ISTITUTO DI MEDICINA DELLO SPORT DI FIRENZE

"dal 1950 al servizio dello sport"

Prevenzione "in movimento"

# "Sindrome Metabolica"


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WIKIPEDIA


# Metabolic syndrome

## From Wikipedia, the free encyclopedia

Jump to: navigation, search

**Dysmetabolic syndrome X**

**ICD-10**

**ICD-9**277.7

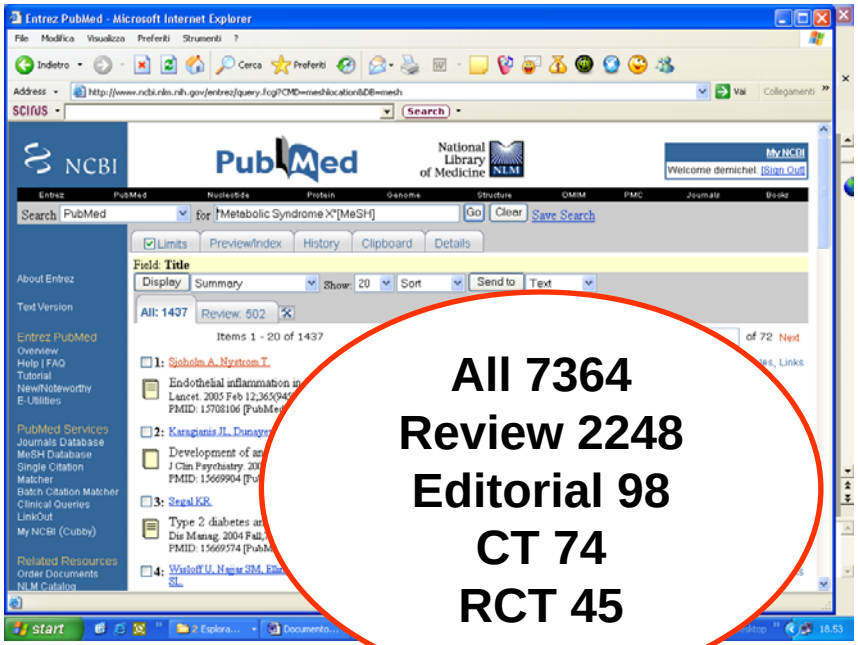
**OMIM**605552**DiseasesDB**31955

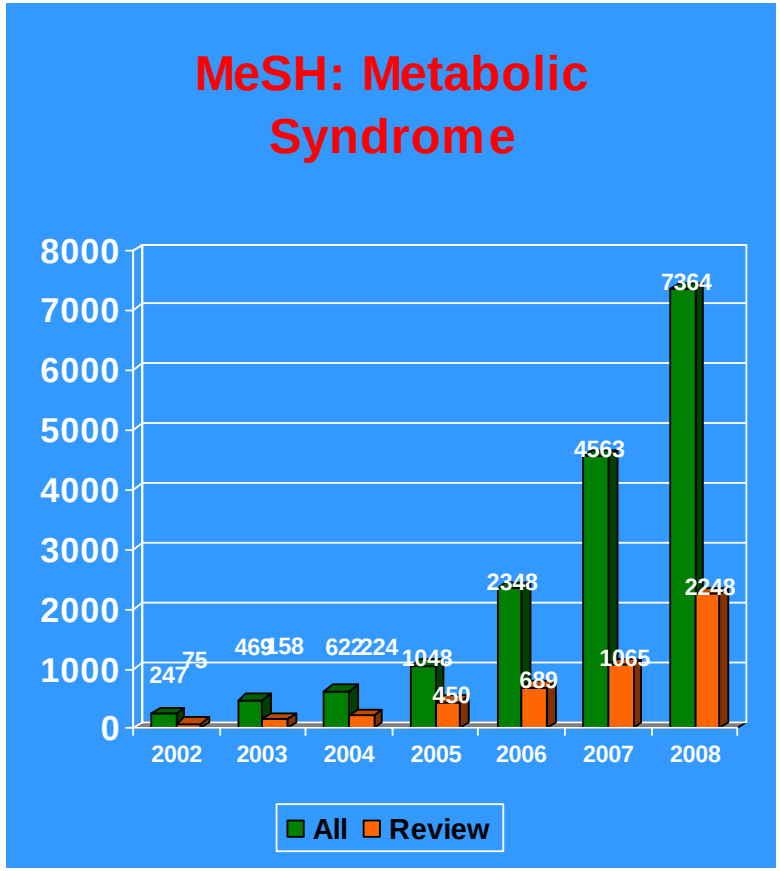
**Metabolic syndrome** is a combination of medical disorders that affect a large number of people in a clustered fashion.

In some studies, the prevalence in the USA is calculated as being up to 25% of the population, the end result of which is to increase one's risk for cardiovascular disease and diabetes.

# Quanto si è parlato della sindrome metabolica?

**Metabolic syndrome:**
**termine MeSH introdotto nel 2002**




8 October 2008

# Sindrome Metabolica: un concetto che ha più di 80 anni……..

**1920:** Kylin descrive un quadro che comprende ipertensione, iperglicemia e gotta

**1947:** J. Vague osserva come l'obesità "androide" si accompagni alle alterazioni metaboliche che si associano al diabete e alle malattie cardiovascolari

**1966:** Camus "trisindrome metabolica"

**1988:** Reaven introduce il concetto di "Sindrome X" (l'associazione di **insulino-resistenza, iperinsulinemia, stati prediabetici o DM2 conclamato**, **dislipidemia**, **ipertensione**, **obesità centrale**, iperuricemia)

**1988-1998:** altri sinonimi (**BIG 4**, **Deadly Quartet**, Plurimetabolic Syndrome ecc.)

**1998:** WHO decide di utilizzare il termine di "**Sindrome metabolica**"

# Definizione

## Definitions of insulin resistance

### Broad definition

Insulin resistance is a clinical state in which a normal or raised insulin level produces an impaired biological response. As insulin has a number of physiological actions—including a central role in acute metabolic actions and growth and development—insulin resistance could mean impairment in any of these actions

### Specific definition in relation to metabolic syndrome

Insulin resistance, when used to identify those at risk of type 2 diabetes and as a component of the metabolic syndrome, usually refers to resistance to insulin's ability to stimulate glucose uptake in insulin sensitive peripheral tissues and its ability to suppress hepatic glucose production, promote glucose storage, inhibit ketogenesis, and suppress lipolysis

# Sindrome Metabolica

Due eventi hanno focalizzato l'attenzione della comunità medica sulla sindrome metabolica:

1. L'inclusione della sindrome nelle linee guida NCEP-ATP III (2001)

2. La creazione di un codice diagnostico ICD 9 (277.7) che permette un rimborso per il trattamento della sindrome

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# Metabolic syndrome

*Independently raises cardiovascular risk and should be picked up in primary care*

**Metabolic syndrome is characterised by:**

- **Hyperinsulinaemia**
- **Low glucose tolerance**
- **Dyslipidaemia**
- **Hypertension**
- **Obesity**

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# Metabolic syndrome

*Independently raises cardiovascular risk and should be picked up in primary care*

**This cluster of factors has been recognised for many years, but the syndrome was not formally labelled until Reaven did so in 1988 and suggested that insulin resistance was its central characteristic.**

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Metabolic syndrome

*Independently raises cardiovascular risk and should be picked up in primary care*

**It is becoming increasingly clear that a proinflammatory state is a common feature of the syndrome and of atheromatous disease.**

**A recent randomised controlled trial showed that insulin resistance and measurements of C reactive protein were significantly lower at two year follow-up in patients with metabolic syndrome who had been allocated to a Mediterranean diet than in those who continued their normal diets.**

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Metabolic syndrome

*Independently raises cardiovascular risk and should be picked up in primary care*

**Although large intervention studies have shown that intensive modification of lifestyle delays the onset of diabetes in patients with impaired glucose tolerance, no similar trials have aimed at reducing all the cardiovascular disease risk factors among people with metabolic syndrome.**

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## Metabolic syndrome

*Independently raises cardiovascular risk and should be picked up in primary care*

**People meeting three of the following criteria qualify as having the metabolic syndrome:**
**raised blood pressure ( > 130/85 mm Hg),**
**a low serum concentration of HDL cholesterol ( < 1.04 mmol/l in men and < 1.29 mmol/l in women),**
**a high serum triglyceride concentration ( > 1.69 mmol/l),**
**a high fasting plasma glucose concentration ( > 6.1 mmol/l), and**
**abdominal obesity (waist circumference > 102 cm in men and > 88 cm in women).**

**A new definition, proposed recently by the International Diabetes Federation, has central obesity as an essential criterion, with a range of cut-offs for waist circumference for people from different ethnic groups.**

# COSA DOVREBBE ESSERE LA SINDROME METABOLICA

Un *semplice e precoce* strumento predittivo per il clinico

- ✓ Aumentata mortalità totale
- ✓ Rischio e mortalità CV <u>superiore</u> alla somma dei fattori di rischio
- ✓ Rischio elevato di sviluppo di diabete tipo 2 (se non presente)

# Definitions for metabolic syndrome

| | US national cholesterol education programme, adult treatment panel III* |
|---|---|
| **Definition** | **Three or more of the following criteria** |
| Impaired glucose metabolism | Fasting plasma glucose ≥6.1 mmol/l |
| Hypertension | Blood pressure ≥130/85 mm Hg or treatment |
| Dyslipidaemia | Triglycerides ≥1.7 mmol/l<br>HDL cholesterol <1.04 mmol/l |
| Central obesity | $NCEP_{WAIST}$ definition: waist circumference >102 cm (age 70)<br>$NCEP_{BMI}$ definition: BMI>29.4 kg/m$^2$ (ages 50 and 70) |
| Target organ damage | — |

*Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Final report. *Circulation* 2002;106:3143-421.

# Definitions for metabolic syndrome

| World Health Organization† |
| --- |
| **Presence of impaired glucose metabolism and two or more other criteria** |
| Glucose intolerance, impaired fasting glucose or diabetes mellitus, or insulin resistance ($WHO_{CLAMP}$ definition: lowest fourth of clamp insulin sensitivity, age 70; $WHO_{HOMA}$ definition: highest fourth of homeostasis model assessment-insulin resistance, age 50 and 70) |
| Blood pressure ≥140/90 mm Hg or treatment |
| Triglycerides ≥1.7 mmol/l or high density lipoprotein cholesterol <0.91 mmol/l |
| Waist to hip ratio >0.9 ($WHO_{CLAMP}$ definition, age 70) or BMI >30 kg/m$^2$ |
| Microalbuminuria: urinary albumin excretion rate ≥20 μg/min ($WHO_{CLAMP}$ definition, age 70) |

†World Health Organization. *Definition, diagnosis and classification of diabetes mellitus and its complications: report of a WHO consultation.* Geneva, WHO, 1999. Part 1: Diagnosis and classification of diabetes mellitus.

## Summary definitions of metabolic syndrome

### World Health Organization*

- Insulin resistance plus at least two of the following: raised blood pressure, dyslipidaemia, obesity, microalbuminuria

### American Treatment Panel III†

At least three of the following:

- High fasting glucose
- Raised blood pressure
- Raised plasma triglycerides
- Low HDL (high density lipoprotein) cholesterol
- Obesity (large waist circumference)

### International Diabetes Federation‡

- Obesity (large waist) plus at least two of the following: raised triglycerides, reduced HDL cholesterol, raised blood pressure, raised fasting plasma glucose

# Classification of Metabolic Syndrome

| | WHO | ATP III | IDF |
|---|---|---|---|
| Insulin resistance | yes | none | none |
| Waist circumference male | ≥ 98 cm | ≥ 102 cm | ≥ 94 cm |
| Waist circumference female | ≥ 85 cm | ≥ 88 cm | ≥ 80 cm |
| Blood pressure | ≥ 140/90 mmHg | ≥ 130/85 mmHg | ≥ 130/85 mmHg |
| Blood glucose | ≥ 110 mg/dl | ≥ 110 mg/dl | ≥ 100 mg/dl |
| Plasma triglycerides | ≥ 150 mg/dl | ≥ 150 mg/dl | ≥ 150 mg/dl |
| HDL cholesterol male | < 35 mg/dl | < 40 mg/dl | < 40 mg/dl |
| HDL cholesterol female | < 39 mg/dl | < 50 mg/dl | < 50 mg/dl |
| Albuminuria | > 20 μg/min | NA | NA |

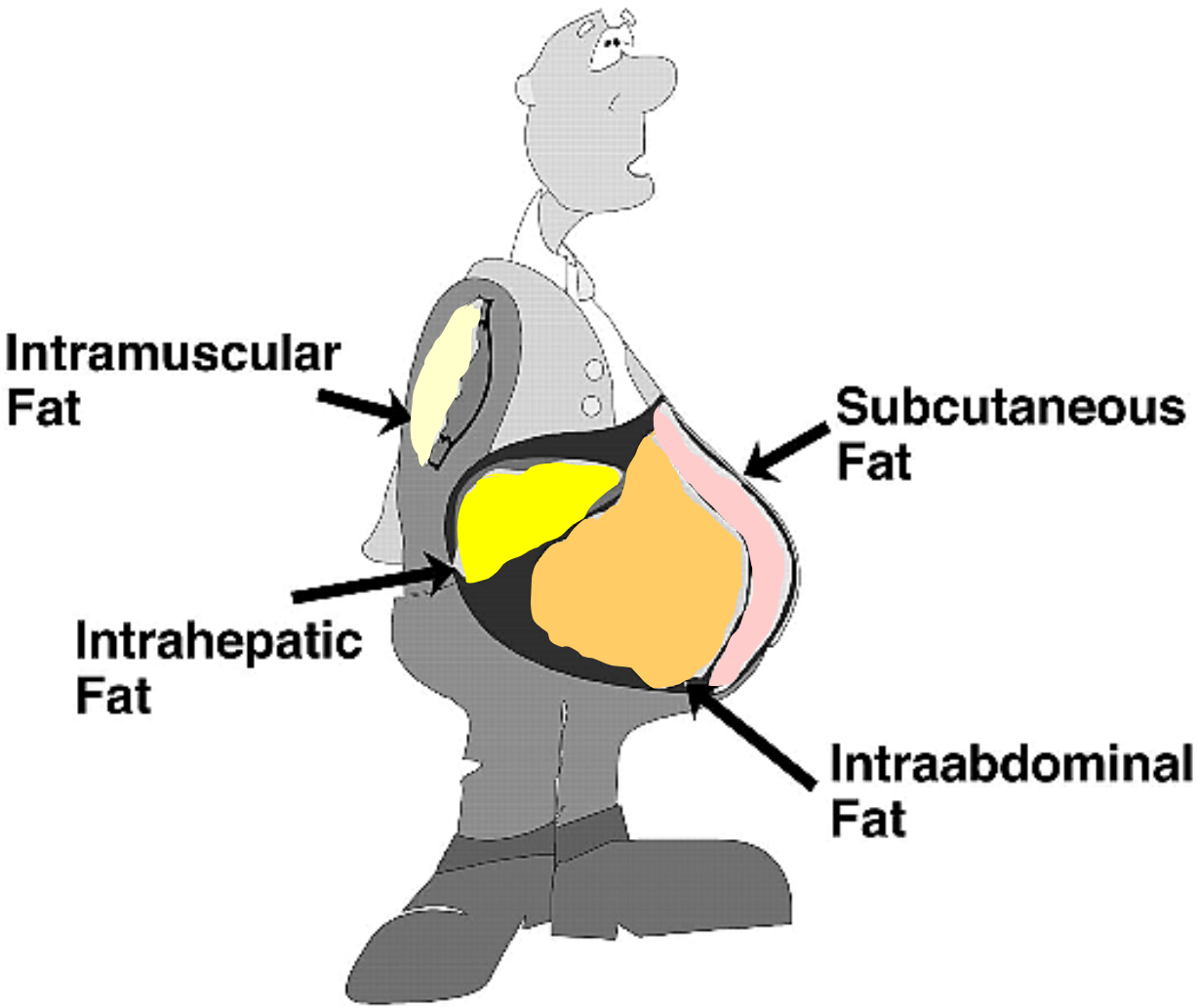
# Prevalenza

# Prevalenza della sindrome metabolica a seconda della definizione di base della sindrome

| | ATP III | WHO | Accordo |
|---|---|---|---|
| Totale | 23.9 | 25.1 | 86.2 |
| Uomini | 24.2 | 27.9 | 86.1 |
| Donne | 23.5 | 22.6 | 86.3 |
| Bianchi | 25.1 | 27.6 | 86.4 |
| Afro-A | 16.5 | 24.9 | 78.0 |
| Messicani-A | 32.0 | 38.1 | 84.2 |

**Popolazione** **Third National Health and Nutrition Examination Survey 1988-2004: età > 20 anni**

**Ford and Giles , Diabetes Care 2003**


Intramuscular Fat
Subcutaneous Fat
Intrahepatic Fat
Intraabdominal Fat

# OBESITA' VISCERALE

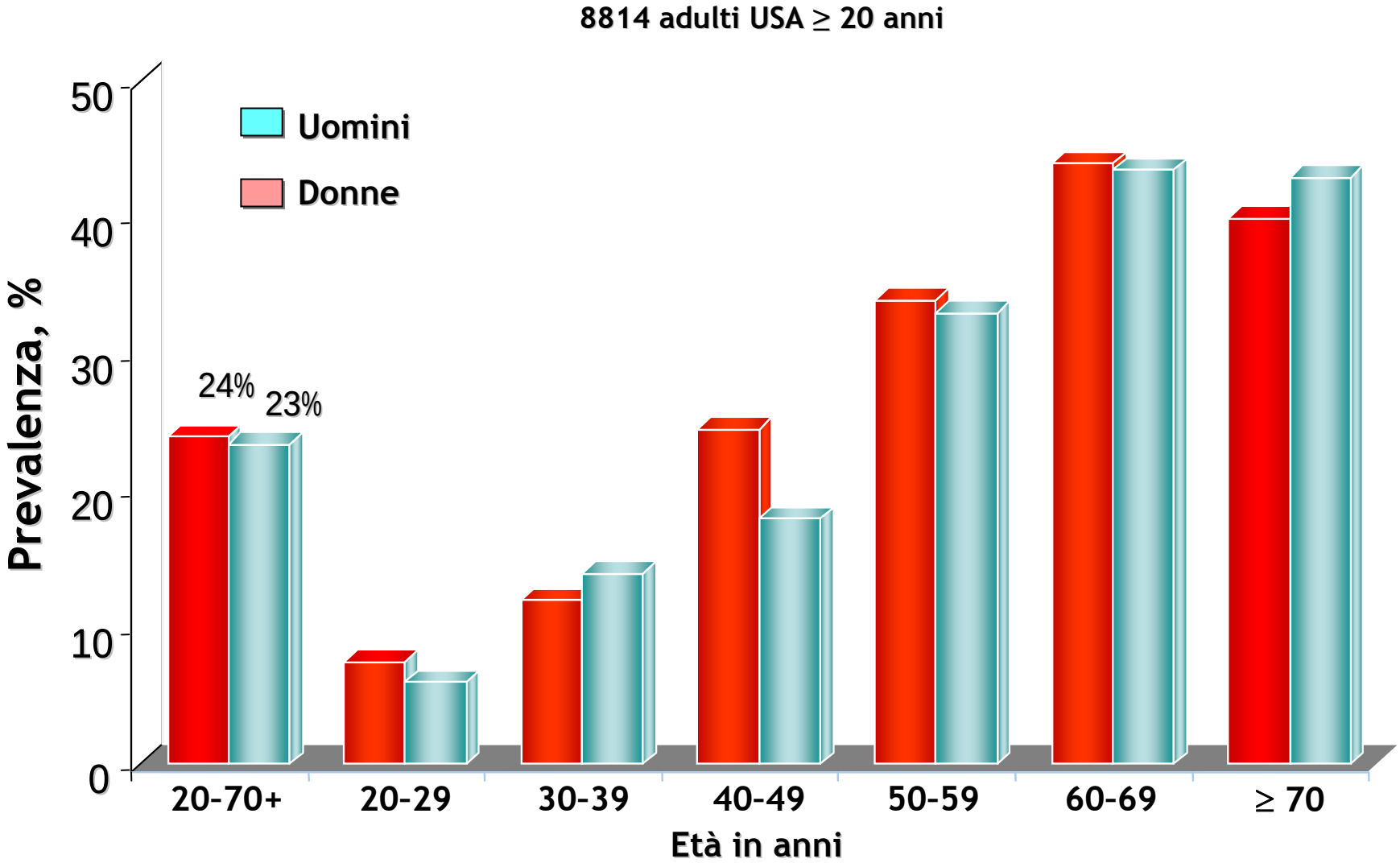
- Misurazione della circonferenza vita
- BMI
- Rapporto vita/fianchi

(Un rapporto vita/fianchi >0.9nell'uomo o >0.85 nella donna è fortemente correlato all'obesità addominale e all'insulino-resistenza).

- Alcuni suggeriscono oggi il diametro anteroposteriore (sagittale) quale miglior indicatore clinico del grasso viscerale

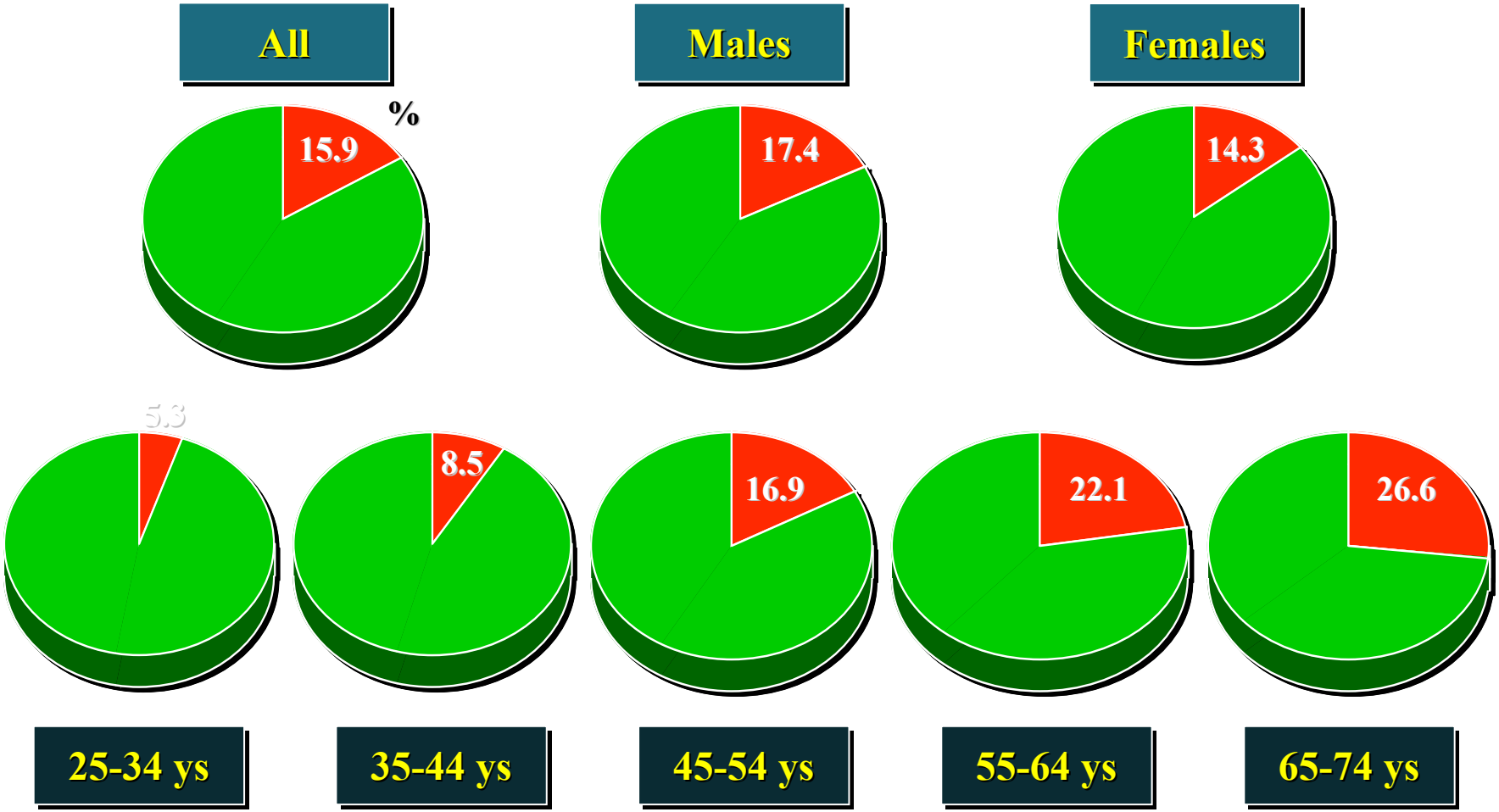
- STRUMENTALE: RM, DEXA

# Prevalenza della sindrome metabolica secondo il NCEP nello studio NHANES III




Ford ES et al. JAMA 2002;287:356-359.

