Health and nutrition situation in transition - from nutrition deficiencies to lifestyle related diseases (non-communicable diseases).

Ulrich Oltersdorf

Outline of this lecture

World Food Situation – Overview

- Famine and Feast
- Food (In)Security
- Nutrition (In)Security

Health Problems related to Lifestyle

Obesity Epidemic and related Health Risks

Which role played the nutrition in the evolution?

Paläolithikum
100.000 generations between *feast and famine*

Neolithikum
300 generations in large constance of the food supply

Modern
2 - 3 Generations of foodfeast

Food Insecurity - today

The Indicator - poor growth of children

Table 3. Estimates of Underweight Children in 1990 and 2015

Region	Estimates (95% CI), in millions		Percentage of Relative Change (95% CI)
	1990	2015	
Africa			
Entire region	25.8 (25.2 to 26.3)	43.3 (42.2 to 44.4)	68.3 (62.7 to 74.1)
Northern	1.6 (1.4 to 2.0)	0.7 (0.3 to 1.3)	–59.3 (–80.2 to –16.5)
Sub-Saharan*	24.1 (21.5 to 26.7)	42.7 (37.9 to 47.5)	76.9 (51.5 to 106.6)
Eastern	9.5 (7.8 to 11.4)	19.1 (15.8 to 22.7)	101.6 (56.2 to 160.0)
Middle	3.7 (2.6 to 5.0)	6.3 (4.7 to 8.2)	71.5 (13.4 to 159.4)
Southern	0.8 (0.6 to 1.1)	0.7 (0.5 to 1.0)	–13.9 (–46.5 to 38.4)
Western	8.8 (7.4 to 10.2)	13.5 (10.9 to 16.4)	53.6 (19.4 to 97.6)
Asia			
Entire region	131.9 (119.2 to 144.7)	67.6 (53.4 to 81.7)	–48.8 (–59.3 to –35.5)
Eastern	23.1 (22.0 to 24.2)	3.0 (2.8 to 3.2)	–86.9 (–88.0 to –85.8)
South Central	86.0 (73.5 to 98.5)	52.1 (39.9 to 66.3)	–39.4 (–54.7 to –19.0)
Southeastern	20.2 (17.6 to 22.9)	9.7 (7.5 to 12.4)	–51.8 (–63.6 to –36.0)
Western	2.7 (2.1 to 3.5)	2.7 (0.4 to 12.1)	0.4 (–82.7 to 483.3)
Latin America			
Entire region	4.8 (3.4 to 6.2)	1.9 (1.1 to 2.7)	–60.2 (–76.1 to –33.8)
Caribbean	0.4 (0.2 to 0.7)	0.1 (0.05 to 0.20)	–74.2 (–89.3 to –37.4)
Central	1.9 (1.2 to 3.1)	0.9 (0.5 to 1.8)	–51.9 (–79.0 to 10.3)
South	2.5 (1.6 to 3.8)	0.9 (0.5 to 1.5)	–64.4 (–82.2 to –28.8)
Developing regions	162.6 (149.8 to 175.5)	112.8 (98.6 to 127.1)	–30.6 (–40.2 to –19.5)
Developed countries†	1.2 (0.6 to 2.4)	0.6 (0.1 to 2.6)	–54.1 (–93.9 to 244.4)
Entire world	163.8 (151.0 to 176.7)	113.4 (99.2 to 127.6)	–30.8 (–40.3 to –19.7)

Abbreviation: CI, confidence interval.
*Comprises the regions of Eastern, Middle, Southern, and Western Africa and Sudan.
†Europe, Japan, Australia, Canada, and United States.

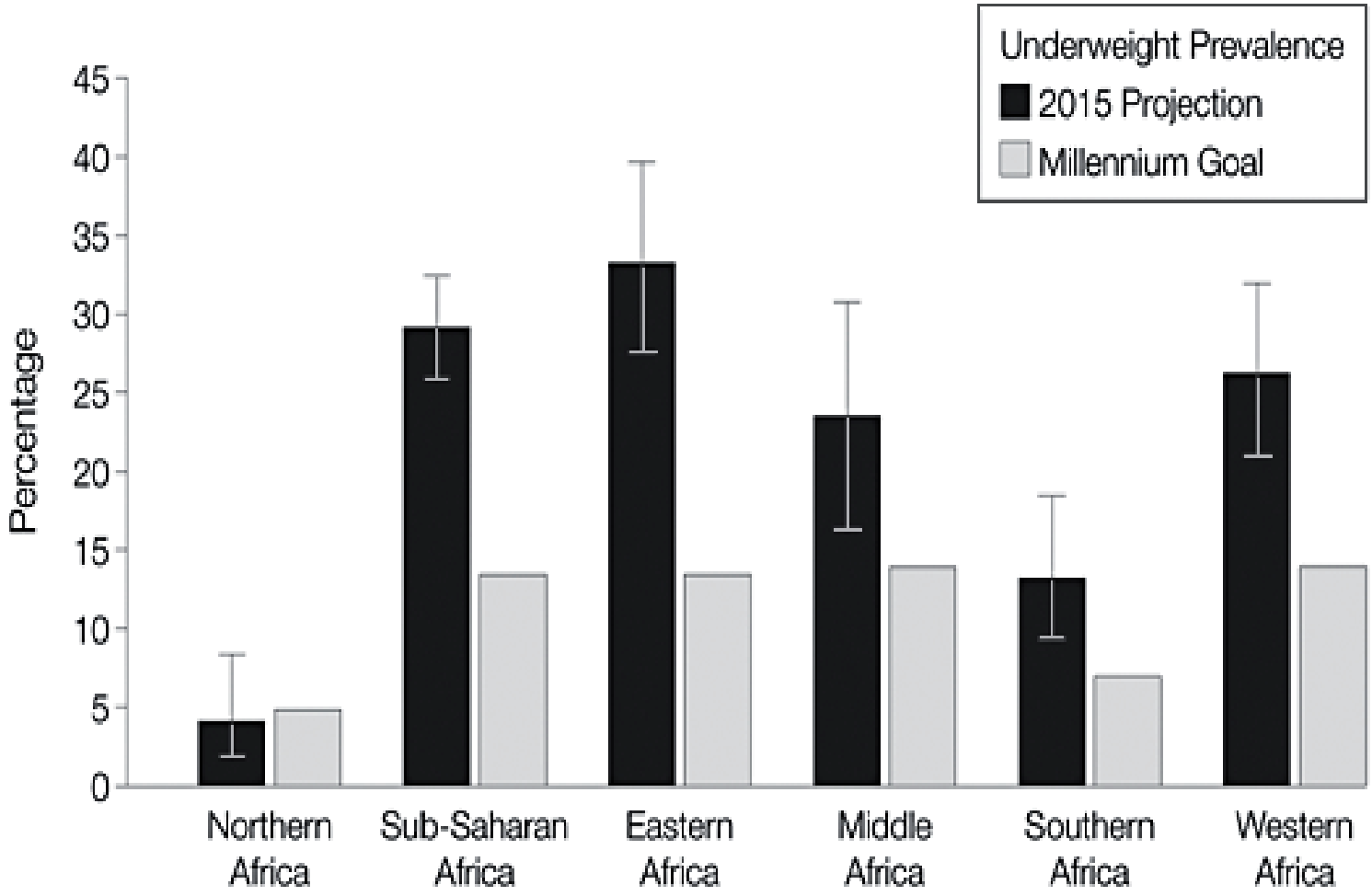
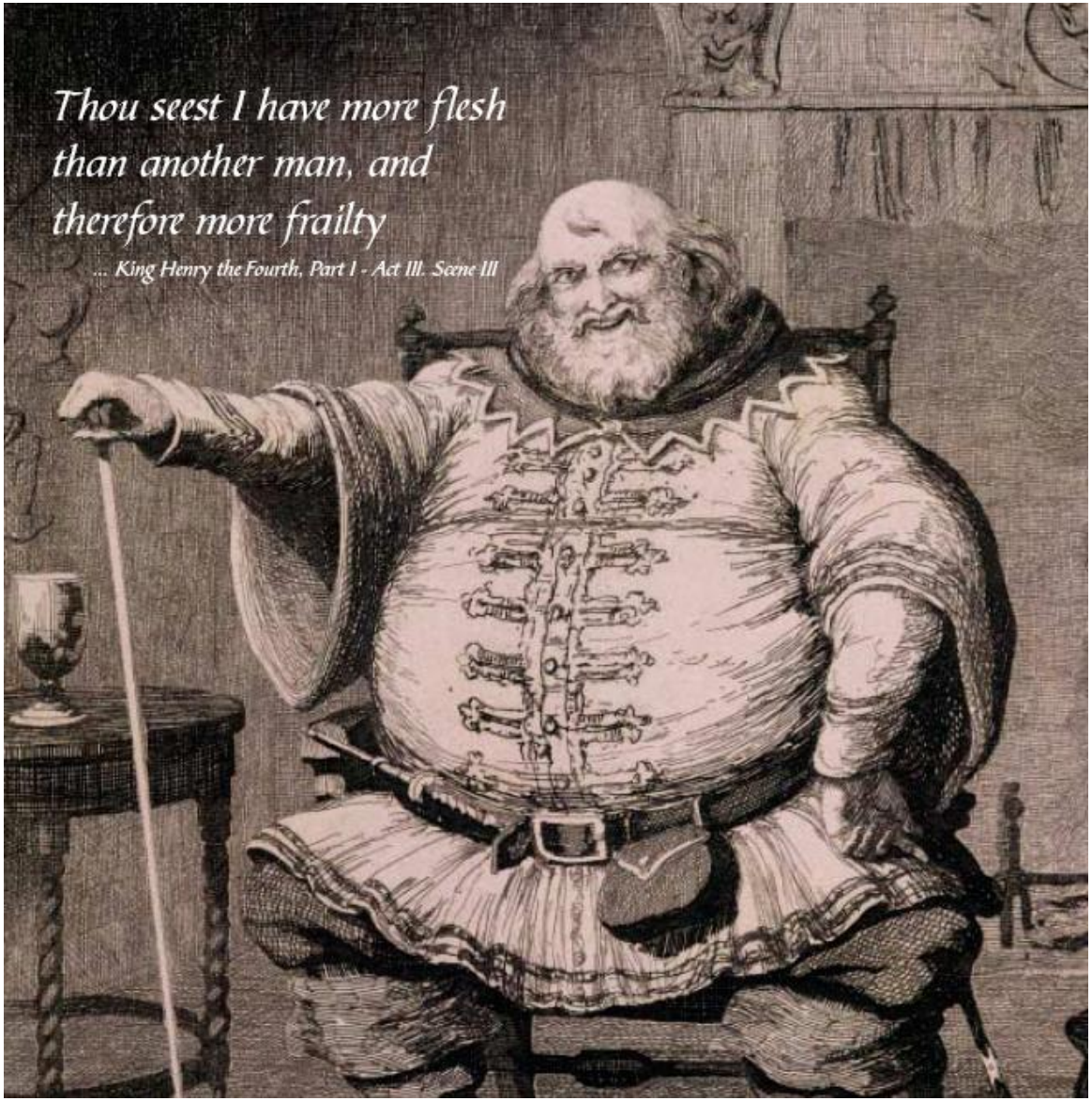

