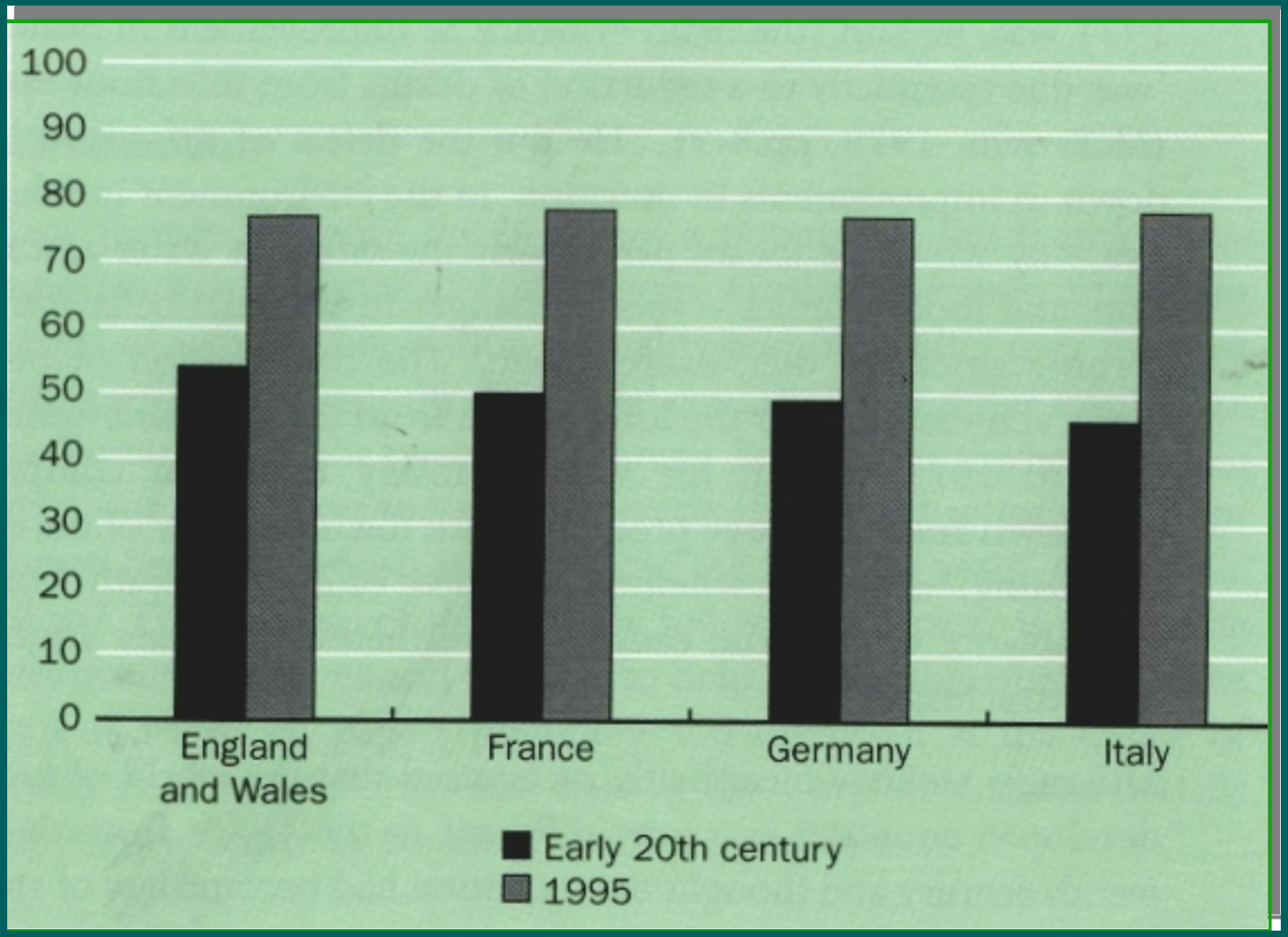
The challenge of combating climate change, the food crisis and escalating health costs

Philip James

LSHTM and Chair of IOTF and the Presidential Council of the Global Prevention Alliance

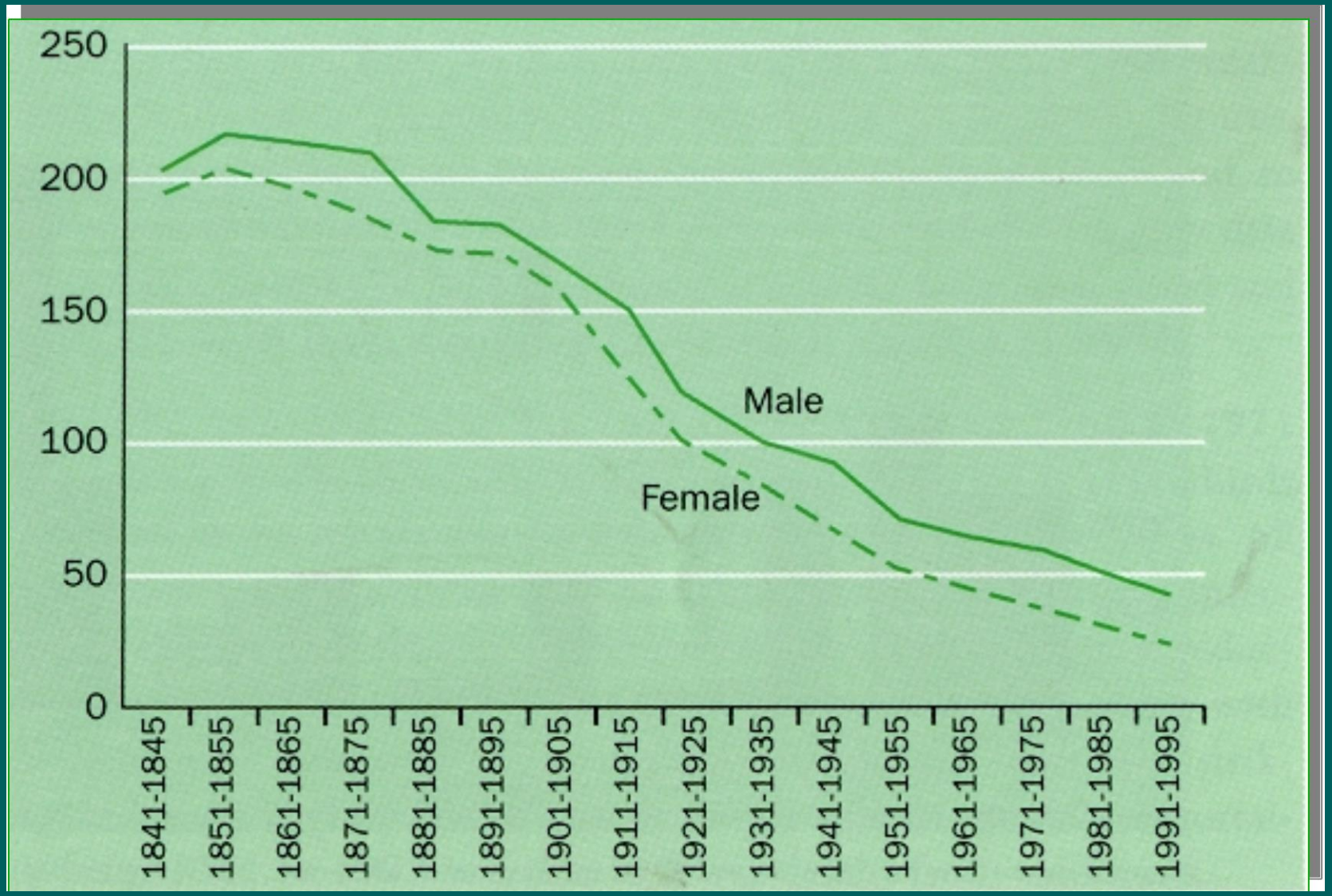
IUNS IDF IOTF IPA WHF

Improved life expectancy at birth

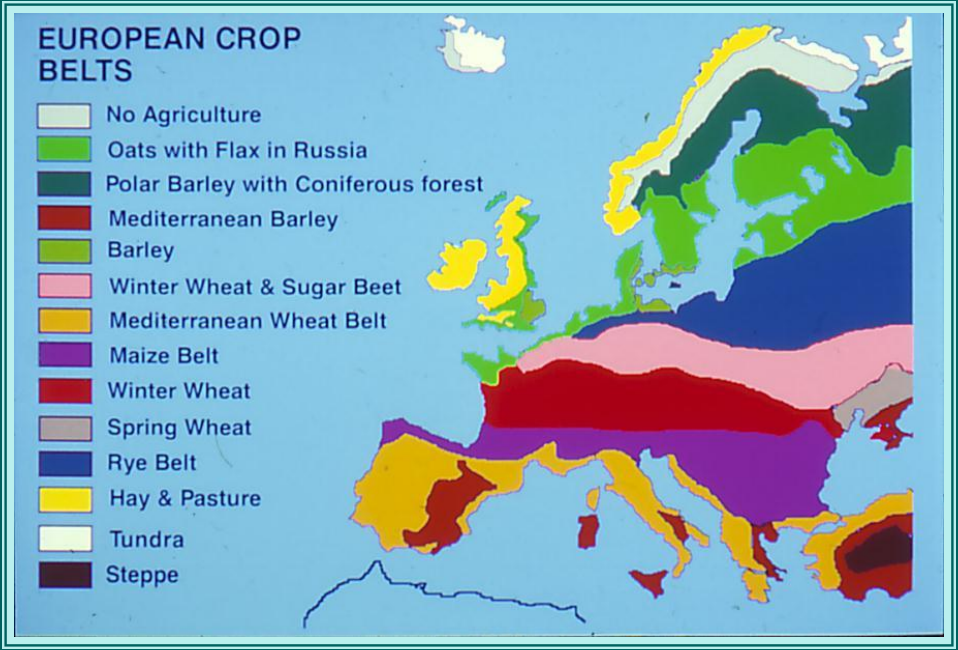


Sussex J & Yuan P. Improving population health in industrialised nations. 2000

Death rate trends in England and Wales, 1841-1995

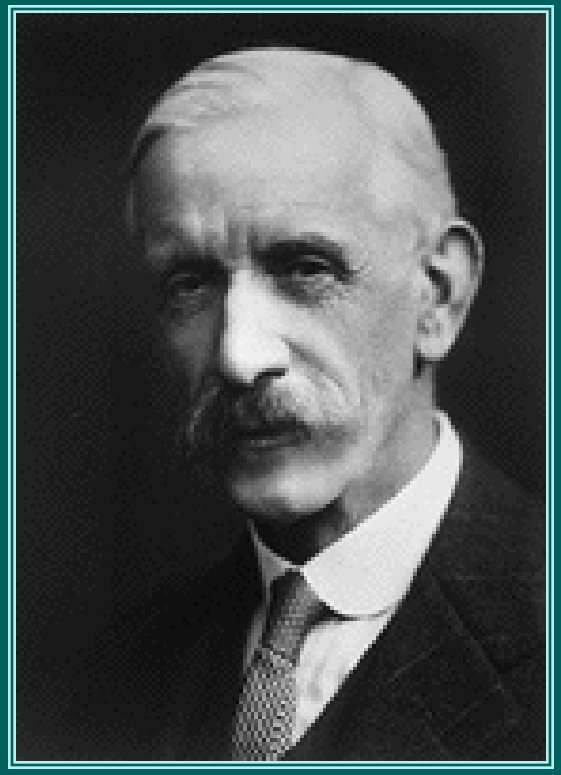


Sussex J & Yuan P. Improving population health in industrialised nations. 2000

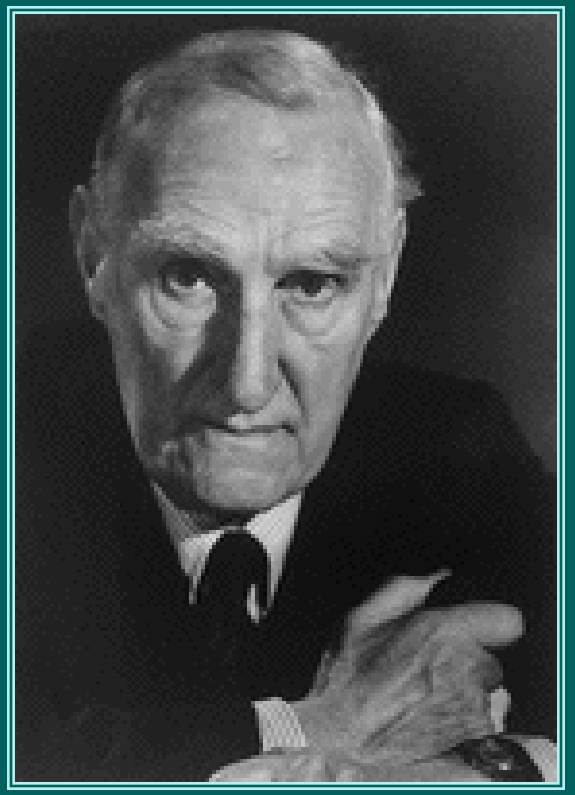

EUROPEAN CROP BELTS
No Agriculture
Oats with Flax in Russia
Polar Barley with Coniferous forest
Mediterranean Barley
Barley
Winter Wheat & Sugar Beet
Mediterranean Wheat Belt
Maize Belt
Winter Wheat
Spring Wheat
Rye Belt
Hay & Pasture
Tundra
Steppe

The excitement of Nutritional Science: Nobelists

Christian Eijkman

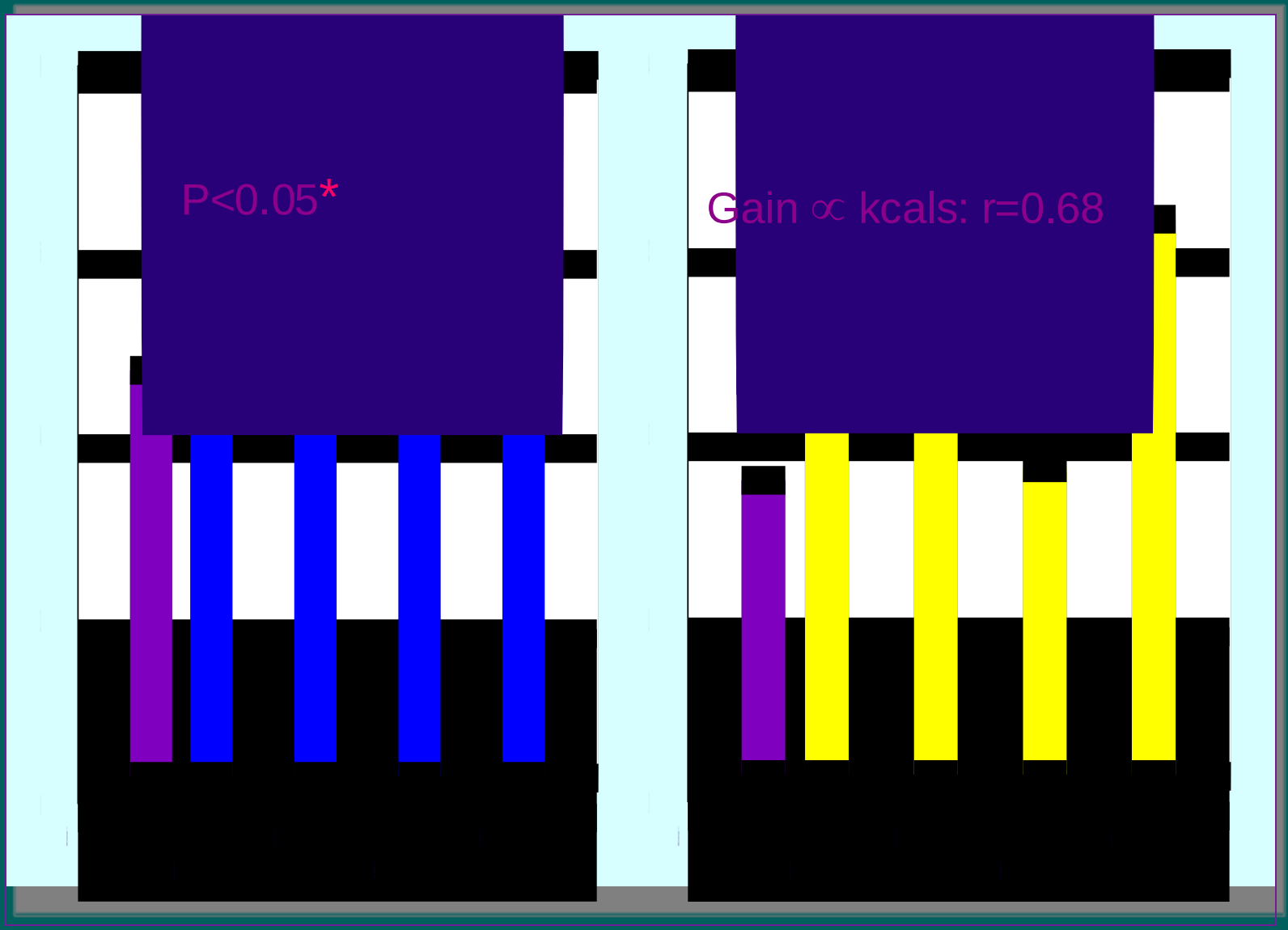


Frederick
Gowland Hopkins



John Boyd Orr

Response to food supplements in stunted children



C. Petty (PhD, 1987) from Corry Mann HC. In "Diets for boys during the school years". 1926.

British wartime feeding based on novel nutritional concepts

Cod liver oil

Milk

Orange juice

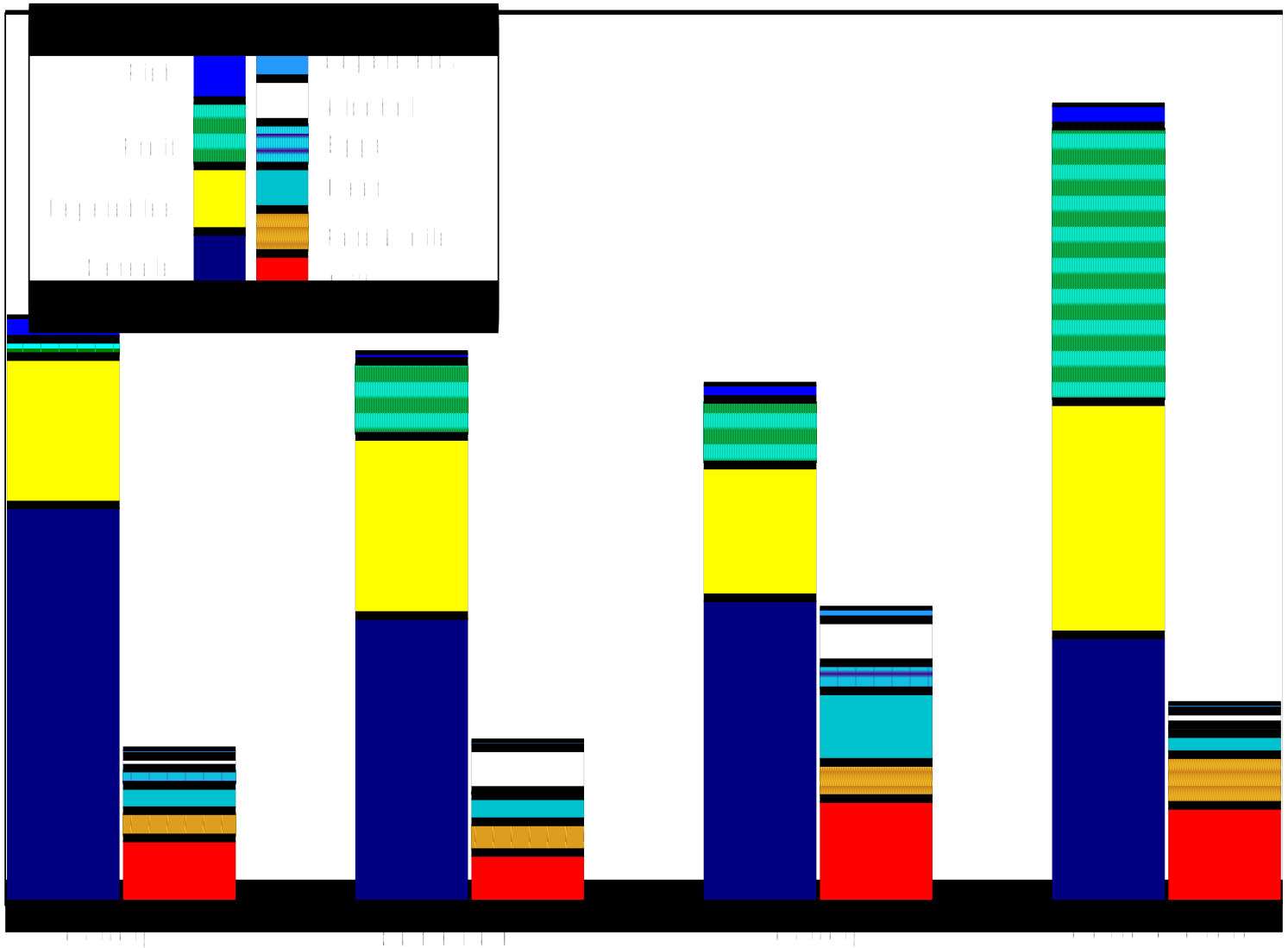

FRUIT YOU WASTE
HERE!
.... MAY PREVENT HIS
WOUNDS FROM HEALING
THERE!
VITAMIN "C" (ASCORBIC ACID) FOUND IN CITRUS FRUITS
IS AN AID TO HEALING WOUNDS AND BUILDING TISSUE
SAVE


FOOD IS A WEAPON
DON'T WASTE IT!
BUY WISELY – COOK CAREFULLY – EAT IT ALL
FOLLOW THE NATIONAL WARTIME NUTRITION PROGRAM

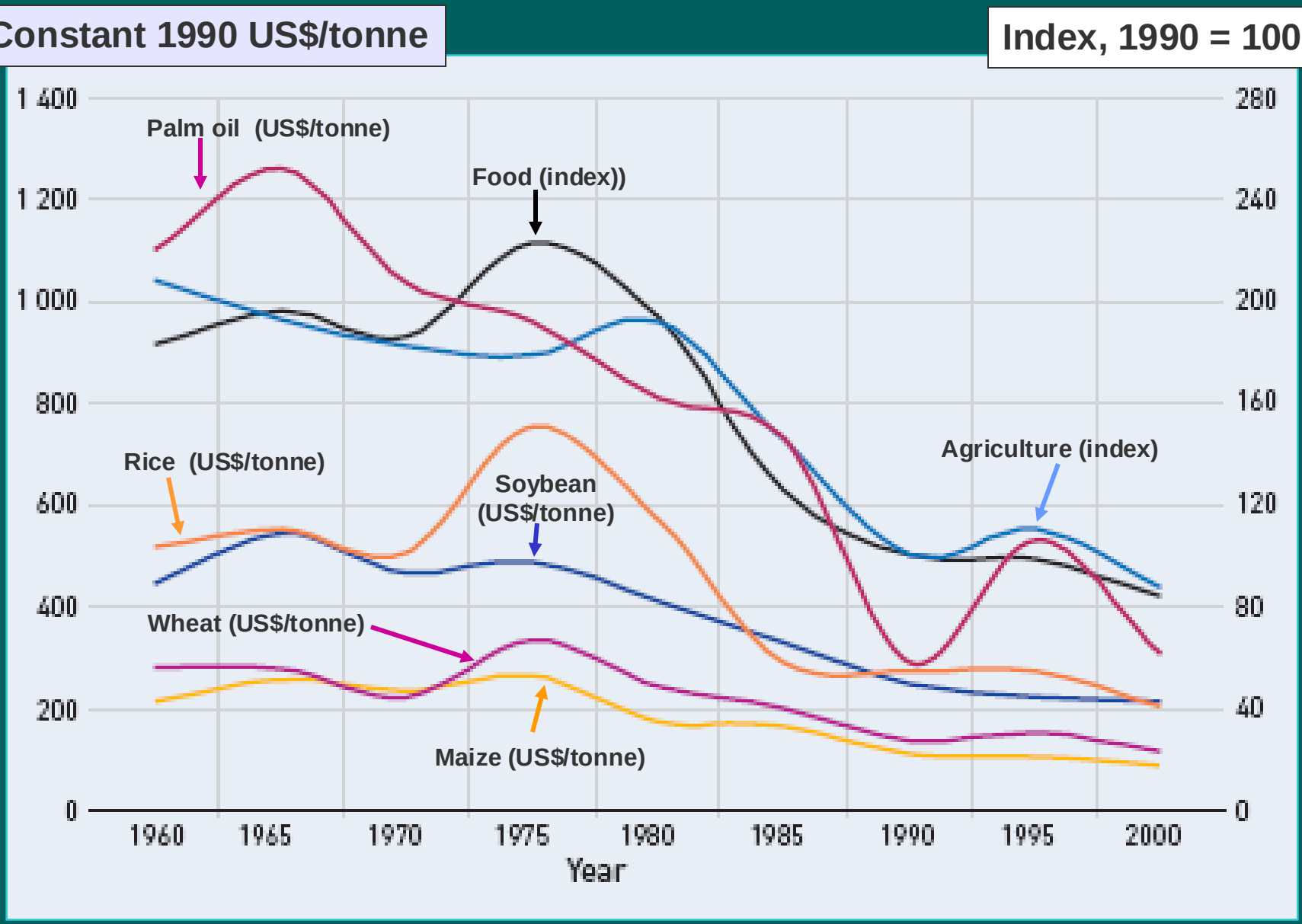
The transformation of agriculture: an issue of fundamental national security

The result of decades long major EU and multiple government funding of dairying

The Traditional Mediterranean Diet



The fall in the global cost of agricultural commodities 1960-2000



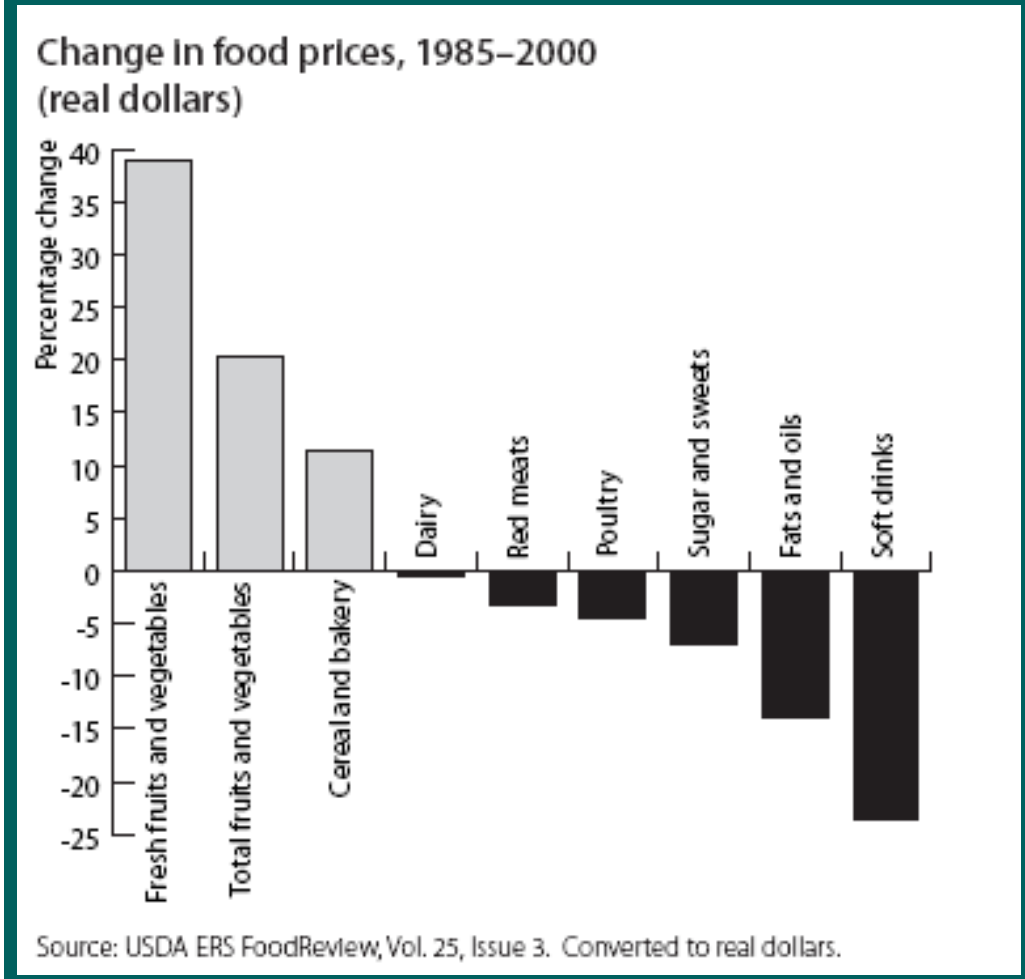
Based on 1990 world market prices.