# Prevalence of the Metabolic Syndrome in PAMELA




Mancia G et al., 2005

# Rate of WHO defined MS in eight European countries for non-diabetic man aged 40-55

| Men 40-55 ys | Sample (nr.) | Prevalence (%) |
|---|---|---|
| Goodlinge, UK | 210 | 7 |
| Barilla, Italy | 230 | 12 |
| MORGEN, Netherlands | 270 | 19 |
| D.E.S.I.R., France | 1033 | 21 |
| VIVA, Spain | 459 | 21 |
| Malmoe, Sweden | 679 | 27 |
| Ely, UK | 234 | 36 |
| **Overall** | **3250** | **20** |

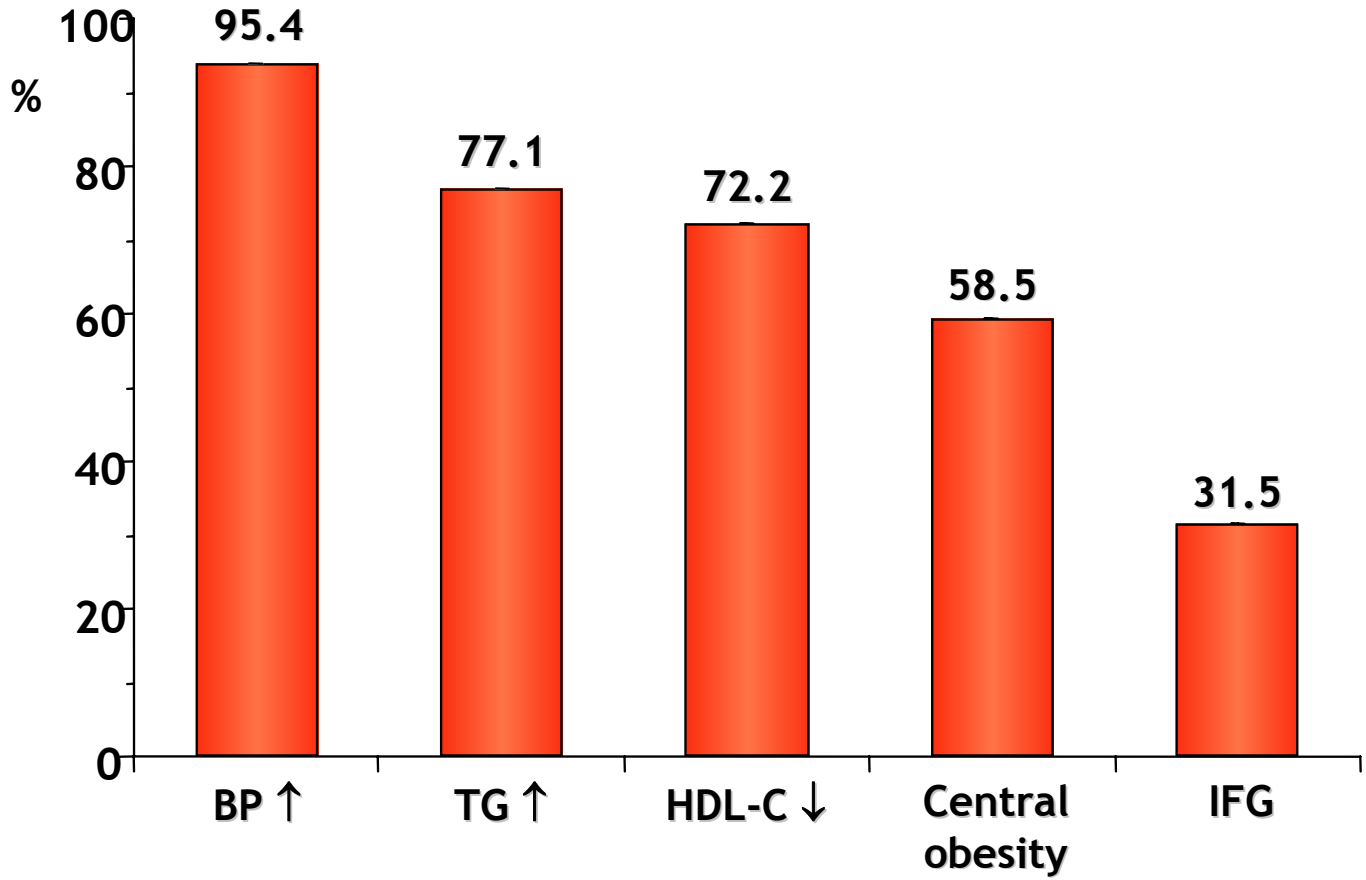
Balkau B, Eur Heart J 2005

# MS prevalence

- Highest prevalence in older persons
- Prevalence increases with age
- Frequency rises rapidly in middle age
- Frequency parallels with some lagtime the development obesity in the population

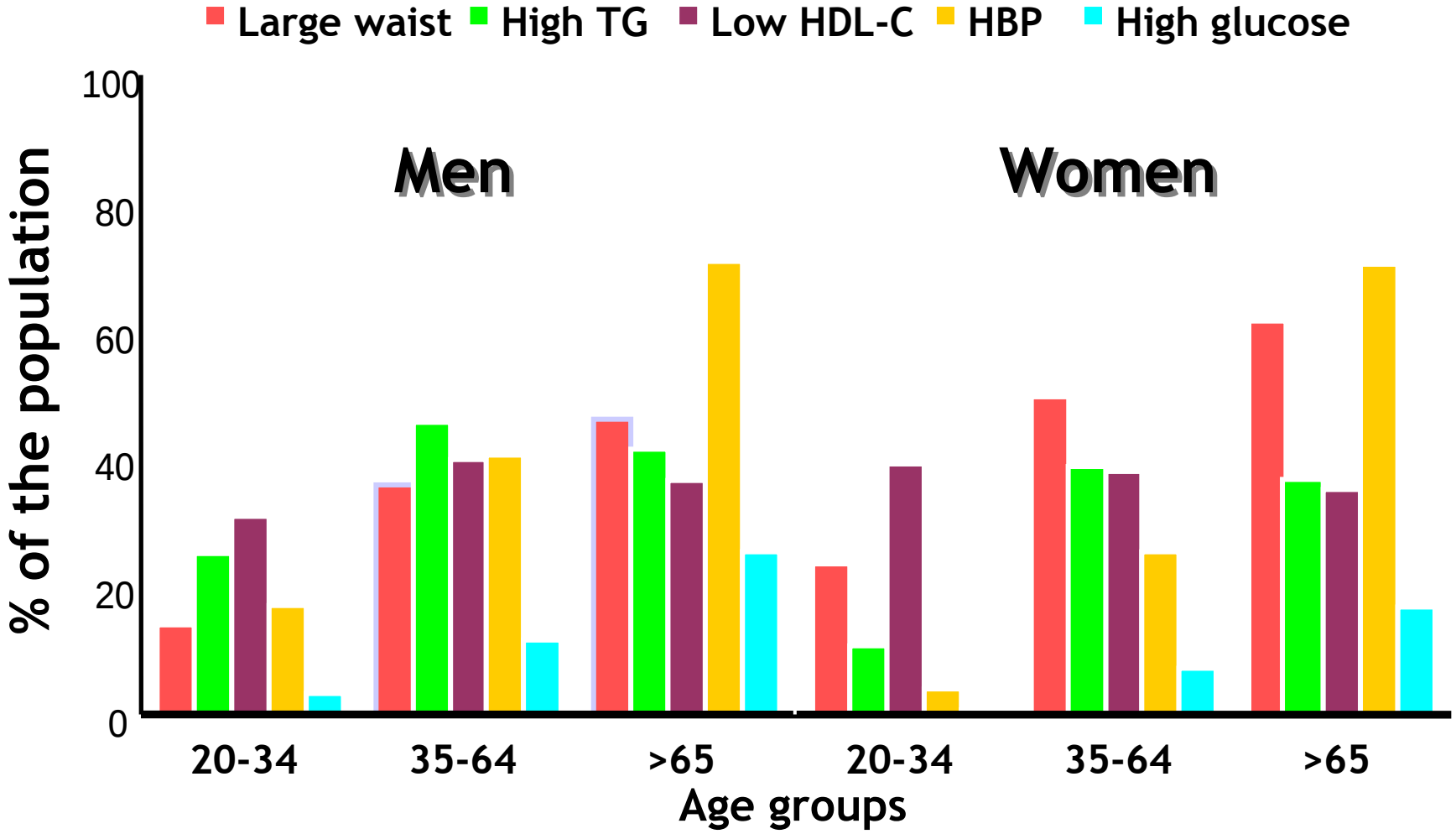
*1/3 of overweight – obese subject manifest MS in USA*

# Prevalence of Various Components of the Metabolic Syndrome in the PAMELA Population




Mancia G et al., 2005

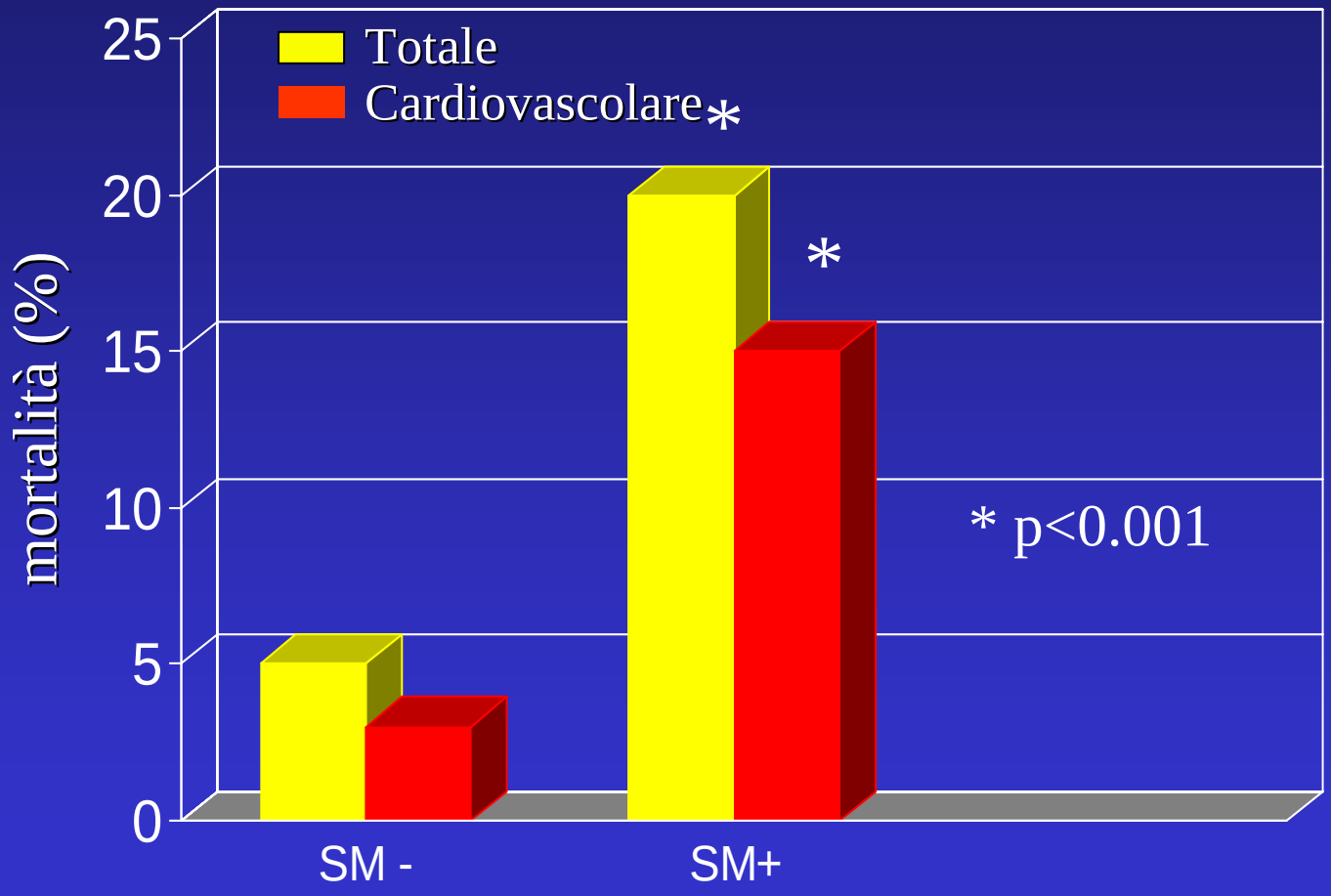
# Prevalence of each metabolic syndrome component in the NHANES III population




Park T-W et al, *Arch Intern Med* 2003

# Sindrome Metabolica e Mortalità

# Mortalità cardiovascolare e totale nella SM




Isomaa et al. Diabetes Care 24:683. 2001

# Impact of the Metabolic Syndrome on Mortality From Coronary Heart Disease, Cardiovascular Disease, and All Causes in United States Adults

Shaista Malik, MD, MPH; Nathan D. Wong, PhD, MPH; Stanley S. Franklin, MD; Tripthi V. Kamath, PhD; Gilbert J. L'Italien, PhD; Jose R. Pio, BS; G. Rhys Williams, ScD

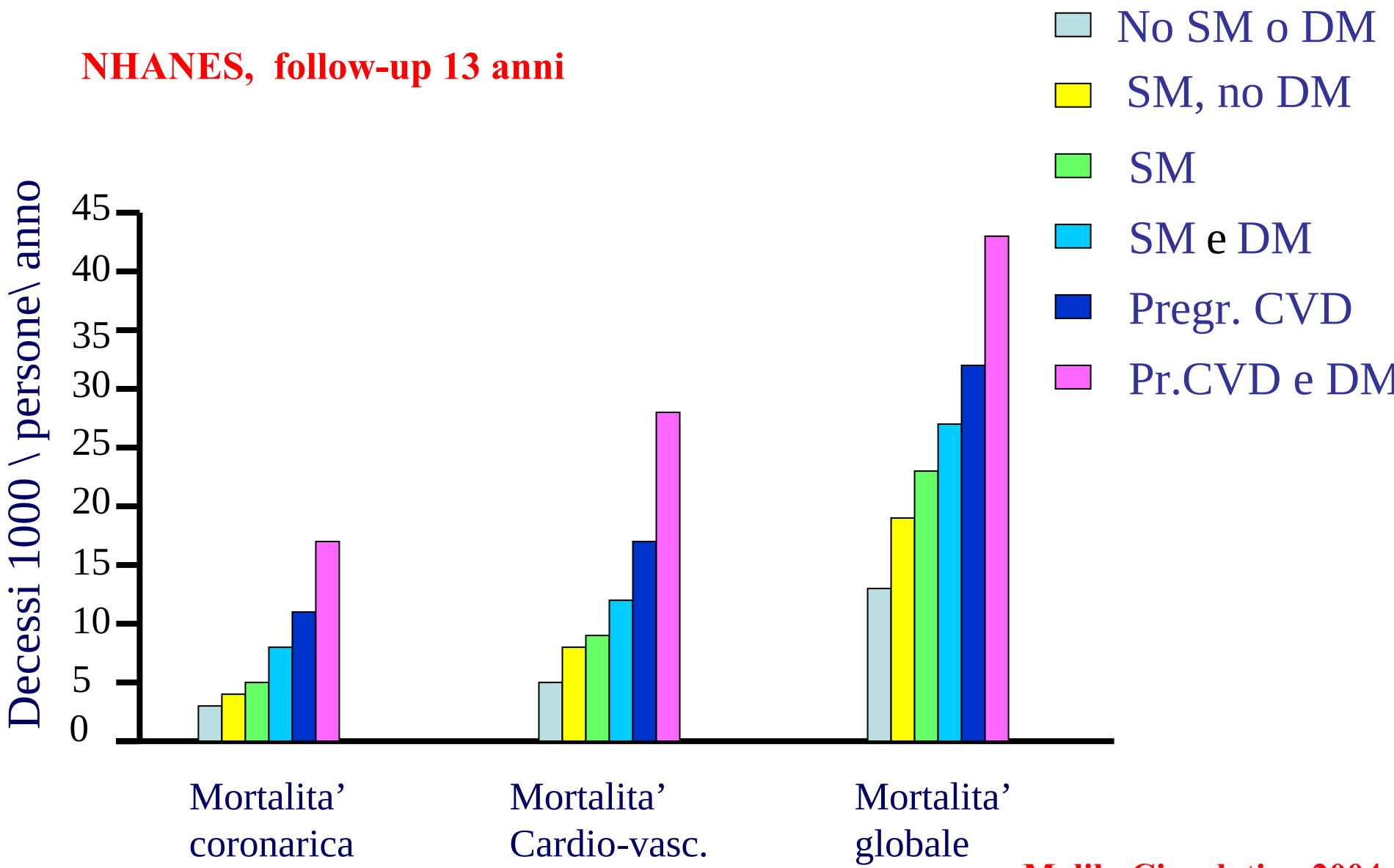
TABLE 3. Multivariable Cox Proportional-Hazards Regression Relating Each Disease/Condition Compared With Neither Condition to CHD, CVD, and Overall Mortality in US Adults

| | | CHD Mortality | | | CVD Mortality | | | Overall Mortality | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Condition | n | HR | 95% CI | *P* | HR | 95% CI | *P* | HR | 95% CI | *P* |
| No MetS, diabetes, or CVD | 2878 | 1.0 | ... | ... | 1.0 | ... | ... | 1.0 | ... | ... |
| MetS (all) | 1698 | 2.02 | 1.42–2.89 | 0.0001 | 1.82 | 1.40–2.37 | <0.0001 | 1.40 | 1.19–1.66 | 0.0001 |
| MetS (no diabetes)* | 1178 | 1.65 | 1.10–2.47 | 0.02 | 1.56 | 1.15–2.12 | 0.005 | 1.17 | 0.96–1.42 | 0.11 |
| Diabetes* | 520 | 2.87 | 1.84–4.47 | <0.0001 | 2.42 | 1.75–3.35 | <0.0001 | 1.97 | 1.59–2.43 | <0.0001 |
| Pre-existing CVD (all) | 1679 | 4.19 | 3.04–5.79 | <0.0001 | 3.14 | 2.49–3.96 | <0.0001 | 1.87 | 1.60–2.17 | <0.0001 |
| Pre-existing CVD (no diabetes)* | 1398 | 3.89 | 2.79–5.43 | <0.0001 | 2.83 | 2.23–3.61 | <0.0001 | 1.74 | 1.48–2.03 | <0.0001 |
| Diabetes and CVD* | 281 | 6.45 | 4.24–9.79 | <0.0001 | 5.26 | 3.82–7.23 | <0.0001 | 2.80 | 2.21–3.54 | <0.0001 |

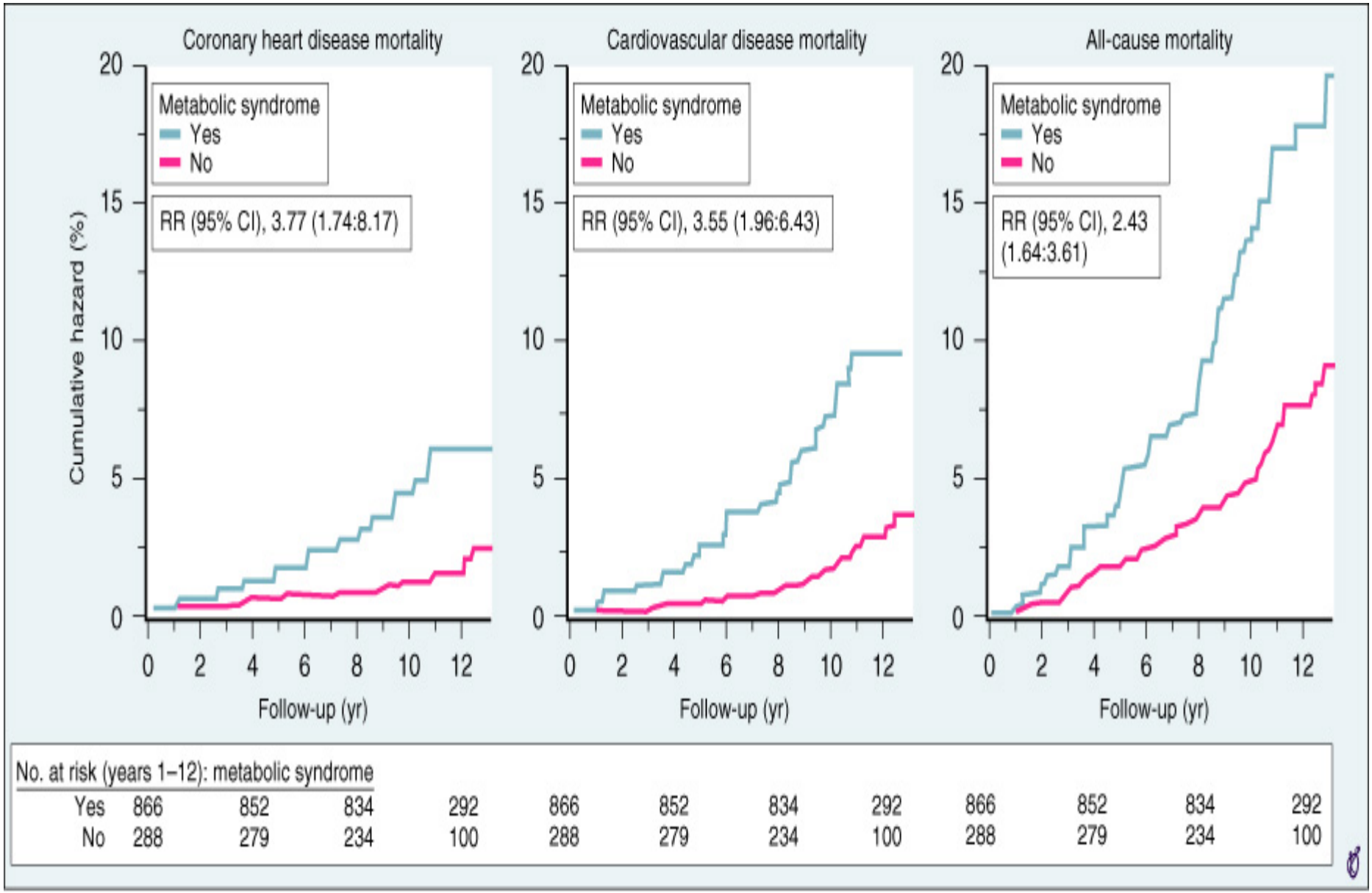
n Indicates unweighted sample sizes. HRs and 95% CIs are weighted to US population and adjusted for gender, age, smoking, physical activity, and total cholesterol.
*Categories represented in lieu of MetS (all) and pre-existing CVD (all) in a separate regression model.

# Sindrome Metabolica e Mortalità Cardiovascolare

**NHANES, follow-up 13 anni**




**Malik, Circulation 2004**

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**Metabolic syndrome**
*Independently raises cardiovascular risk and should be picked up in primary care*

# Metabolic Syndrome and risk of CHD

**TABLE 3. Metabolic Syndrome and Age-Adjusted Risk for Outcomes for Framingham Offspring at 8-Year Follow-Up**

| Event | No. of Metabolic Syndrome Risk Factors | Men, RR (95% CI) | Women, RR (95% CI) |
|---|---|---|---|
| CVD | 0 | Referent | Referent |
| | 1 or 2 | 1.48 (0.69–3.16) | 3.39 (1.31–8.81) |
| | ≥3 | 3.99 (1.89–8.41) | 5.95 (2.20–16.11) |
| Hard CHD | 0 | Referent | Referent |
| | 1 or 2 | 0.98 (0.36–2.67) | 3.77 (0.45–31.28) |
| | ≥3 | 2.55 (0.96–6.79) | 7.21 (0.81–64.37) |
| Total CHD | 0 | Referent | Referent |
| | 1 or 2 | 1.24 (0.54–2.83) | 3.29 (0.95–11.34) |
| | ≥3 | 3.01 (1.33–6.83) | 3.96 (1.02–15.38) |
| T2DM | 0 | Referent | Referent |
| | 1 or 2 | 4.16 (0.98–17.64) | 6.10 (1.85–20.10) |
| | ≥3 | 23.83 (5.80–98.01) | 29.69 (9.10–96.85) |

MS accounts for up to 1/3 of CVD in men, and 1/2 of new T2DM over 8 years of follow-up

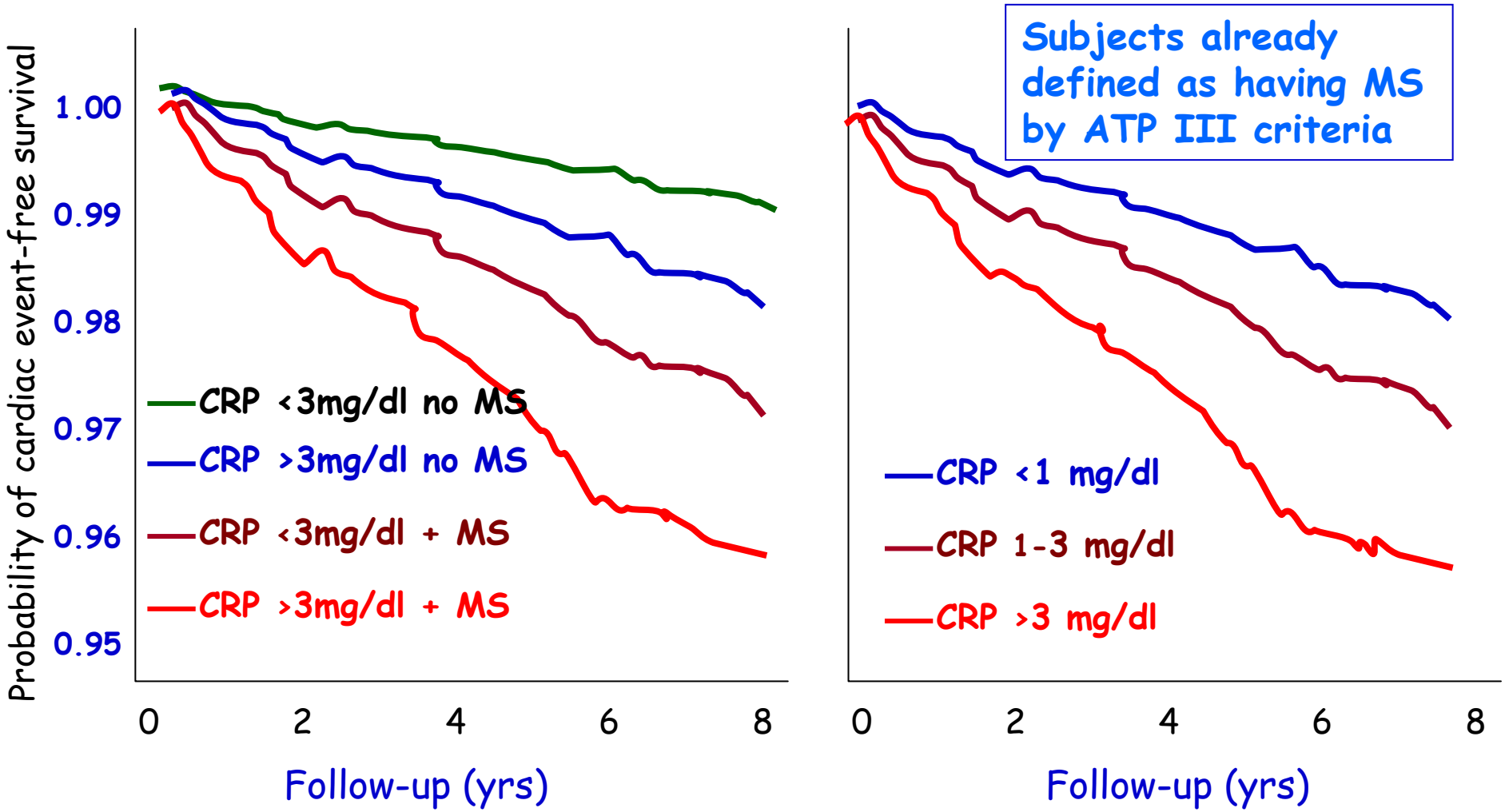
Wilson D et al , Circulation 2005

# RELATIVE RISK OF FUTURE CARDIOVASCULAR EVENTS ACCORDING TO CRP LEVELS AND TO THE PRESENCE OR ABSENCE OF METABOLIC SYNDROME (MS) IN HEALTHY WOMEN

| | ALL CARDIOVASCULAR EVENTS | | | CORONARY EVENTS |
|---|---|---|---|---|
| | TOTAL COHORT (n=14719) | LDL <160 mg/dL (n=12453) | LDL >160 mg/dL (n=8500) | TOTAL COHORT (n=14719) |
| CRP<3 mg/L no MS | 1.0 | 1.0 | 1.0 | 1.0 |
| CRP>3 mg/L no MS | 1.5 (1.0-2.2) | 1.3 (0.8-2.2) | 1.2 (0.6-2.3) | 1.6 (0.9-2.7) |
| CRP<3 mg/L + MS | 2.3 (1.6-3.3) | 2.2 (1.4-3.5) | 2.5 (1.4-4.4) | 3.1 (2.0-4.9) |
| CRP>3 mg/L + MS | 4.0 (3.0-5.4) | 4.4 (3.1-6.3) | 4.4 (2.8-7.1) | 5.5 (3.8-8.0) |

