Relationship between **Obesity** & **CVD**

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FUNDATIA CARDIO PREVENT

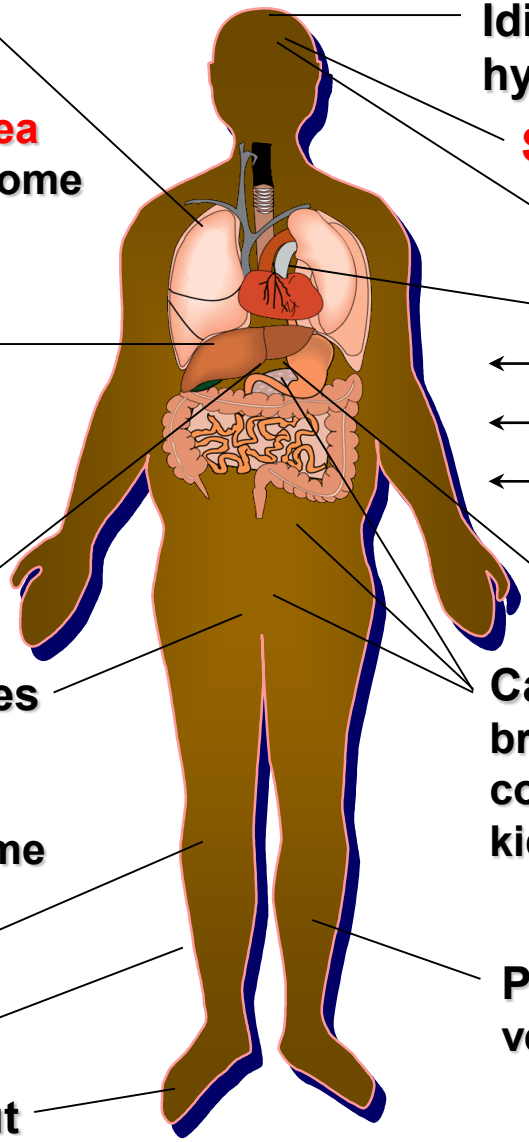
forumul național de PREVENȚIE

Disclosure

Amgen, AstraZeneca, Berlin-Chemie, Boehringer Ingelheim, Galenica, GSK, MSD, Mylan, Novartis, Pfizer, Sanofi, Servier

"The only way to keep healthy is to eat what you don't want, drink what you don't like and to do what you would rather not do"
Mark Twain

Medical Complications of Obesity



Pulmonary disease
abnormal function
obstructive sleep apnea
hypoventilation syndrome

Idiopathic intracranial hypertension

Stroke

Cataracts

Nonalcoholic fatty liver disease
steatosis
steatohepatitis
cirrhosis

Coronary heart disease

Diabetes

Dyslipidemia

Hypertension

Gall bladder disease

Severe pancreatitis

Gynecologic abnormalities
abnormal menses
infertility
polycystic ovarian syndrome

Cancer
breast, uterus, cervix
colon, esophagus, pancreas
kidney, prostate

Osteoarthritis

Skin

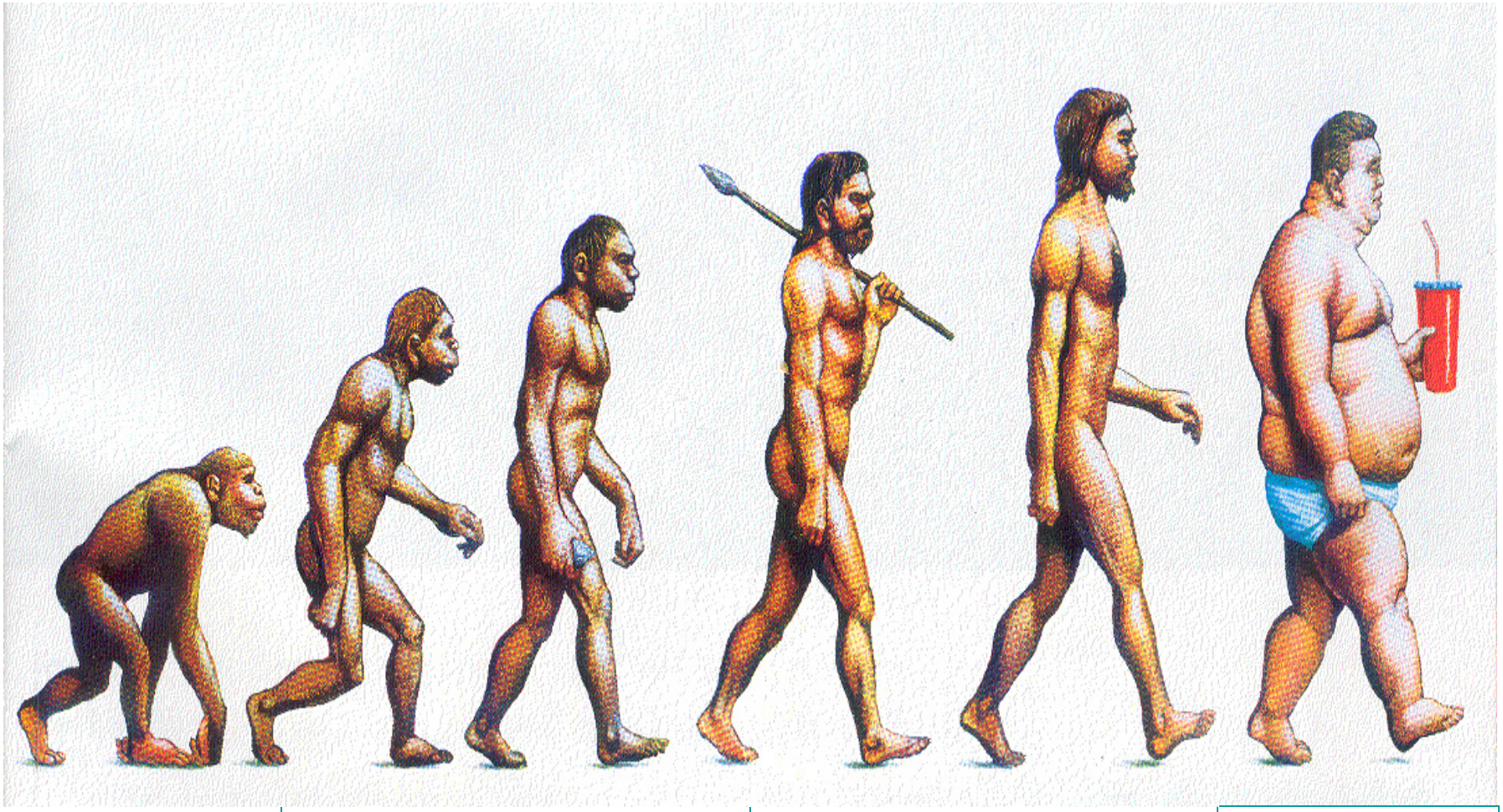
Gout

Phlebitis
venous stasis

WHO key factors

- Worldwide obesity has nearly doubled since 1990.
- 65% of the world's population live in countries where obesity kills more people than underweight.
- More than 40 million children under the age of 5 are overweight or obese.
- Obesity is preventable!!!

200!



2 500 000 ani

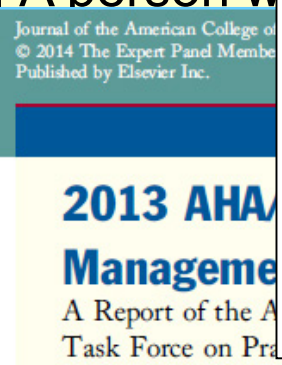
50 ani

World Health Organization

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a **risk to health.**

A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in m)

A person w



Merriam-Webster

Definition of *OBESITY*
a condition characterized by the excessive accumulation and storage of fat in the body

An Encyclopædia Britannica Company

Obesity raises the risk of morbidity from hypertension, dyslipidemia, type 2 diabetes mellitus (diabetes), coronary heart disease (CHD), stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, and some cancers. Obesity is also associated with increased risk of all-cause and CVD mortality.

Increased Body Fat (Adiposity)

Body Mass Index

Obesity is defined as BMI > 30 kg/m^2*

***Different BMI cut-off points may be more appropriate for women versus men, those of different races, and individuals**

Increased Body Fat (Adiposity)

Percent Body Fat

Gender, age & race differences

Increased Body Fat (Adiposity)

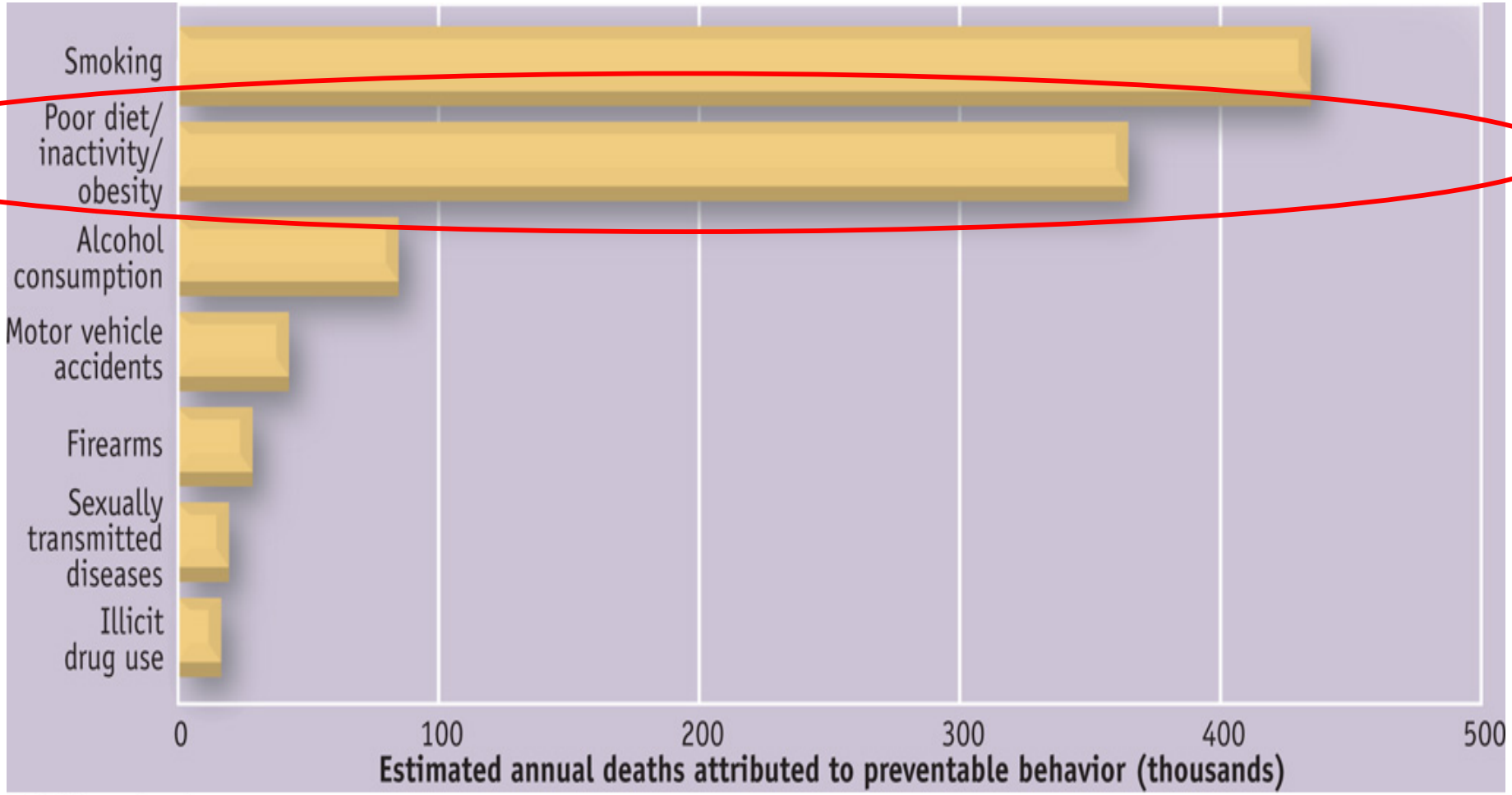
Waist Circumference*

Men > 102 cm (40 inches)

Women > 88 cm (35 inches)

***Different WC abdominal obesity cut-off points are appropriate for different races (i.e., > 90 centimeters for Asian men and > 80 centimeters for Asian women)**

