Update on life-style and cardiovascular prevention
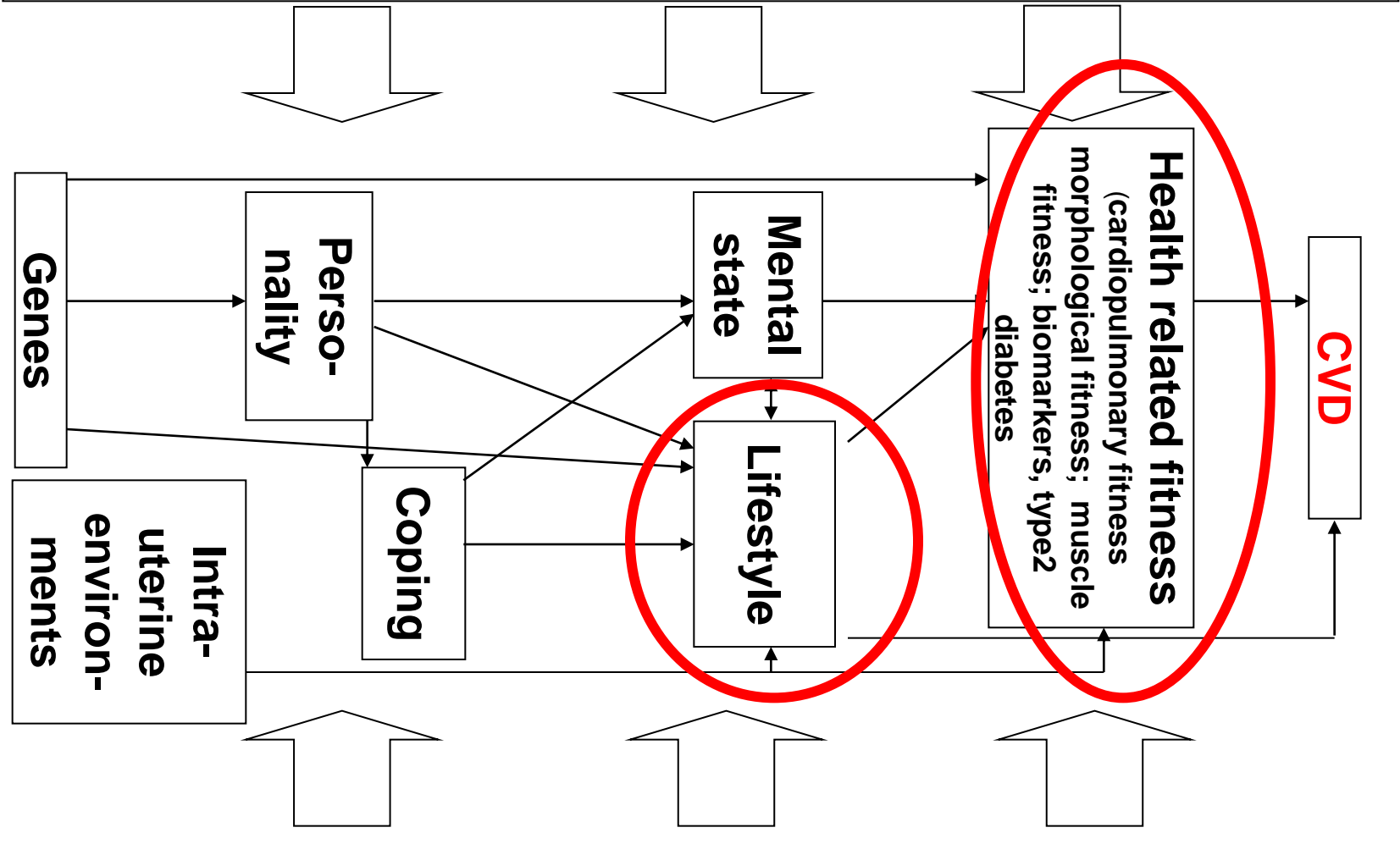
The approach to the problem

**Rome Cardiology Forum 2014
Rome 29.-31. January 2014**

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Research Centre for Prevention and Health
University of Copenhagen and Aalborg**

Social and demographic factors (both parents and own)

Genes

Intra-uterine environ-ments

Perso-nality

Coping

Mental state

Lifestyle

Health related fitness (cardiopulmonary fitness morphological fitness; muscle fitness; biomarkers, type2 diabetes

CVD

Physical and social environments; policies (e.g. taxation, workplace regulation); industries (e.g. advertising, lobbying)

Prevention
(Different strategies)

✵ Person based strategies

- *High risk strategy: Intervention among persons with known risk factors*
  - *Initiative (health system), responsibility (person)*
- *Mass Campaigns*
  - **Information about healthy life style**
  - *Initiative (health system), responsibility (person)*

✵ Structural (contextual) strategies

- **Health promoting regulations ("Make the right choices the easy choices")**
- *Initiative and responsibility: The political/administrative level*

Which are the tools?

- **Personal counselling and treatment**
- **General information to the people**
- **Changing the context for the population**

But do we agree on what we want to change?

Life style

- **Healthy food**
- **Daily low intensity activity**

Mandatory

- **Enjoyment/fun**
  - Alcohol
  - Tobacco
  - Soft drinks/candy
  - Junk food
  - Marathon running
  - Etc.

- *Not mandatory for staying alive*

- *Can be nice*

- *Do you harm when you exaggerate*

Food and daily activity is necessary in a society – Enjoyment should be regulated

Physical inactivity

- **What are we talking about?**
- **What disappeared during the last 50 years?**
  - Fitness centres?
  - Marathon running?
  - Daily activity?
- **What appeared?**
  - Sedentarism
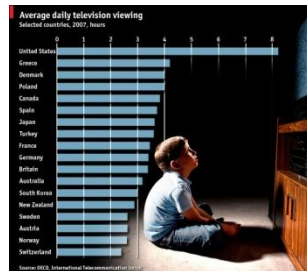
Sedentarism
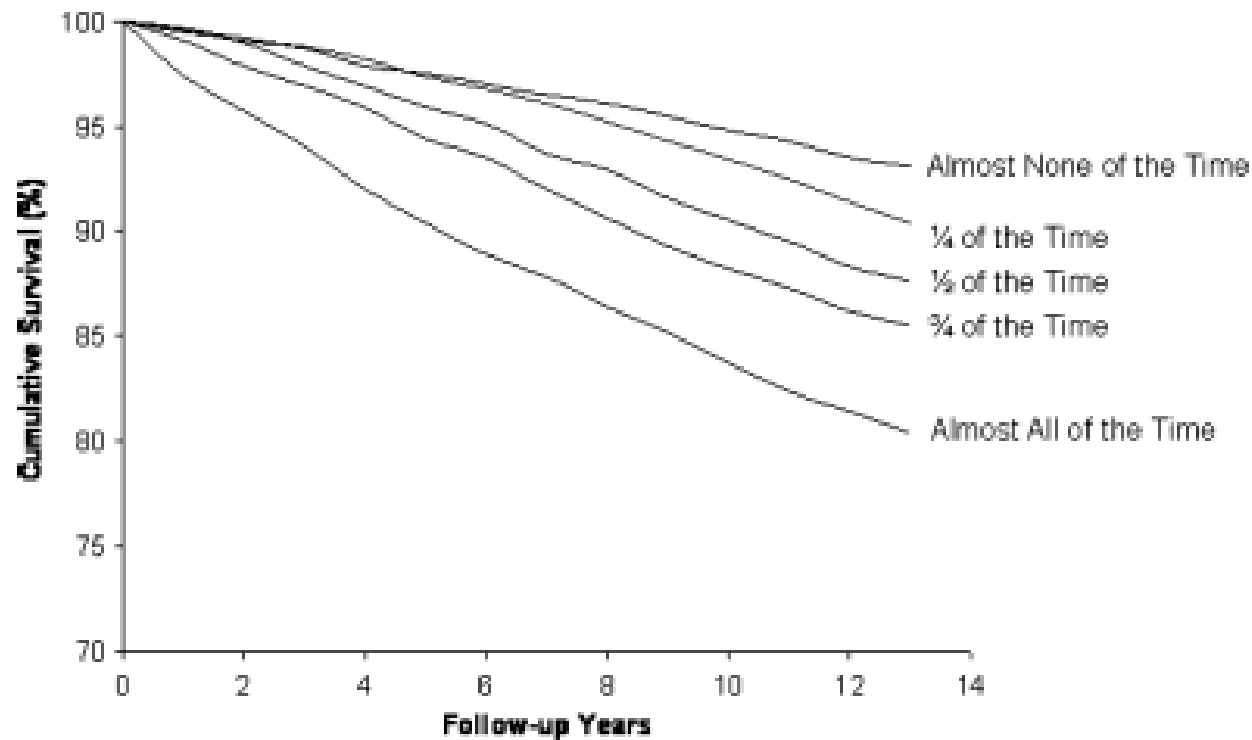## *prospective epidemiological studies*

Katzmarzyk, MSSE 2009

FIGURE 1—Kaplan–Meier survival curve for all-cause mortality across categories of daily sitting time in 17,013 men and women 18–90 yr of age, in the Canada Fitness Survey, 1981–1993. Log-rank $\chi^2 = 174.4$, $df = 4$, $P < 0.0001$. The sample sizes across the categories were 3022 (17.8%), 6652 (39.1%), 4379 (25.7%), 2138 (12.6%), and 822 (4.8%), for the categories of almost none of the time, one fourth of the time, half of the time, three fourths of the time, and almost all of the time, respectively.

