



# The physical benefits resulting from cycling and walking

## Current research

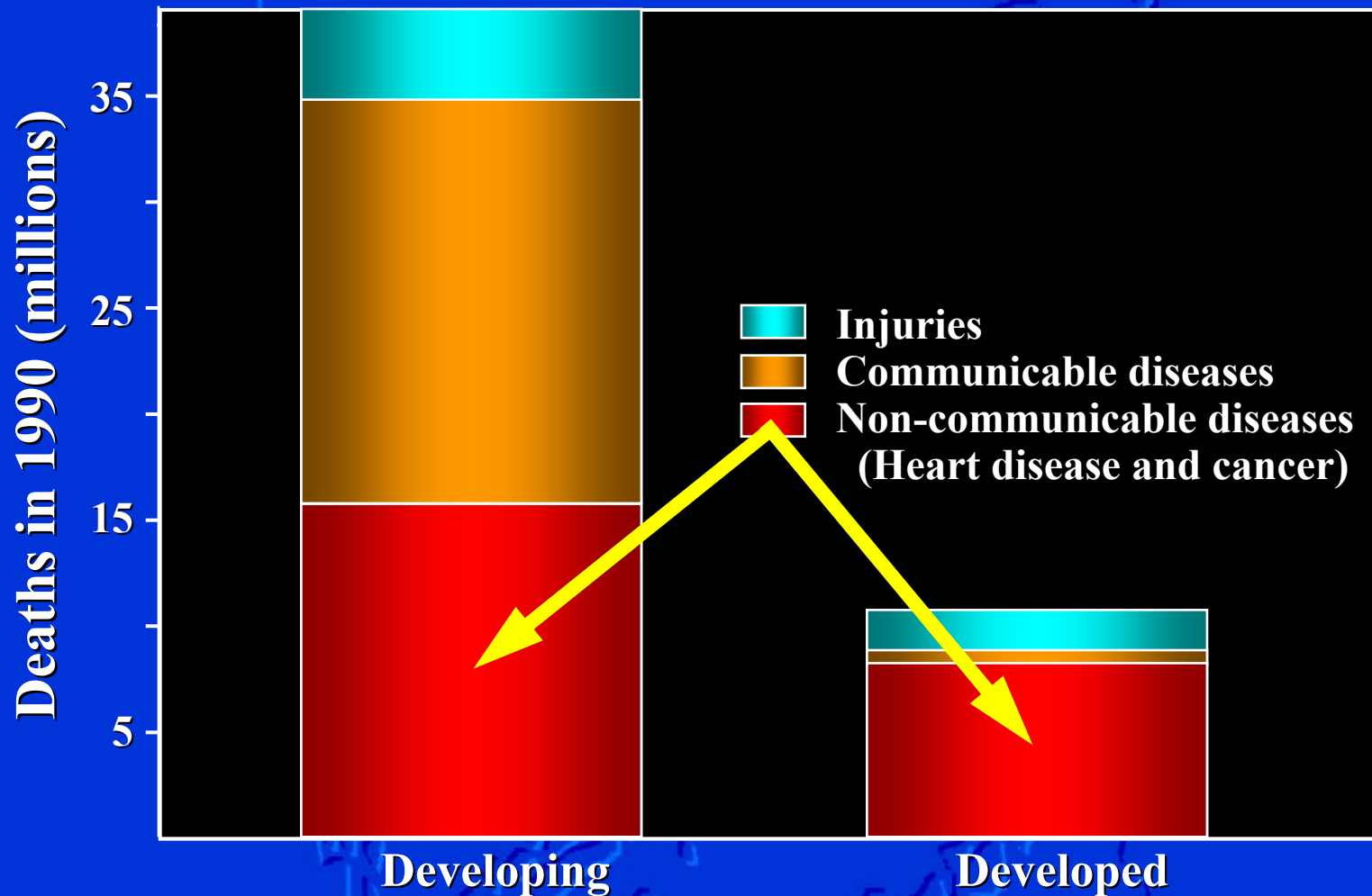


*6<sup>th</sup> March, 2006 • Cape Town • South Africa*

*Professor TD Noakes MBChB, MD, DSc, FACSM*

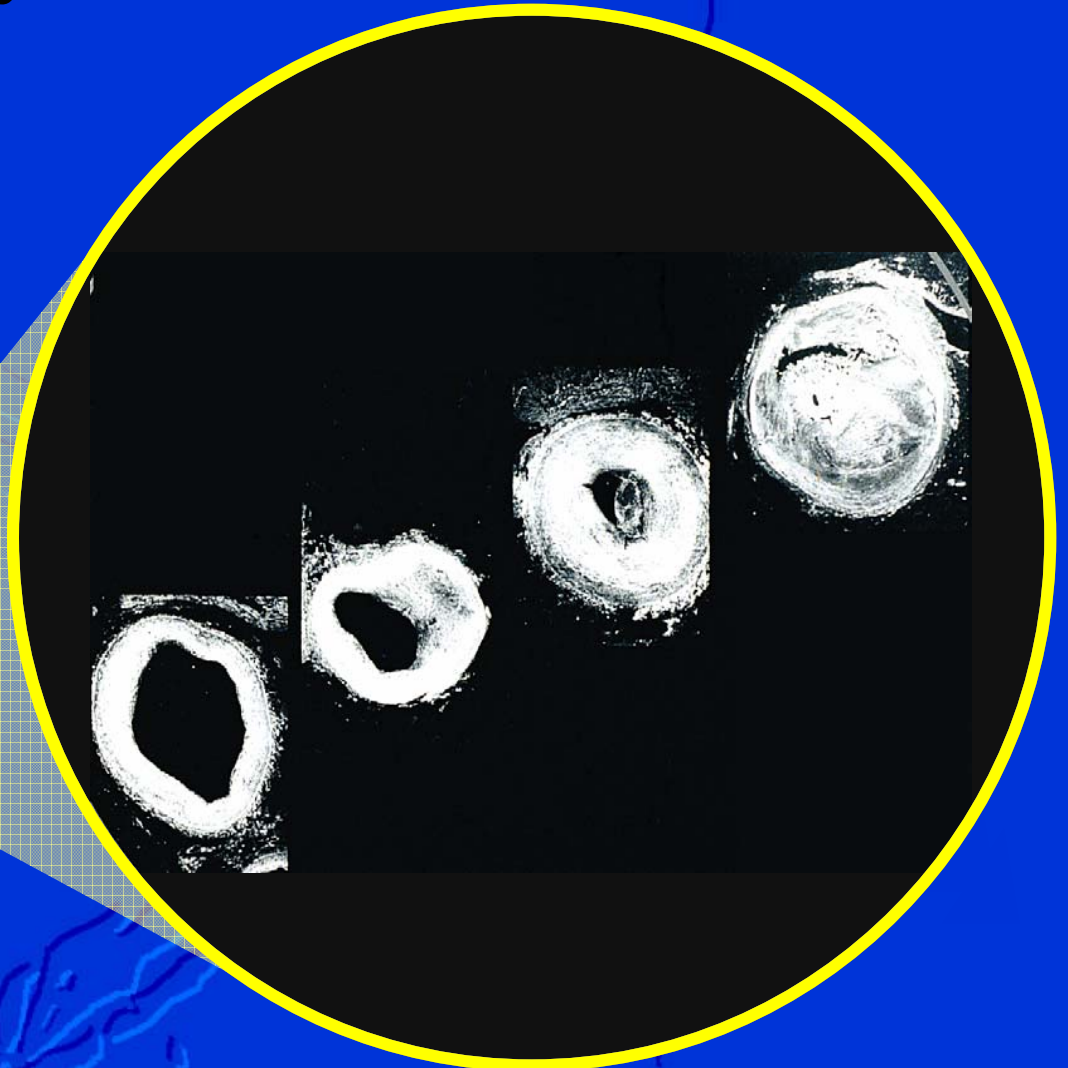
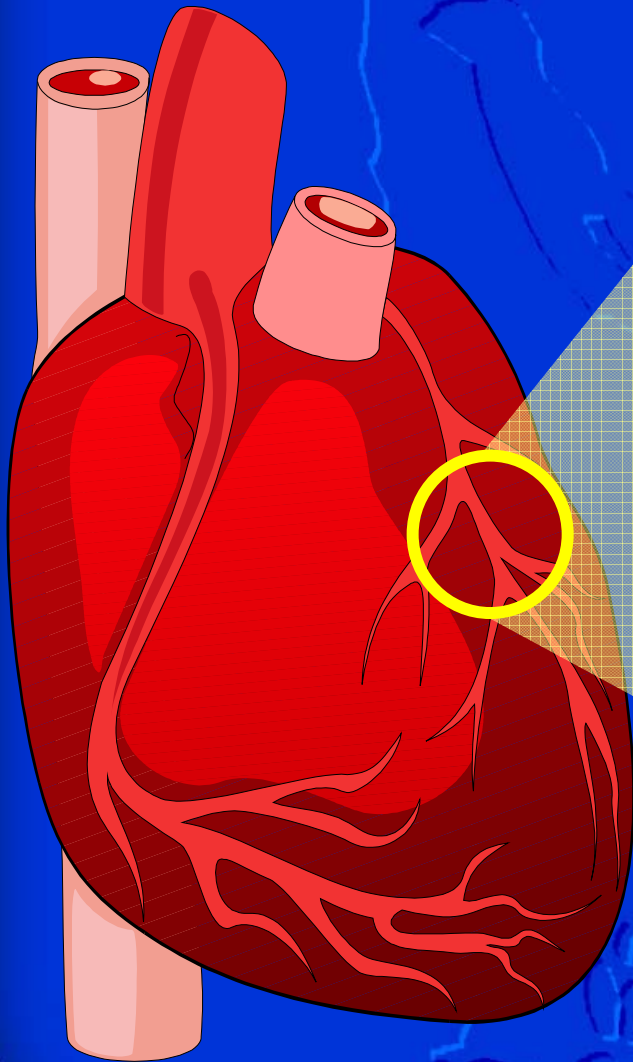
MRC/UCT Research Unit for Exercise Science and Sports Medicine,  
University of Cape Town and  
Sports Science Institute of South Africa

# Causes of mortality in developed and developing countries

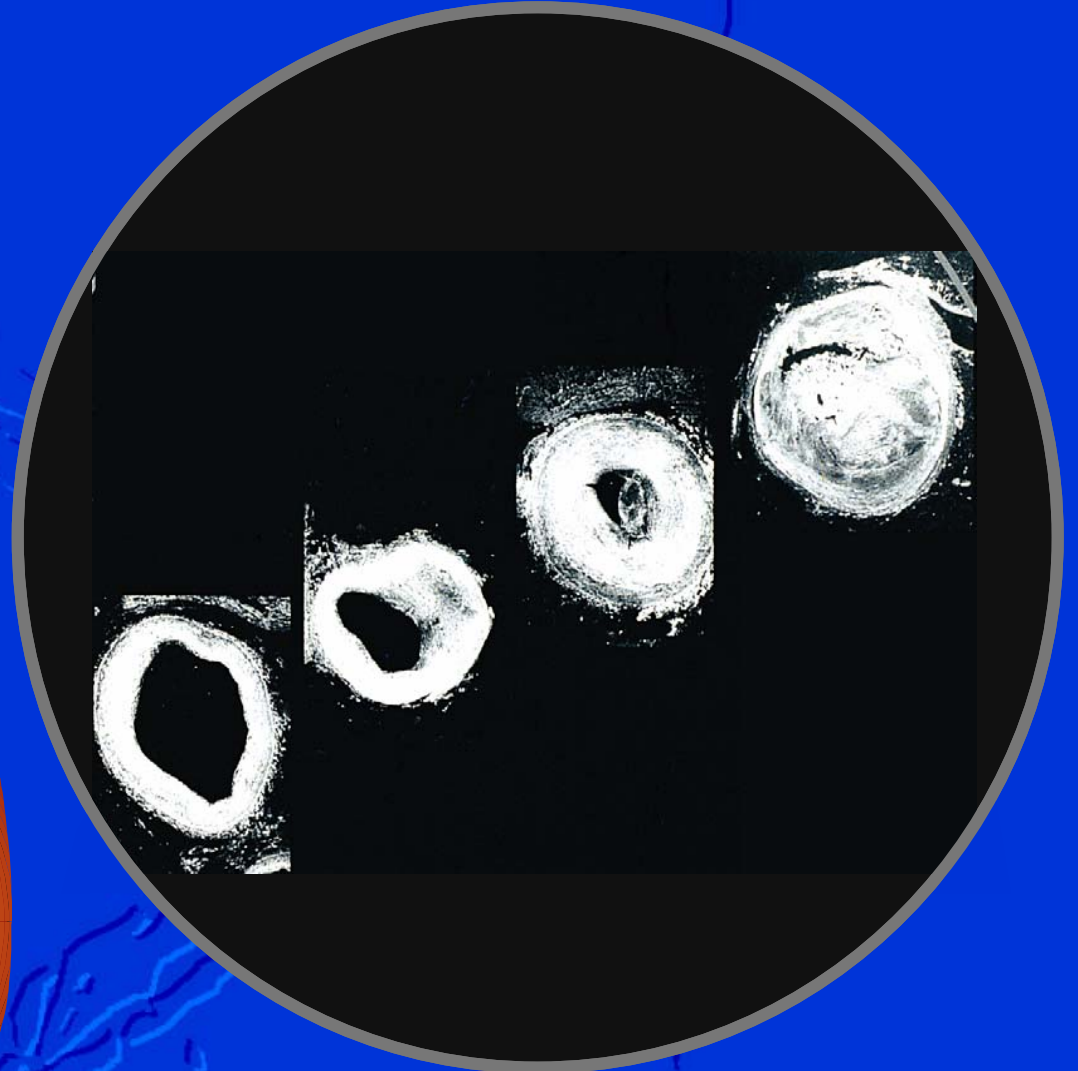
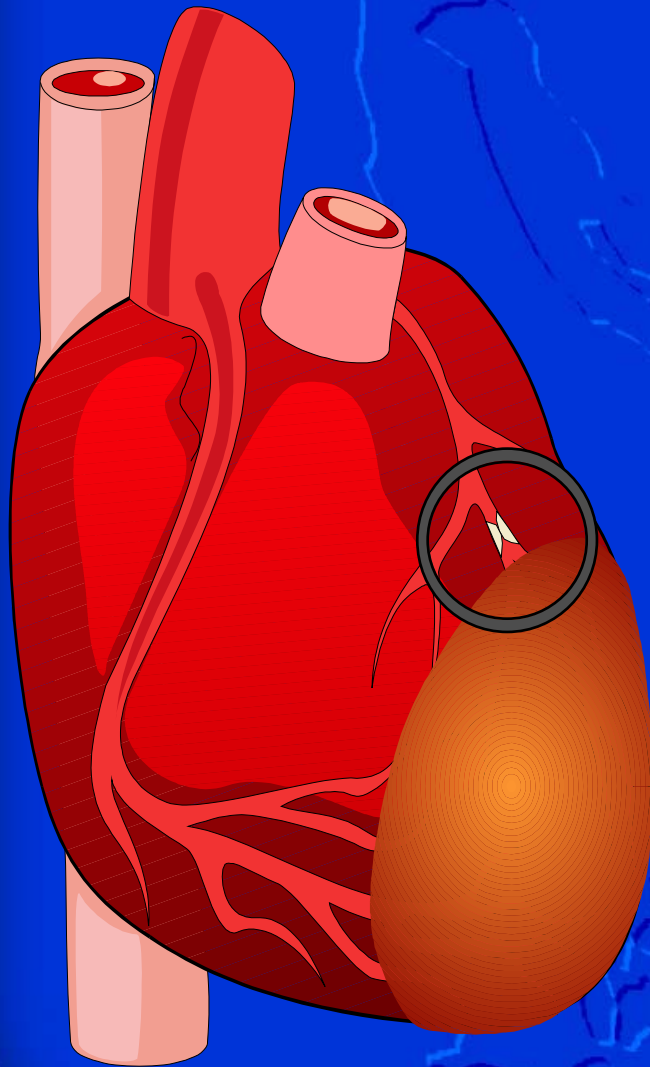


*Murray and Lopez, Lancet 349: 1997.*

# Coronary Atherosclerosis



# Myocardial Infarction



# The dangers of cycling 1890 - 1900



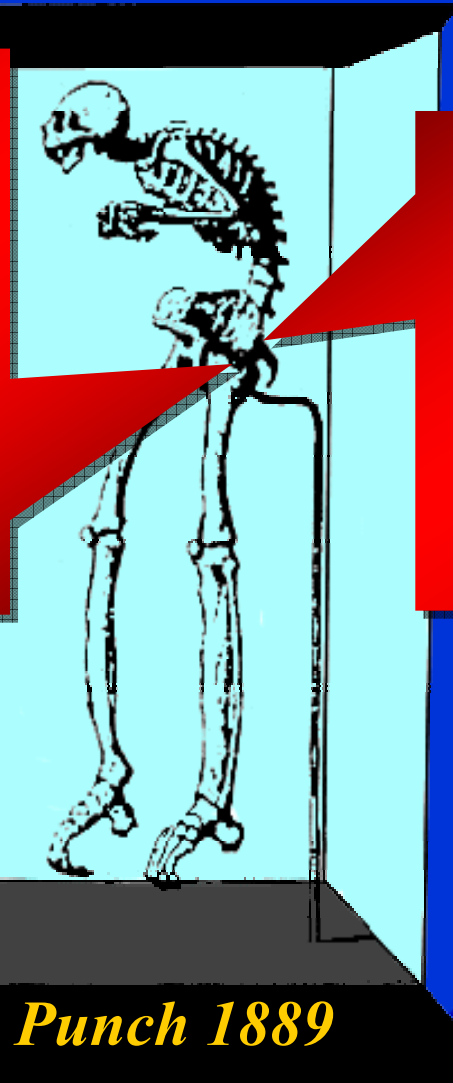
# A warning to enthusiasts: Punch 1889



## CYCLIST'S PROLONGED LABOUR

“... frequent bicycle exercise and continued pressure of a hard saddle may act as a cause of delay in the second stage of labour...”