Source: World Bank, 2001.

Food without Thought

How U.S. Farm Policy Contributes to Obesity

20 years Institute for Agriculture and Trade Policy
Environment and Agriculture Program



Government support for producing grain and oilseed crops comes in many forms, from money invested in public universities and government agencies to research such crops, to subsidy payments that make up for low prices, to continued promises of increased export markets for these crops.

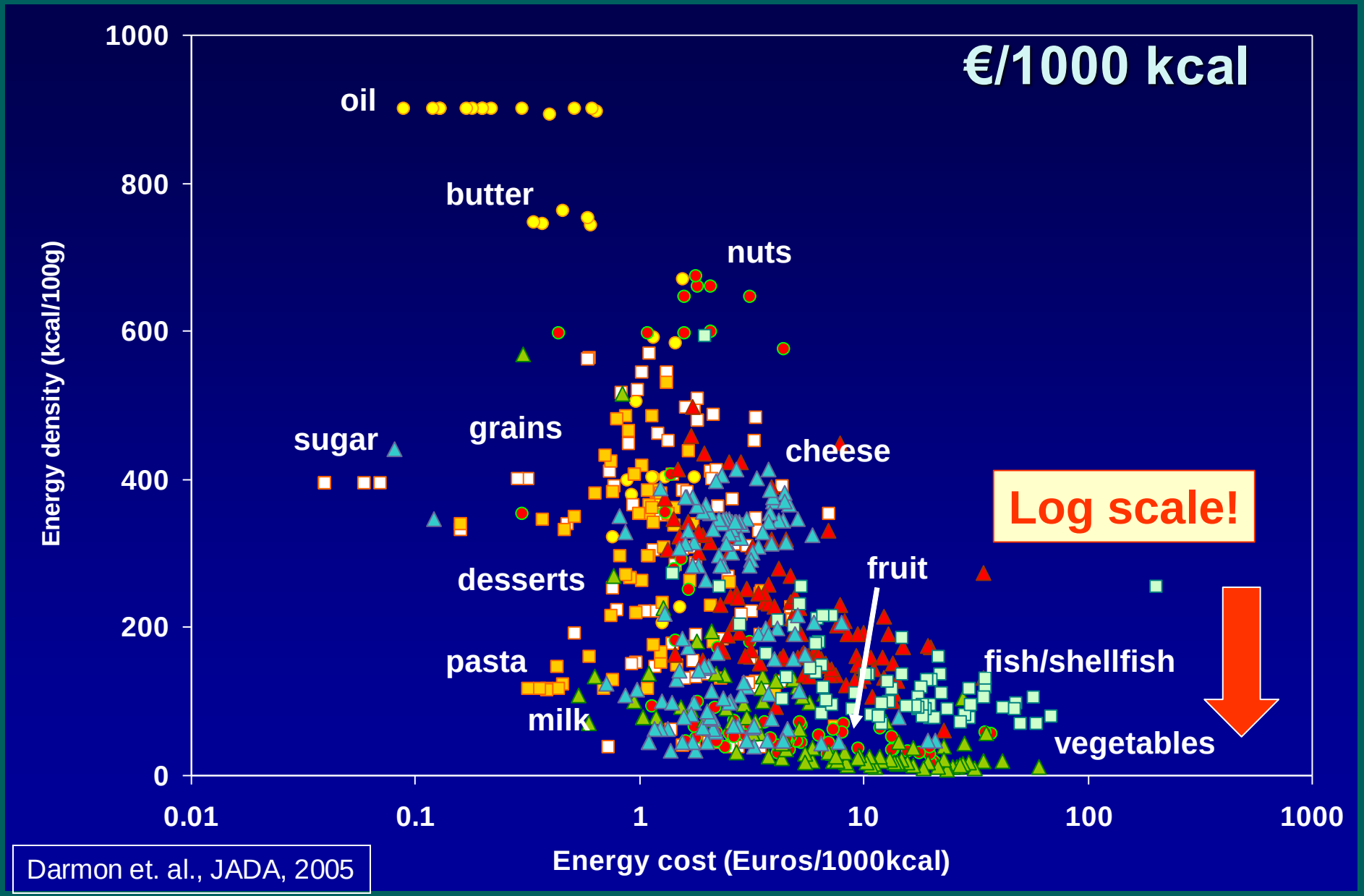
Agriculture policy

- Chronic over-production of sugar and butter
- Low cost of calories from oils, sugars, starches

55 cents for 100 kcal

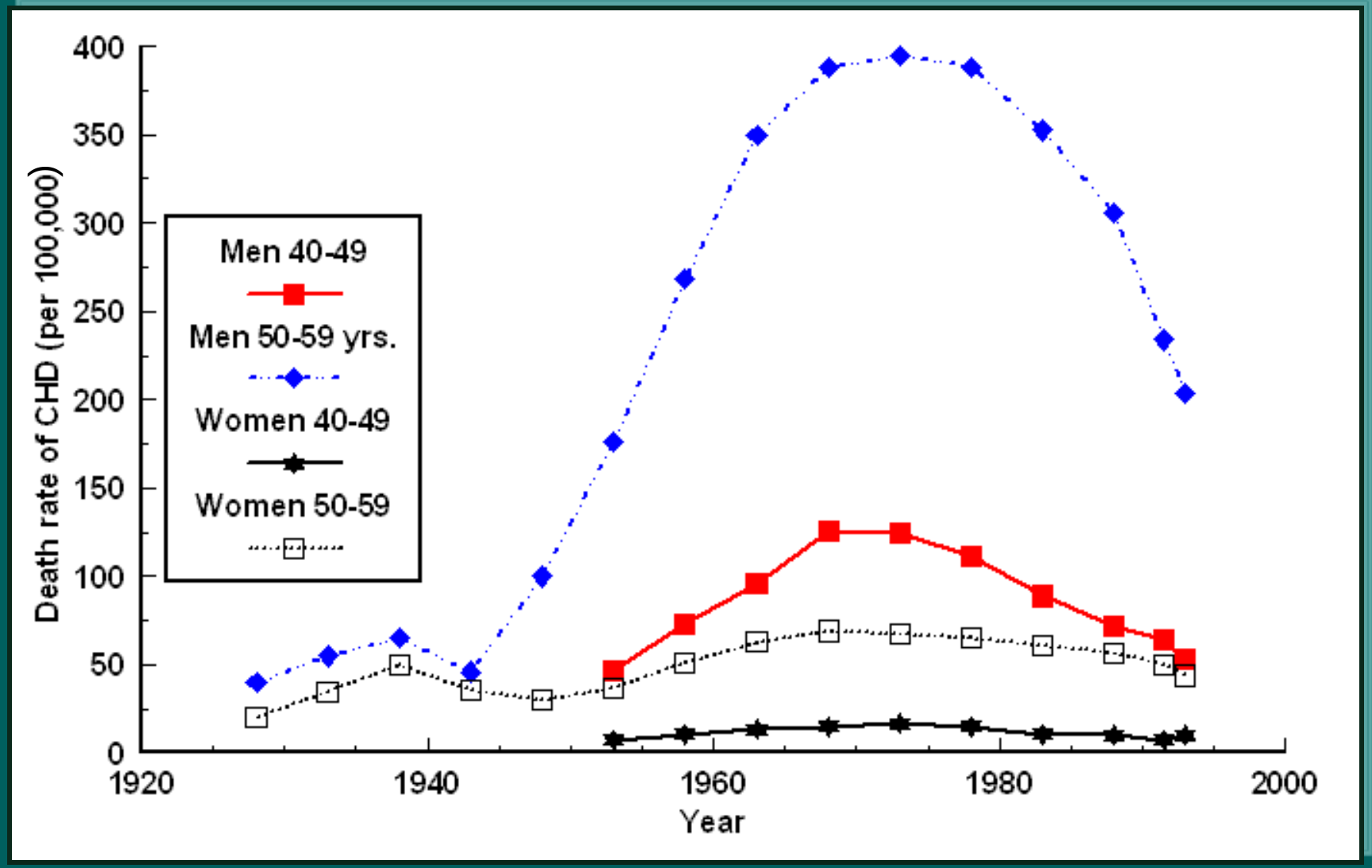
1 cent for 100 kcal

High energy dense foods (kcal/100g) cost less in France

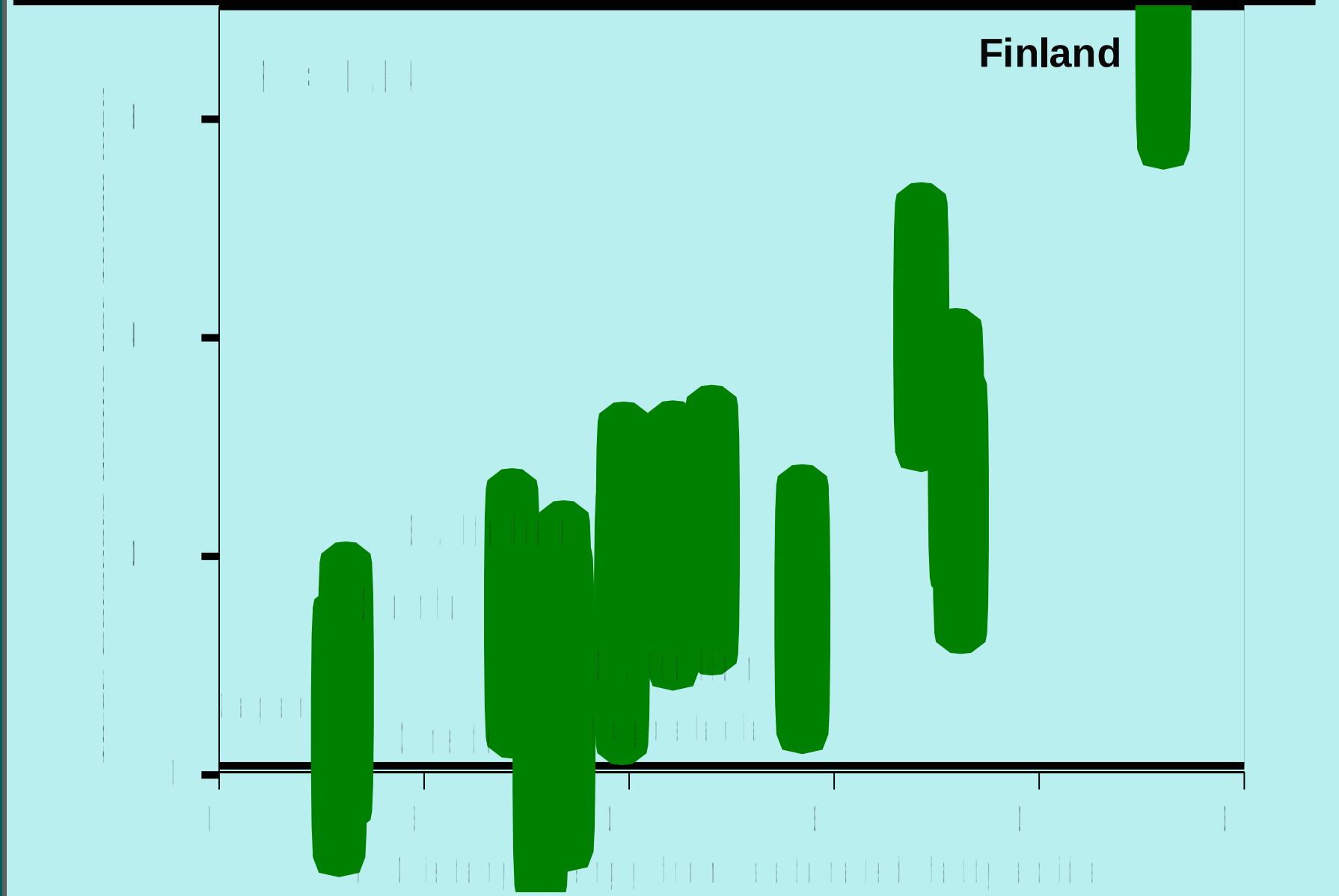


Darmon et. al., JADA, 2005

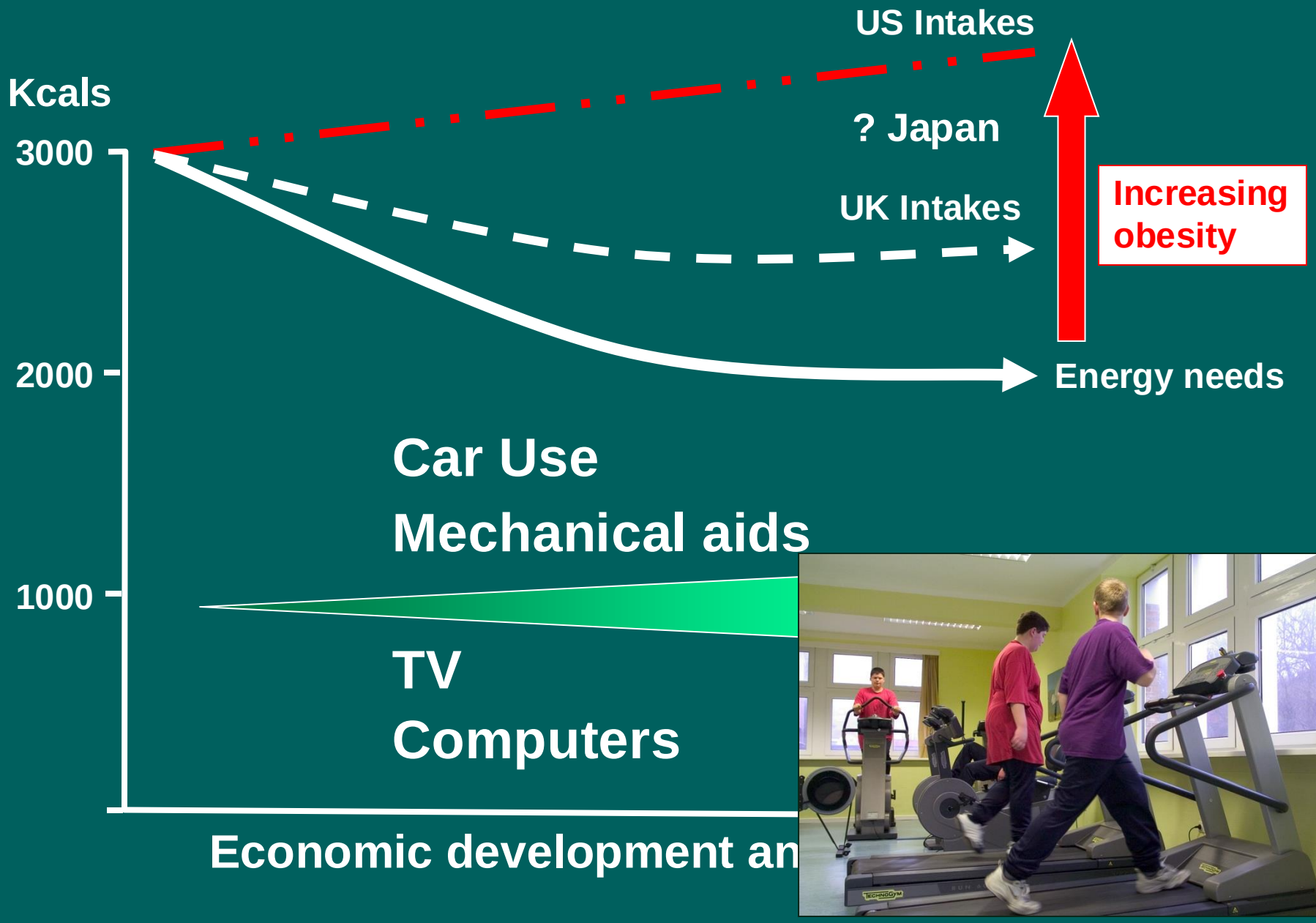
Nutritionists advocate a "balanced diet": the emergence of coronary heart disease in the Western world

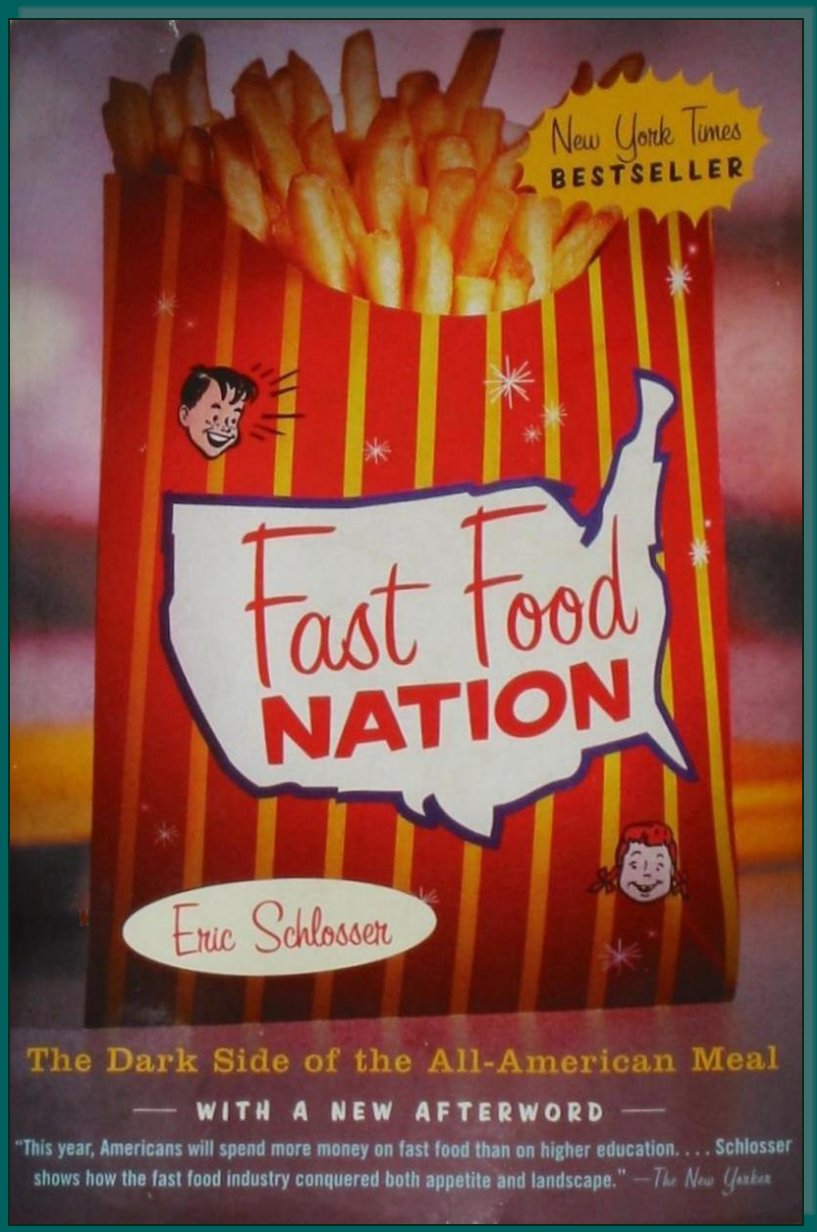


UN Commission Report: Food & Nutrition Bulletin, 2000.


Finland

Economic development and falling food needs

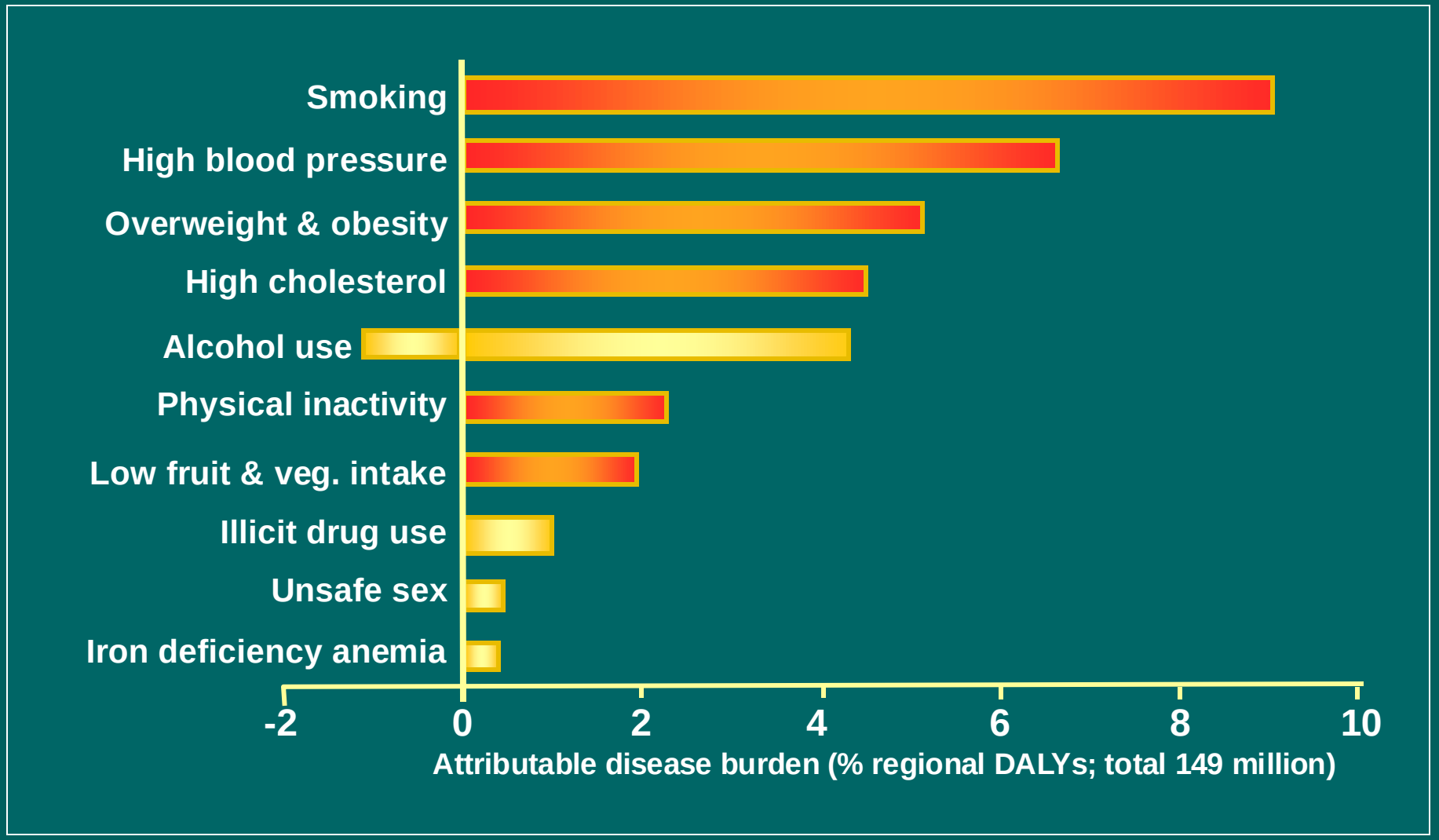




A quarter-pound cheeseburger, large fries and a 16 oz. soda *provide:*

- **1,166 calories**
- **51 g fat**
- **95 mg cholesterol**
- **1,450 mg sodium**

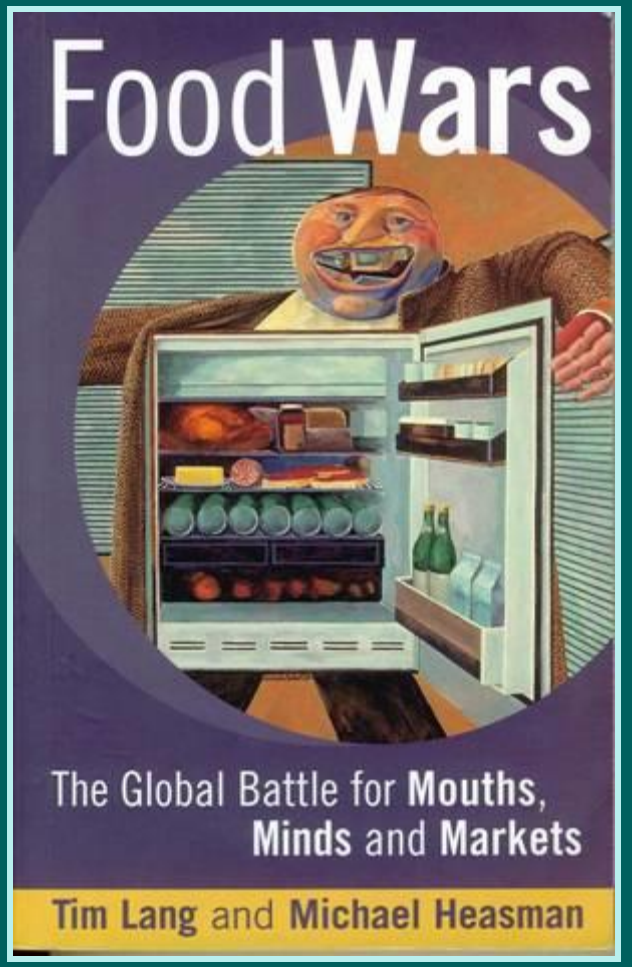
The top risk factors underlying the disease burden of high income countries (all preventable)



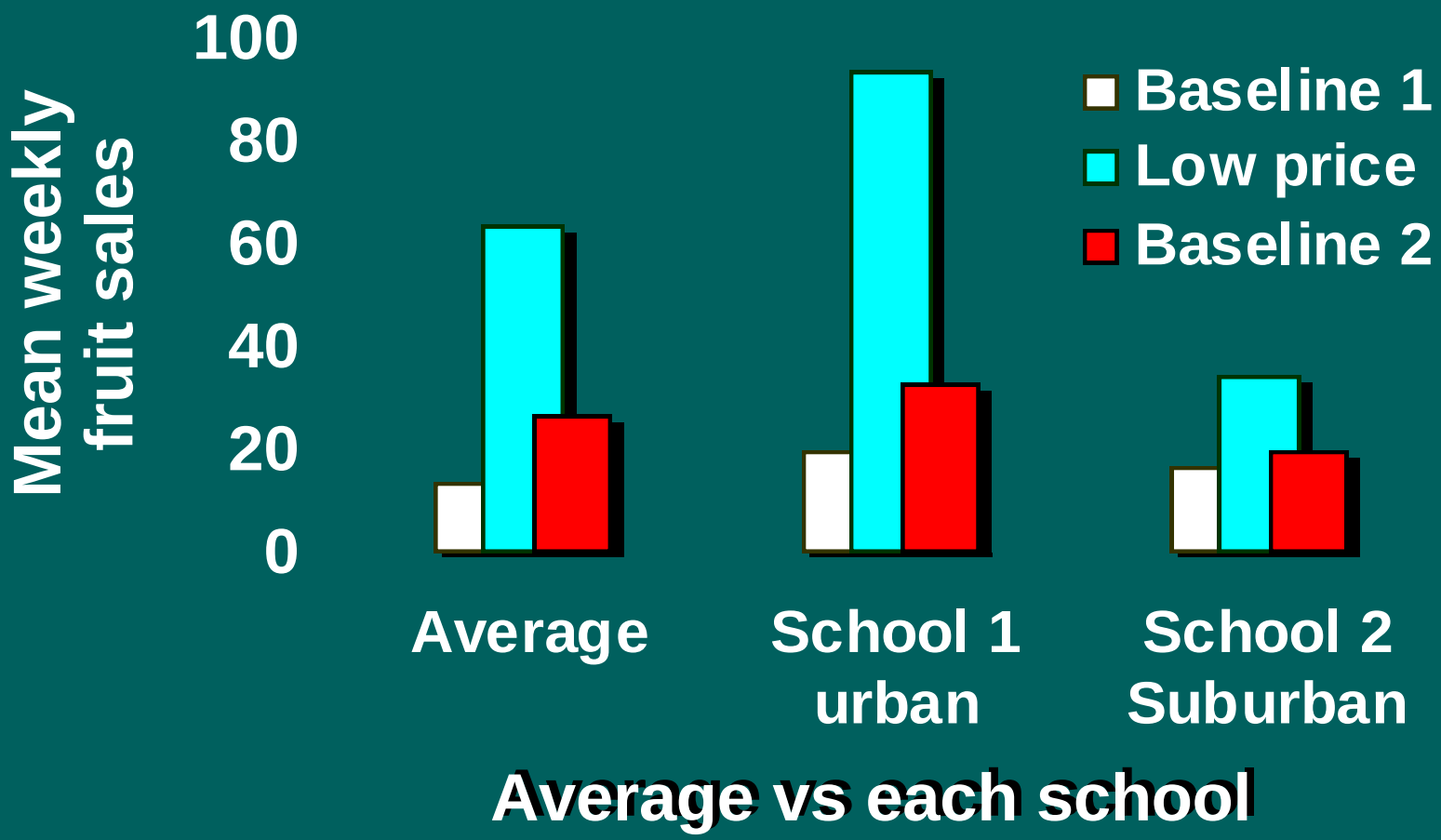
WHO / World Bank. Global Burden of Disease. Lopez et al., 2006.