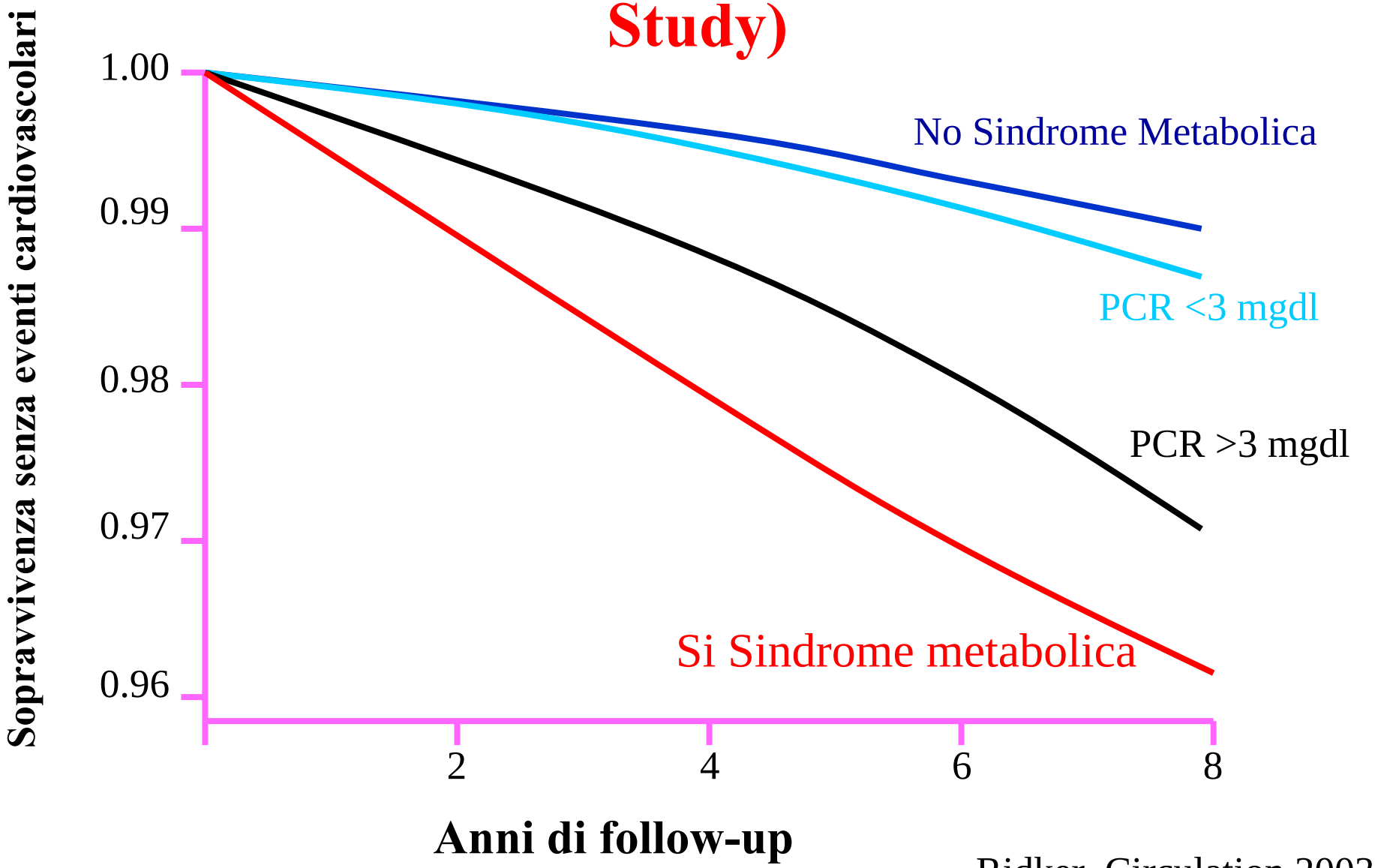
Ridker et al., Circulation 2004

# CARDIOVASCULAR EVENT-FREE SURVIVAL ACCORDING TO CRP LEVELS AND TO THE PRESENCE OR ABSENCE OF METABOLIC SYNDROME (MS) IN HEALTHY WOMEN




Ridker et al., Circulation 2004

# PCR e Sindrome metabolica : effetto sul rischio cardiovascolare. 14716 donne (Women's Health Study)




Ridker, Circulation 2003

# La Sindrome Metabolica: esiste ancora?

*Clinical Chemistry* 51:5
000–000 (2005)

Review

# The Metabolic Syndrome: Requiescat in Pace

Gerald M. Reaven

It is essential to emphasize at this point that insulin resistance is not a disease, but a description of a physiologic state that greatly increases the chances of an individual developing several closely related abnormalities and associated clinical syndromes. Insulin resistance does not necessarily lead to the clinical syndromes listed in Table 2, and to various degrees, the syndromes can all occur in the absence of insulin resistance. The primary

*Clinical Chemistry* 51:5
000–000 (2005)

Review

# The Metabolic Syndrome: Requiescat in Pace

GERALD M. REAVEN

In conclusion, it appears that making the diagnosis of the metabolic syndrome does not bring with it much in the way of pathophysiologic understanding or clinical utility, and deciding that individuals do not have it because they fail to satisfy three of five arbitrarily chosen criteria may withhold relevant therapeutic intervention. Does the **ATP** III concept of the metabolic syndrome have any redeeming virtues? That is a question that only the reader can answer.

ADA STATEMENT

# The Metabolic Syndrome: Time for a Critical Appraisal

Joint statement from the American Diabetes Association and the European Association for the Study of Diabetes

RICHARD KAHN, PHD[1]
JOHN BUSE, MD, PHD[2]
ELE FERRANNINI, MD[3]
MICHAEL STERN, MD[4]

*Diabetes Care* 28:2289–2304, 2005

# The Metabolic Syndrome: Time for a Critical Appraisal

*Diabetes Care* 28:2289–2304, 2005

Joint statement from the American Diabetes Association and the European Association for the Study of Diabetes

**Table 3—*Summary of concerns regarding the metabolic syndrome***

1) Criteria are ambiguous or incomplete. Rationale for thresholds are ill defined.
2) Value of including diabetes in the definition is questionable.
3) Insulin resistance as the unifying etiology is uncertain.
4) No clear basis for including/excluding other CVD risk factors.
5) CVD risk value is variable and dependent on the specific risk factors present.
6) The CVD risk associated with the "syndrome" appears to be no greater than the sum of its parts.
7) Treatment of the syndrome is no different than the treatment for each of its components.
8) The medical value of diagnosing the syndrome is unclear.

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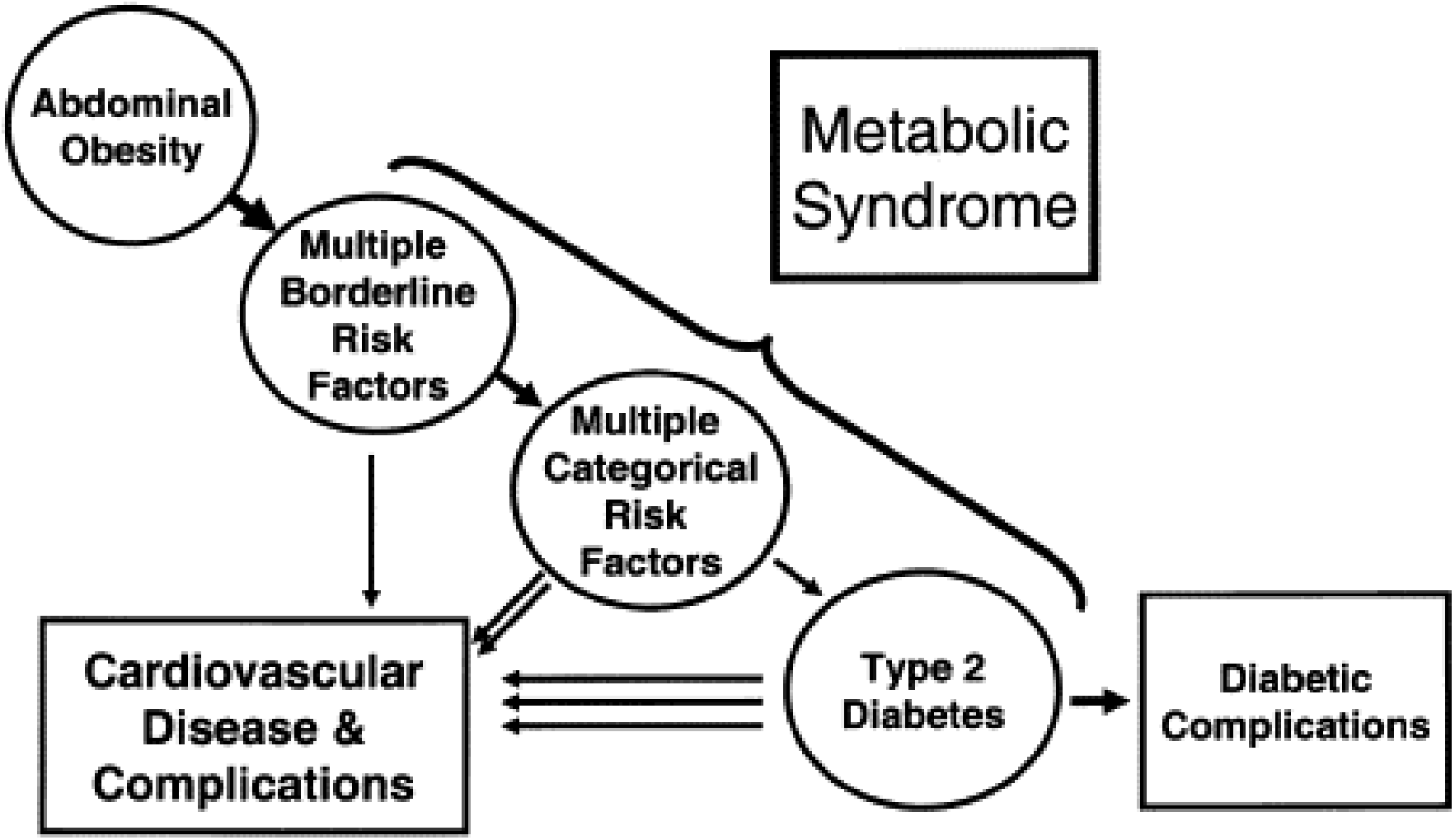
**STATE-OF-THE-ART PAPER**

# Metabolic Syndrome: Connecting and Reconciling Cardiovascular and Diabetes Worlds

Scott M. Grundy, MD, PHD
*Dallas, Texas*

**JACC Vol. 47, March 21, 2006:**

# Progression and outcomes of the metabolic syndrome.

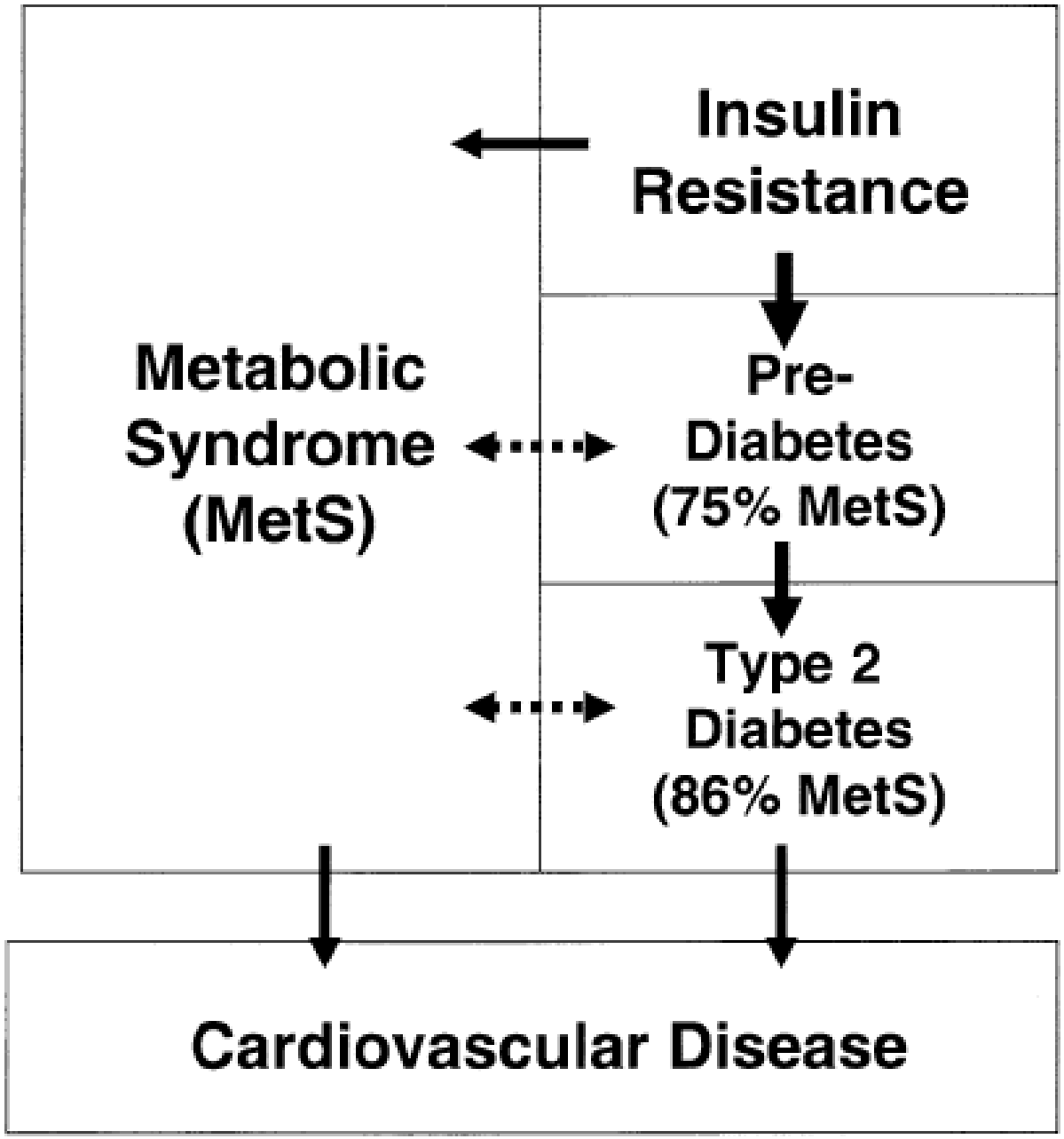



**JACC Vol. 47, March 21, 2006:**

**Table 1.** Diagnostic Criteria for Metabolic Syndrome

| Measure (Any 3 of the 5 Criteria Below Constitute a Diagnosis of Metabolic Syndrome) | Categorical Cut Points |
|---|---|
| Elevated waist circumference*† | ≥102 cm (≥40 inches) in men<br>≥88 cm (≥35 inches) in women |
| Elevated triglycerides | ≥150 mg/dl (1.7 mmol/l)<br>or<br>drug treatment for elevated triglycerides‡ |
| Reduced HDL-C | <40 mg/dl (0.9 mmol/l) in men<br><50 mg/dl (1.1 mmol/l) in women<br>or<br>drug treatment for reduced HDL-C‡ |
| Elevated blood pressure | ≥130 mm Hg systolic blood pressure<br>or<br>≥85 mm Hg diastolic blood pressure<br>or<br>drug treatment for hypertension |
| Elevated fasting glucose | ≥100 mg/dl<br>or<br>drug treatment for elevated glucose |

JACC Vol. 47, March 21, 2006:




**Interrelations and overlap of metabolic syndrome with insulin resistance, prediabetes, and type 2 diabetes. According to the insulin resistance hypothesis, the metabolic syndrome is caused predominantly by insulin resistance.**

JACC Vol. 47, March 21, 2006:

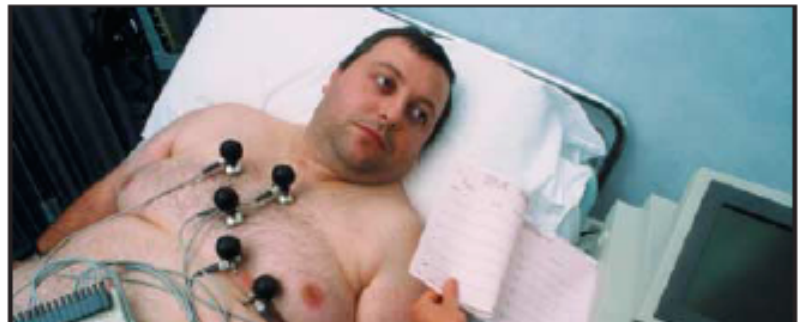
*ABC of obesity*

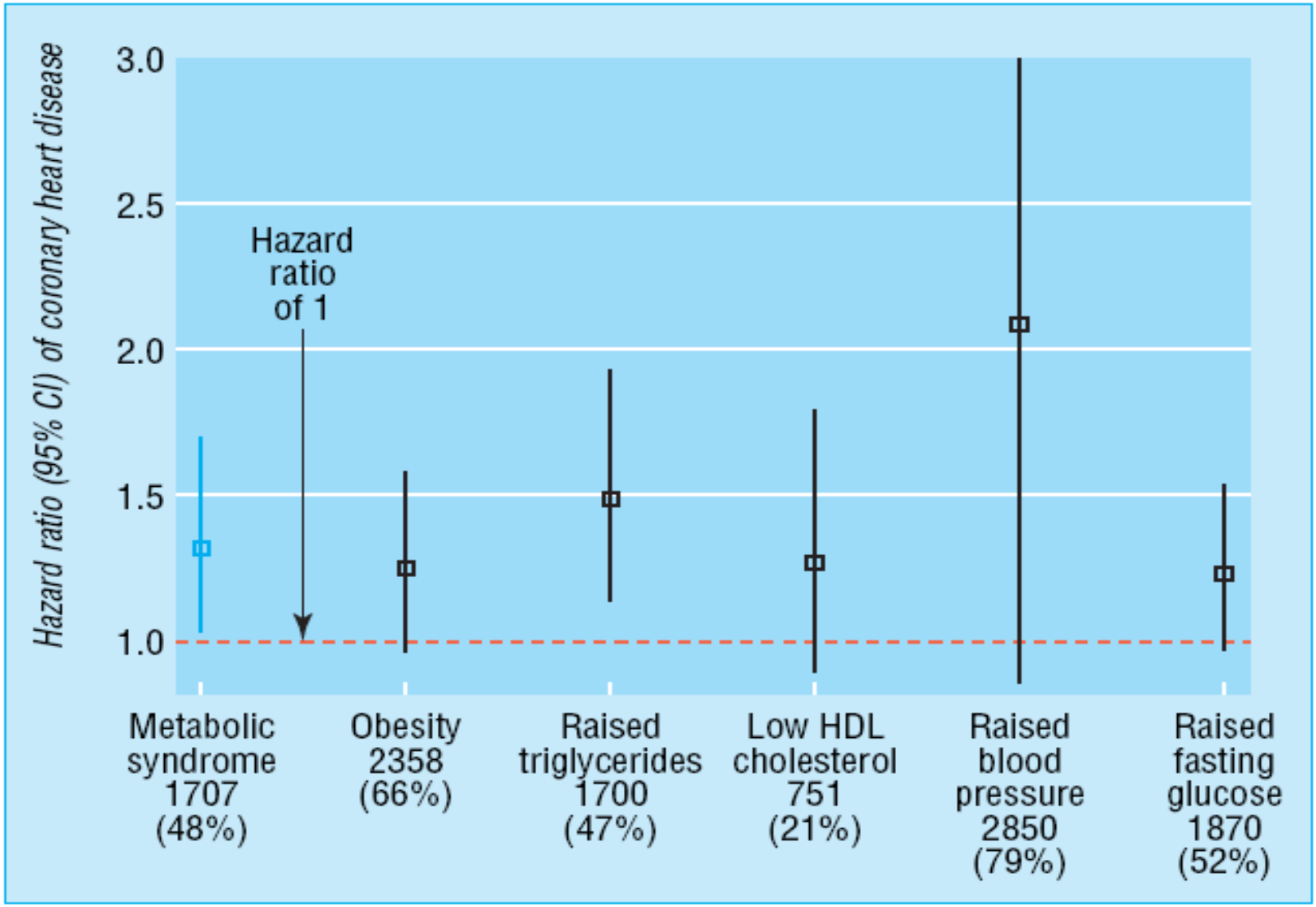
# Obesity and vascular disease

Debbie A Lawlor, Mike Lean, Naveed Sattar

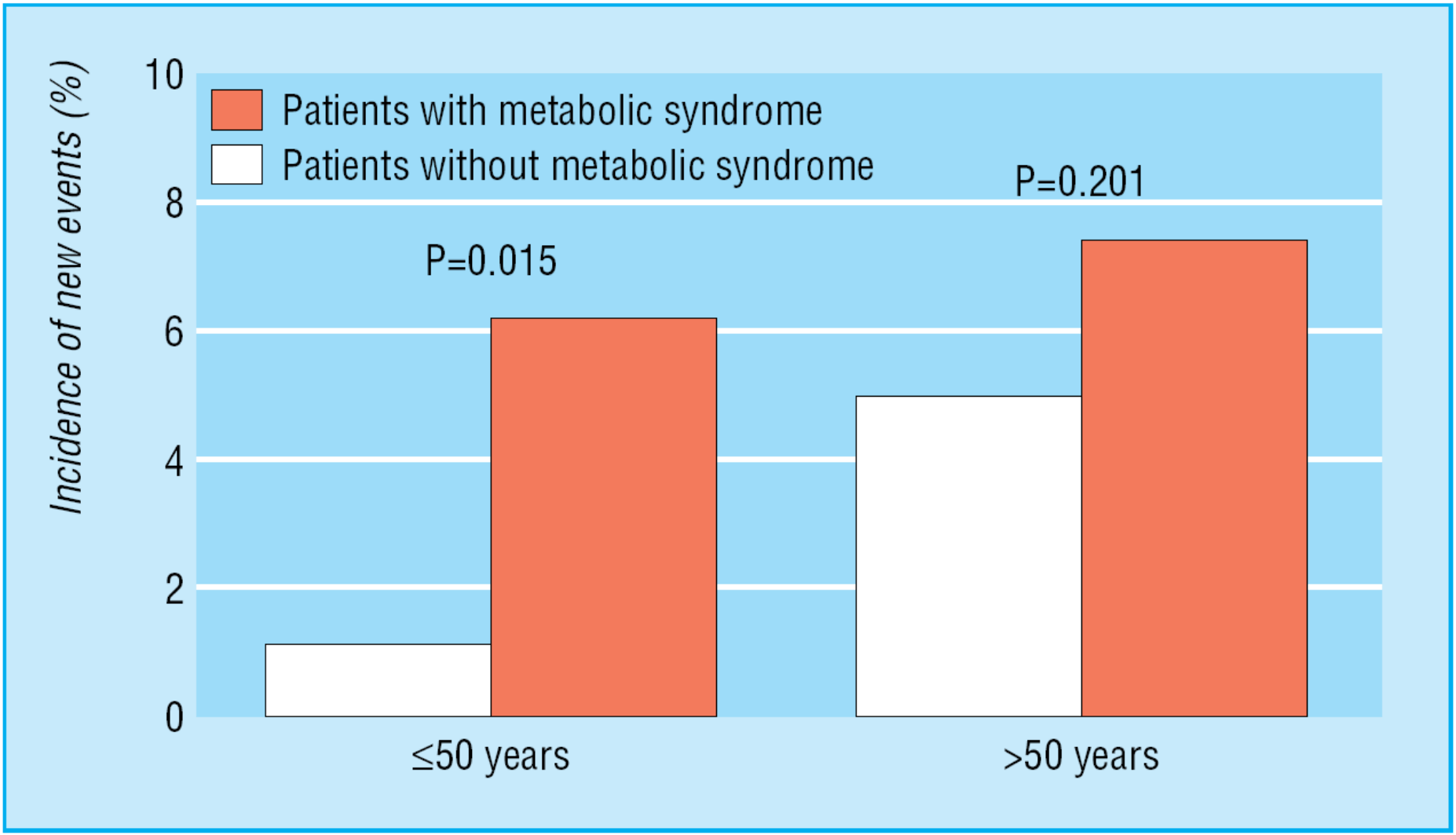
This is the eighth article in the series

Previous articles in this series have discussed the relation of overweight and obesity with coronary heart disease (CHD) and individual cardiovascular disease risk factors—such as diabetes, raised blood pressure, and dyslipidaemia. This article examines the wider impact of obesity on vascular disease: the effect on cardiovascular disease of obesity as primary cause of the metabolic syndrome and of obesity as a risk factor for heart failure, stroke, other vascular conditions, and cognitive decline.