Underweight Prevalence
2015 Projection
Millennium Goal
Percentage
45
40
35
30
25
20
15
10
5
0
Northern Africa
Sub-Saharan Africa
Eastern Africa
Middle Africa
Southern Africa
Western Africa

Table. Ten leading causes of death in the United States, 1900 and 2000[a]

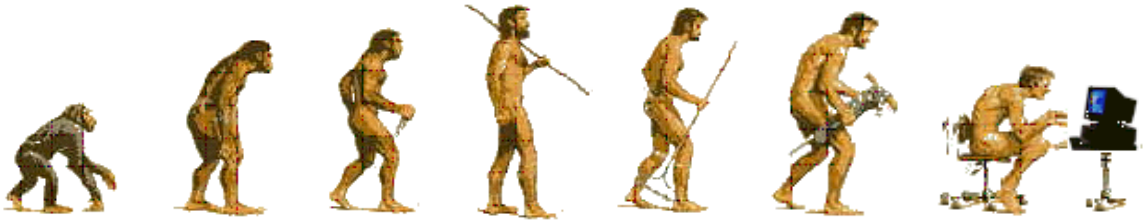
1900	Percent	2000	Percent
Tuberculosis	11.3	Heart disease	31.4
Pneumonia	10.2	Cancer	23.3
Diarrhea diseases	8.1	Stroke	6.9
Heart disease	8.0	Lung disease	4.7
Liver disease	5.2	Accidents	4.1
Injuries	5.1	Pneumonia/influenza	3.7
Stroke	4.5	Diabetes mellitus	2.7
Cancer	3.7	Suicide	1.3
Bronchitis	2.6	Kidney disease	1.0
Diphtheria	2.3	Liver disease and cirrhosis	1.0
Total top ten	61.0		80.1

[a]Data from Nestle M. *Food Politics*. Berkeley, CA: University of California Press; 2002.

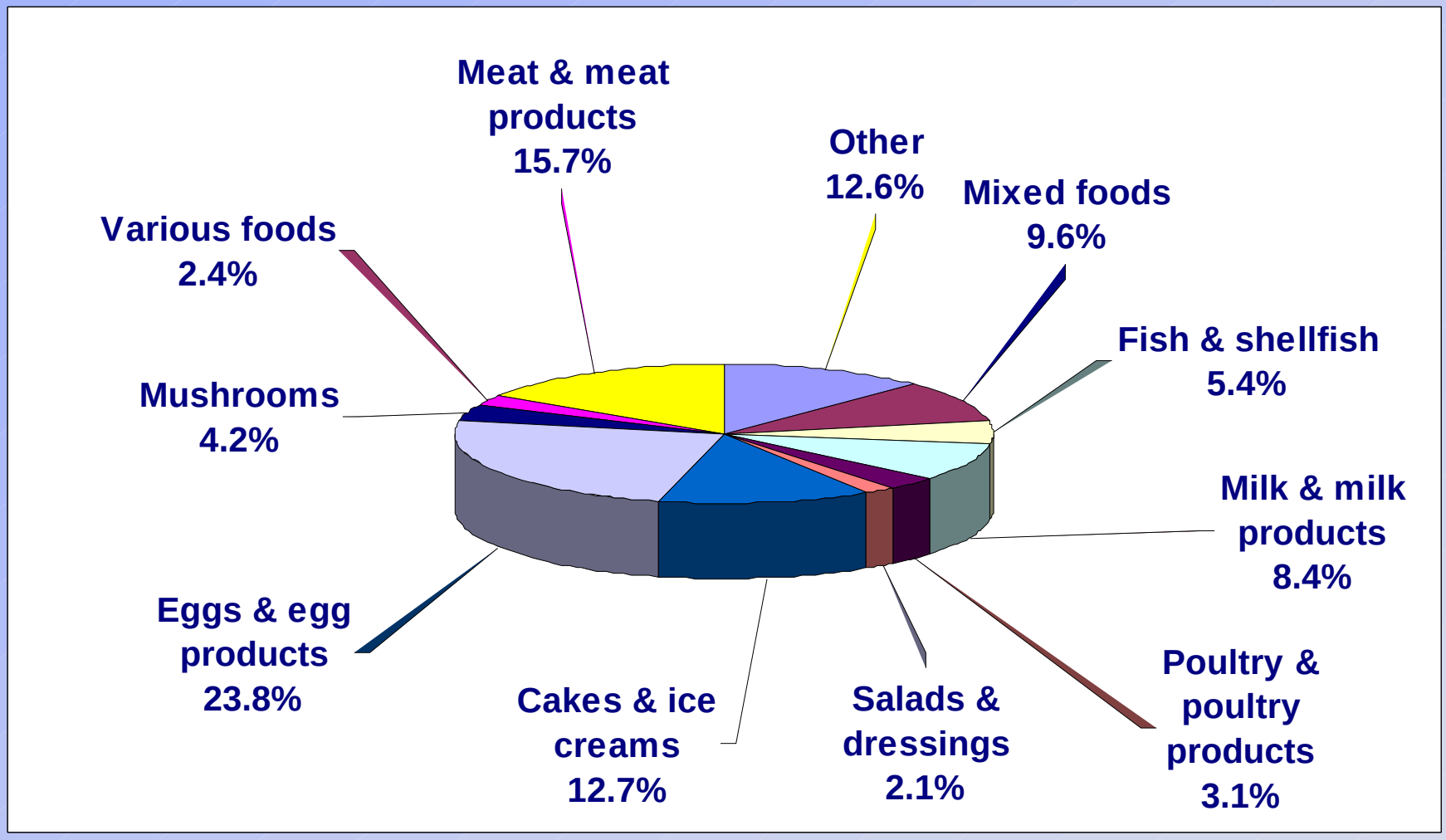

Thou seest I have more flesh
than another man, and
therefore more frailty
... King Henry the Fourth, Part 1 - Act III. Scene III

Evolution?