The keys to success in the food business and in obesity and chronic disease prevention

- Price
- Availability
- Marketing



Children's fruit purchases depend on price



French et al, 1997

Snack Foods are everywhere

- Car washes
- Book stores
- Hardware stores (Home Depot)
- Gas stations
- Office buildings (vending machines)
- Health clubs/gyms
- Video stores
- Car repair shops

mycoke

Manipulating children's behaviour: evidence from a UK government

Food industry promotions

- Can confuse nutritional knowledge, e.g. whether fruit is in product
- Change food preferences
- Change purchasing behaviour
- Influence choice and consumption by brand
- Alter balance of categories of food eaten

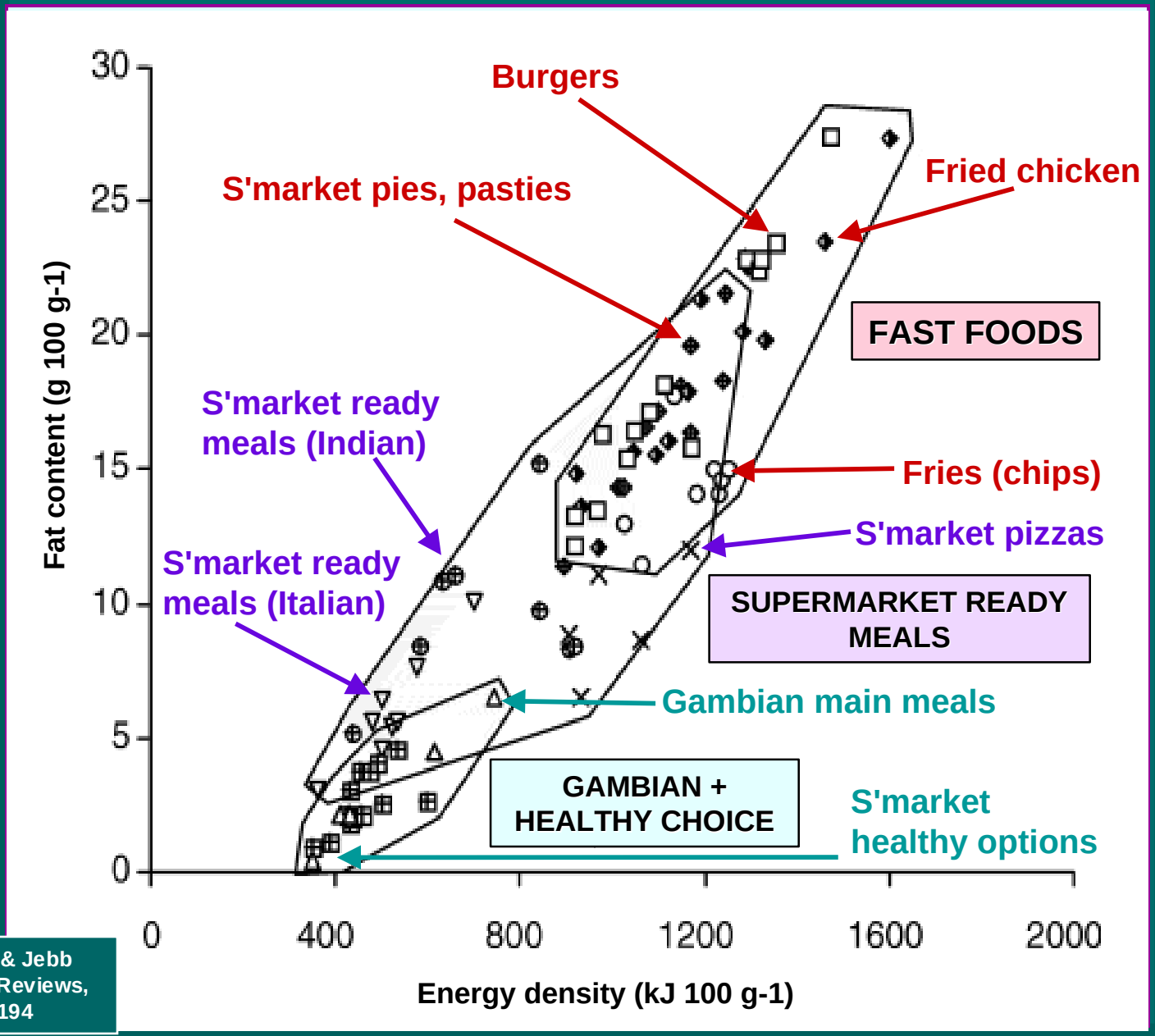
Hastings Report, UK Food Standards Agency, 25th September, 2003.

End of aisle display increases sales 2-5 fold

CHIPS ARE IN SEASON !

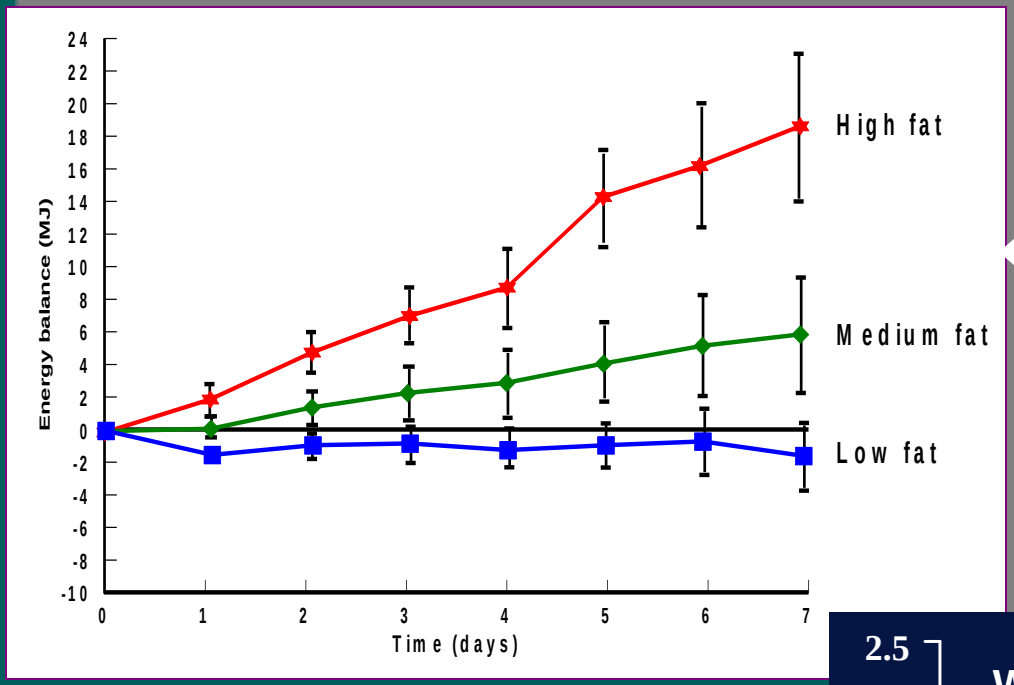
Doubling shelf space increases sales by 40%

Concentration of kcals in food depends mainly on their fat content



Prentice AM & Jebb SA. Obesity Reviews, 2003, 4: 187-194

The brain does not recognise hidden fats & sugary drinks

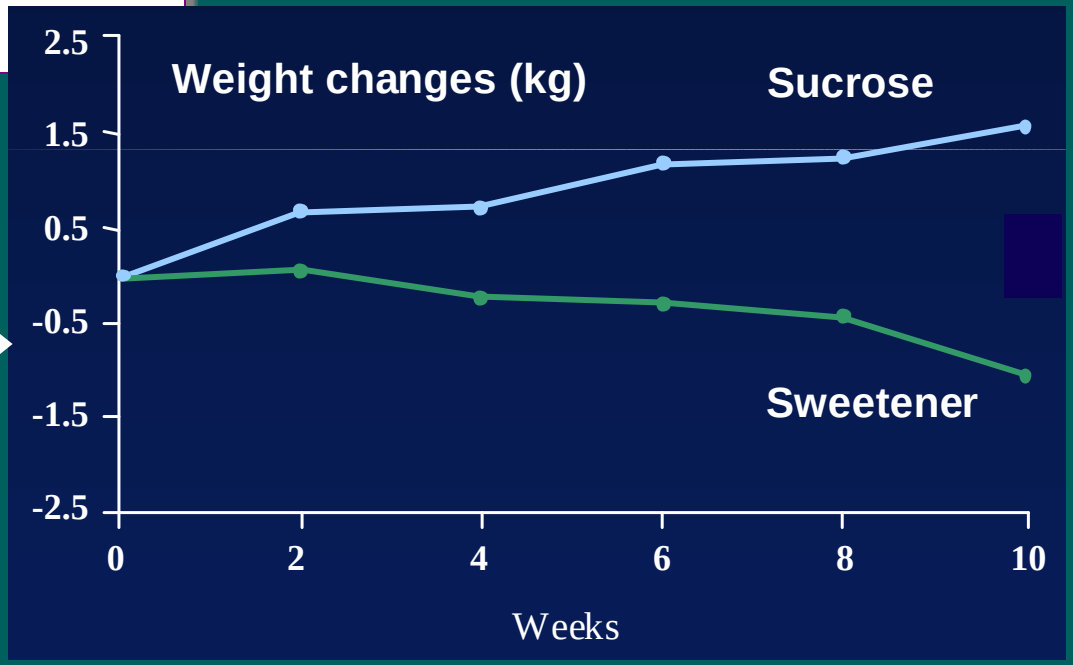


Three groups were offered the same food but with very different fat content.

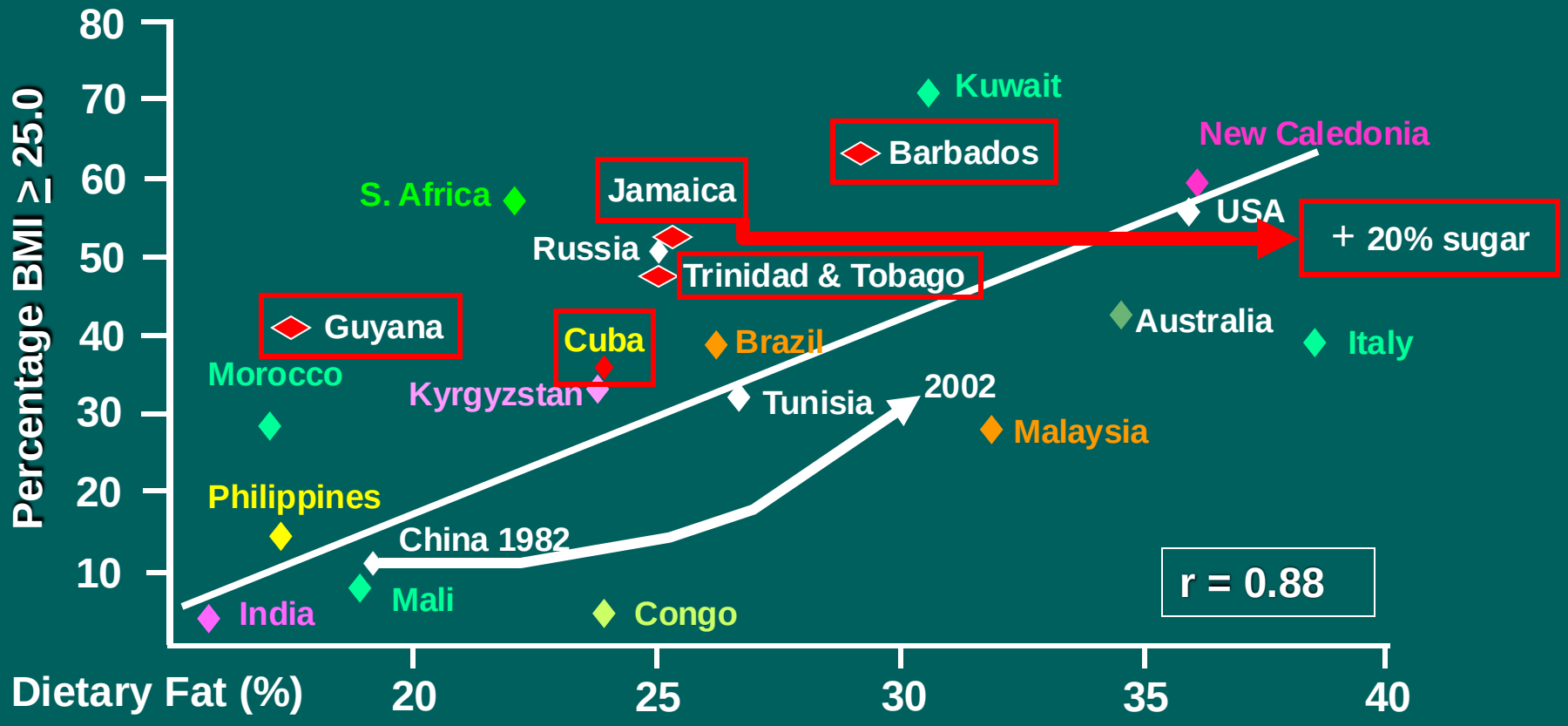
The groups ate the same amount of food: those on high fat foods unconsciously stored kcals and put on weight

2 groups drank soft drinks with either sugar or sweeteners (no kcals).

Those drinking sugary soft drinks unconsciously gained weight every week for 10 weeks; those on calorie free drinks lost weight



Dietary fat and weigh gain : additional effects of high sugar intakes on Caribbean overweight/obesity



Adapted from Bray & Popkin, AJCN 1998; 68: 1157-1173 with data from FAO 2005, CFNI and recent national surveys

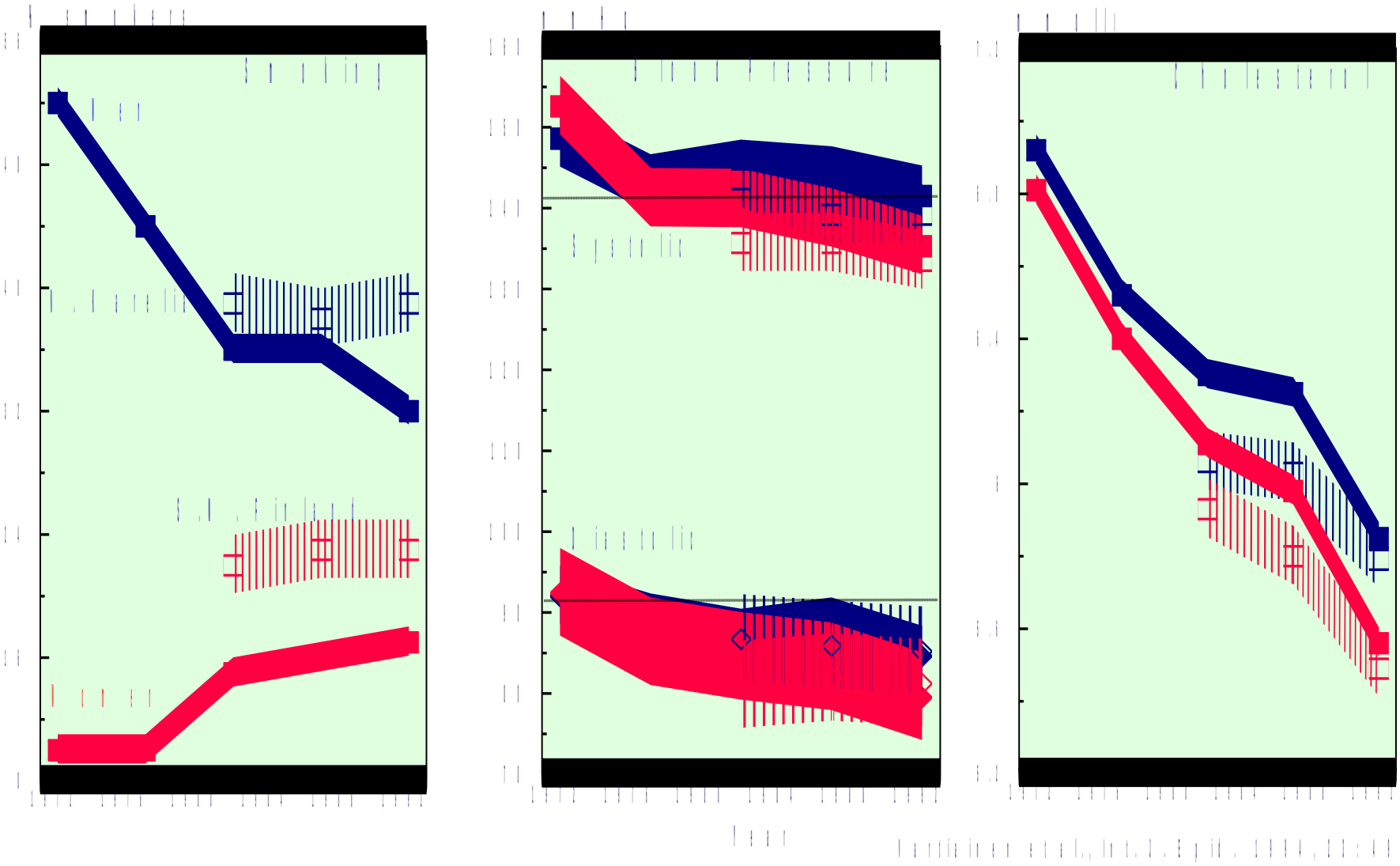
Obesity epidemic is inevitable unless policies to reduce intakes substantially from fat & sugar with spontaneous increases in activity are introduced now

The ten leading causes of death in Low and Middle / High income countries

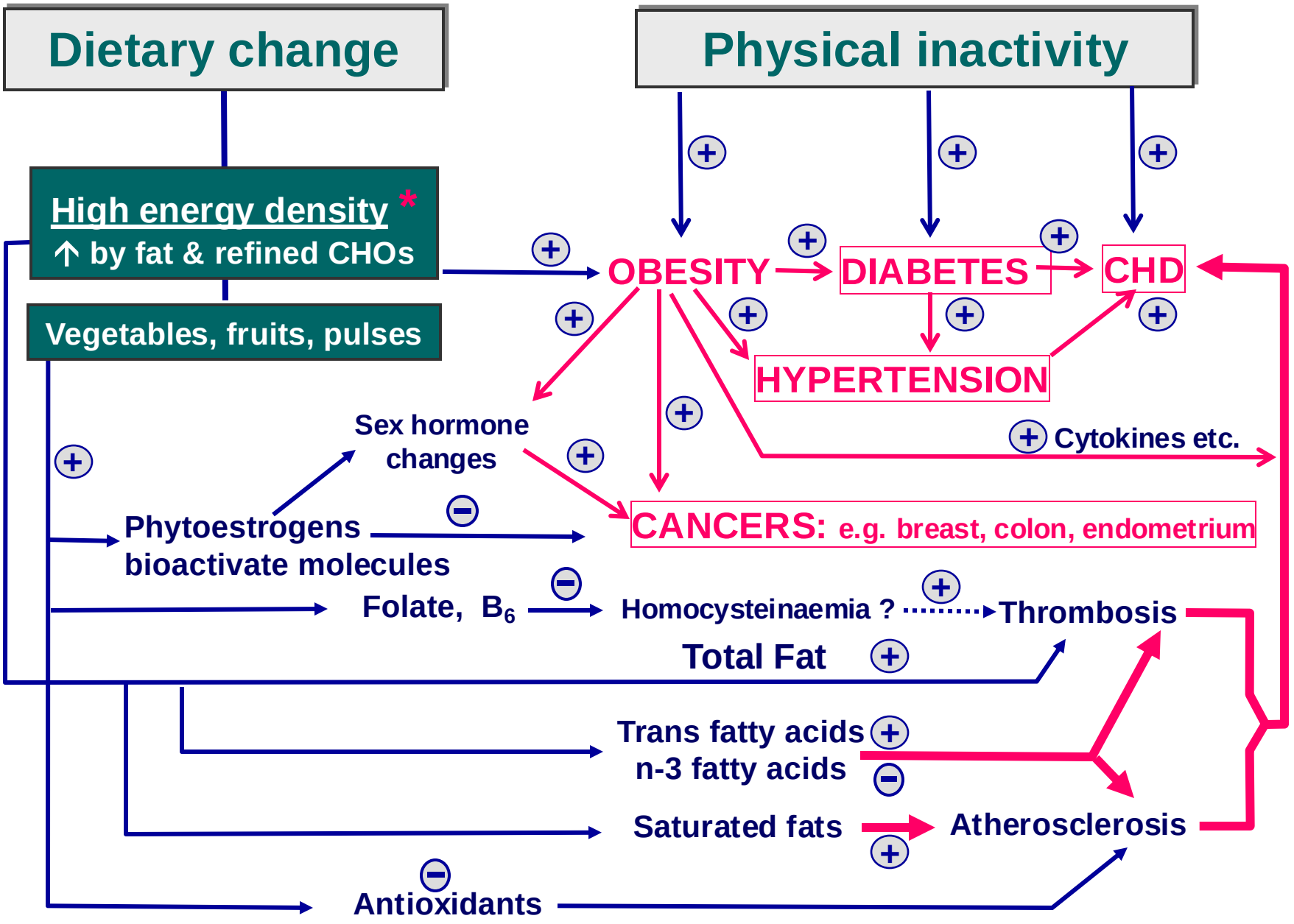
Low- and Middle-income countries				High-income countries			
	Cause	Deaths (millions)	% total deaths	Cause	Deaths (millions)	% total deaths
1.	Ischemic heart disease	5.70	11.8	Ischemic heart disease	1.36	17.3
2.	Cerebrovascular disease	4.61	9.5	Cerebrovascular disease	0.76	9.9
3.	Lower respiratory infections	3.41	7.0	Trachea, bronchus & lung cancers	0.46	5.8
4.	HIV/AIDS	2.55	5.3	Lower respiratory infections	0.34	4.4
5.	Perinatal conditions	2.49	5.1	Chronic obstructive pulmonary disease	0.30	3.8
6.	Chronic obstructive pulmonary disease	2.38	4.9	Colon and rectal cancers	0.26	3.3
7.	Diarrhoeal diseases	1.78	3.7	Alzheimer's & other dementias	0.21	2.6
8.	Tuberculosis	1.59	3.3	Diabetes mellitus	0.20	2.6
9.	Malaria	1.21	2.5	Breast cancer	0.16	2.0
10	Road traffic accidents	1.07	2.2	Stomach cancer	0.15	1.9

WHO / World Bank. Global Burden of Disease. Lopez et al., 2006.