Mortality due to health-impairing behaviors

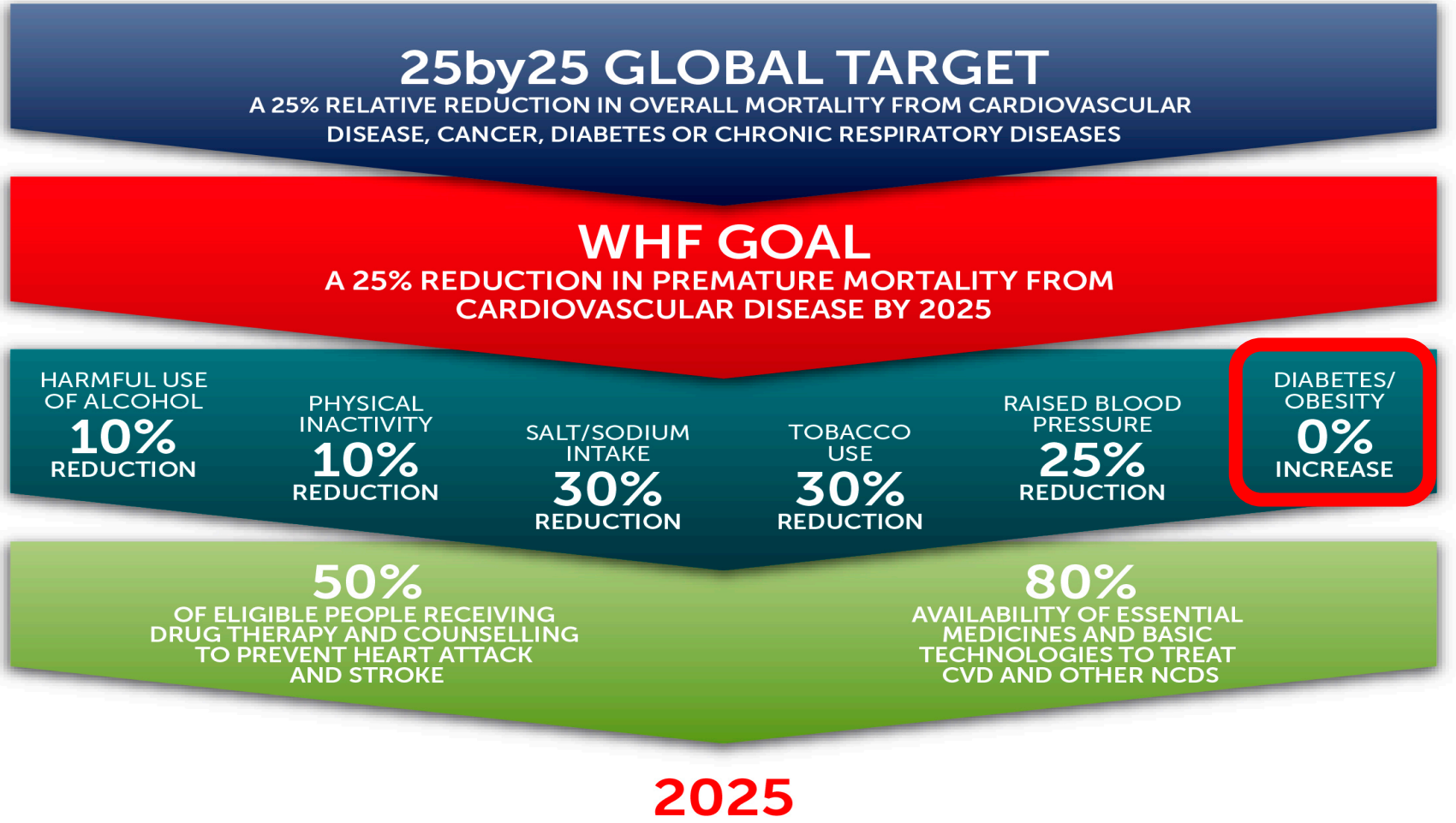


Mokdad et al, 2004

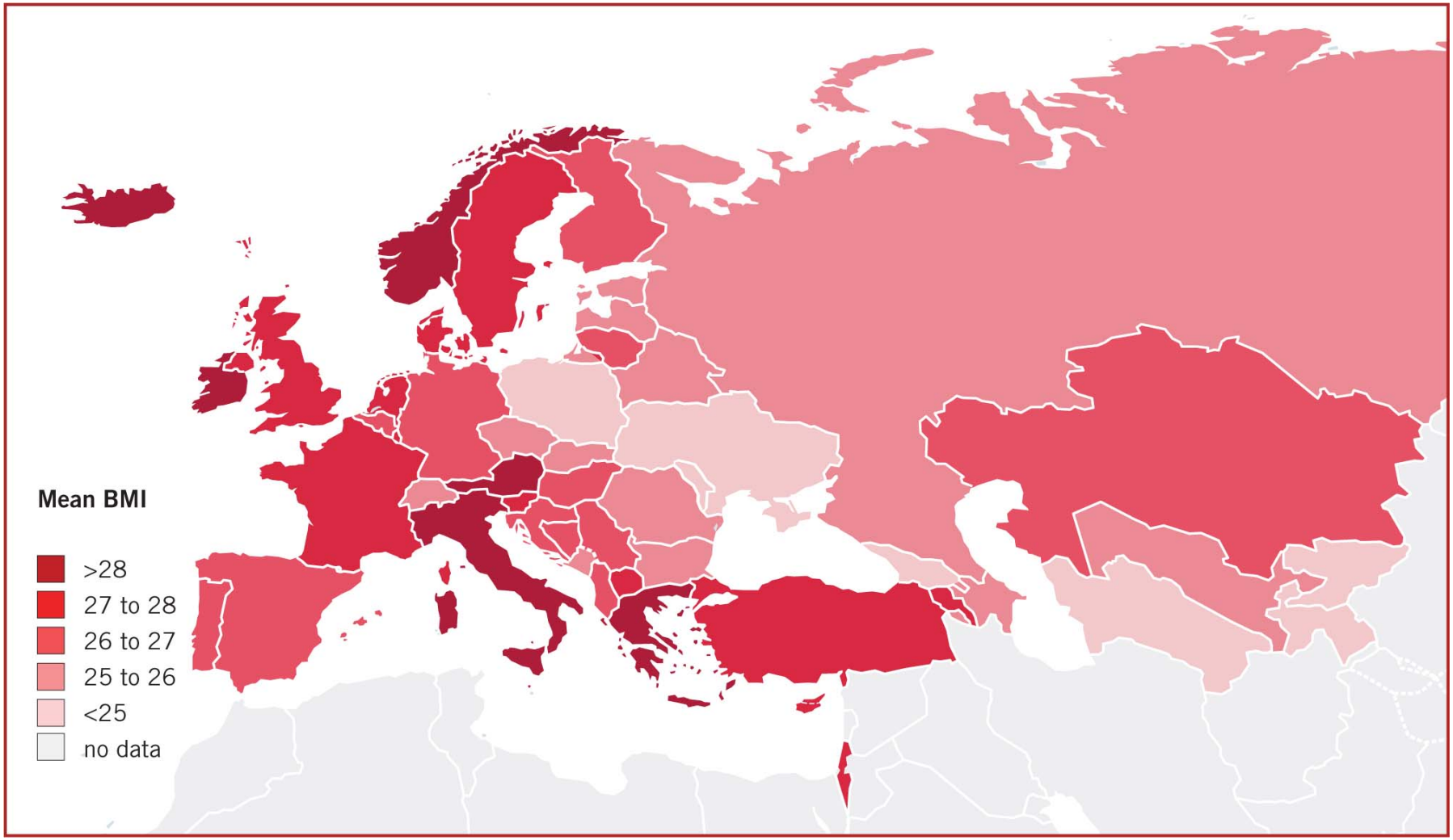
Topics

- Fat = Bad?
- Procustes Bed (too bad!)
- Theory vs Practice?
- Conclusions

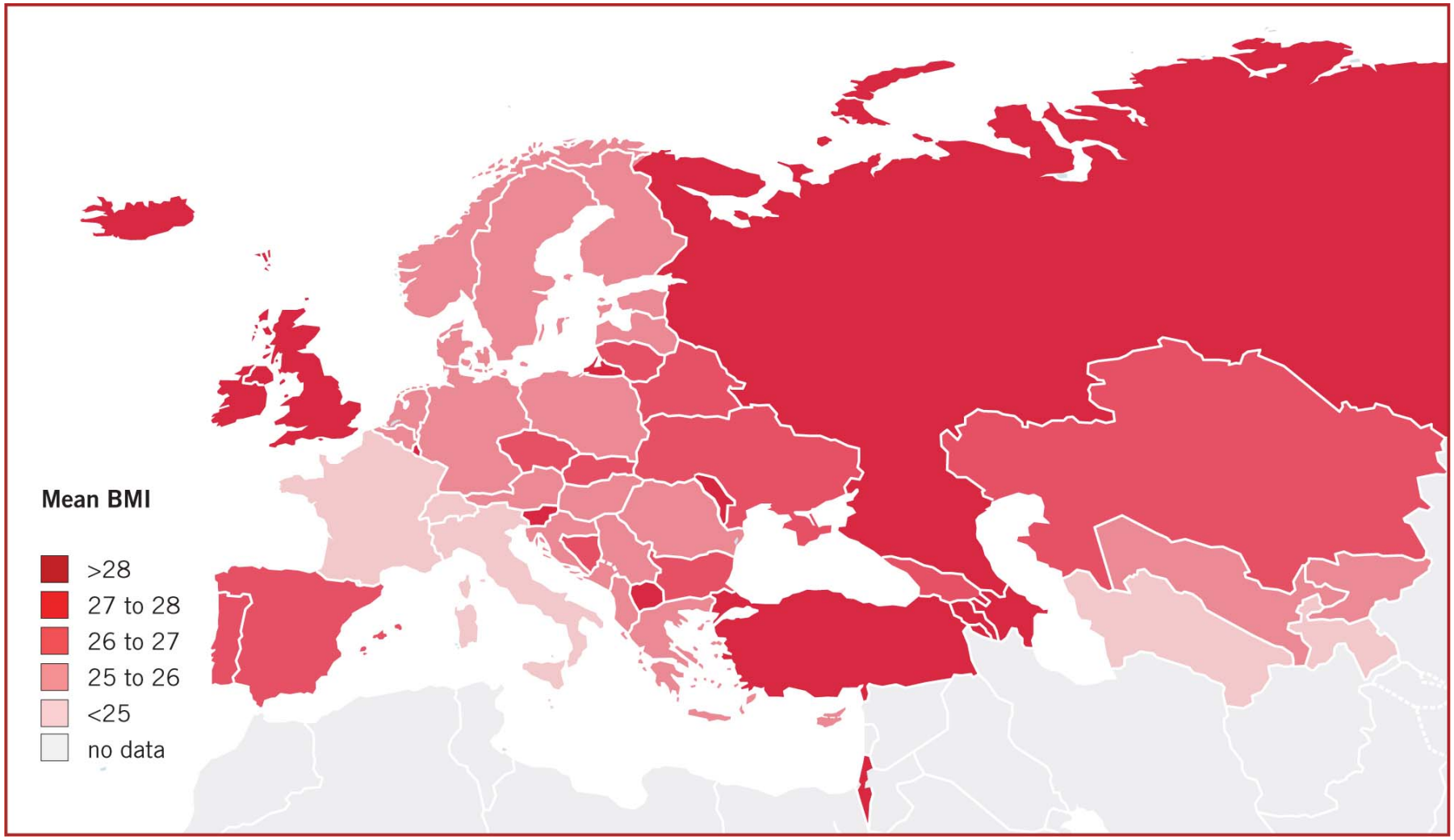
WHO Targets and WHF Goal



Mean BMI - men



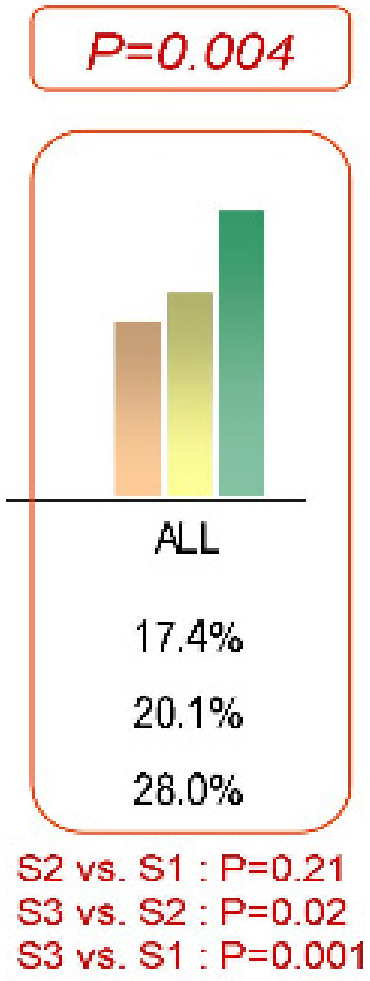
Mean BMI - women

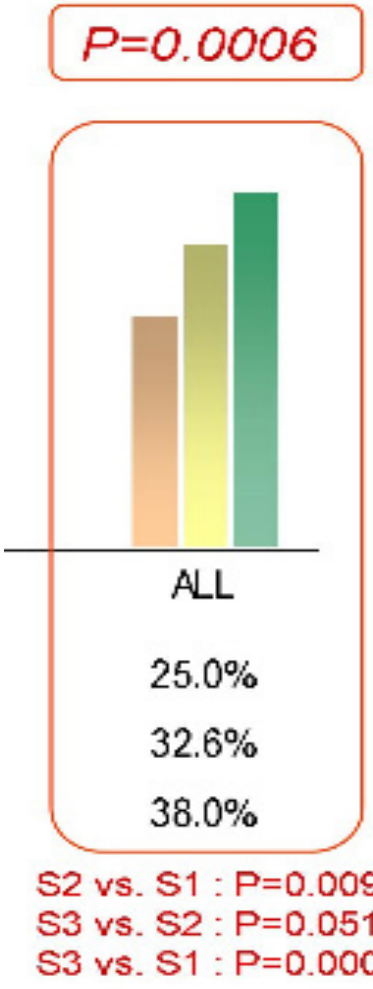


1995 -2006…

EuroASPIRE

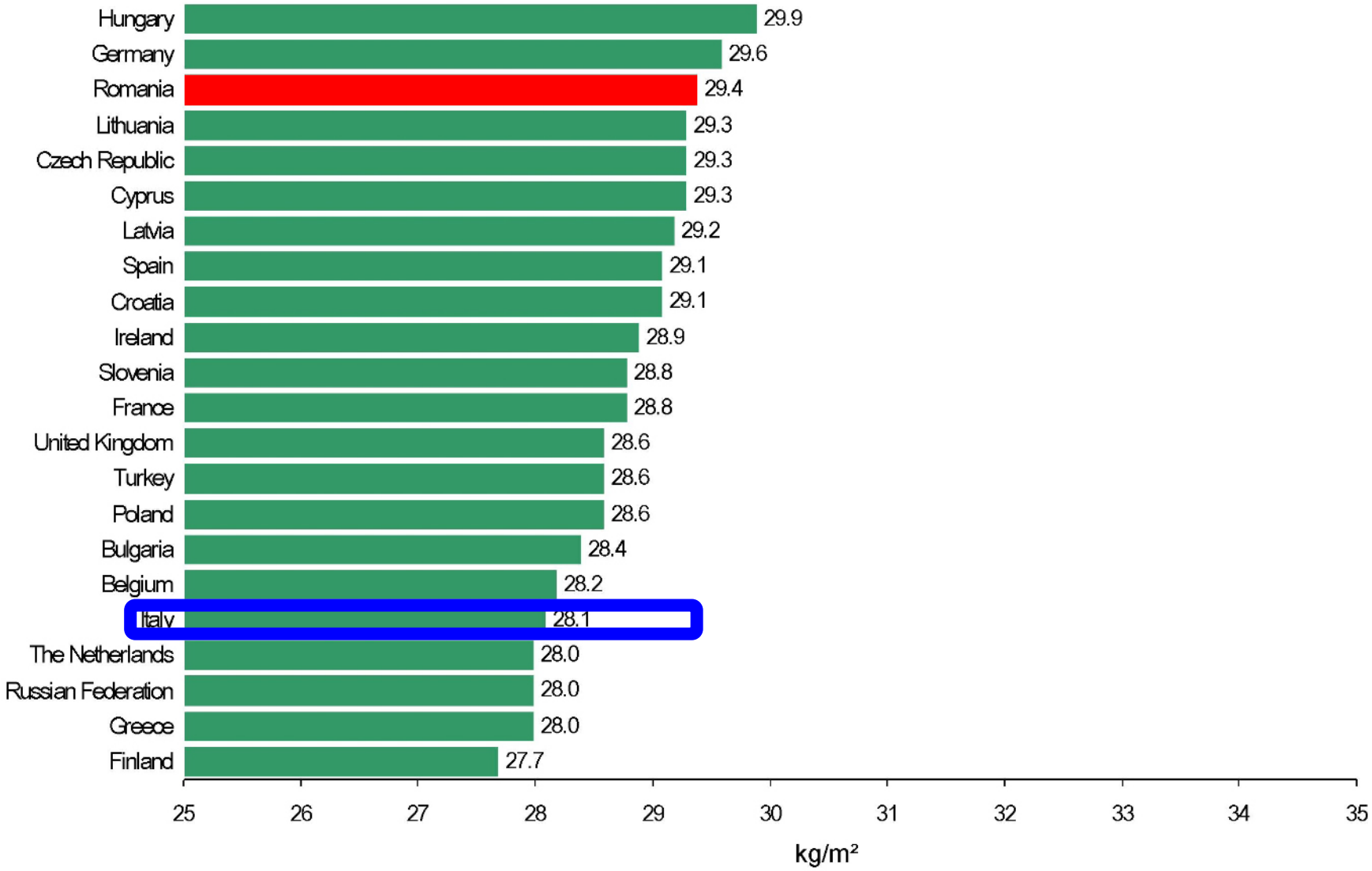
Diabetes





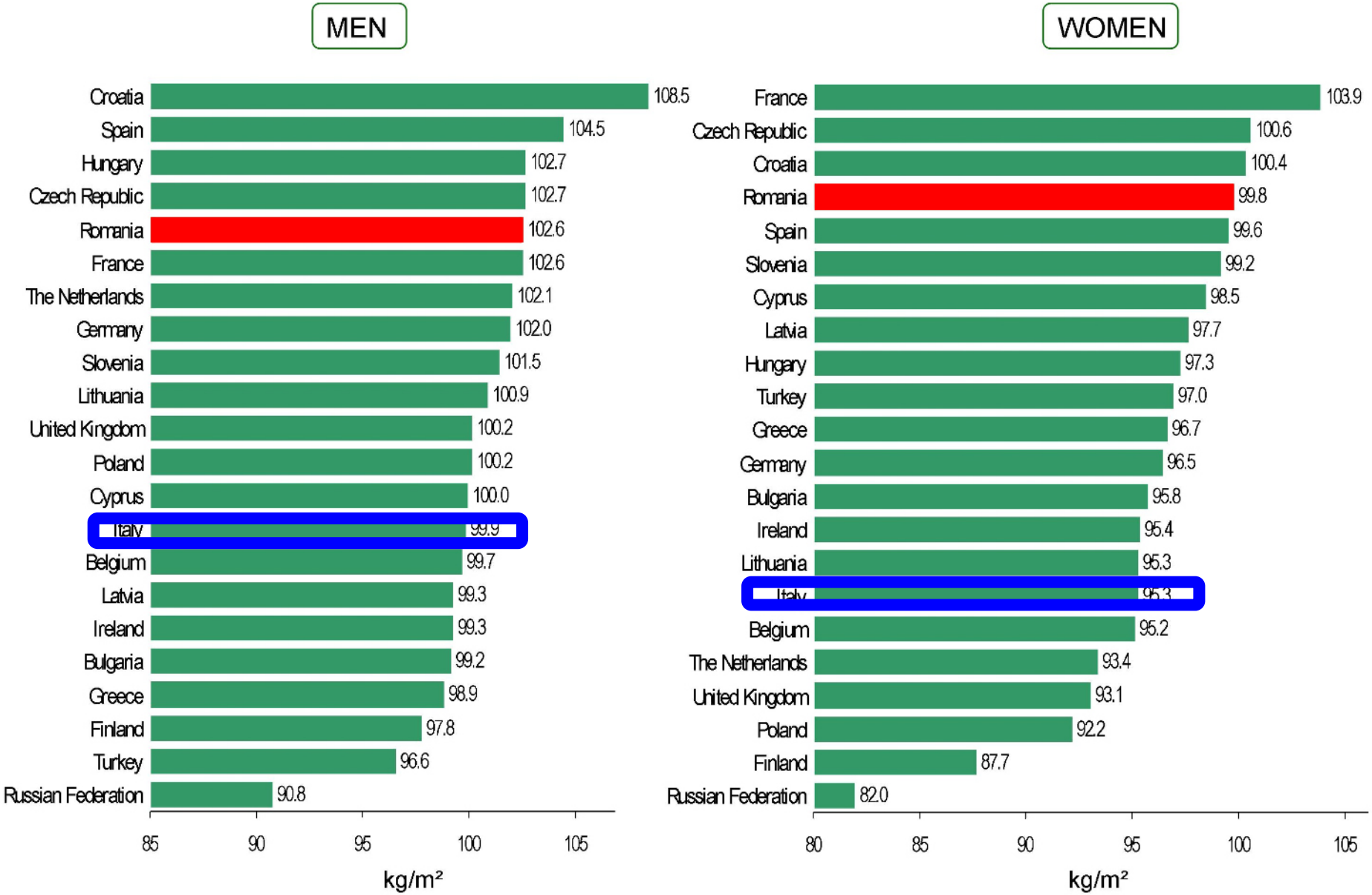
Obesity

Mean body mass index



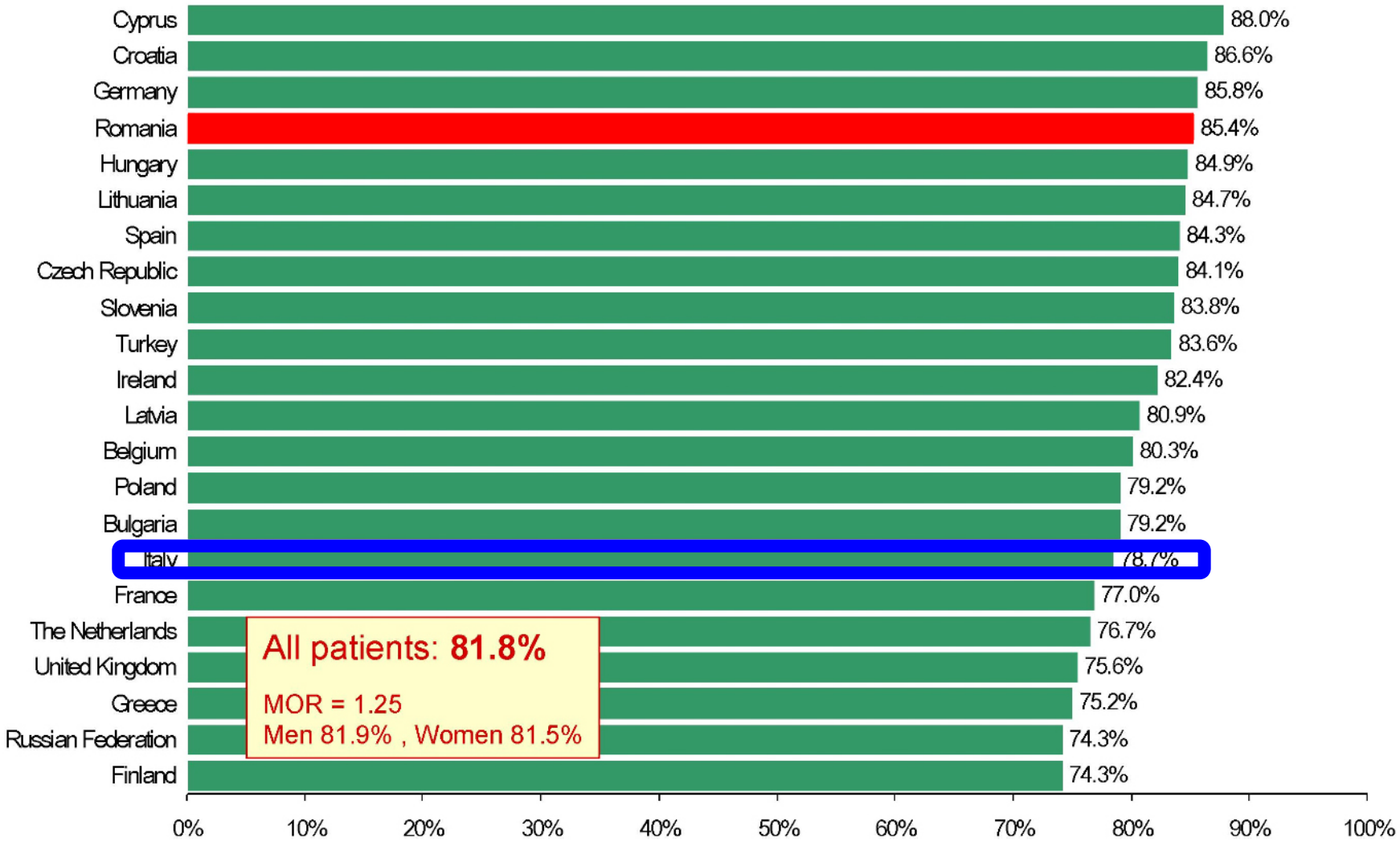