*Boston Medical and Surgical Journal, 1890.*



## CYCLIST'S APPENDICITIS

“The bicycle is taking the place of the cigarette as a pathological scapegoat”

*Boston Medical and Surgical Journal, 1889.*

*Punch 1889*

*Restoration of British cyclist, British Museum, 20th century.*

# A warning to enthusiasts: Punch 1889



## CYCLIST'S FACE

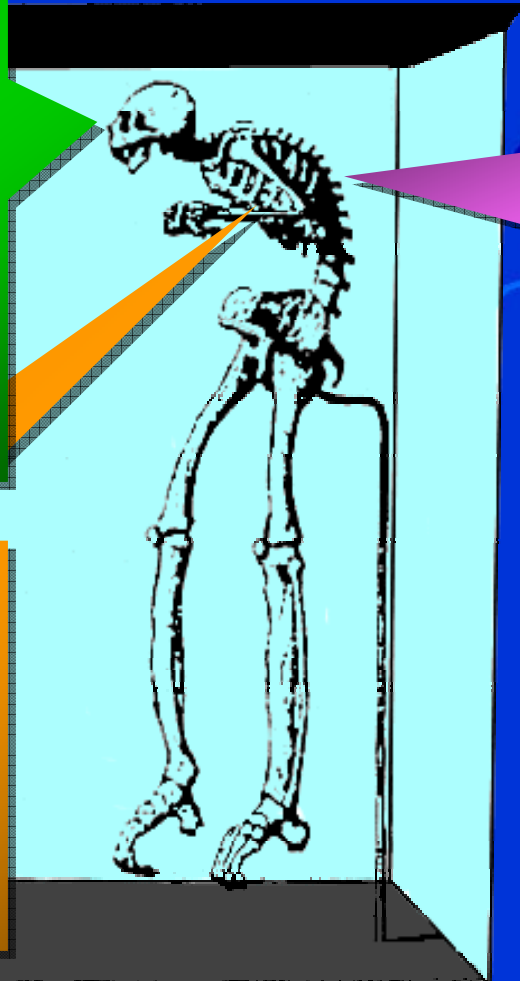
“... habitual violation of the law of the Sabbath may result in the worn, weary and exhausted face called The Bicycle Face”

*Boston Medical and Surgical Journal, 1891.*

## CYCLIST'S HEART

“There must be few of us who have not seen the ill effects of over-exertion on a bicycle”

*Boston Medical and Surgical Journal, 1891.*



## CYCLIST'S STOOP

“Kyphosis Bicyclistarum”

*Boston Medical and Surgical Journal, 1890.*

*Punch 1889*

*Restoration of British cyclist, British Museum, 20th century.*

# Exercise and Longevity



“... in those days we used to be told that no man in a racing-boat could expect to live to the age of 30.”

*Reverend Charles Wordsworth Originator of the University Boat race, 1829.*



*1983 picture of Yale rowing crew of 1933.*





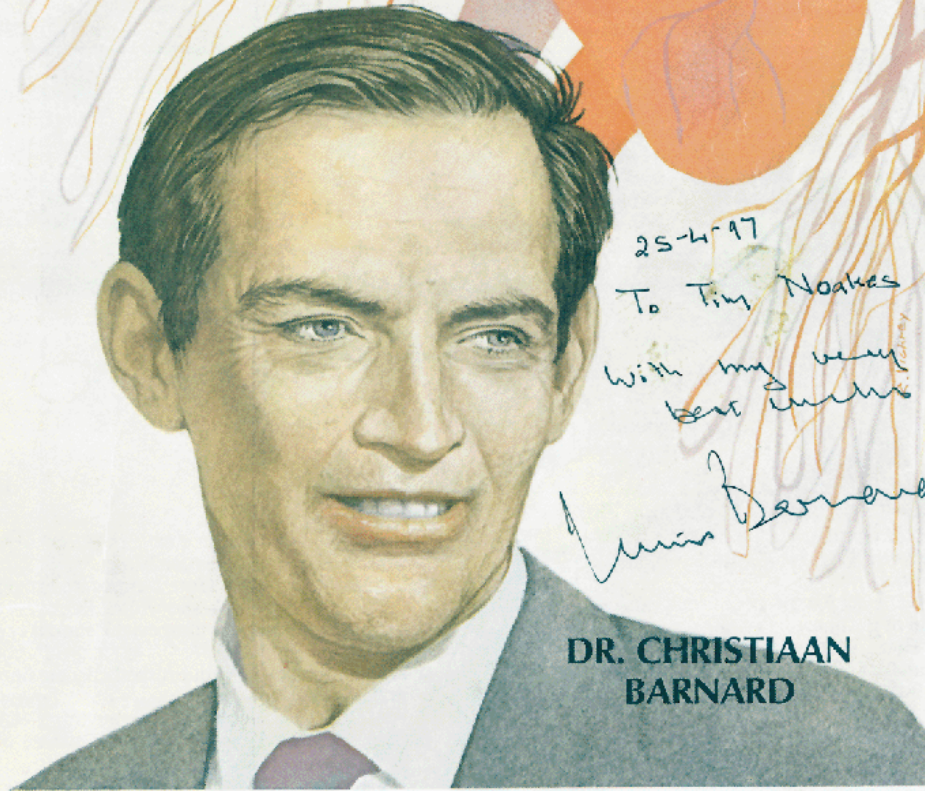
FIFTY CENTS \*

DECEMBER 15, 1967

THE TRANSPLANTED HEART

# TIME

THE WEEKLY NEWSMAGAZINE



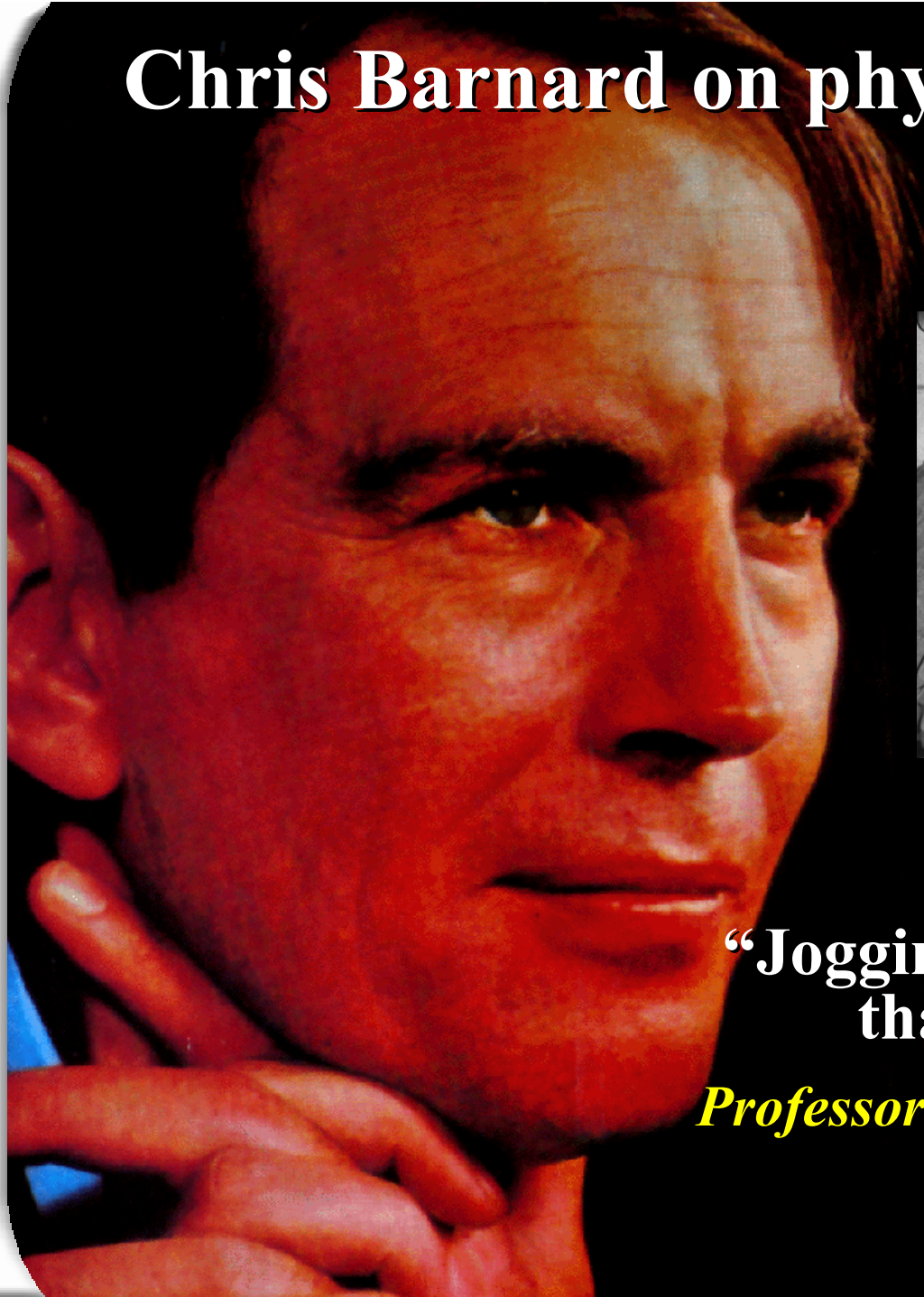
25-4-97  
To Tim Noakes  
With my very  
best wishes