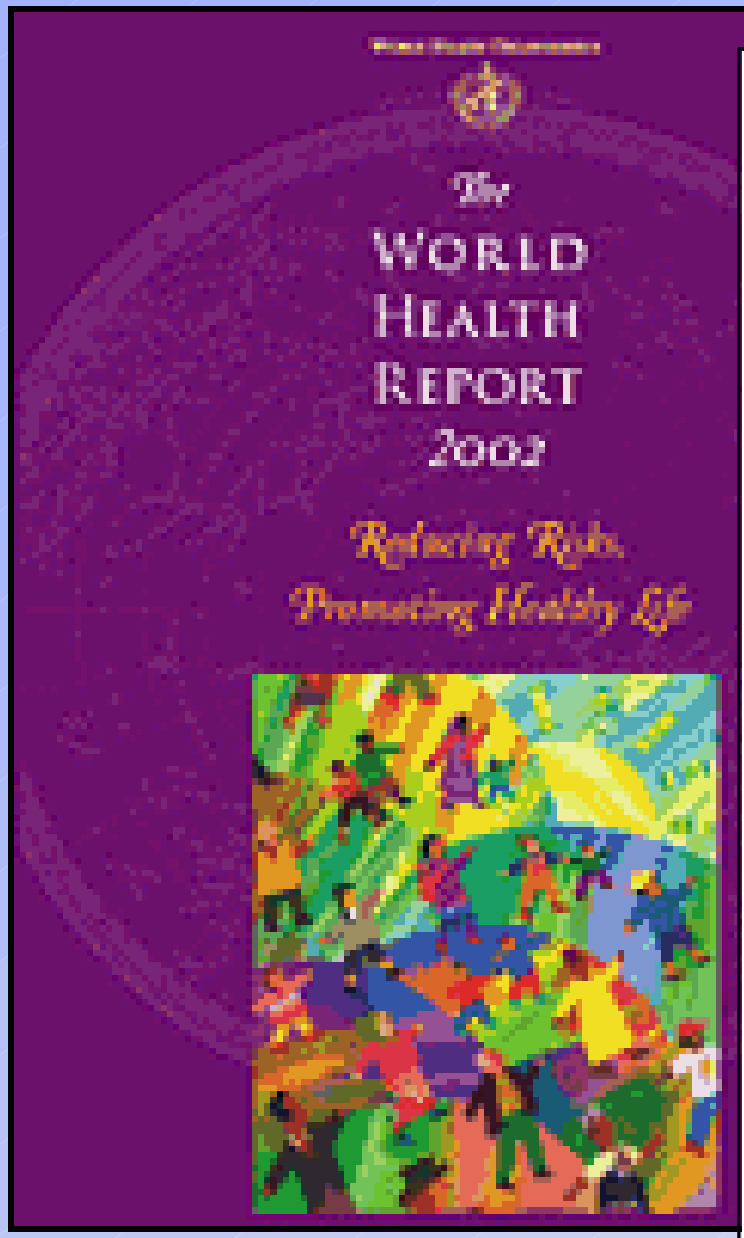
Evolution of the Hominiden

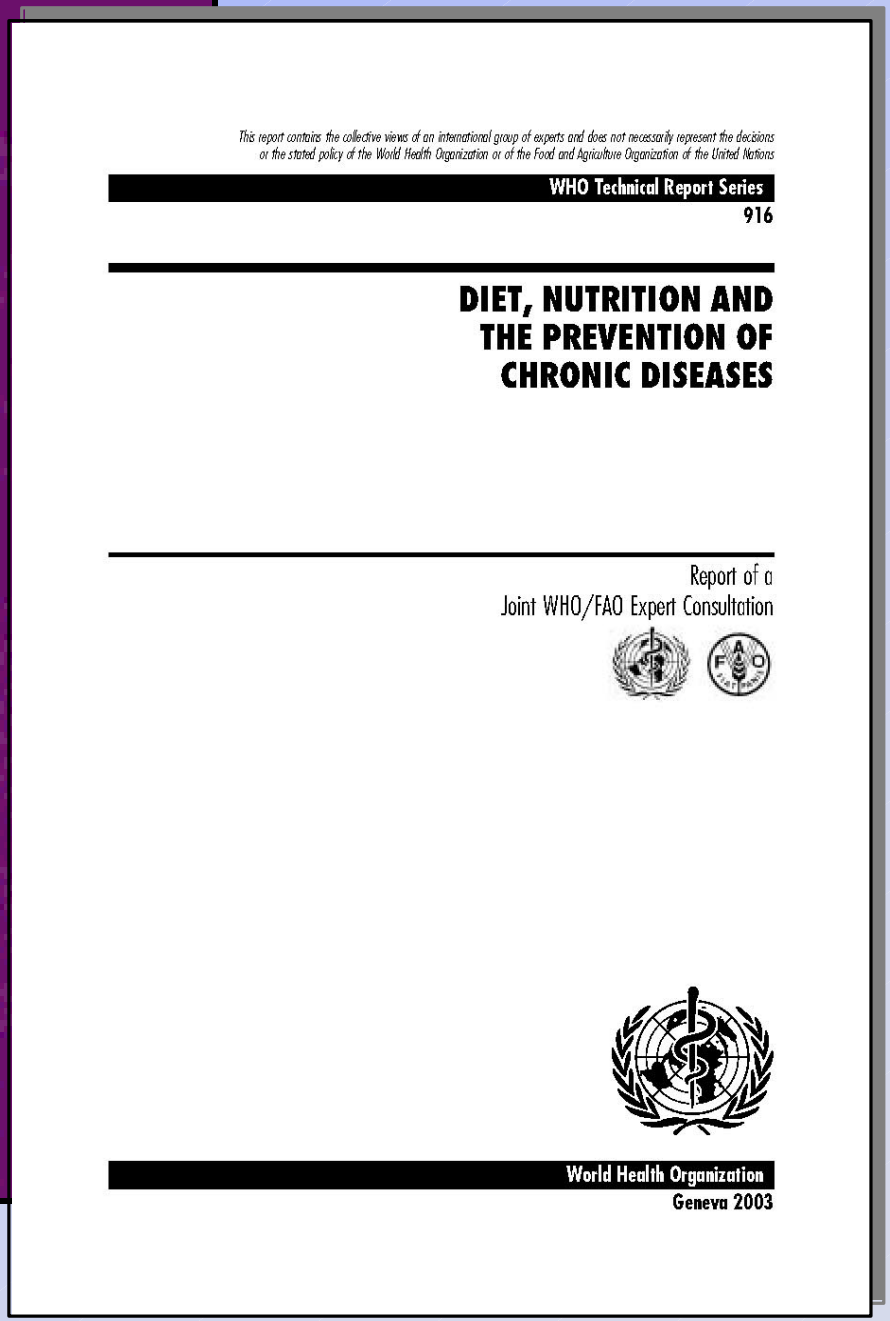


Food involved in food borne disease outbreaks in the WHO European Region, 1993–1998



Source: WHO Regional Office for Europe.





This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization or of the Food and Agriculture Organization of the United Nations

WHO Technical Report Series
916

DIET, NUTRITION AND THE PREVENTION OF CHRONIC DISEASES

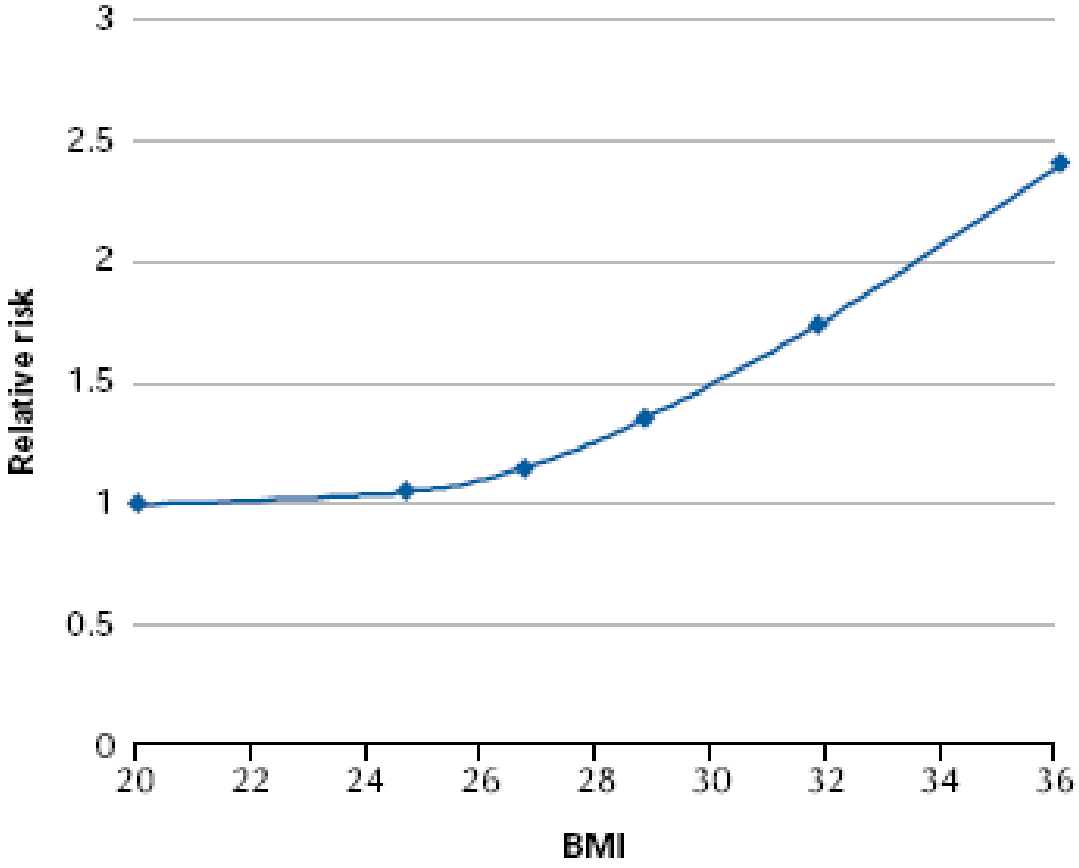
Report of a
Joint WHO/FAO Expert Consultation

World Health Organization
Geneva 2003

Classification of overweight in adults according to BMI[a]

Classification	BMI (kg/m^2)	Risk of comorbidities
Underweight	<18.5	Low (but risk of other clinical problems increased)
Normal range	18.5–24.9	Average
Overweight	⩾25.0	
Pre-obese	25.0–29.9	Increased
Obese class I	30.0–34.9	Moderate
Obese class II	35.0–39.9	Severe
Obese class III	⩾40.0	Very severe

The relationship between body weight, measured by BMI, and the relative risk of mortality



Note: This figure is based on data from a study of female nurses in the United States. Studies for all adults imply a similar relationship between BMI and risk of mortality in men.

Source: Manson J. E., Willet W. C., Stampfer M. J. (1995). "Bodyweight and mortality among women" - New England Journal of Medicine.