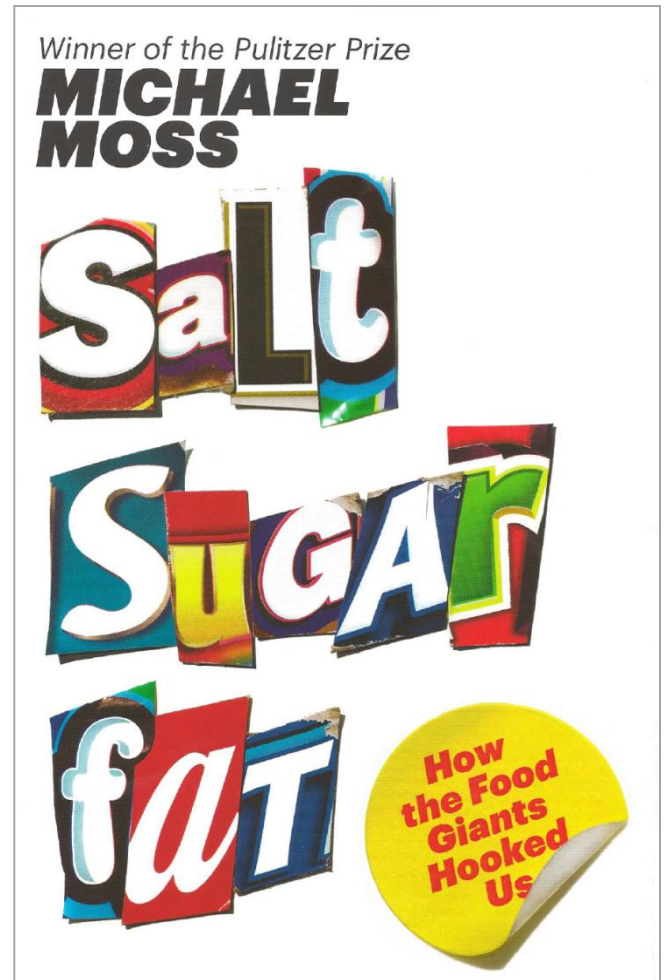# Fat, sugar and salt

Unhealthy diet

High intake of salt, red meat, processed meat, saturated fat, *trans*-fat, and refined grains and sugar

Main problem: HFSS-"food"

"Food" constructed in laboratories as the right mixture of fat, salt and sugar

From soft drinks, over cakes to fast foods. Stimulate the dopamine system in the brain

HFSS-"food" is the target!

High risk strategy

- **Identify the persons at risk**
  - Systematic or opportunistic screening
- **Motivational interviewing**
  - Empowerment - many theories on behaviour
  - It works sometimes on the individual level
  - Linear deterministic or "chaos"?
- **Problems**
  - Very few people follow the guidelines
  - New high risk persons
  - Stigmatisation – "blame the victim"
  - Systematic screening?

The "Charts" section allows you to have graphical displays of your patient's risk evaluation on the date of the examination. The "Intervention" section consolidates the advices given to the patient according to the date of the examination. The "Guidelines" section includes doctor advices based on the European Guidelines on CVD Prevention.

The patient printout gives an excellent overview of your patient's personal CVD risk profile. Simply click on the icon below and proceed to printing.
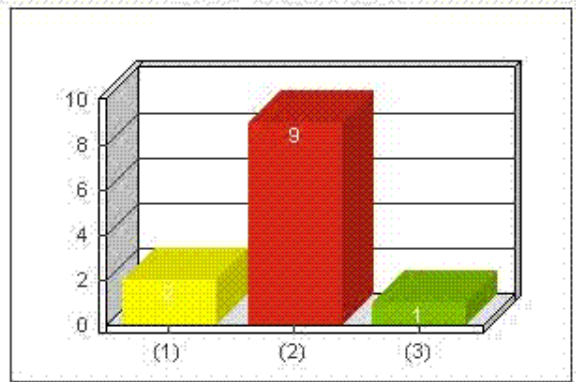
Patient printout

| **Charts** | Intervention | Guidelines |

Your 10-year risk of fatal cardiovascular disease is 2% : Low risk

Examination Date	Age	Systolic Blood Pressure	Cholesterol	Smoker
25/08/2005	44	165 mmHg	6 mmol/L (≈ 225 mg/dl)	No

Modify examination data

Absolute CVD Risk

Contribution of risk factors to total risk

(1) : Your current risk : 2%
(2) : Your risk at age 60 : 9%
(3) : Your risk if you achieve your treatment goal : 1%
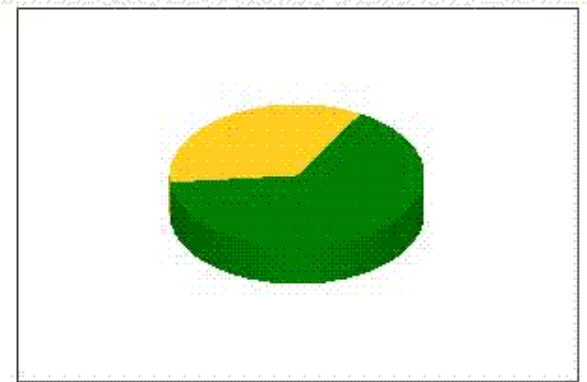
Systolic Blood Pressure (65 %)
Cholesterol (35 %)

Comments :
Please add any information relevant to your patient's condition. They will be automatically added to the patient's printout.

www.heartscore.org

Add this exam to the patient history

Screening and health counselling

Less than 10 % of a population has an ideal heart health

S Ebrahim 2011

(Systematic Cochrane review)

Conclusion:

No effect of systematic health screening on mortality from coronary heart disease

Coronary Heart Disease mortality
Peto OR (95% Cl, fixed effects)

WHO Factories Trial
Gothenberg Study
Oslo Study
MRFIT Study
Finnish men
HDFP Trial
Johns Hopkins
CELL Study
OXCHECK Study
Swedish RIS

Pooled estimate all studies   0·96 (0·89, 1·04)

0·1   1·0   10·0

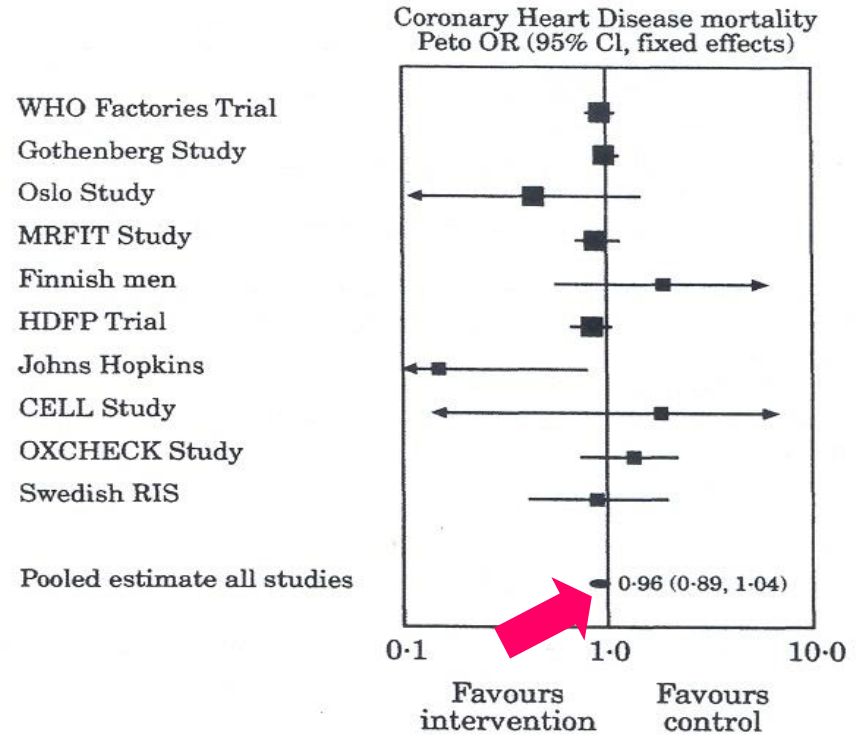Favours   Favours
intervention   control

Figure 3 Meta-analysis of trials of multiple risk factor interventions: coronary heart disease mortality. Abbreviations, see Fig. 2 legend.
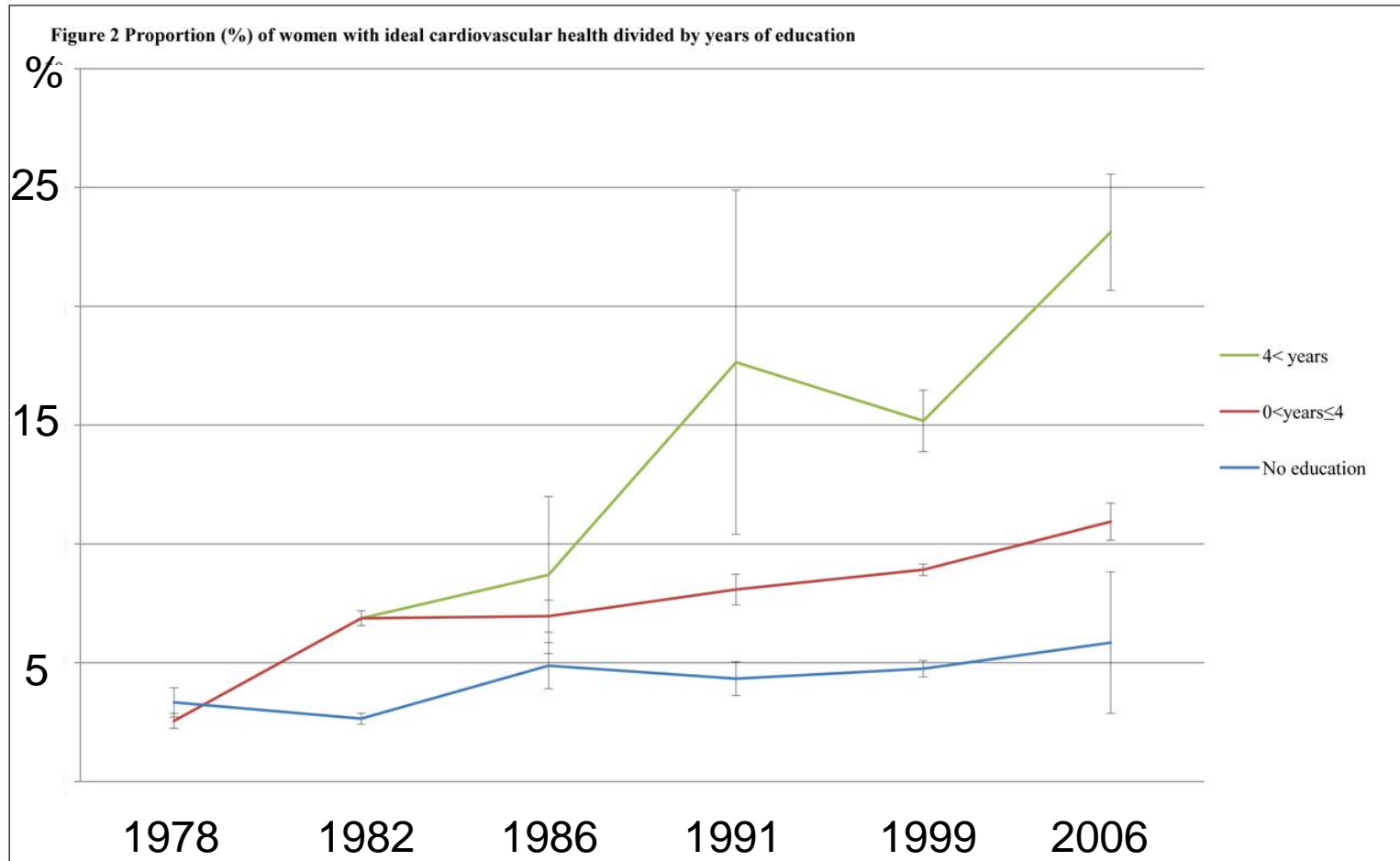
High risk strategy
(individually counselling and treatment)