*Christiaan Barnard*

DR. CHRISTIAAN  
BARNARD

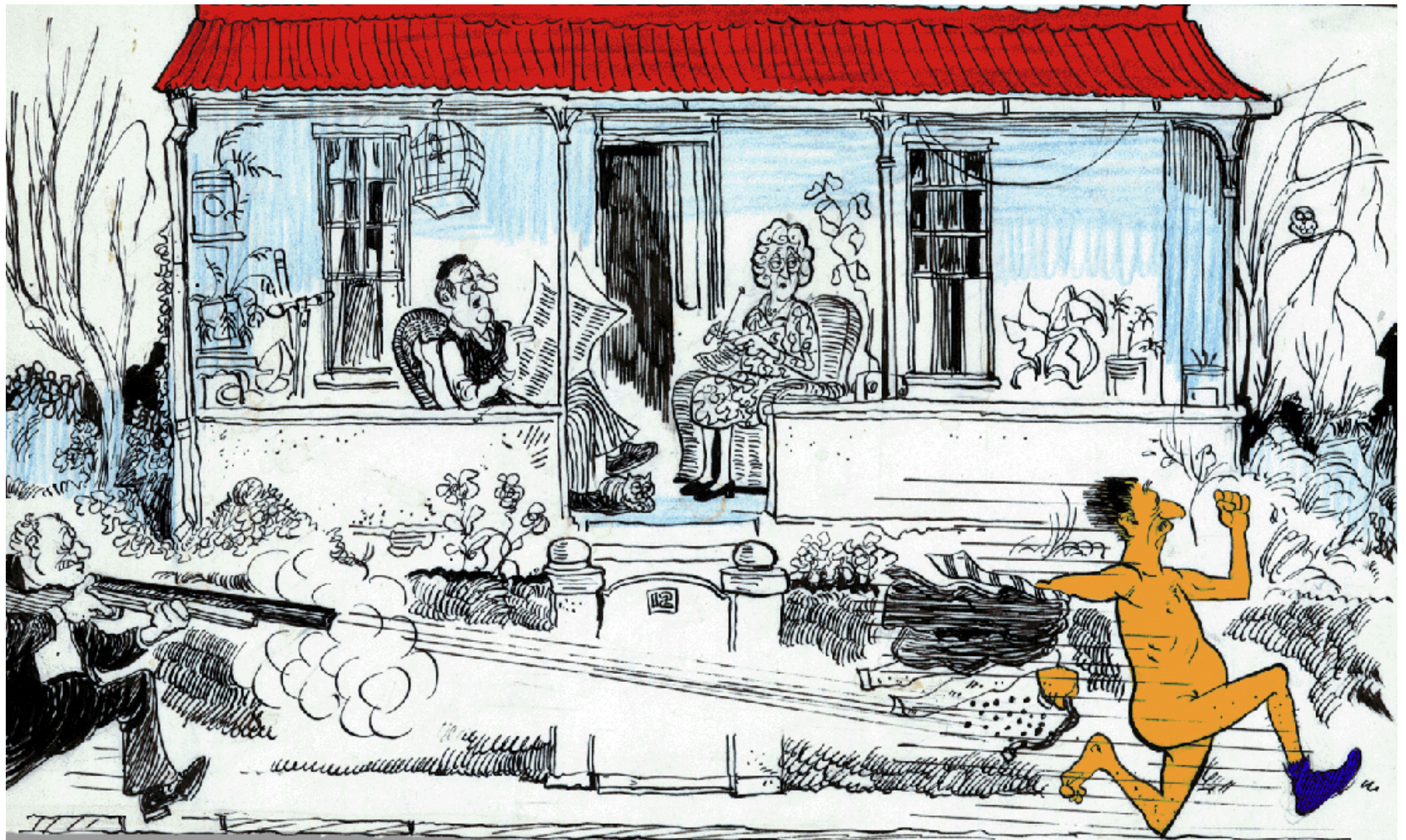


# Chris Barnard on physical activities



**“Jogging is more dangerous than extramarital sex.”**

***Professor Chris Barnard (aged 48)***

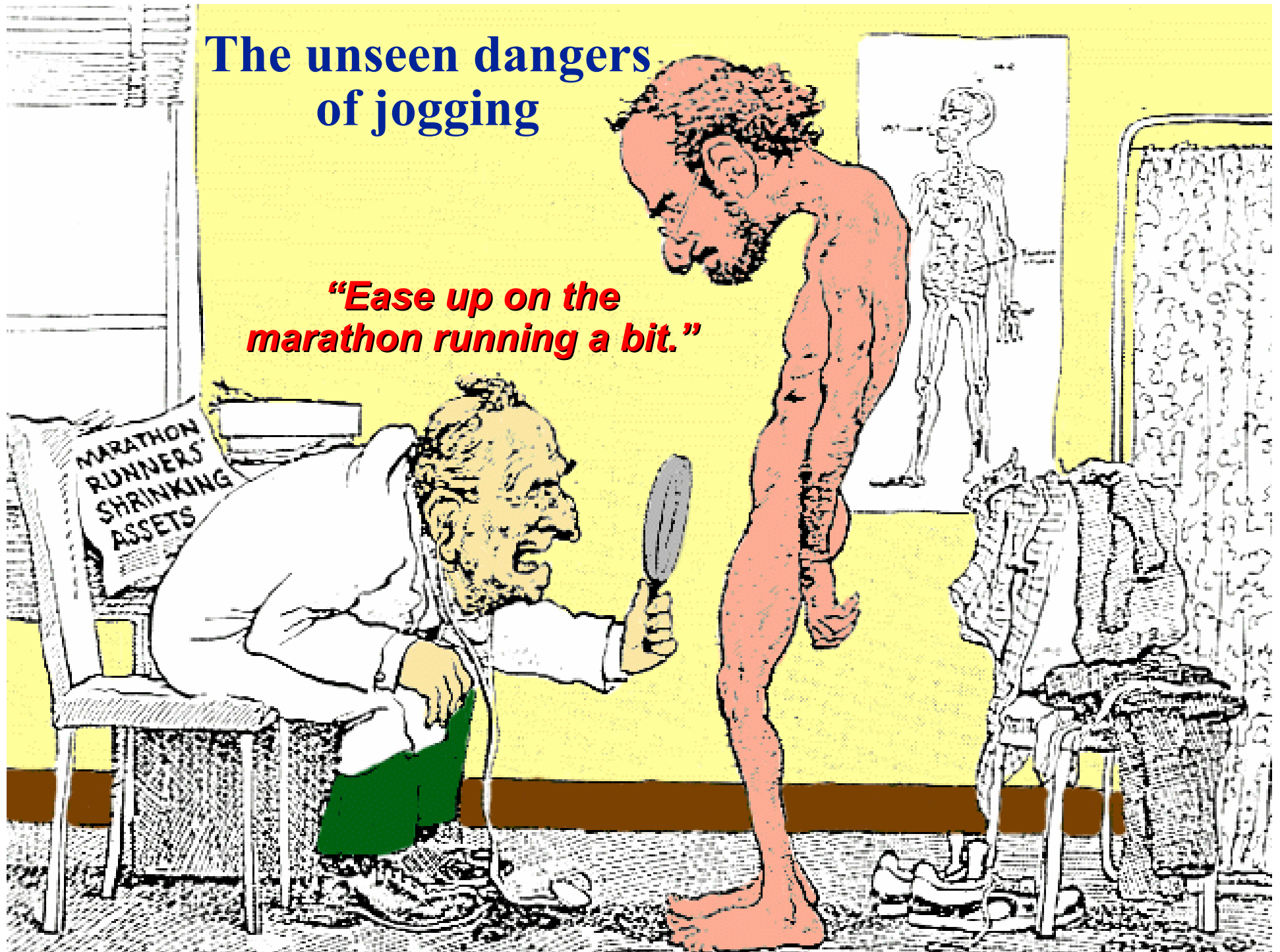


***“Extra-marital sex is ‘more dangerous’ than jogging”, says an Australian doctor...  
“together they could be fatal.”***

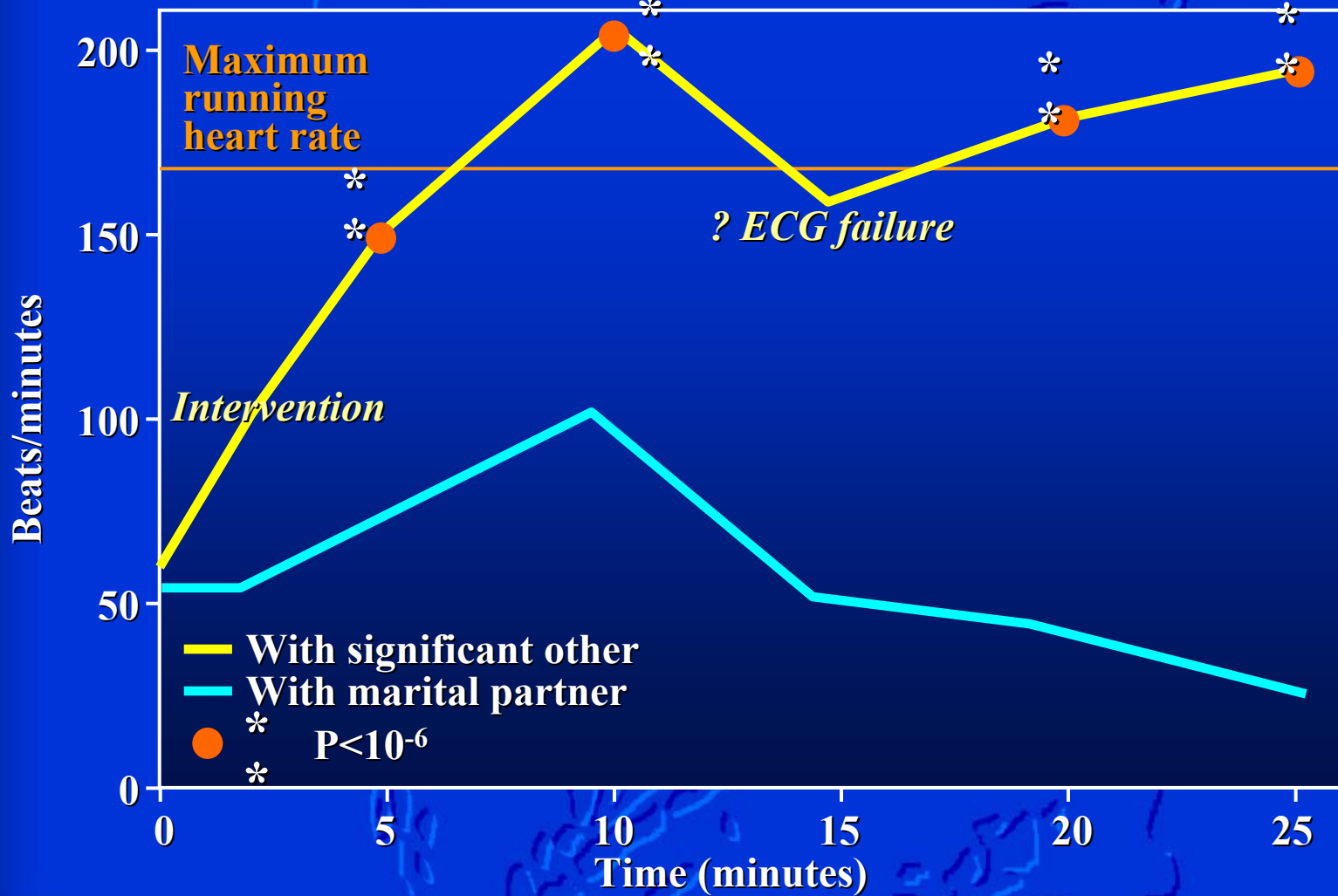
*CROGAN '90*

# The unseen dangers of jogging

*“Ease up on the  
marathon running a bit.”*



# Heart rates during sexual activity: The Chris Barnard Intervention Trial



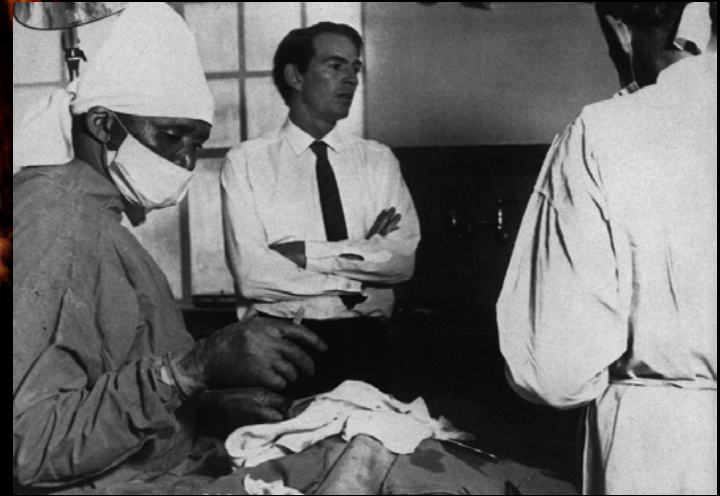
*C.N. Barnard et al. Jogging is more dangerous than extramarital sex:  
A thesis denied, 1980. (Unpublished)*

# Barnard on physical activities



**“Jogging is more dangerous than extramarital sex.”**

***Professor Chris Barnard  
(aged 48)***



**“Exercise is the most effective intervention to treat and delay the aging process.”**

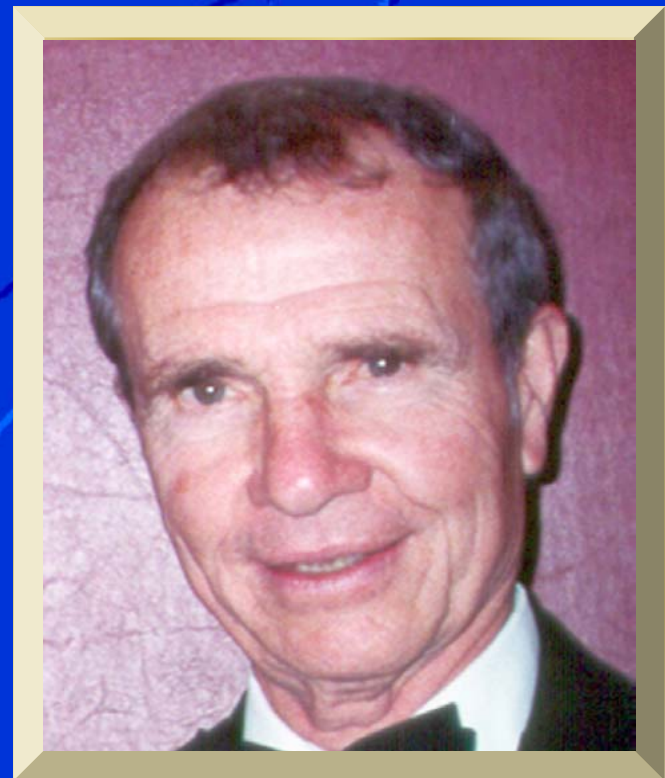
***Professor Chris Barnard  
(aged 73)***



# IOC Olympic Prize 1996 Exercise and Cardiac Health



**Jeremy Morris**  
University of London, UK

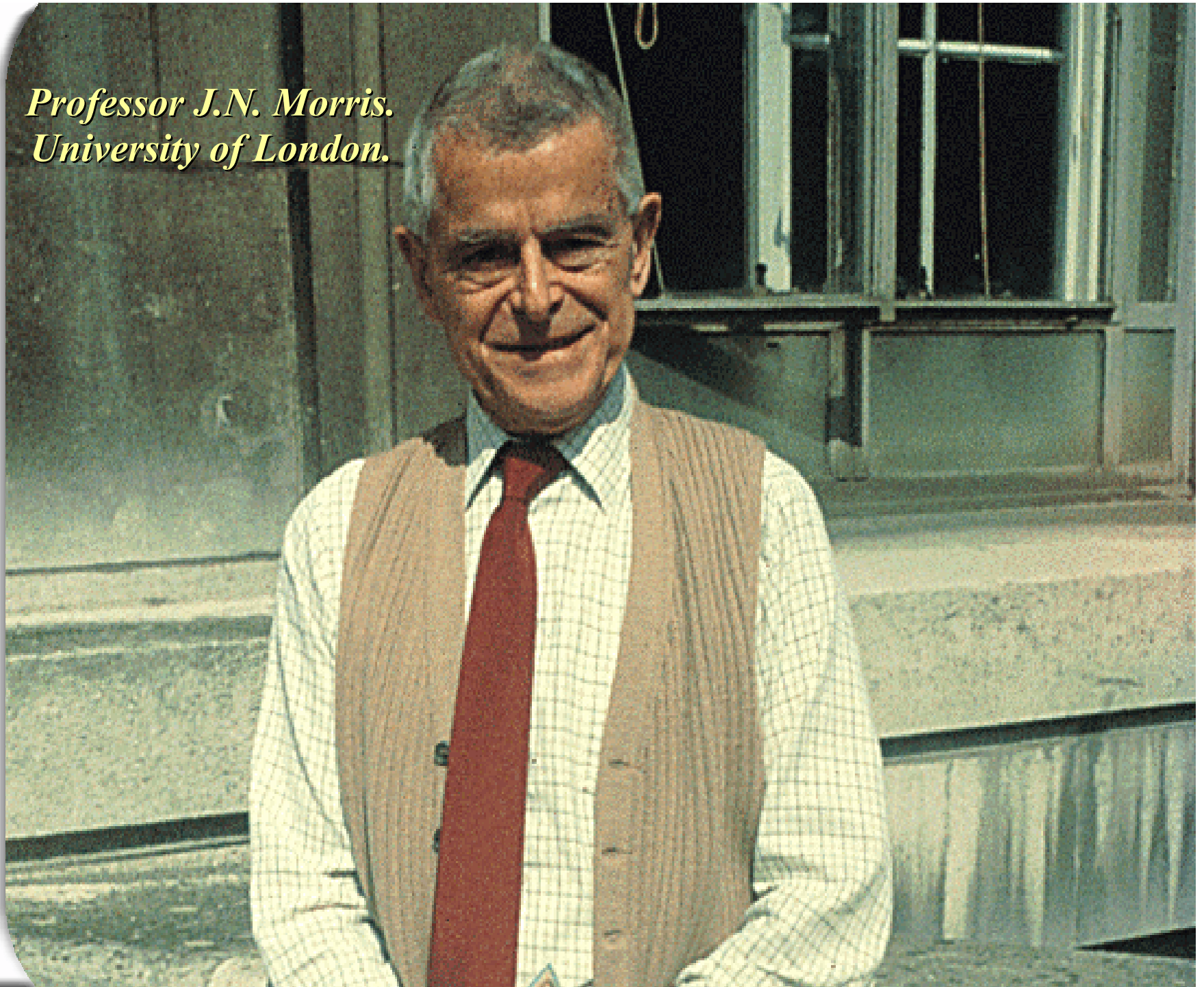


**Ralph Paffenbarger jun.**  
Stanford University, USA



IOC OLYMPIC  
PRIZE  
ENDOWED BY  
 **PARKE-DAVIS**

*Professor J.N. Morris.  
University of London.*

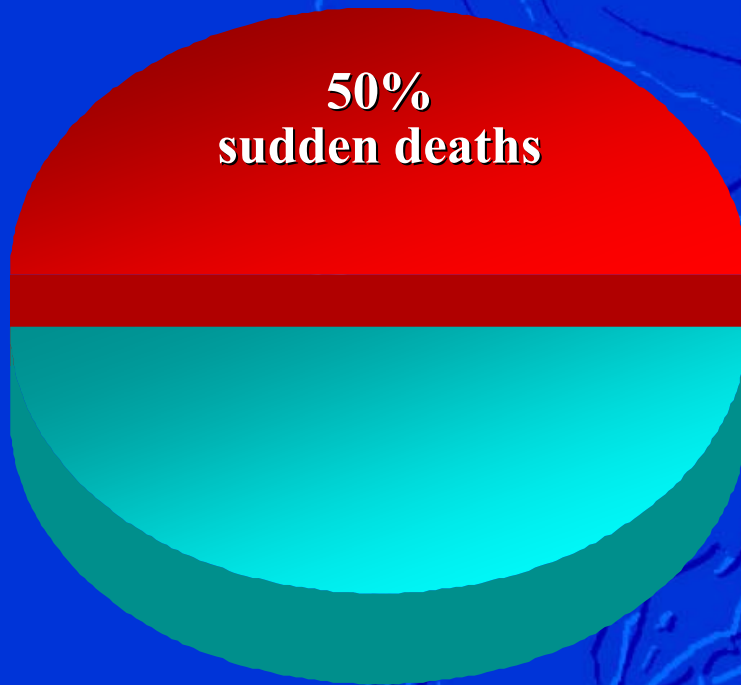




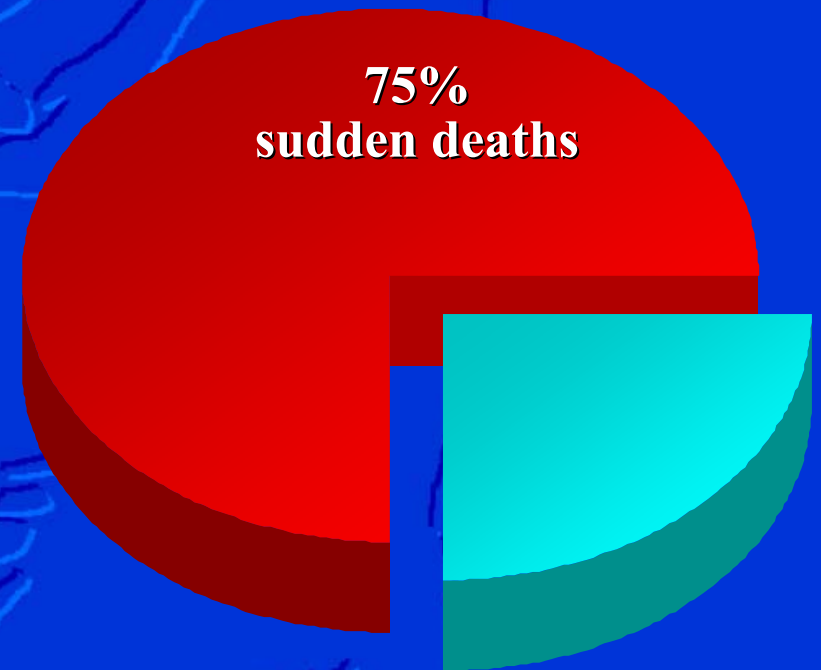
# The earliest study of physical activity and heart health