Mean waist circumference

Interview



Prevalence of overweight*

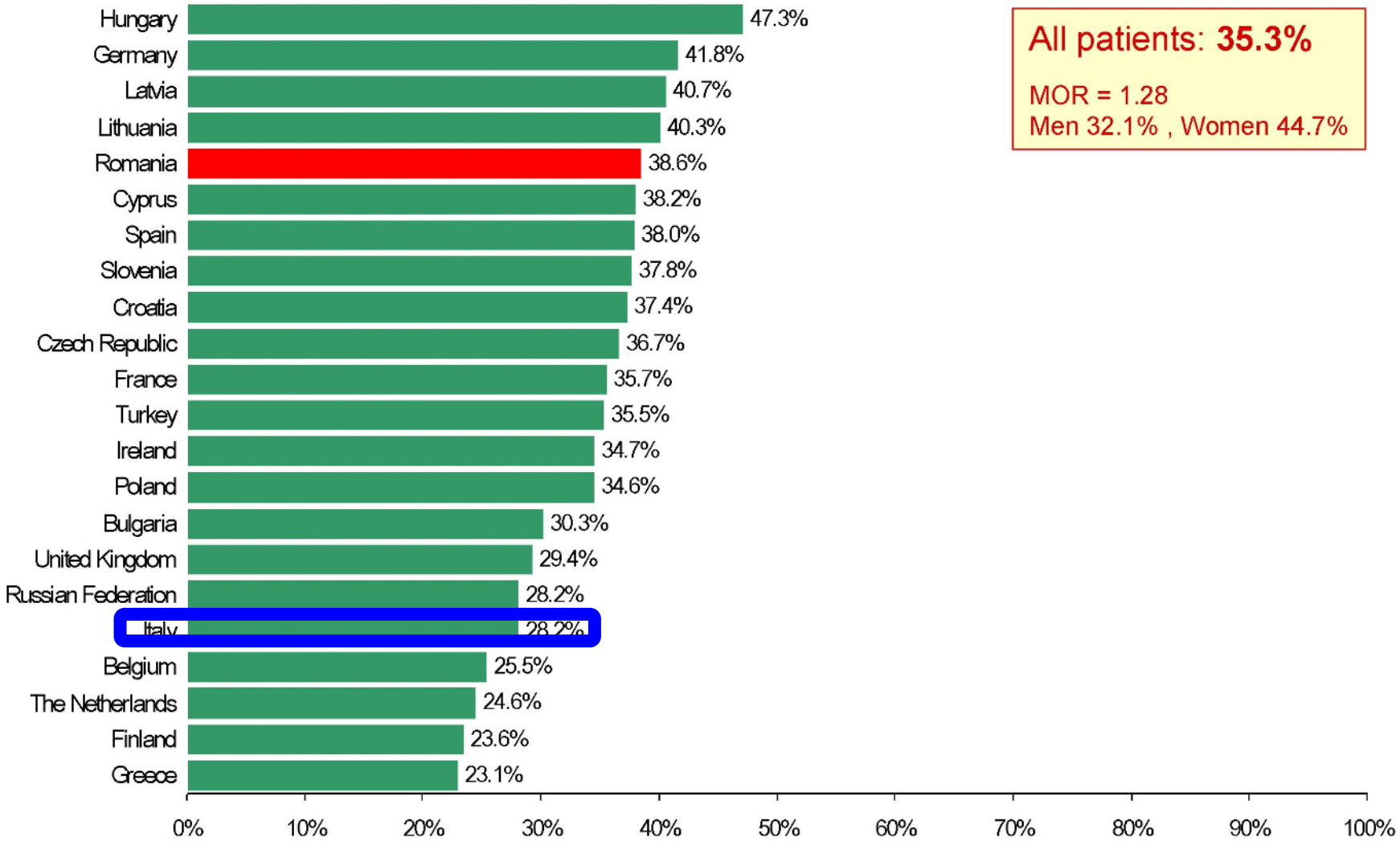
Interview



* Body mass index ≥ 25 kg/m²

Prevalence of obesity*

Interview

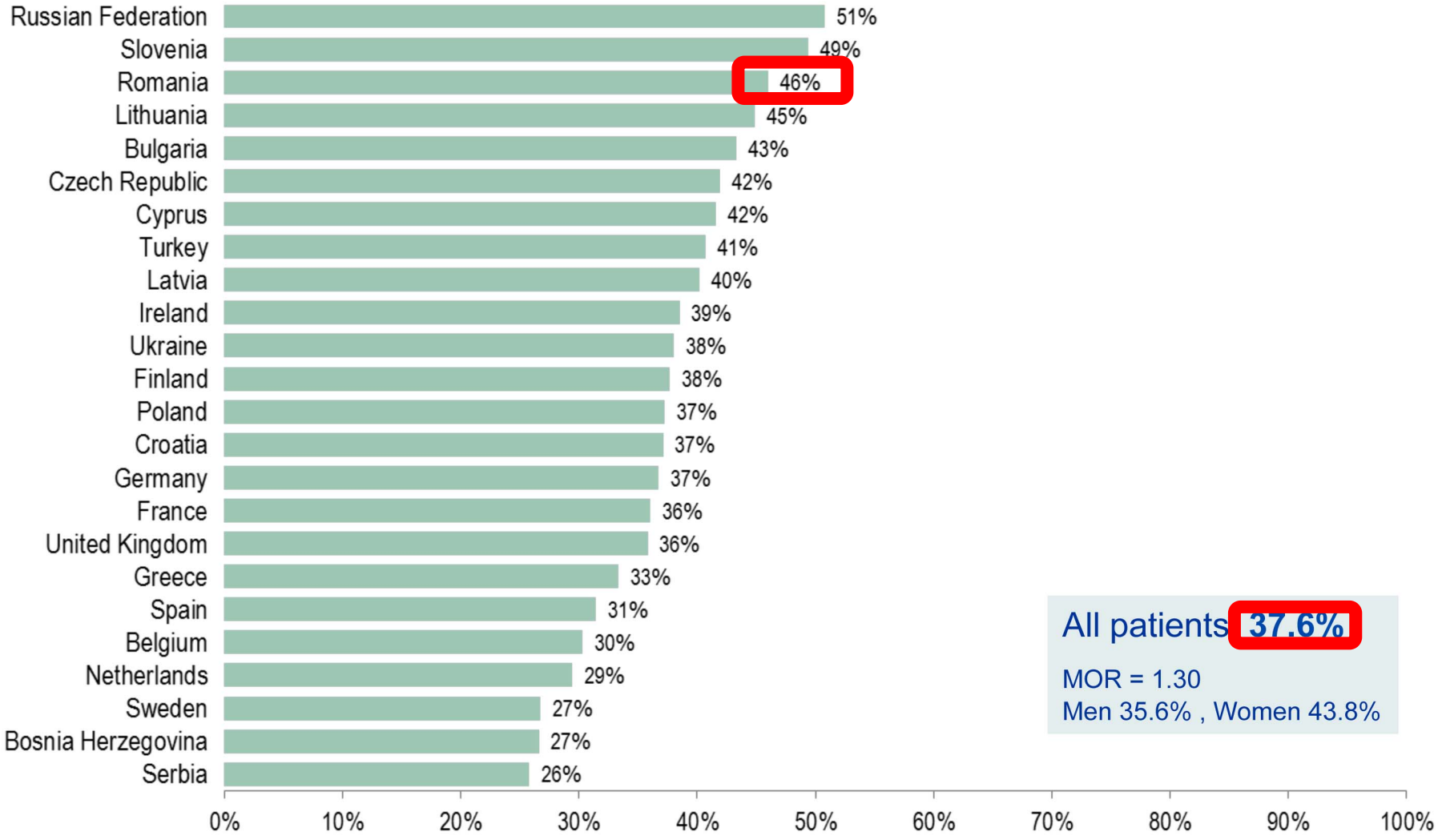


All patients: **35.3%**

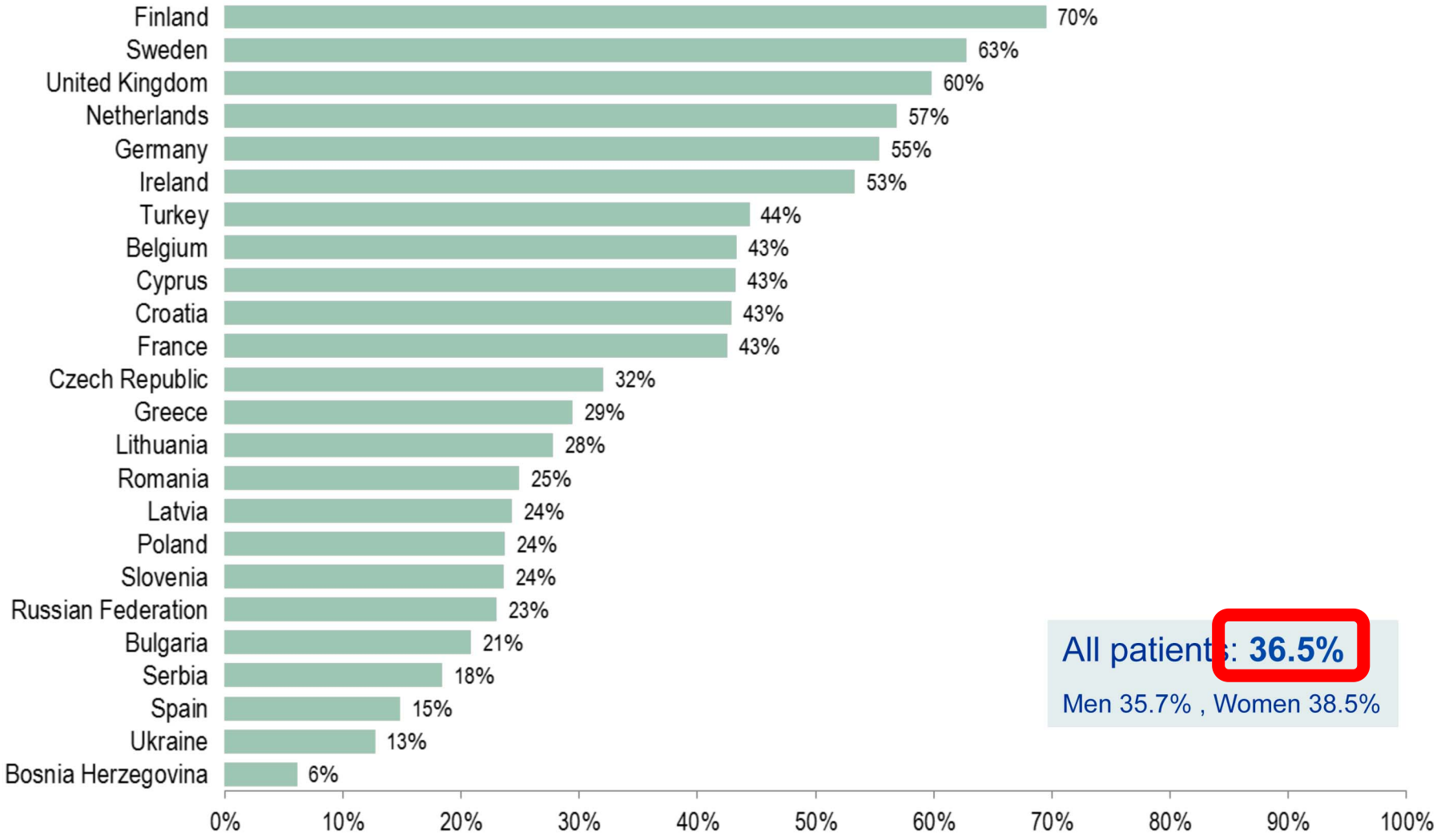
MOR = 1.28
Men 32.1% , Women 44.7%

* Body mass index ≥ 30 kg/m²

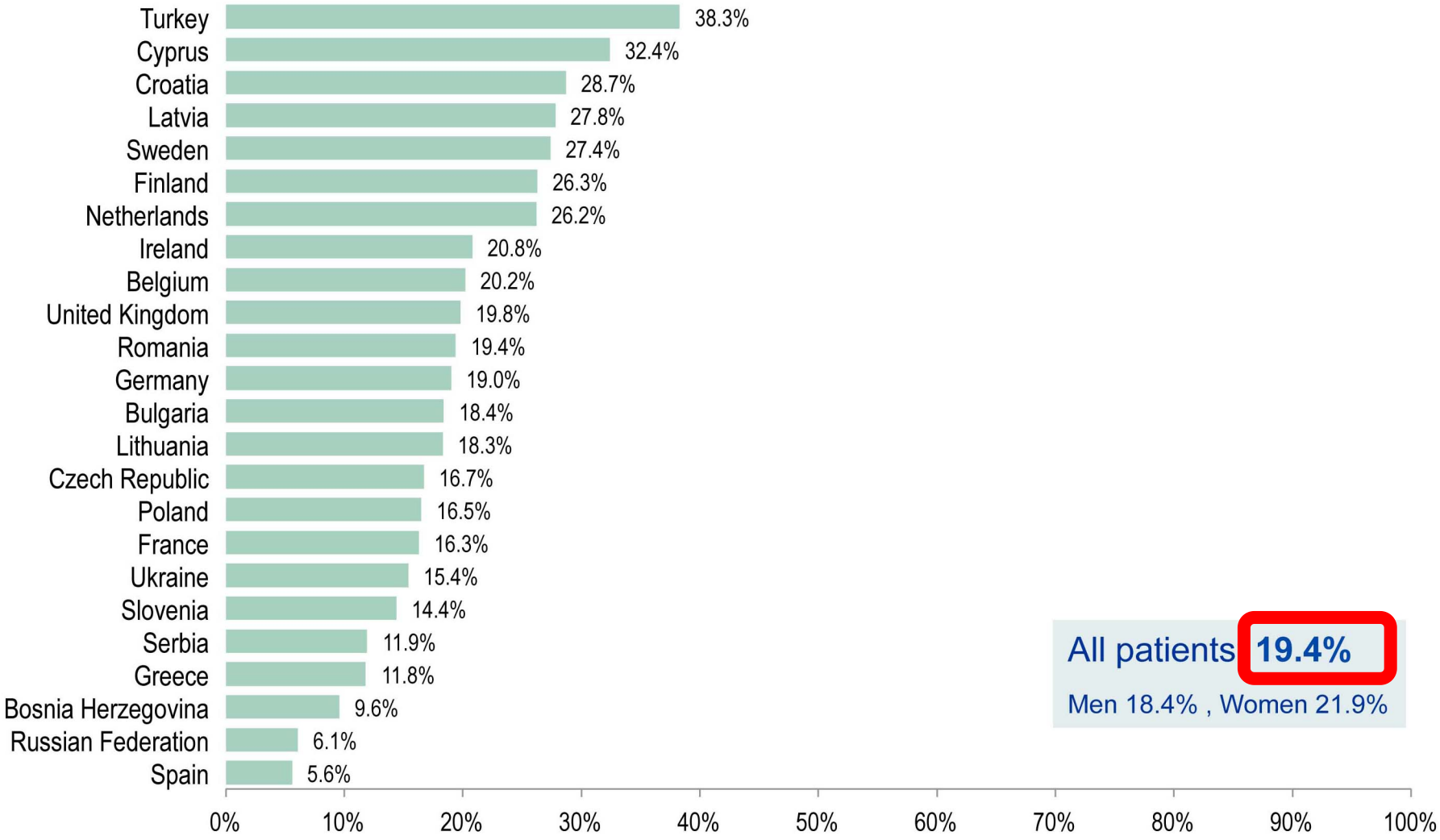
Prevalence of obesity EA IV



Obese patients: not told that diet is unhealthy



Obese patients: never been told to be… overweight



Obesity & CV Risk

Risk factor	Change	Change in CHD risk, %
Obesity, men	+ 1%	+ 3.6
	+ 1 BMI unit	+ 15.8
	+ 1 kg	+ 5.4
Obesity, women	+ 1%	+ 3.3
	+ 1 BMI unit	+ 14.3
	+ 1 kg	+ 5.2

11 Studies , > 30,000 W, > 13,000 M

After adjusted for other risk factors, such as hypertension, dyslipidemia, diabetes, or smoking

Anderson JW et al. Obes Res 2001;9:326S-334S

Weight gain? Looks the same…

Risk factor	Change	Change in CHD risk, %
Weight gain, men	+ 1%	+ 2.1
	+ 1 BMI unit	+ 9.1
	+ 1 kg	+ 3.1
Weight gain, women	+ 1%	+ 2.9
	+ 1 BMI unit	+ 15.6
	+ 1 kg	+ 5.7

11 Studies , > 30,000 W, > 13,000 M

After adjusted for other risk factors, such as hypertension, dyslipidemia, diabetes, or smoking