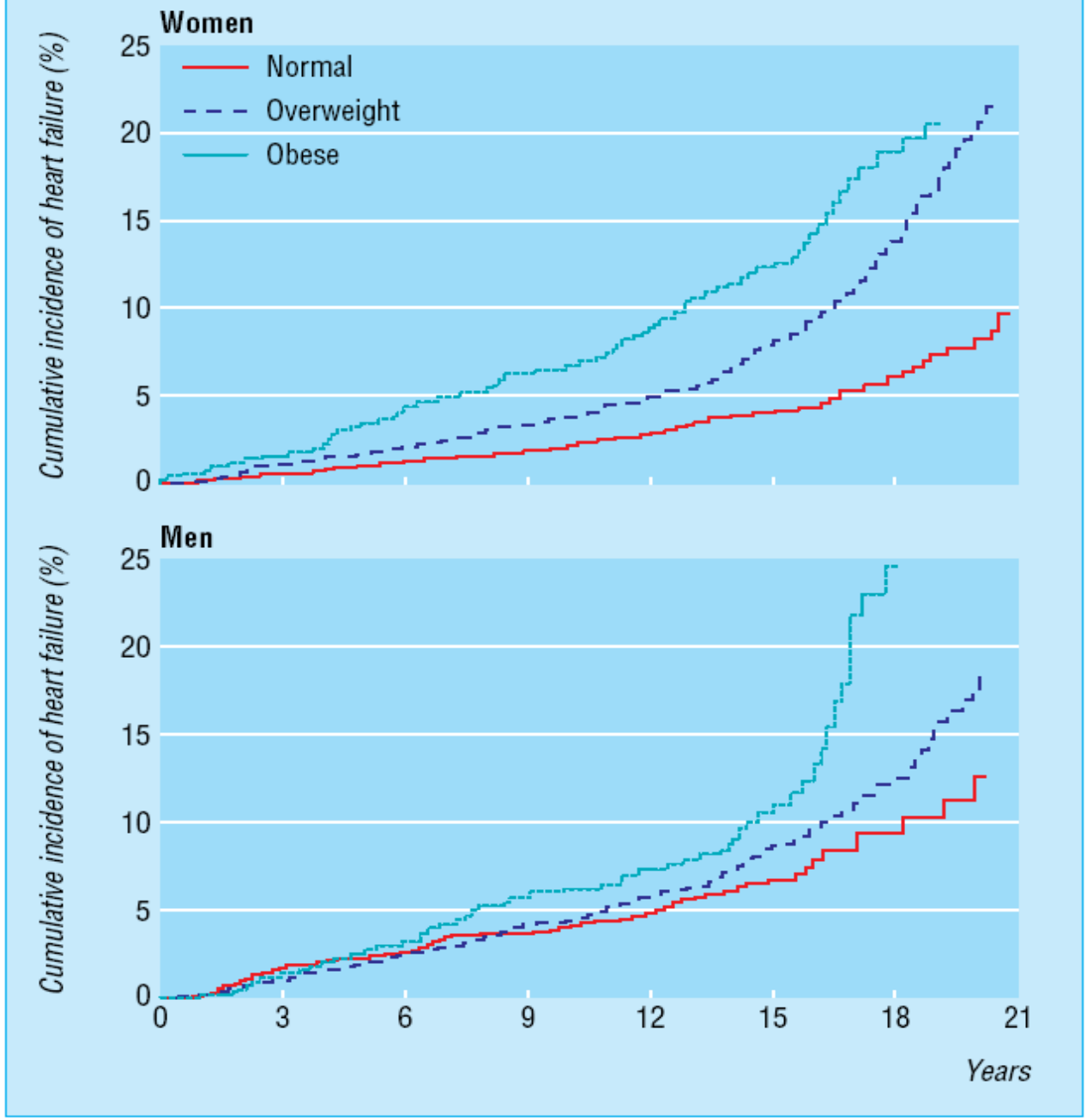



Age adjusted hazard ratio of coronary heart disease associated with International Diabetes Federation's definition of metabolic syndrome and each component of this definition among 3589 British women aged 60-79 years. Data from Lawlor et al (*Diabetologia* 2006 doi: 10.1007/s00125-005-0040-3)




Age stratified incidence of new cardiovascular events (myocardial infarction, revascularisation, cardiac death) in patients with or without metabolic syndrome (according to modified criteria of American Treatment Panel III). Adapted from Reinhard et al (*Am J Cardiol* 2006;97:964-7)

# CHF




Cumulative incidence of heart failure by weight category (based on body mass index) at baseline examination in Framingham study. Adapted from Kenchaiah et al (see Further Reading box)

**BMJ** VOLUME 333 18 NOVEMBER 2006

# Terapia

# Trattamento della Sindrome metabolica?

- La riduzione dell'apporto calorico e l'incremento dell'esercizio fisico sono essenziali per il trattamento di tutte le componenti della sindrome metabolica
- La presenza di più fattori di rischio rende necessario un trattamento più aggressivo di ciascuno di essi
- La scelta della terapia farmacologica per ciascun fattore di rischio richiede attenta considerazione agli effetti sui fattori di rischio associati

# Come possiamo intervenire?

Modificazioni dello stile di vita (riduzione del peso e aumento dell' esercizio fisico)

**Ottimo effetto su tolleranza glicidica e TG**

**Discreto effetto sulla PA**

**Modesto effetto su LDL (-15%)**

Global Guideline for type 2 Diabetes. *International Diabetes Federation 2005*

To prevent the slippery slope of the MS towards diabetes and CHD ...

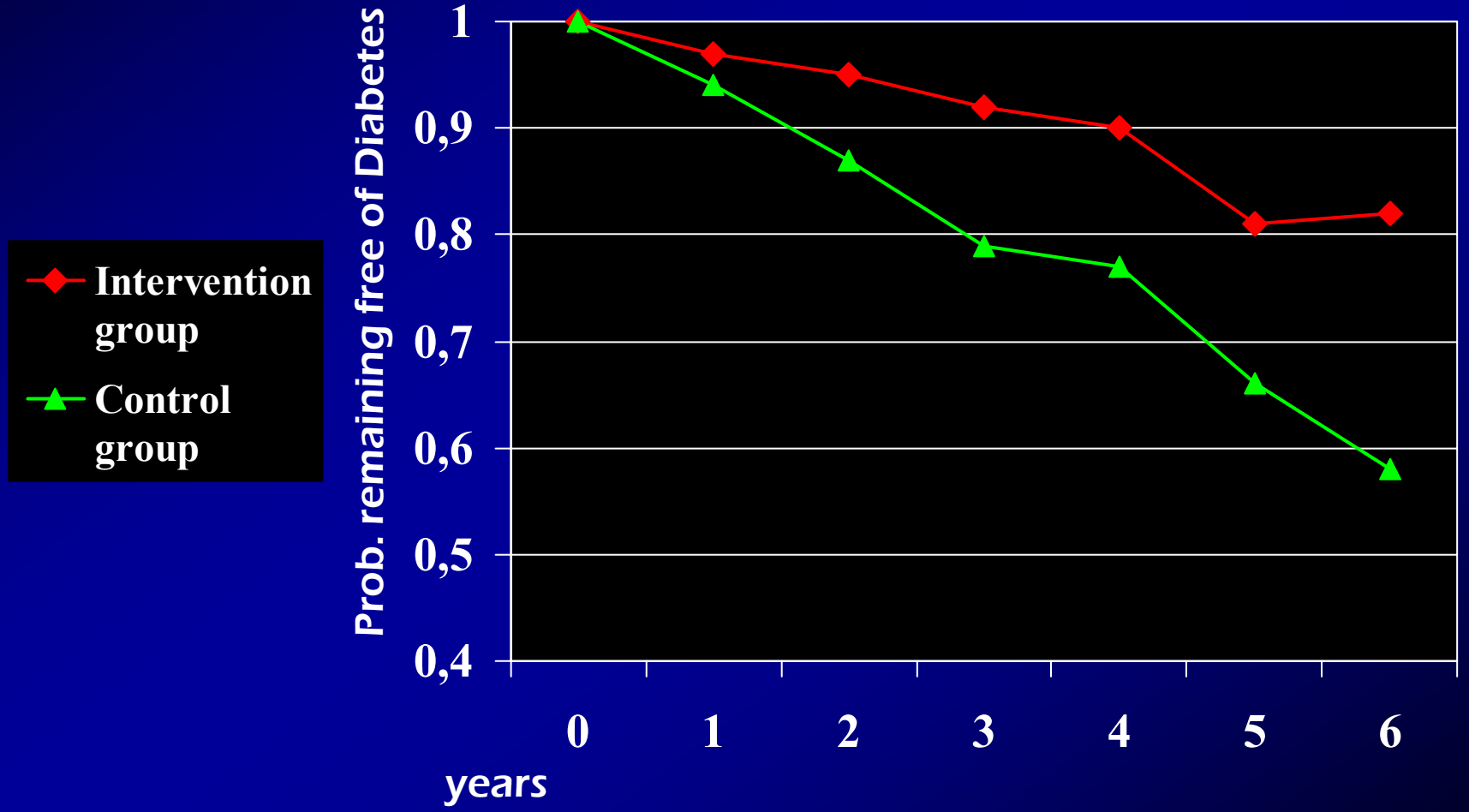
| | |
|---|---|
| *Modest weight loss* | *5-7%* |
| *Modest increase in physical activity* | *150 min/week* |

Absolute risk reduction of diabetes of 14,5% over 3 years

JAMC 2004; 170 (9): 1390

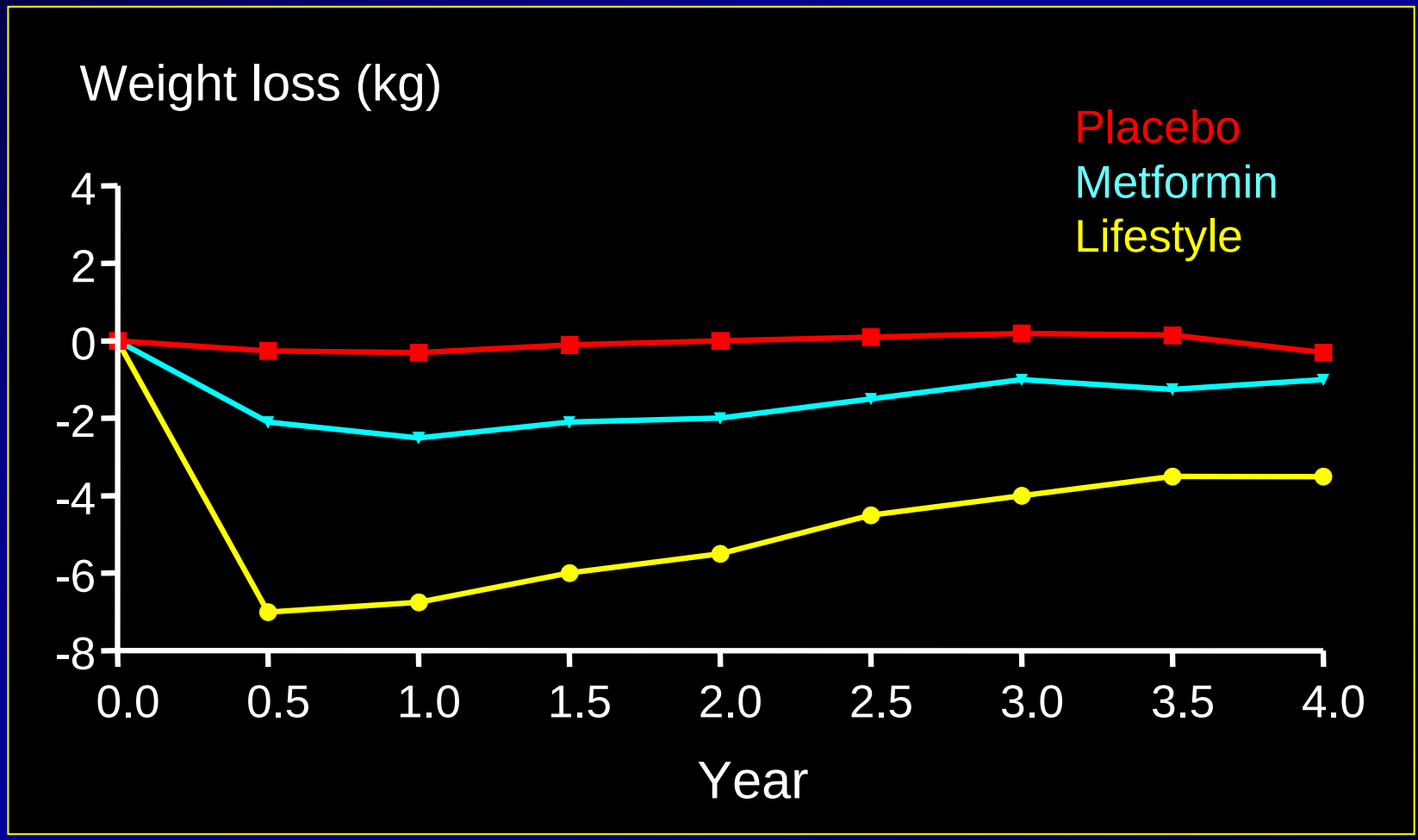
# Prevention of Type 2 Diabetes Mellitus by changes in lifestyle among subjects with impaired glucose tolerance

**RCT, 523 patients with IGT,BMI>25 kg/m2;follow-up 3.2 years**




Tuomilehto et al., N Engl J Med 2001;344:1343

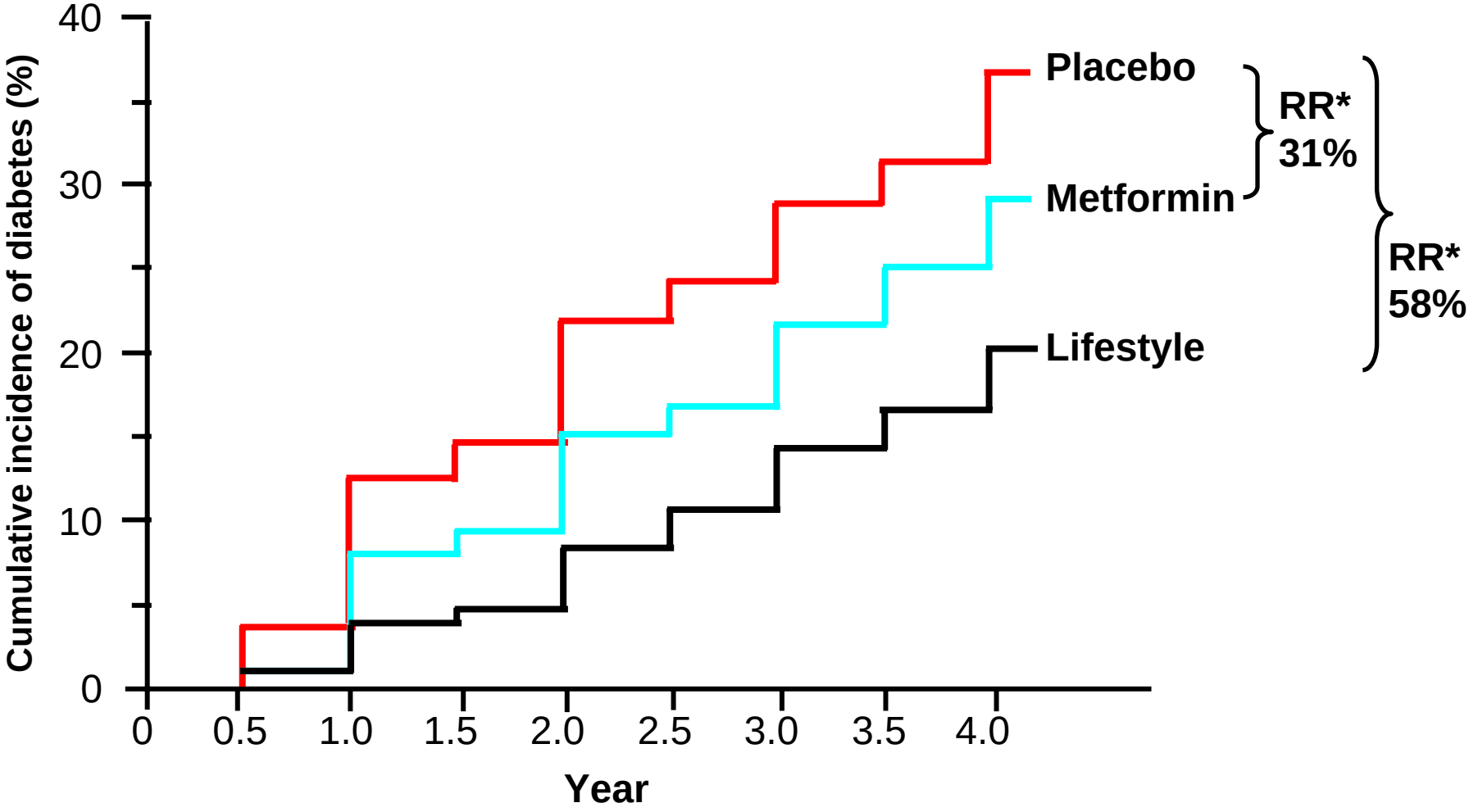
# Diabetes Prevention Program




*DPP. N Engl J Med. 2002; 346: 393-403*

# Diabetes Prevention Program

***Riduzione del rischio di progressione a diabete *versus* placebo**




*DPP.N Engl J Med. 2002; 346: 393-403*

# Validation of a Counseling Strategy to Promote the Adoption and the Maintenance of Physical Activity by Type 2 Diabetic Subjects

Diabetes Care 2003

Chiara Di Loreto, MD
Carmine Fanelli, MD
Paola Lucidi, MD
Giuseppe Murdolo, MD
Arianna De Cicco, MD
Natascia Parlanti, MD
Fausto Santeusanio, MD
Paolo Brunetti, MD
Pierpaolo De Feo, MD

Table 3—*Effects of the 2-year intervention on levels of physical activity (energy expenditure through voluntary physical activity, METs × h/week), caloric intake, BMI, and $HbA_{1c}$ compared with the usual care (control group)*

| | Intervention group | | Control group | | |
|---|---|---|---|---|---|
| | 2 years | Δ versus basal | 2 years | Δ versus basal | *P** |
| Percent of patients > 10 METs × h/week | 69 | +66.2 | 18 | +14.2 | <0.001 |
| METs × h/week | 27.1 ± 2.0 | +26 ± 2.0 | 4.1 ± 0.8 | +3.2 ± 0.7 | <0.001 |
| Diet prescription (kcal/day) | 1,677 ± 36 | +142 ± 10 | 1,485 ± 31 | −25 ± 4 | <0.01 |
| BMI ($kg/m^2$) | 28.9 ± 0.2 | −0.4 ± 0.1 | 30.4 ± 0.3 | +0.6 ± 0.1 | <0.01 |
| $HbA_{1c}$ (%) | 7.0 ± 0.1 | −0.6 ± 0.05 | 7.6 ± 0.1 | −0.1 ± 0.04 | <0.001 |

Epidemiology/Health Services/Psychosocial Research
ORIGINAL ARTICLE

# The Finnish Diabetes Prevention Study (DPS)

## Lifestyle intervention and 3-year results on diet and physical activity

JAANA LINDSTRÖM, MSC[1]
ANNE LOUHERANTA, PHD[2]
MARJO MANNELIN, MSC[3]
MERJA RASTAS, MSC[4]
VIRPI SALMINEN, MSC[5]
JOHAN ERIKSSON, MD, PHD[1]
MATTI UUSITUPA, MD, PHD[2]
JAAKKO TUOMILEHTO, MD, PHD[1,6]
FOR THE FINNISH DIABETES PREVENTION STUDY GROUP

Table 2—*Changes in physical activity and nutrient intakes from baseline to years 1 and 3*

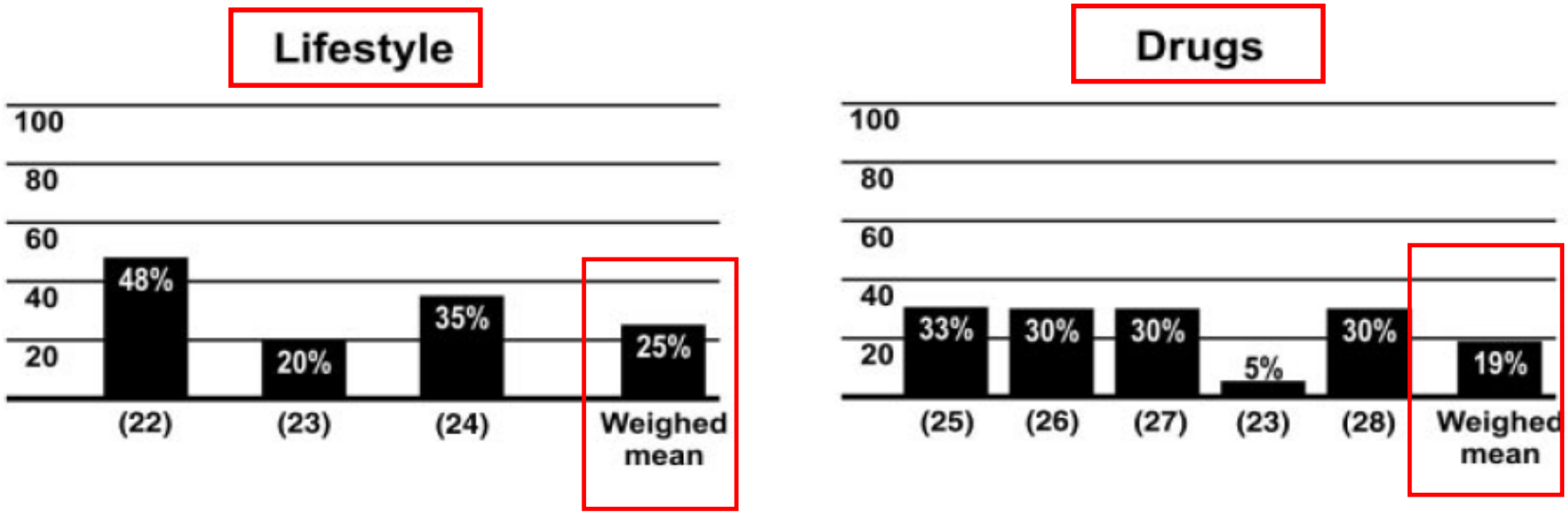
Leisure Time Physical Activity

| | From baseline to year 1 | | | From baseline to year 3 | | |
|---|---|---|---|---|---|---|
| | Intervention group | Control group | P* | Intervention group | Control group | P* |
| n | 256 | 250 | | 231 | 203 | |
| Total LTPA (min/week) | 16 (−126 to 115) | 21 (−133 to 138) | 0.9045 | 50 (−126 to 115) | 23 (−142 to 171) | 0.2415 |
| Moderate-to-vigorous LTPA (min/week) | 49 (−41 to 140) | 14 (−47 to 90) | **0.0073** | 61 (−33 to 168) | 6 (−91 to 104) | **0.0057** |

*Diabetes Care* 26:3230–3236, 2003

# Are there specific treatments for the metabolic syndrome?[1–3]

*Dario Giugliano, Antonio Ceriello, and Katherine Esposito*



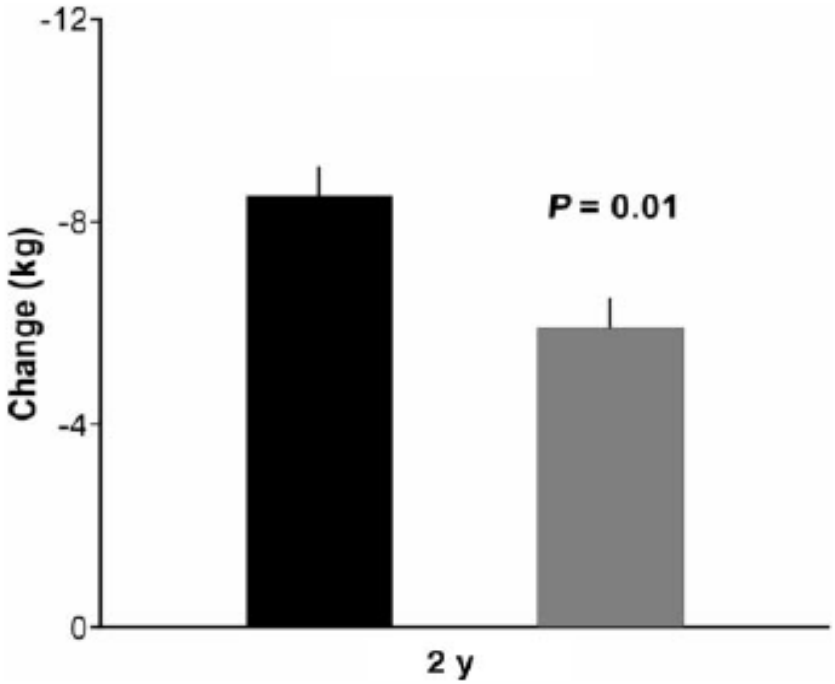

## Percentage resolution of metabolic syndrome

**according to therapeutic strategies**

Giugliano et al. Am J Clin Nutr 2008

# Are there specific treatments for the metabolic syndrome?[1–3]

*Dario Giugliano, Antonio Ceriello, and Katherine Esposito*




**Mean changes in body weight at the 2-year follow-up in 115 women consuming a Mediterranean-style diet**

Giugliano et al. Am J Clin Nutr 2008

# DIETA MEDITERRANEA

# Effect of a Mediterranean-Style Diet on Endothelial Dysfunction and Markers of Vascular Inflammation in the Metabolic Syndrome

## A Randomized Trial

90 subjects following a Mediterranean diet vs. 90 following a prudent diet

| Variable | Intervention Diet (n = 90) Mean (SD) 2 Years | Intervention Diet (n = 90) Mean (SD) Change | Intervention Diet (n = 90) P Value | Control Diet (n = 90) Mean (SD) 2 Years | Control Diet (n = 90) Mean (SD) Change | Control Diet (n = 90) P Value | Between-Group Comparison of Change Difference (95% CI) | Between-Group Comparison of Change P Value at 2 Years |
|---|---|---|---|---|---|---|---|---|
| Weight, kg | 74 (7) | −4 (1.1) | <.001 | 75.8 (7) | −1.2 (0.6) | .02 | −2.8 (−5.1 to −0.5) | <.001 |
| Body mass index* | 26.7 (3.1) | −1.2 (0.3) | <.001 | 27.7 (3.1) | −0.4 (0.4) | .06 | −0.8 (−1.4 to −0.2) | .01 |
| Waist circumference, cm | 90 (8) | −2 (0.5) | .01 | 93 (10) | 0 (0.01) | .74 | −2 (−3.5 to −0.5) | .01 |
| Plasma glucose, mg/dL | 105 (9) | −8 (3) | <.001 | 112 (9) | −2.0 (1.5) | .21 | −6 (−11 to −2) | <.001 |
| Serum insulin, μU/mL | 11 (5) | −4 (1.9) | .01 | 15.5 (7) | −0.5 (1.0) | .45 | −3.5 (−6.1 to −1.7) | .01 |
| HOMA score | 2.5 (0.6) | −1.2 (0.5) | <.001 | 3.7 (0.7) | −0.1 (0.2) | .12 | −1.1 (−1.9 to −0.3) | <.001 |
| Serum lipids, mg/dL | | | | | | | | |
| Total cholesterol | 188 (29) | −11 (6) | .01 | 191 (30) | −2 (2) | .23 | −9 (−17 to −1) | .02 |
| HDL-C | 45 (10) | +4 (2) | .01 | 43 (9) | +1 (1) | .08 | +3 (0.8 to 5.2) | .03 |
| Triglycerides | 150 (49) | −18 (8) | .01 | 173 (53) | +1 (3) | .15 | −19 (−32 to −6) | .001 |
| Blood pressure, mm Hg | | | | | | | | |
| Systolic | 130 (8) | −4 (2) | <.001 | 135 (10) | −1 (1) | .06 | −3 (−5 to −1) | .01 |
| Diastolic | 82 (5) | −3 (1) | <.001 | 85 (6) | −1 (1) | .05 | −2 (−3.5 to −0.5) | .03 |
| Endothelial function score | 7.9 (1.3) | +1.9 (0.6) | <.001 | 6.1 (1.1) | +0.2 (0.2) | .09 | +1.7 (1.0 to 2.4) | <.001 |
| hs-CRP and cytokines, median (IQR) | | | | | | | | |
| hs-CRP, mg/L | 1.7 (0.4-4.9) | −1.1 (0.4) | .01 | 2.8 (0.5-5.5) | −0.1 (0.3) | .12 | −1 (−1.7 to −0.3) | .01 |
| IL-6, pg/mL | 1.4 (0.4-3.8) | −0.7 (0.3) | .02 | 1.8 (0.5-4.5) | −0.1 (0.2) | .21 | −0.6 (−1.1 to −0.1) | .04 |
| IL-7, pg/mL | 1.9 (0.5-5.2) | −0.5 (0.2) | .04 | 2.6 (0.7-6.0) | 0 (0.1) | .78 | −0.5 (−0.9 to −0.1) | .04 |
| IL-18, pg/mL | 148 (92-219) | −19 (9) | .03 | 171 (100-230) | −4 (3) | .08 | −15 (−28 to −2) | .03 |
| No. of components of the metabolic syndrome, No. (%) | | | | | | | | |
| Adjusted for weight changes | | | | | | | | |
| 3 | 31 (34) | −43 | | 59 (66) | −17 | | −26 | |
| 4 | 10 (11) | −8 | | 12 (13) | −4 | | −4 | <.001 |
| 5 | 1 (1) | −7 | | 7 (8) | −1 | | −6 | |
| Unadjusted for weight changes | | | | | | | | |
| 3 | 24 (27) | −50 | | 55 (61) | −21 | | −29 | |
| 4 | 6 (7) | −12 | | 11 (12) | −5 | | −7 | <.001 |
| 5 | 0 | −8 | | 6 (7) | −2 | | −6 | |

Giugliano et al. JAMA 2004

# Adherence to Mediterranean diet and risk of developing diabetes: prospective cohort study

BMJ

**Table 2** | Incidence and relative risk of type 2 diabetes (confirmed cases) during follow-up according to adherence (Trichopoulou's score[22]) to Mediterranean food pattern at baseline

| | No in group | Unadjusted cumulative incidence of type 2 diabetes (%) | Incidence rate ratio* adjusted for age and sex (95% CI) | Multivariate adjusted incidence rate ratio (95% CI)† |
|---|---|---|---|---|
| Low (score 0-2) | 2253 | 0.40 | 1 (reference) | 1 (reference) |
| Moderate (score 3-6) | 9604 | 0.23 | 0.41 (0.19 to 0.87) | 0.40 (0.18 to 0.90) |
| High (score 7-9) | 1523 | 0.13 | 0.17 (0.04 to 0.75) | 0.17 (0.04 to 0.72) |

*Poisson regression model with robust standard errors.
†Adjusted for sex, age, years of university education (three categories), body mass index (continuous), family history of diabetes (two categories), hypertension at baseline (two categories), physical activity (three categories), hours/week sitting down (five categories), smoking (three categories), total energy intake (continuous). P=0.04 for trend from likelihood ratio test when Trichopoulou's score was introduced as continuous variable in fully multivariate adjusted model.