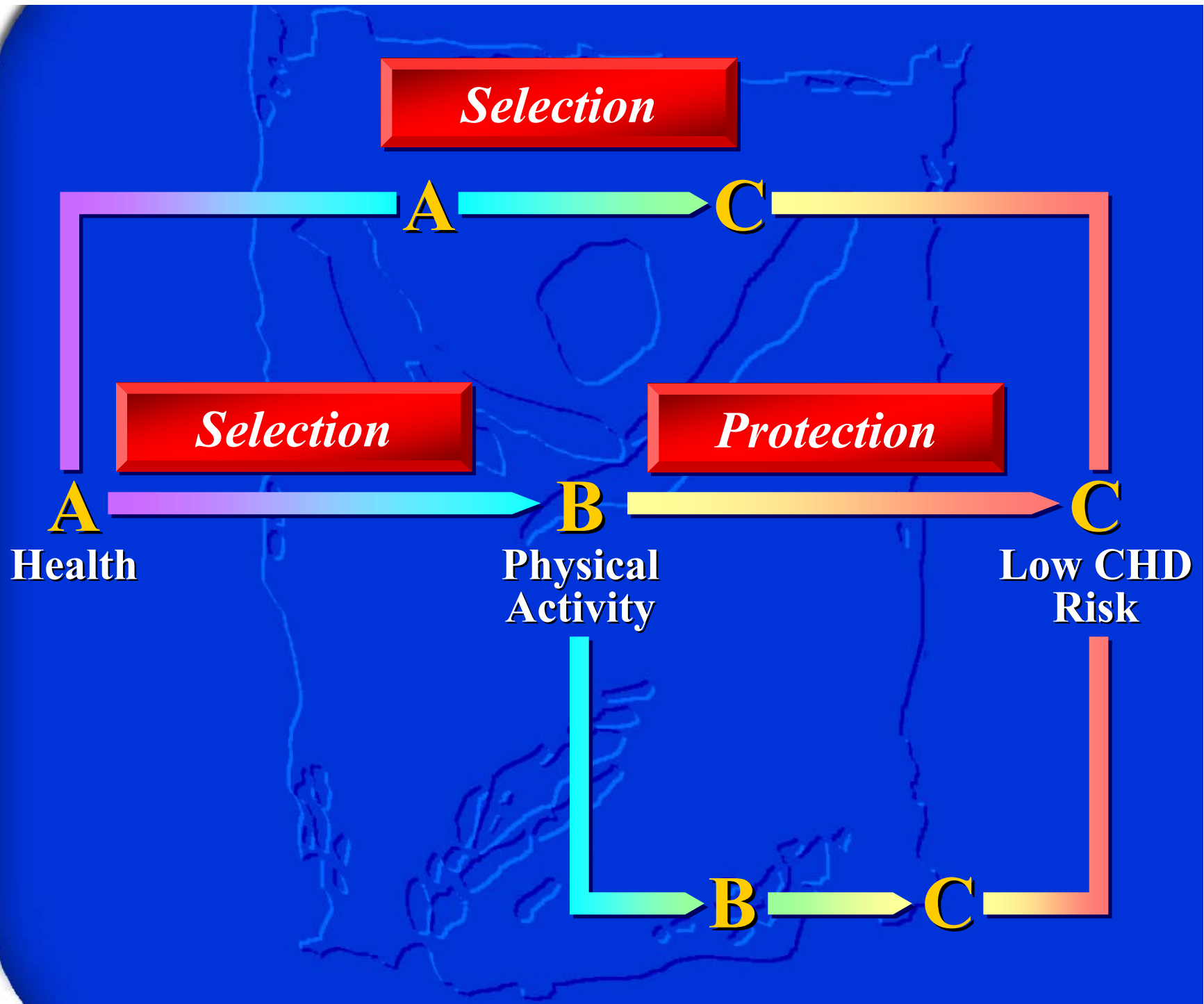
*Heavy workers*  
*23 deaths*



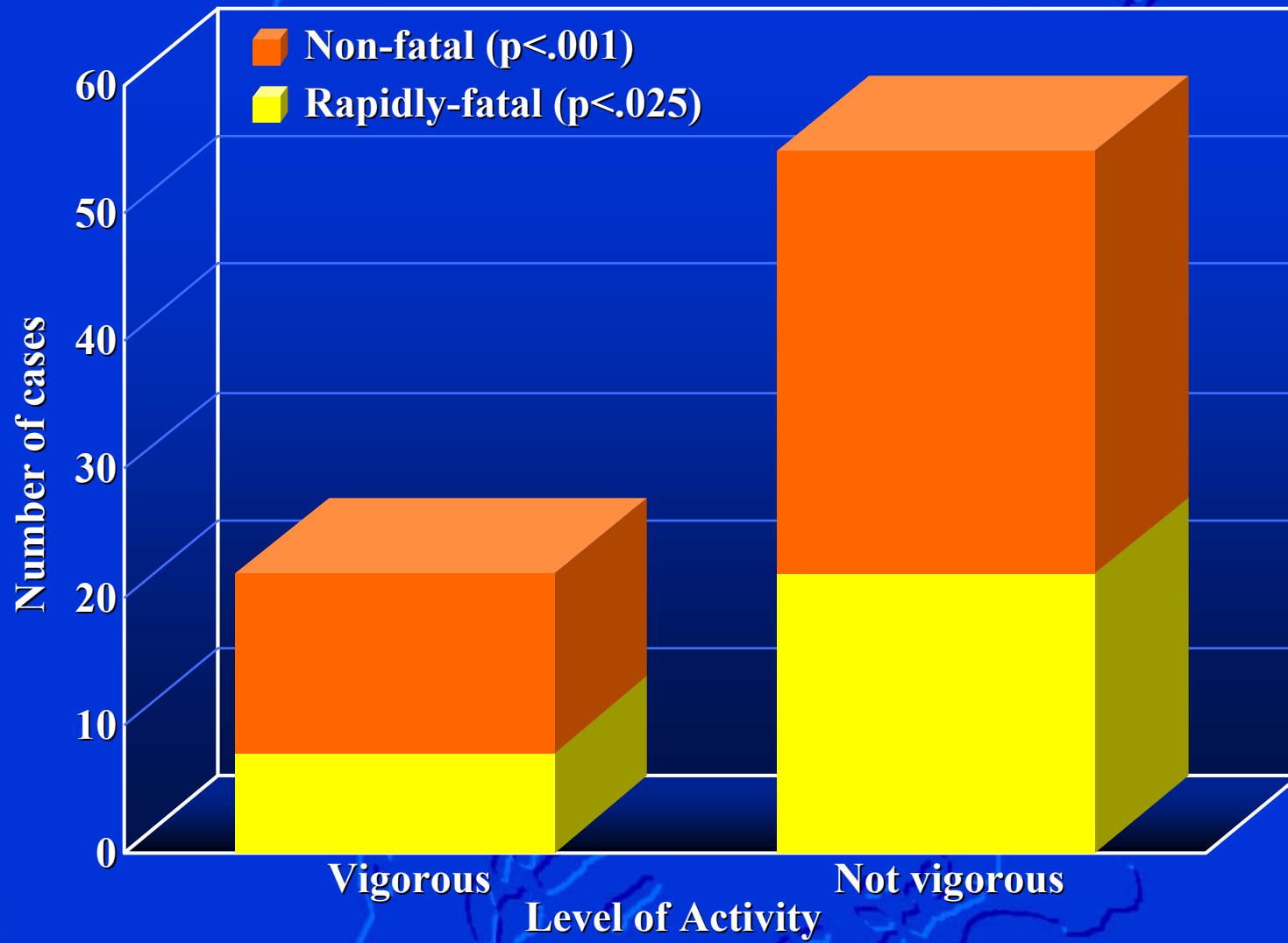
*Light workers*  
*59 deaths*



*J.N. Morris et al. Lancet 2; 1053-1057, 1953.*



# Physical activity and risk of heart attack: The British Civil Servants Study



*J.N. Morris et al. Lancet 1; 333-339, 1973.*



# Physical activity and heart health: The studies of Ralph Paffenbarger



## Longshoreman Study

1951 ————— 1972 |————— follow-up ————| 1977

**6 351 subjects**



## Harvard Alumni Study

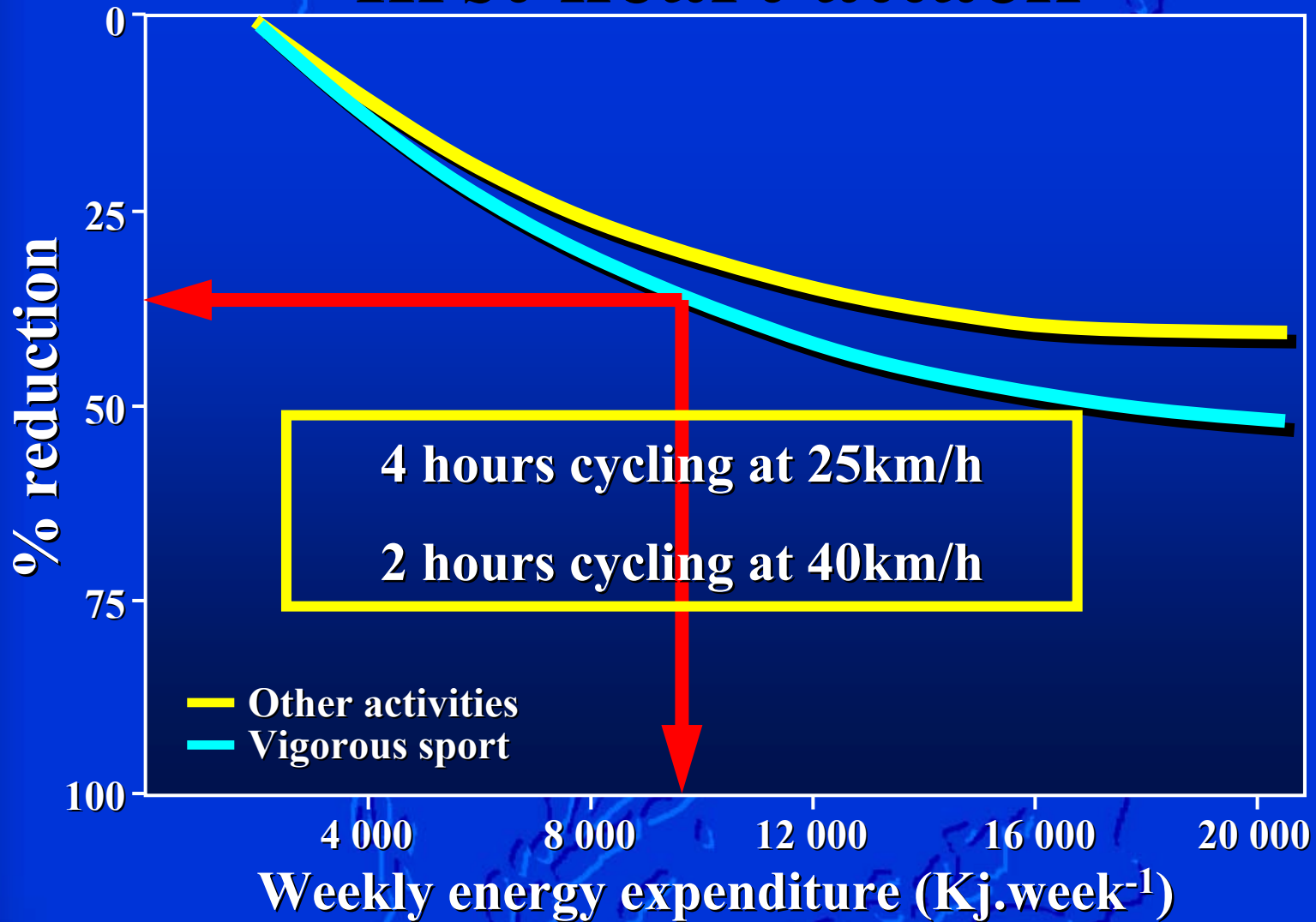
1916 ————— 1950 1972 |————— follow-up ————| 1999

**16 936 subjects**



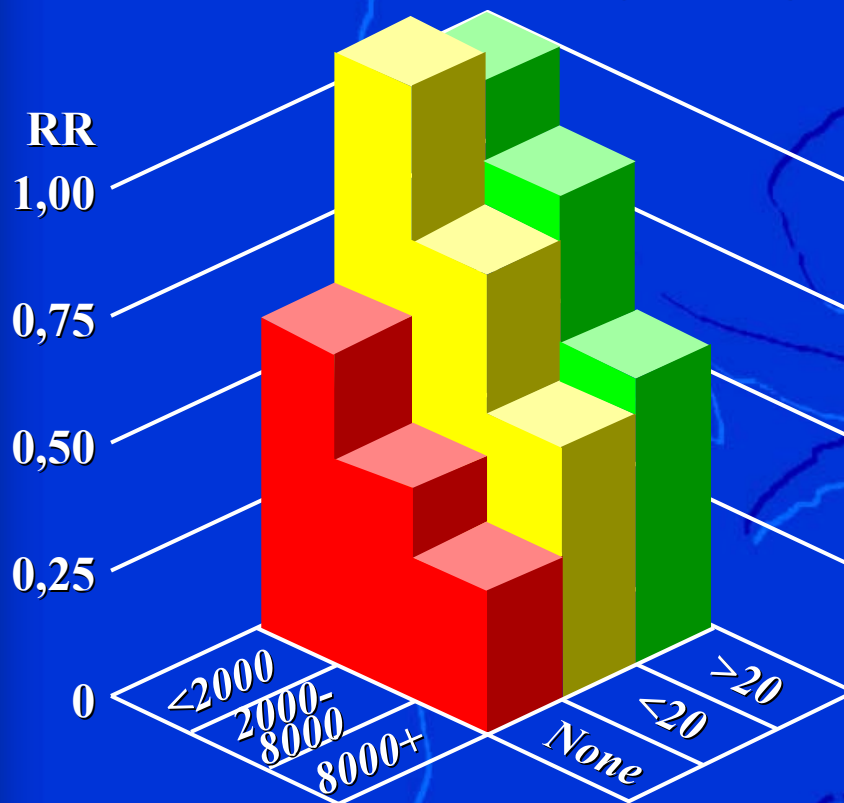
Major findings: 1978; 1983; 1986; 1991; 1993.