Anderson JW et al. Obes Res 2001;9:326S-334S

Topics

- Fat = Bad?
- Procustes Bed (too bad!)
- Theory vs Practice?
- Conclusions

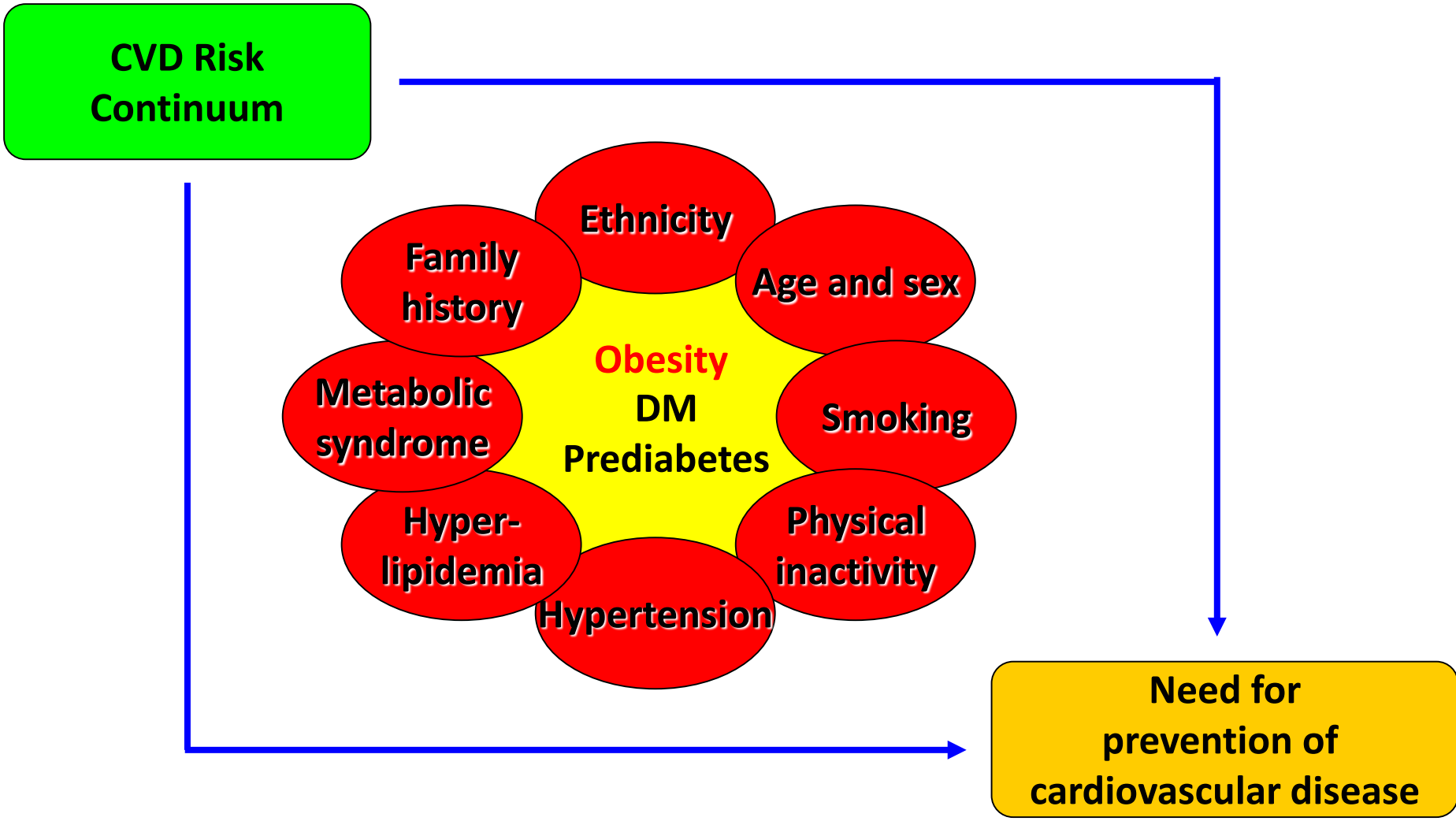
BMI - mortality interaction **in healthy individuals**

Lancet 2012; 380: 2224–60

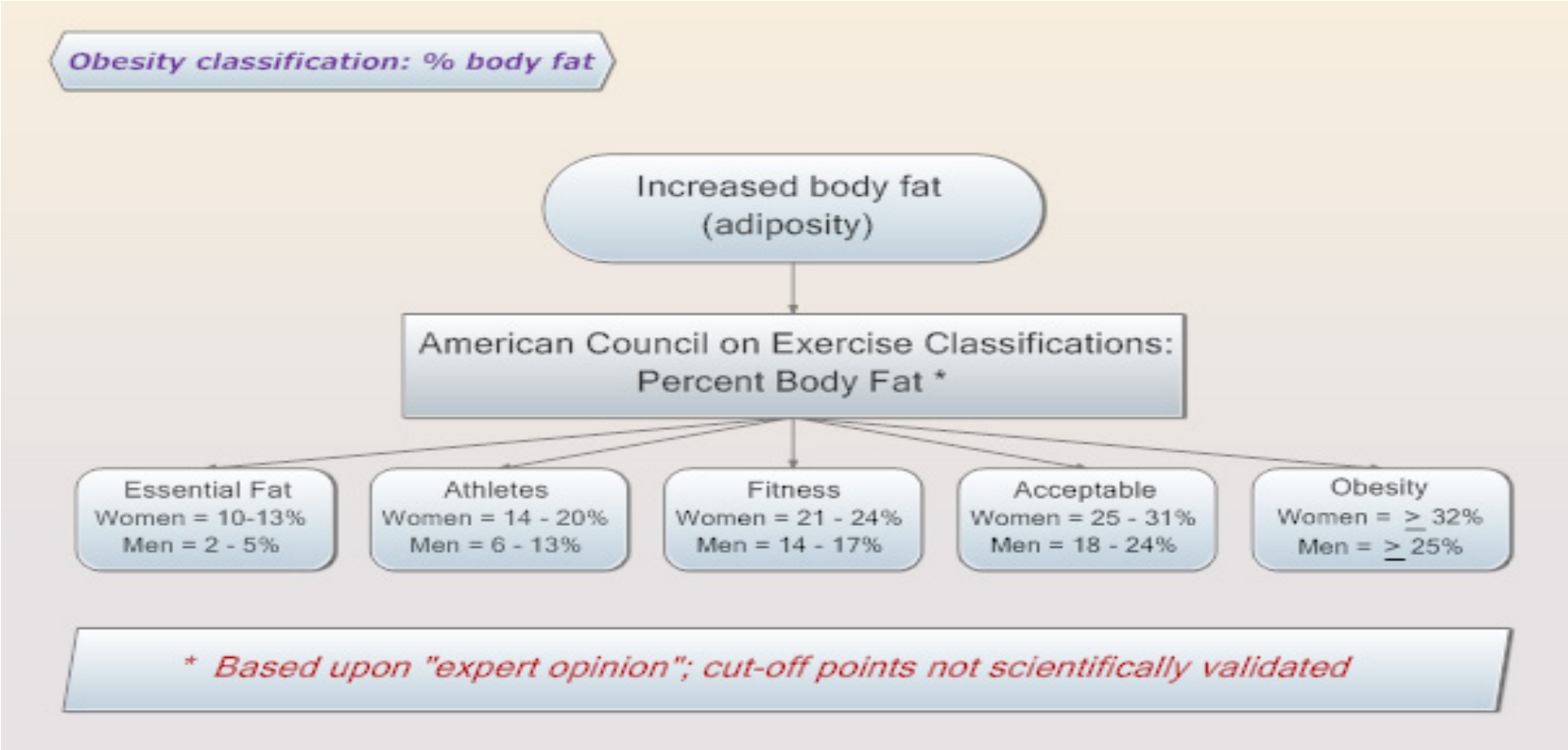
A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010

1990		2010		
Mean rank (95% UI)	Risk factor	Risk factor	Mean rank (95% UI)	% change (95% UI)
1·1 (1–2)	1 Childhood underweight	1 High blood pressure	1·1 (1–2)	27% (19 to 34)
2·1 (1–4)	2 Household air pollution	2 Smoking (excluding SHS)	1·9 (1–2)	3% (–5 to 11)
2·9 (2–4)	3 Smoking (excluding SHS)	3 Alcohol use	3·0 (2–4)	28% (17 to 39)
4·0 (3–5)	4 High blood pressure	4 Household air pollution	4·7 (3–7)	–37% (–44 to –29)
5·4 (3–8)	5 Suboptimal breastfeeding	5 Low fruit	5·0 (4–8)	29% (25 to 34)
5·6 (5–6)	6 Alcohol use	**6 High BMI**	6·1 (4–8)	82% (71 to 95)
7·4 (6–8)	7 Ambient PM pollution	7 High fasting plasma glucose	6·6 (5–8)	58% (43 to 73)
7·4 (6–8)	8 Low fruit	8 Childhood underweight	8·5 (6–11)	–61% (–66 to –55)
9·7 (9–12)	9 High fasting plasma glucose	9 Ambient PM pollution	8·9 (7–11)	–7% (–13 to –1)
10·9 (9–14)	**10 High BMI**	10 Physical inactivity	9·9 (8–12)	0% (0 to 0)

Figure 3: Global risk factor ranks with 95% UI for all ages and sexes combined in 1990, and 2010, and percentage change


CVD Risk Continuum
Ethnicity
Family history
Age and sex
Obesity
DM
Prediabetes
Metabolic syndrome
Smoking
Hyper-lipidemia
Physical inactivity
Hypertension
Need for prevention of cardiovascular disease

Increased Body Fat (Adiposity)



American Society of Bariatric Physicians (2015)

The "Best" Measure of Ob

Population Assessment

- BMI, WC and %BF similarly co ce of MS

Individual Assess

- BMI is a reas g measurement
- WC prov nation regarding adipose tissue funct predisposition to MS
- in patients with extremes in muscle mass (a more re of body composition when assessing the efficacy of s directed towards change in muscle mass)

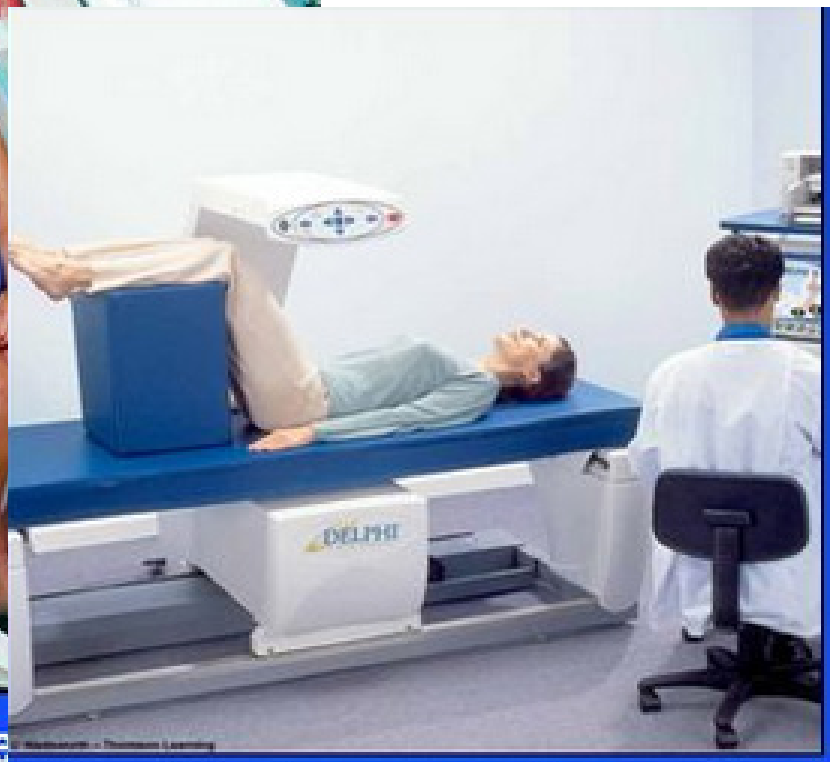
Metabolic Syndrome?