Amplified by excess weight gain

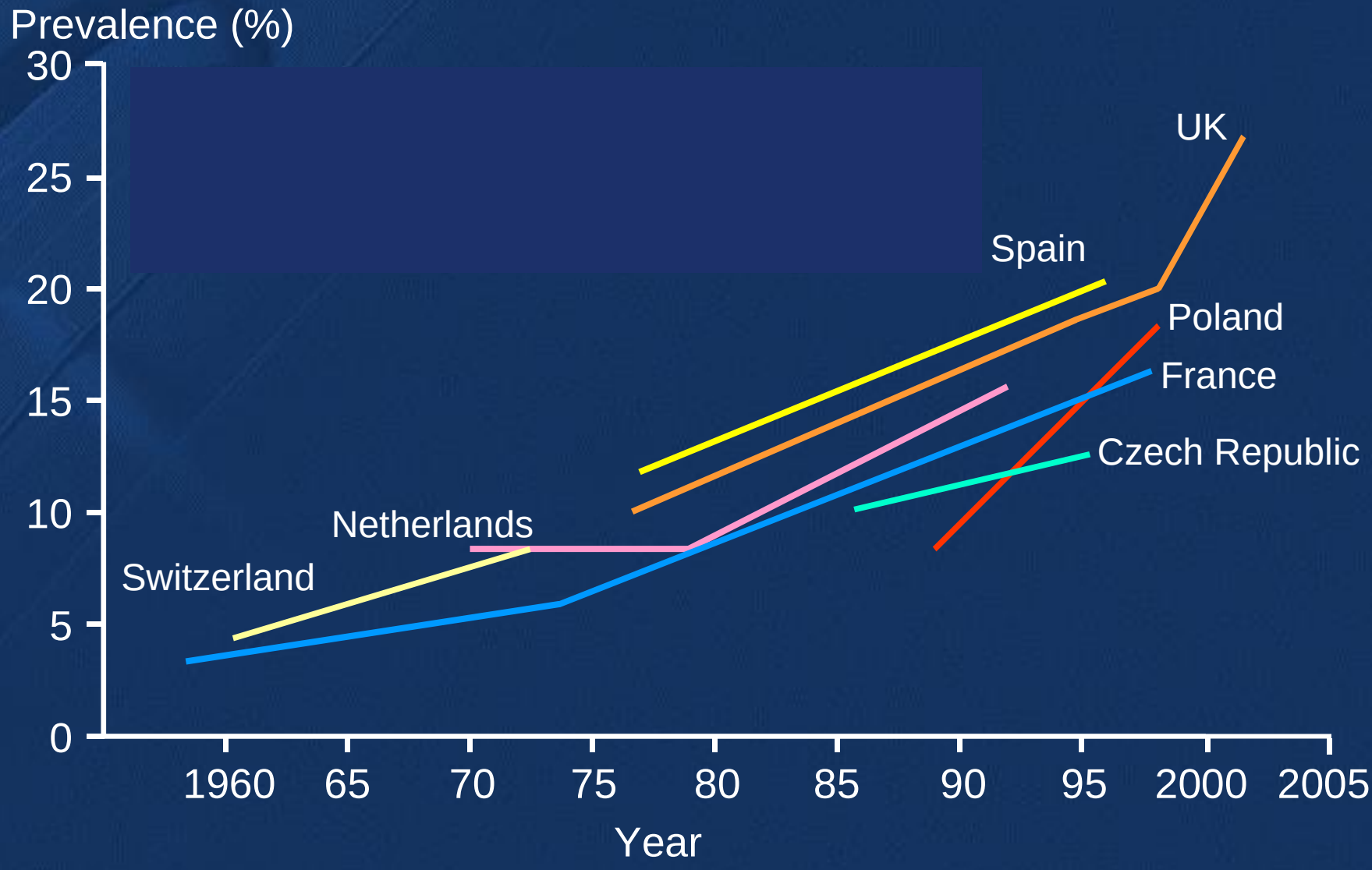


Note remarkable 10mmHg fall in BP and 15% drop in cholesterol - not drug based



* Energy density reduced by water-holding, bulky foods, e.g. tubers, cereals, vegetables, fruits, pulses.

Excess bodyweight is increasingly prevalent in children and adolescents

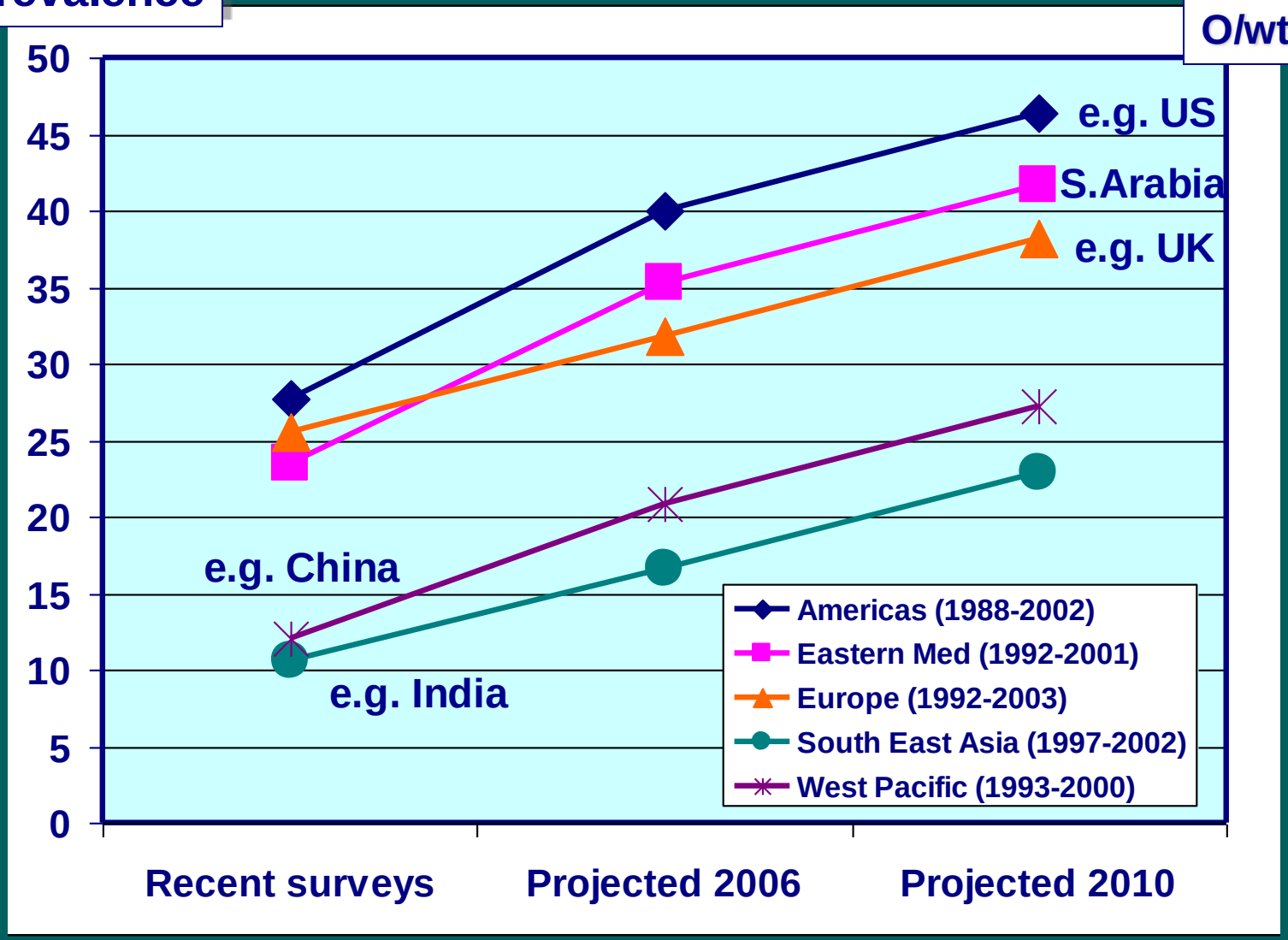


IOTF/EASO Obesity in Europe Report 2002; IOTF 2004

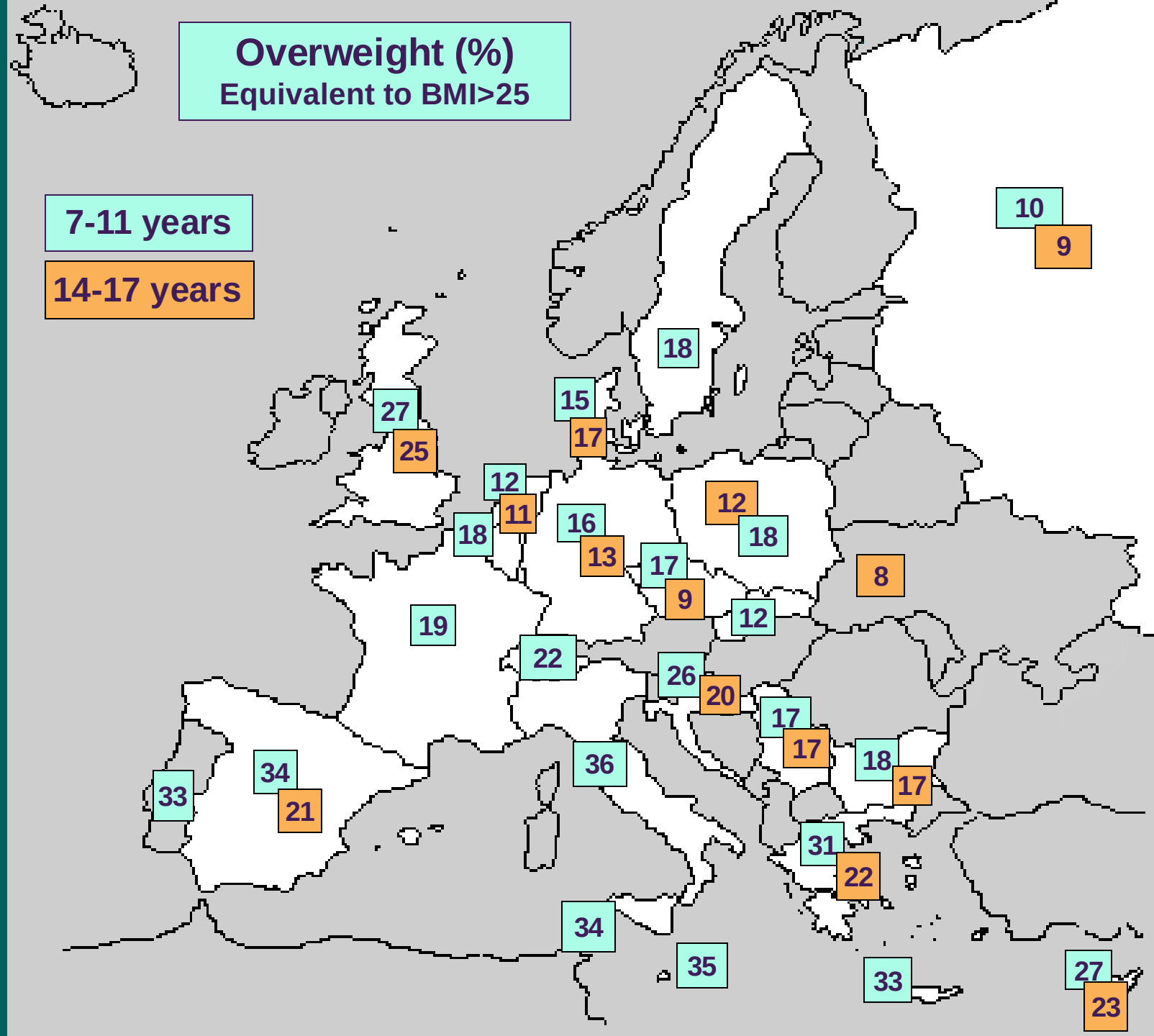

Dax

Projected overweight (incl. obesity) rates for school age children

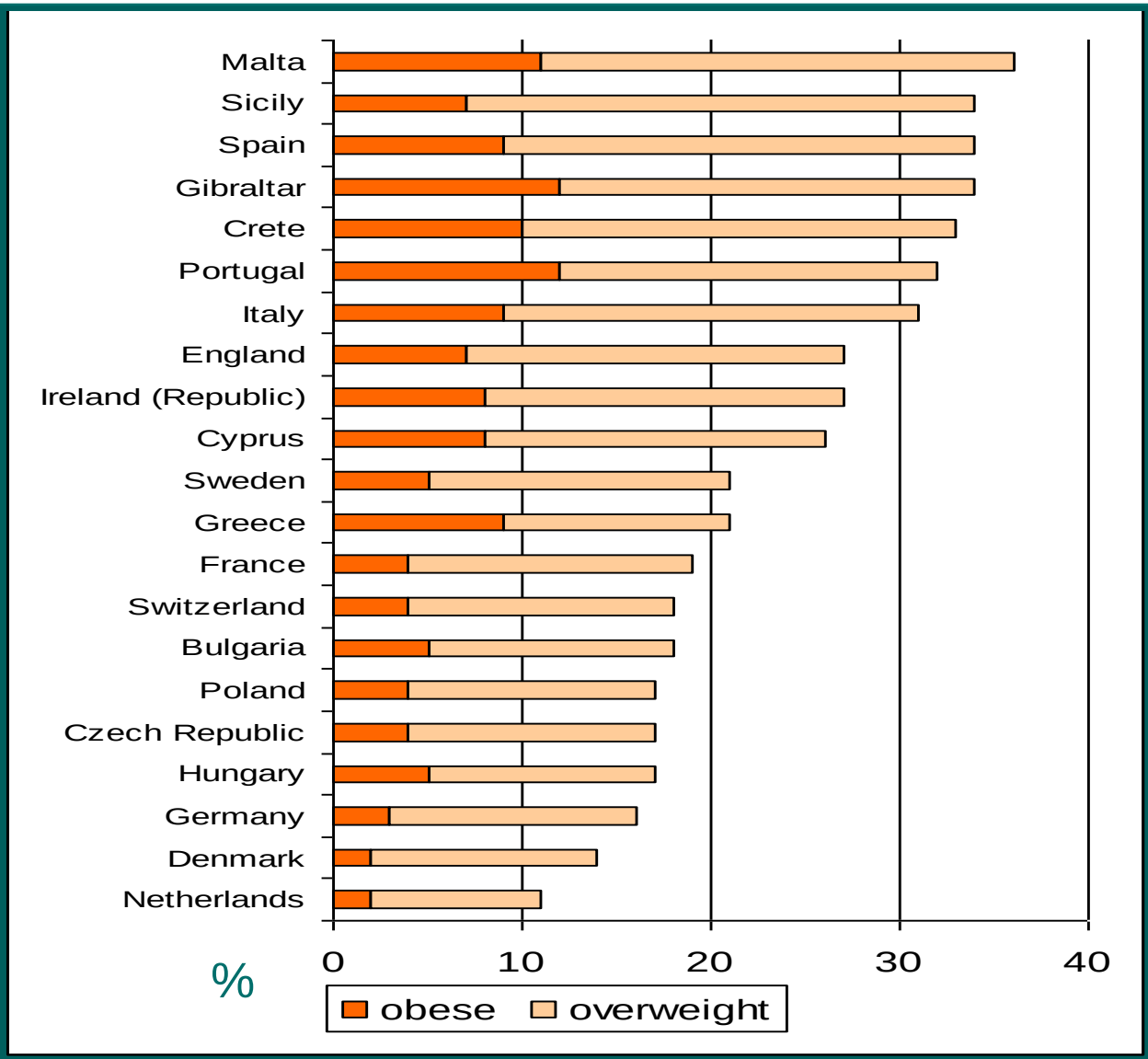
Global total
Obese 74 mil.
O/wt 287 mil.



Wang and Lobstein, IOTF, 2006.



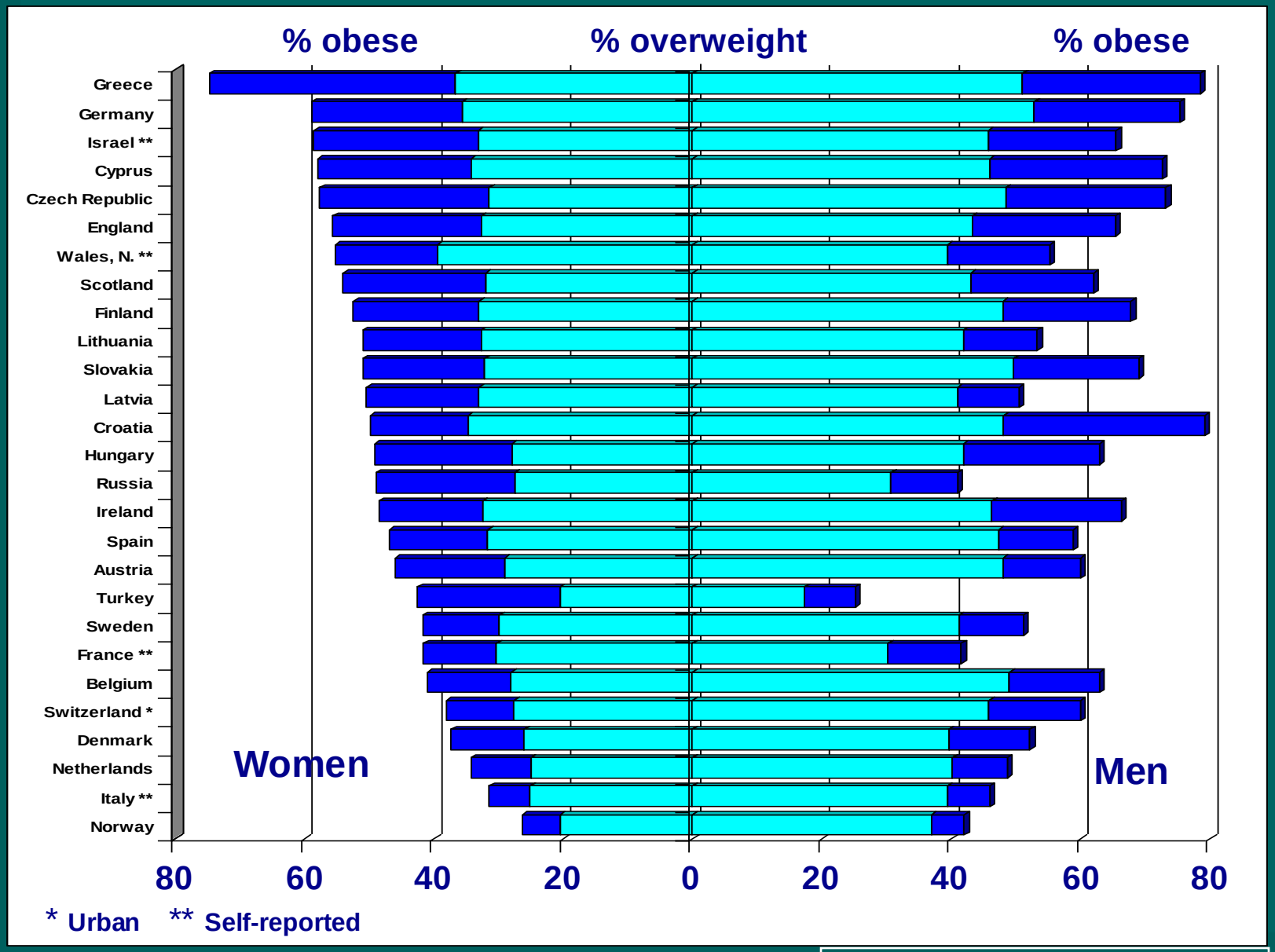
Obesity and overweight prevalences in European children aged 7-11 yrs.



IOTF cut-off points with regional or nationally representative measured data sets.

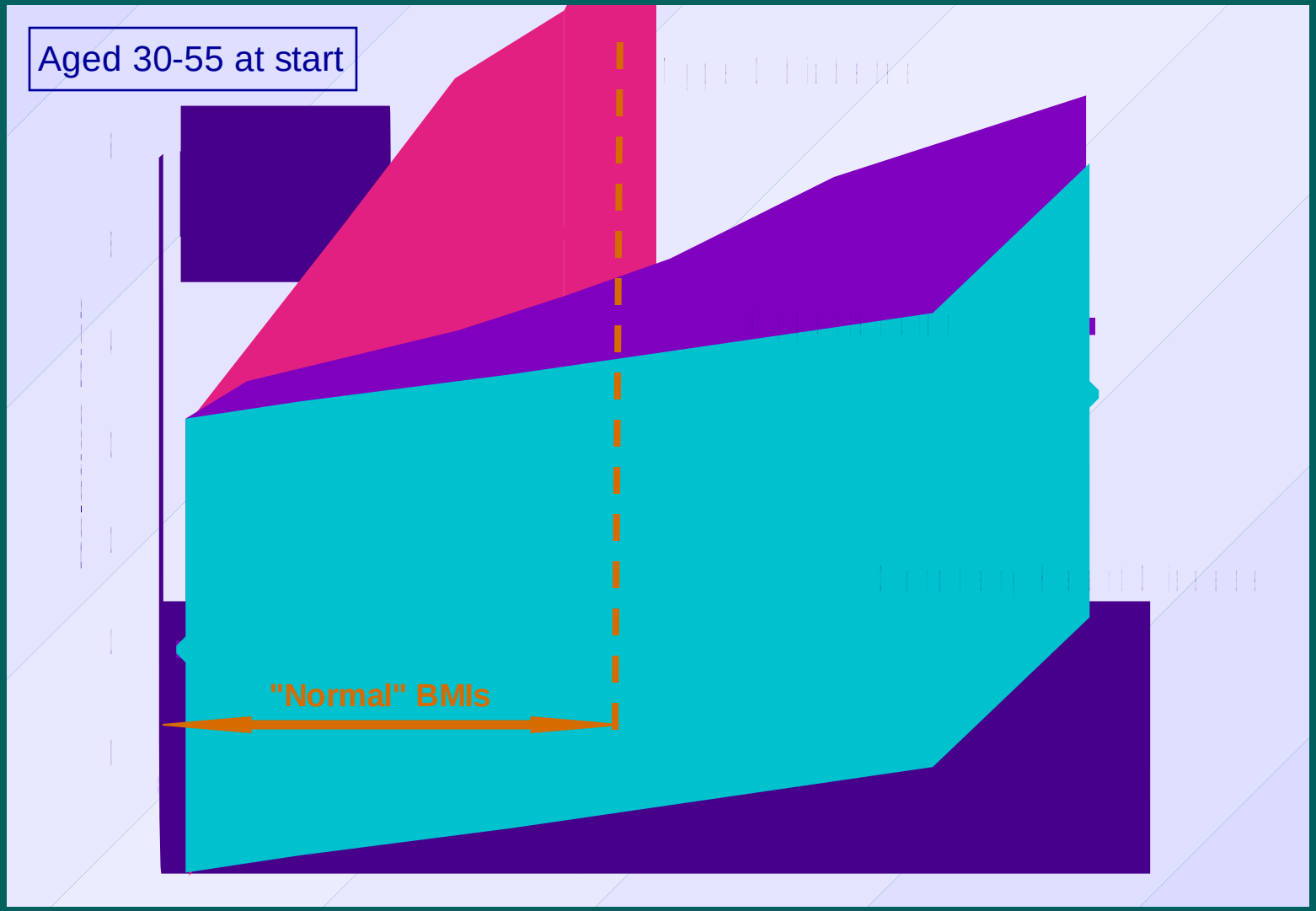
IOTF data presented EU Platform Launch, March 15th, 2005

European national overweight and obesity rates



IOTF, 2005 – no age standardisation.

The importance of modest weight gain in precipitating chronic disease: risks markedly increase within "normal" BMI range



Adapted from Willett, Dietz & Colditz, NEJM, 1999; **341**, 426-434

DAILY EXPR

THE BEST AND MOST UP TO DATE COVERAGE

The World's Greatest Newspaper

How to get rich....FAST

SEE PAGE 52

FREE INSIDE: YOUR ESSENTIAL EIGHT-PAGE JOB

TIMEBOMB OF ILLNESS IN OUR CHILDREN

Exclusive: Couch potato generation face

Daily Mail

THURSDAY, FEBRUARY 21, 2002

Newspaper of the Year 40p

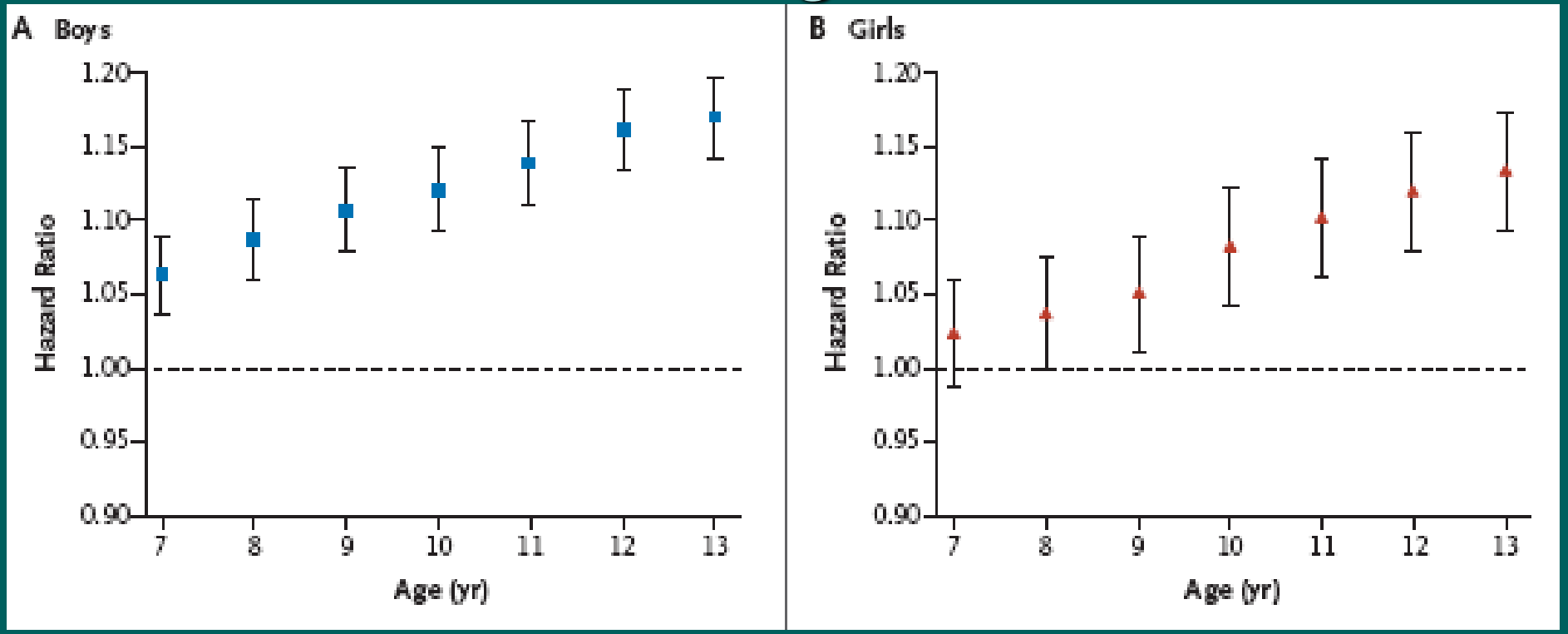
QUEENS OF THE

Kylie and Dido beat the boys to snatch pop's top awards

SEE PAGES 8-9 and 24-25

DIABETES THREAT TO COUCH POTATO CHILDREN

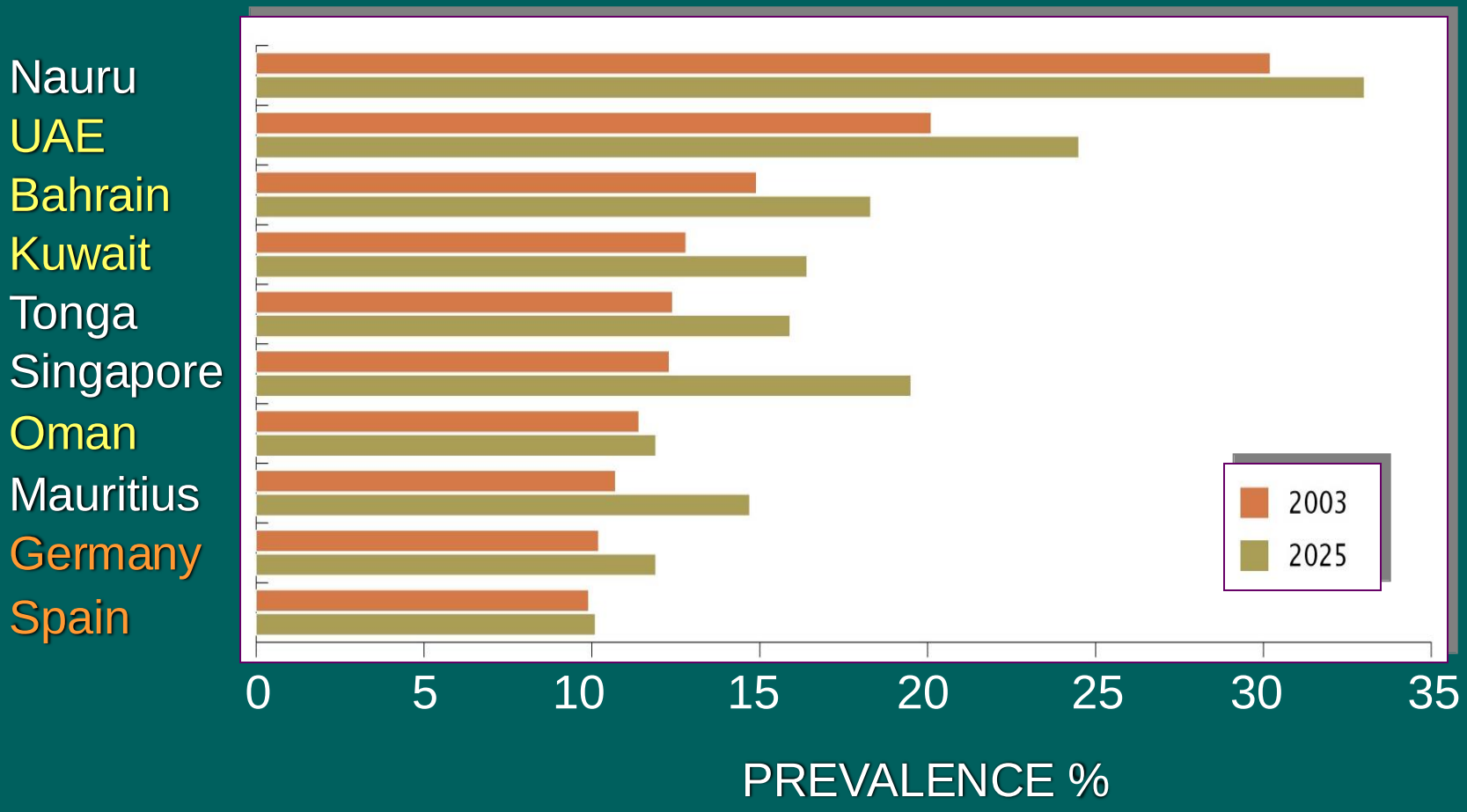
The increasing risk of adult coronary heart disease if adults in childhood (7-13 yrs) had modest weight increases



Copenhagen school children's study of 276,835 children measured from 1955 - 1960 with National Death and Hospital Discharge Registries. Hazard relates to one BMI Z score: linearly related to events at all ages but hazard ratio progressively increases with age during childhood.

