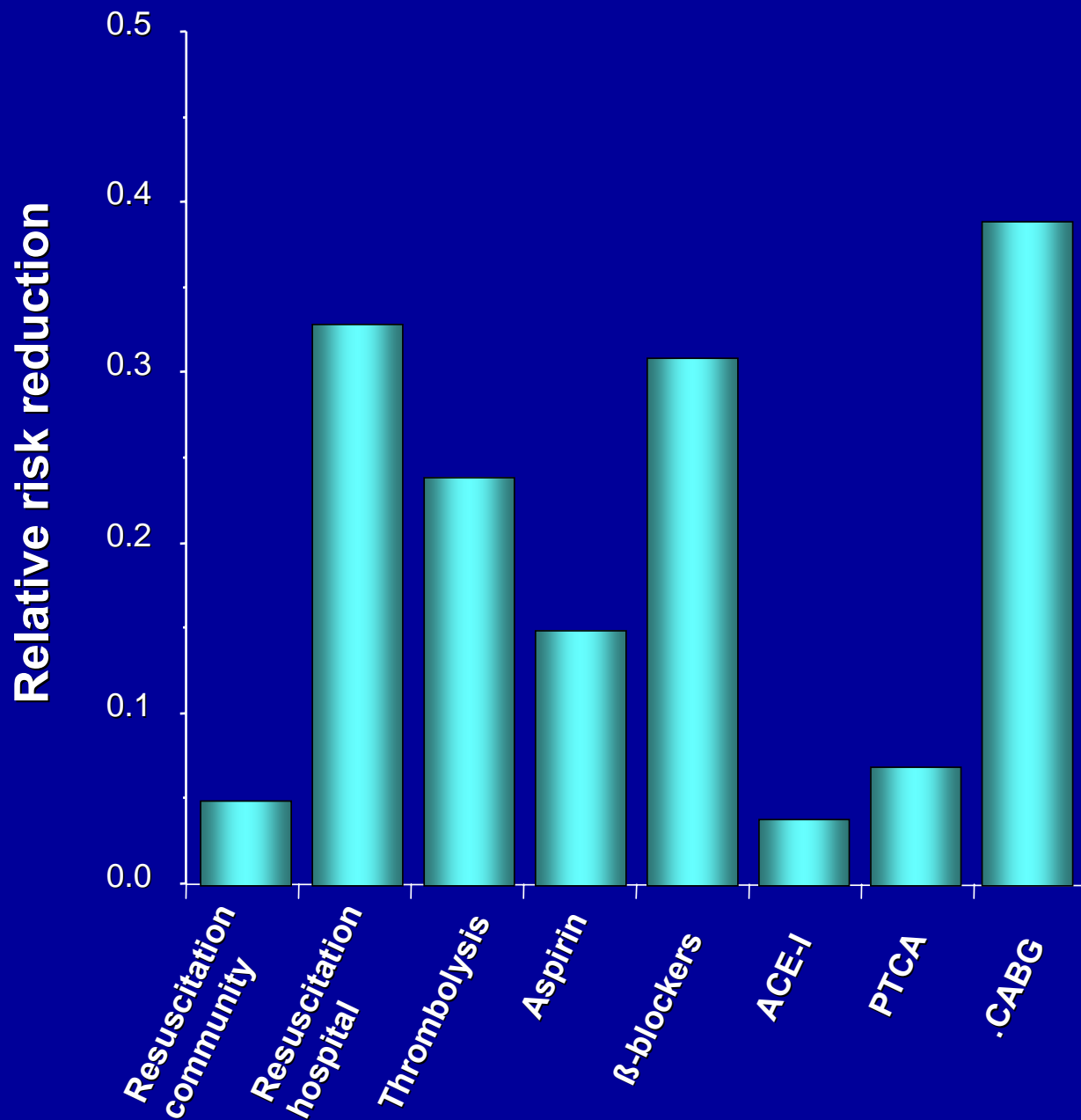
Estimated and observed reductions in deaths from coronary heart disease in the United States between 1980 and 2000, stratified according to age and sex



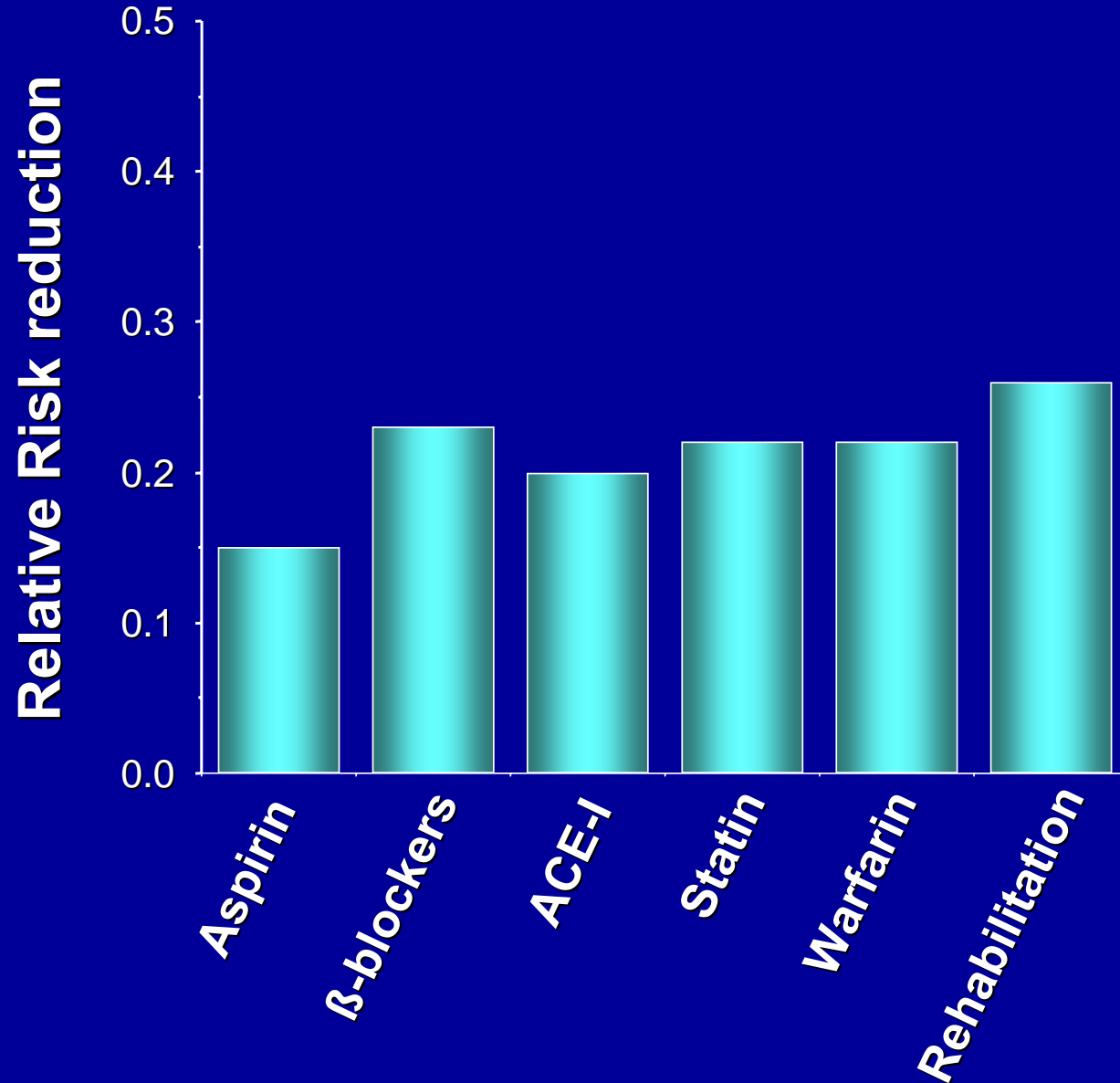
Percentage decrease in deaths from coronary heart disease attributed to treatments and risk-factor changes