Metods Used to Assess Body Fat

Hy

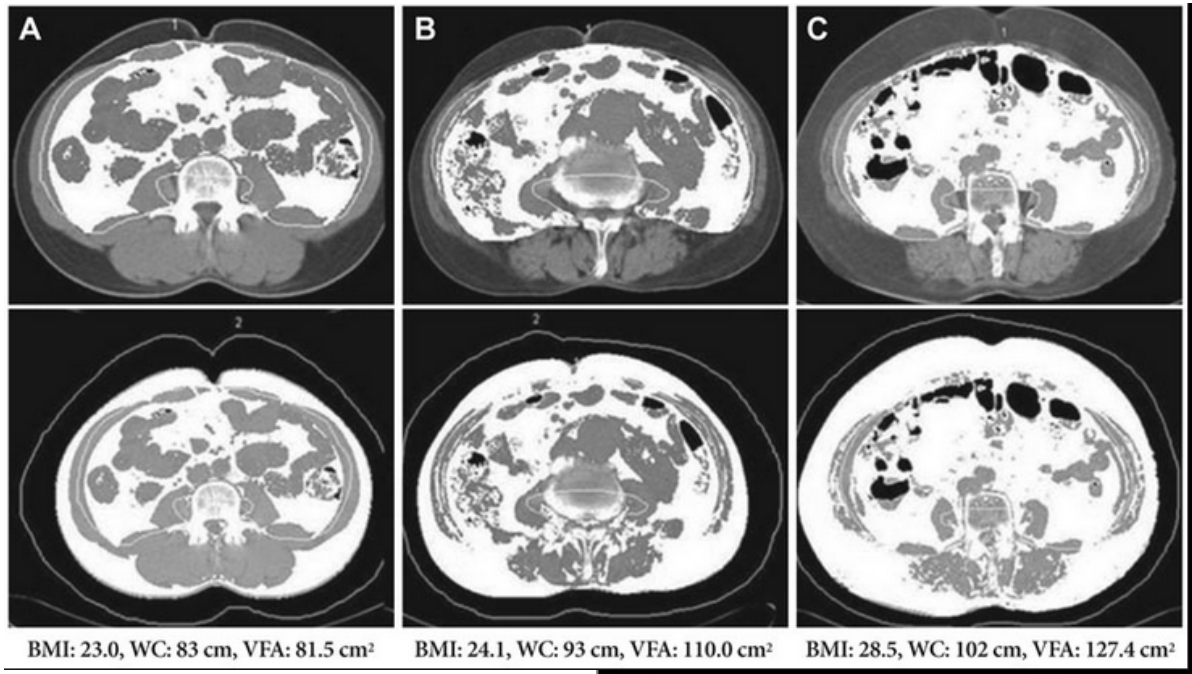
Bioelectric

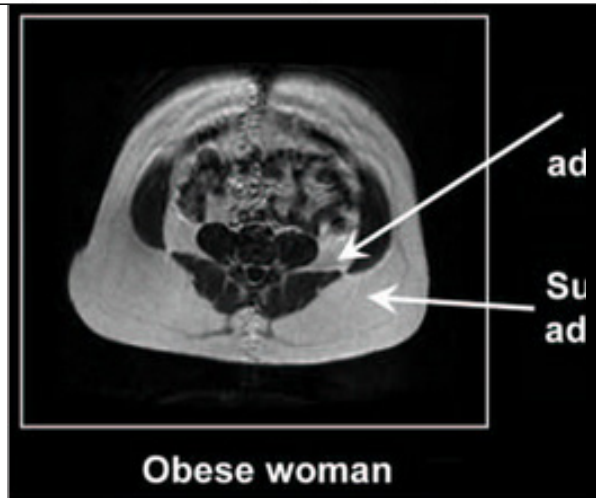
Air displace
plethysmog

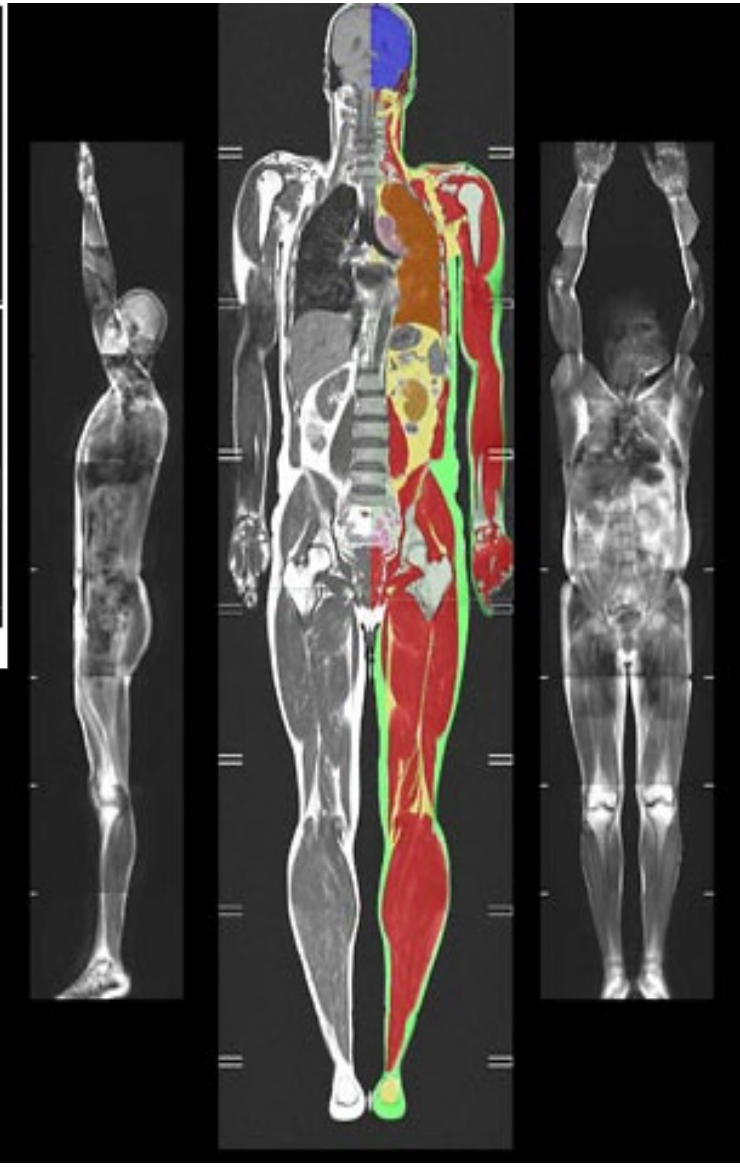


Dual energy X-ray
absorptiometry (DEXA)

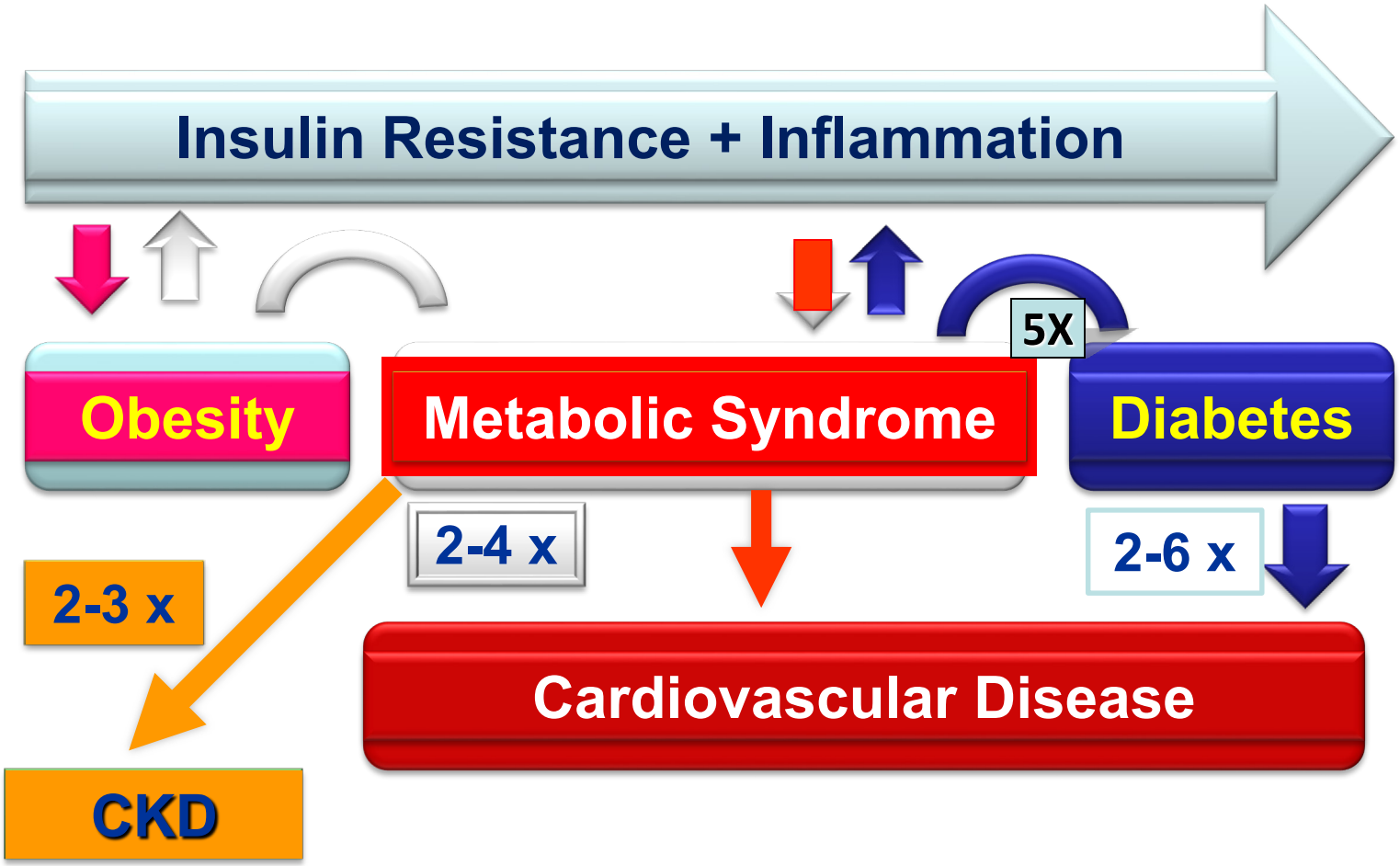
MRI & CT


A
B
C
BMI: 23.0, WC: 83 cm, VFA: 81.5 cm²
BMI: 24.1, WC: 93 cm, VFA: 110.0 cm²
BMI: 28.5, WC: 102 cm, VFA: 127.4 cm²


ad
Su
ad
Obese woman



Cardio-metabolic risk

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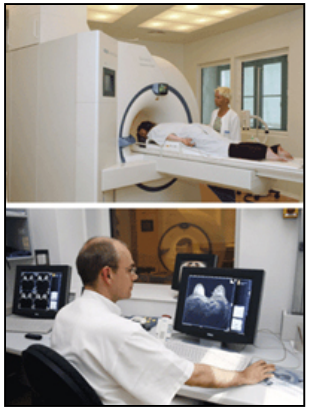
Topics

- Fat = Bad?
- Procustes Bed (too bad!)
- Theory vs Practice?
- Conclusions

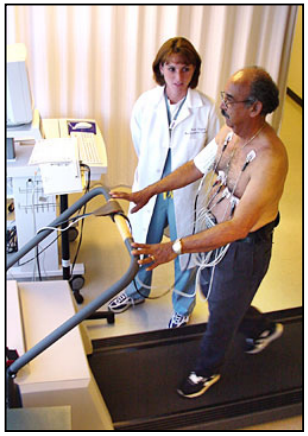
Assessment of CV Risk

Classic and Emerging Methods



- ID of (vulnerable) plaques
- MR/MSCRT

- Case history
- Length/weight
- Waist circumf
- Blood pressure



- ECG
- Stress test
- Echocardiogram

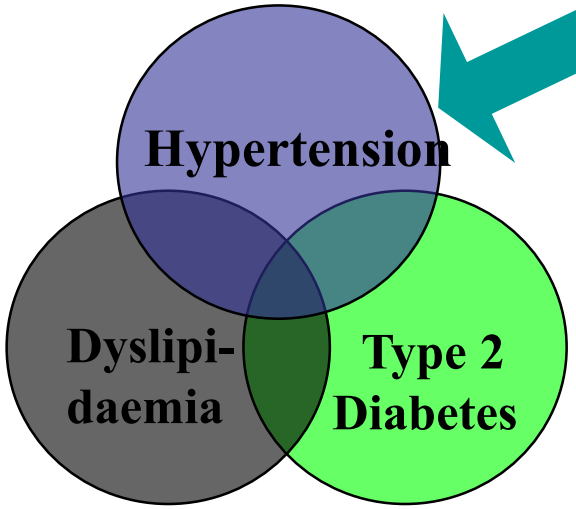
Lab examinations

- Lipids
- Glucose

Most patients have overlapping CV Risk Factors

Of all patients with dyslipidaemia:
48% have hypertension
14% have type 2 diabetes
35% are Overweight/obese

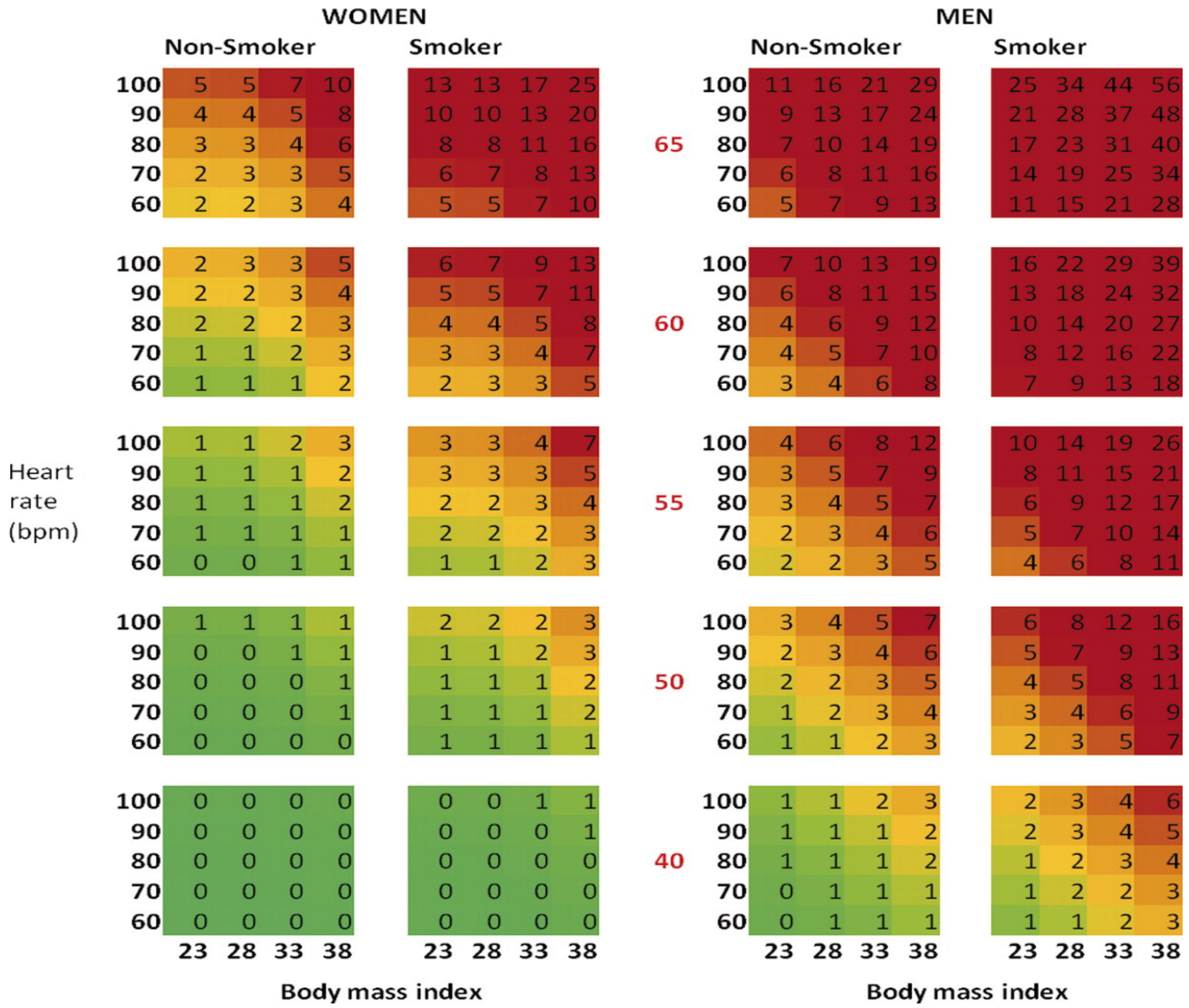
Hypertension was found in:
82% of those with CKD
77% of those with DM
74% in those with PAD
73% of those with CHD
71% in those with CHF
62% in those with MetS
70% in those with stroke
52% in those with dyslipidaemia



Of all type 2 diabetes:
60% have hypertension
60% have hyperlipidemia
90% are overweight/ obese