Estimated increased risk for the obese of developing associated diseases, taken from international studies

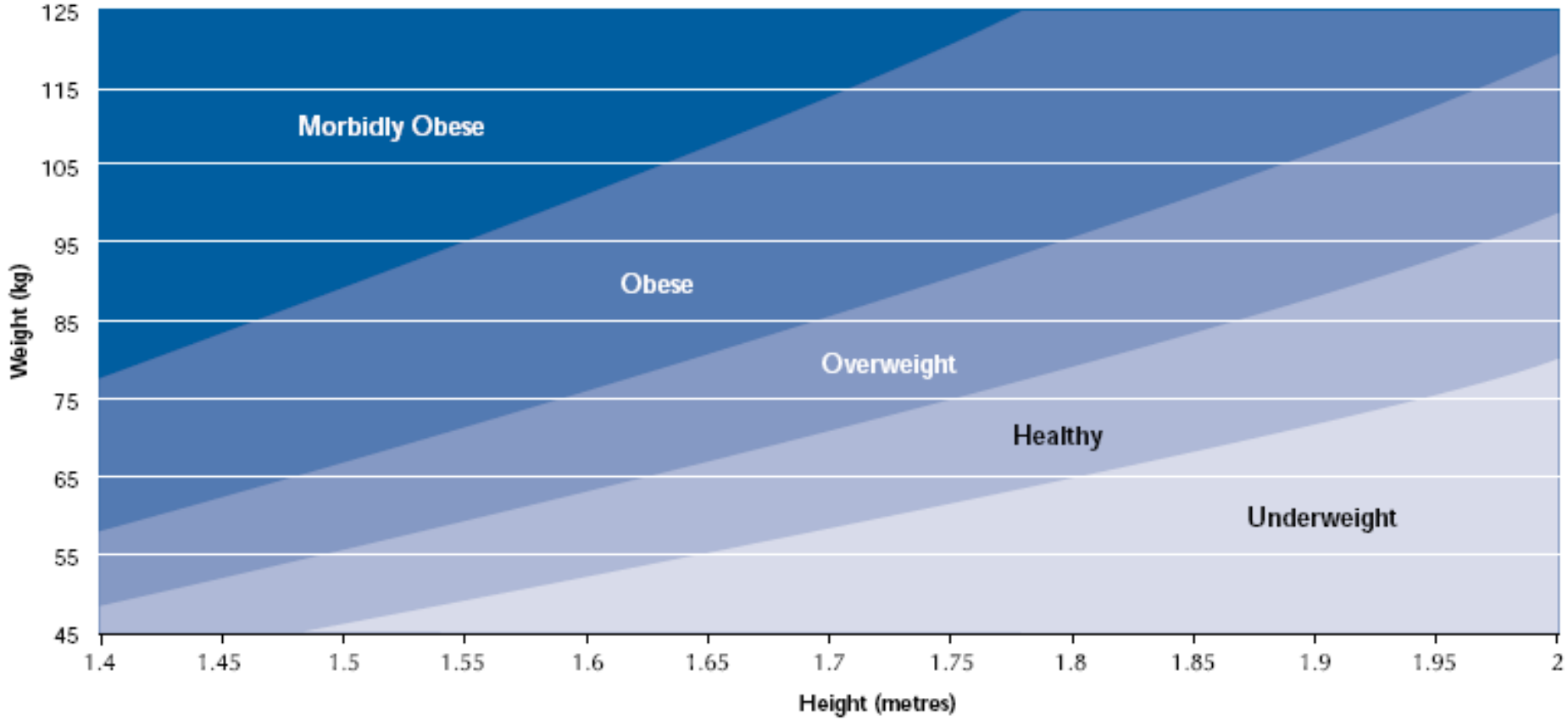
Disease	Relative risk - women	Relative risk - men
Type 2 Diabetes *	12.7	5.2
Hypertension	4.2	2.6
Myocardial Infarction	3.2	1.5
Cancer of the Colon	2.7	3.0
Angina	1.8	1.8
Gall Bladder Diseases	1.8	1.8
Ovarian Cancer	1.7	-
Osteoarthritis	1.4	1.9
Stroke	1.3	1.3

* Non-insulin dependent diabetes mellitus (NIDDM)

Note: The BMI range for the obese and non-obese groups used to estimate relative risk varies between studies, which limits the comparability of these data.

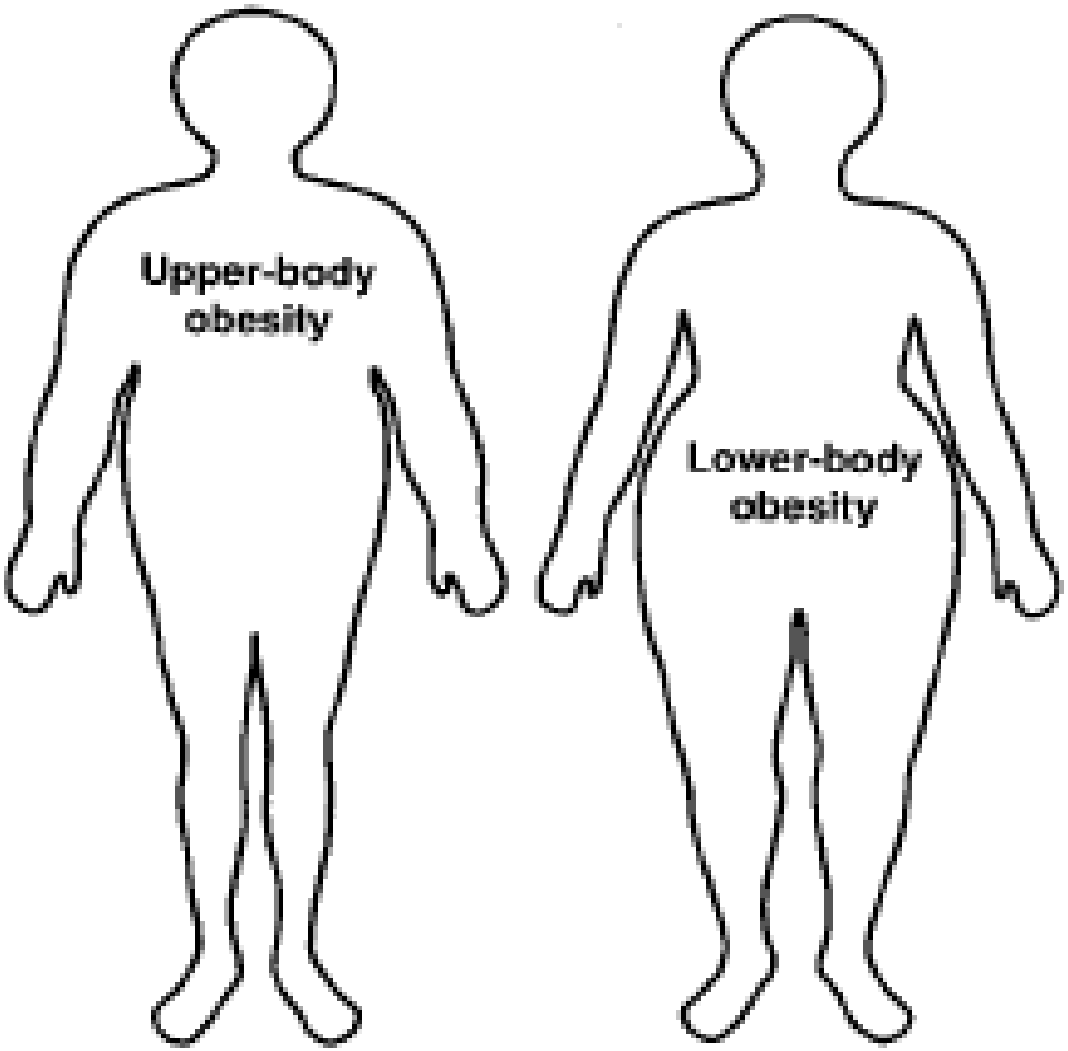
Source: National Audit Office estimates based on literature review (Appendix 6)

Different categories of weight defined by Body Mass Index (kg/m²)



Source: National Audit Office based on classifications used in the Health Survey for England[1]

Fig. 4. Apple shape or pear shape

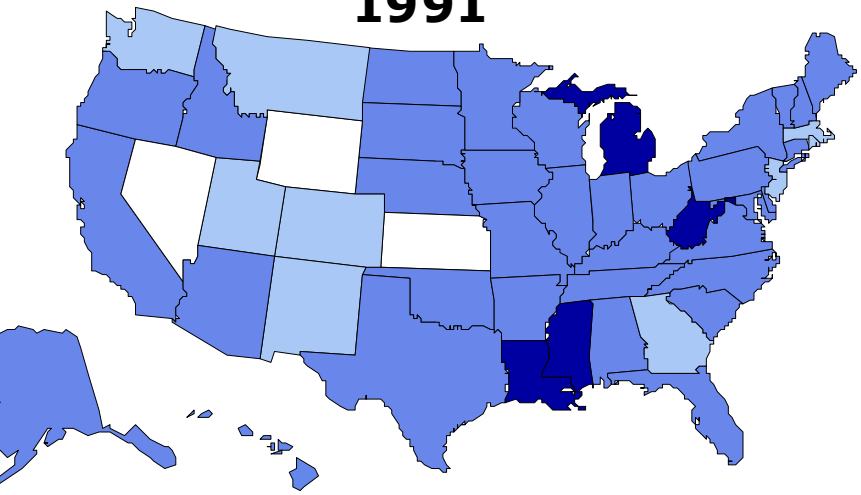


Obesity Trends* Among U.S. Adults

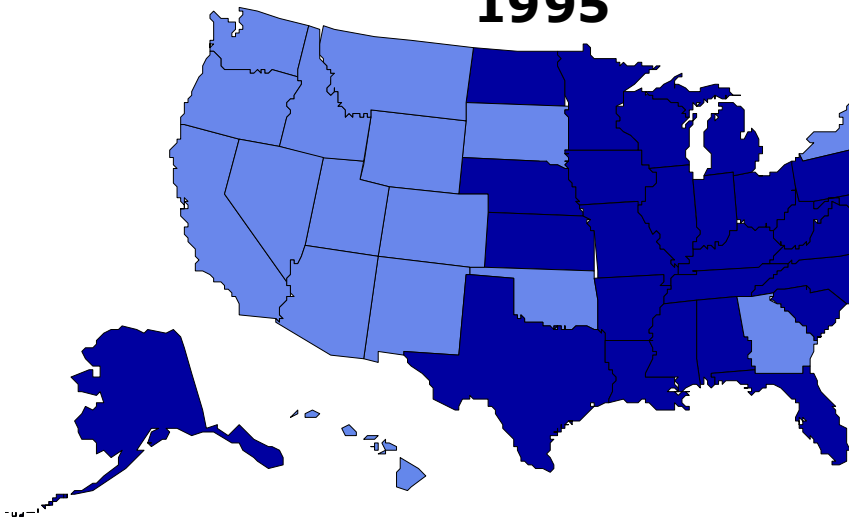
BRFSS, 1991-2002

(*BMI " 30, or ~ 30 lbs overweight for 5’ 4” woman)