BMJ

RESEARCH

# Adherence to Mediterranean diet and health status: meta-analysis

Francesco Sofi, researcher in clinical nutrition,[1,2,5] Francesca Cesari, researcher,[1] Rosanna Abbate, full professor of internal medicine,[1,5] Gian Franco Gensini, full professor of internal medicine,[3] Alessandro Casini, associate professor of clinical nutrition[2,4,5]

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The New York Times
Monday, October 6, 2008

Health

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RESEARCH | FITNESS & NUTRITION | MONEY & POLICY | VIE

**Consults**

**Experts on the Front Lines of Medicine**

October 3, 2008, 11:33 AM

## What's the Healthiest Diet of All?

By PETER LIBBY, M.D.

Diners at an outdoor cafe in Corsica, France. (Ed Alcock for The New York Times)

What exactly do doctors mean by a "healthy diet"?

Many of us consider the Mediterranean diet to be the closest thing known to an ideal meal plan, rich in vegetables, fruits, legumes, cereals, fish, olive oil and, yes, a bit of red wine with meals. Compared to traditional American menu — high in red meat and in butter and other dairy products — the Mediterranean diet is lower in saturated fat, more varied and often more satisfying.

CORRIERE DELLA SERA .it

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» Corriere della Sera › Salute › Nutrizione › *La dieta mediterranea salva la vita*

MA GLI ITALIANI NON LA FANNO PIÙ

## La dieta mediterranea salva la vita

*Uno studio dimostra che seguendola si abbatte del 10% la mortalità per ogni causa*

**Frutta, verdura, pasta, olio, pesce, sono i cardini della dieta mediterranea (Ansa)**

Seguire «davvero» la dieta mediterranea garantisce una significativa protezione nei confronti della mortalità per qualunque causa e dell'incidenza delle principali patologie cronico-degenerative come quelle del cuore e dei vasi, i tumori, il morbo di Parkinson e quello di Alzheimer. A ribadirlo con argomentazioni scientifiche ancora più solide che in passato è una metanalisi, cioè una revisione di dati a disposizione da studi precedenti, condotta da specialisti dell'Università di Firenze e dell'Azienda Ospedaliero-Universitaria Careggi, pubblicata sul prestigioso British Medical Journal.

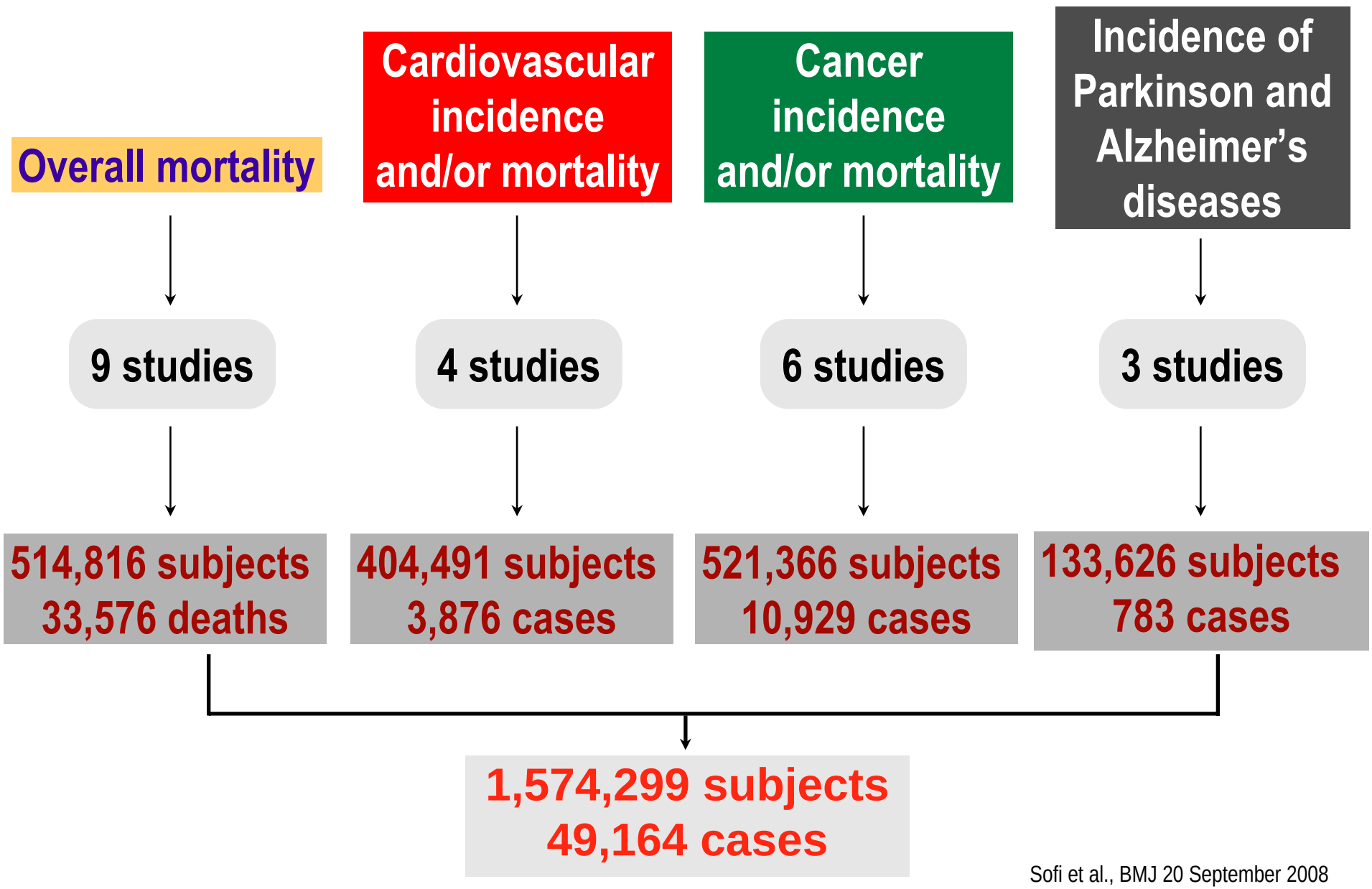
NOTIZIE CORRELATE

- Il canale nutrizione di Corriere.it
- Nutrizione: l'esperto risponde
- Tutti i video sulla nutrizione



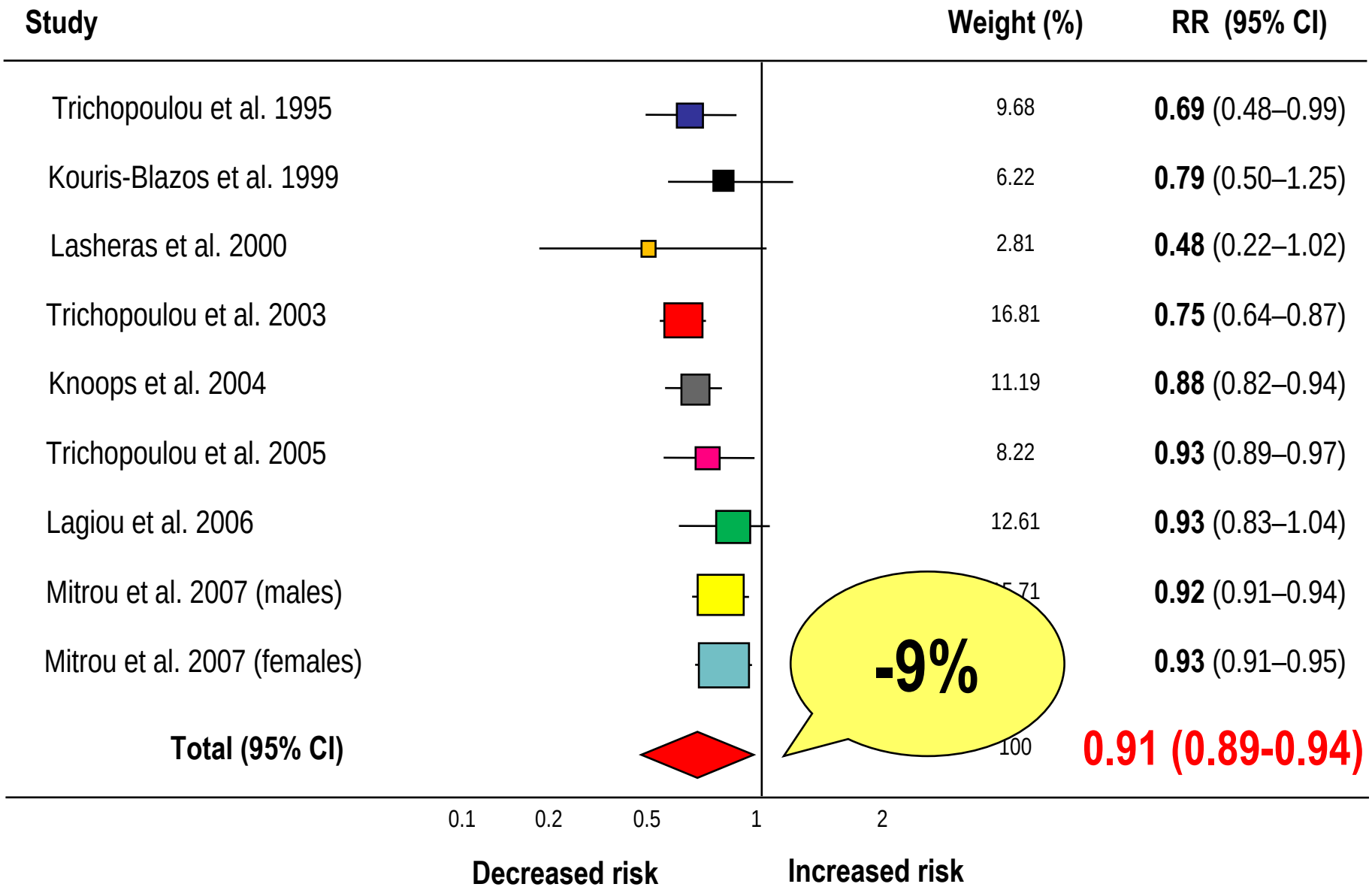
**LO STUDIO** - Le ricerche prese in considerazione dai ricercatori toscani hanno «sezionato» le abitudini alimentari e lo stato di salute di più di 1,5 milioni di persone seguite dai 3 ai 18 anni. Tutti gli studi esaminati utilizzavano un punteggio numerico, chiamato *punteggio di aderenza*, per calcolare quanto fedelmente veniva seguita la dieta Mediterranea,. Dall'analisi di questi dati è emerso che coloro che aderivano in maniera rigorosa alla dieta Mediterranea avevano un significativo miglioramento dello stato di salute con una riduzione del 9% della mortalità totale, del 9% della mortalità per cause cardiovascolari, del 13% dell'incidenza di patologie come Parkinson e Alzheimer, e del 6% dell'incidenza o mortalità per tumori.

# Studies included



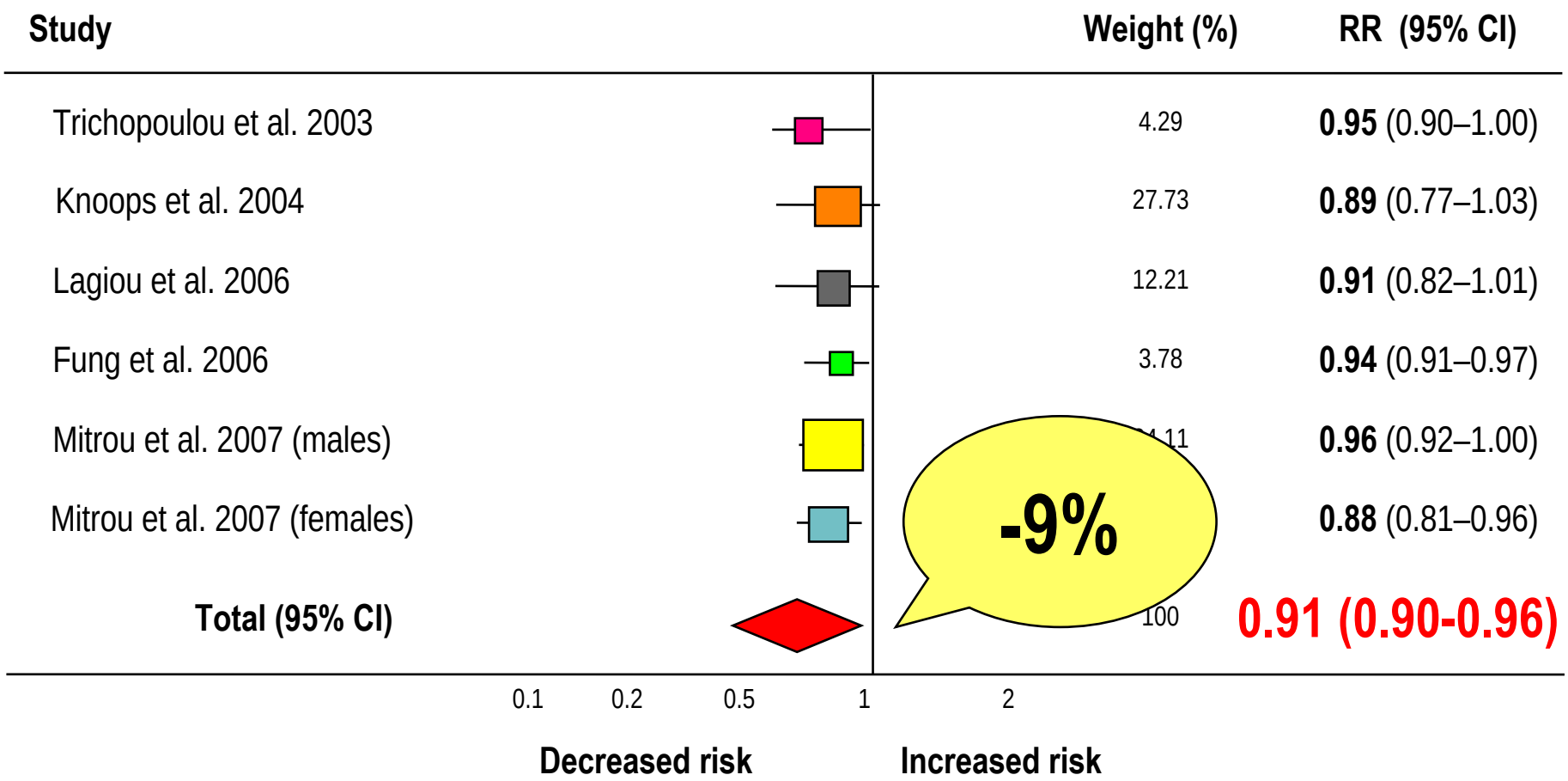

Sofi et al., BMJ 20 September 2008

# Adherence to MD and overall mortality



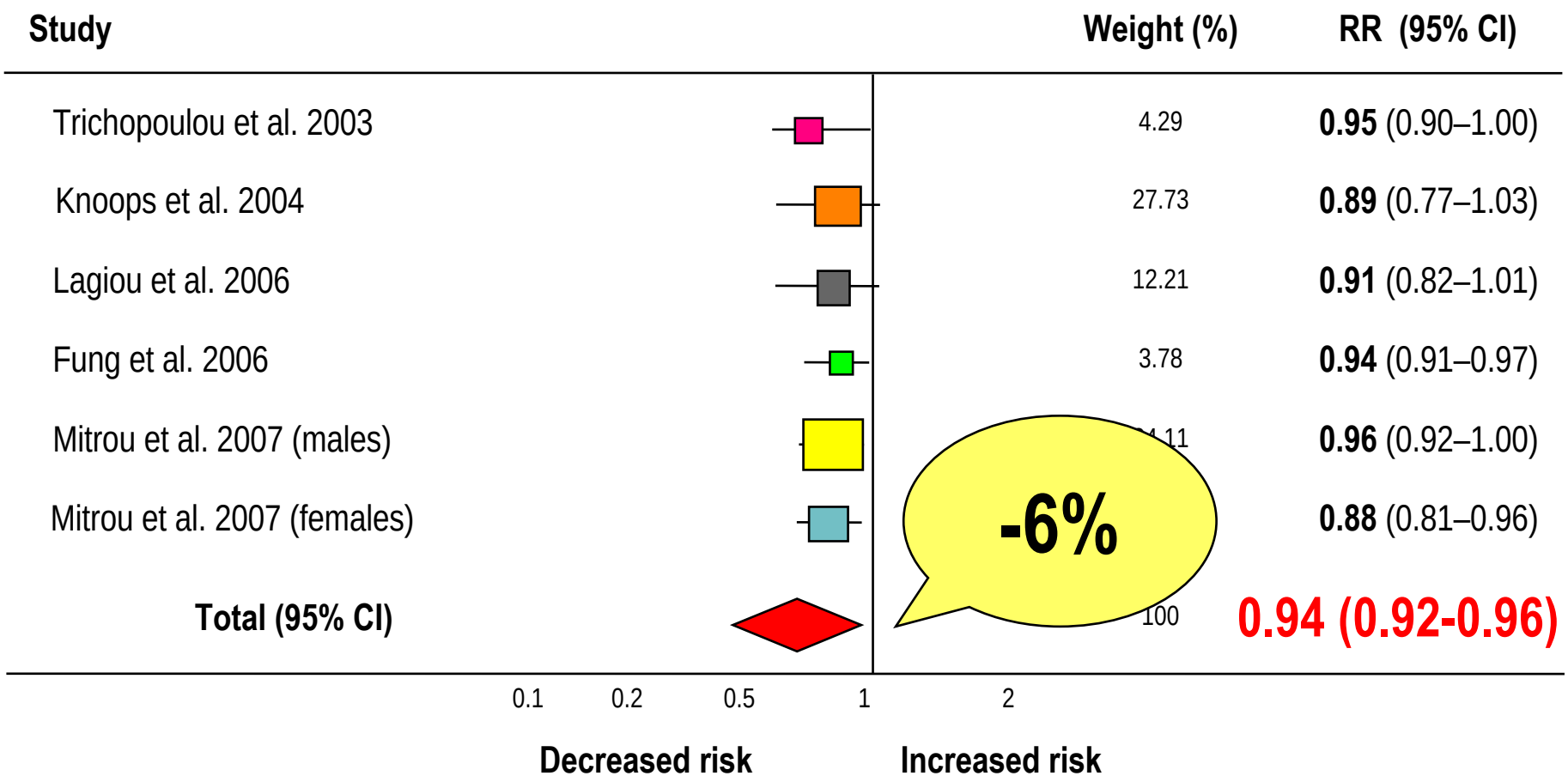

Sofi et al., BMJ 20 September 2008

# Adherence to MD and cardiovascular incidence and/or mortality



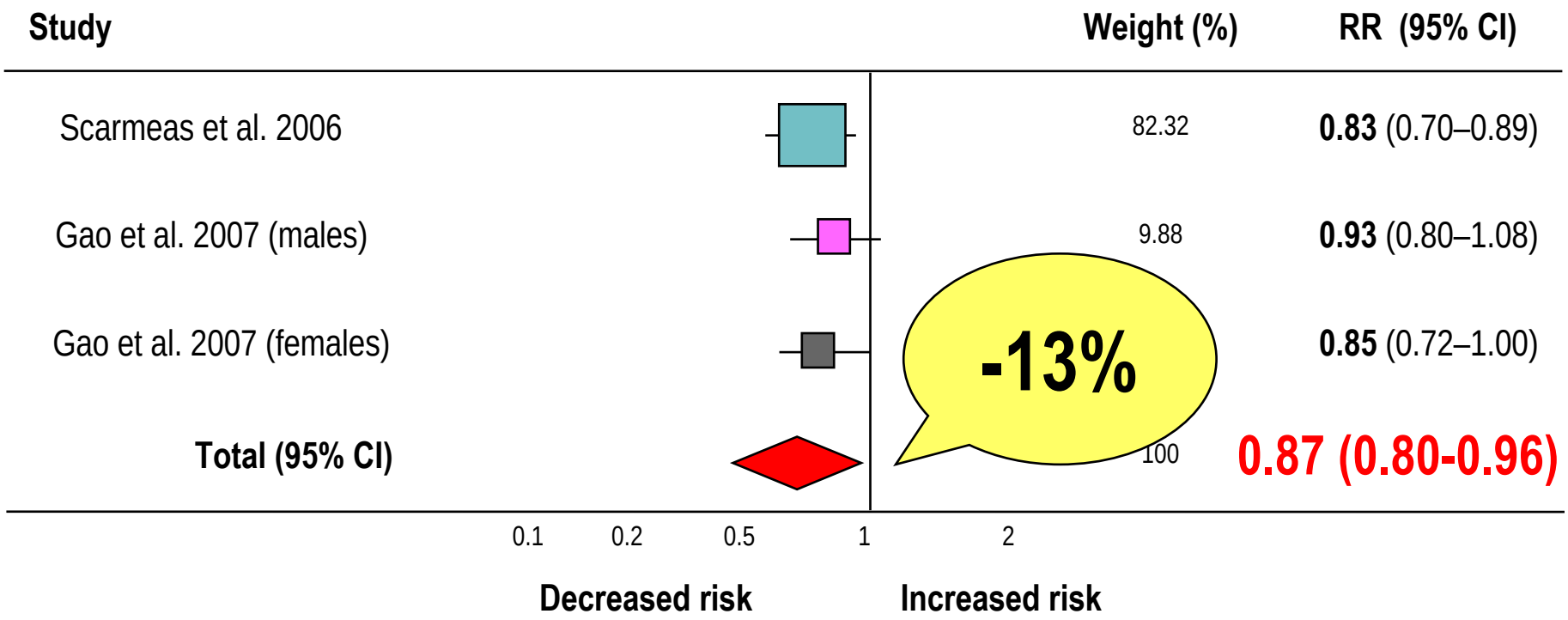

Sofi et al., BMJ 20 September 2008

# Adherence to MD and cancer incidence and/or mortality




Sofi et al., BMJ 20 September 2008

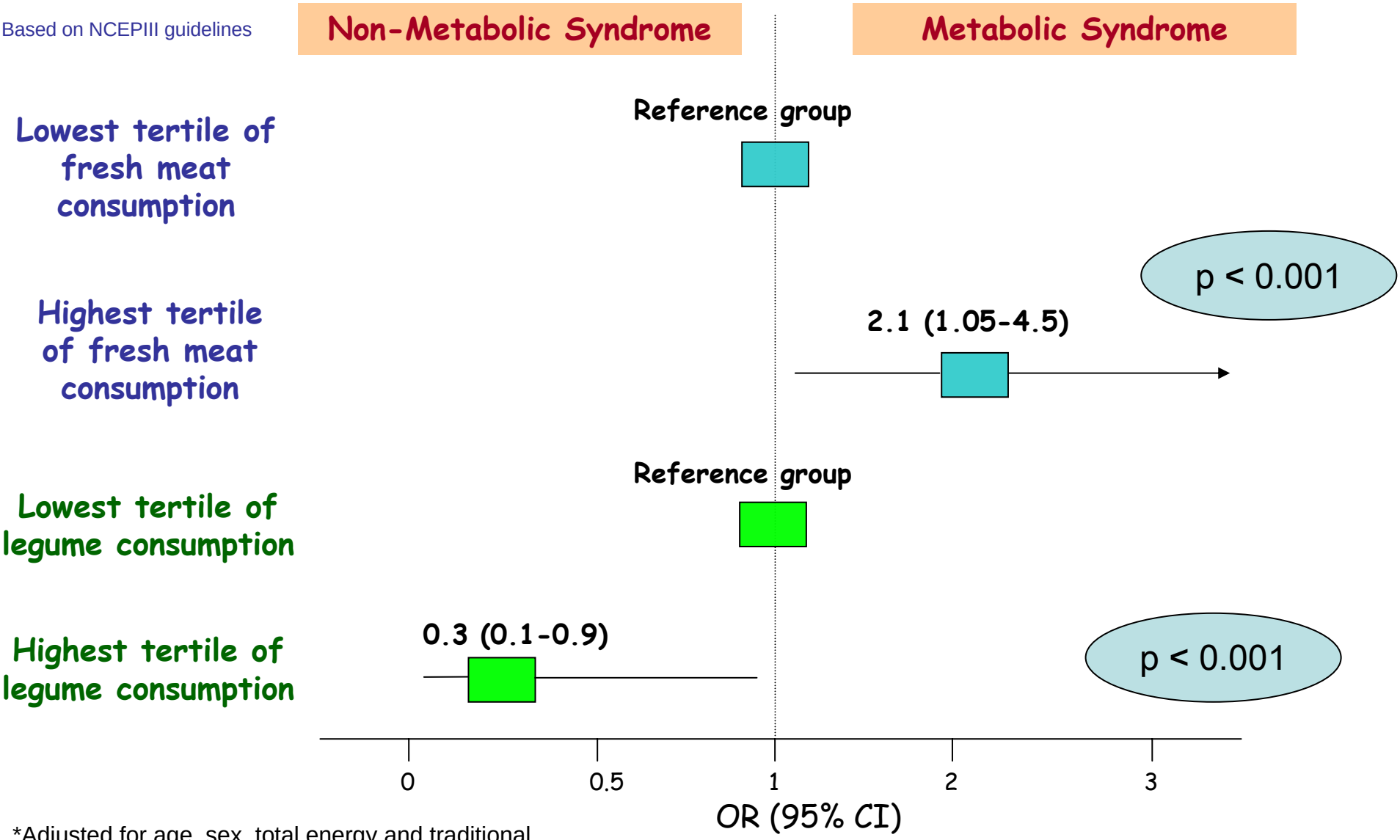
# Adherence to MD and incidence of Parkinson and Alzheimer's diseases