- Can be of benefit for the individual person/patient
- But is has no effect on a population level
- Does it increase social inequality?

Development in social inequality
(ideal heart health in women in Denmark)

Figure 2 Proportion (%) of women with ideal cardiovascular health divided by years of education

Legend:
- 4< years
- 0<years≤4
- No education

X-axis: 1978, 1982, 1986, 1991, 1999, 2006

Ideal heart health: No established CVD, no diabetes, non-smokers, BMI < 25 kg/m2, BP ≤ 120/80 mmHg with no antihypertensive treatment and TC ≤ 5 mmol/l (193 mg/dl) with no LLT

Information to the citizen
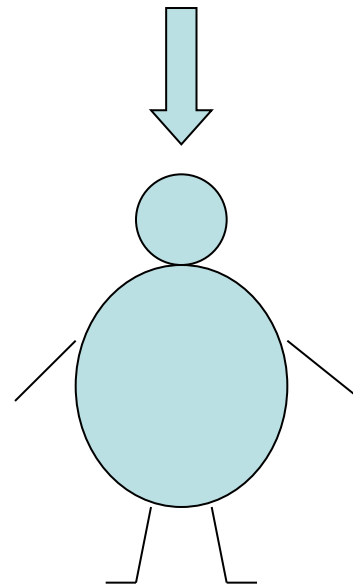
Health authorities
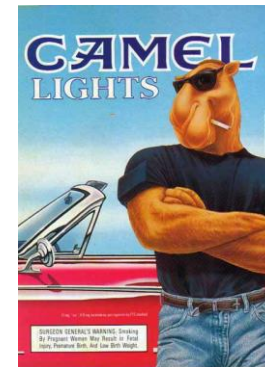
Information on

Alcohol

Tobacco

Diet

Physical activity

Healthy life

Corporations

commercials

Change habits

**Each time health authorities use one € on information, corporations use 10 € on commercials**

What are we trying to influence

"It's not reasonable to expect people to change behaviour, when the surroundings does not encourage or directly oppose such changes" (Schmid 1995)

We need to take the environment into account!

Country

Region

Municipality

Environ-
ments

Social
network

Individual
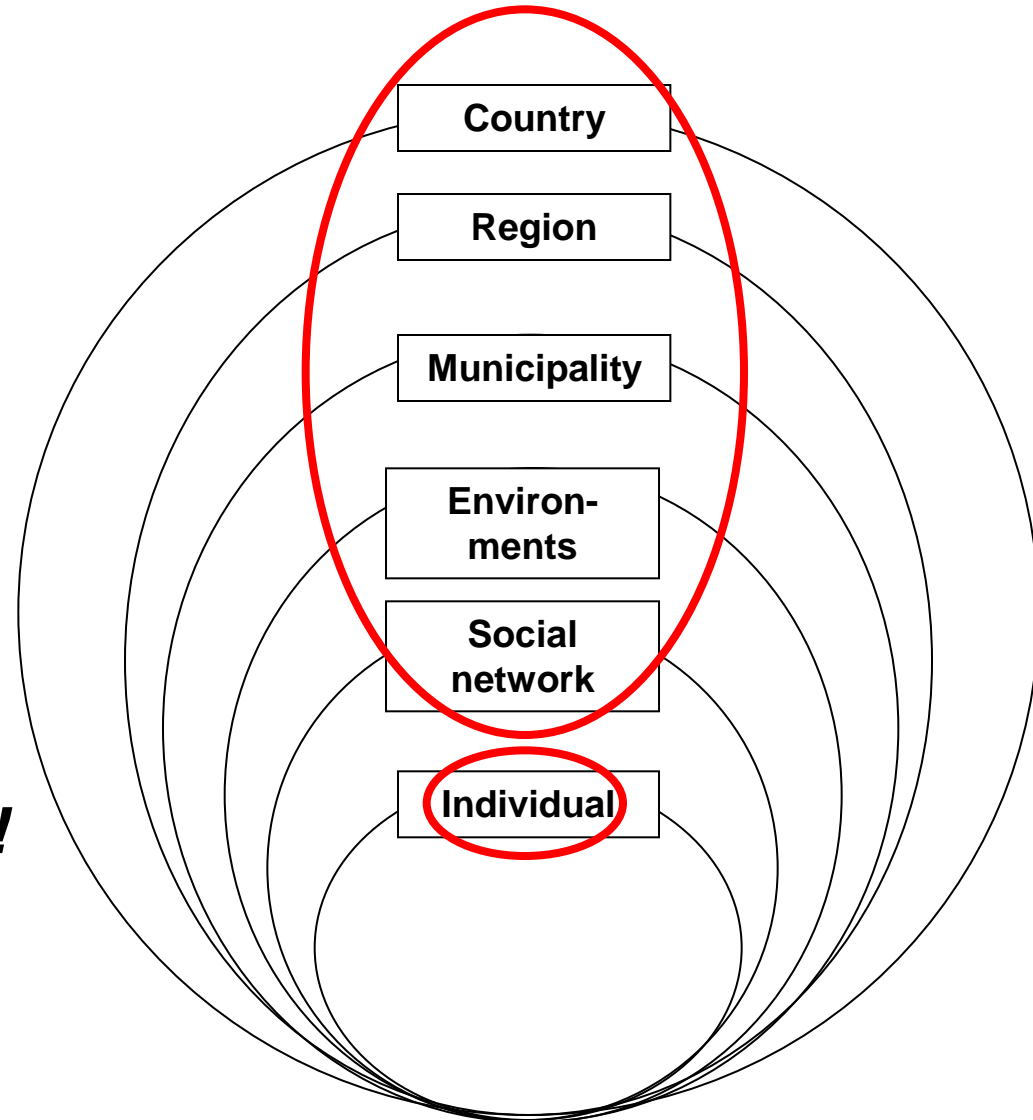
Structural (contextual) strategies

- **What is it?**
    - Fiscal measures (i.e. taxes and subsidies)
    - International, national and regional policies
        - Smoke-free policies, rules for marketing, food production
   - Environmental changes
- **Who are responsible**
    - Global level (WHO, WTO, EU)
    - National levels (government department, health authorities, health agencies)
    - Regional level (authorities, such as for traffic planning, outlets, schools, built environment)
- **Who are not interested?**
   - Disease promoting corporations

Structural (contextual) strategy

G. Rose: **A small shift in the risk of disease across a whole population can lead to greater reduction in disease burden than a large shift among those persons already at risk**
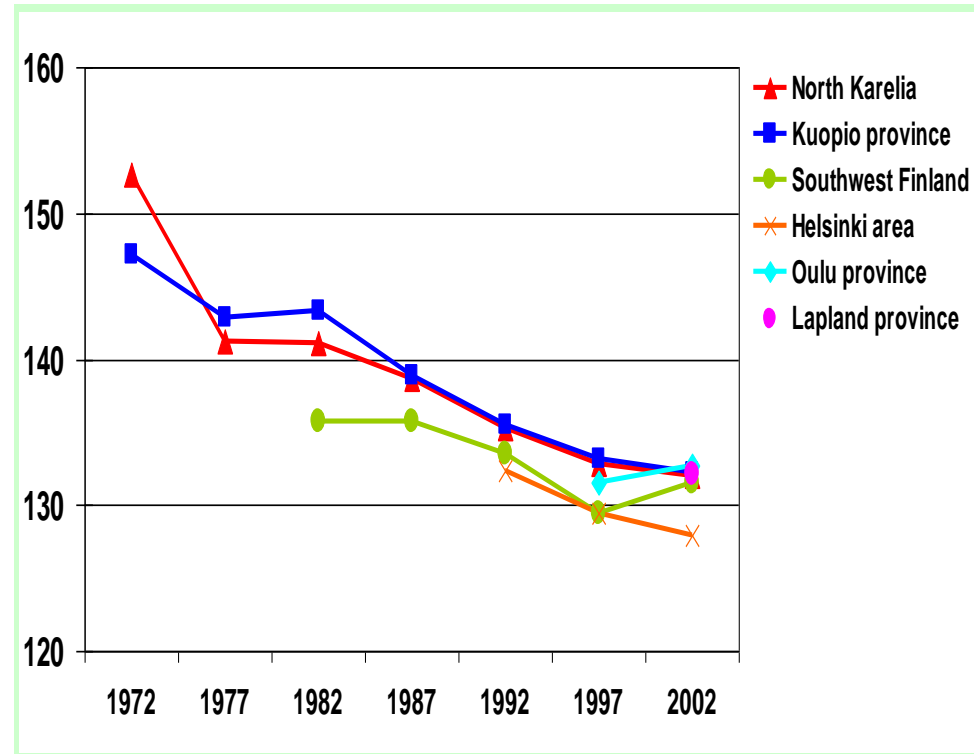
High risk strategy