Acute myocardial infarction

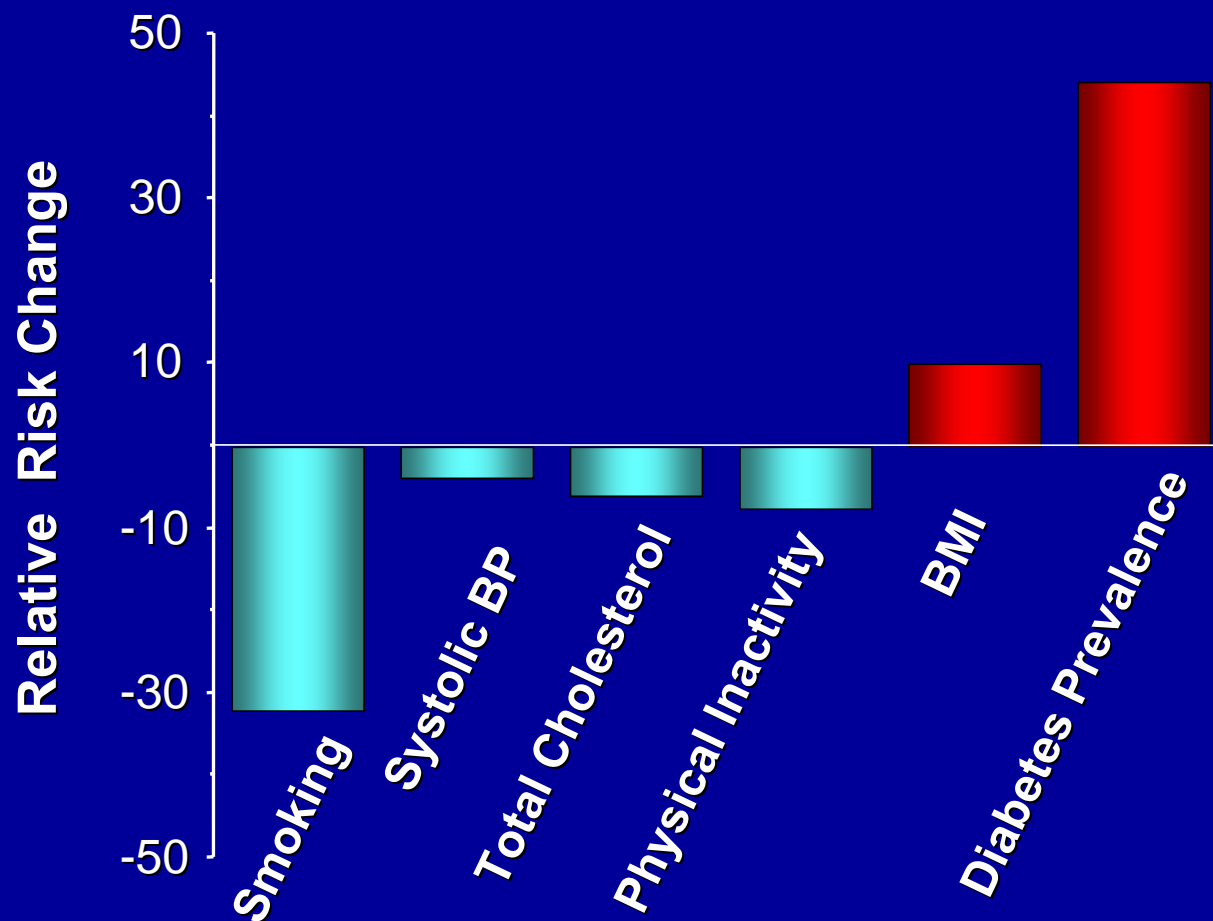


Secondary Prevention after Myocardial Infarction



The bad news

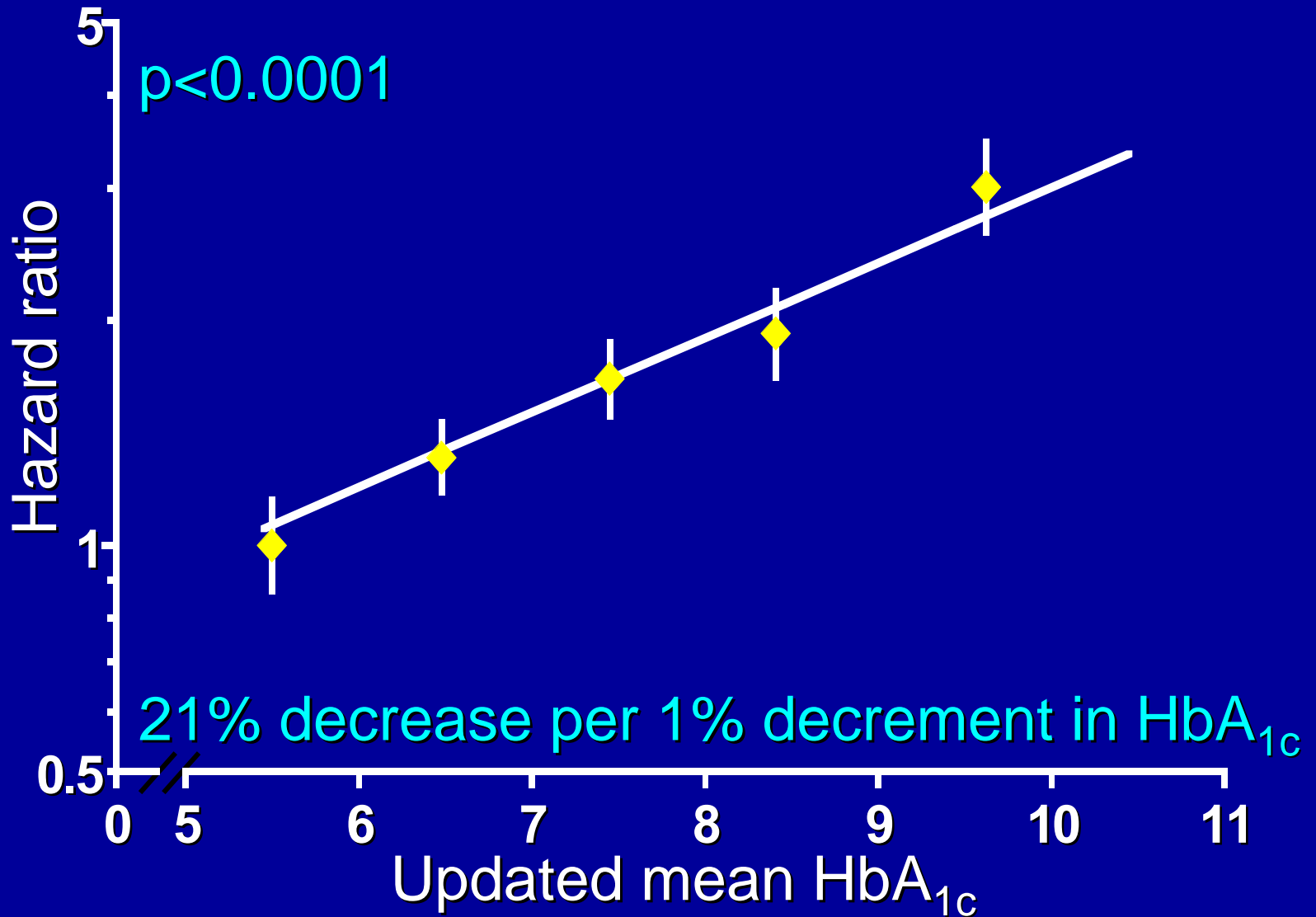
Deaths from Coronary Heart Disease that were Prevented or Postponed as a result of changes in population risk factors in the United States, 1980 to 2000