Baker, Olsen & Sorensen. NEJM 2007, 357: 2329-32

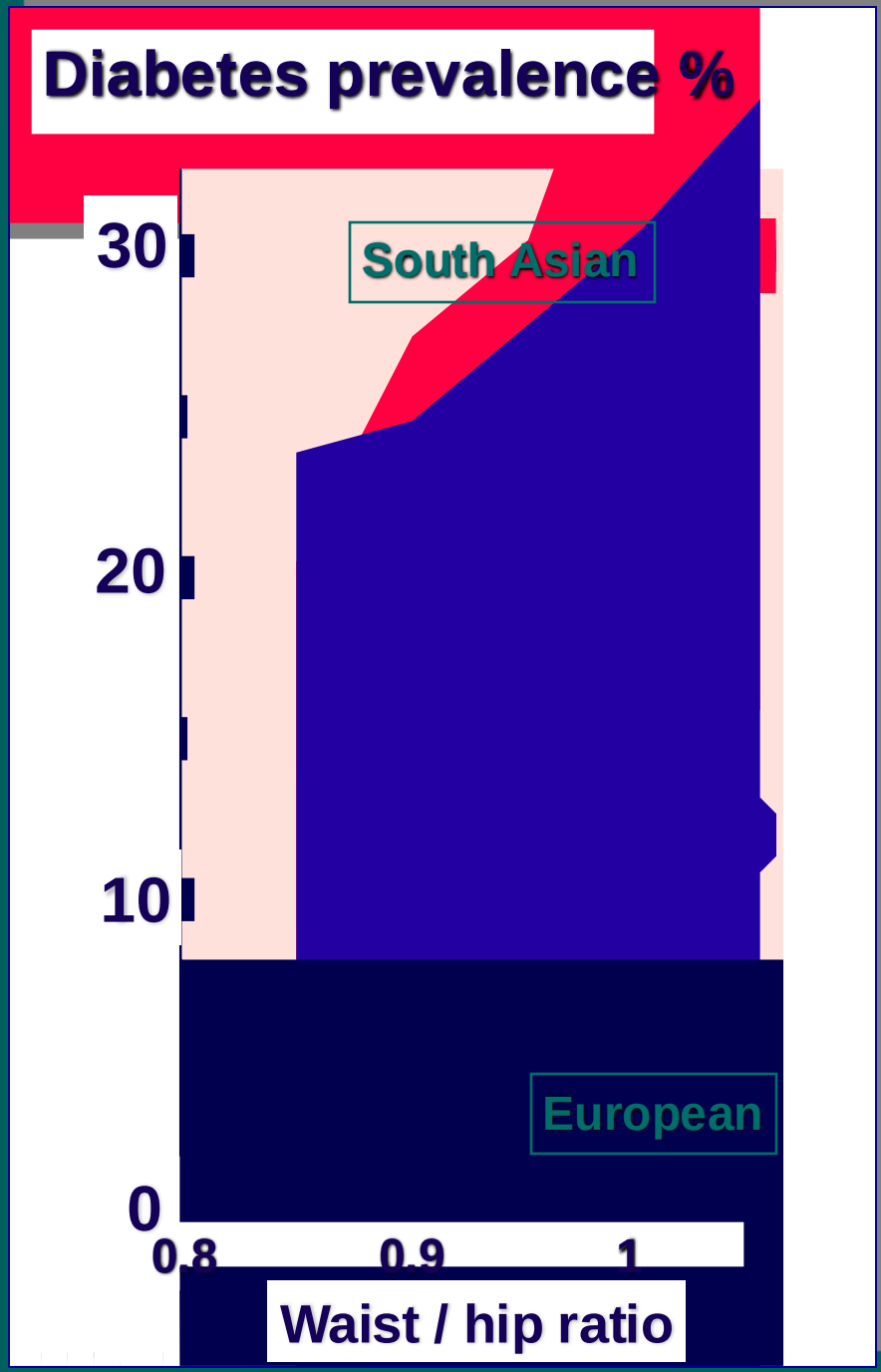
The top global prevalences for adult type II diabetes 20-79 year age group 2003



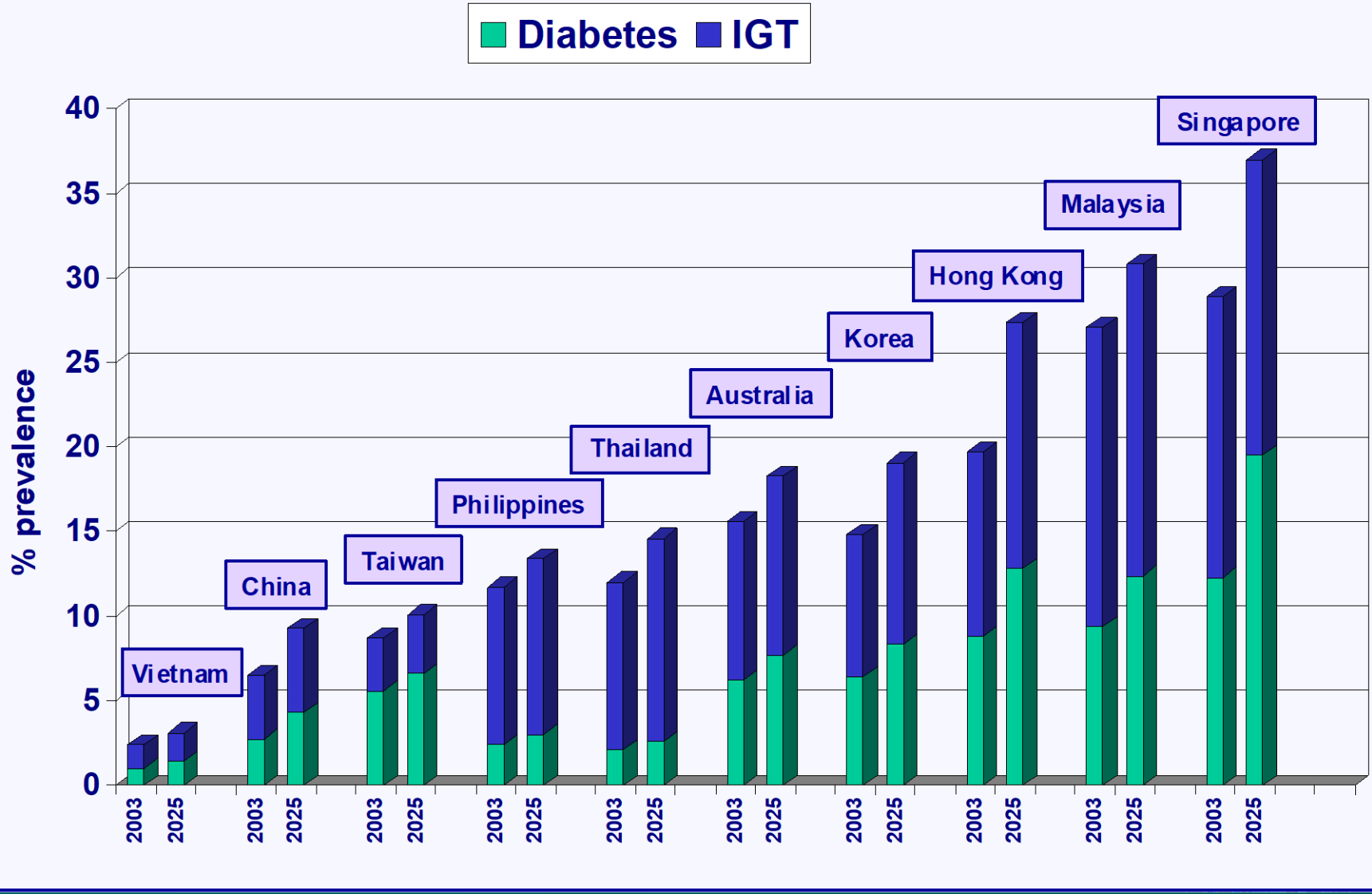
Source: Diabetes Atlas, 2nd edition. IDF, 2003.

Central obesity and insulin resistance: South Asian susceptibility

McKeigue et al. Lancet, 1991, 337: 382

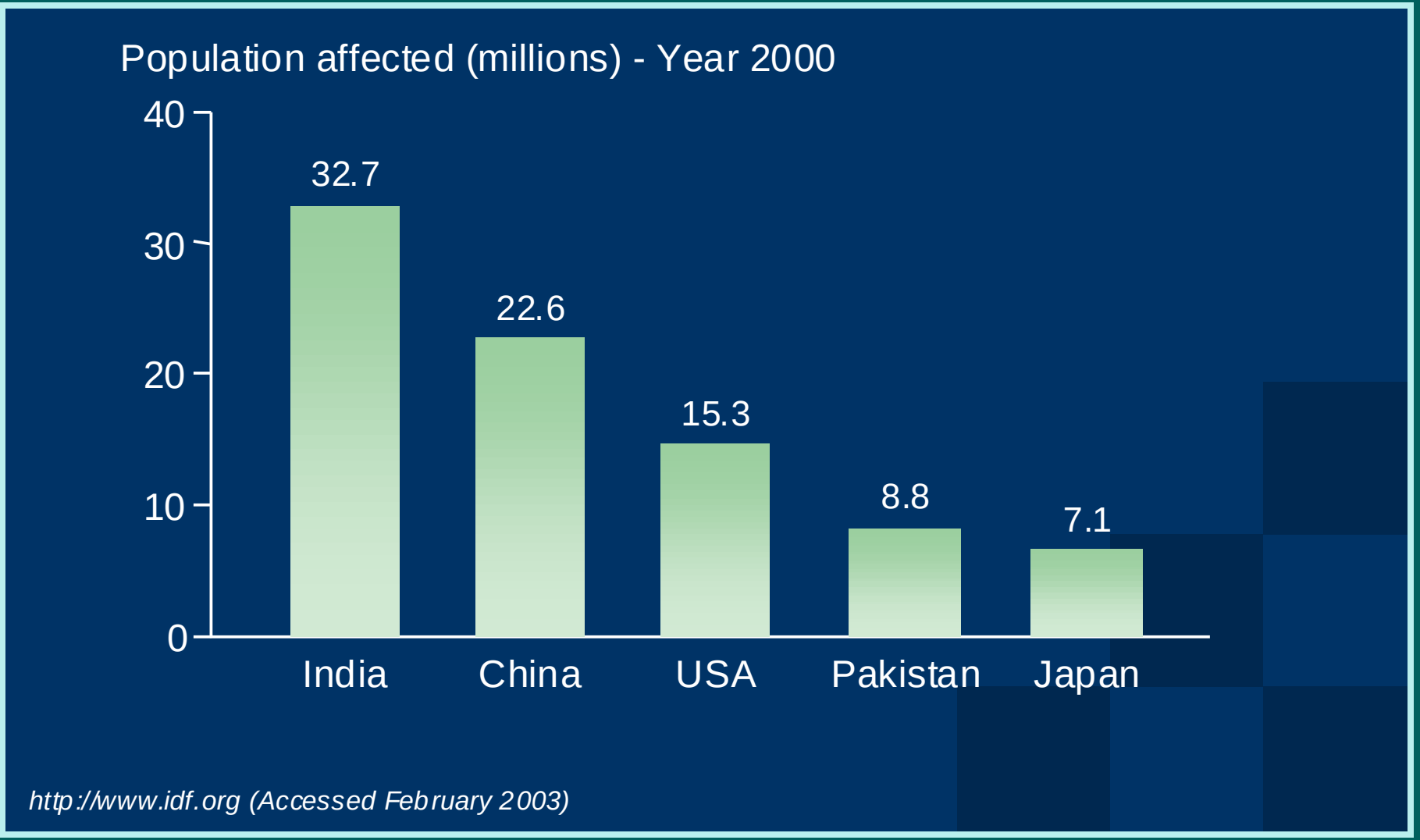


The predicted escalation of the burden from diabetes and IGT



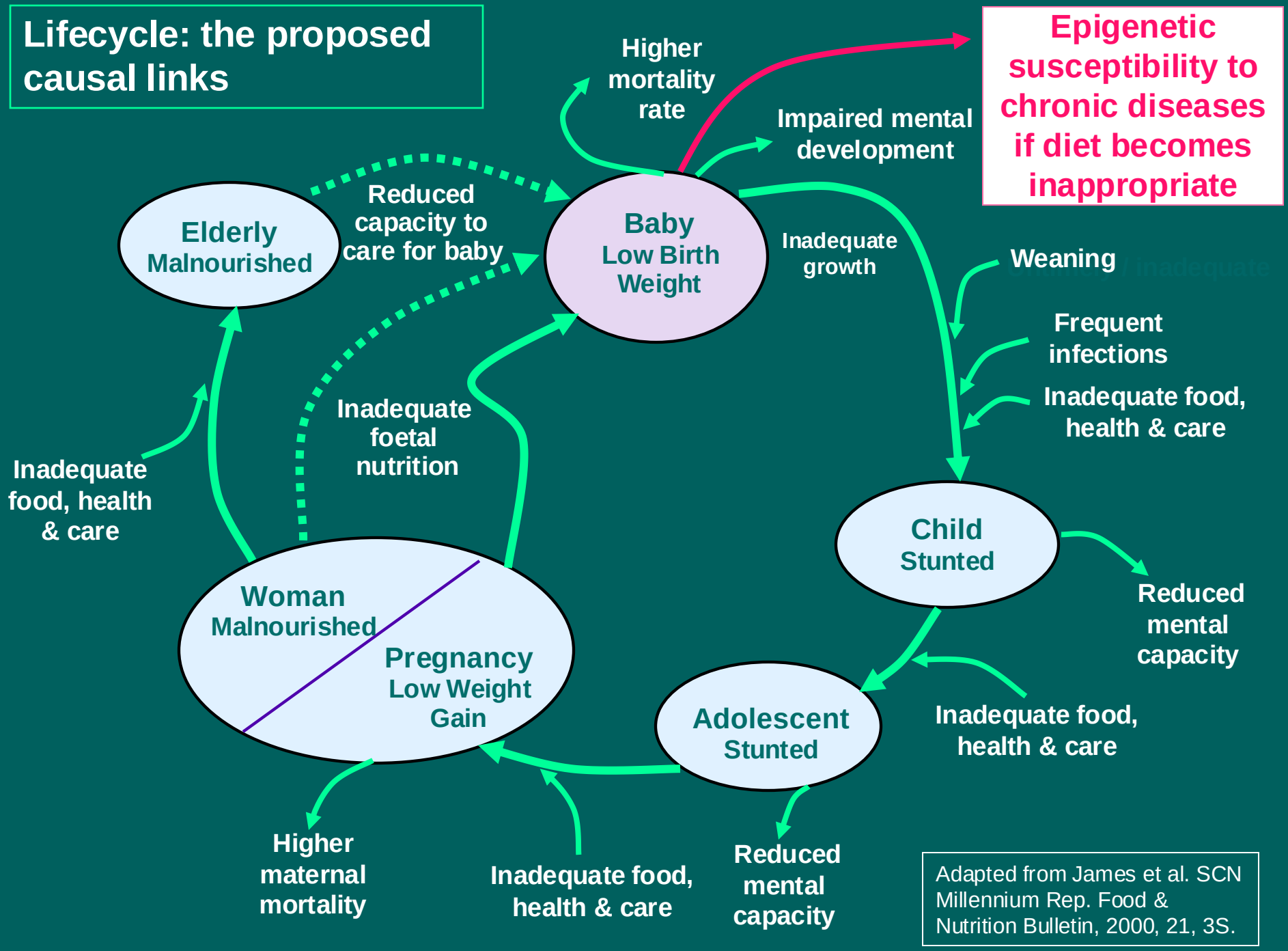
Diabetes Atlas, International Diabetes Federation, 2003.

Diabetes is prevalent in developing and developed countries



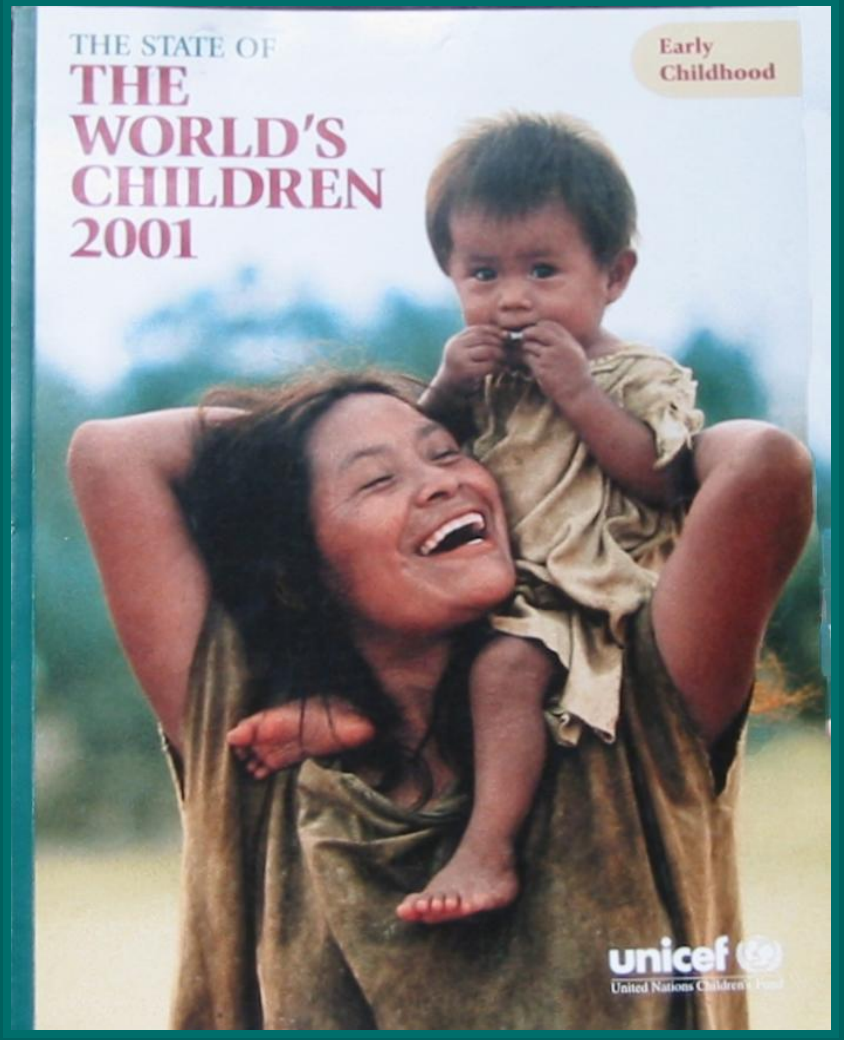
http://www.idf.org (Accessed February 2003)

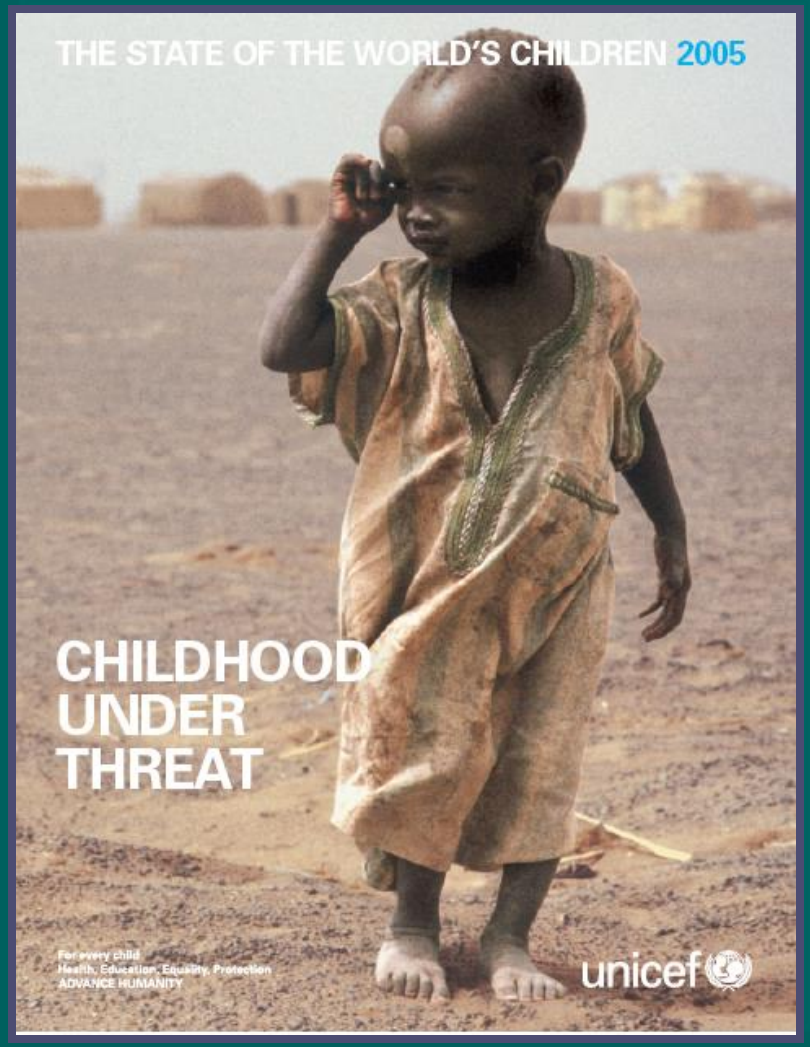
Lifecycle: the proposed causal links



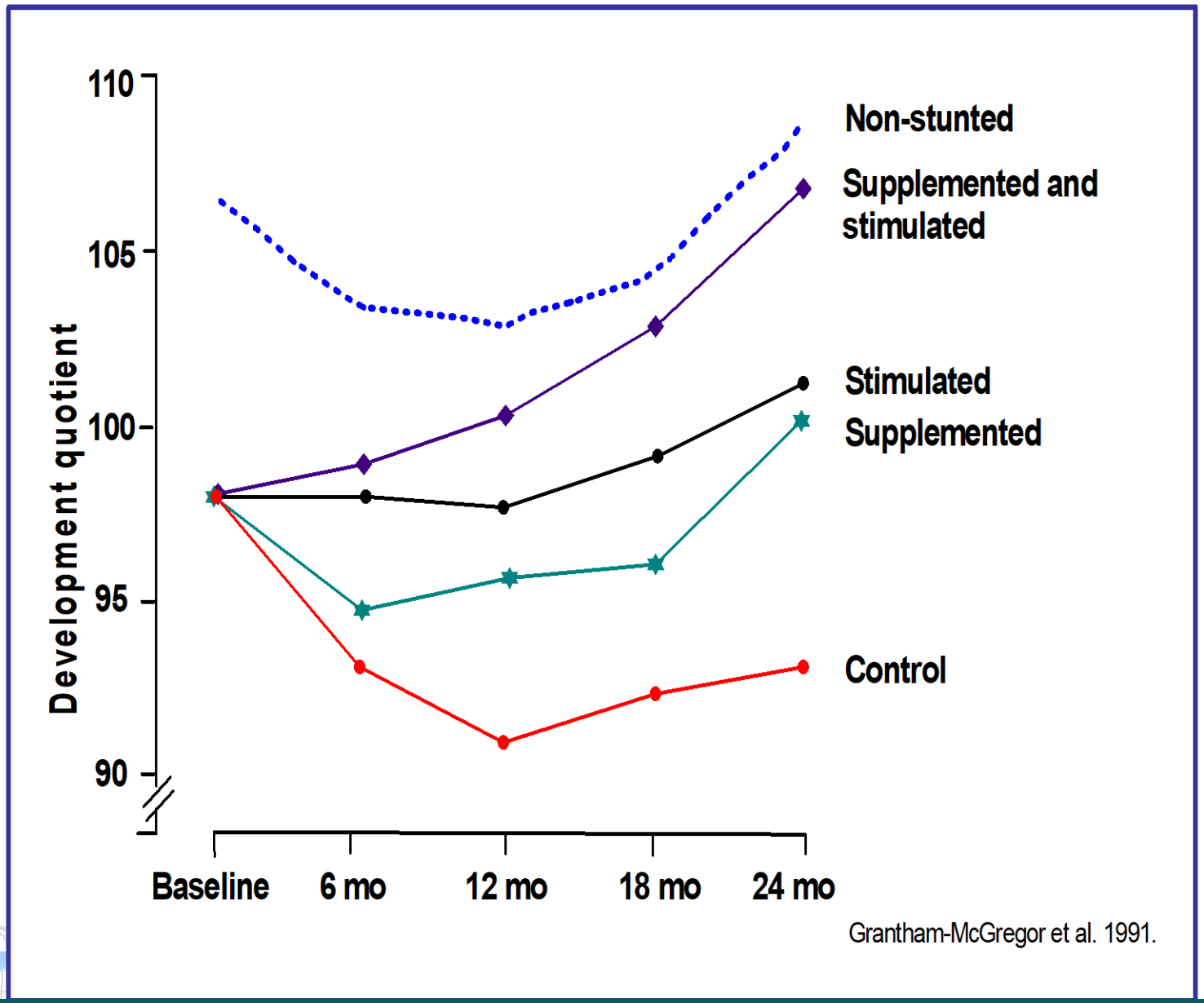
Adapted from James et al. SCN Millennium Rep. Food & Nutrition Bulletin, 2000, 21, 3S.