Clinical treatment

Good

Health behaviour

Bad
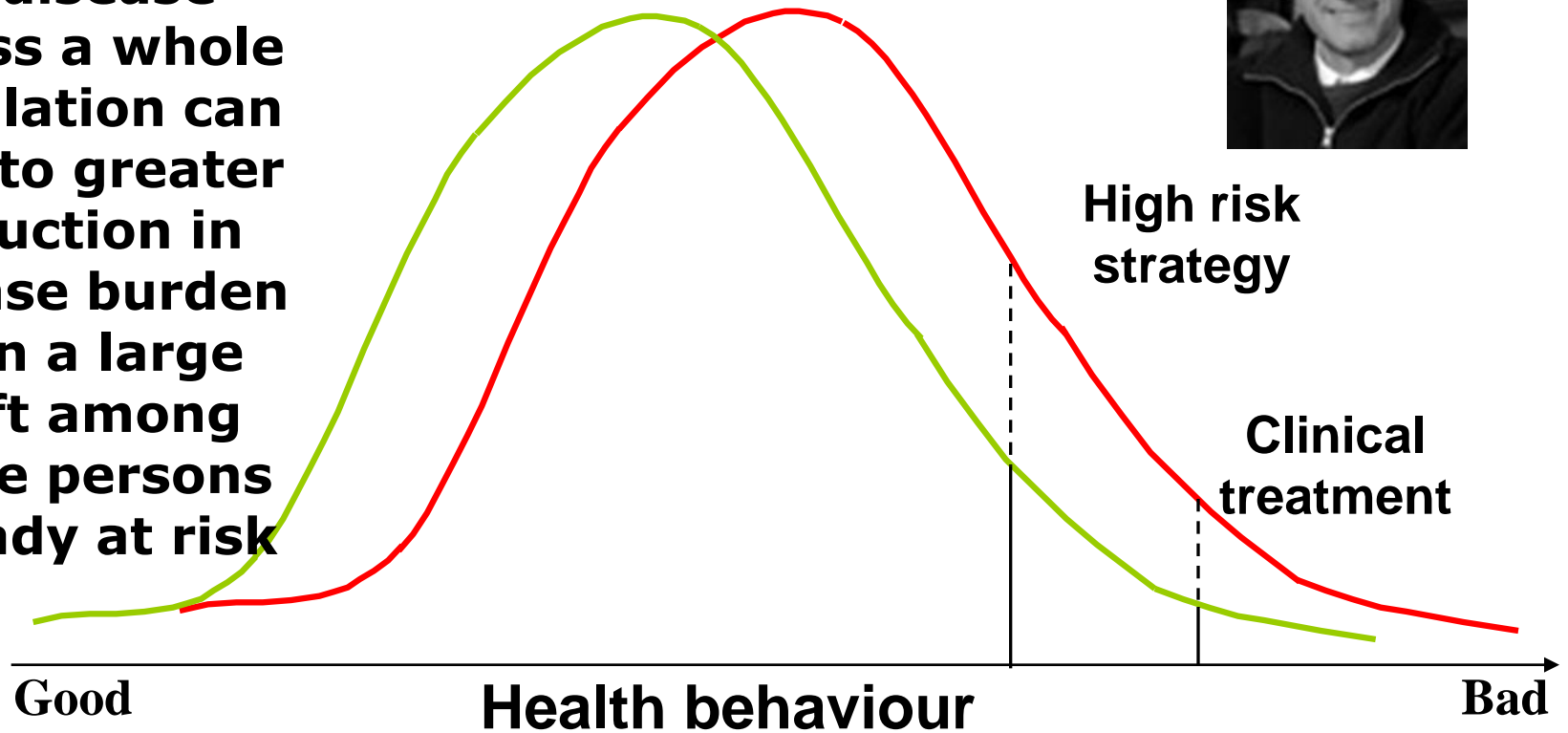
Salt intake & blood pressure

Salt intake in Finland 1977-2007
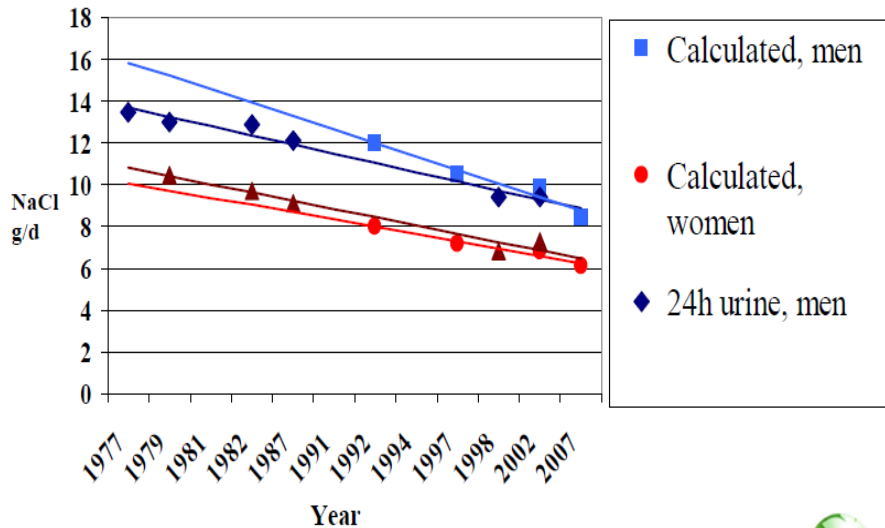
NATIONAL INSTITUTE FOR HEALTH AND WELFARE

85 % of the salt comes from processed food

Salt intake varies from 6 to 15 g/d (high in Poland)

WHO: 5 g/d; reduction of 3 g/d ➔ 14-20,000 fewer death of CVD in UK

Sources: Karvonen et al.   1977, Nissinen et al. 1982, Pietinen et al. 1981, Pietinen et al. 1990, Valsta 1992, KTL/Nutrition Report 1995, KTL/ FINDIET 1997 and FINDIET2002 Studies, KTL/unpublished information

How to regain physical activity?

- **Change environment ➔ facilitate PA in daily life**
  - Re-allocate road space (lanes)
  - Create enhancing places in cities for movements
  - Linkage of different sites
  - Staircase visible – not elevators
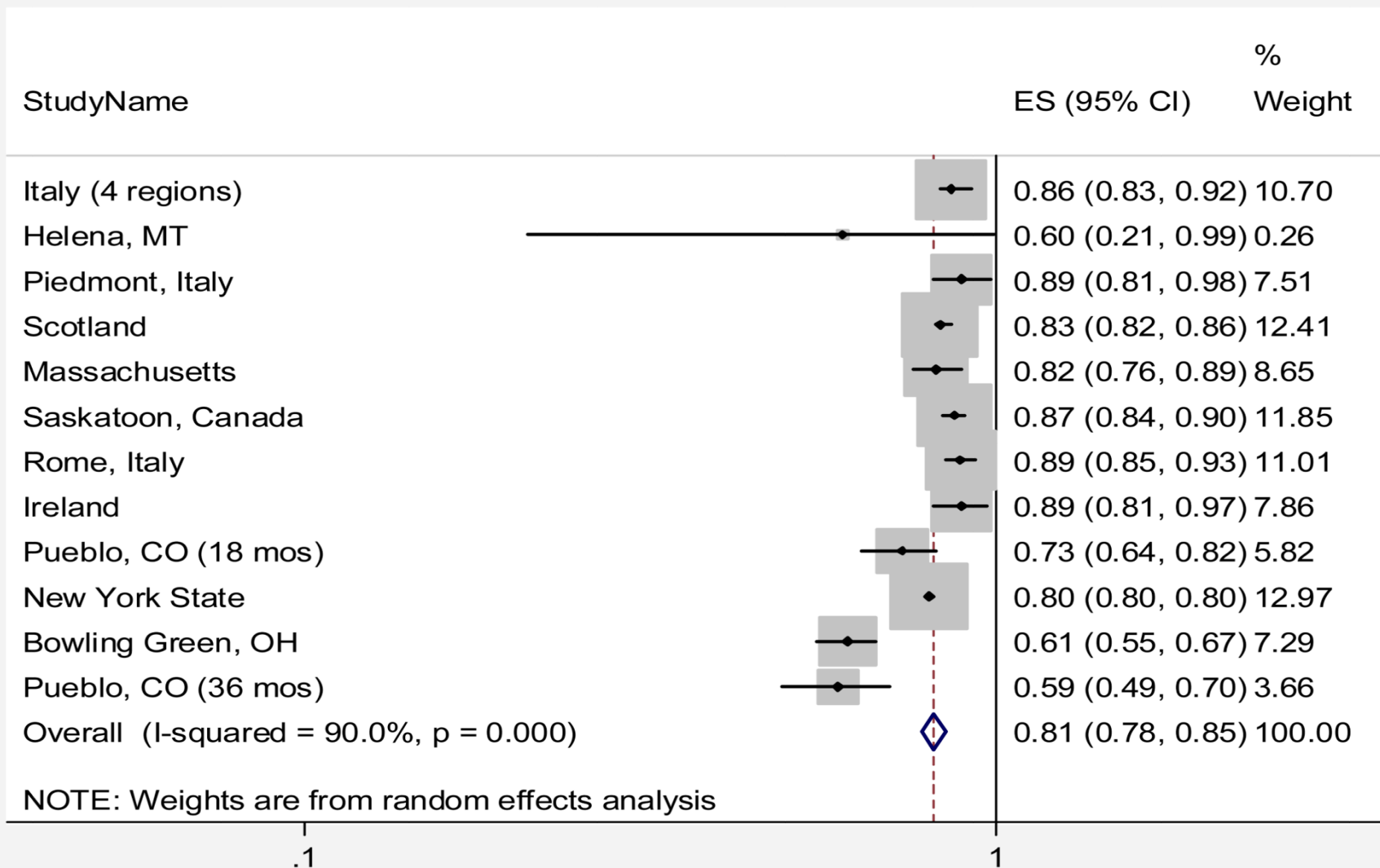 - Design school playgrounds
- **Pricing**
  - Road-user charge; higher parking fees; cheaper public transportation
- **Breaks in sitting time**