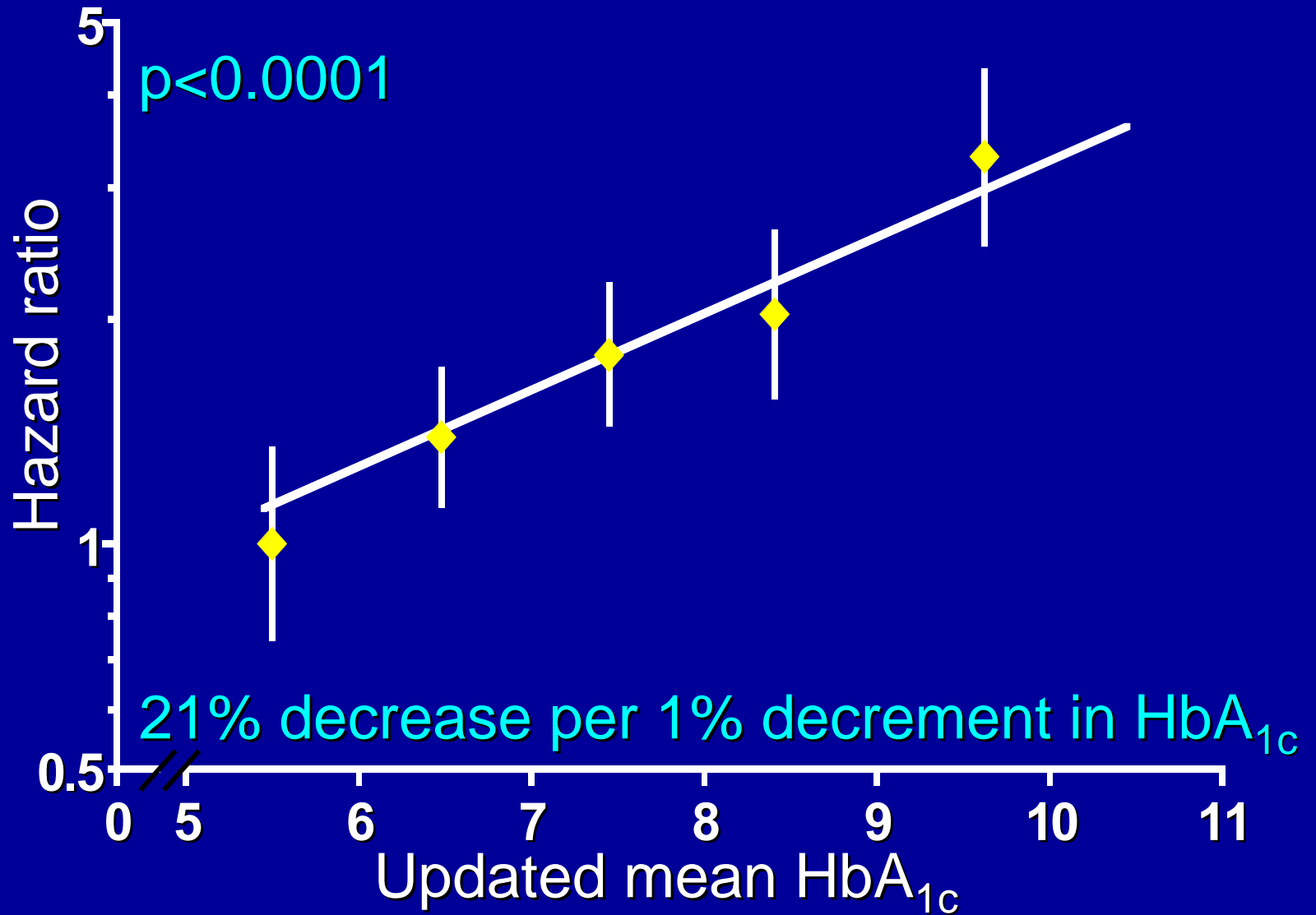
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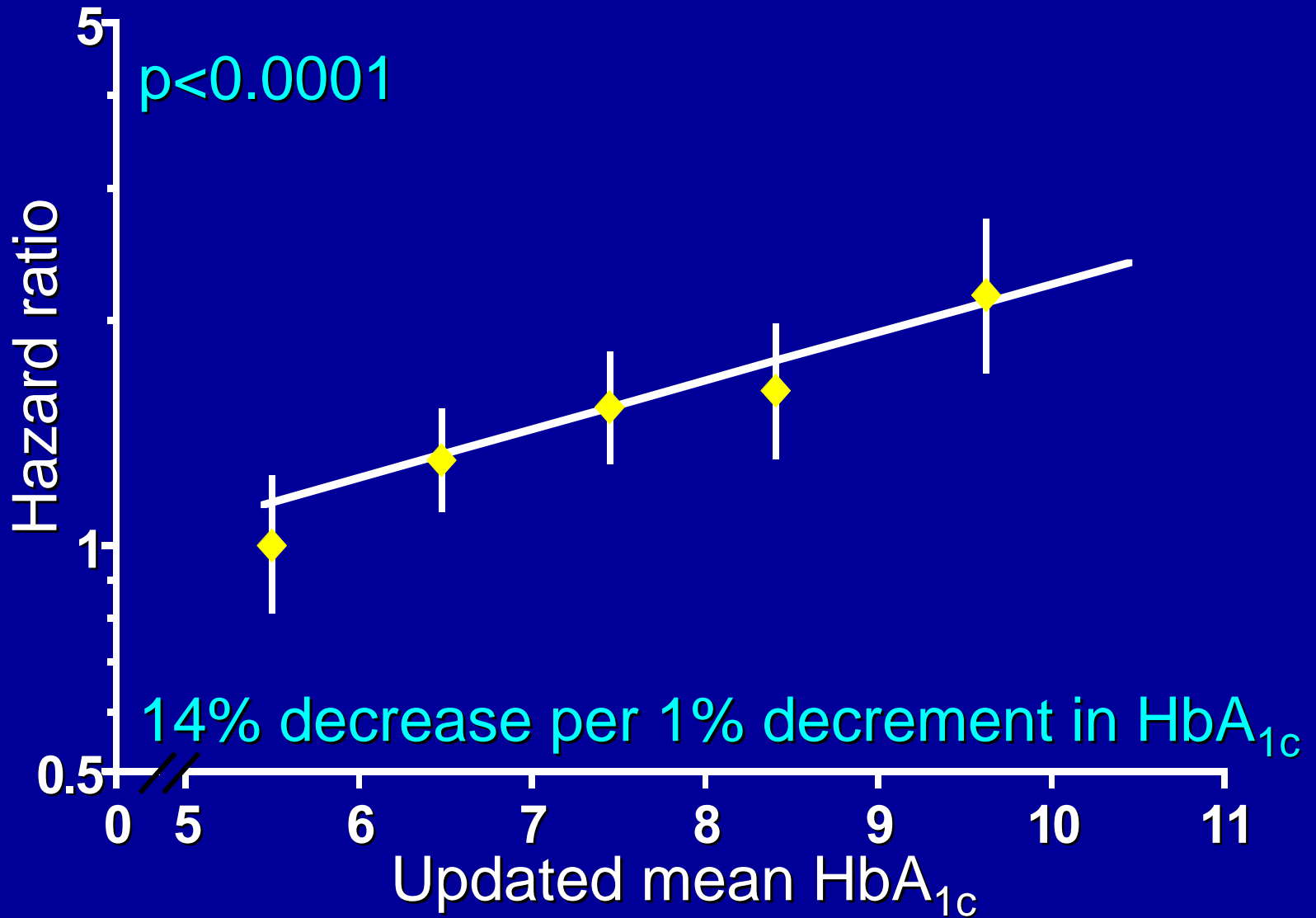
Any Diabetes Related Endpoint