WHERE IS THE PRIORITY ?



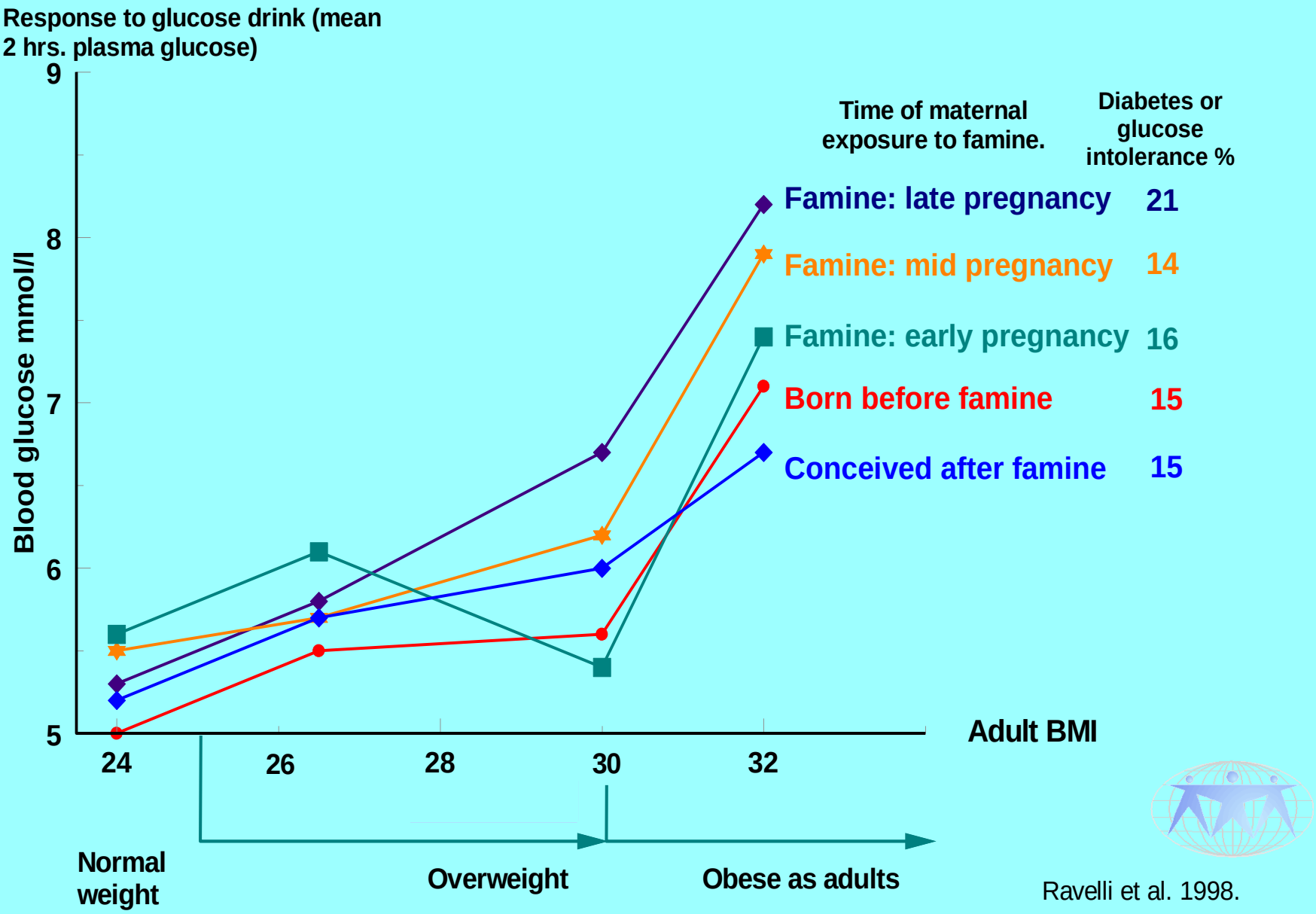


Mental development of stunted babies aged 9-24 months given milk supplement and/or play stimulation for 2 years.



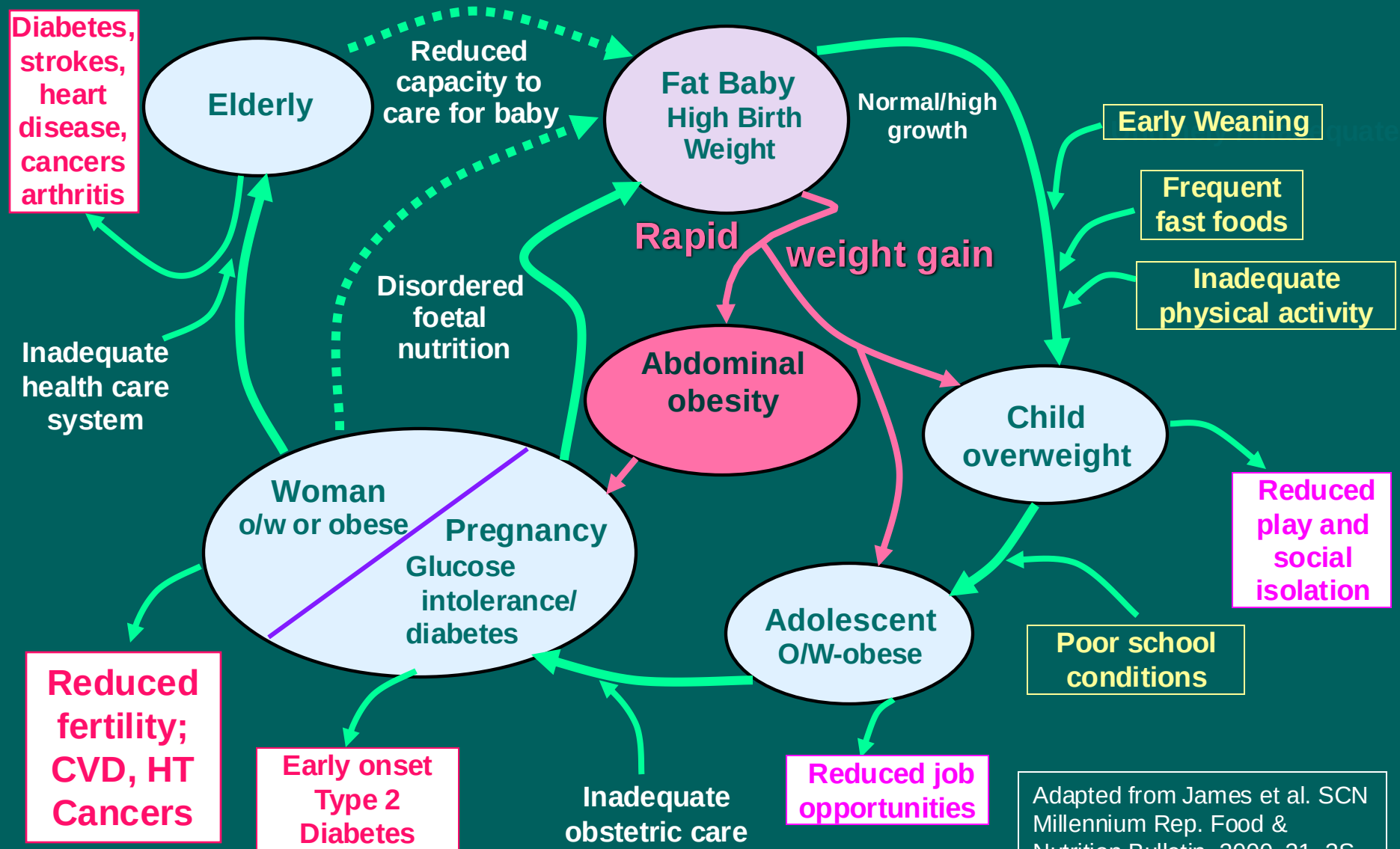
Grantham-McGregor et al. 1991.

Adult diabetes and glucose intolerance after fetal nutritional deprivation in Netherlands during World War II.



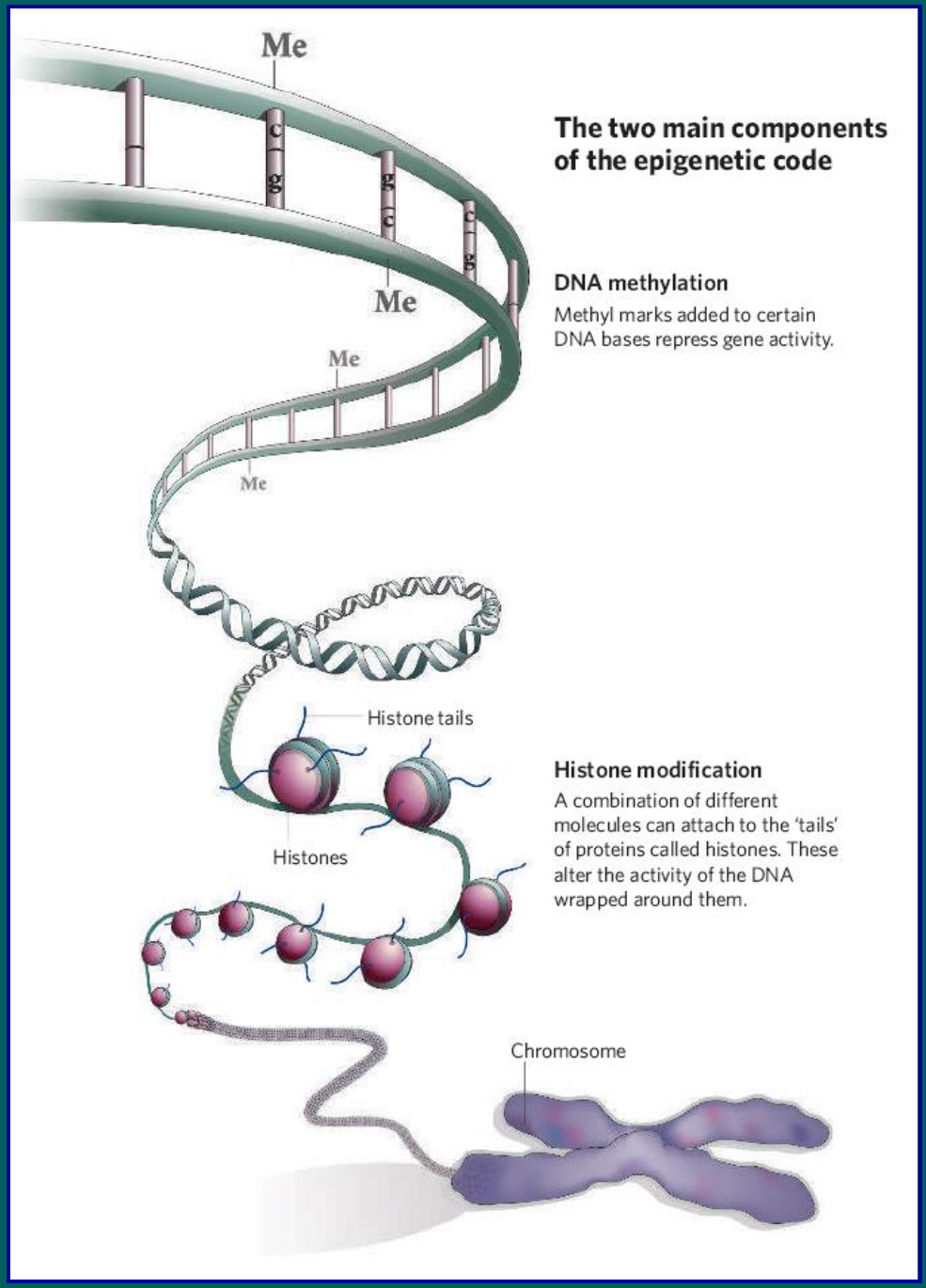
Ravelli et al. 1998.

The impact of inappropriate Western diets on most of the world's susceptible populations: health systems already overwhelmed



Adapted from James et al. SCN Millennium Rep. Food & Nutrition Bulletin, 2000, 21, 3S.

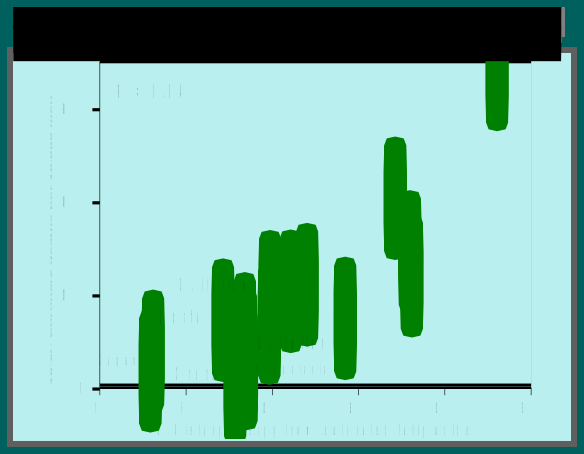
The basic mechanisms for controlling gene expression: silencing through DNA methylation and de-acetylating histones



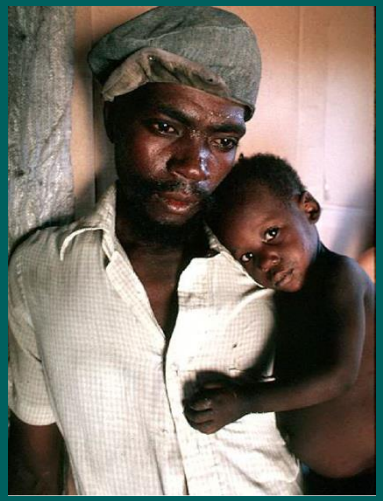
Qiu J, Nature, 2006; 441: 143-145.

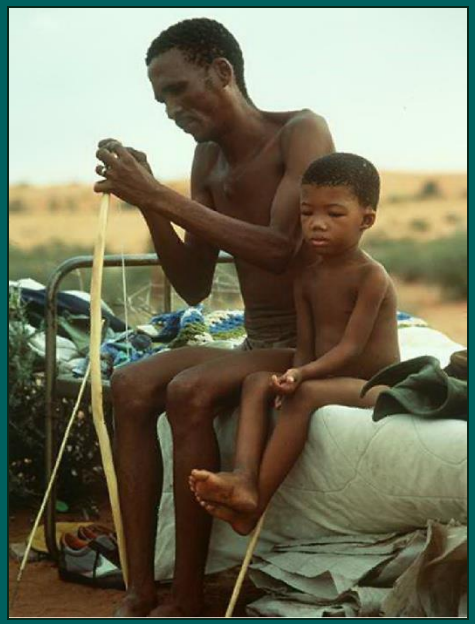
Malnutrition: a continuing outrage

TMRU, Kingston, Jamaica, Christmas 1966



The striking contrast in global nutritional problems

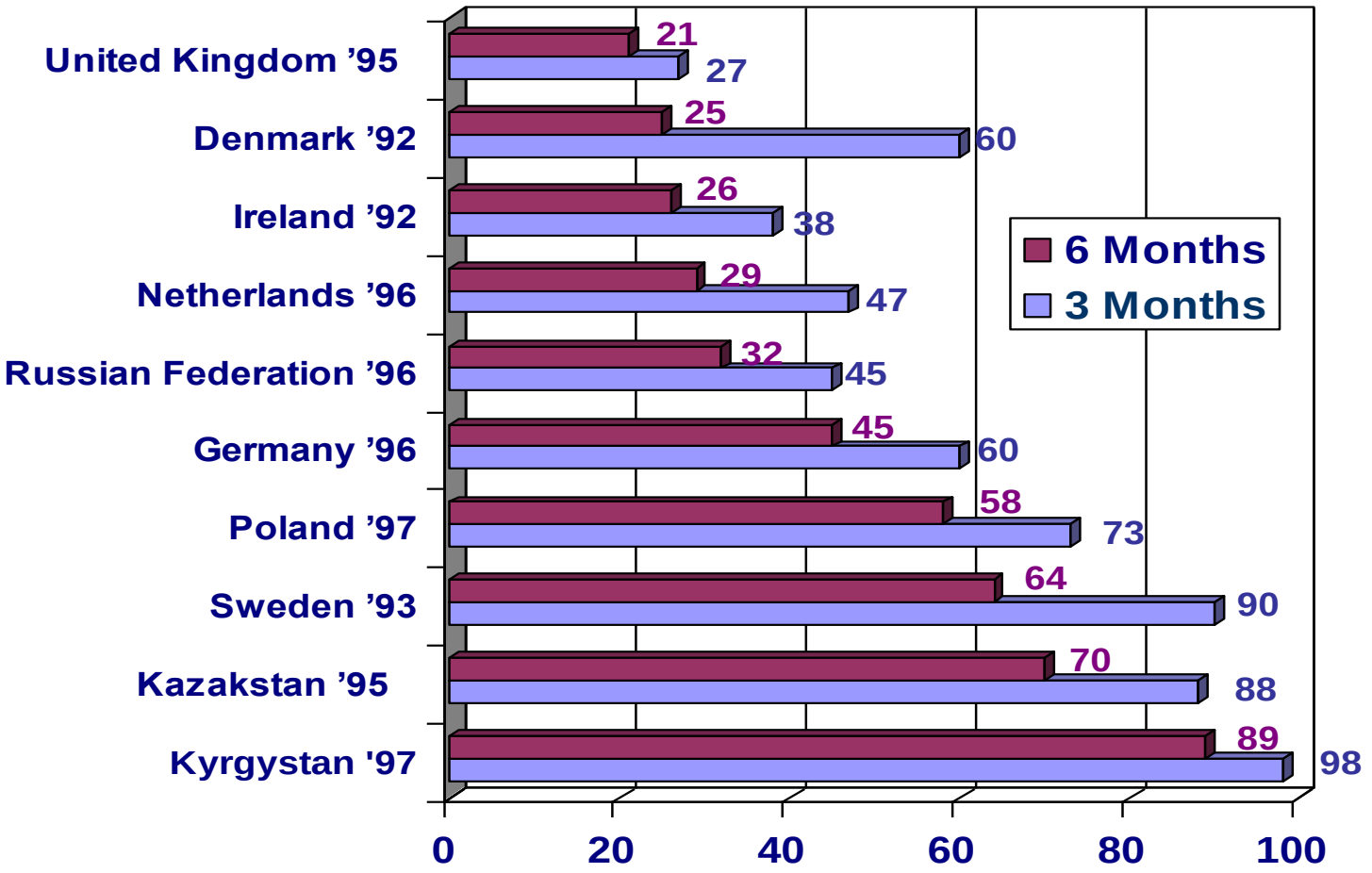




Options for interventions in the young

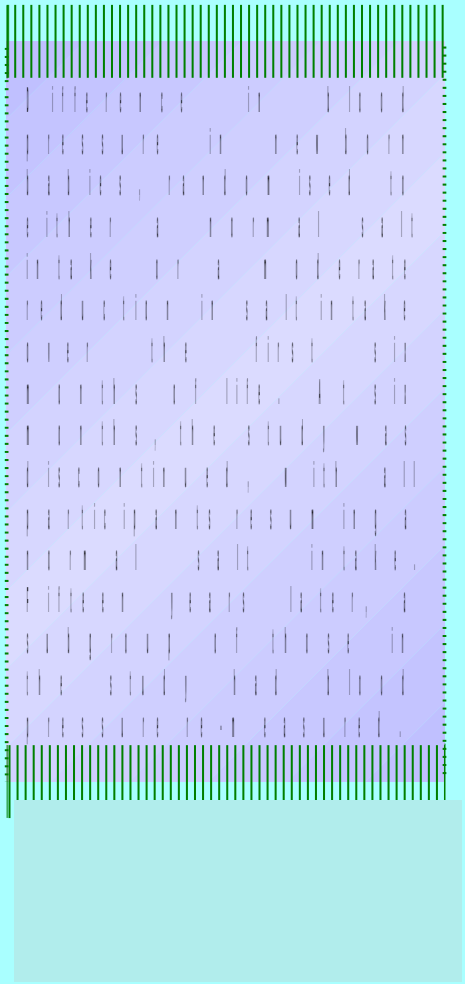
- Breast feeding depends on shifting cultural norms but maternity allowances / work facilities / medical drive and support for extended breast feeding critical
- 92% Swedish mothers exclusively breast feeding at 4 months
- EU/UK law - right to breast feed in public

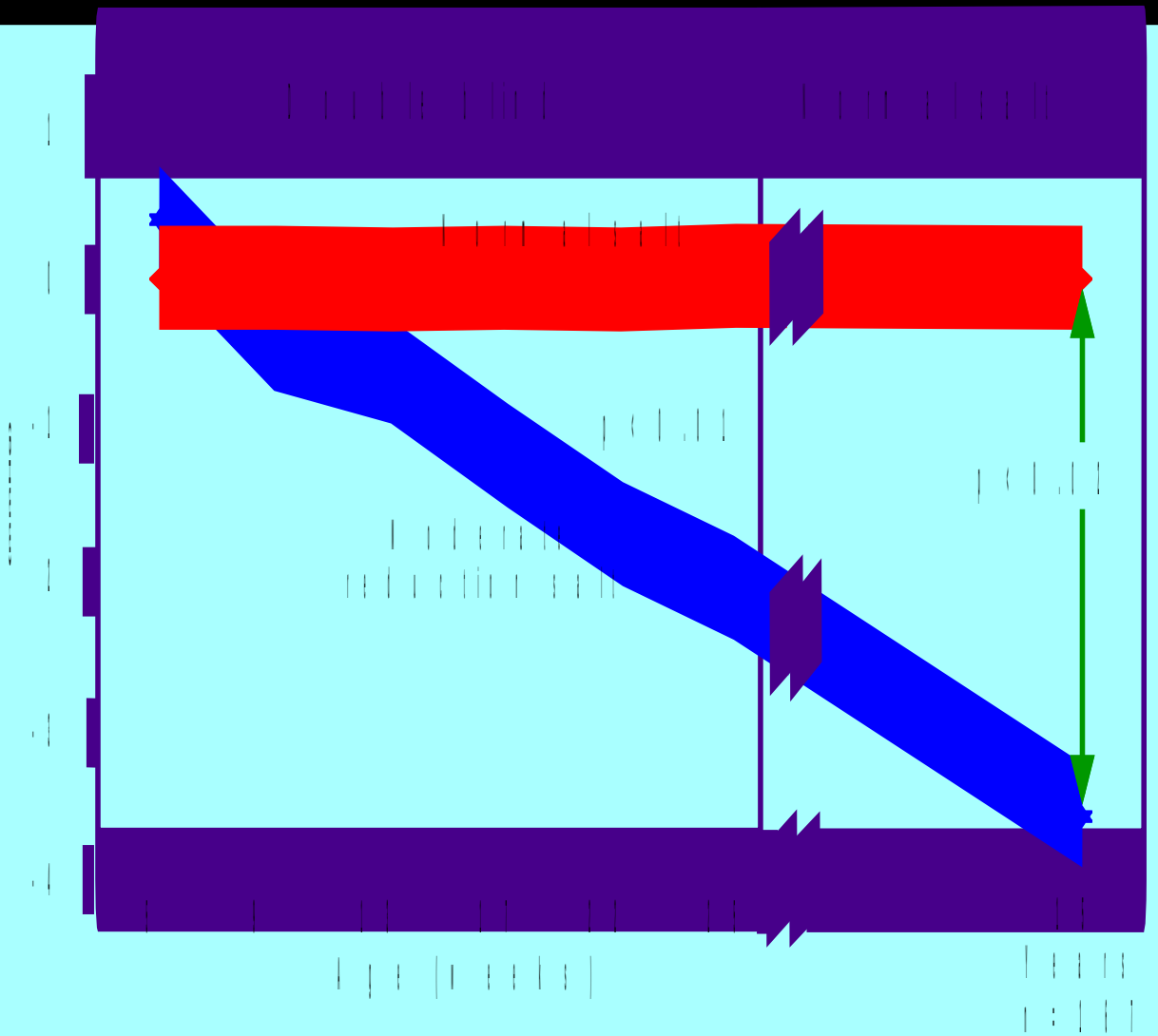
The percentage of infants being partially breastfed at 3 and 6 months, European Region.



The different responses of babies to a bitter hydrolysate of protein formula depending on whether they are a) exposed to the feed since birth or b) for the first time at 7.5. months.