# Physical activity and risk of first heart attack



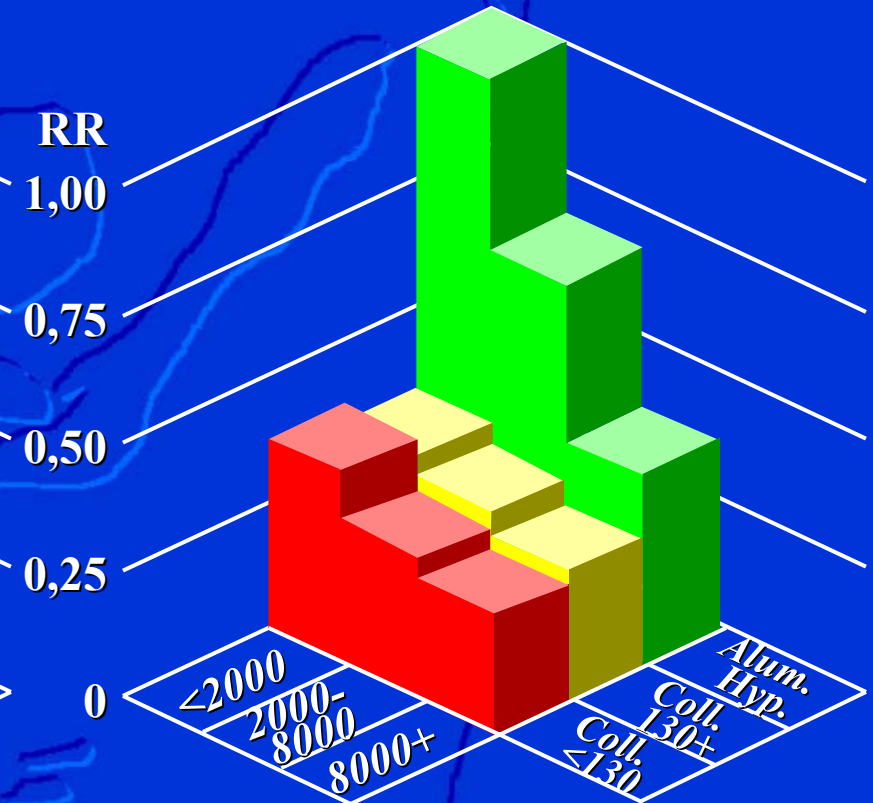
*R. Paffenbarger et al. American Journal of Epidemiology 108; 61-75, 1978.*

# Physical activity reduces risk of first heart attack



Physical Activity Index KJ/week

Cigarettes per day

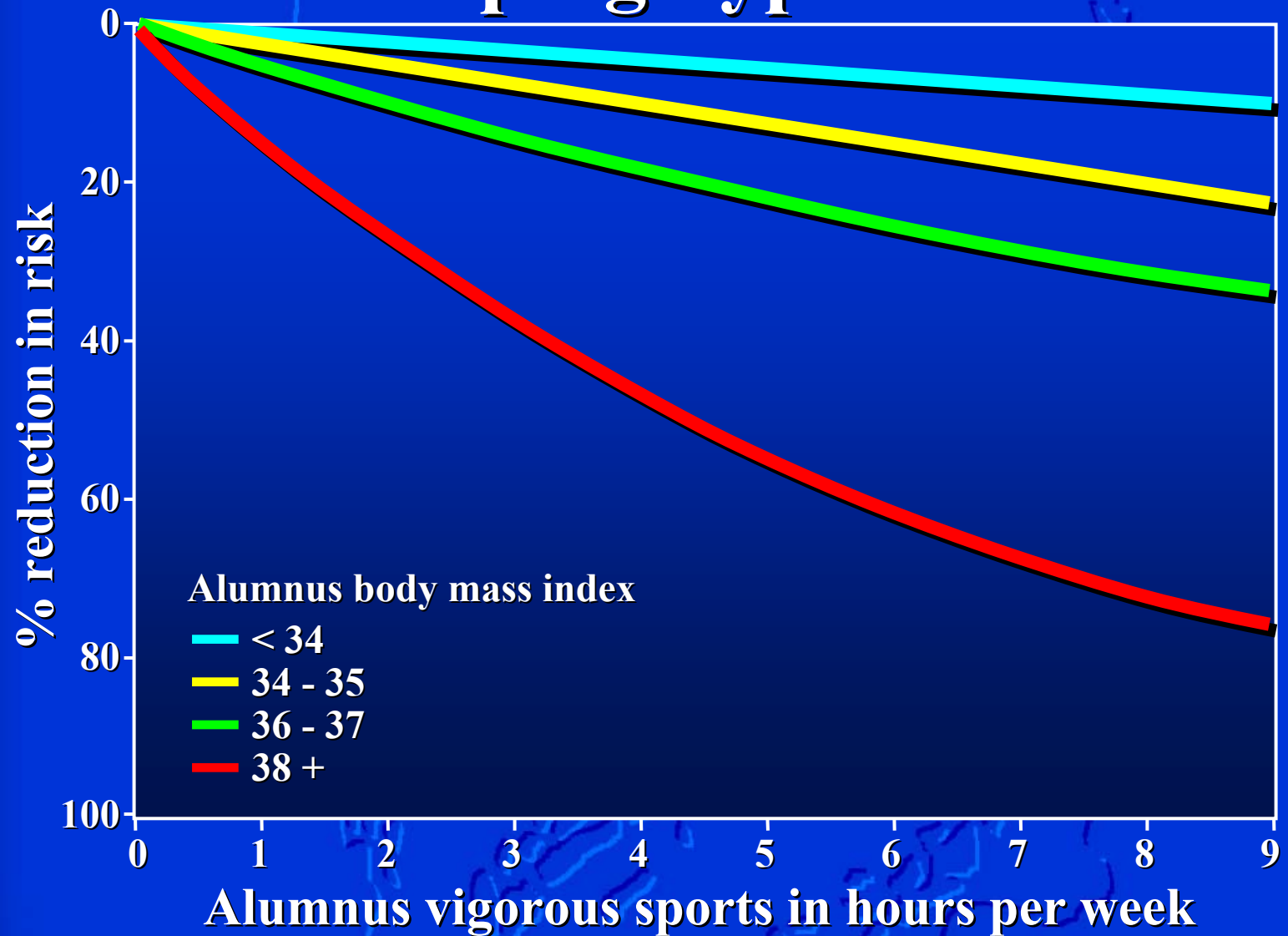


Physical Activity Index KJ/week

Blood Pressure Status

*R. Paffenbarger et al. American Journal of Epidemiology 108; 161-175, 1978.*

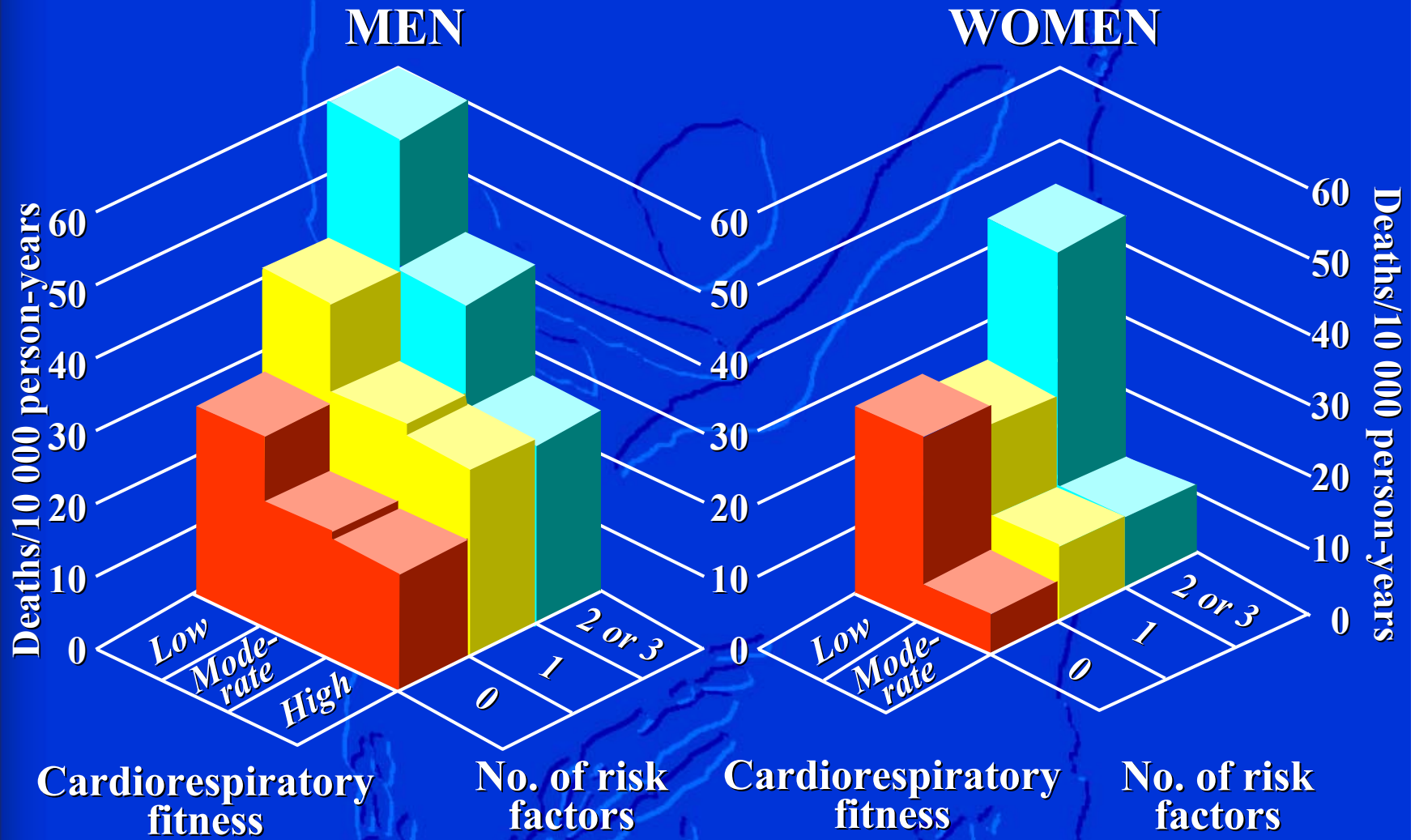
# Physical activity and risk of developing hypertension



*R. Paffenbarger et al. American Journal of Epidemiology 117; 245-257, 1983.*



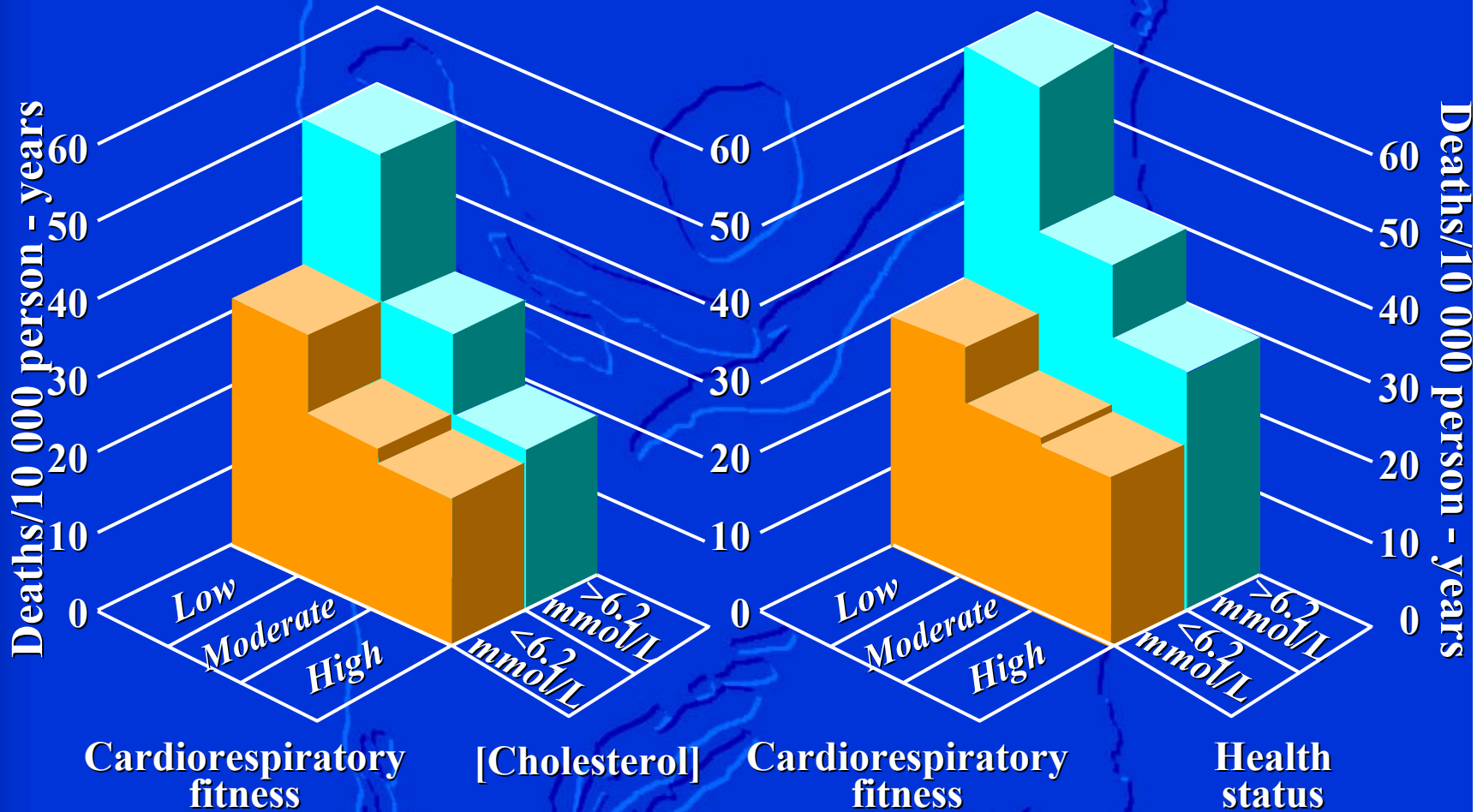
# Aerobics Centre Longitudinal Study



*S. Blair et al. Journal of the American Medical Association 276; 205-210, 1996.*