Wong ND et al. Arch Intern Med 2007;167:2394

BMI and resting heart rate



Cooney M T et al. Eur Heart J 2010;eurheartj.ehq164

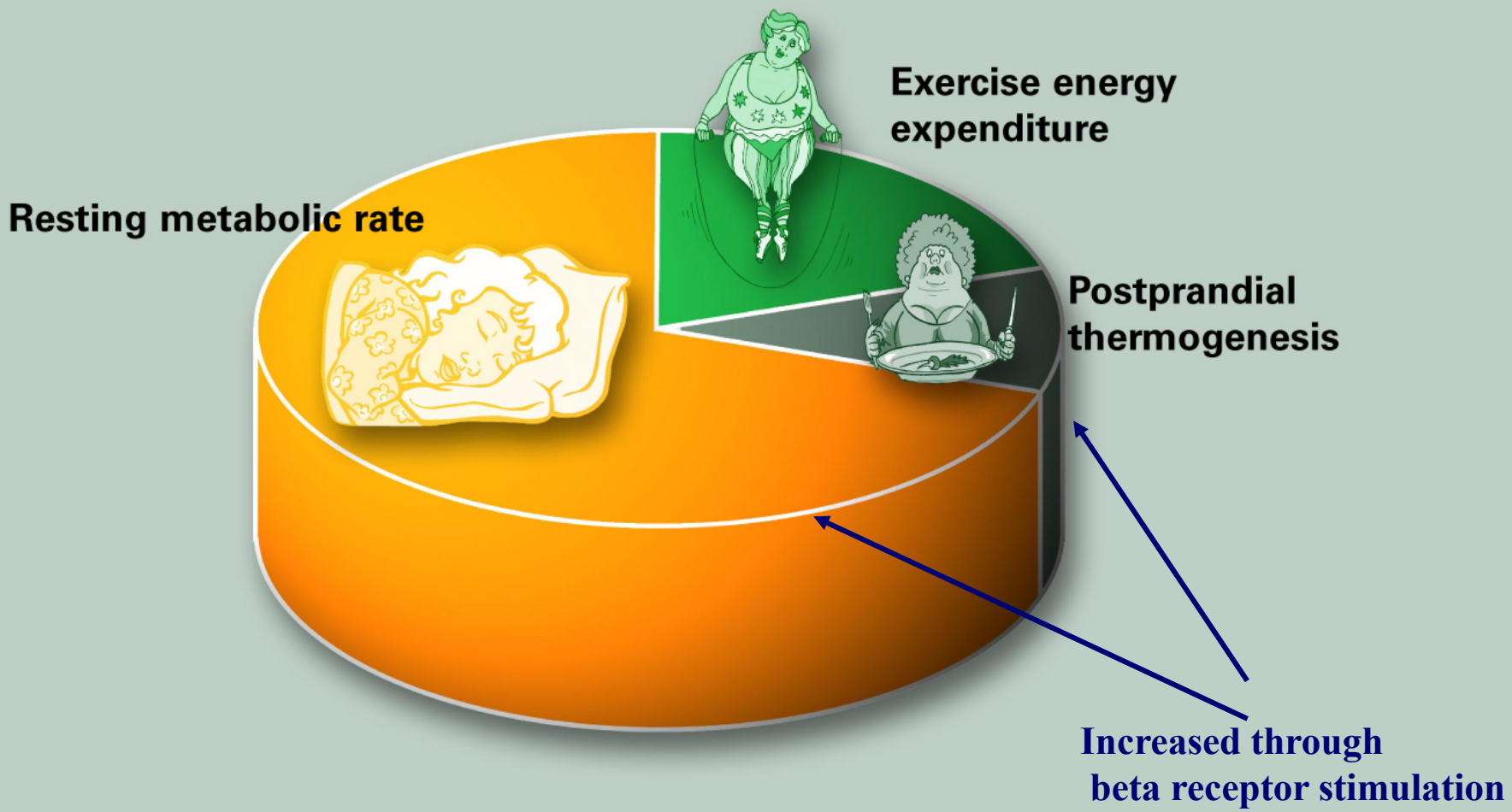
Health Determinants

- **BEHAVIORS**
  - **NO SMOKING**
  - **OPTIMAL NUTRITION**
  - **DAILY EXERCISE**
  - **ADIPOSITY (BMI<25)**
- **FACTORS**
  - Cholesterolemia
  - Glycemia
  - Blood pressure

Minimum 5!

American Heart Association 2012

Components of energy output



Today Portions

NHLBI Expert Panel: Goals of Therapy

- reduce body weight and maintain it for long term

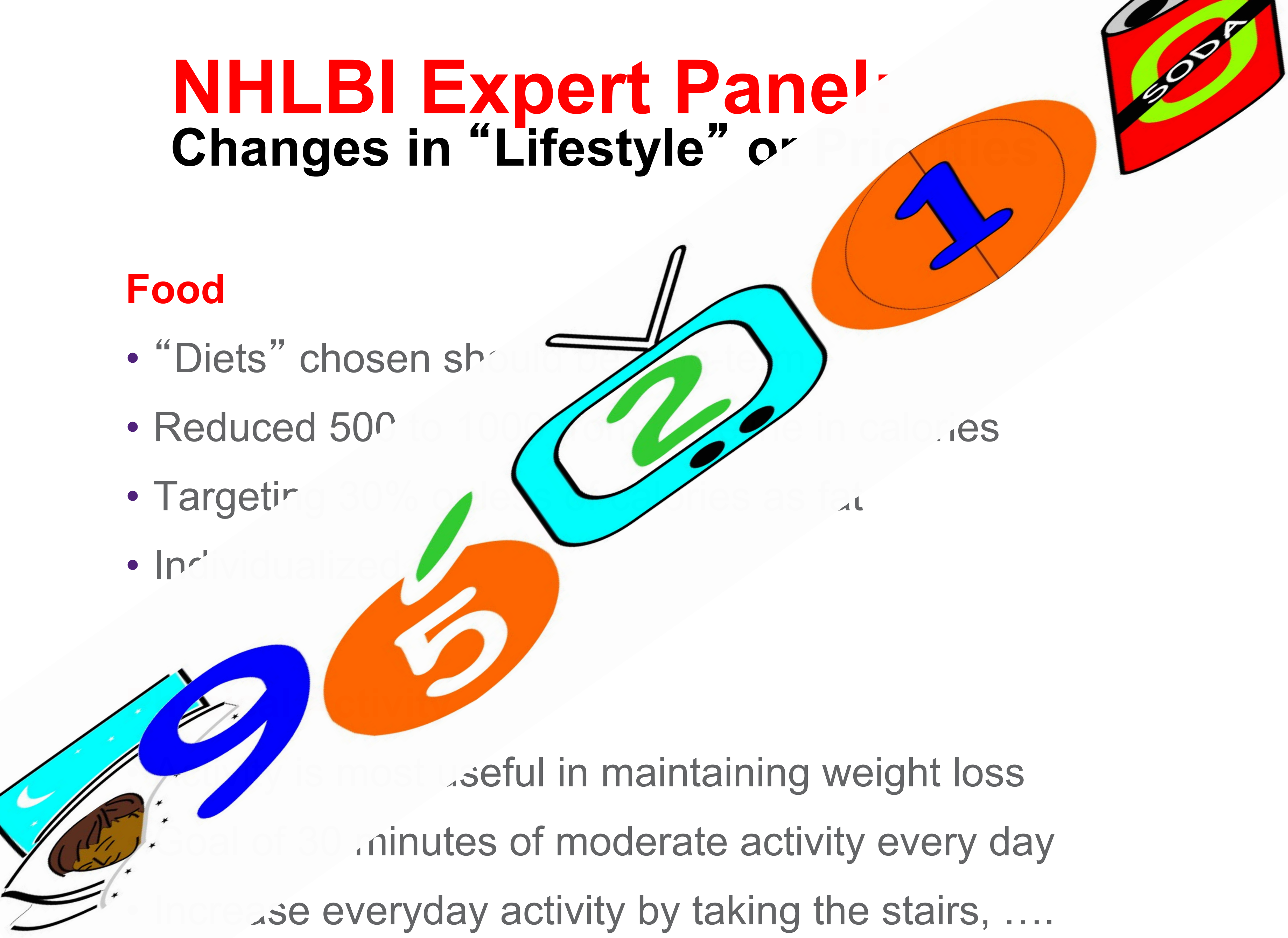
- an initial weight loss target of 10% of body weight
  (in 6 months, the rate should be 0.5-1 kg/week)

- after the first six months the priority should be weight maintenance - through combined changes in

diet, **physical activity** & **behavior**.

NHLBI Expert Panel:

Changes in “Lifestyle” or Priorities



Food

- “Diets” chosen should be [illegible]-term
- Reduced 500 to 1000 [illegible] in calories
- Targeting 30% or less of calories as fat
- Individualized

- Activity is most useful in maintaining weight loss
- Goal of 30 minutes of moderate activity every day
- Increase everyday activity by taking the stairs, ….

Assessment of the Risk for Diabetes

FINDRISC

Finnish Diabetes Risk Score (FINDRISC) to address 10-year risk of type 2 DM (T2DM) in adults

Type 2 diabetes risk assessment form

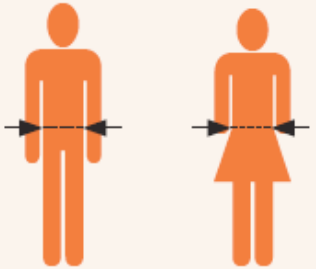
Circle the right alternative and add up your points.

1. Age
- 0 p. Under 45 years
- 2 p. 45-54 years
- 3 p. 55-64 years
- 4 p. Over 64 years

2. Body mass Index
- 0 p. Lower than 25 kg/m²
- 1 p. 25-30 kg/m²
- 3 p. Higher than 30 kg/m²

3. Waist circumference measured below the ribs (usually at the level of the navel)

	MEN	WOMEN
0 p.	Less than 94 cm	Less than 80 cm
3 p.	94-102 cm	80-88 cm
4 p.	More than 102 cm	More than 88 cm



4. Do you usually have daily at least 30 min of physical activity at work and/or during leisure time (including normal daily activity)?
- 0 p. Yes
- 2 p. No

5. How often do you eat vegetables, fruit, or berries?
- 0 p. Every day
- 1 p. Not every day

6. Have you ever taken anti-hypertensive medication regularly?
- 0 p. No
- 2 p. Yes

7. Have you ever been found to have high blood glucose (e.g. in a health examination, during an illness, during pregnancy)?
- 0 p. No
- 5 p. Yes

8. Have any of the members of your immediate family or other relatives been diagnosed with diabetes (type 1 or type 2)?
- 0 p. No
- 3 p. Yes: grandparent, aunt, uncle, or first cousin (but no own parent, brother, sister or child)
- 5 p. Yes: parent, brother, sister, or own child

Total risk score

The risk of developing type 2 diabetes within 10 years is

Lower than 7	Low: estimated one in 100 will develop disease
7-11	Slightly elevated: estimated one in 25 will develop disease
12-14	Moderate: estimated one in 6 will develop disease
15-20	High: estimated one in three will develop disease
Higher than 20	Very High: estimated one in two will develop disease


Who's BAD ?

Topics

- Fat = Bad?
- Procustes Bed (too bad!)
- Theory vs Practice?
- Conclusions

- Obesity is a **risk factor for CV disease**!

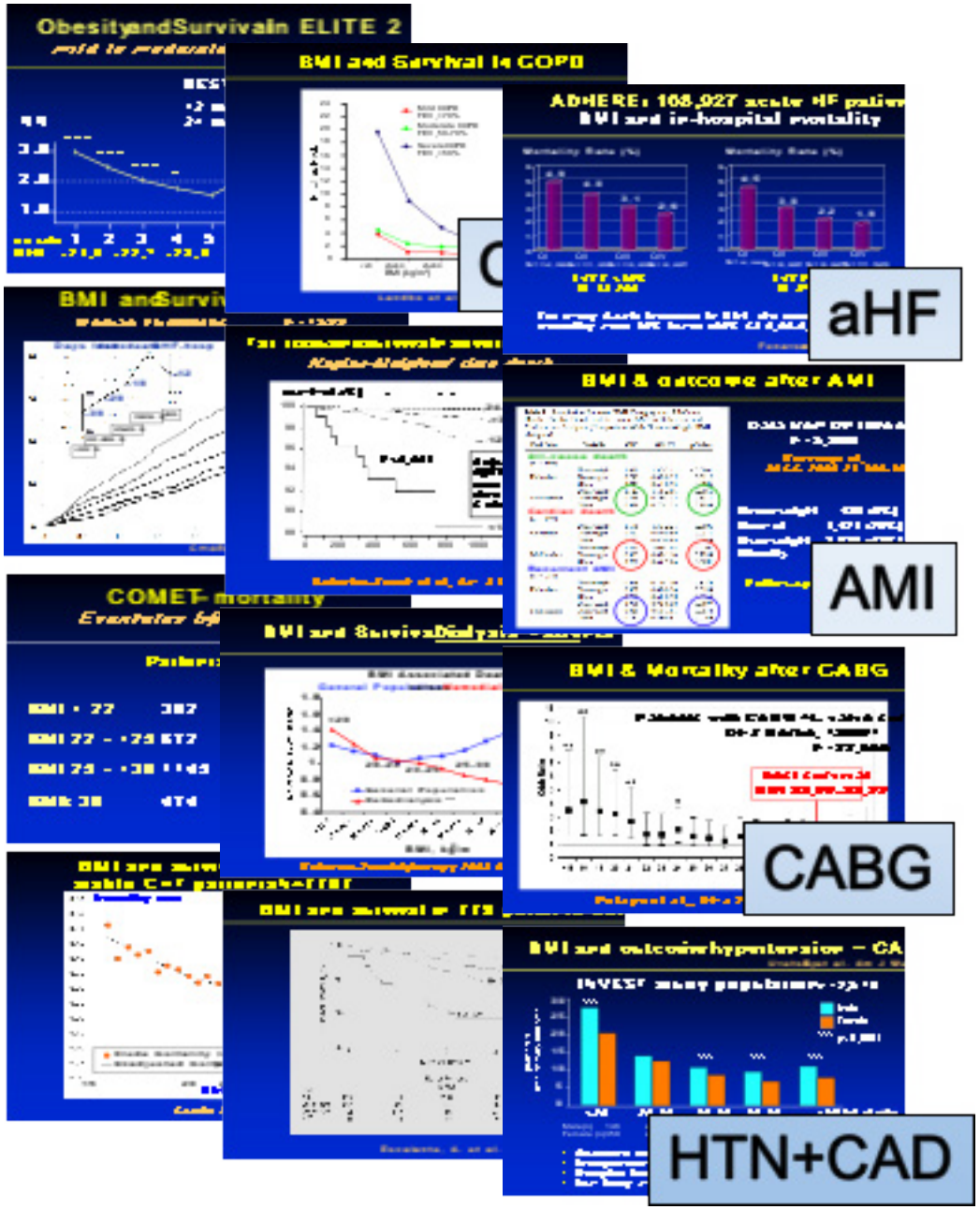
- Adiposopathy (**Sick Fat Disease**)

- From “the lower, the better” to **“the earliest, the best”**

- The need for an **interdisciplinary approach…**

Obesity Paradox?!