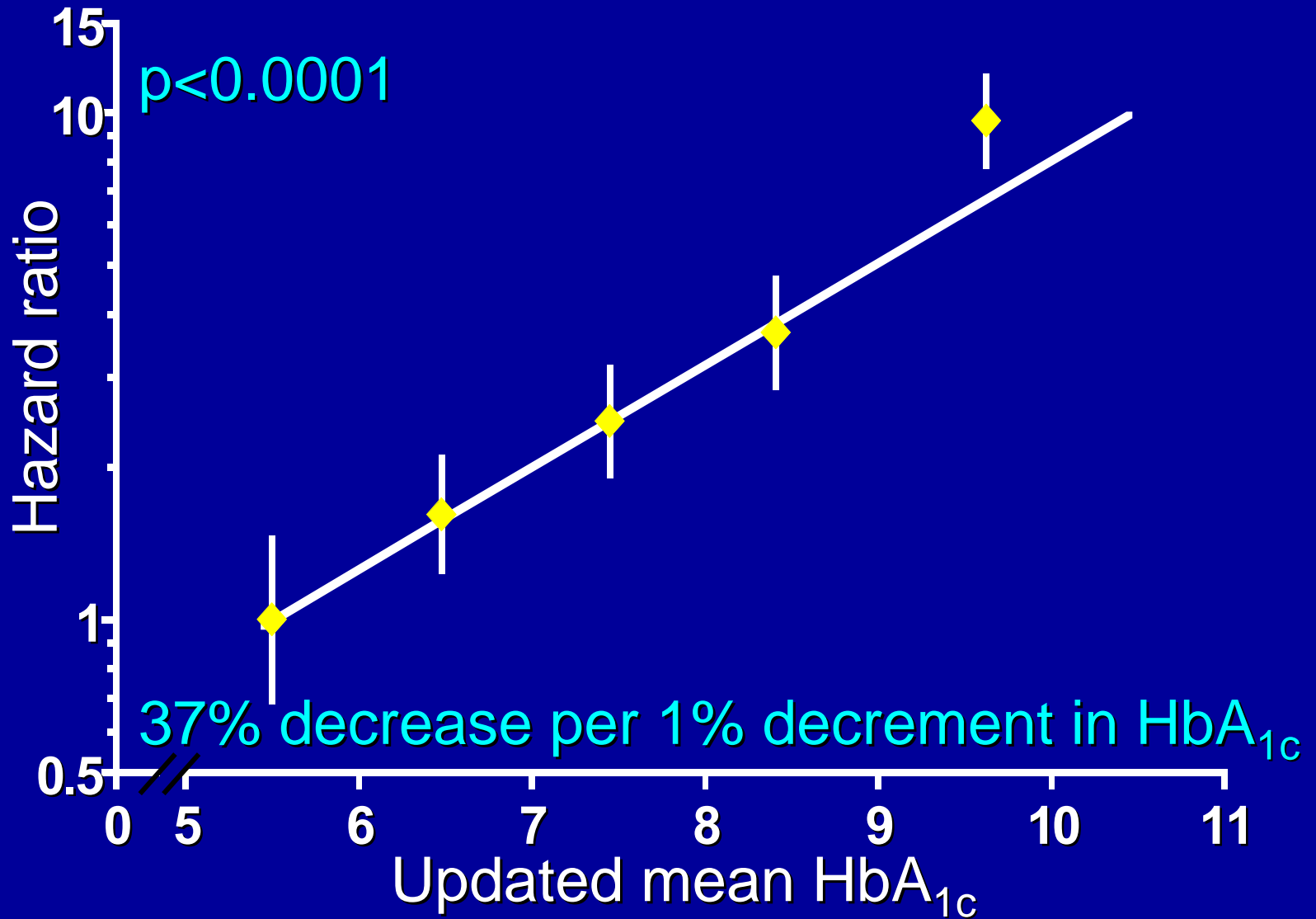
Diabetes Related Deaths



All Cause Mortality

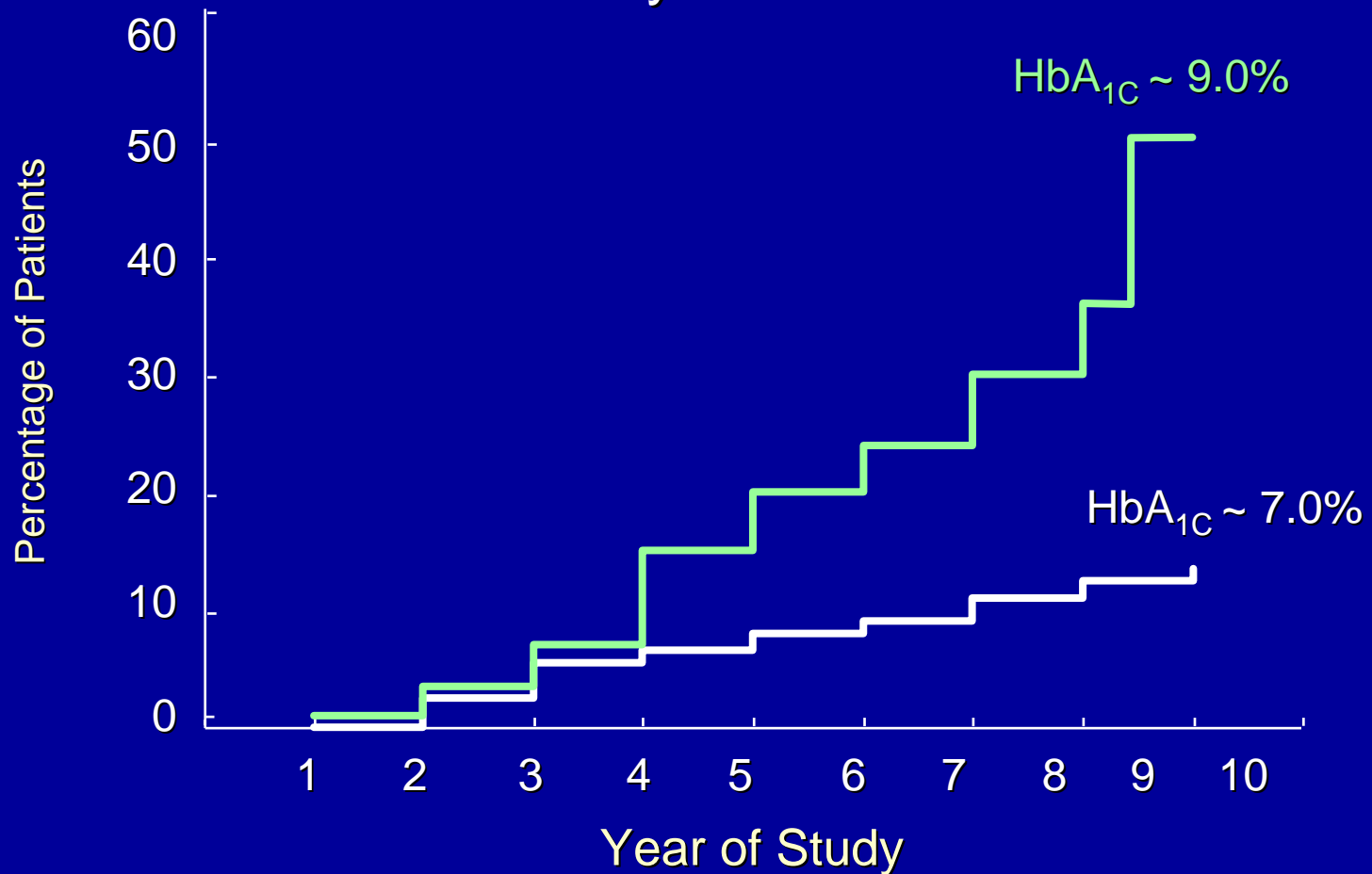


Microvascular Endpoints



Retinopathy