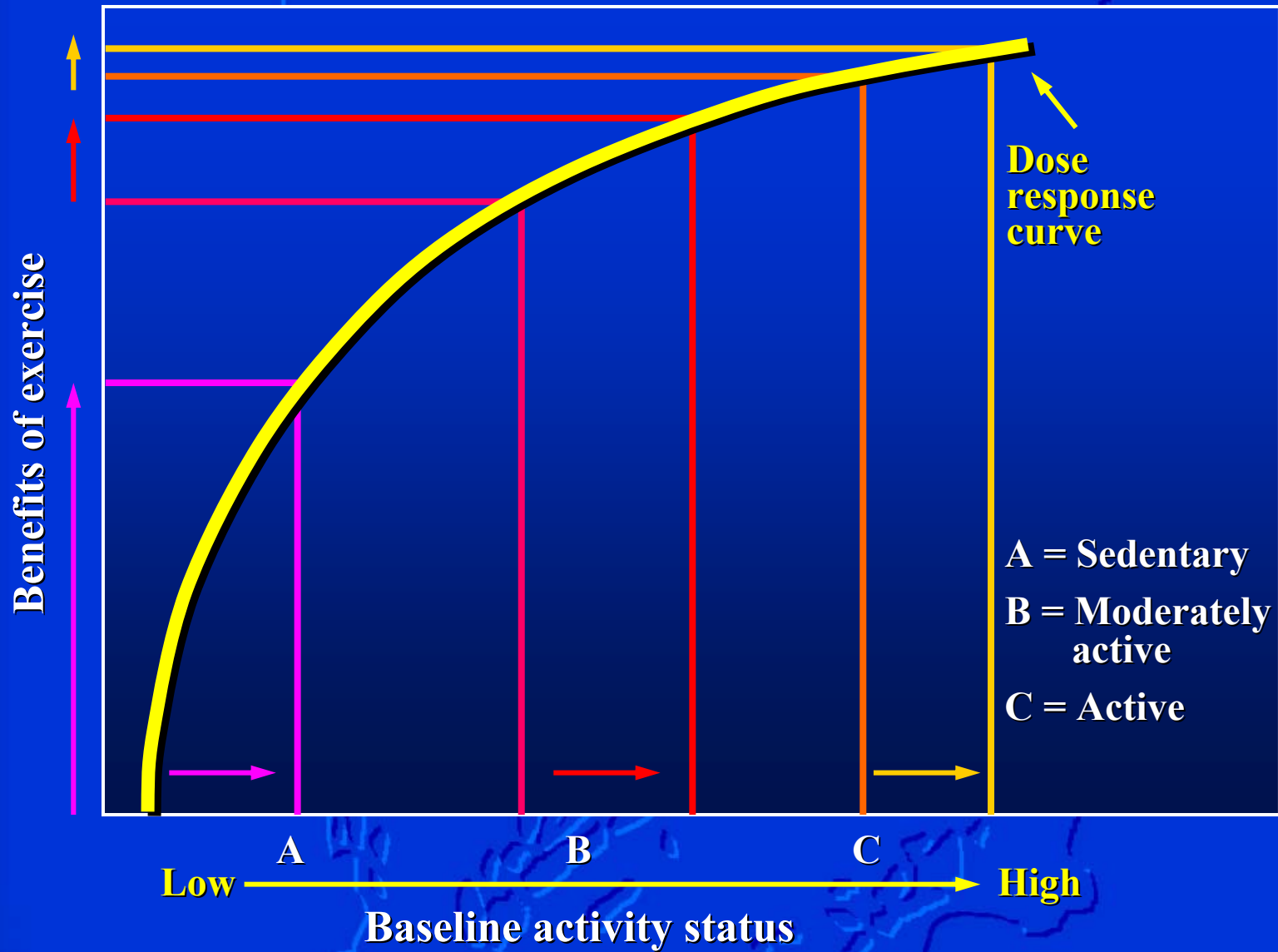
# Cardiorespiratory fitness and health status in persons with coronary risk factors



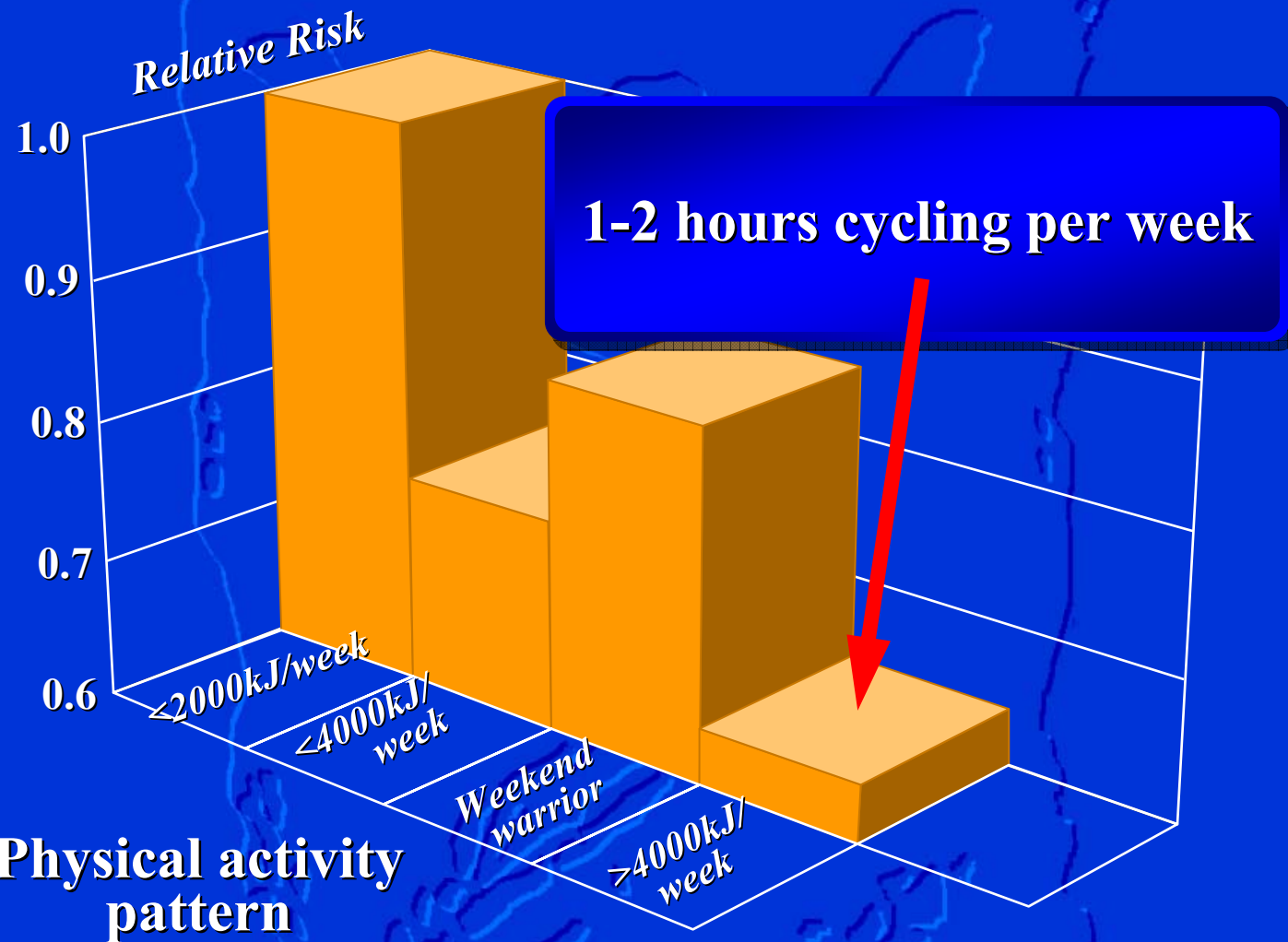
*S. Blair et al. Journal of the American Medical Association 276; 205-210, 1996.*



# How much exercise is enough?



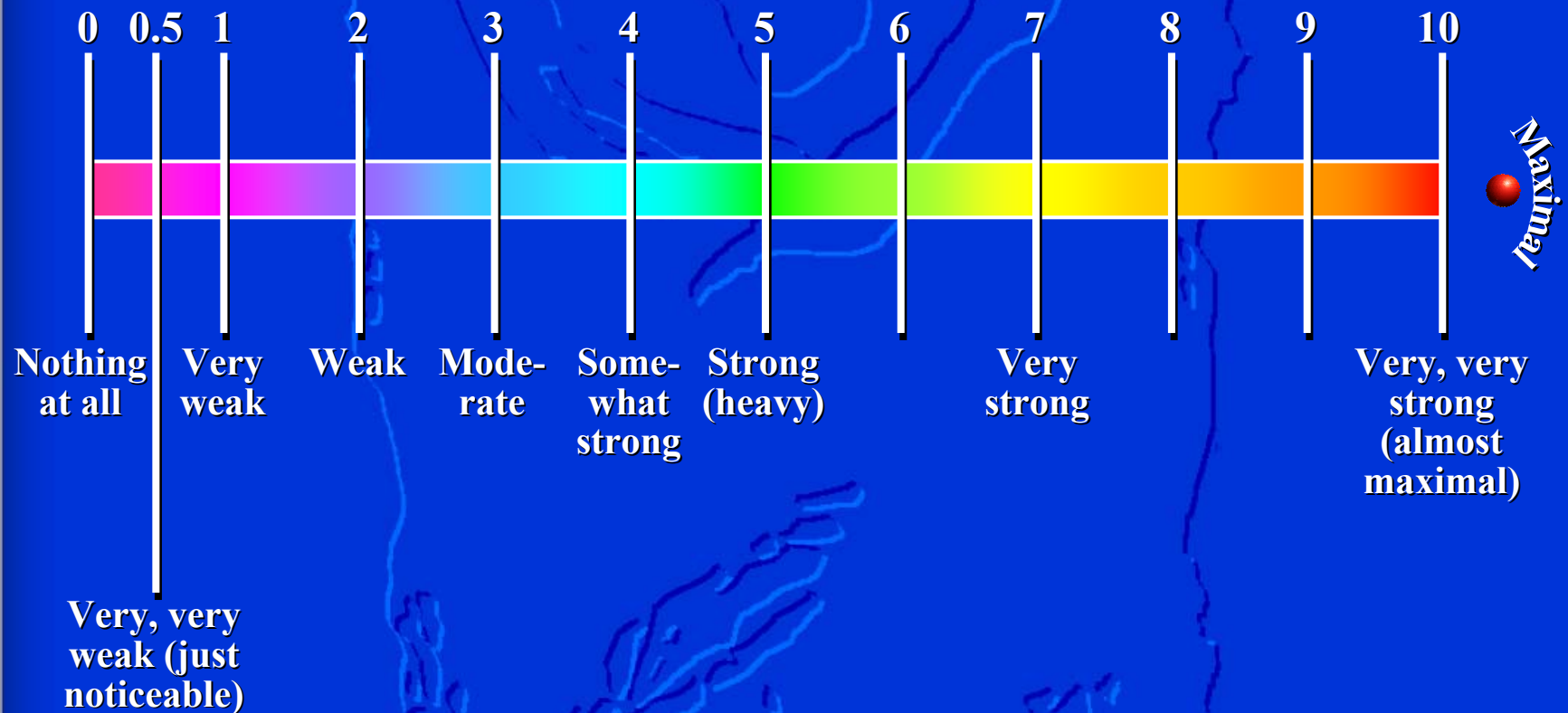
# Relative risk of mortality according to physical activity pattern



Physical activity pattern

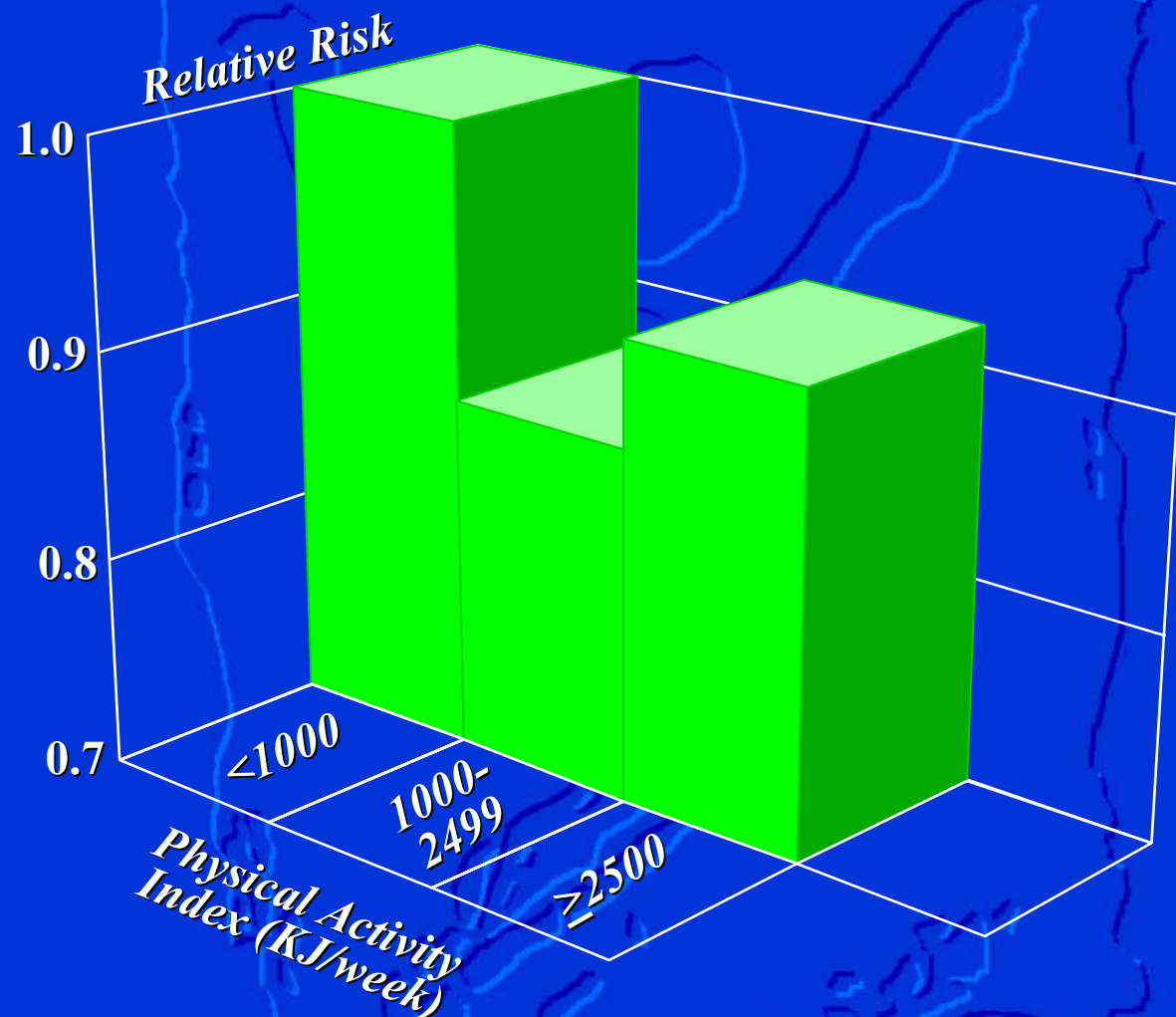
*I-Min Lee et al. American Journal of Epidemiology 2004; 160: 636-641.*

# Assessment of relative intensity of physical activity using the Borg scale



*I-Min Lee et al. Circulation 2003; 107: 1110-1116.*

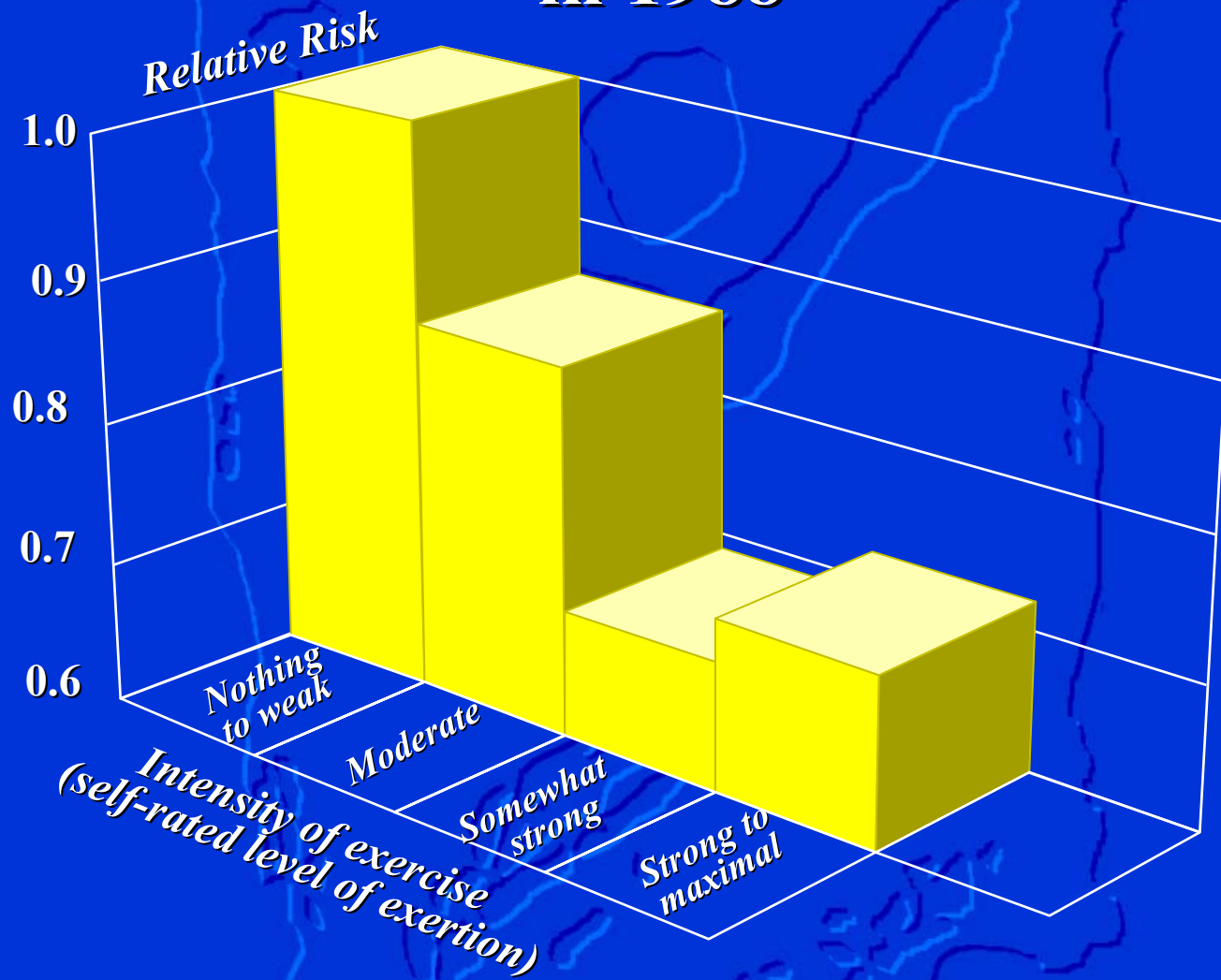
# Relative risk of coronary heart disease, 1988-1995, according to physical activity index in 1988