Decline in acute myocardial infarction after smokefree laws

StudyName	ES (95% CI)	% Weight
Italy (4 regions)	0.86 (0.83, 0.92)	10.70
Helena, MT	0.60 (0.21, 0.99)	0.26
Piedmont, Italy	0.89 (0.81, 0.98)	7.51
Scotland	0.83 (0.82, 0.86)	12.41
Massachusetts	0.82 (0.76, 0.89)	8.65
Saskatoon, Canada	0.87 (0.84, 0.90)	11.85
Rome, Italy	0.89 (0.85, 0.93)	11.01
Ireland	0.89 (0.81, 0.97)	7.86
Pueblo, CO (18 mos)	0.73 (0.64, 0.82)	5.82
New York State	0.80 (0.80, 0.80)	12.97
Bowling Green, OH	0.61 (0.55, 0.67)	7.29
Pueblo, CO (36 mos)	0.59 (0.49, 0.70)	3.66
Overall (I-squared = 90.0%, p = 0.000)	0.81 (0.78, 0.85)	100.00

NOTE: Weights are from random effects analysis

.1   1

Alcohol

- **Pricing**
  - **10 % rise ➔ 5.1 % reduction (4.6-8.0)**
- **Restriction**
  - **Age-limits with consequences**
  - **Drink-driving strategies**
- **Advertising**
  - **Regulation**
- **Regional level**
 - **Policies in schools, workplaces etc.**
  - **Number of outlets and reduction in hours of sale**
- **Education of children/adolescents: Very little or no effect**

Conclusion

- **It is not a natural law that cardiovascular diseases are still the leading cause of morbidity and mortality in the world**
- **It calls for a collaboration between politicians, administrative authorities and health professionals**
- **We need a "triple" approach to handle the situation**
  - Healthy environments ("health in all policies")
  - Neutral information – regulate advertising
  - Health professionals to support, monitor and do the individual counselling
  - Industry should be kept in "arms length"
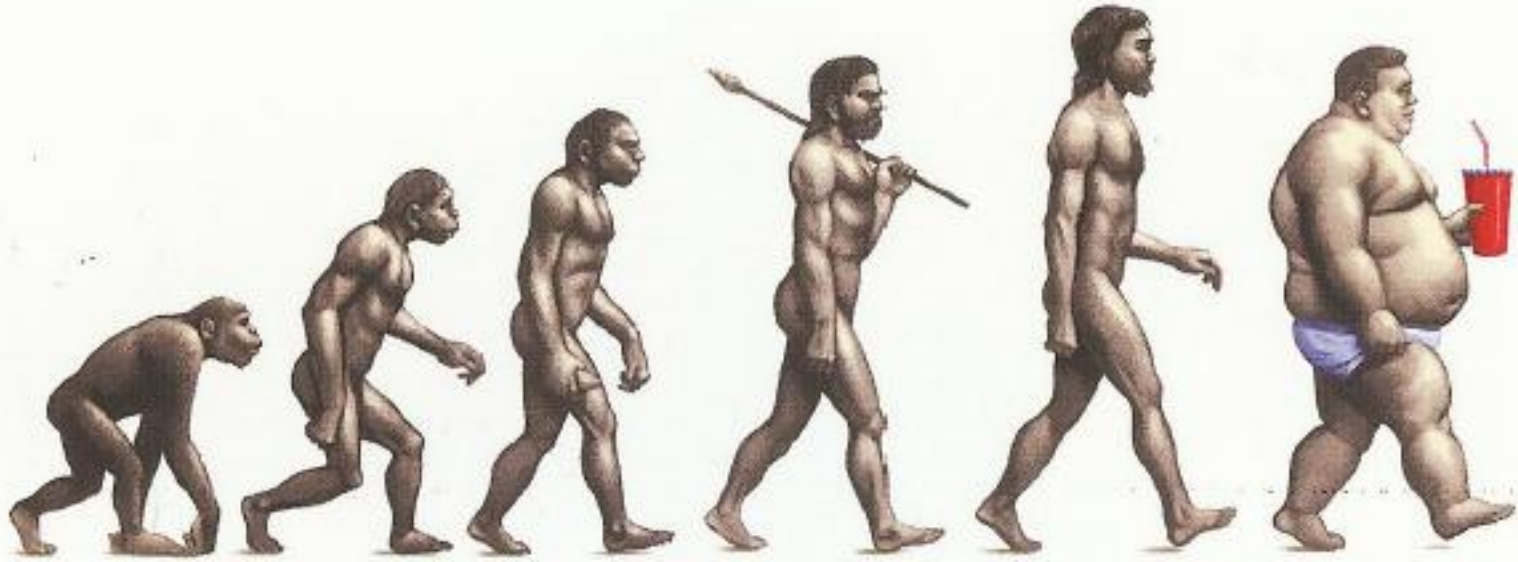
Thank you

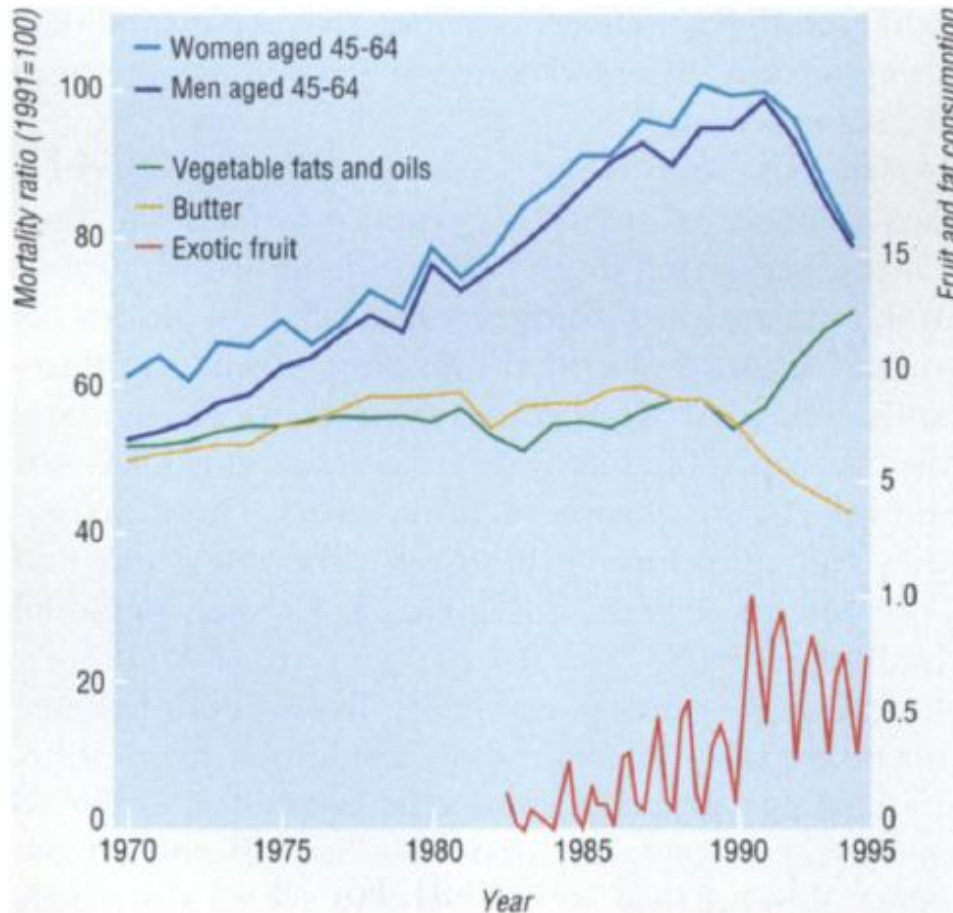# Is Homer Simpson physical active?

30 min

8 hours

30 min

30 min

6 hours

Yes (according to health authorities)

Mortality of heart disease in Poland

Effect of lowering saturated fat?

Mortality ratios for ischaemic heart disease plus atherosclerosis and arterial diseases, with estimates of butter and vegetable fats and oils (kg/person/year)[7] and of exotic fruits (kg/person/quarter)[12] available for consumption by quarter from 1970 to 1994. Data for years are plotted to mid-year and for quarters to mid-quarter. Mortality ratios are age standardised

Before 1990:

Animal fat subsidies

After 1990:

No fat subsidies

Cheap vegetable oils (rapeseed)

More fruit

Zatonski et al, BMJ 1998

Healthy diet policies are effective

- High intake of salt, red meat, processed meat, saturated fat, *trans*-fat, and refined grains and sugar

- Salt ➔ Hypertension ➔ CVD
    - Finland: 14 g ➔ 8 g/day
- Saturated fat ➔ cholesterol ➔ CVD
- Sugar ➔ Fatness ➔ Diabetes ➔ CVD