Mild obesity: no increased risk **in patients with chronic disease**



- Chronic heart failure
- Acute heart failure
- Acute myocardial infarction
- Unstable angina + NSTEMI
- Acute coronary intervention
- CAD + CV risk profile
- DM + CV risk profile
- CV rehabilitation

- Bypass surgery
- Valvular surgery
- Heart transplantation

Mild obesity = no increased risk

Metabolically healthy obese ?!

MHO = a “phase” NOT a “state”!

- is defined by the presence of obesity in the absence of metabolic risk factors
- specific subgroup of obese individuals “resistant” to metabolic complications
- …but MHO presents a higher all-cause mortality vs *normal weight MH individuals*.
- …long-term results support the notion that MHO is a transient phase moving towards **glucometabolic abnormalities** rather than a specific “state”.

Piepoli MF, et al.European Guidelines on cardiovascular disease prevention in clinical practice EurHeartJ (2016) 37, 2315–2381

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THE PRESENT AND FUTURE

STATE-OF-THE-ART REVIEW

The CardioMetabolic Health Alliance

Working Toward a New Care Model for the Metabolic Syndrome

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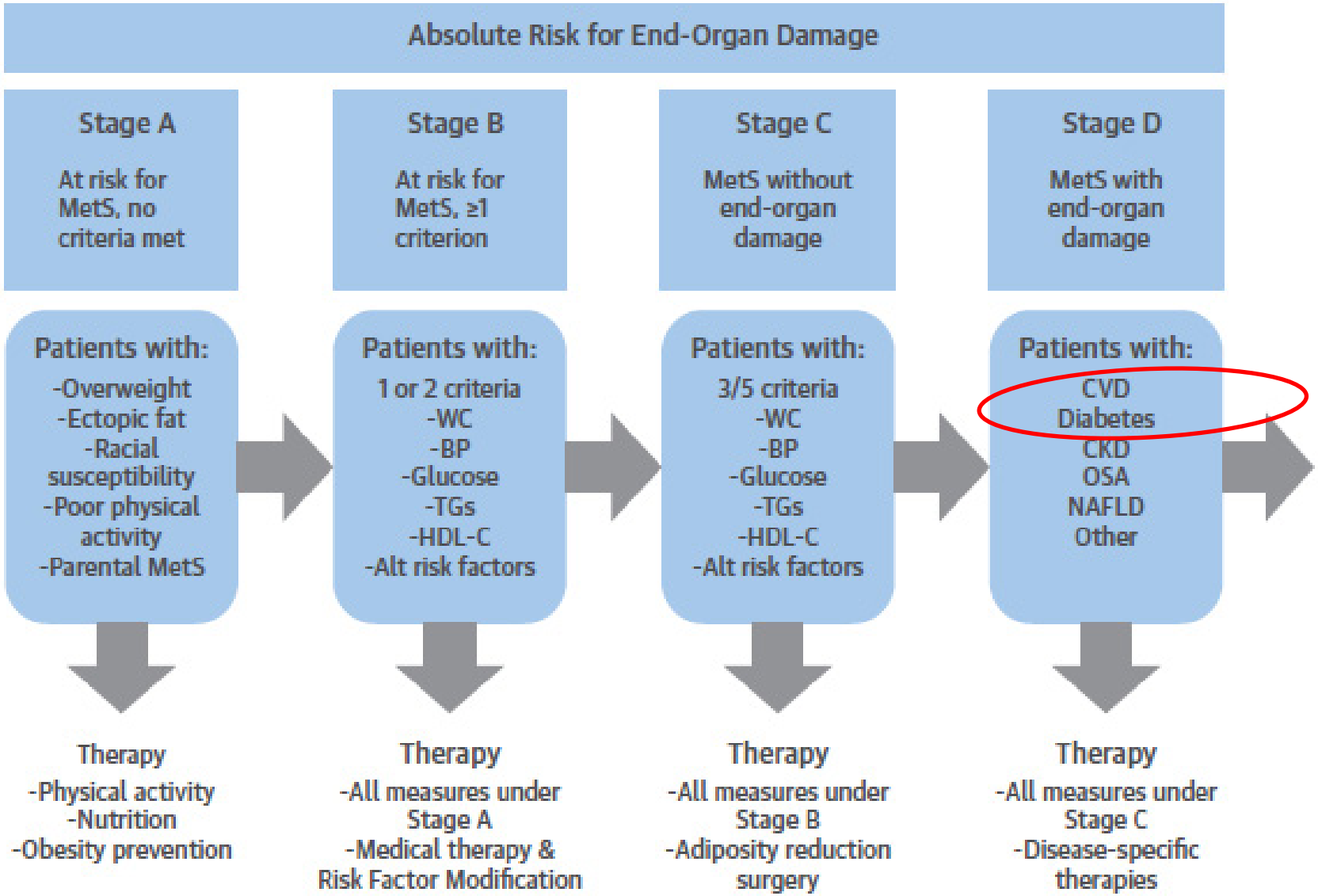
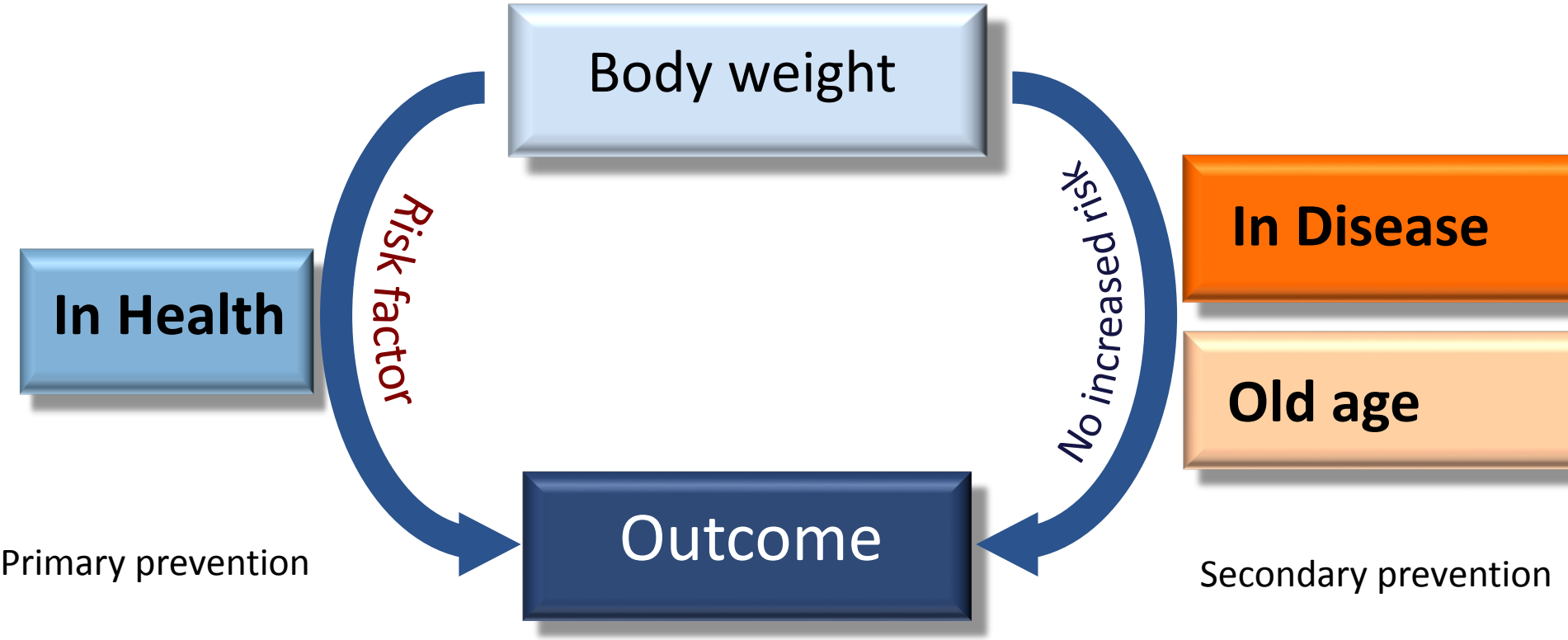
FIGURE 2 Stages in the Evolution of MetS and Recommended Therapy by Stage



Sperling L et al. J Am Coll Cardiol.2015; 66(9):1050-67

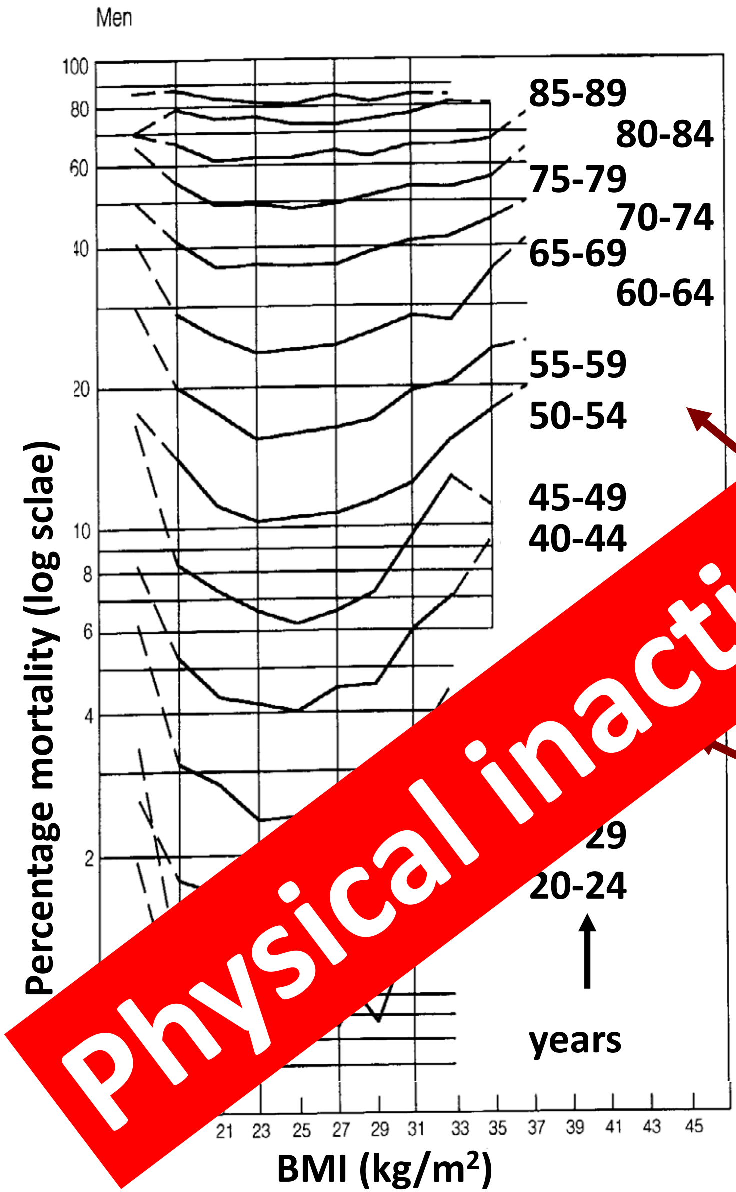
Body weight management in CV disease

We need to distinguish



Doehner W., Heart Fail Rev2014

10 year Mortality by BMI groups



„The Norwegian ... e"

Populat...

N = ...

...o impact of BMI at >75y

- attenuated with older age

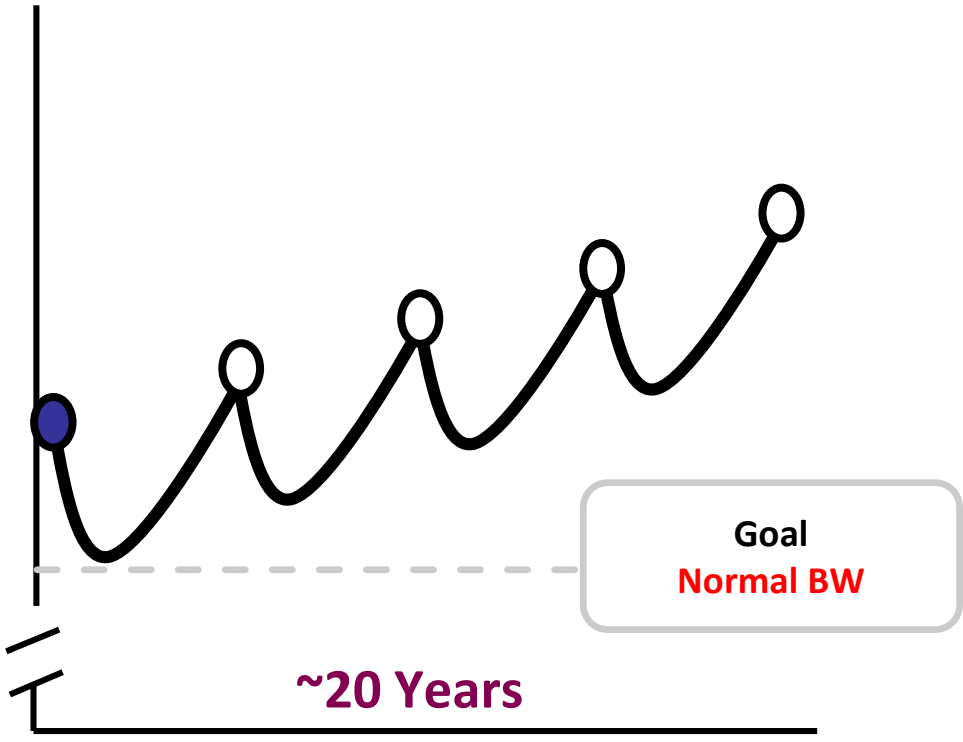
- U shaped relationship

Physical inactivity it counts more!

Waaler; Acta med Scand 1984; 679: 1-56

Horia Colibasanu - seven 8.000-meter peaks

Metabolic Memory?



Conclusions

Obesity is bad...

- Defi
- Understood
- Managed

Is BAD not to consider it BAD!


Early to bed,
Early to rise,
Work like hell
RESPECT GUIDELINES!!