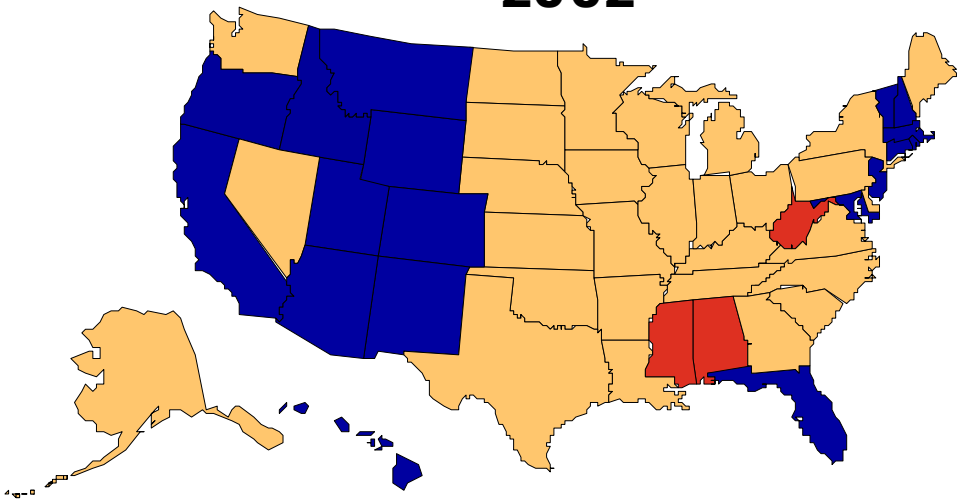
1991



1995

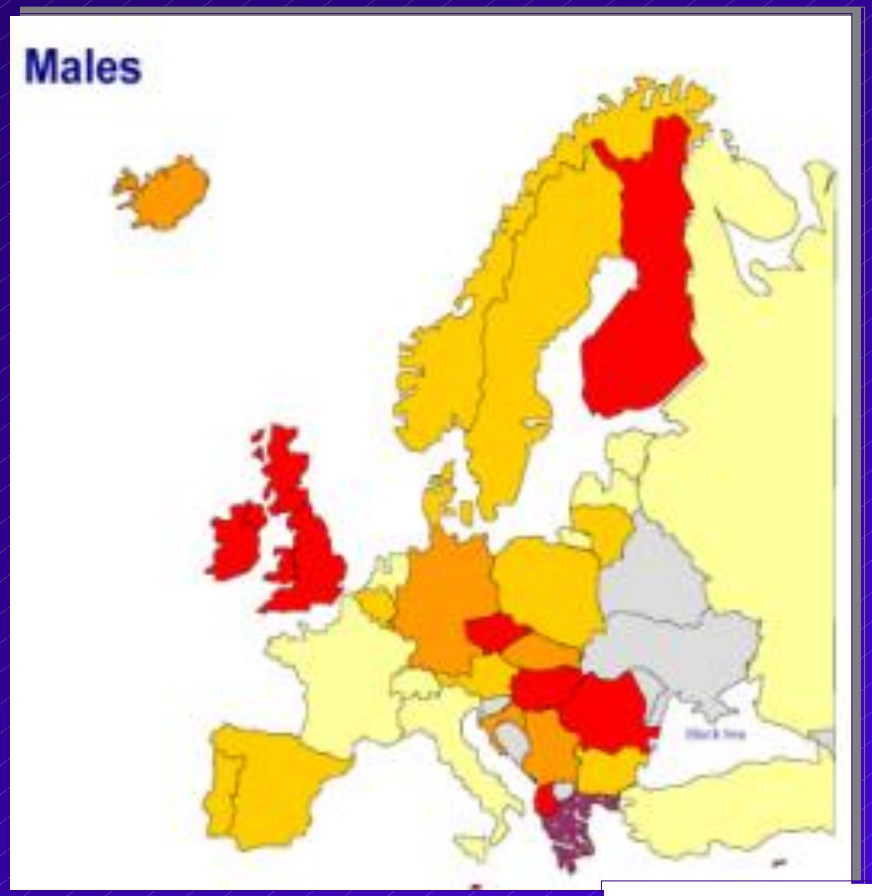


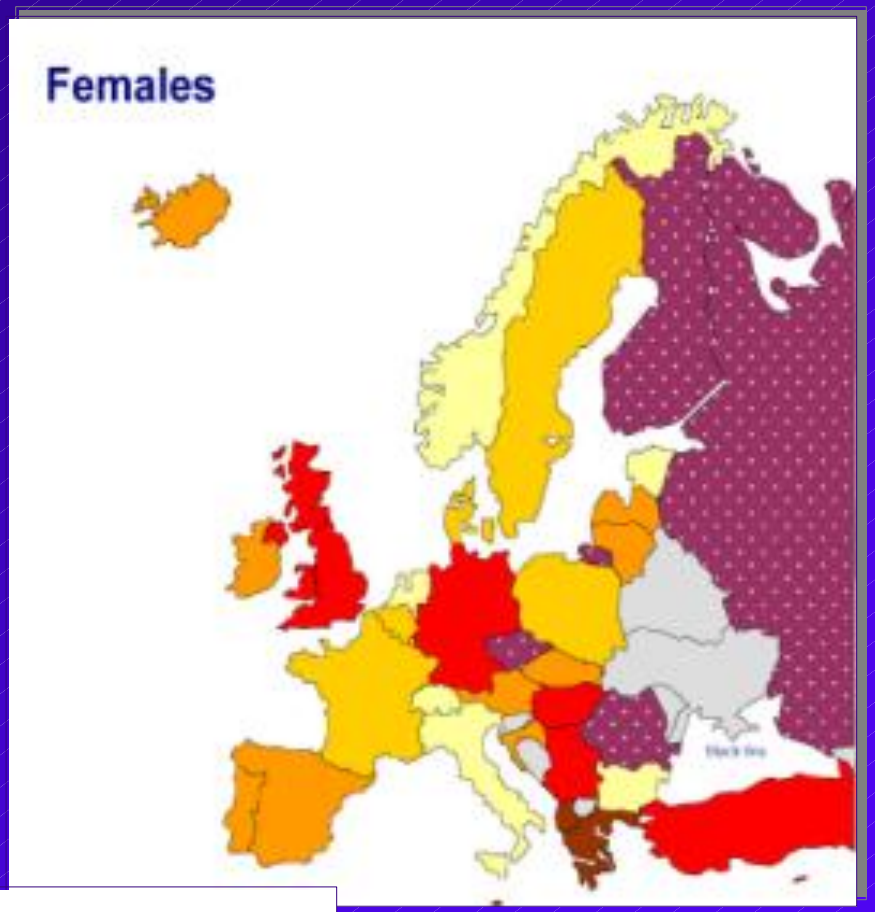
2002



Data | <10% | 10%–14% | 15%–19% | 20%–24% | " 25%

Prevalence of adult obesity in Europe BMI >30 kgm^2





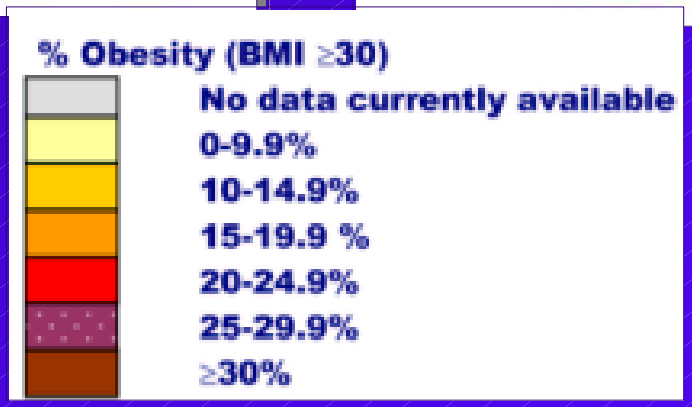