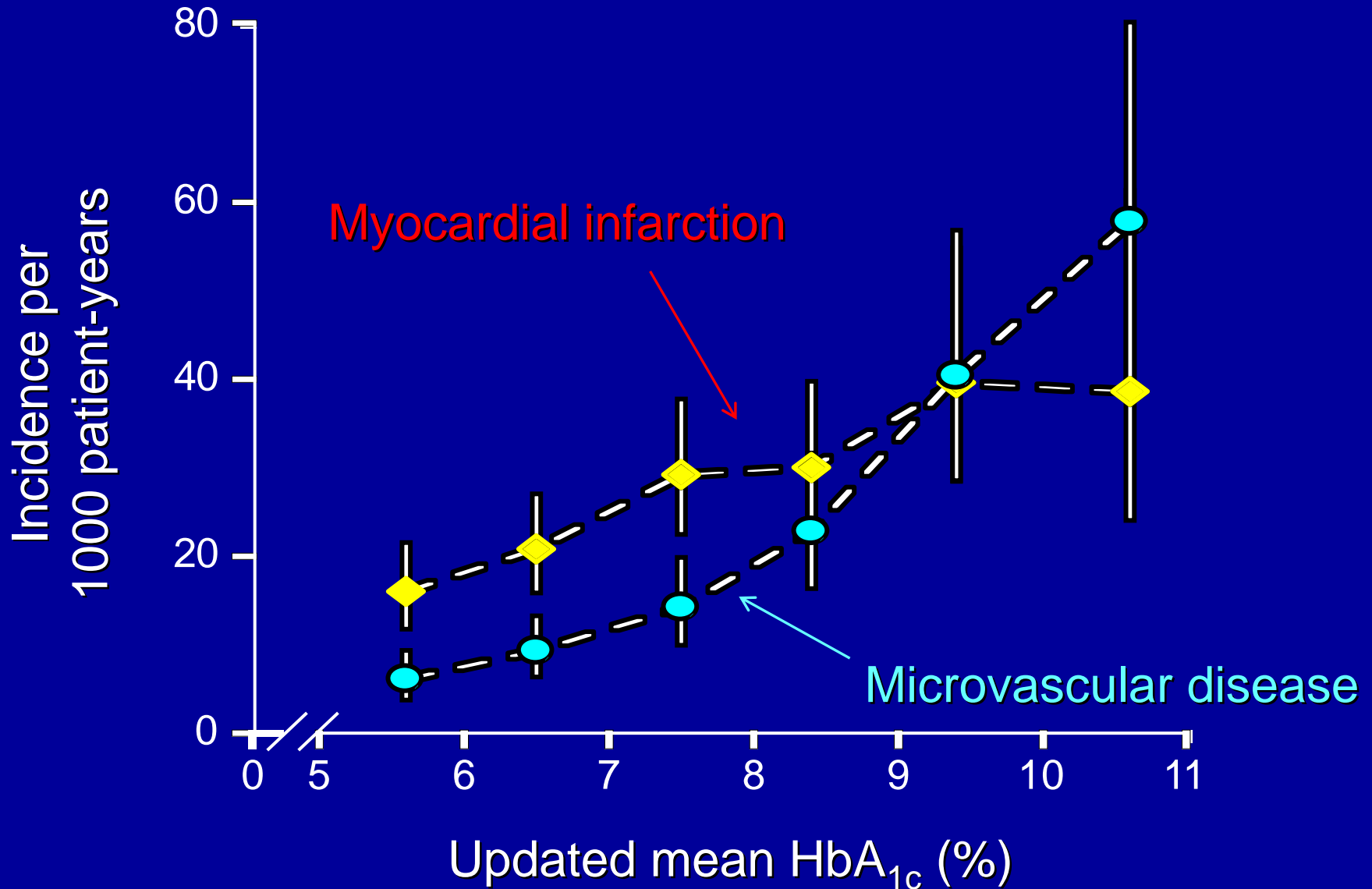
Primary Prevention



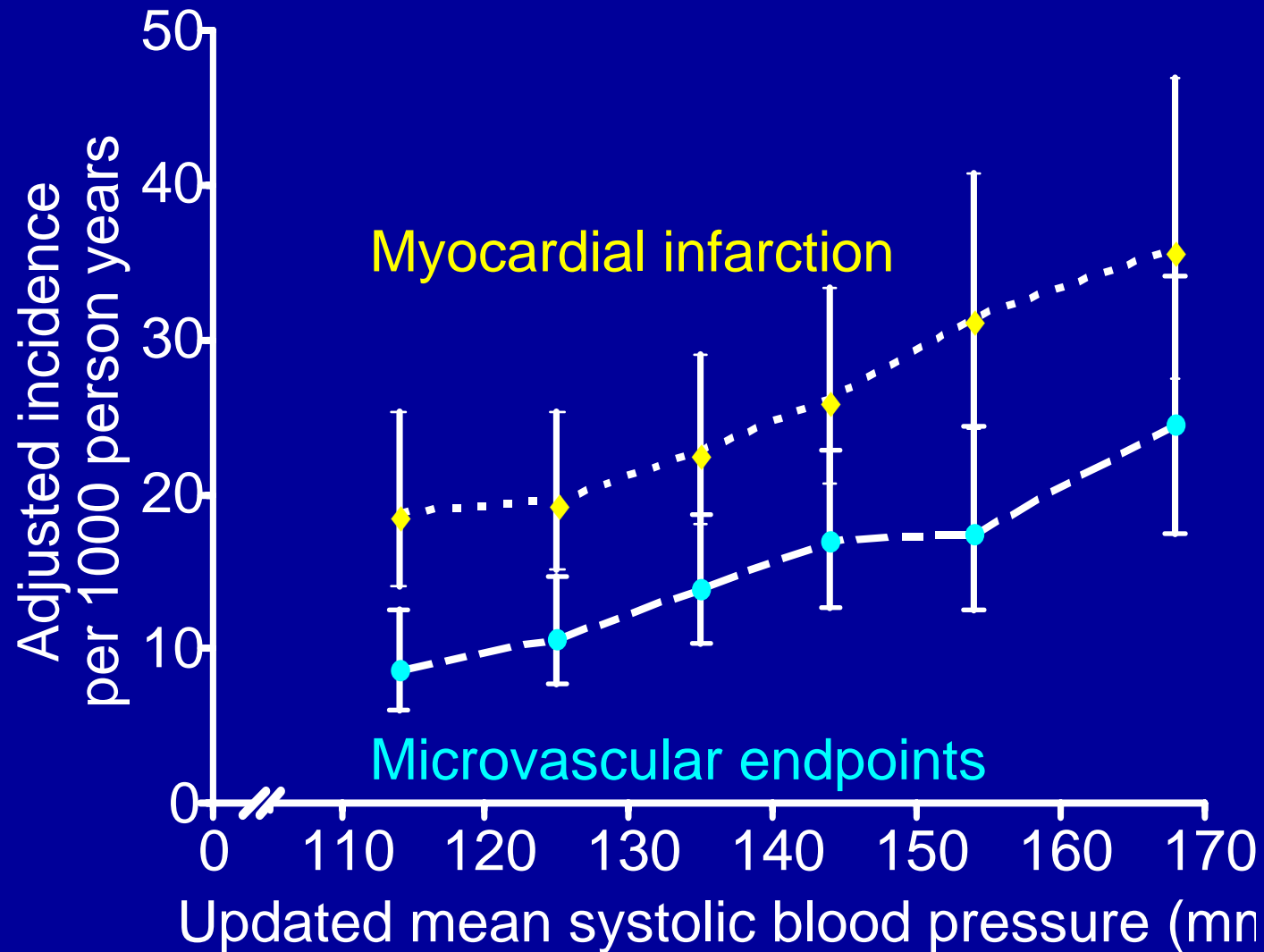
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Myocardial Infarction and Microvascular Disease