*I-Min Lee et al. Circulation 2003; 107: 1110-1116.*



# Relative risk of coronary heart disease, 1988-1995, according to intensity of training in 1988

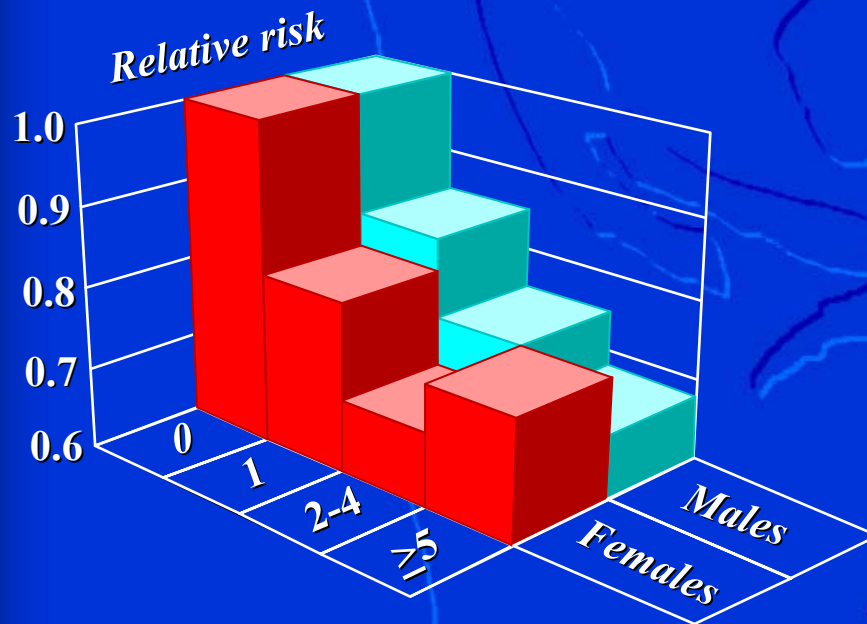


*I-Min Lee et al. Circulation 2003; 107: 1110-1116.*



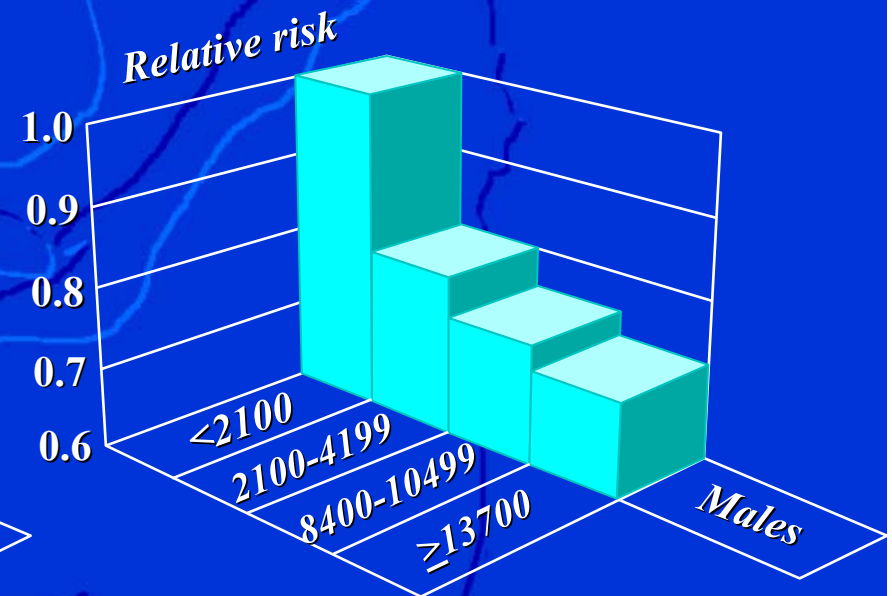


# Physical activity and Non Insulin Dependent Diabetes Mellitus (NIDDM)



Sessions of vigorous exercise per week

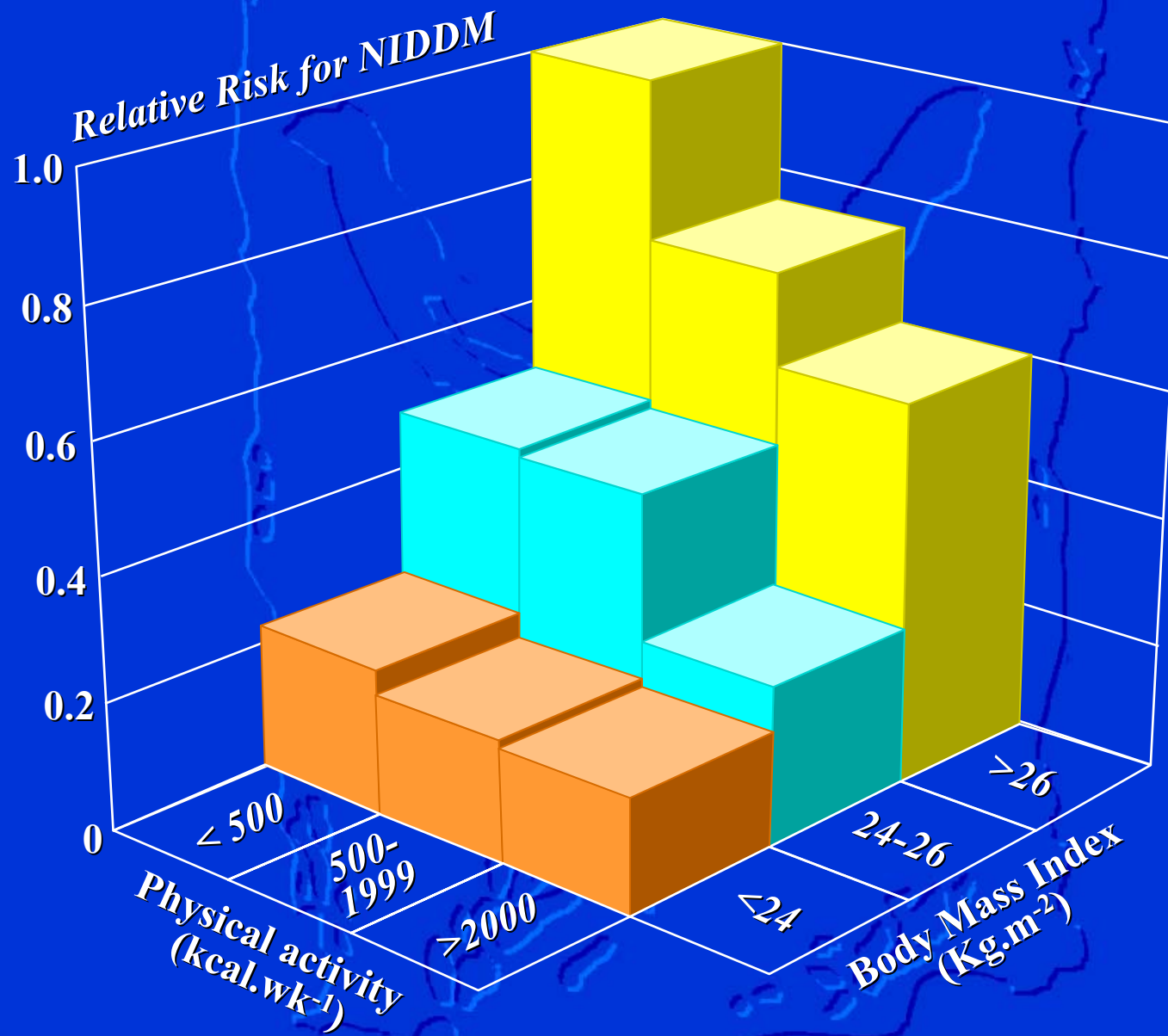
*Manson et al. JAMA 268; 63-67, 1992.  
Manson et al. Lancet 338, 774-778, 1991.*



Physical activity (KJ/week)

*Helmrich et al. N Engl J Med. 325; 147-152, 1991.*

# Physical activity reduces risk of NIDDM



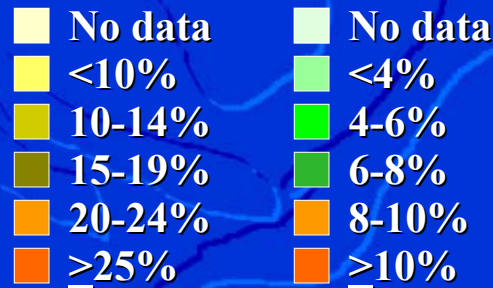
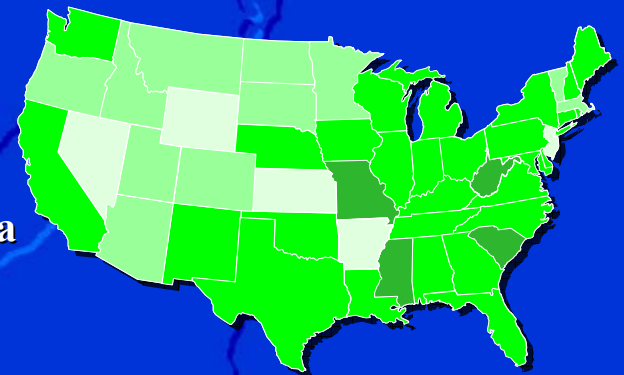
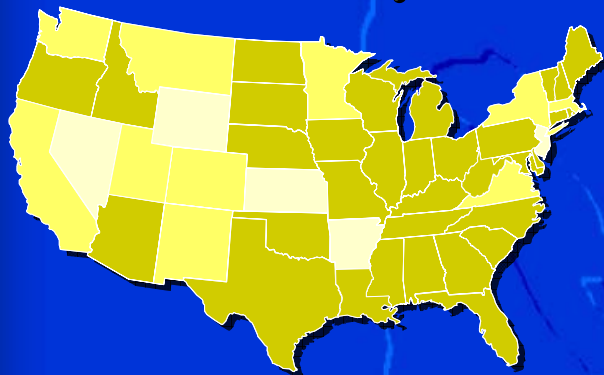


# Diabetes costs rising in the US

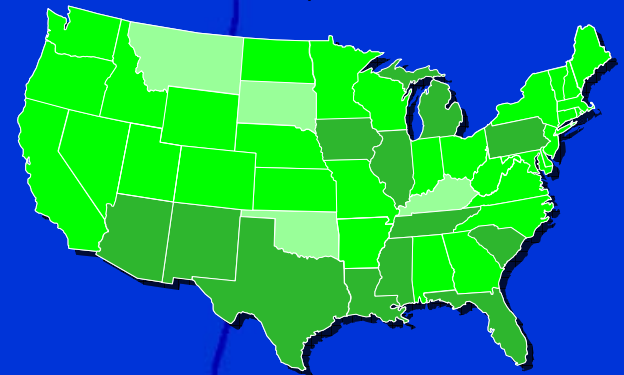
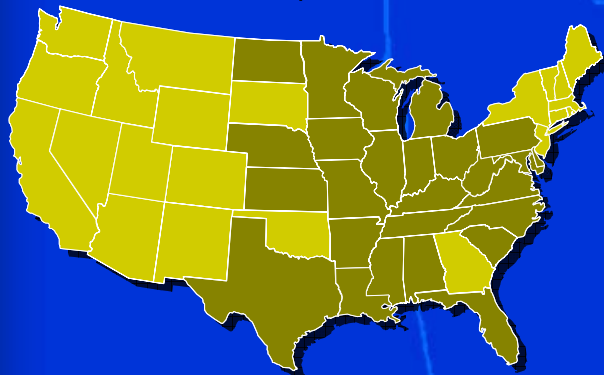
## Obesity

## Diabetes

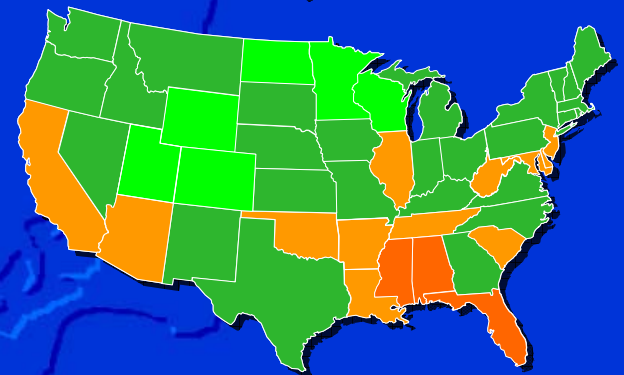
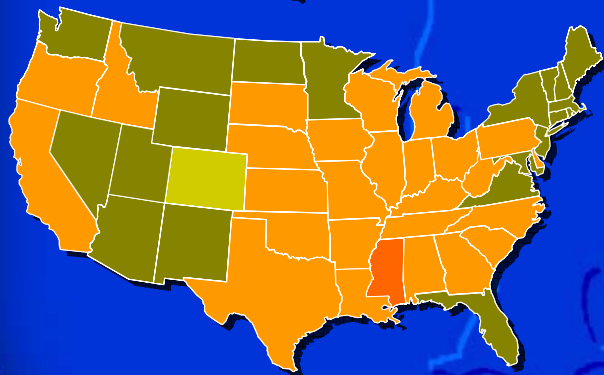
1990