Sofi et al., BMJ 20 September 2008

# Multivariate logistic regression analysis on Metabolic Syndrome (n=54)*

Based on NCEPIII guidelines




*Adjusted for age, sex, total energy and traditional cardiovascular risk factors

Sofi et al, Eur J Clin Nutr 2005; Nutr Metab Cardiovasc Dis 2006

# Trattamento della Sindrome metabolica?

- La riduzione dell'apporto calorico e l'incremento dell'esercizio fisico sono essenziali per il trattamento di tutte le componenti della sindrome metabolica
- **La presenza di più fattori di rischio rende necessario un trattamento più aggressivo di ciascuno di essi**
- La scelta della terapia farmacologica per ciascun fattore di rischio richiede attenta considerazione agli effetti sui fattori di rischio associati

# Come possiamo intervenire?

**Intervento farmacologico**

- **Ottimo effetto su LDL**
- **Discreto effetto sulla PA**
- **Modesto effetto sulla tolleranza glicidica**

Global Guidline for type 2 Diabetes. *International Diabetes Federation* 2005

# Trattamento della Sindrome metabolica?

- La riduzione dell'apporto calorico e l'incremento dell'esercizio fisico sono essenziali per il trattamento di tutte le componenti della sindrome metabolica
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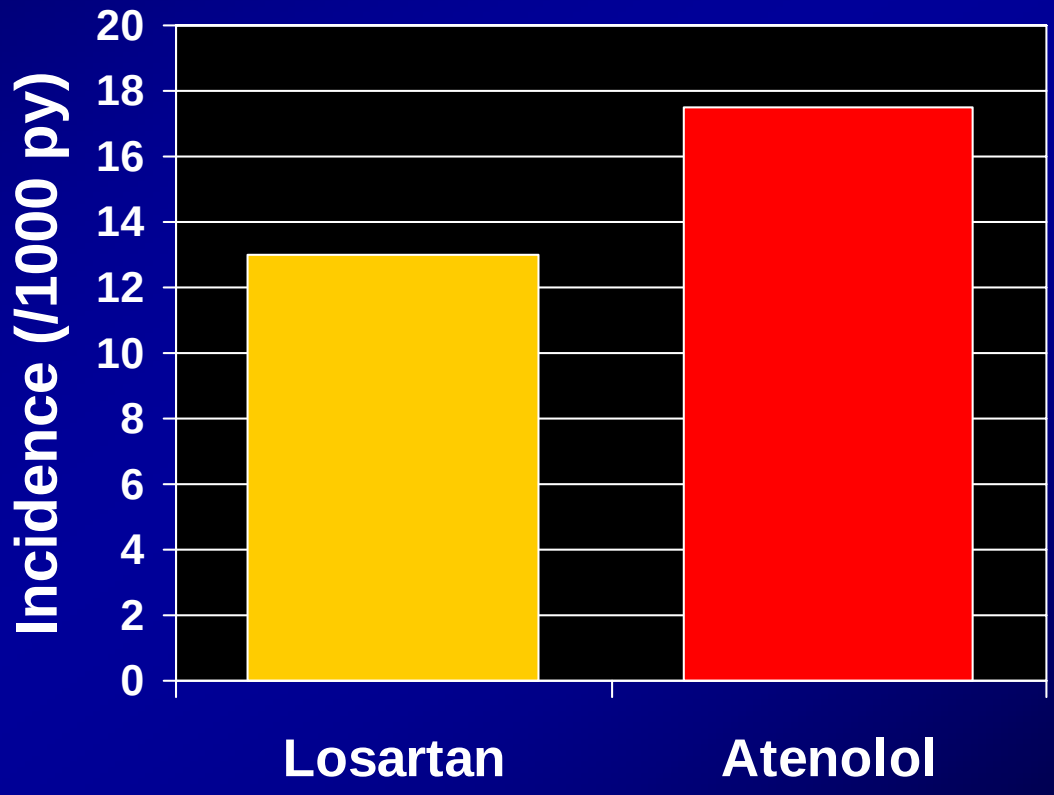
- La scelta della terapia farmacologica per ciascun fattore di rischio richiede attenta considerazione agli effetti sui fattori di rischio associati

# *Losartan and diabetes*

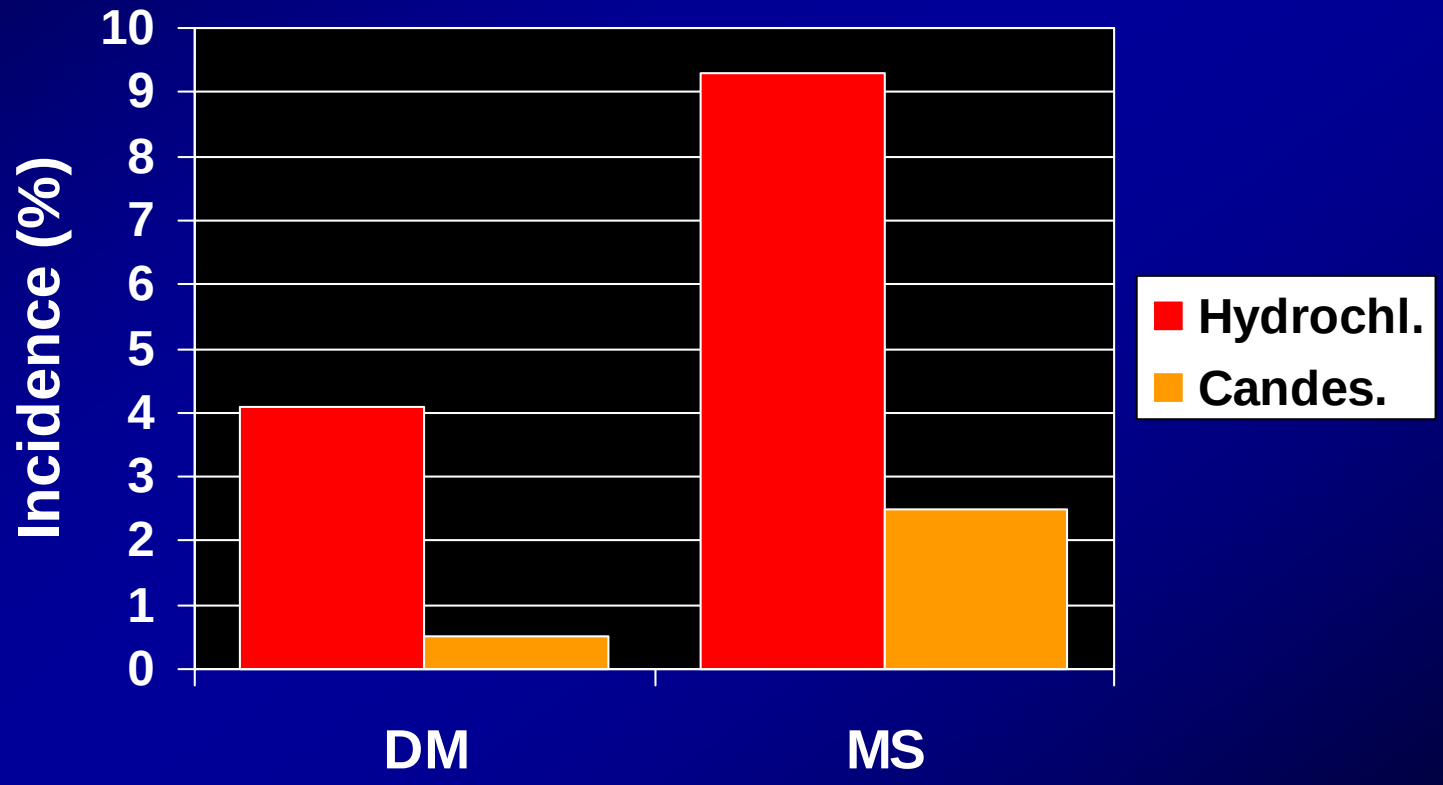
9193 patients with hypertension and LVH; losartan vs. atenolol, double-blind.




Lindholm *et al., J Hypert 20:1879*, 2002

# ALPINE Study

RCT, PS; hydrochlorothiazide vs. candesartan, DB, 1yr. 386 hypertensive patients.




Lindholm *et al., J Hypertens 21:1563*, 2003

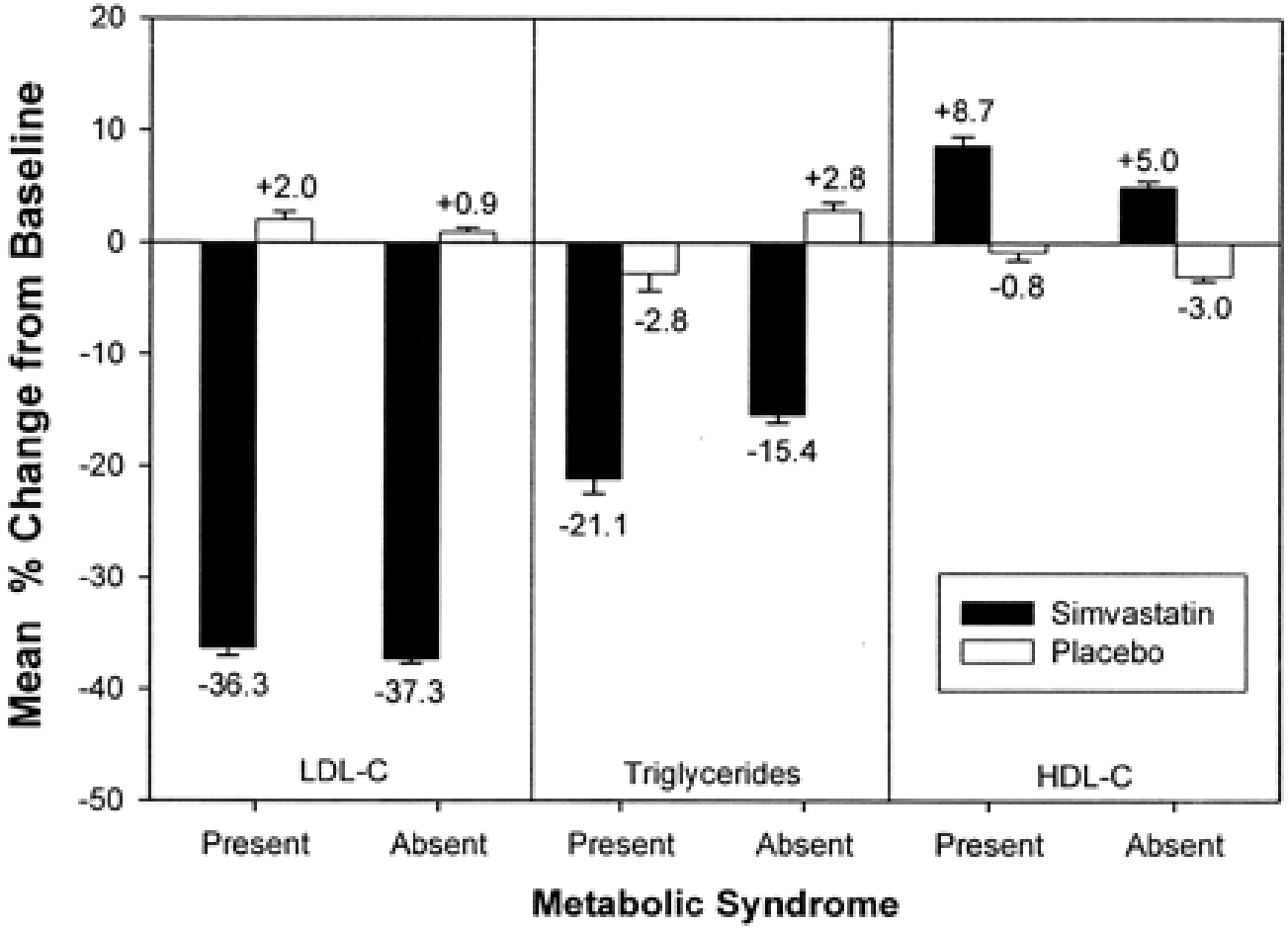
# ALPINE Study

## Metabolic effects of antihypertensive treatment: long live the debate

Ele Ferrannini and Michaela Kozàkovà

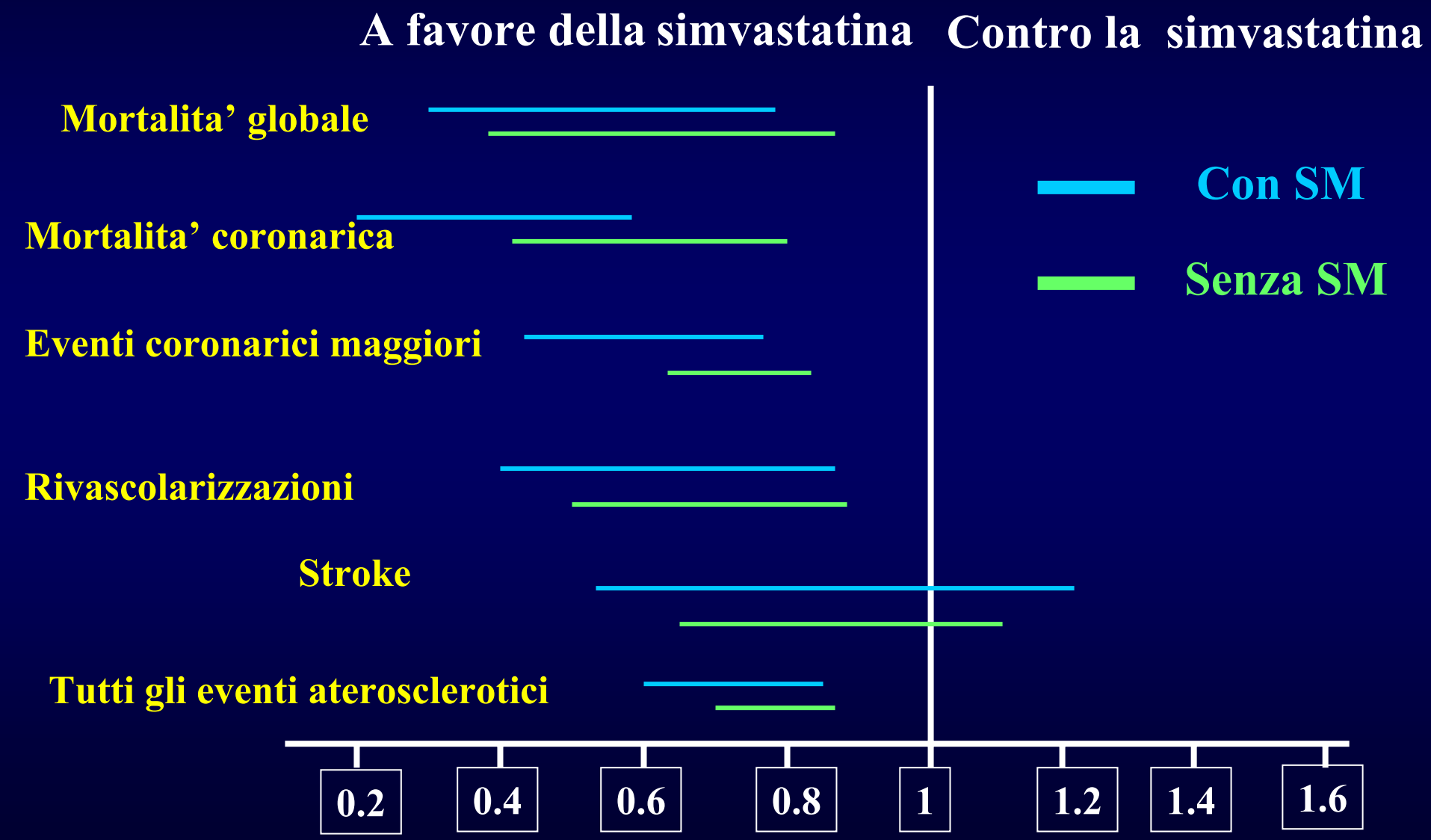
Journal of Hypertension 2003, 21:1459–1462

# Change in lipid parameters in nondiabetic CHD patients with and without the metabolic syndrome after treatment with simvastatin in the 4S




Pyorala K et AL., Diabetes Care 2004

# Statine nella sindrome metabolica: dati dal 4S



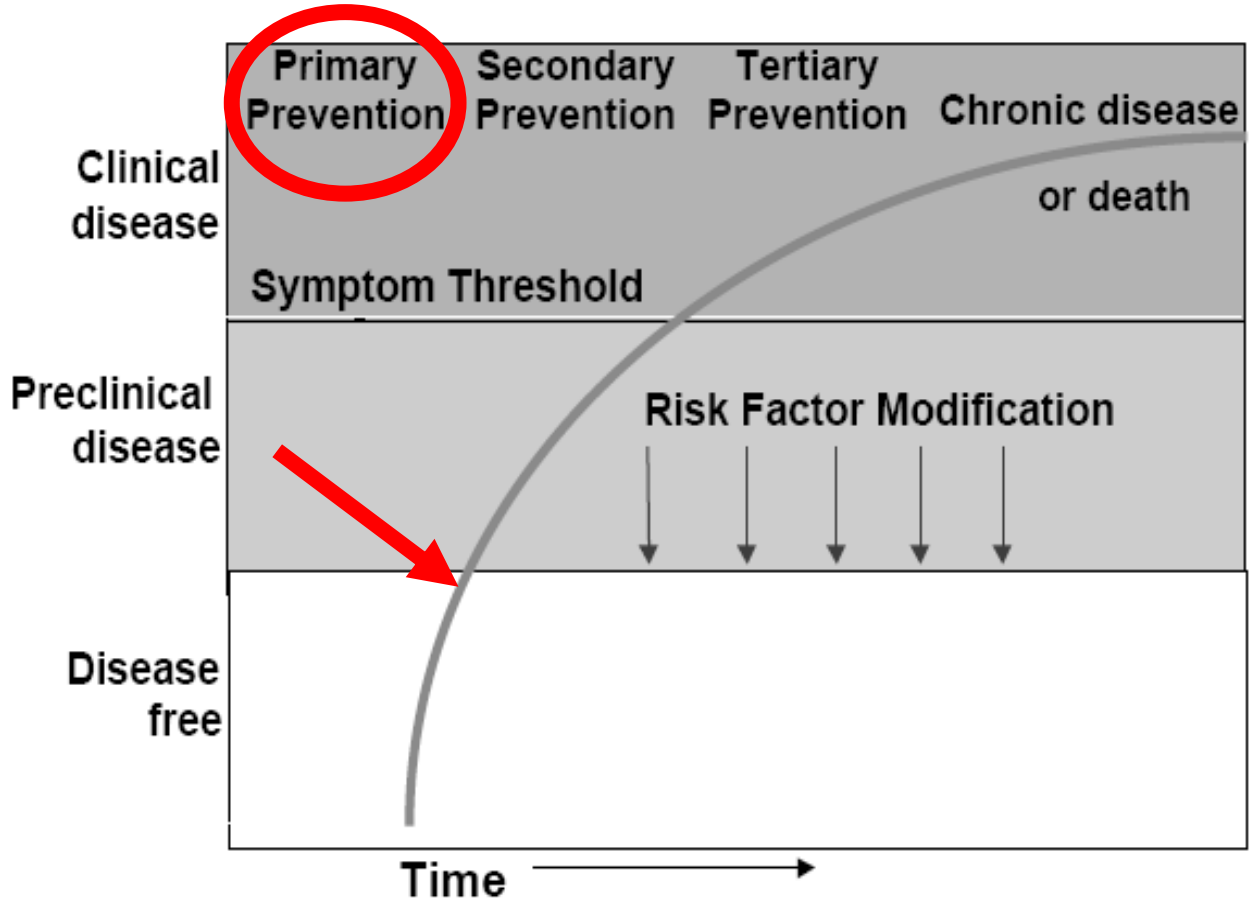

Pyorala, Diabetes Care 2004

- **La SM *deve essere* vista uno strumento semplice per individuare facilmente e precocemente pazienti su cui intervenire aggressivamente con interventi farmacologici e non**

- **E' certamente un buon predittore di sviluppo di diabete di tipo 2 e malattia CV**
- **L'intervento sul peso e sull'attività fisica ha ottimi effetti soprattutto sulla tolleranza glicidica**
- **L'intervento sul colesterolo LDL, il più precoce da attuare, è attualmente il più agevole ed efficace grazie alla presenza di statine sicure e sperimentate**
- **Le associazioni di statine con altri farmaci CV è sicura e vantaggiosa**