- Food *H*igh in saturated *F*at, *S*alt and *S*ugar – *HFSS* food

Theories on behaviour

- **Individual (more than 60 theories)**
  - *Health belief model*
  - *Theory of reasoned action*
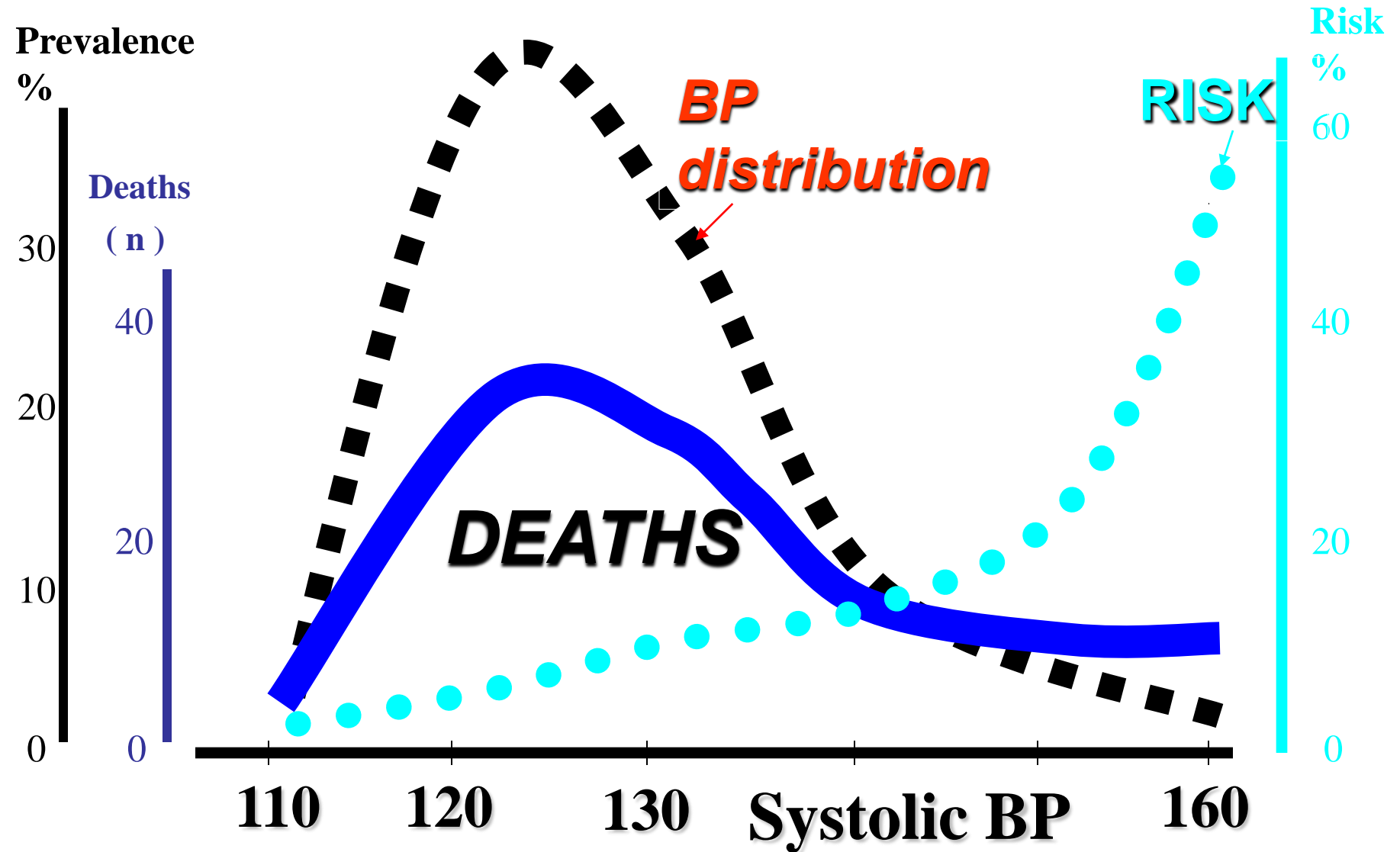 - *Theory of planned behaviour*
  - *Chaos theory*
- **Lokal environment**
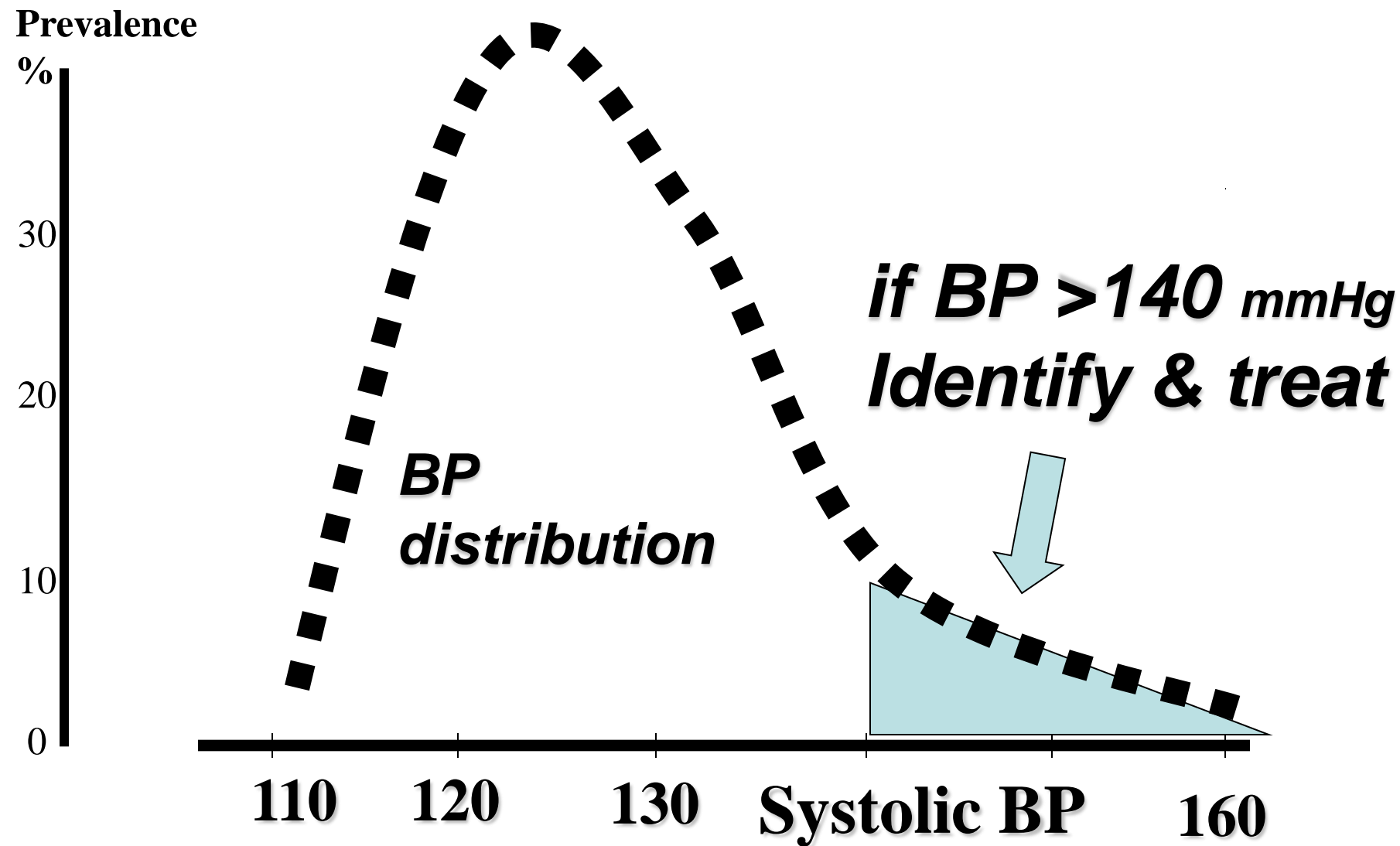- **Politics on all levels (from EU to local municipalities)**
- **Commercial interests**
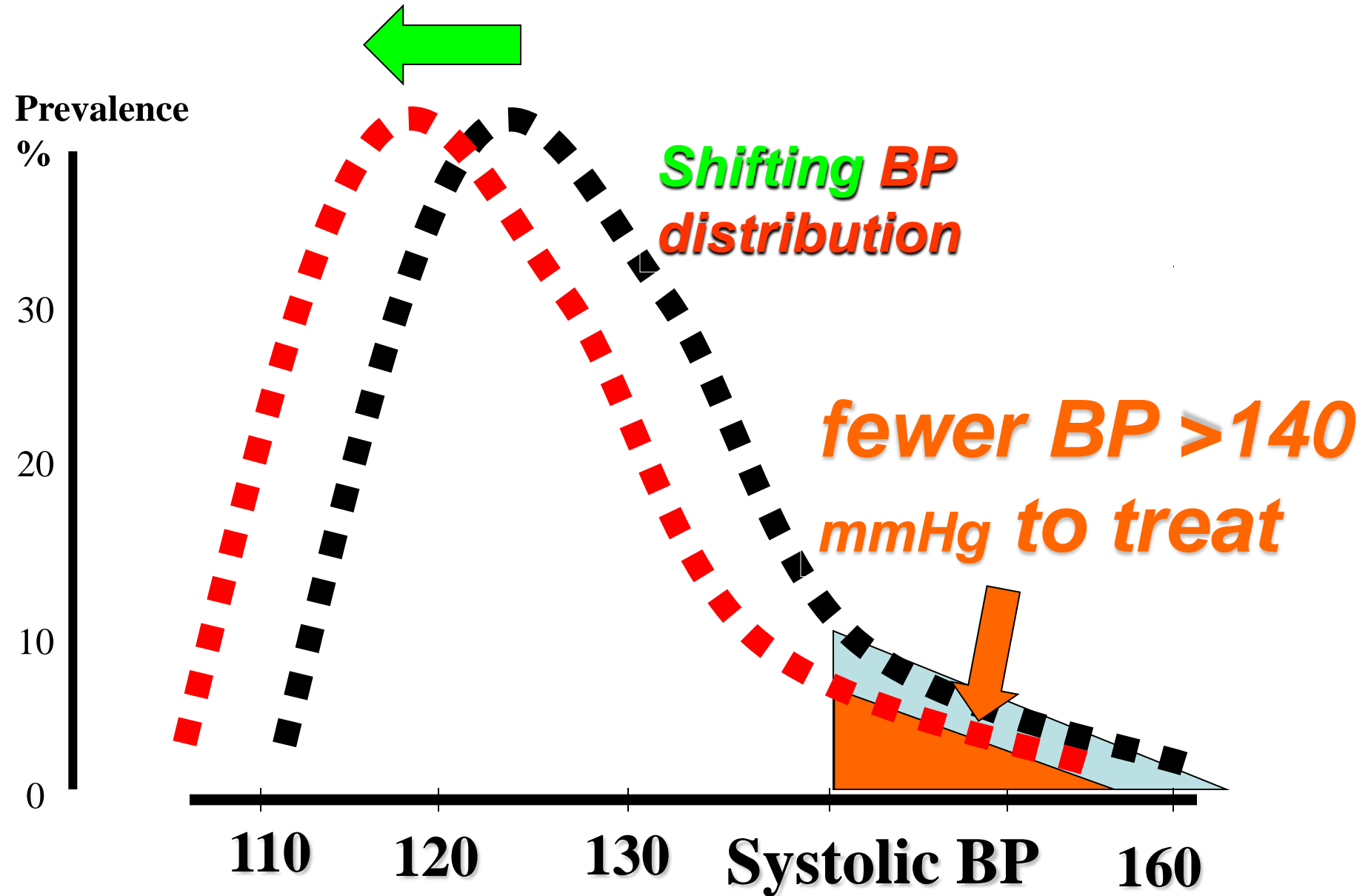
Blood Pressure & CHD risk vs. numbers of deaths
(13.5 years follow-up in 855 men aged 50 Wilhelmson)