Myocardial Infarction and Microvascular Disease



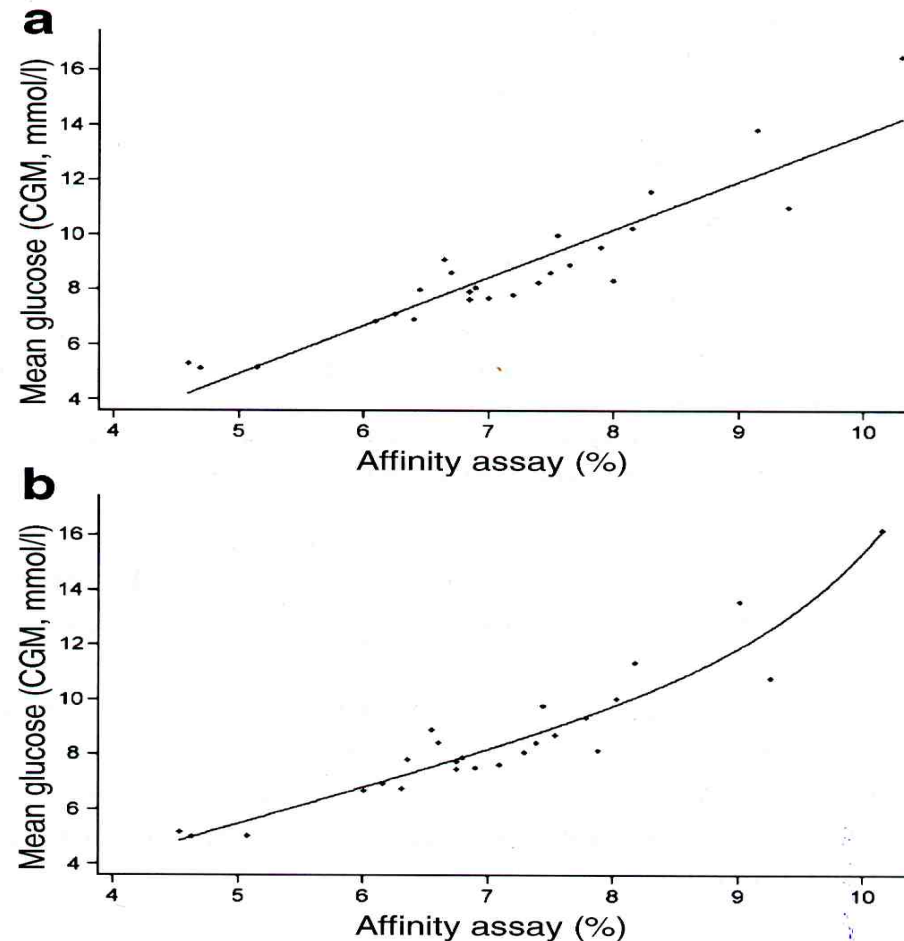


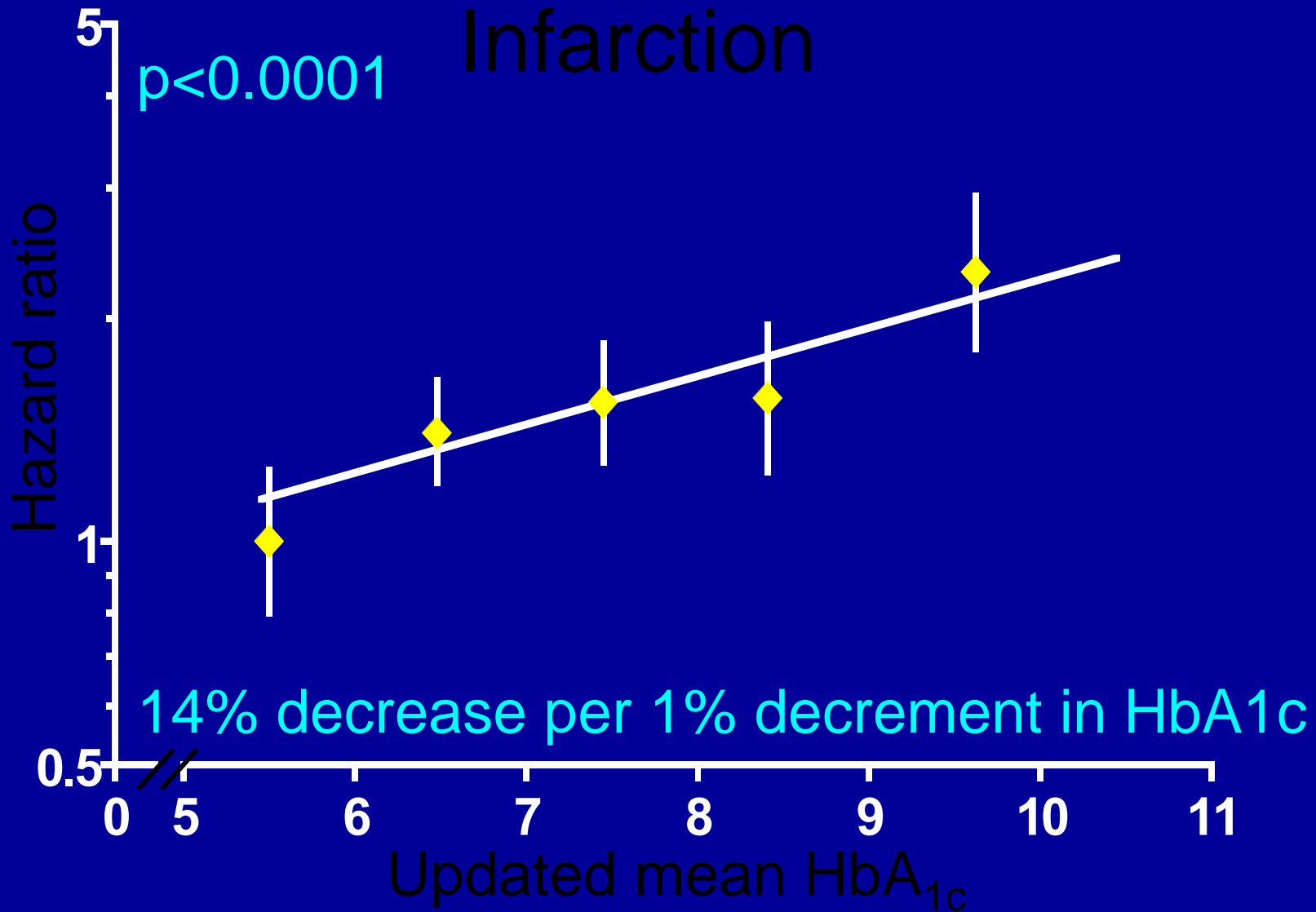
Fig. 1 Relationship between HbA_{1c} at month 3 and mean glucose level calculated from CGM during 12 previous weeks according to (a) linear regression mean CGM=HbA_{1c}×1.75–3.81 ($r=0.89$, $p<0.001$), and (b) the exponential mean CGM=1.28HbA_{1c}+0.000136exp(HbA_{1c})–0.92 ($r=0.89$, $p<0.001$). Continuous line, fitted values; diamonds, observed values

Questions

- How good is HbA_{1c} to predict risk?
- How good should HbA_{1c} be to prevent risk?
- Is normalisation of HbA_{1c} feasible?