# The Challenge of Prevention

Daniel F. Hanley, MD



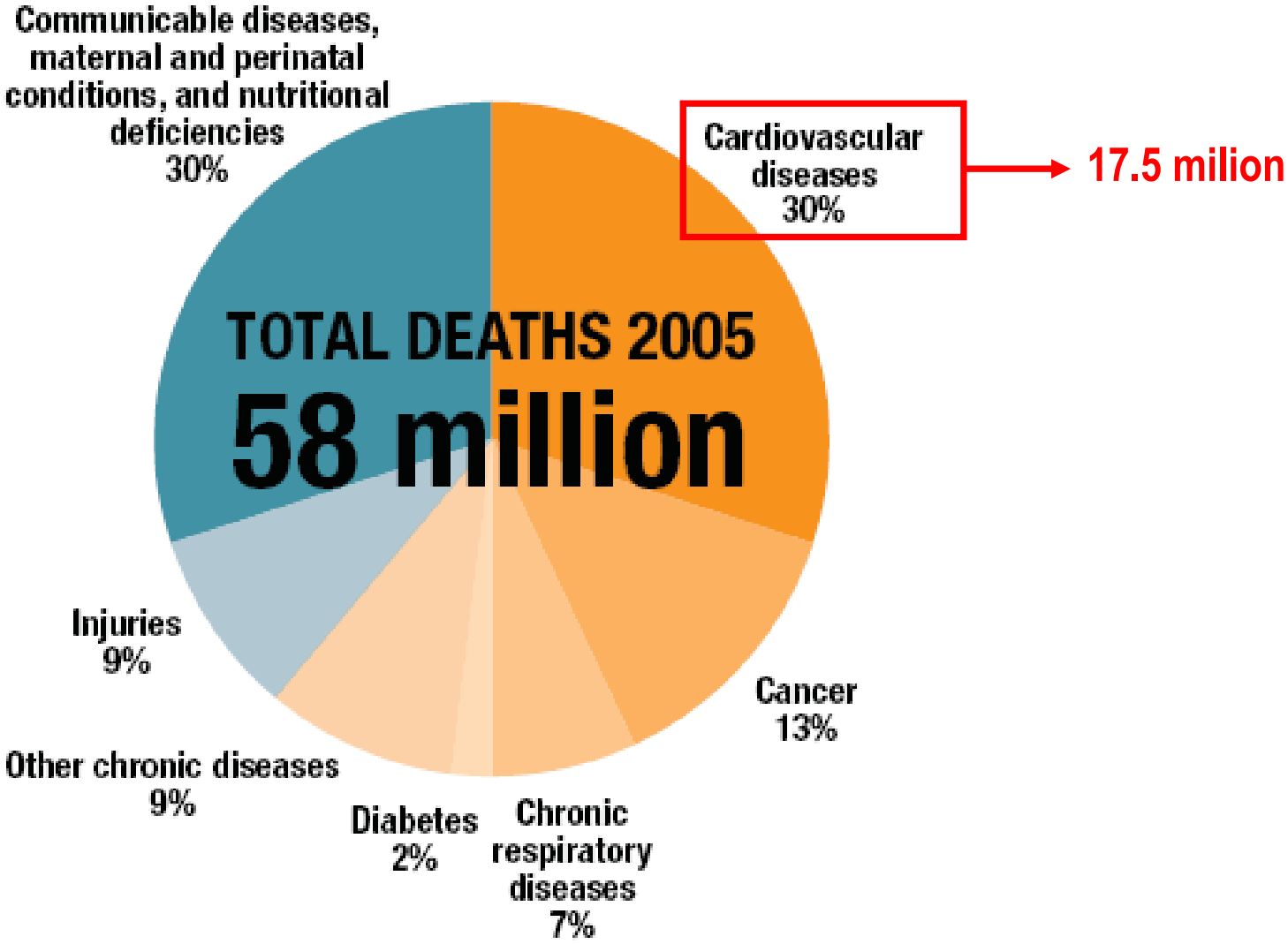

Sacco, Diabetes, Obesity and Metabolism, 2002

# Working *together* for health

The World Health Report 2006

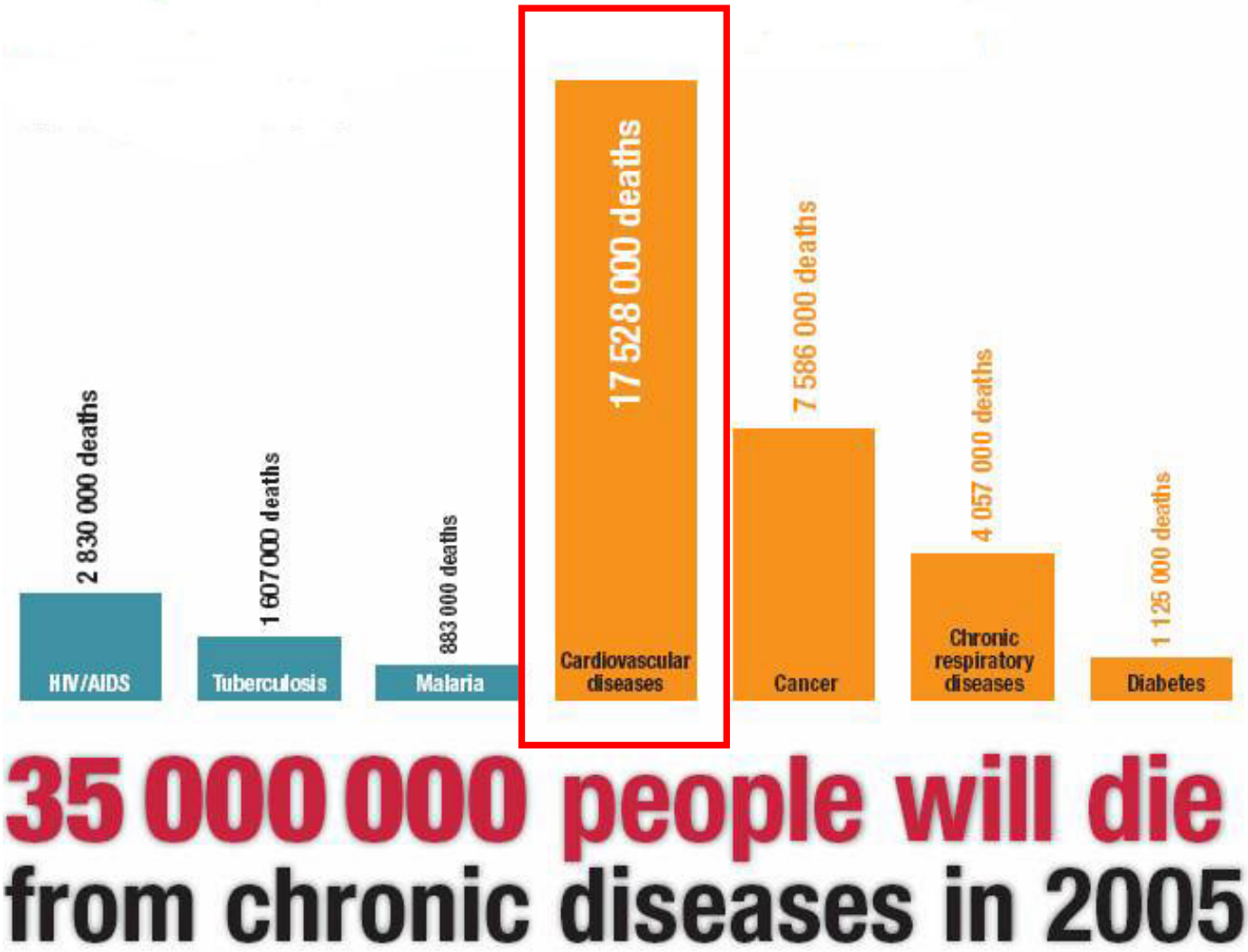
World Health Organization

# Main causes of death worldwide at all ages (year: 2005)




Preventing Chronic Diseases – A vital investiment. WHO global report 2006

# Worlwide deaths by causes (year: 2005)

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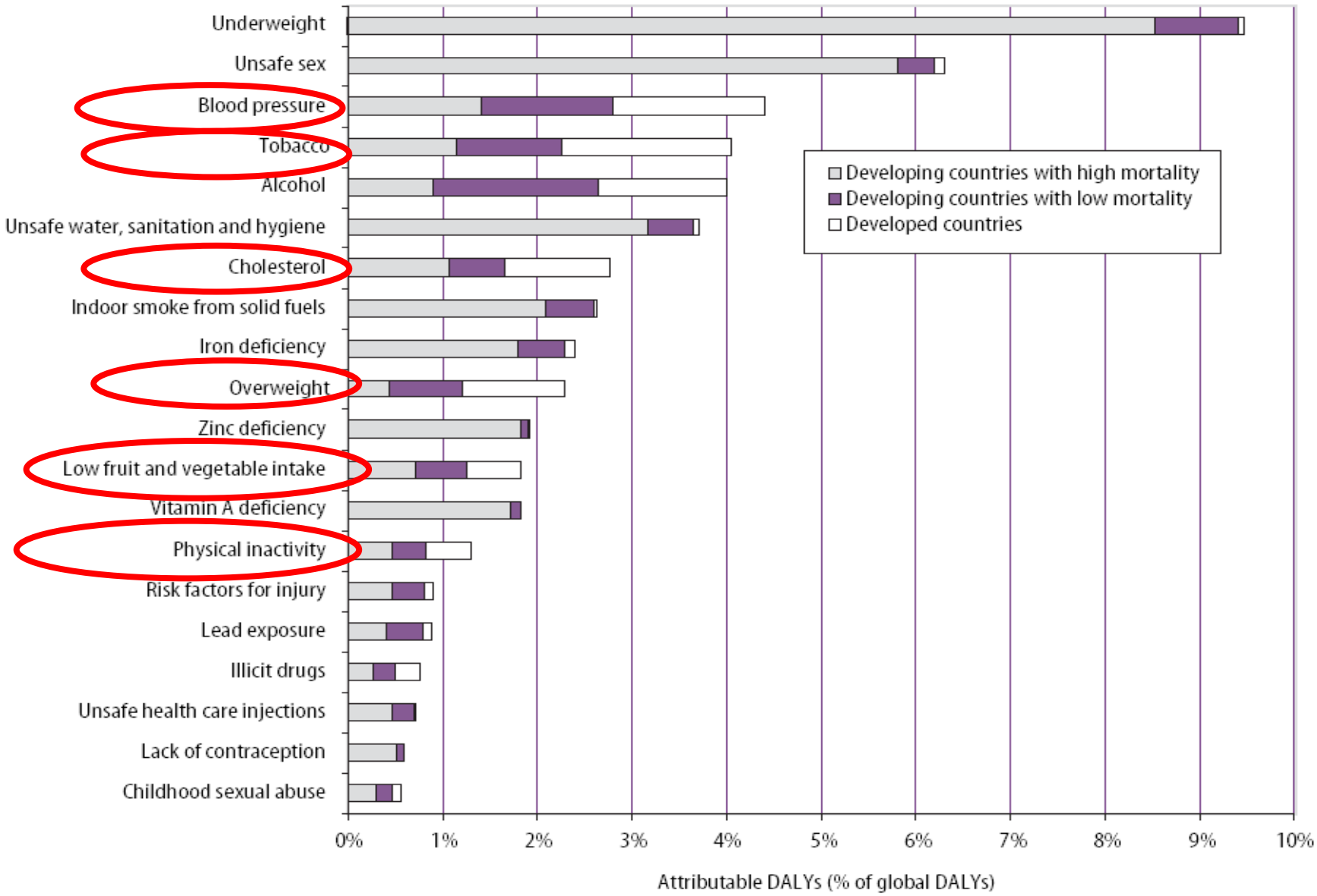
## Figure 4.9 Global distribution of burden of disease attributable to 20 leading selected risk factors



## Table 4.11 Ranking of estimated attributable and avoidable burdens of 10 leading selected risk factors

| Rank | 2000 | Estimated attributable burden in 2000 DALYs (millions) | % total | 2010 | Estimated avoidable burden after 25% distributional transition from 2001 in 2010 DALYs (millions) | % total | 2020 | Estimated avoidable burden after 25% distributional transition from 2001 in 2020 DALYs (millions) | % total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Underweight | 138 | 9.5 | Unsafe sex | 42 | 3.0 | Unsafe sex | 71 | 4.8 |
| 2 | Unsafe sex | 92 | 6.3 | Blood pressure | 25 | 1.7 | Blood pressure | 27 | 1.9 |
| 3 | Blood pressure | 64 | 4.4 | Underweight | 23 | 1.6 | Tobacco | 22 | 1.5 |
| 4 | Tobacco | 59 | 4.1 | Tobacco | 17 | 1.2 | Cholesterol | 17 | 1.2 |
| 5 | Alcohol | 58 | 4.0 | Cholesterol | 15 | 1.1 | Underweight | 16 | 1.1 |
| 6 | Unsafe water sanitation and hygiene | 54 | 3.7 | Alcohol | 15 | 1.1 | Alcohol | 16 | 1.1 |
| 7 | Cholesterol | 40 | 2.8 | Overweight | 13 | 0.9 | Overweight | 15 | 1.0 |
| 8 | Indoor smoke from solid fuels | 39 | 2.6 | Iron deficiency | 9 | 0.6 | Low fruit and vegetable intake | 9 | 0.6 |
| 9 | Iron deficiency | 35 | 2.4 | Low fruit and vegetable intake | 9 | 0.6 | Iron deficiency | 7 | 0.5 |
| 10 | Overweight | 33 | 2.3 | Unsafe water, sanitation and hygiene | 8 | 0.6 | Physical inactivity | 6 | 0.4 |
| *Total DALYs* | | *1 455* | | | *1 417* | | | *1 459* | |

Preventing Chronic Diseases – A vital investiment. WHO global report 2006

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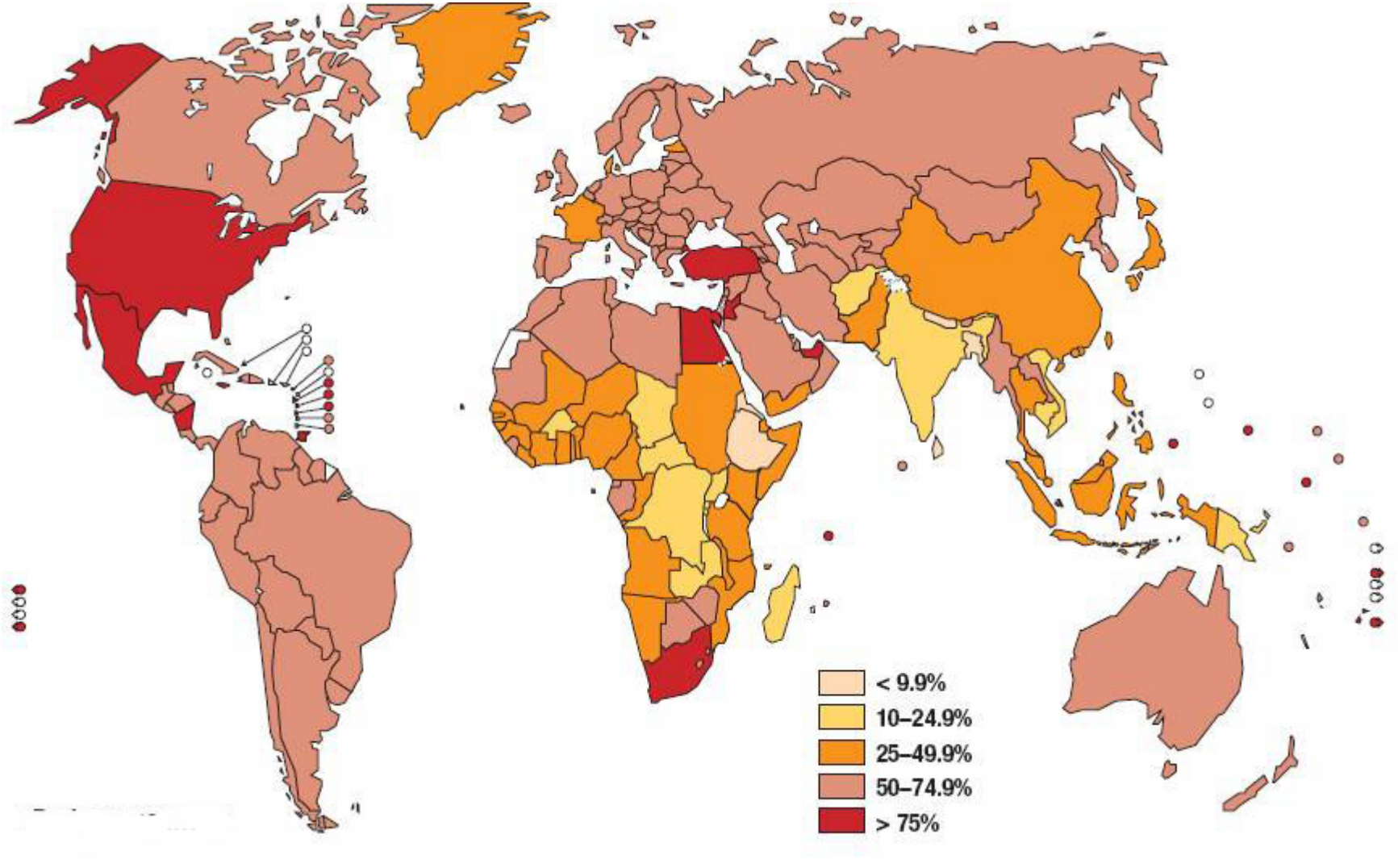
# Obesity

# Prevalence of overweight (BMI>25 kg/$m_2$) (year: 2005)

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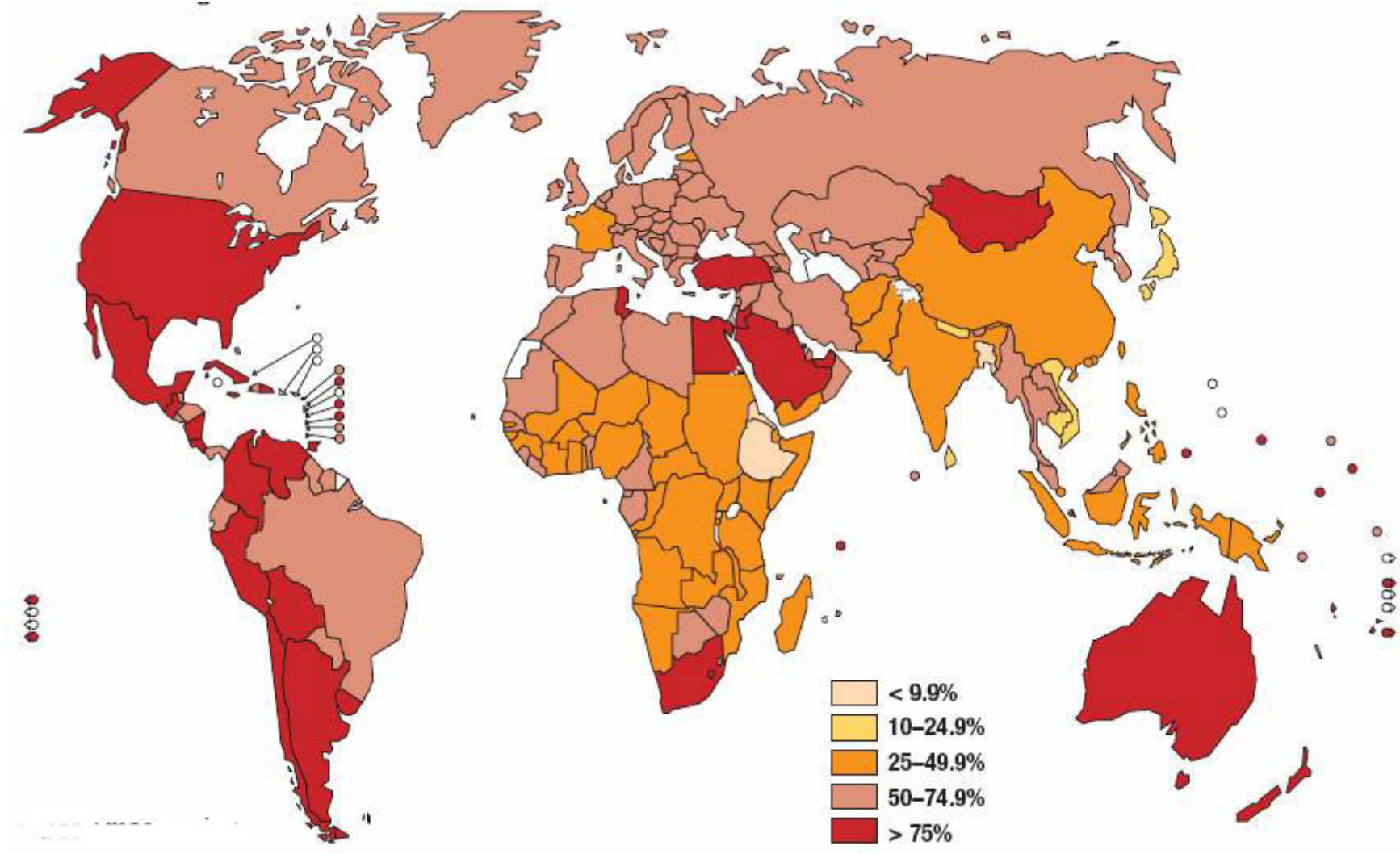
# Prevalence of overweight (BMI>25 kg/$m_2$) (year: 2015)

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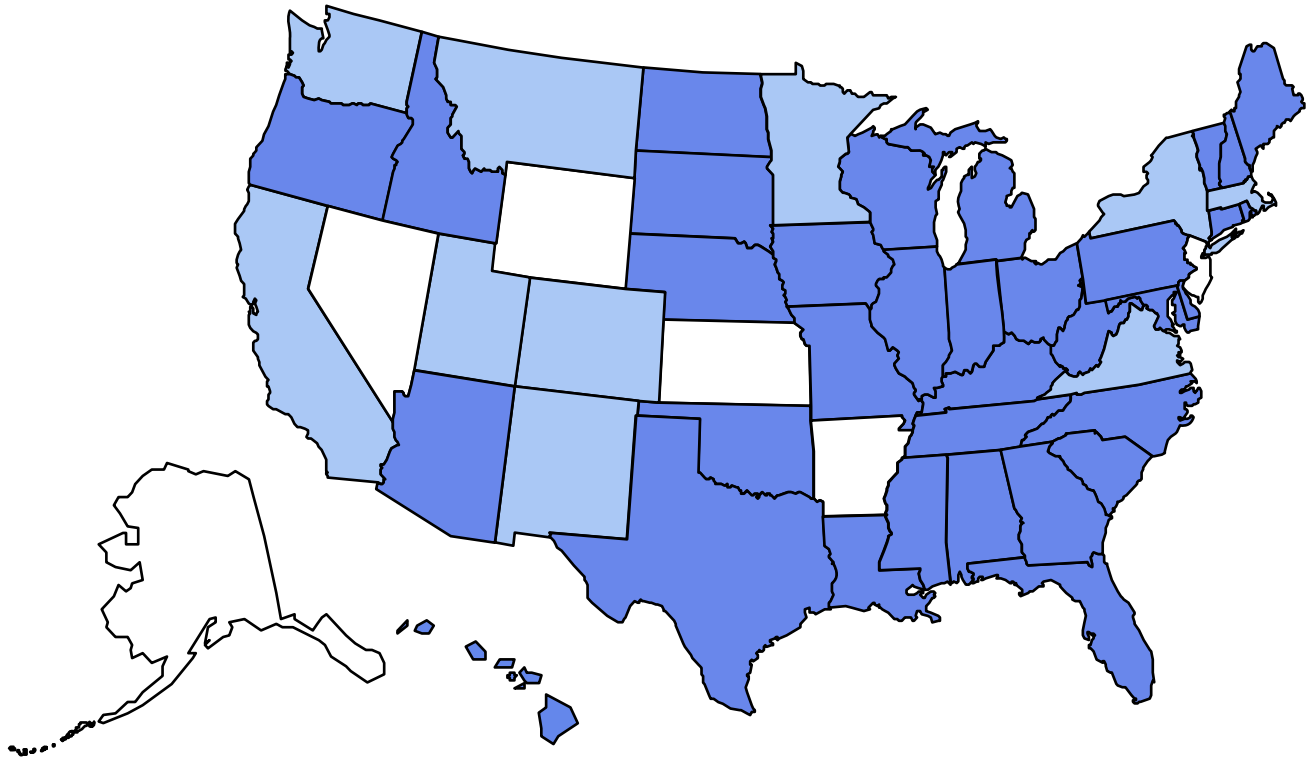
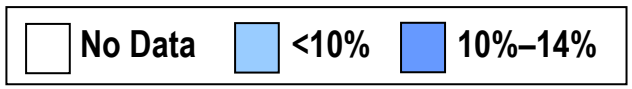
# Obesity Trends* Among U.S. Adults