Example: Blood pressure
High risk strategy

Chaos theory

- **Are changes linear, deterministic processes under totalcontrol from the individual?**
- **This is challenged by chaos theoretics**
  - *Changes happens in major leaps*
  - *Not planned, but sudden indskydelser*
  - *Changes are related to knowledge, attitudes, beliefs, personality, self confidence etc etc*
  - *Small changes in each parameter ➔ sudden changes*
  - *Bio statistics: 3, 4, 5 and 10 way interactioner ➔ unpredictable results*
- **Keep on challenging your patients – you never know when the opening for changes occur.**

Modifiable risk factors for CVD

- **Unhealthy diet**
    - High intake of salt, red meat, processed meat, saturated fat, *trans*-fat, and refined grains and sugar
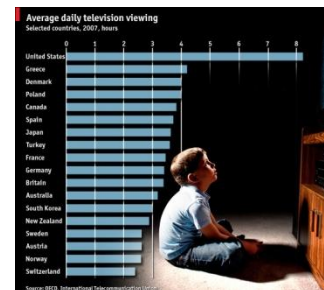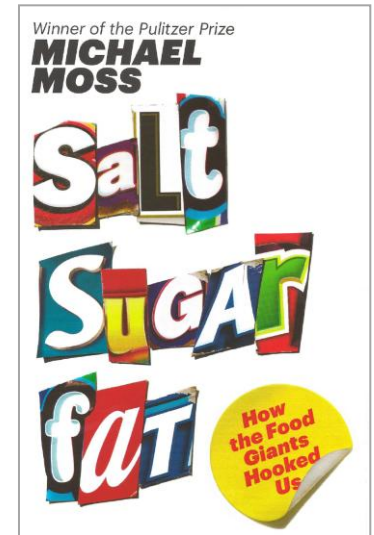   - Main problem: HFSS-"food"
- **Smoking**
    - Both passive smoking and smoking
- **Physical inactivity**
    - Including sedentarism
- **Alcohol**
    - Excess amount of alcohol

Prevention
(classification of strategies)

High risk strategies
- Intervention in persons with known risk factors

Population based strategies
- *Campaigns*
  - Inform the population of healthy life style
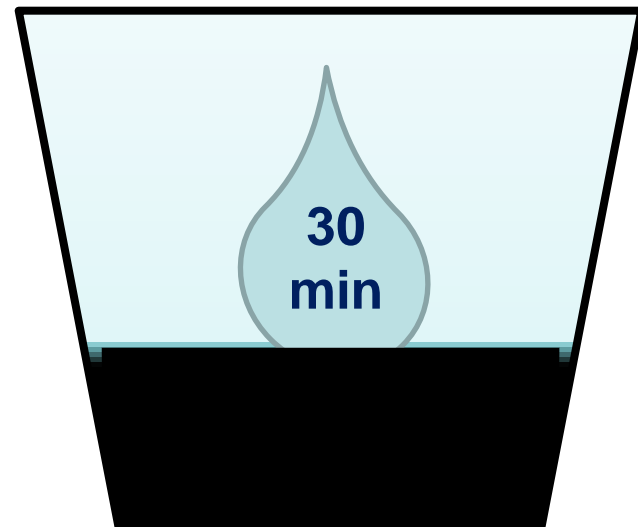- *Structural/environmental strategies*
  - Healtrh promoting regulations ("Make the right choices the easy choices")

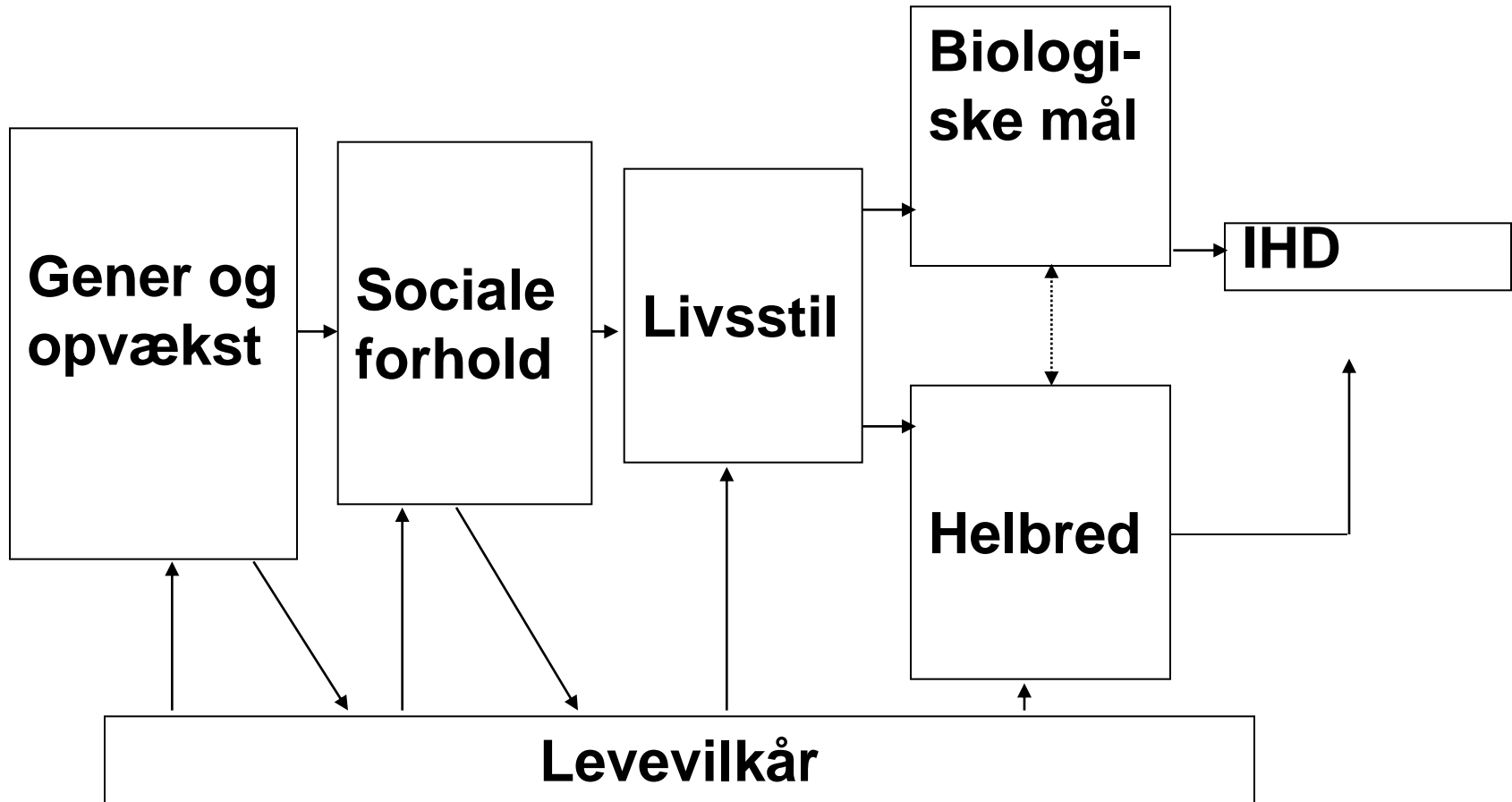# Is it enough with 30 minutes of moderate-to-vigorous physical activity, in a time with increasing sedentarism?

1985

2010

30 min

30 min

Maybe we have not hit the bottom yet – further technological improvements can make it even worse
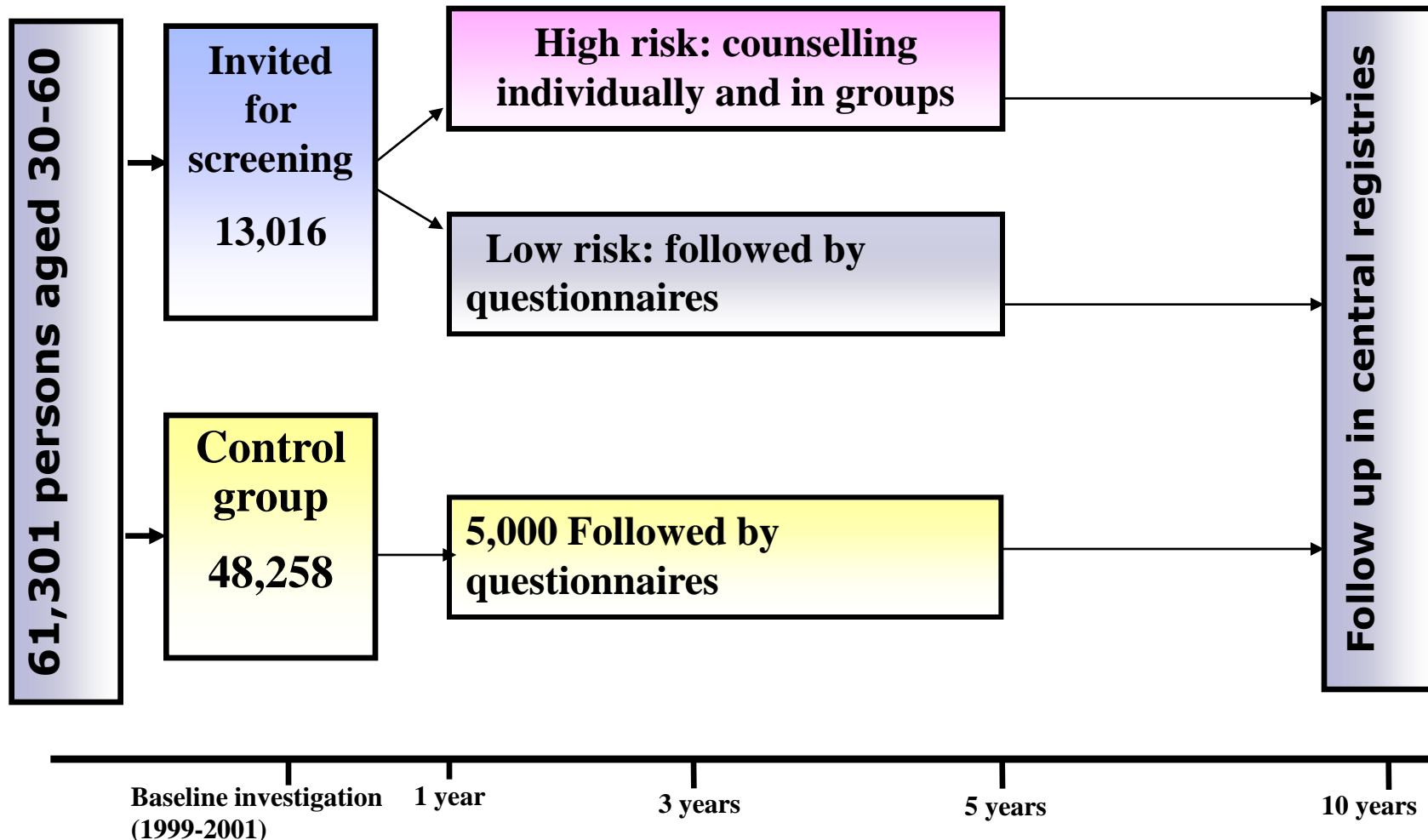
Udvikling af iskæmisk hjertesygdom