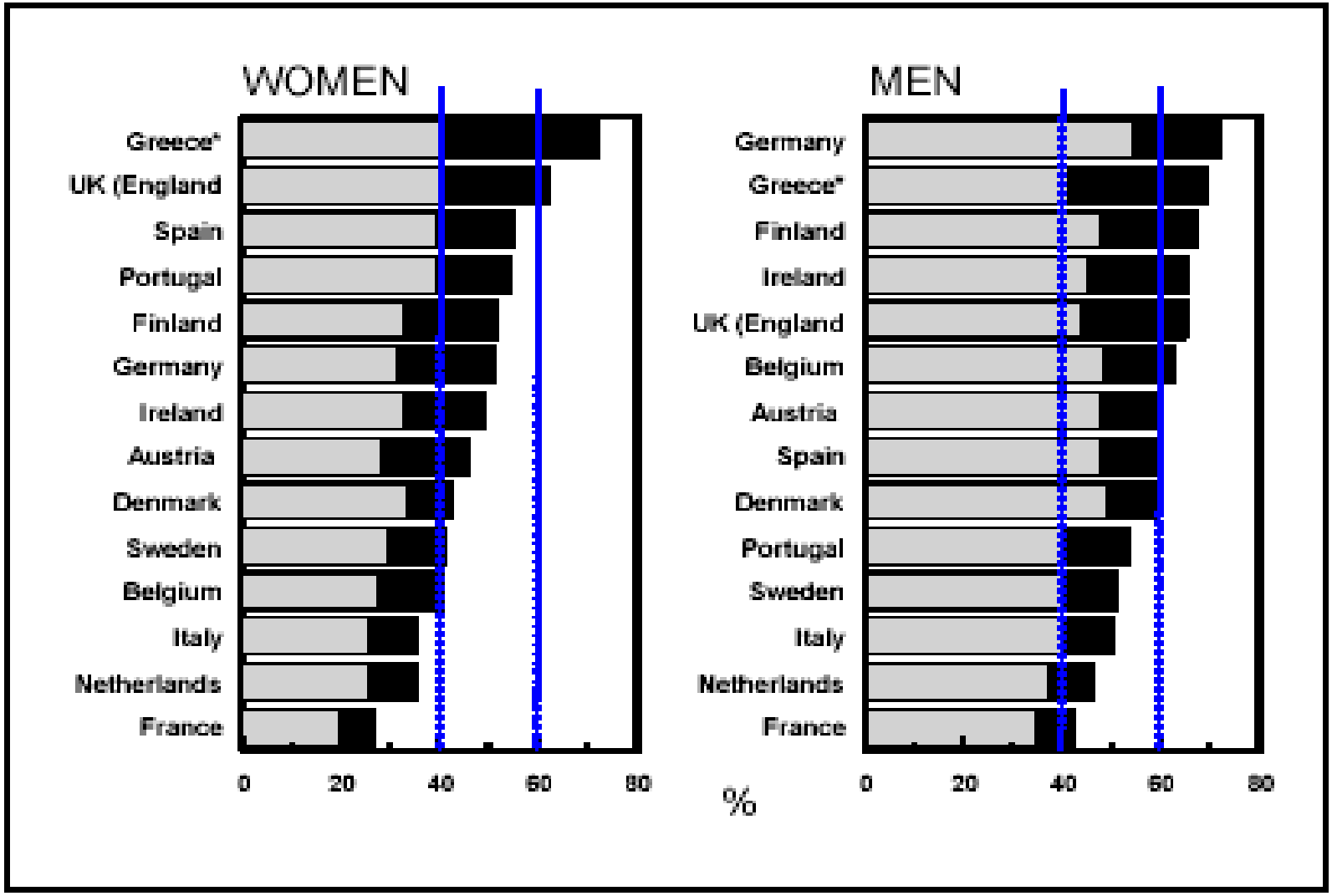


Fig 1 Estimated relative prevalences of overweight and obesity in the EU



* Restricted age group.

** O/wt from MONICA studies

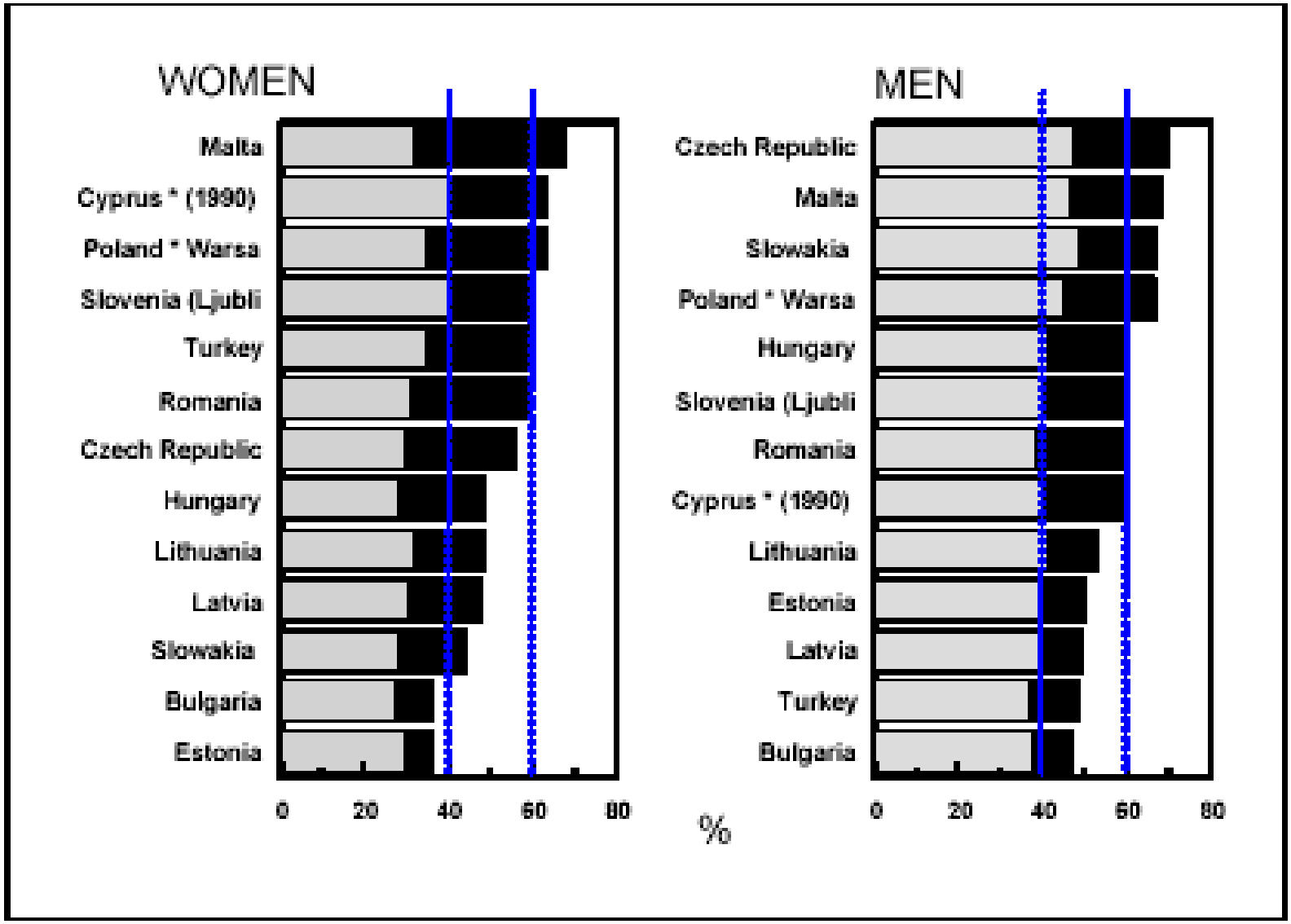
BMI 25-29

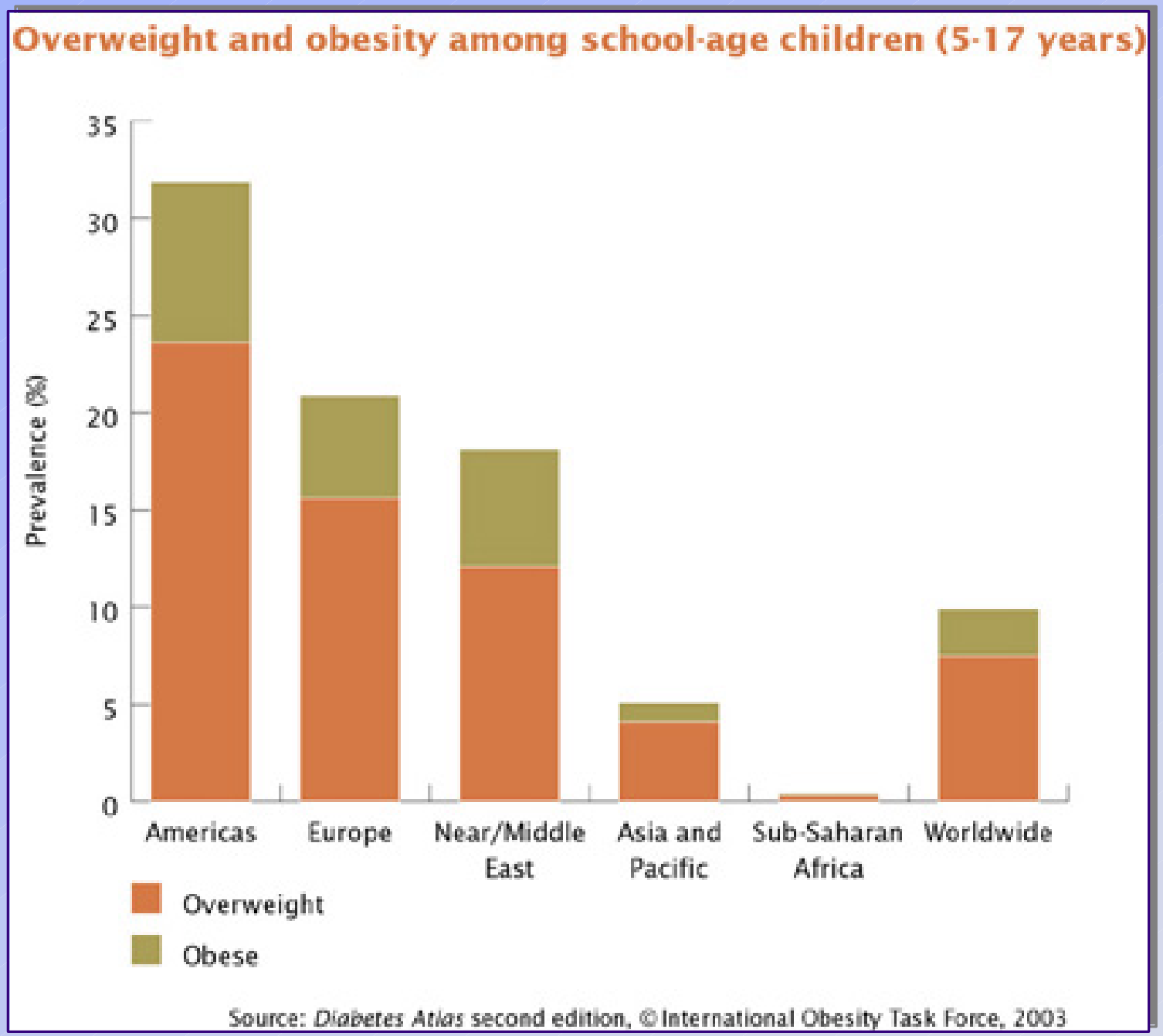
BMI ≥30

* Restricted age group.