## BRFSS, 1990

**(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)**

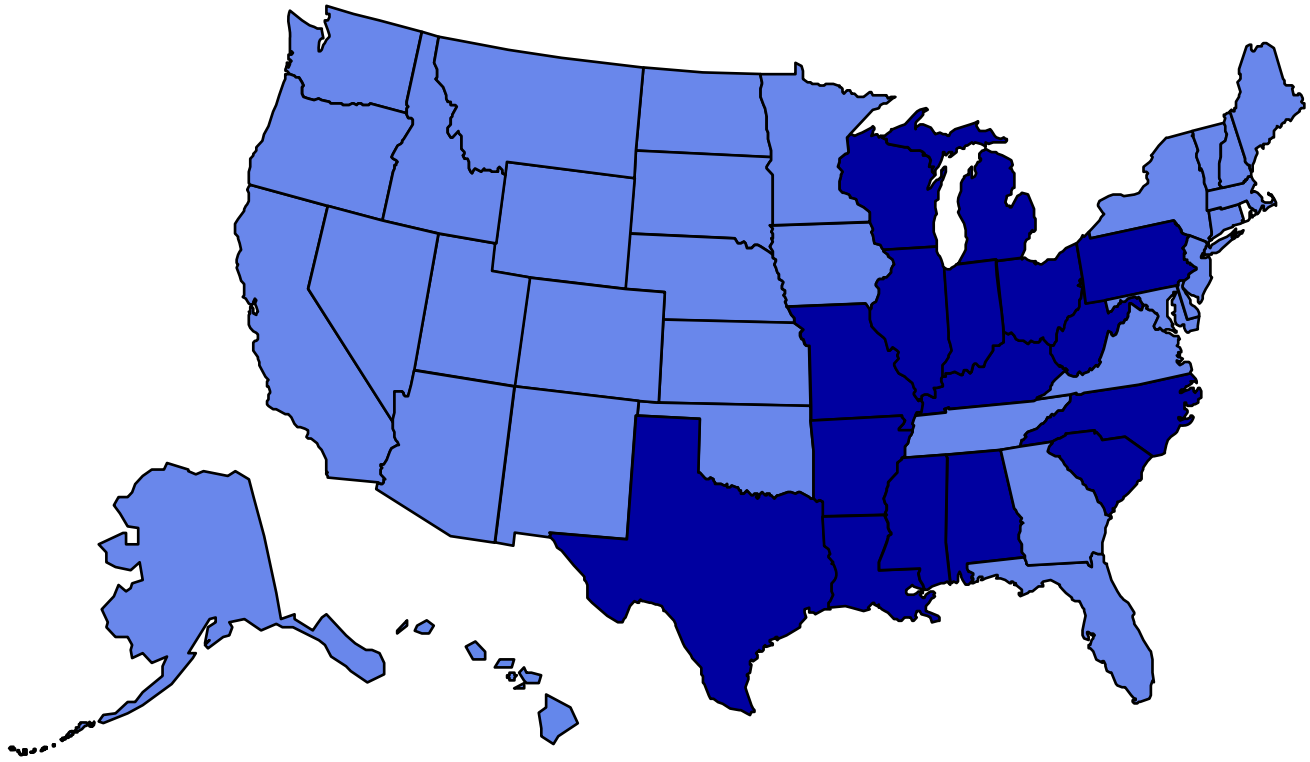


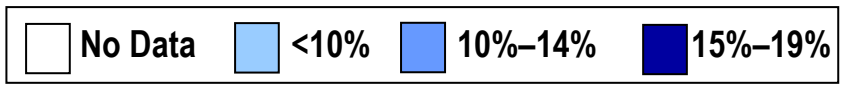


# Obesity Trends* Among U.S. Adults

## BRFSS, 1994

**(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)**

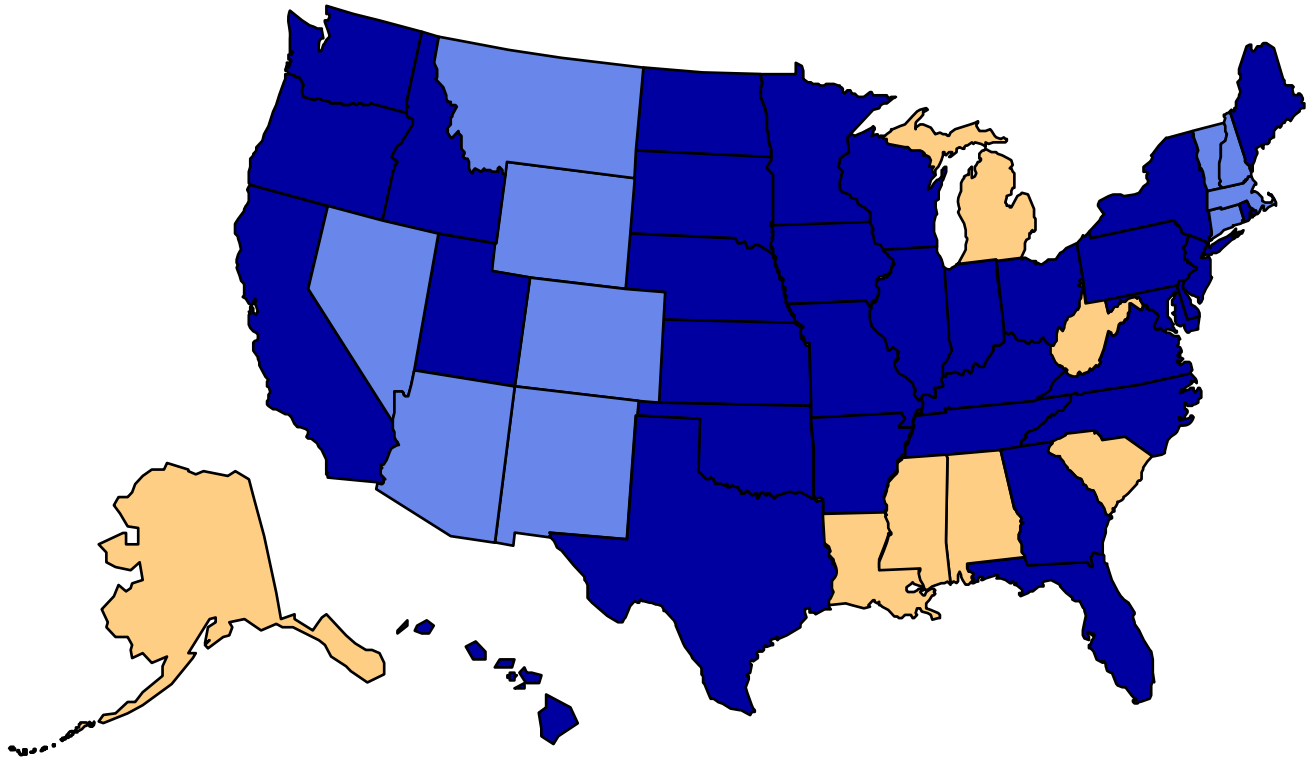


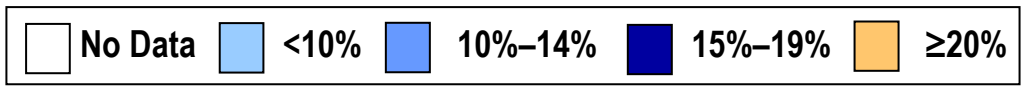


# Obesity Trends* Among U.S. Adults

## BRFSS, 1998

**(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)**

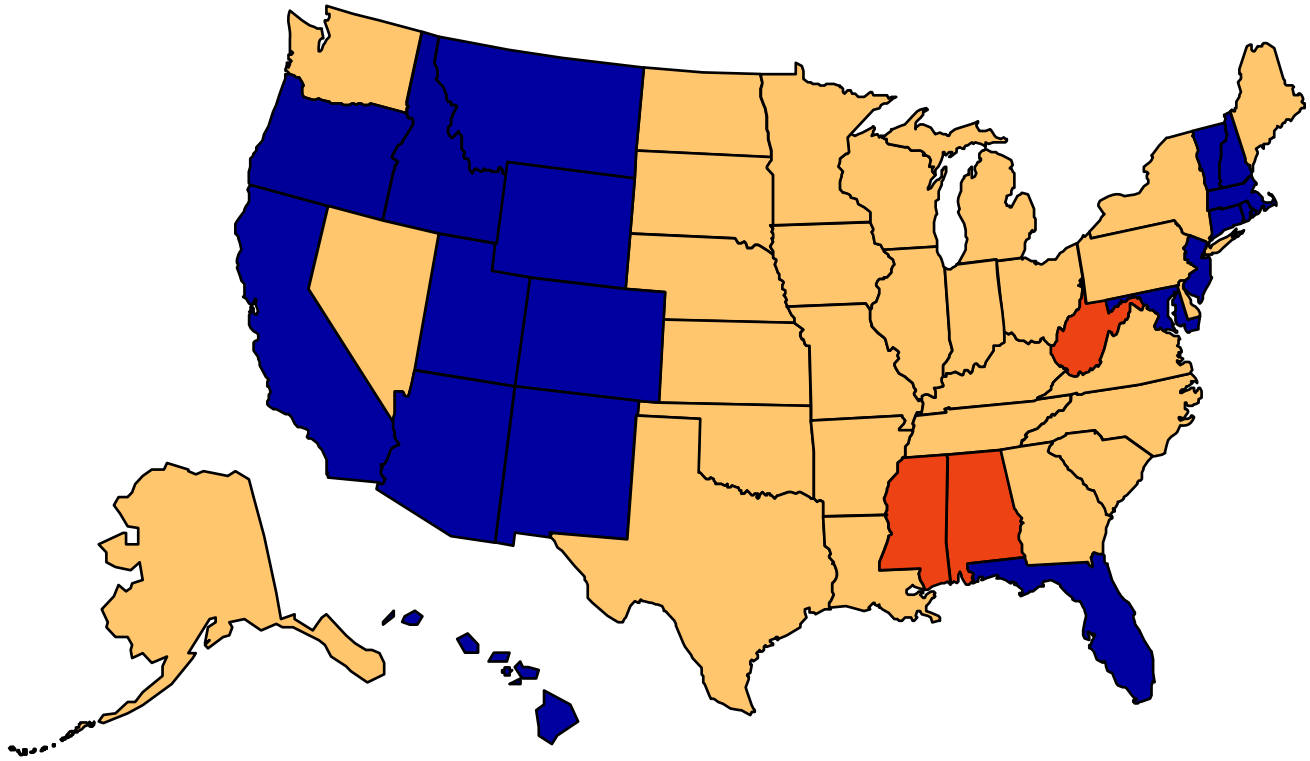


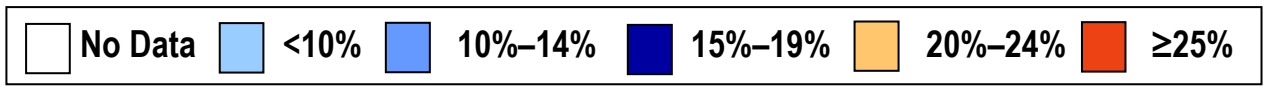


# Obesity Trends* Among U.S. Adults

## BRFSS, 2002

**(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)**

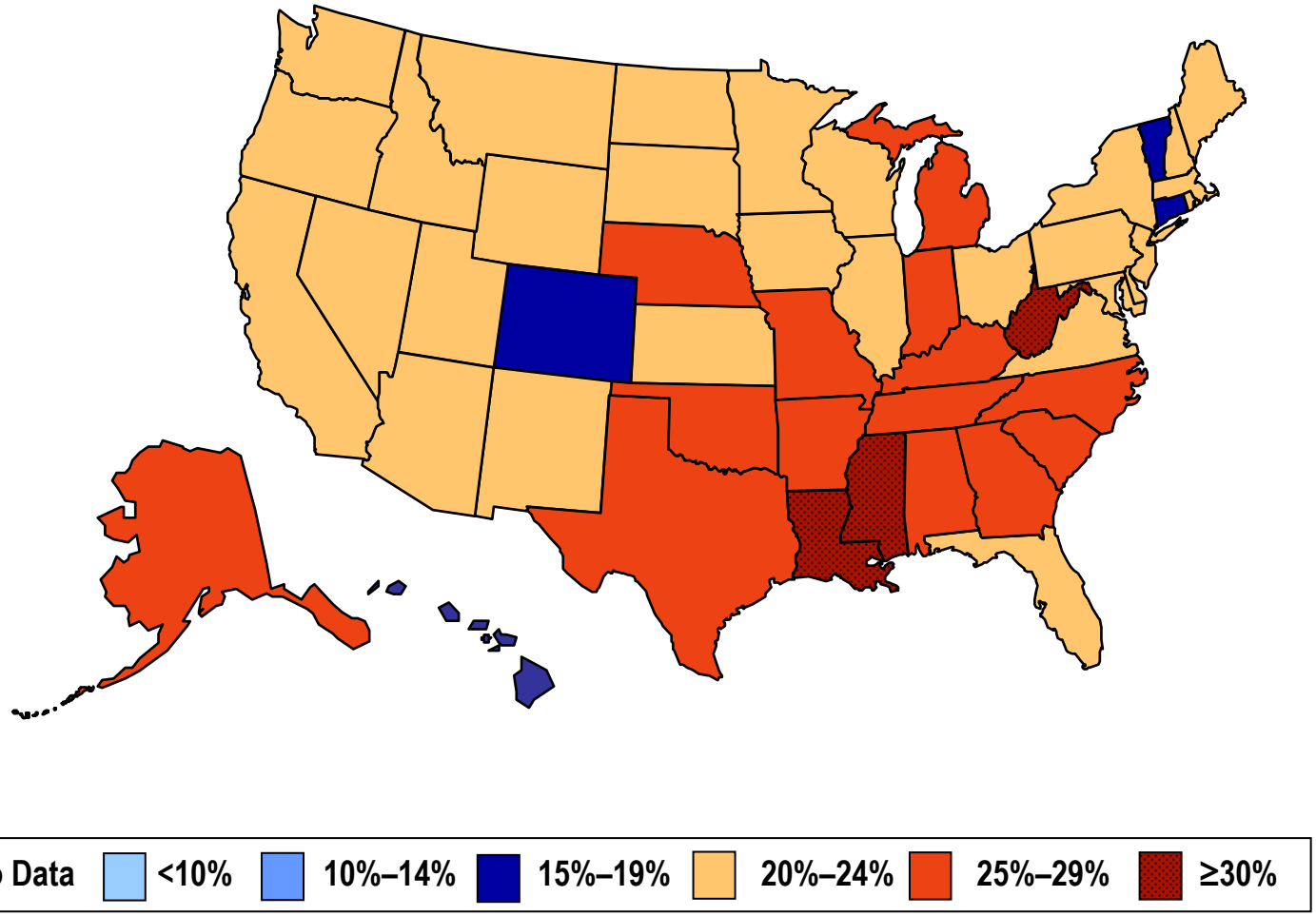




# Obesity Trends* Among U.S. Adults

## BRFSS, 2005

**(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)**



*ABC of obesity*

**BMJ** VOLUME 333 18 NOVEMBER 2006

# Obesity and vascular disease

Debbie A Lawlor, Mike Lean, Naveed Sattar

## Conclusion

- Clear evidence exists that obesity has a wider impact on cardiovascular health beyond its effect on coronary heart disease
- Individuals who are obese in mid-life are at increased risk of heart failure and stroke in later life, and emerging evidence shows that they may also be at increased risk of dementia. For all these associations, the link between obesity and disease outcome could result from the behaviours that cause adult weight gain—namely, inactivity and high fat diets
- Further, the associations may in part be mediated by obesity related diabetes, hypertension, and dyslipidaemia, but the causal pathway still involves adult weight gain. This emphasises the importance of reversing the current obesity epidemic, not only because of its impact on premature mortality but because of the devastating effect it will have on quality of life in older age through its impact on these disease outcomes

**Practical strategy for managing raised waist circumference in relation to cardiovascular disease risk**

| Patient characteristics | Treatment |
|---|---|
| Circumference <80 cm in women, <94 cm in men (low risk) | Requires no intervention (avoid weight gain and stay below these levels) |
| Circumference ≥80 cm in women, ≥94 cm men, and <10% risk of cardiovascular disease* over next 10 years (raised risk) | Requires health promotion and public health measures for self directed treatment to prevent further weight gain |
| Circumference 80-88 cm in women and 94-102 cm men, and >10% risk of cardiovascular disease* over next 10 years (high risk) | Requires effective treatment to lose 5-10% body weight and to prevent further weight gain |
| Circumference >88 cm in women and >102 cm in men irrespective of 10 year risk of cardiovascular disease* (high risk for other medical problems associated with obesity or intra-abdominal fat accumulation) | Requires effective treatment to lose 5-10% body weight and to prevent further weight gain |

**Glucose, waist circumference, and triglyceride—three of the key components of the criteria for metabolic syndrome—are far stronger predictors of diabetes than of cardiovascular disease**

**The outlined conclusions on the associations of obesity with heart failure, stroke, and cognitive decline are based on the best available published evidence from prospective cohort studies that have used measures to minimise these sources of bias**

**Obesity is also associated with increased risk of atrial fibrillation, venous thromboembolism, and sudden death. Obesity is therefore associated with a broad range of fatal and non-fatal cardiovascular events**

**BMJ** VOLUME 333 18 NOVEMBER 2006

## Potential weaknesses of current criteria for metabolic syndrome for predicting risk

- The current criteria have not yet been shown definitively to add to risk prediction for cardiovascular disease beyond current charts
- Arbitrary thresholds for risk factors and differing combinations of risk factors in the different definitions may lead to loss of important information about an individual's risk of cardiovascular disease
- The criteria fail to include important risk factors such as age, low density lipoprotein cholesterol, and smoking—a weakness if metabolic syndrome is used as the sole means of defining cardiovascular disease risk
- Prediction models that include additional risk factors (not just components of the metabolic syndrome) are a better means of identifying those at greatest risk

## Requirements of future research

- Identify the best prediction models for cardiovascular disease and diabetes in different population groups (by pooling data from large number of individual prospective data sets in different populations)
- Evaluate the long term effect on disease risk of using these prediction models in clinical practice
- Determine the long term effect of weight maintenance and reduction programmes on cardiovascular disease risk using appropriately resourced and powered prospective trials

# Dalla parte del paziente

# The Metabolic Syndrome

Since **cardiovascular** (heart and blood vessel) disease is the leading cause of death for adults in developed countries, many medical studies focus on treating or preventing heart disease and stroke. **The metabolic syndrome**, a collection of unhealthy body measurements and abnormal laboratory test results, may identify persons at high risk for developing cardiovascular disease. Aggressive lifestyle modification and possible use of medications to treat the conditions that make up the metabolic syndrome may reduce a person's chances of developing heart disease or stroke. The metabolic syndrome has also been called syndrome X or insulin resistance syndrome. The February 15, 2006, issue of *JAMA* includes an article about the metabolic syndrome.

## DEFINITION OF THE METABOLIC SYNDROME

- Abdominal (waist) circumference greater than 40 inches for men or 35 inches for women
- High blood pressure (hypertension)
- Hyperglycemia (fasting blood sugar more than 110 mg/dL)
- Elevated triglycerides (a type of fat in the bloodstream)
- Low levels of high-density lipoprotein, also known as HDL or "good cholesterol"

Having at least 3 of the above measurements means that an individual has metabolic syndrome and is at risk for developing type 2 diabetes, coronary heart disease, heart attack, or stroke.

## TREATING THE METABOLIC SYNDROME

Lifestyle modifications include weight loss, regular exercise, stopping smoking, and reducing dietary fat intake. Losing just 10% of excess body weight lowers blood pressure and improves insulin resistance. Some persons may be able to treat high blood pressure and hyperglycemia by altering their lifestyle alone. In many individuals, lifestyle modification is not adequate, and medications must be used to decrease blood pressure, lower triglycerides, and increase the level of HDL.

Because these problems are often linked, treating one aspect of the metabolic syndrome may help the other issues. For example, regular exercise can help you lose weight, reduce blood pressure, and manage hyperglycemia and insulin resistance. Combining healthful eating with a regular exercise program is the cornerstone of treating the metabolic syndrome and reducing risk for heart disease, stroke, diabetes, and other medical problems.

## PREVENTION

- Exercise regularly throughout your life.
- Encourage children to have daily physical activity and make healthful food choices.
- Eat a healthful, balanced diet low in saturated fats and high in nutrient-rich fruits and vegetables.
- Do not smoke.
- Recognize that you may have a genetic (inherited) predisposition for diabetes, heart disease, and the metabolic syndrome.
- Have regular medical check-ups and initiate early treatment for high blood pressure.

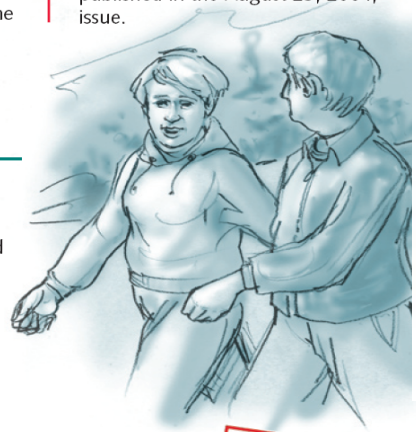
*Sources: National Heart, Lung, and Blood Institute; American Heart Association; National Cholesterol Education Program; American Diabetes Association*

## FOR MORE INFORMATION

- National Heart, Lung, and Blood Institute
  www.nhlbi.nih.gov
- American Heart Association
  www.americanheart.org
- American Diabetes Association
  www.diabetes.org

## INFORM YOURSELF

To find this and previous JAMA Patient Pages, go to the Patient Page link on *JAMA*'s Web site at www.jama.com. Many are available in English and Spanish. A Patient Page on coronary artery disease was published in the November 24, 2004, issue; and one on weight gain and diabetes was published in the August 25, 2004, issue.




Janet M. Torpy, MD, Writer
Cassio Lynm, MA, Illustrator
Richard M. Glass, MD, Editor





**JAMA Feb 2006**

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**JAMA Feb 2006**

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**JAMA Feb 2006**

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**JAMA Feb 2006**

# ...per chi Medico non è...

Internal and Emergency Medicine

## Perché "...per chi medico non è..."

La nascita di *Internal and Emergency Medicine* è il frutto di una lunga riflessione che ha portato anche a focalizzare l'importante ruolo educativo sul paziente che può svolgere la Società Italiana di Medicina Interna.

È così nato un inserto di quattro pagine in italiano dedicato al paziente. In ogni numero sarà trattato un argomento importante della patologia sul quale si vorrà richiamare l'attenzione del pubblico. Poiché l'inserto arriva ad oltre 2500 internisti membri della Società, l'idea è che esso sia messo a disposizione dei pazienti nelle sale di attesa degli ambulatori medici contribuendo alla diffusione delle conoscenze che il paziente ha su patologie di grande diffusione.

Cite this article as: BMJ, doi:10.1136/bmj.38833.411204.80 (published 23 May 2006)

Research

BMJ

# Randomised controlled trial of four commercial weight loss programmes in the UK: initial findings from the BBC "diet trials"

Helen Truby, Sue Baic, Anne deLooy, Kenneth R Fox, M Barbara E Livingstone, Catherine M Logan, Ian A Macdonald, Linda M Morgan, Moira A Taylor, D J Millward

## The BBC diet trials

*Reality television and academic researchers jointly tackle the weight loss industry*

### Recruitment strategy

We identified potential participants via a BBC advertising campaign (television and other forms of media). Participants

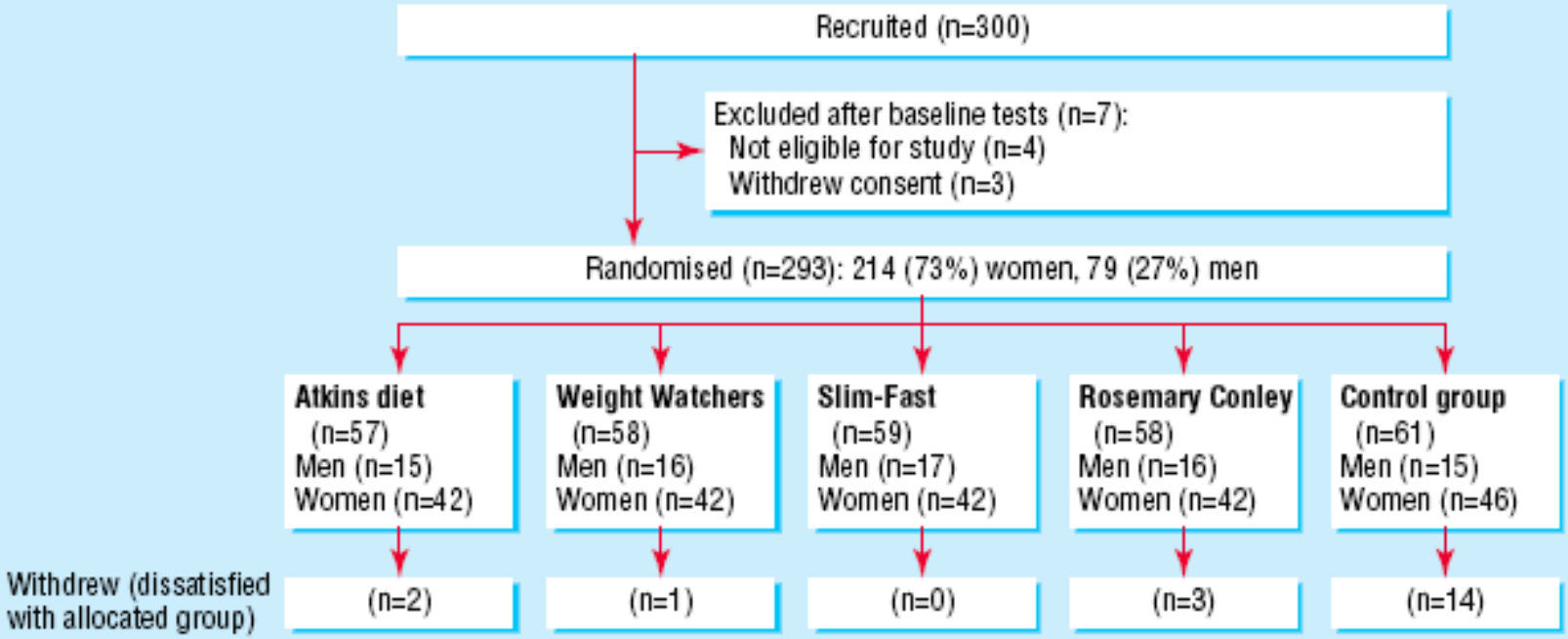
# Randomised controlled trial of four commercial weight loss programmes in the UK: initial findings from the BBC "diet trials"

Helen Truby, Sue Baic, Anne deLooy, Kenneth R Fox, M Barbara E Livingstone, Catherine M Logan, Ian A Macdonald, Linda M Morgan, Moira A Taylor, D J Millward

**Conclusions**

**Clinically useful weight loss and fat loss can be achieved in adults who are motivated to follow commercial diets for a substantial period**. Given the limited resources for weight management in the NHS, healthcare practitioners should discuss with their patients programmes known to be effective.

**BMJ, 23 May 2006**



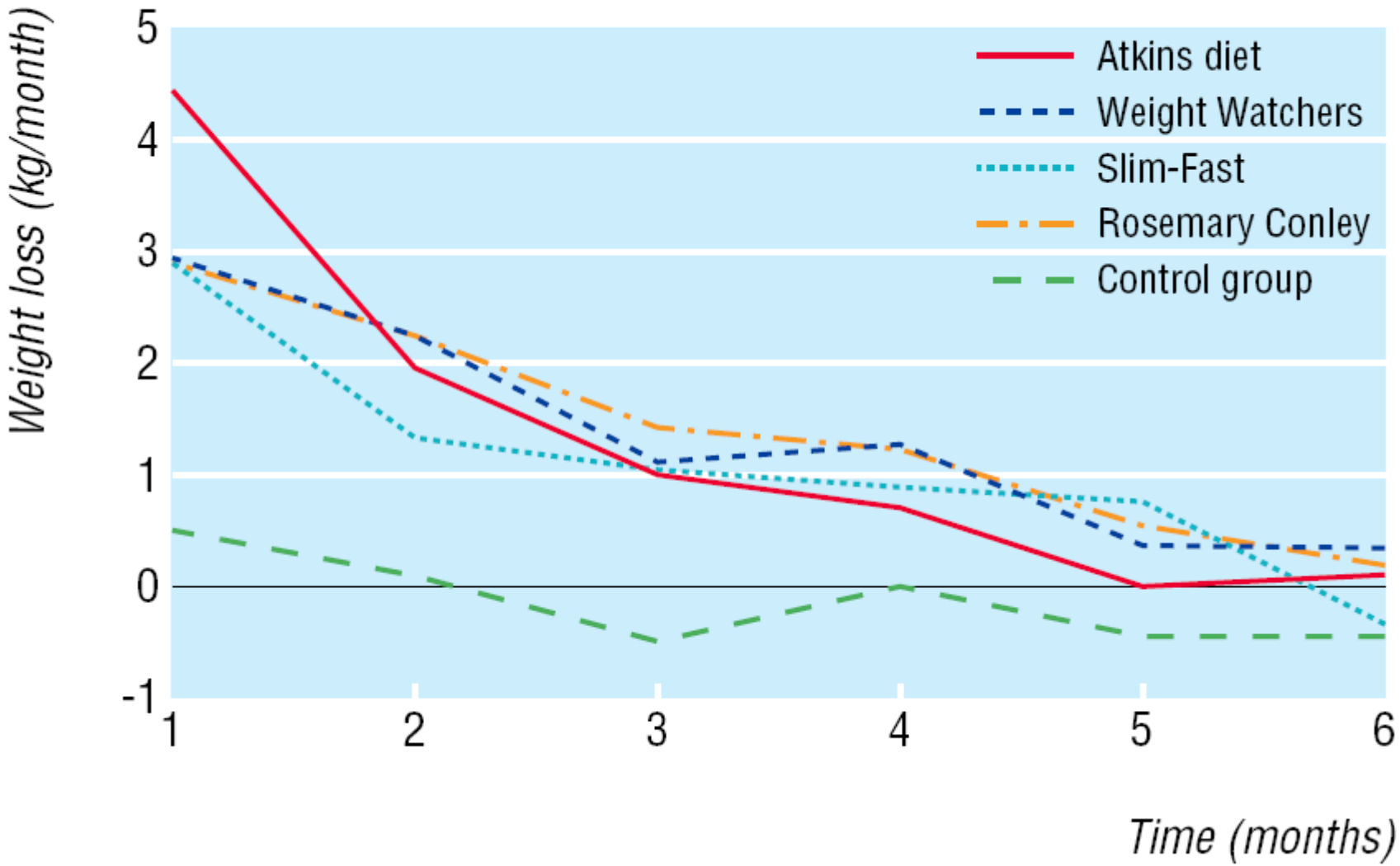

| Week | Atkins diet | Weight Watchers | Slim-Fast | Rosemary Conley | Control group |
|---|---|---|---|---|---|
| 4 | 50 | 56 | 54 | 52 | 46 |
| 8 | 46 | 52 | 49 | 46 | 41 |
| 12 | 42 | 48 | 46 | 43 | 38 |
| 16 | 38 | 49 | 42 | 40 | 37 |
| 20 | 24 | 35 | 30 | 30 | 28 |
| 24 | 40 | 47 | 42 | 41 | 40 |
| Included in analysis of participants who completed (n=210) | 40 (men 13, women 27) | 47 (men 14, women 33) | 42 (men 12, women 30) | 41 (men 10, women 31) | 40 (men 10, women 30) |
| Included in intention to treat | 57 | 58 | 58* | 58 | 61 |

Follow-up measures

*1 excluded because of pregnancy

**BMJ, 23 May 2006**

# Weight loss during the BBC diet trials

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## Editorials

The BBC could also greatly serve the public by presenting data on efficacy, safety, and cost in their health related programming—thereby imposing some reality on "reality television."

David Arterburn *assistant investigator*