Mennella et al. Flavor Programming During Infancy. Pediatrics, 2004;113;840-845





Salt sources in UK and Italian diets

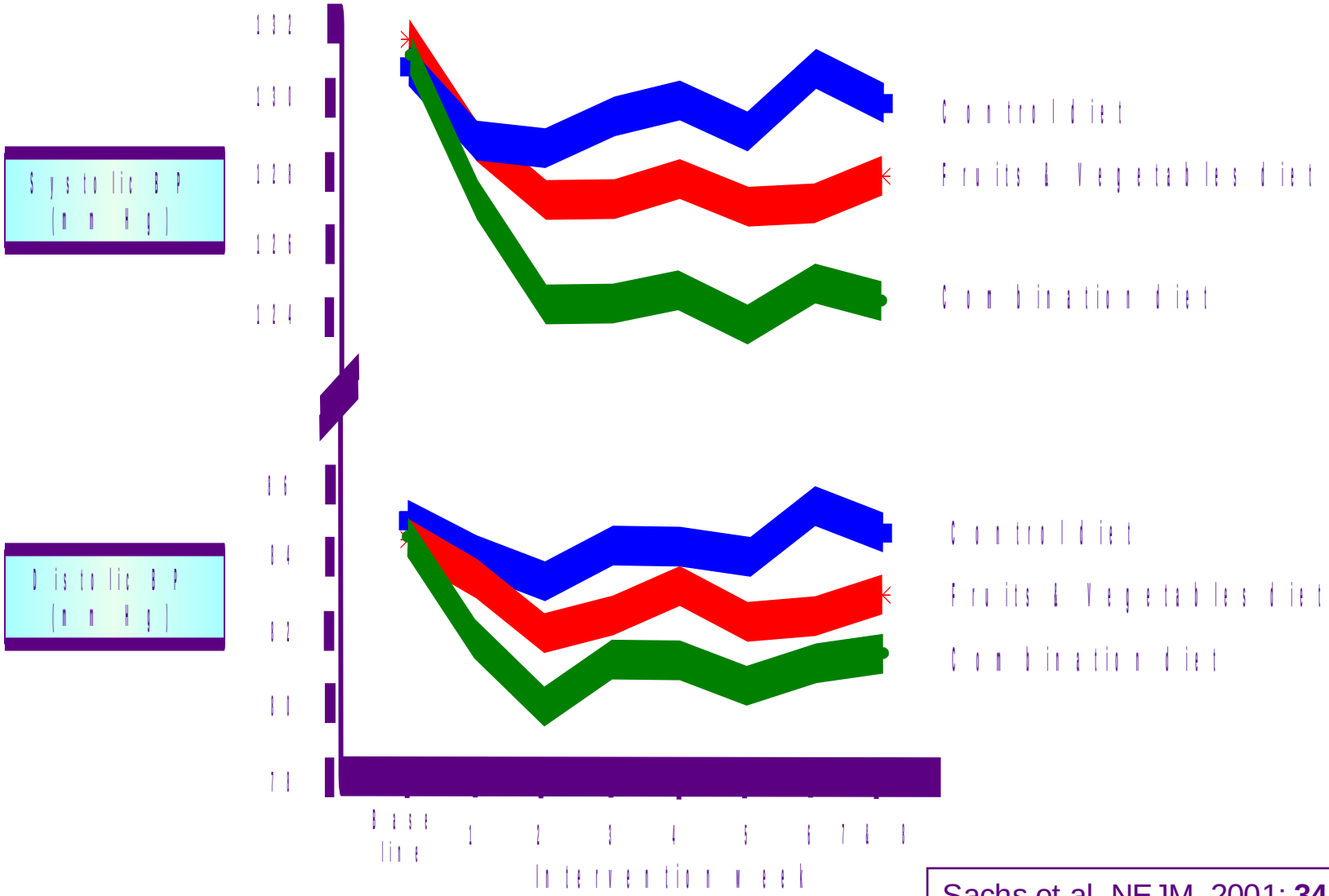
* Total discretionary salt in Italy in late 1980s : 34 - 39%

: food processing

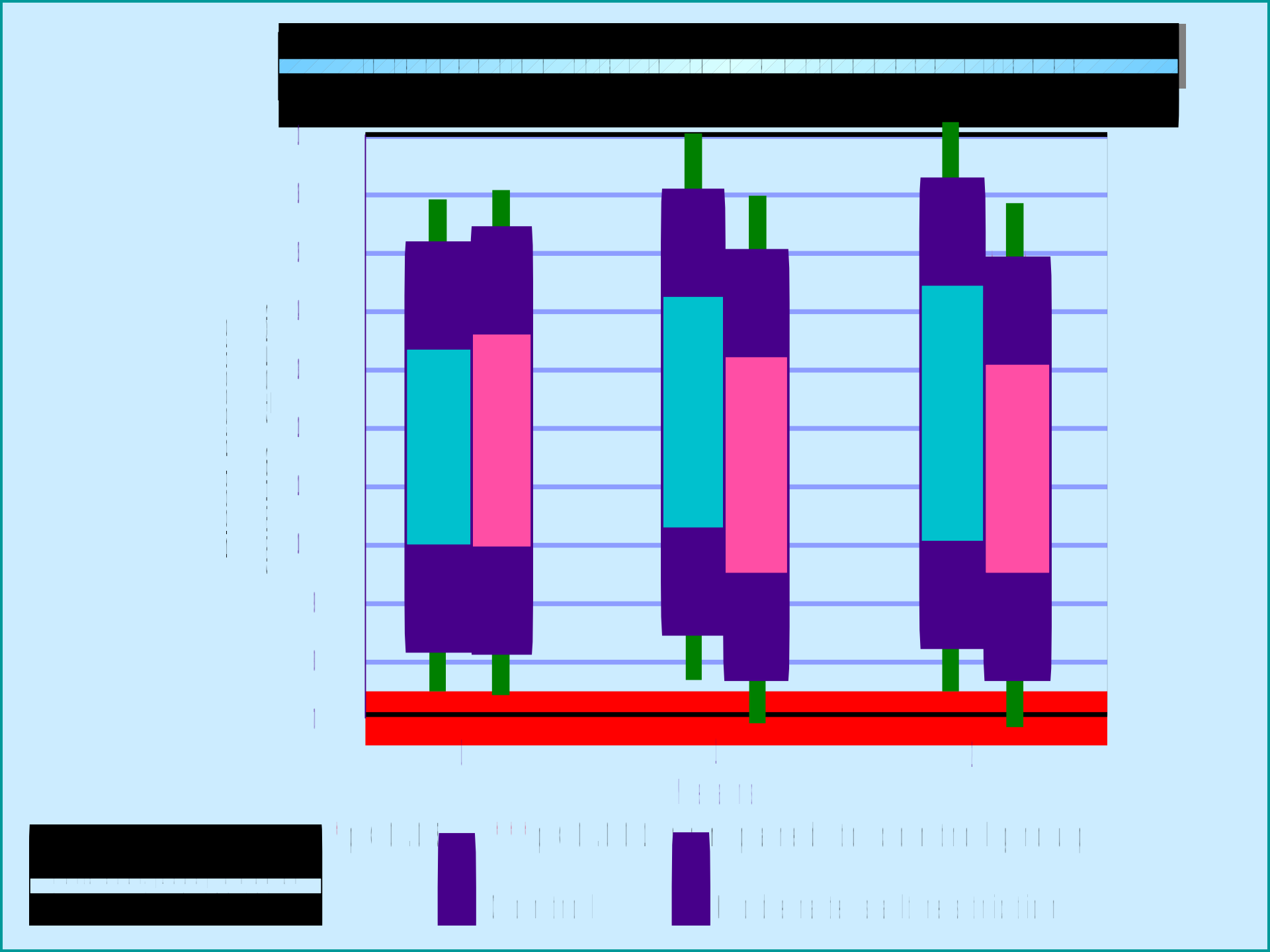
Total Salt intakes in Italy similar to UK: 11.1g in men; 9.3.g in women and 7.7g/d in children

* Derived by the lithium technique: James et al., Lancet,1987; 1: 426-429. Edwards et al. Eur J Clin Nutr 1989 43:855-61;Italian data: Leclercq & Ferro-Luzzi Eur J Clin Nutr 1991,3,151-159

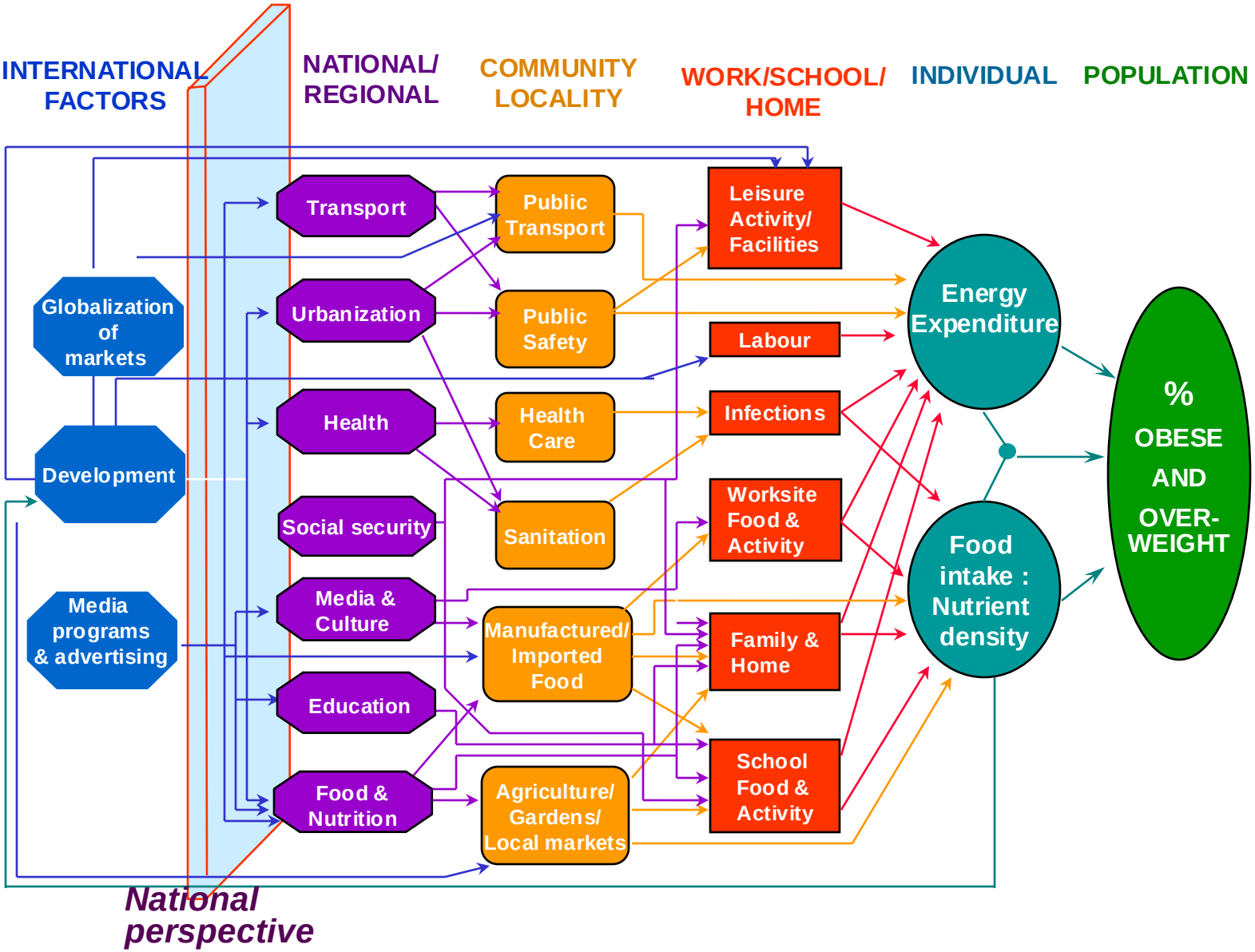
Mean systolic and diastolic blood pressures at base line during each intervention week, according to diet, for 379 subjects with complete sets of weekly blood pressure measurements.



Sachs et al. NEJM, 2001; **344**, 1-6

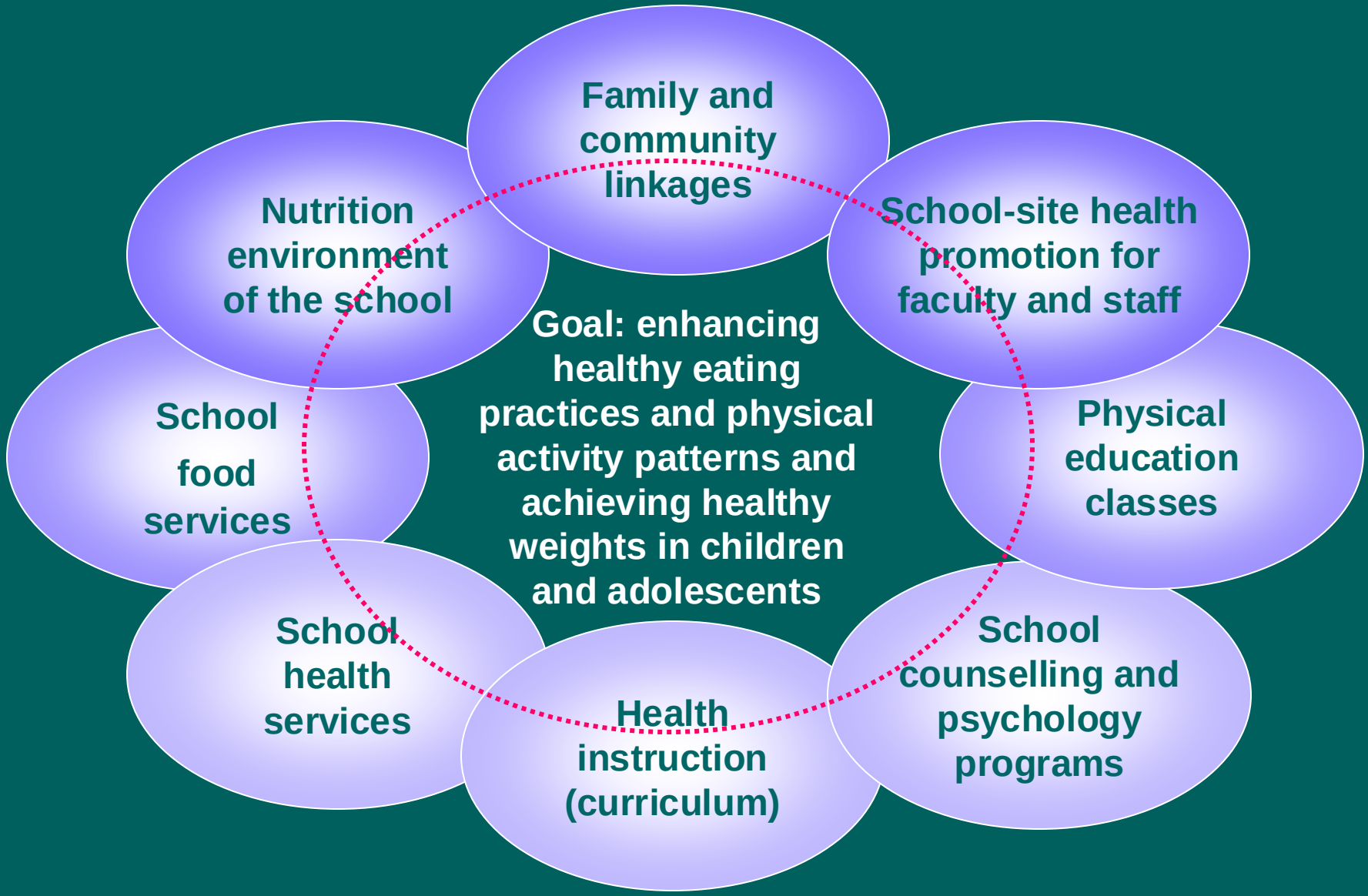


Societal policies and processes influencing the population prevalence of obesity



Modified from Ritenbaugh C, Kumanyika S, Morabia A, Jeffery R, Antipatis V. IOTF website 1999: http://www.iotf.org

Components of an integrated comprehensive model for school-based obesity prevention.



Question 1

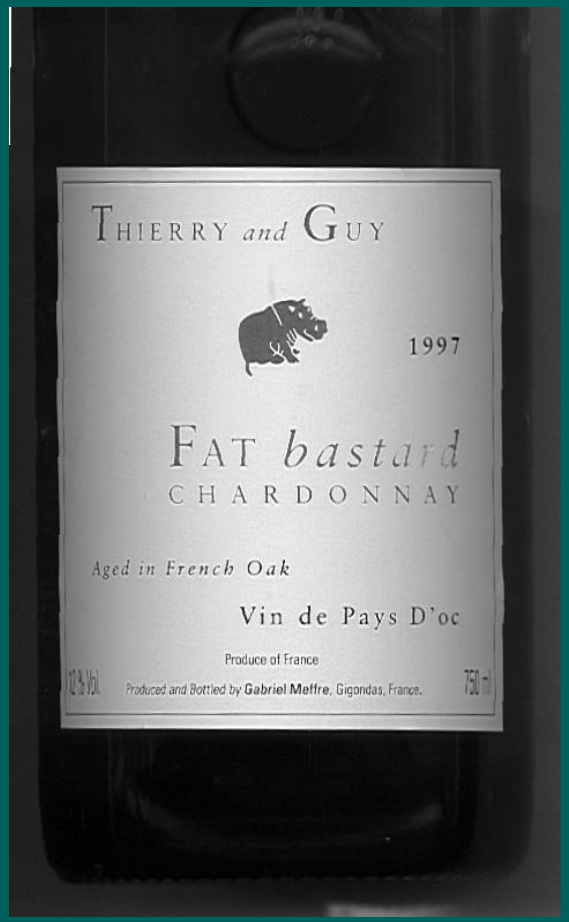
Which food has the most kcals?

- **cream**
- **mayonnaise**
- **olive oil**
- **butter**

Question 1 - Answer

Olive oil	**100% fat**
Butter	**80% fat**
Mayonnaise	**50% fat**
Cream	**20% fat**

Question 2



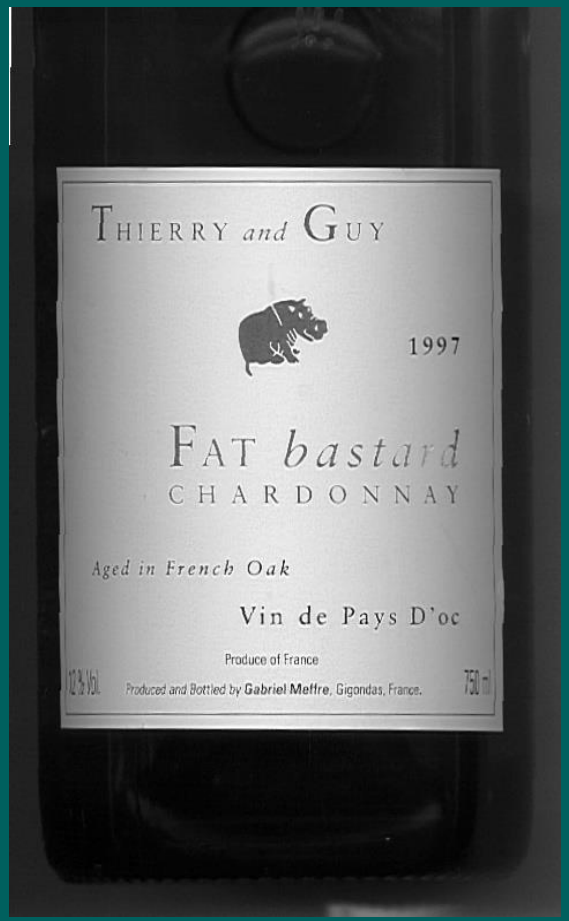
How many kcals in this bottle of wine?

a) less than 300

b) 300 - 600

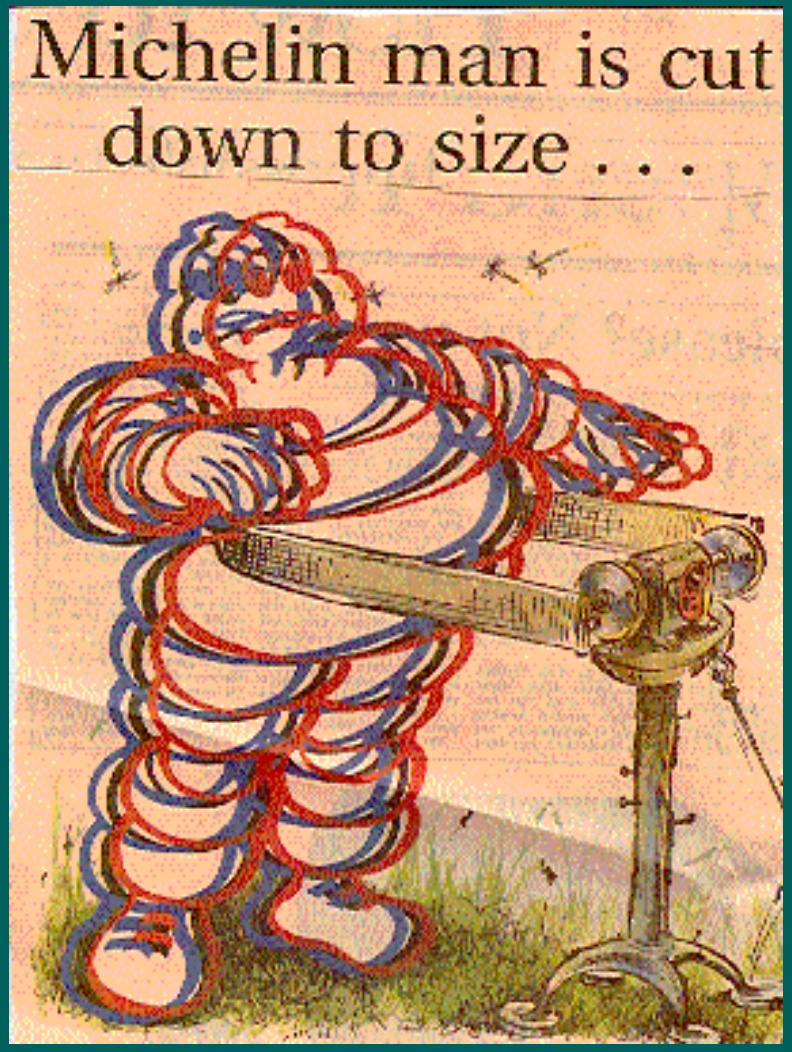
c) More than 600

Question 2 -Answer



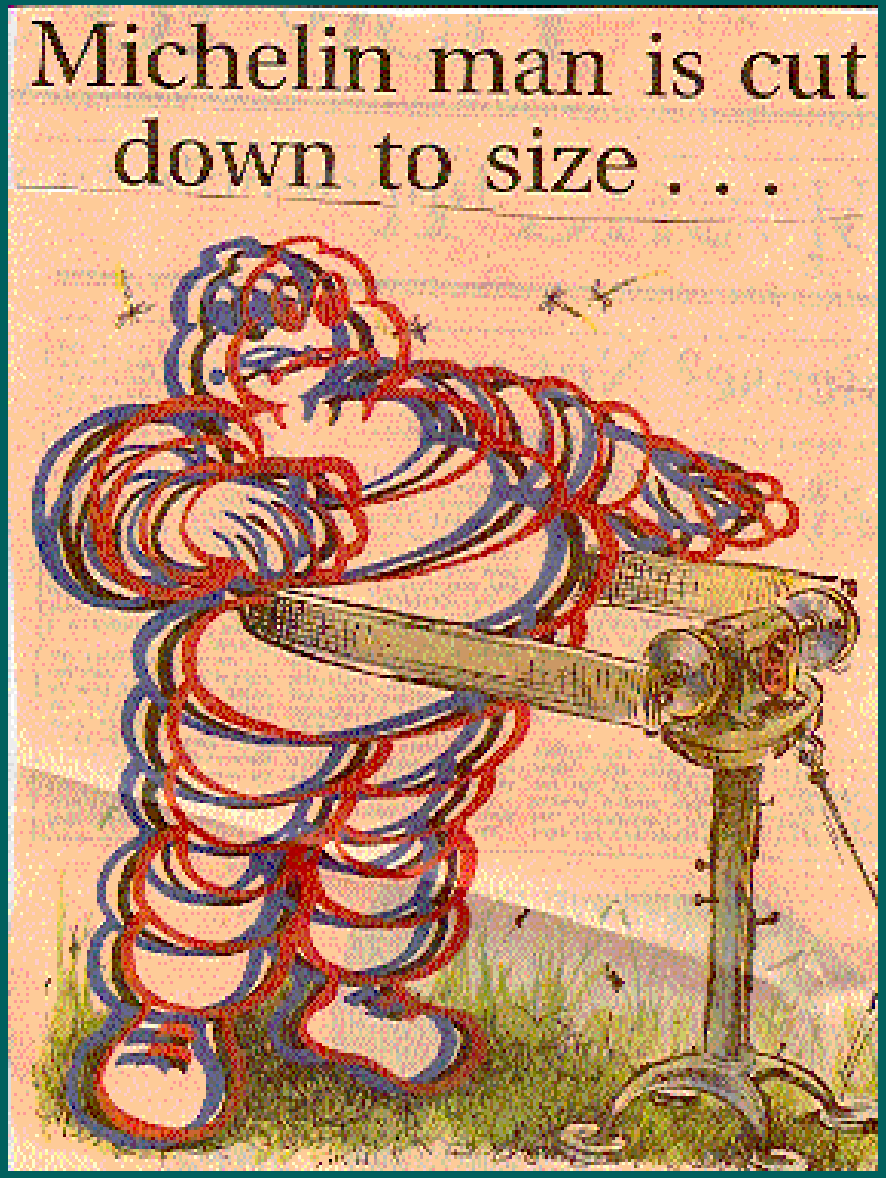
Wine contains about 1 kcal per ml …
so one bottle contains at least 750 kcals

Question 3



How long will the Michelin man have to walk to burn off 1 kg ?