** O/wt from MONICA studies

EU Accession Countries




Overweight and obesity among school-age children (5-17 years)
Prevalence (%)
35
30
25
20
15
10
5
0
Americas
Europe
Near/Middle East
Asia and Pacific
Sub-Saharan Africa
Worldwide
Overweight
Obese
Source: Diabetes Atlas second edition, © International Obesity Task Force, 2003

Prevalence (%) of overweight among children in Europe

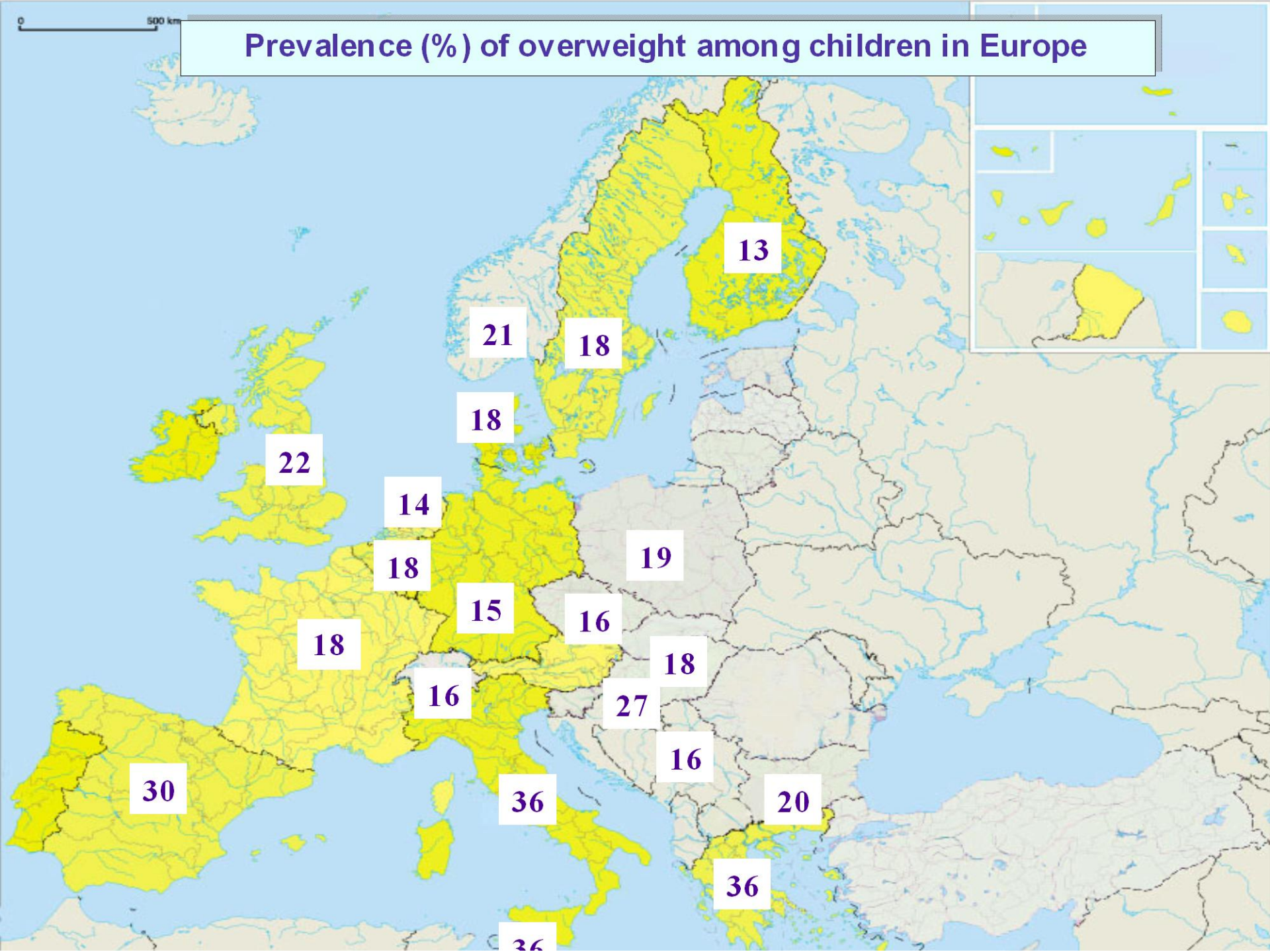


Table 4 Prevalences (%) of stunting, underweight, wasting and overweight among 2–5-year-old children; Iran National Health Survey, 1999

Condition	Prevalence (%)	
	Urban ($n = 2588$)	Rural ($n = 1989$)
Stunted (height-for-age Z-score ≤ -2)		
Boys	20.0	29.3
Girls	17.6	29.2
Underweight (weight-for-age Z-score ≤ -2)		
Boys	14.0	22.9
Girls	17.7	14.2
Wasted (weight-for-height Z-score ≤ -2)		
Boys	9.5	12.3
Girls	11.3	12.0
Overweight (weight-for-height Z-score $\geq +2$)		
Boys	11.0	6.9
Girls	9.0	7.3

Table 8 Prevalences (%) of overweight and obesity (BMI of 25–29.9 and ≥30 kg m^{-2}, respectively) among adults by age and rural/urban residence; Iran National Health Survey, 1999

	Prevalence (%)			
	Urban		Rural	
Adult category	Overweight	Obesity	Overweight	Obesity
Women				
15–39 years (n = 13 185)	24.5	12.3	18.5	6.9
40–69 years (n = 5534)	38.9	27.9	31.3	15.6
70+ years (n = 877)	30.4	15.6	21.6	6.7
Men				
15–39 years (n = 10 029)	21.2	4.7	14.3	2.2
40–69 years (n = 4746)	39.8	11.0	22.5	6.2
70+ years (n = 953)	28.5	5.7	16.5	3.0

Table 7

Summary of strength of evidence on factors that might promote or protect against weight gain and obesity[a]

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Regular physical activity High dietary intake of NSP (dietary fibre)[b]		Sedentary lifestyles High intake of energy-dense micronutrient-poor foods[c]
Probable	Home and school environments that support healthy food choices for children[d] Breastfeeding		Heavy marketing of energy-dense foods[d] and fast-food outlets[d] High intake of sugars-sweetened soft drinks and fruit juices Adverse socioeconomic conditions[d] (in developed countries, especially for women)
Possible	Low glycaemic index foods	Protein content of the diet	Large portion sizes High proportion of food prepared outside the home (developed countries) "Rigid restraint/periodic disinhibition" eating patterns
Insufficient	Increased eating frequency		Alcohol

[a] Strength of

The interlinking of physical inactivity and dietary effects on obesity and the progression of disease with industrialisation