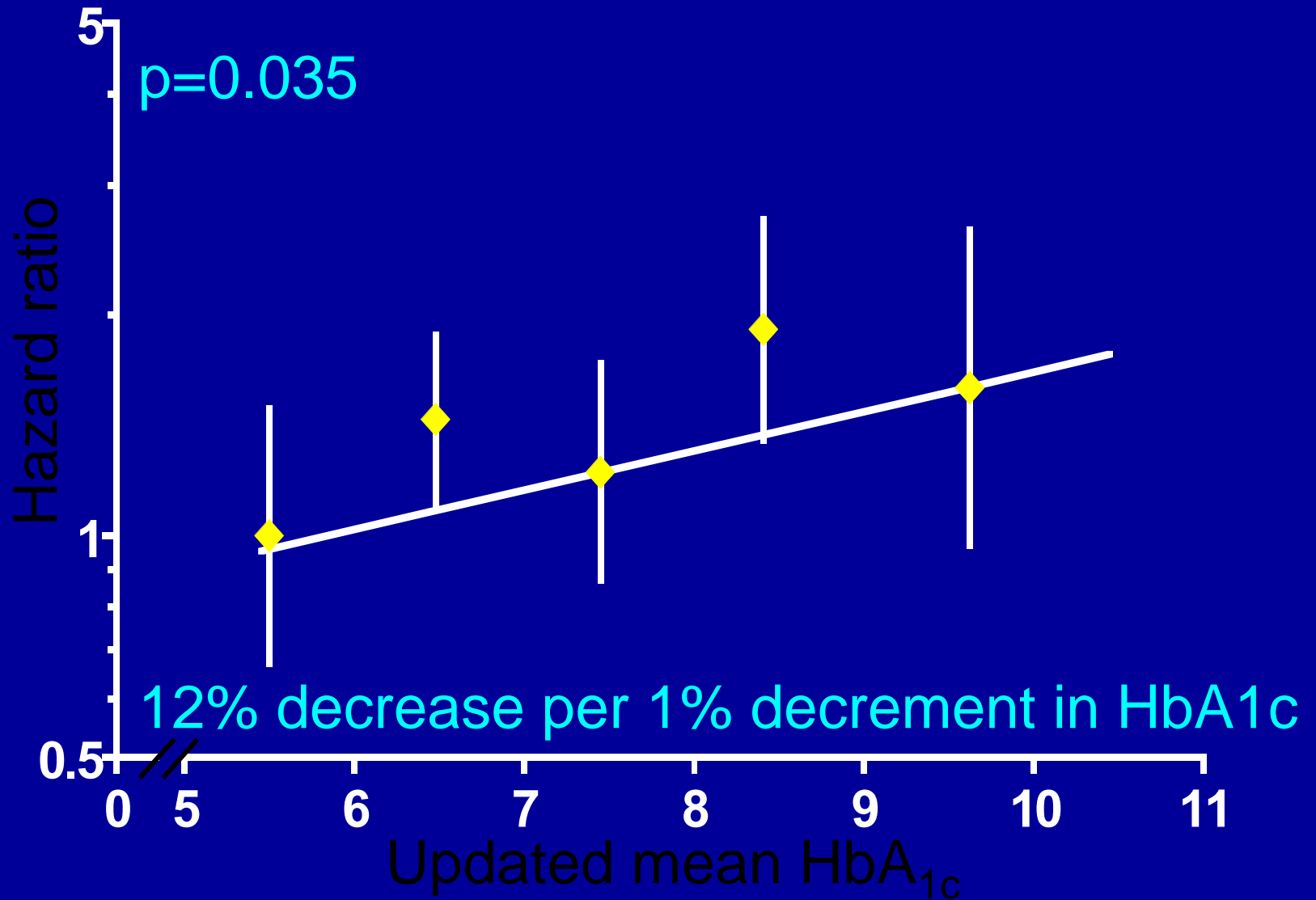
Thank you

Fatal and Non-Fatal Myocardial Infarction



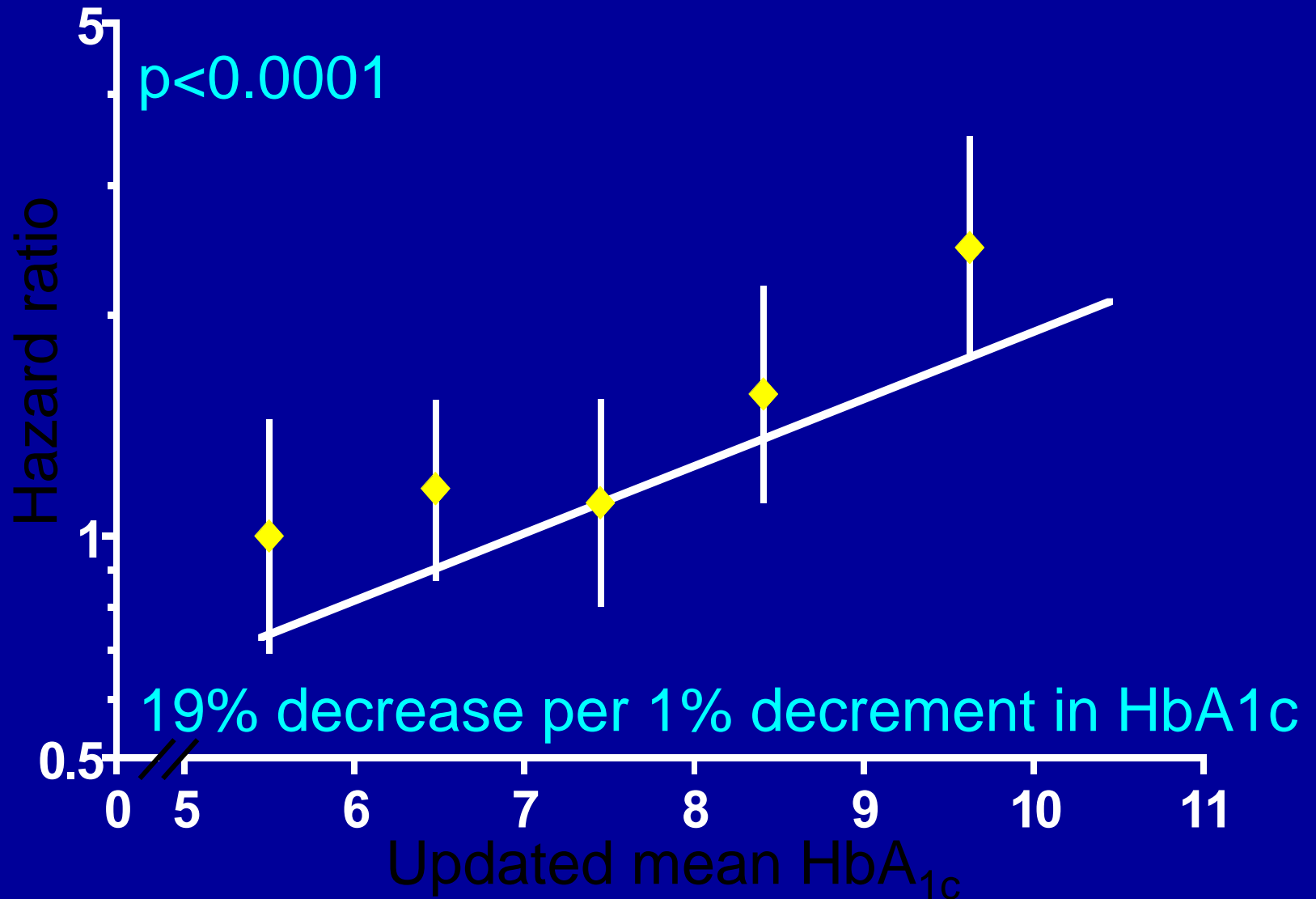
UKPDS 35. *BMJ* 2000; 321: 405-12

Fatal and Non-Fatal Stroke



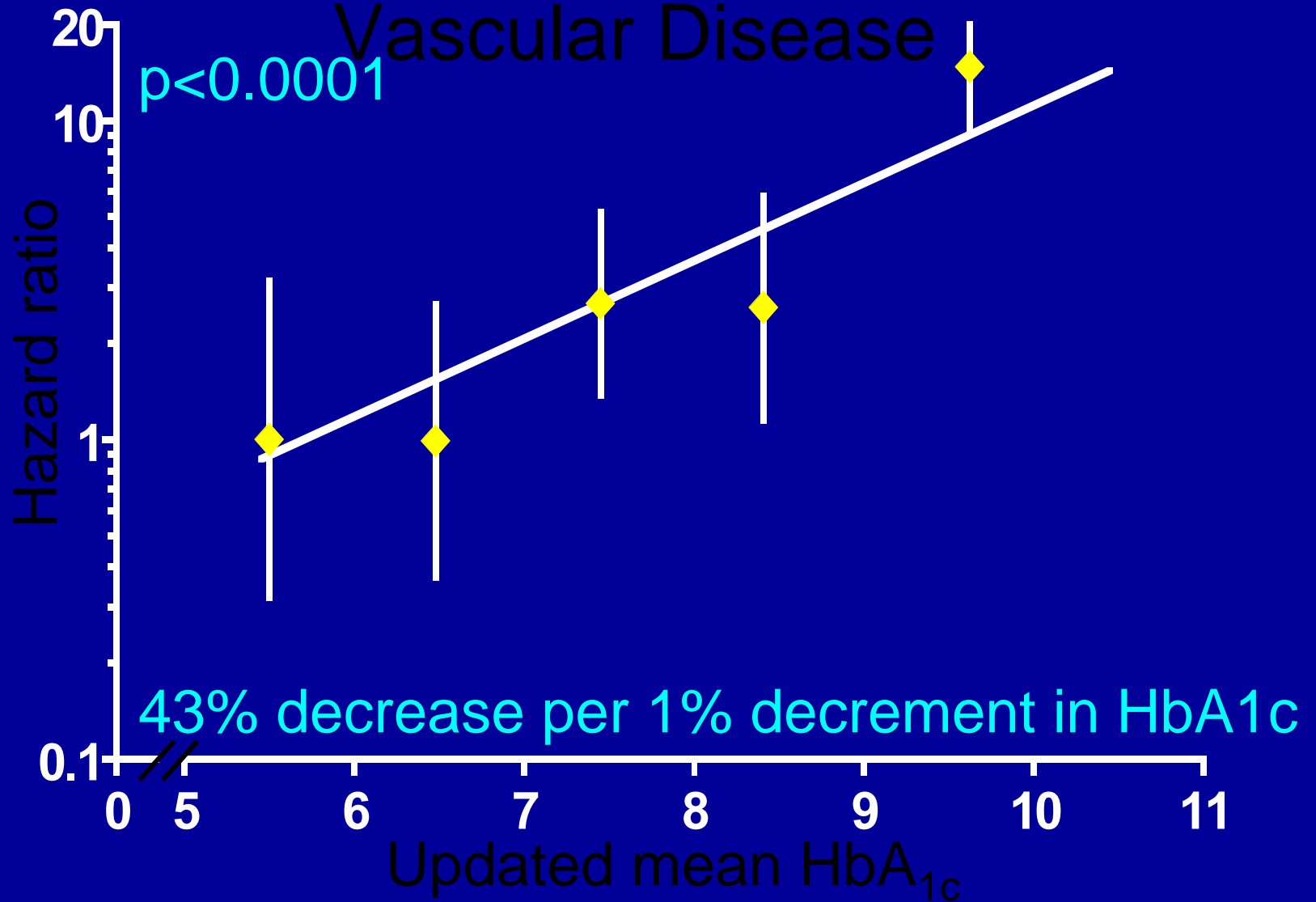