Question 3 - Answer



About 20 hours

Activity required to burn 250 kcal

Walking

70 min

Cycling

50 min

Running

30 min

Food labelling schemes based on nutritional profiling tested by the UK Consumers' Organisation - "Which"

UK Food Standards Agency scheme

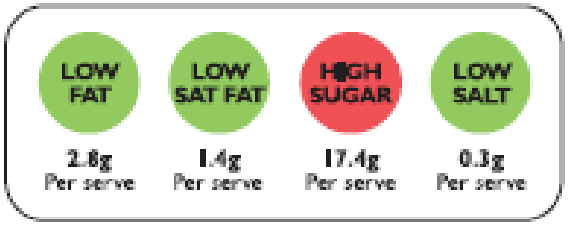
Tesco Supermarket GDA labelling with a different colour for each nutrient

GDA system

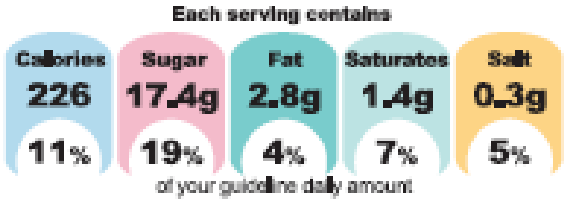
Tesco: GDA + traffic lights

The different schemes mocked up and presented in the research

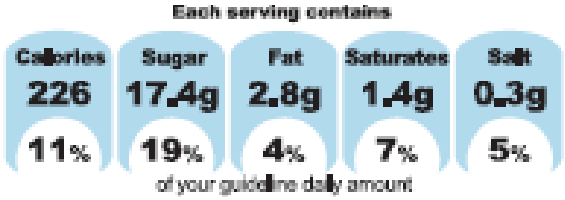
FSA



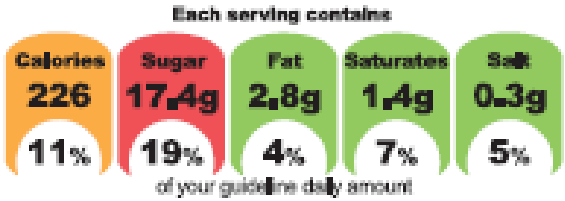
Tesco



Other Manufacturers



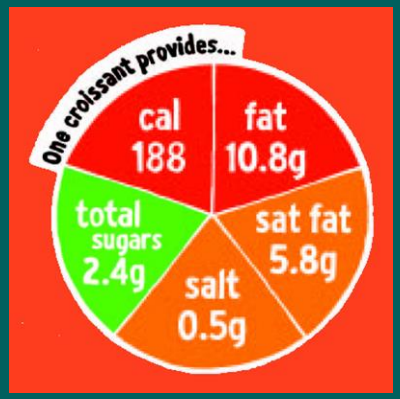
Tesco with traffic lights

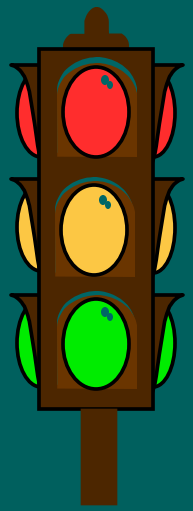


IOTF demand for EU action

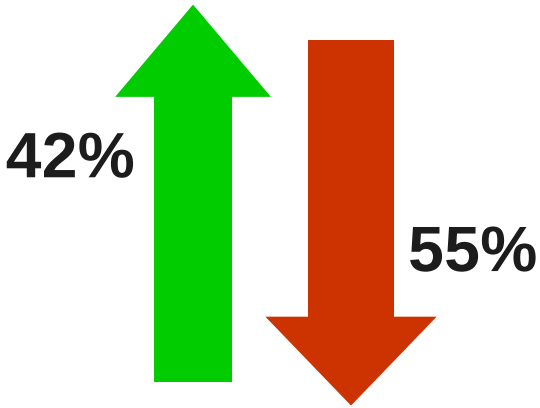
Consumer purchases with traffic light food labelling of nutrients as proposed by UK's Food Standards Agency. Healthy (green), reasonable (yellow), or unhealthy (red)

Wheel of Health (WoH)





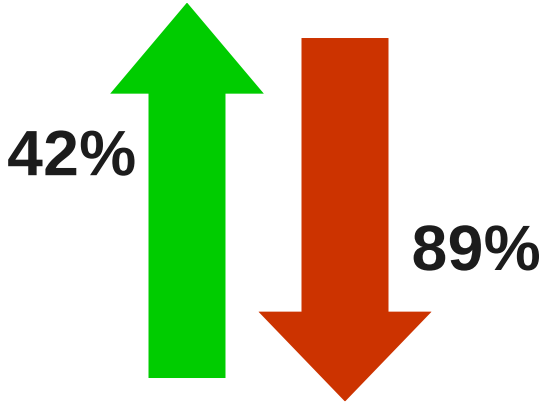
JS Ham and Pineapple Pizzeria 356
all 5 GREEN on WoH



JS Ham & Pineapple Thin & Crispy Pizza 335g
1 red 2 amber 2 green

Sainsbury's Supermarket presentation to The National Heart Forum, UK., 2006.

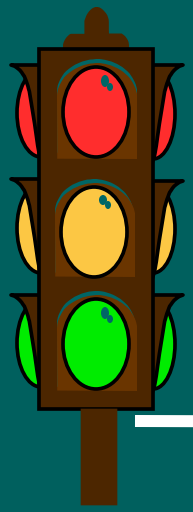
'Be Good to Yourself' Chocolate sponge puddings
4 Green 1 amber



'Taste the Difference' Melting Middle Chocolate puddings
4 red 1 amber

Who controls the food chain ?

Nutritional profiling determining government policies throughout the food chain



Global Feed Companies

Farmers (large Government subsidies)

Family and other small food companies

Global Food Companies

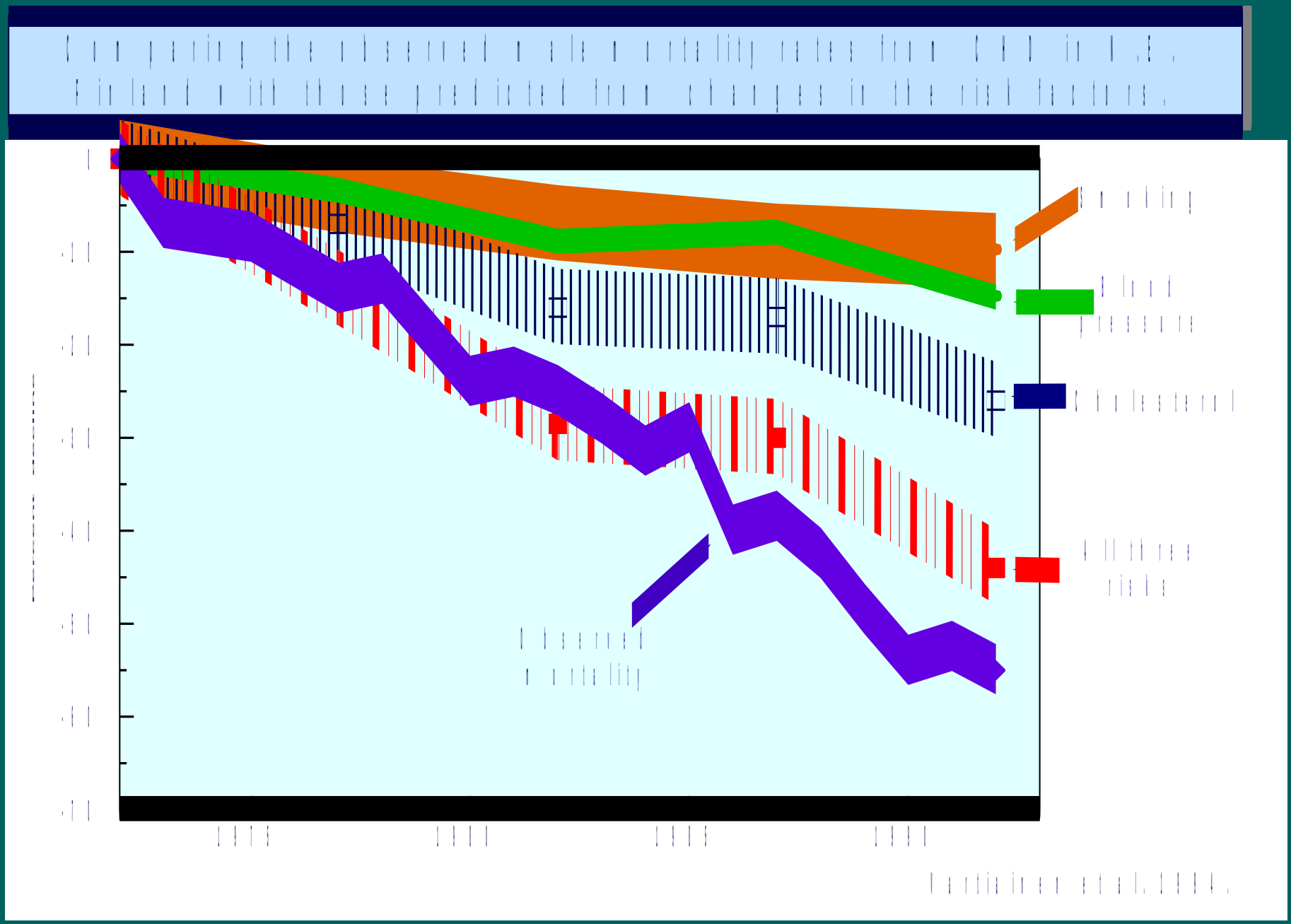
Local markets, roadside stalls and farm shops

Small food outlets

Supermarkets: the "food consuming industry"

GENERAL POPULATION

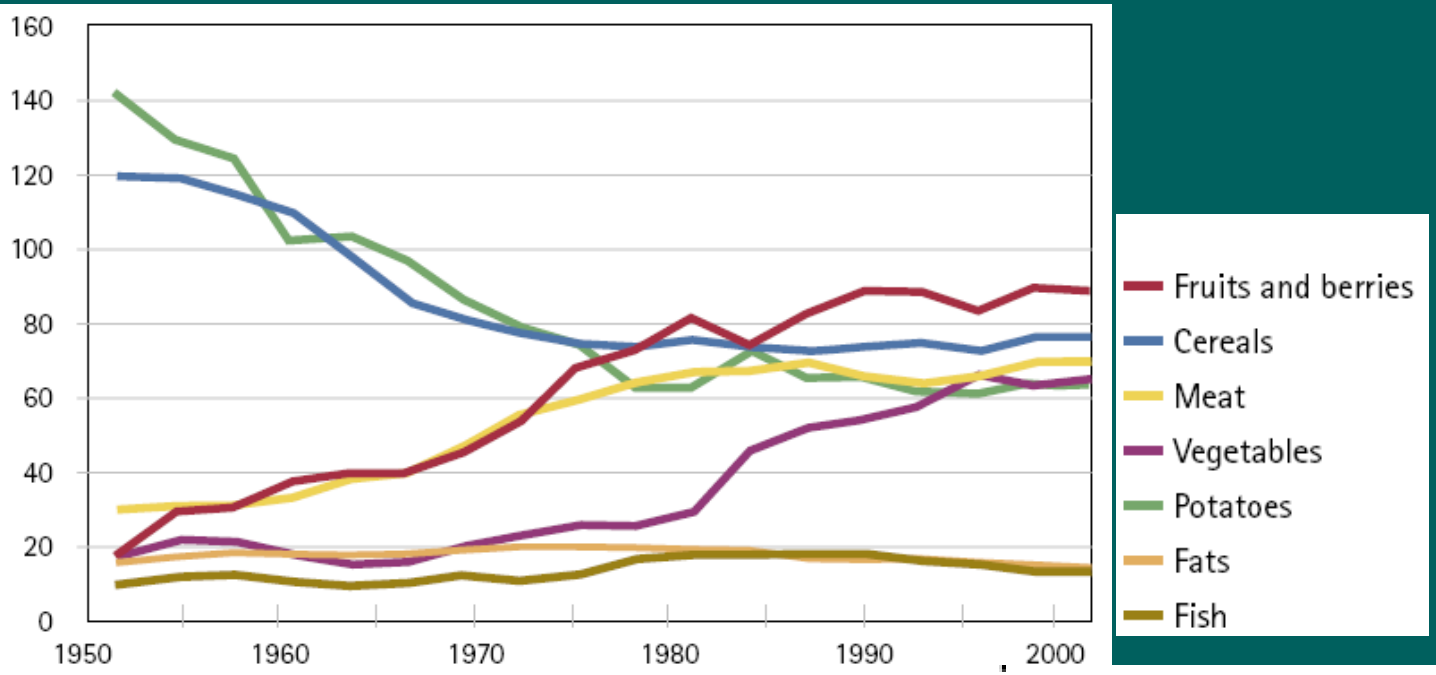
Corinna Hawkes, 2006



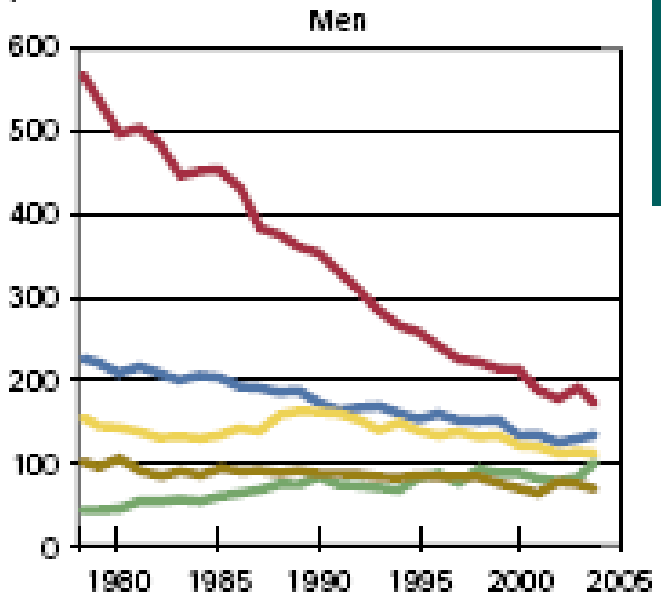
Mortality now down by 90%

National rates of change in diet and disease Finland 1950-2005

Food intake (Kg/person/yr

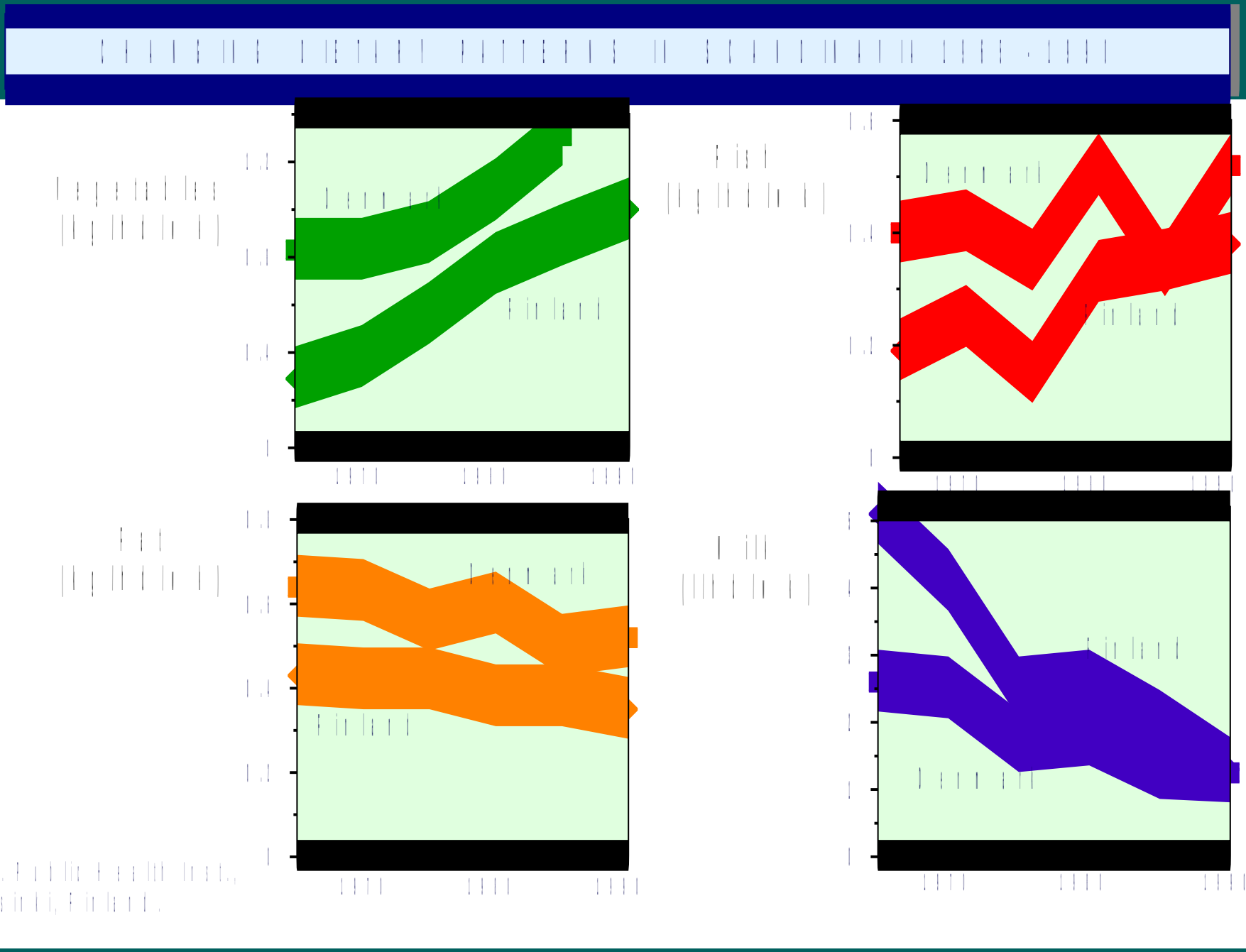


age - standardised mortality/100,000



CVDs
Cancers
Accidents &violence
Alcohol related
Others

"Health of Finland" Ministry of Social Affairs and Health 2006



The biggest change in diet ever seen other than in war and famine

The current obesity dilemma:

UK Government report Oct. 2007

Obesity is a normal "passive" biological response to our changed physical and food environment

Some children/adults are more susceptible for genetic, social and economic reasons

Overwhelming environmental impact reflects outcome of normal industrial development

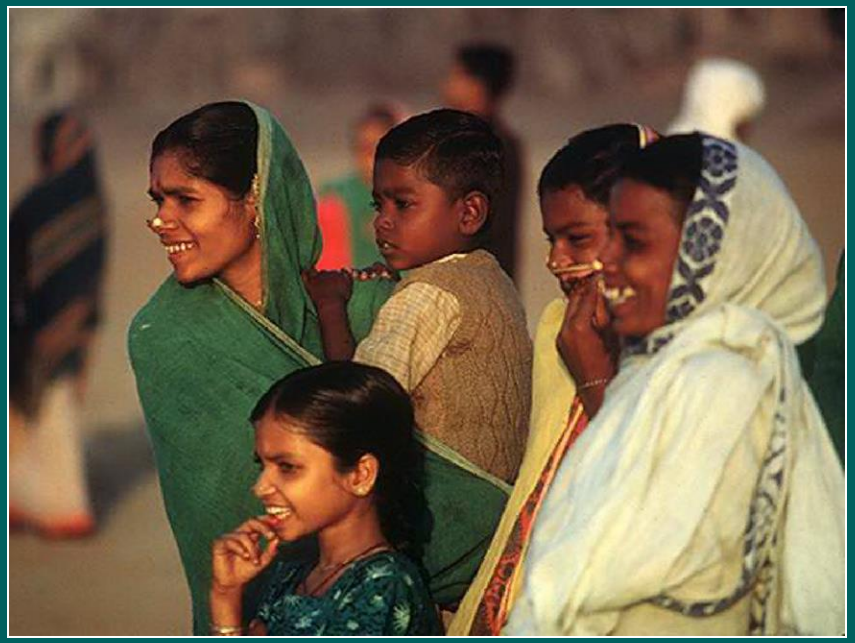
Obesity reflects failure of the free market

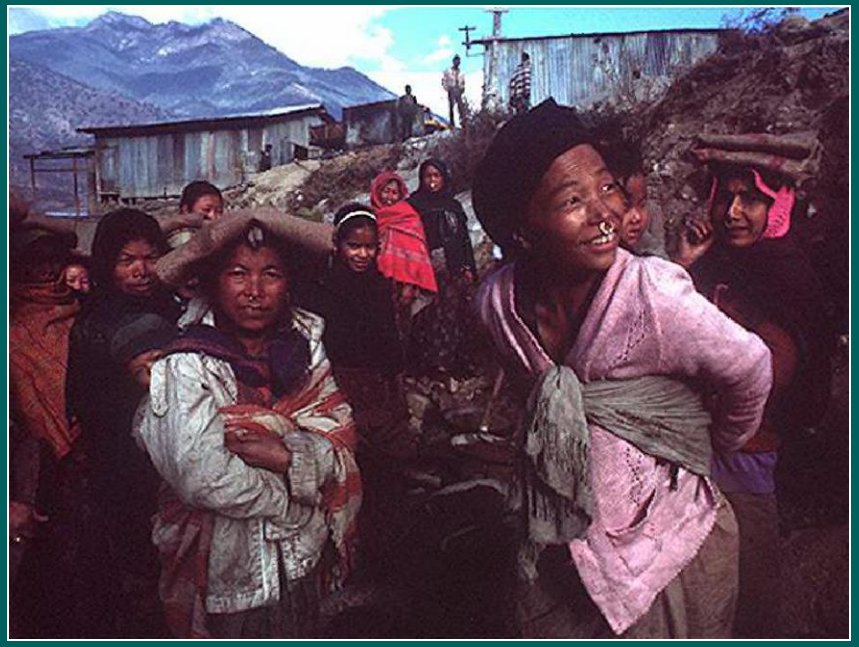
The current obesity dilemma:

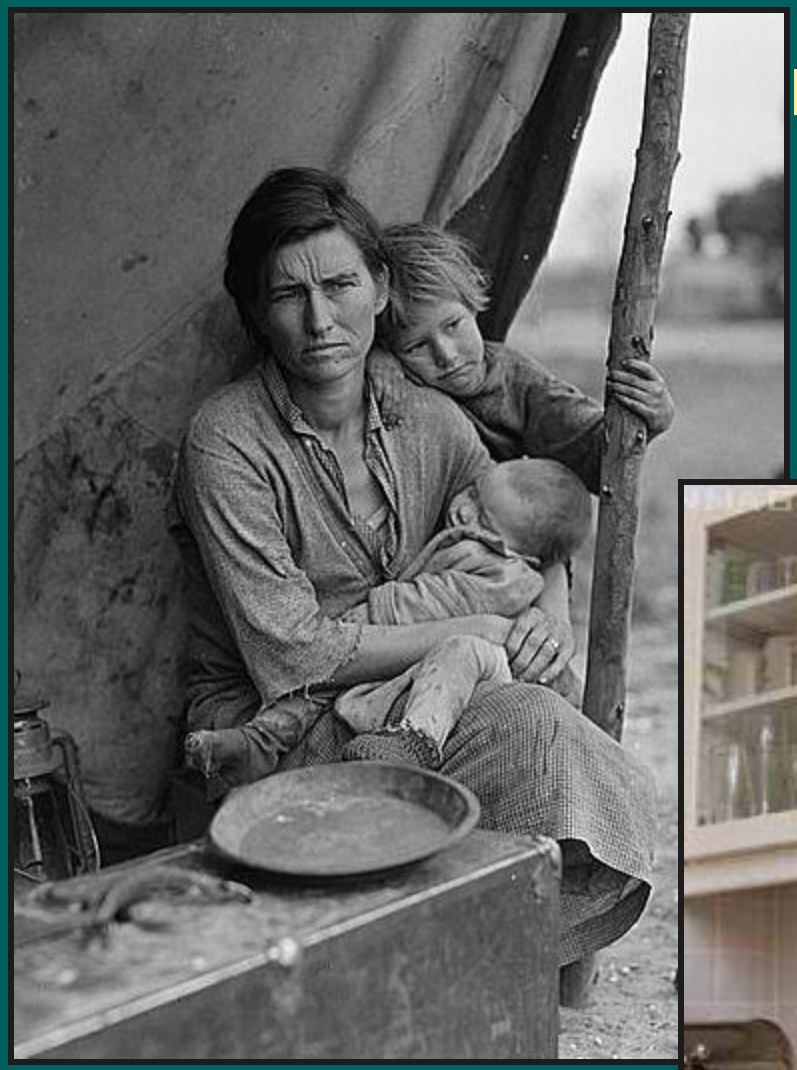
UK Government Report Oct.2007

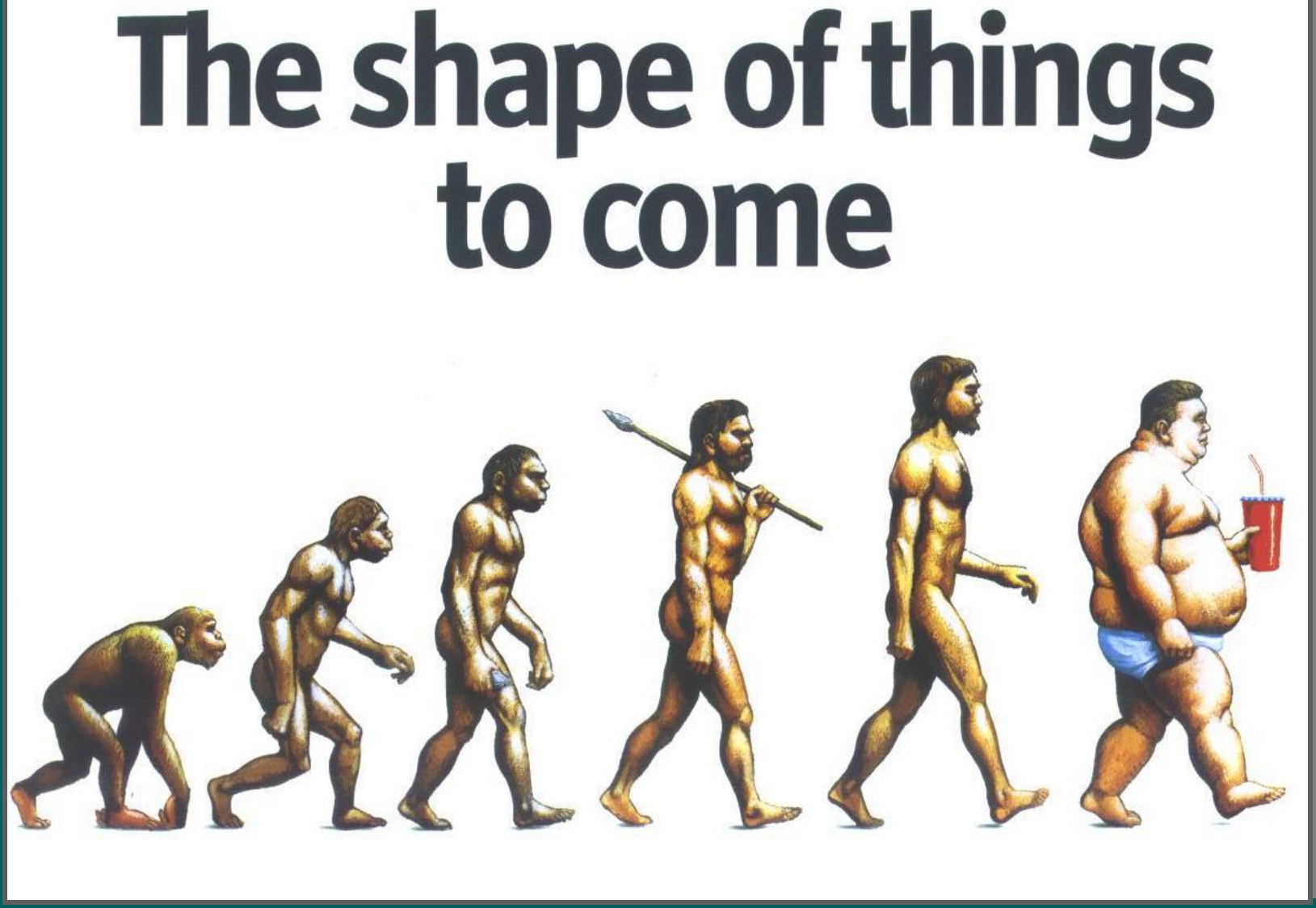
Obesity similar to climate change:

1. Outcome of numerous societal and industrial developments/ forces
2. Action now essential- exceptionally difficult to reverse
3. No single remedy will suffice
4. Co-ordinated central & local government, industrial, societal and individual changes necessary
5. Major changes needed - not just individual advice to eat less and walk more!
6. Immediate action necessary although many logical remedies remain unproven









The cover of "The Economist", Dec. 13-19, 2003.