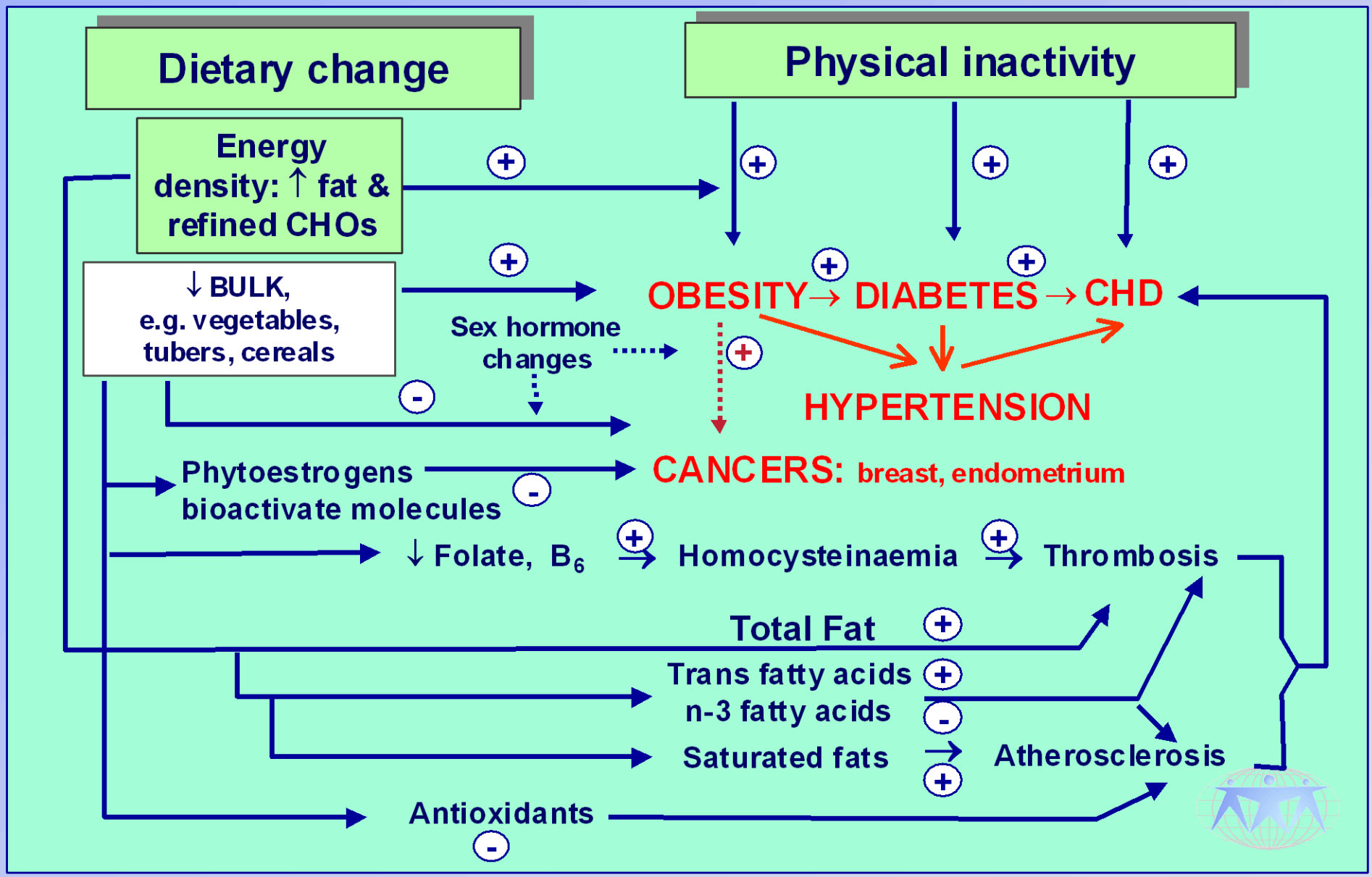


Table 1. Features of the Metabolic Syndrome

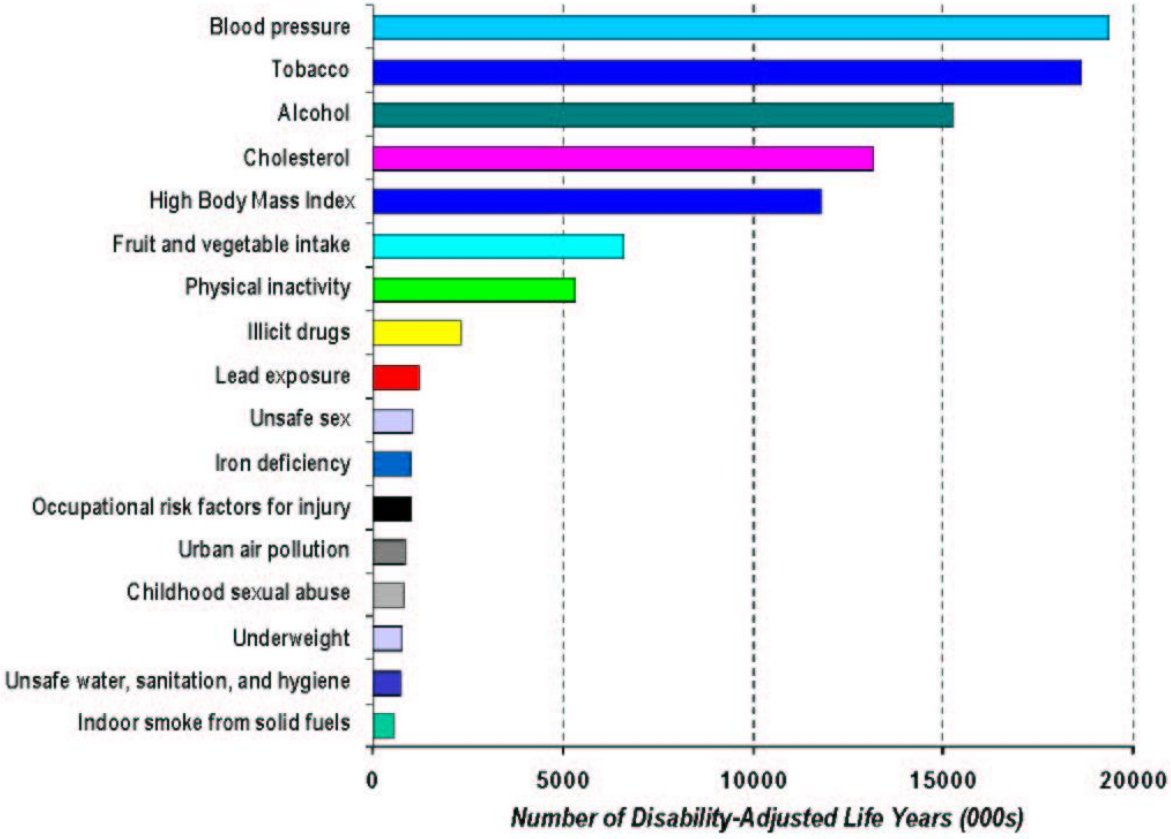
Central features	Other components
Central adiposity	Microalbuminuria
Dyslipidemia including increased plasma triglycerides, low plasma HDL cholesterol, and small dense LDL cholesterol particles	Procoagulant state including elevated levels of plsdminogen activator inhibitor-1, von Willebrand factor, fibrinogen, and factor VII
Hypertension	Inflammatory markers including elevated levels of C-reactive protein (CRP) and IL-6
Hyperglycemia	Vascular abnormalties including elevated levels of intracellular adhesion molecule-1 and vascular cell adhesion molecule
Hyperinsulinemia	Insulin resistance
Abnormal glucose tolerance	Hyperuricemia

Table 2. Clinical features of the Metabolic Syndrome

Risk factor	Defining level
Abdominal obesity (waist circumference)	
Men	>102 cm (>40 in)
Women	>88 cm (>35 in)
HDL cholesterol	
Men	<40 mg/dL
Women	<50 mg/dL
Triglycerides	≥150 mg/dL
Fasting glucose	≥110 mg/dL
Blood pressure (SBP/DBP)	≥130/≥85 mm Hg

EUROPE

Disease burden (DALYs) in 2000 attributable to selected leading risk factors



Source: WHR 2002

World Health Organization

Table 11

Summary of strength of evidence on lifestyle factors and the risk of developing cancer

Evidence	Decreased risk	Increased risk
Convincing[a]	Physical activity (colon)	Overweight and obesity (oesophagus, colorectum, breast in postmenopausal women, endometrium, kidney) Alcohol (oral cavity, pharynx, larynx, oesophagus, liver, breast) Aflatoxin (liver) Chinese-style salted fish (nasopharynx)
Probable[a]	Fruits and vegetables (oral cavity, oesophagus, stomach, colorectum[b]) Physical activity (breast)	Preserved meat (colorectum) Salt-preserved foods and salt (stomach) Very hot (thermally) drinks and food (oral cavity, pharynx, oesophagus)
Possible/ insufficient	Fibre Soya Fish n-3 Fatty acids Carotenoids Vitamins B_2, B_6, folate, B_{12}, C, D, E Calcium, zinc and selenium Non-nutrient plant constituents (e.g. allium compounds, flavonoids, isoflavones, lignans)	Animal fats Heterocyclic amines Polycyclic aromatic hydrocarbons Nitrosamines

[a] The "convincing" and "probable" categories in this report correspond to the "sufficient" category of the IARC report on weight control and physical activity (*4*) in terms of the public health and policy implications.

[b] For colorectal cancer, a protective effect of fruit and vegetable intake has been suggested by many case-control studies but this has not been supported by results of several large prospective studies, suggesting that if a benefit does exist it is likely to be modest.

Summary of strength of evidence on lifestyle factors and risk of developing cardiovascular diseases

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Regular physical activity Linoleic acid Fish and fish oils (EHA and DHA) Vegetables and fruits (including berries) Potassium Low to moderate alcohol intake (for coronary heart disease)	Vitamin E supplements	Myristic and palmitic acids Trans fatty acids High sodium intake Overweight High alcohol intake (for stroke)
Probable	α-Linolenic acid Oleic acid NSP Wholegrain cereals Nuts (unsalted) Plant sterols/stanols Folate	Stearic acid	Dietary cholesterol Unfiltered boiled coffee
Possible	Flavonoids Soy products		Fats rich in lauric acid Impaired fetal nutrition Beta-carotene supplements
Inufficient	Calcium Magnesium Vitamin C		Carbohydrates Iron

EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; NSP, non-starch polysaccharides.

Summary of strength of evidence on lifestyle factors and risk of developing type 2 diabetes

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Voluntary weight loss in overweight and obese people		Overweight and obesity
	Physical activity		Abdominal obesity
			Physical inactivity
			Maternal diabetes[a]
Probable	NSP		Saturated fats
			Intrauterine growth retardation
Possible	n-3 fatty acids		Total fat intake
	Low glycaemic index foods		Trans fatty acids
	Exclusive breastfeeding[b]		
Insufficient	Vitamin E		Excess alcohol
	Chromium		
	Magnesium		
	Moderate alcohol		

Summary of strength of evidence linking diet to osteoporotic fractures

Evidence	Decreased risk	No relationship	Increased risk
Convincing Older people[a]	Vitamin D Calcium Physical activity		High alcohol intake Low body weight
Probable Older people[a]		Fluoride[b]	
Possible	Fruits and vegetables[c] Moderate alcohol intake Soy products	Phosphorus	High sodium intake Low protein intake (in older people) High protein intake

Summary of strength of evidence linking diet to dental caries

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Fluoride exposure (local and systematic)	Starch intake (cooked and raw starch foods, such as rice, potatoes and bread; excludes cakes, biscuits and snacks with added sugars)	Amount of free sugars Frequency of free sugars
Probable	Hard cheese Sugars-free chewing gum	Whole fresh fruit	
Possible	Xylitol Milk Dietary fibre		Undernutrition
Insufficient	Whole fresh fruit		Dried fruits

What are the causes for this situation ?

Answers will be given in the next lecture