UKPDS 35. *BMJ* 2000; 321: 405-12

Cataract Extraction



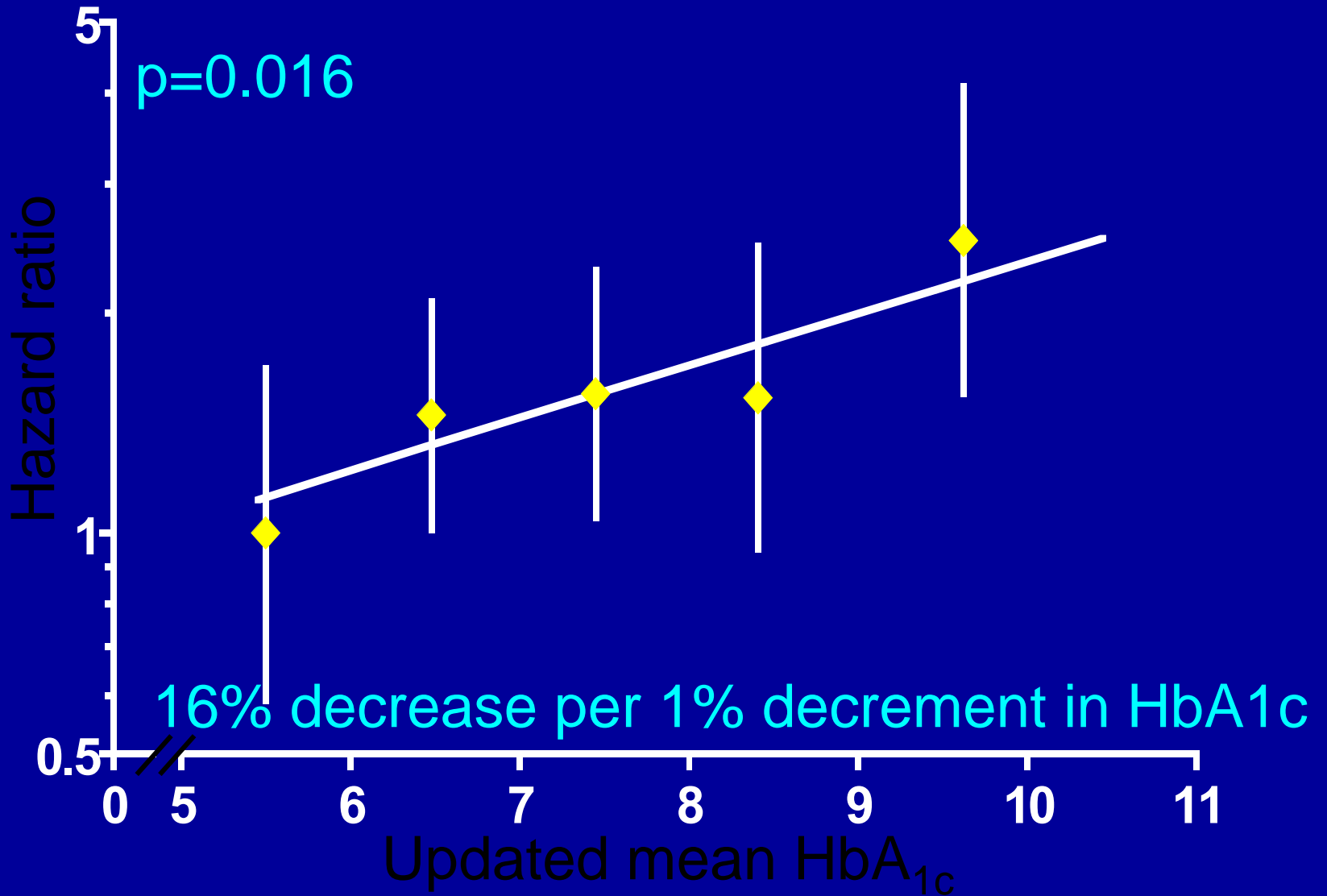
UKPDS 35. *BMJ* 2000; 321: 405-12

Amputation or Death from Peripheral Vascular Disease



UKPDS 35. *BMJ* 2000; 321: 405-12

Heart Failure



UKPDS 35. *BMJ* 2000; 321: 405-12