1995



2001

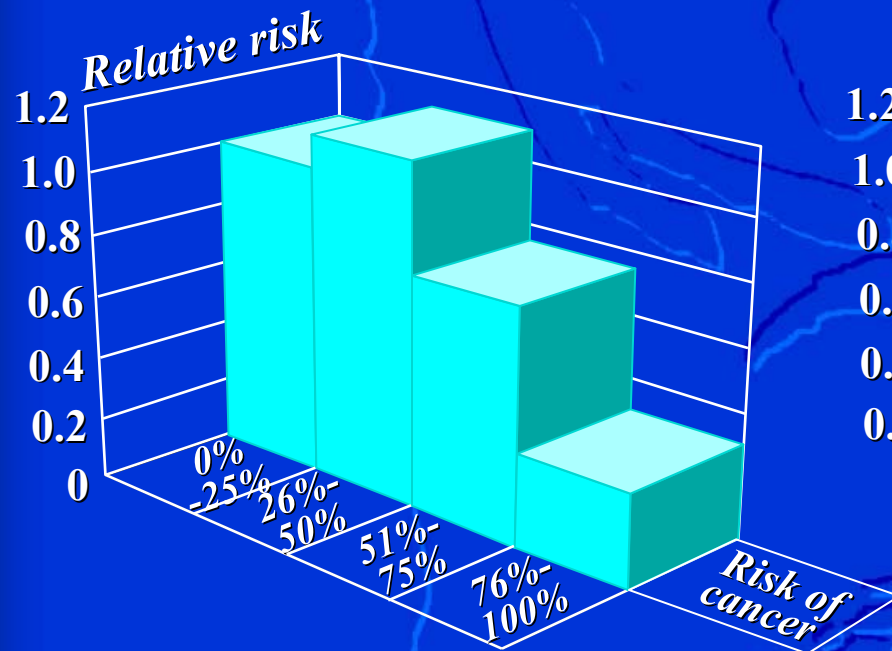


Source: Centers for Disease Control and Prevention

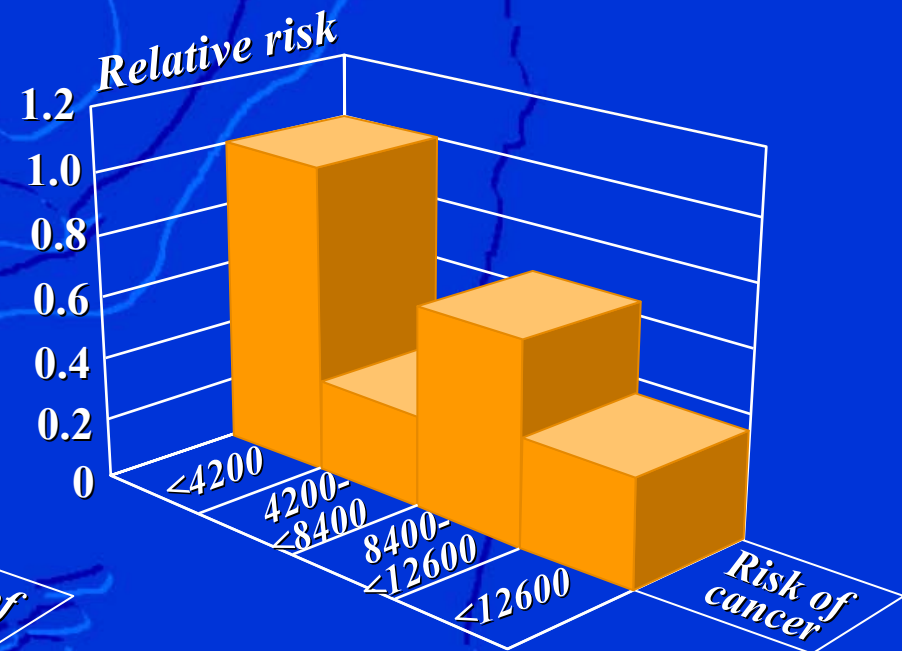


# Aerobics Centre Longitudinal Study

## *Physical activity, fitness and prostate cancer*



Physical fitness group

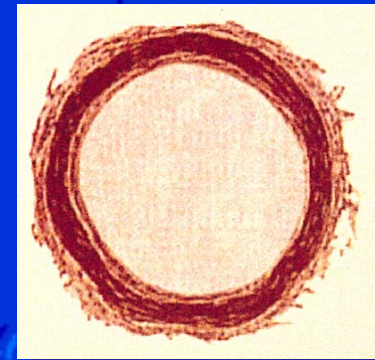
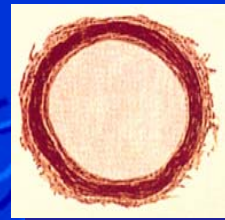


Physical activity (KJ/Week)

*Oliveria et al. Medicine and Science in Sports and Exercise 28; 97-104, 1996.*

# Increased vasodilatory capacity of coronary arteries of veteran ultramarathon runners

	Sum of circumference at rest (mm <sup>2</sup> )	% change with nitroglycerine
Inactive men	21	29%
Ultramarathon runners	21	29%



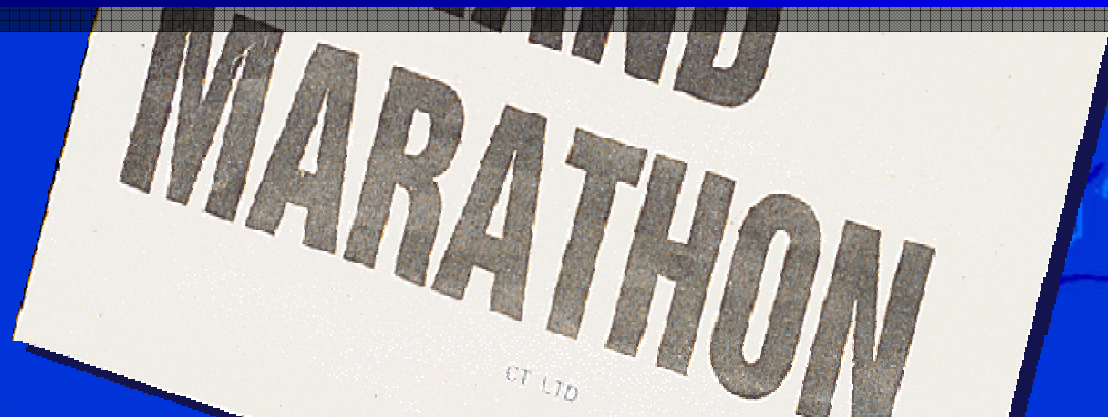
*W. Haskell et al. Circulation 87; 1076-1082, 1993.*



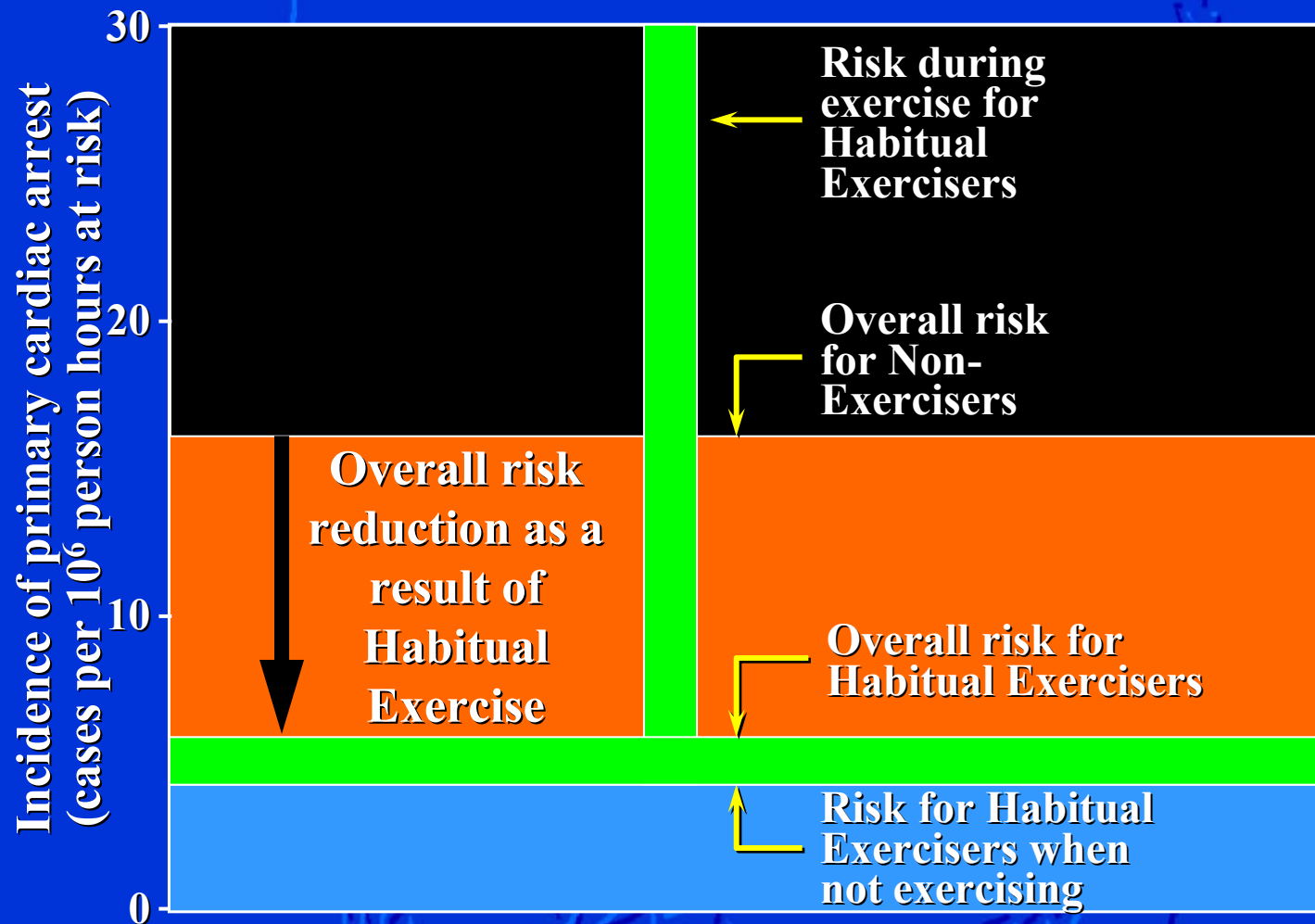


*Three athletes died during the 2002 Argus  
Cycle Tour.*

*1 Heart attack  
2 cases of "Heatstroke"*



# Overall risk of primary cardiac arrest

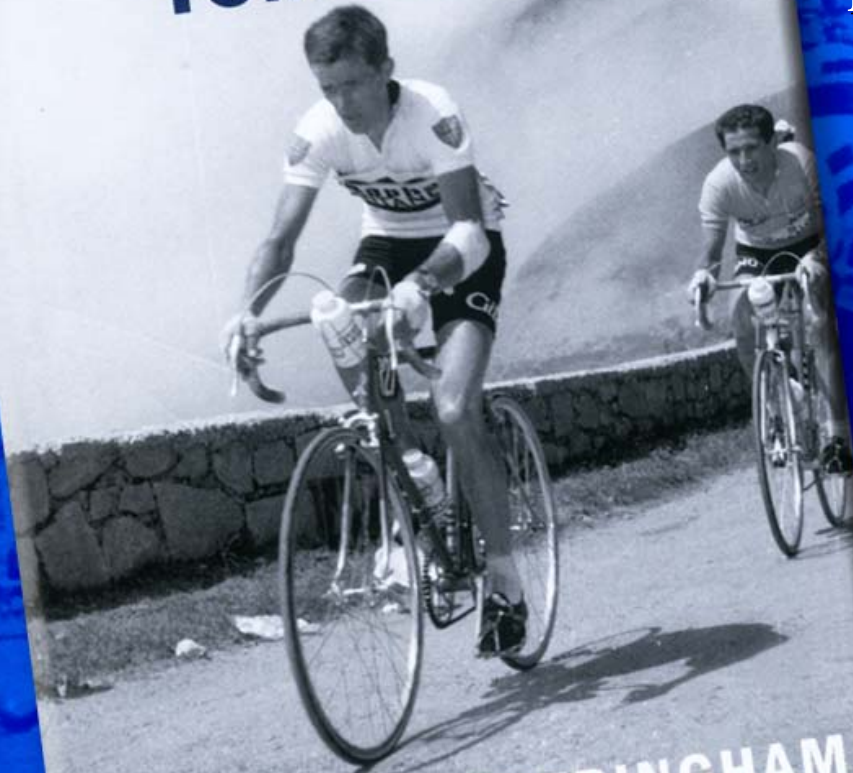


*D. Siskovick et al. Journal of American Medical Association 248; 3113-3117, 1982.*



# put me back on my bike

In Search of  
**TOM SIMPSON**



**WILLIAM FOTHERINGHAM**

“You would have to be an imbecile or a crook to imagine that a professional cyclist who races for 235 days a year can hold a pace without stimulants”

*Jacques Antequil*

*5 Times winner of the  
Tour de France.*

*Dead at 53 from cancer*

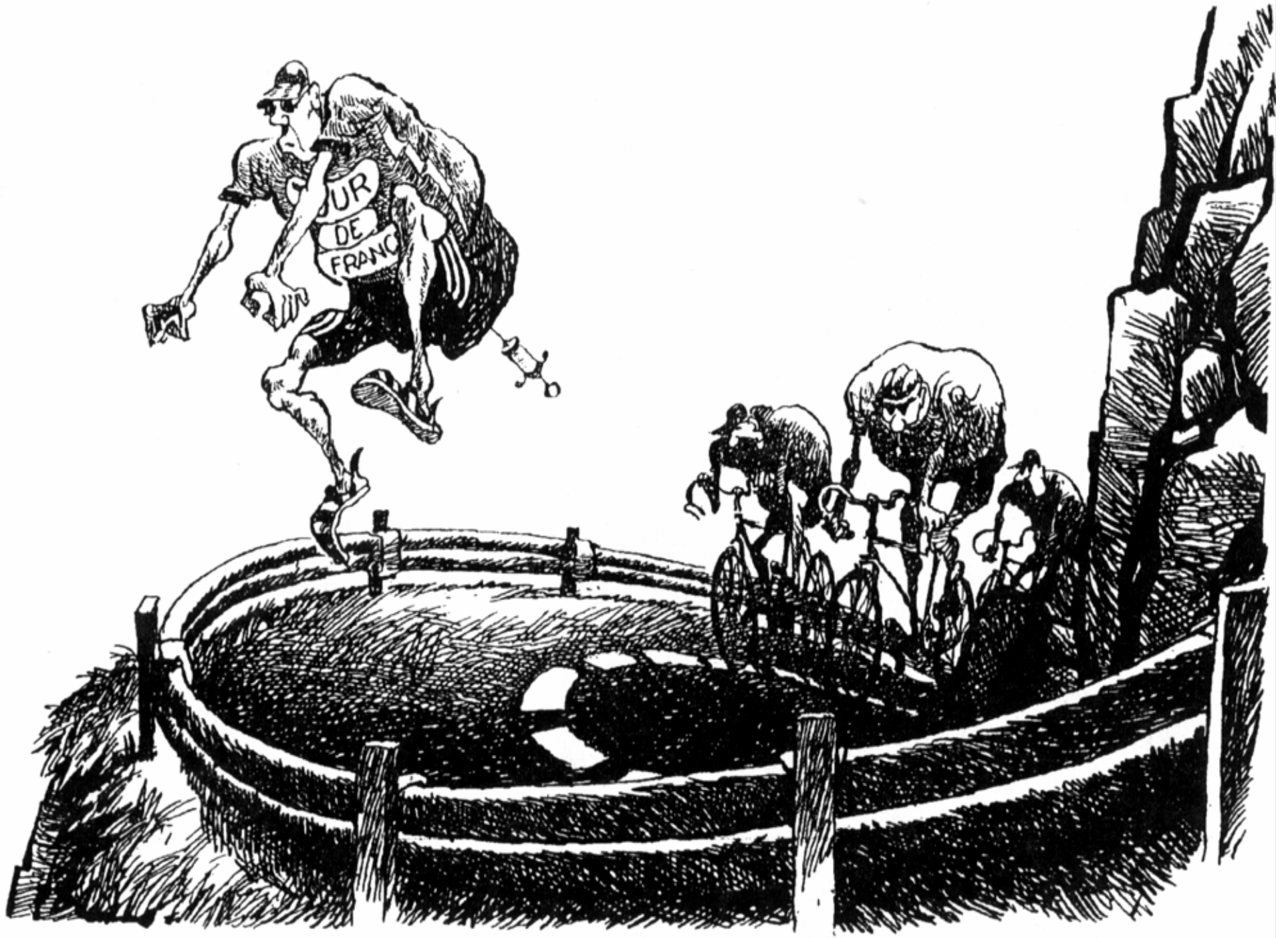
*W. Fotheringham. Put me back on my bike (In Search of Tom Simpson), p.166, 2002.*

# Tom Simpson dies of amphetamine-induced heatstroke.



**Mount Ventoux. 13th Stage of the 1967 Tour de France**

*W. Fotheringham. Put me back on my bike (In Search of Tom Simpson),  
p.180, 2002.*







# The physical benefits resulting from cycling and walking

## Conclusions

Cycling the Argus Cycle Tour expends about 10000kJ sufficient to qualify for double Weekend Warrior status (and a reduced risk of heart disease).

The benefits of exercise can be achieved by cycling between 2-4 hours per week.