Overall aim

To reduce incidence of cardiovascular diseases and total mortality in the population by means of a high risk strategy focusing on life-style intervention

Inter99 investigation

61,301 persons aged 30-60

Invited for screening

13,016

Control group

48,258

High risk: counselling individually and in groups

Low risk: followed by questionnaires

5,000 Followed by questionnaires

Follow up in central registries

Baseline investigation (1999-2001)   **1 year**   **3 years**   **5 years**   **10 years**

Screening and instant health counselling

High risk defined according to: **family history, life style, BMI, blood pressure, and cholesterol**

Health counselling talks:

"motivational interviewing", "stages of changes"

Counselling in groups

- **Six times during ½ a year**
- **2 hours per session**
- **14-20 persons in each group**
- **Baseline and after one and three years**

Effect after five years on life-style and general health
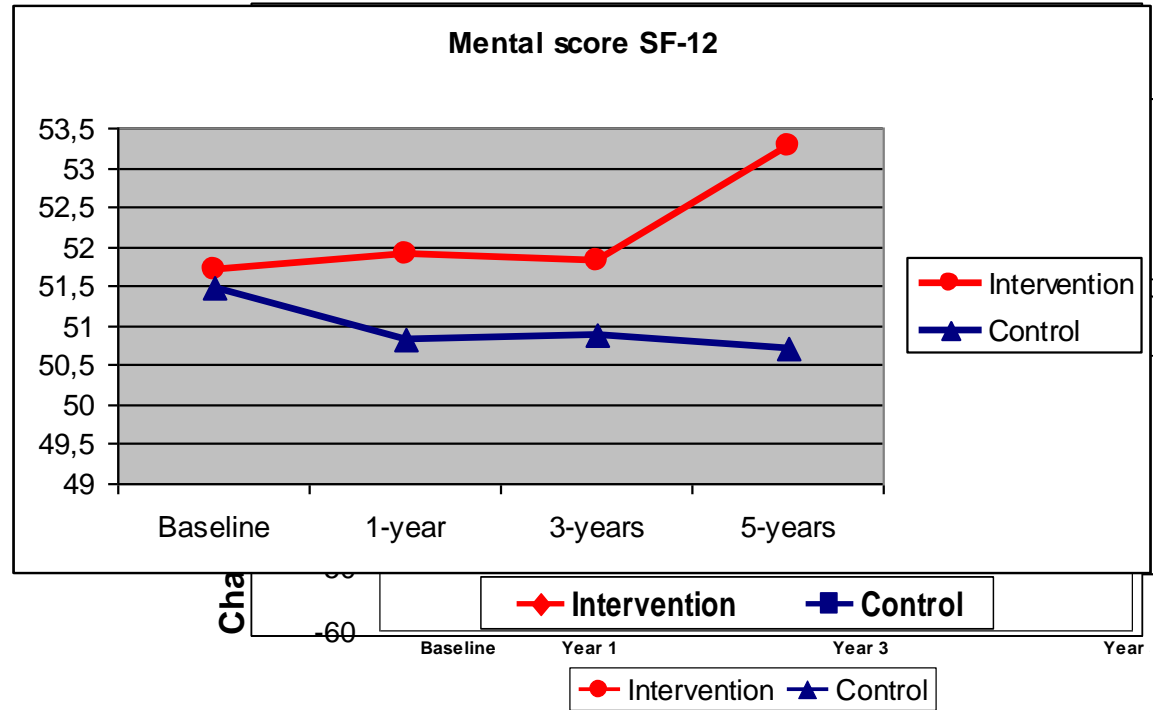
- **Smoking**
- **Alkohol**
  - –Binge drinking
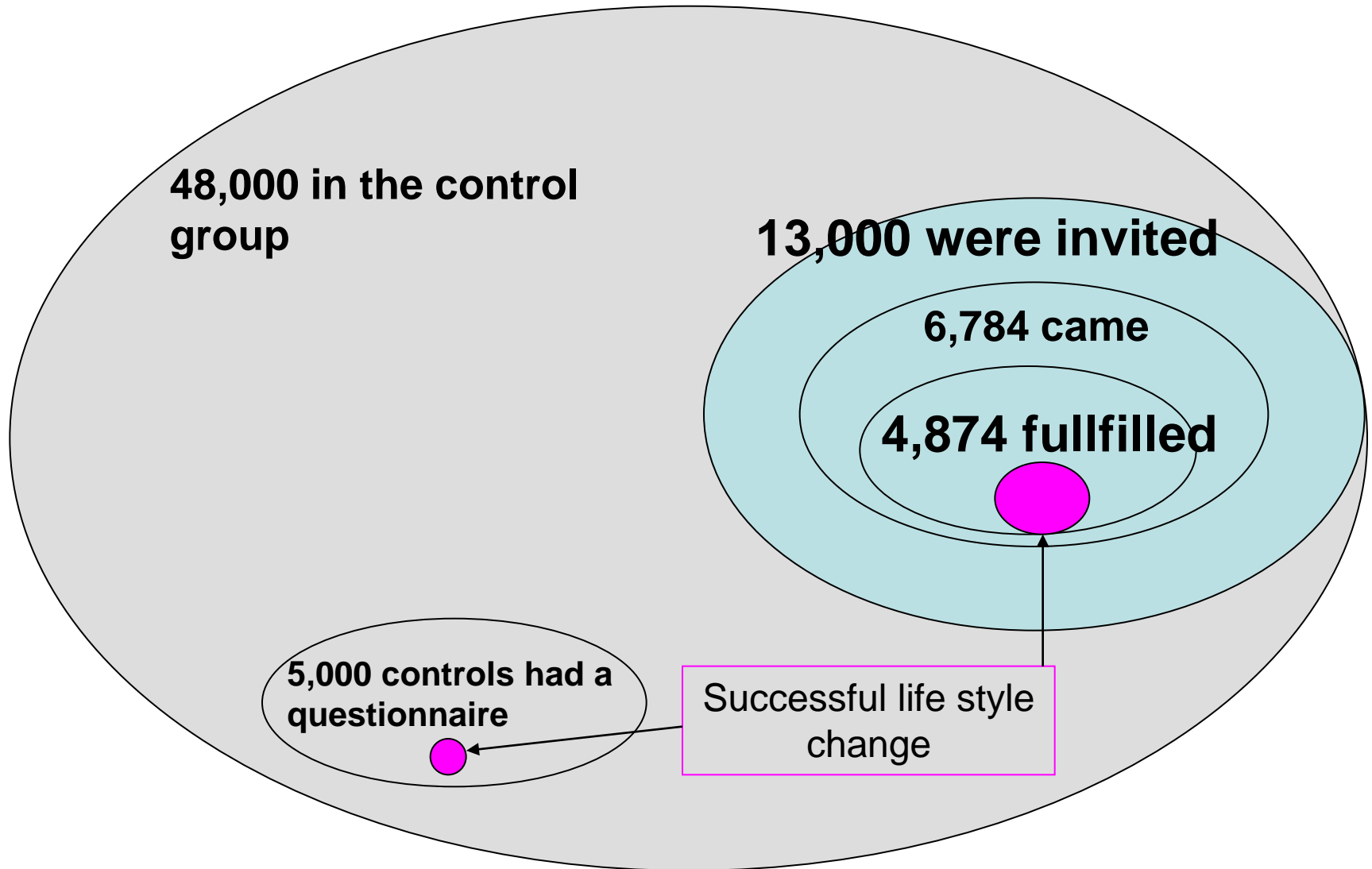- **Diet**
  - –Saturated fat
  - –Vegetables/fruit
- **Physical activity**
- **Mental health**

So – it was a success?

What have we compared?

48,000 in the control group

13,000 were invited

6,784 came

4,874 fullfilled

5,000 controls had a questionnaire

Successful life style change

Who participated?

	Education (RR)	Income (RR)
Base-line	1.56 (1.47-1.66)	1.32 (1.24-1.40)
1 year	1.33 (1.22-1.46)	1.08 (0.98-1.20)
3 years	1.26 (1.15-1.38)	1.28 (1.15-1.43)
5 years	1.39 (1.26-1.52)	1.23 (1.08-1.41)

Indexes for inequality: "The summary effect of the ordered educational and income participation distribution, which take into account the size of the education and income groups (Mackenbach 1997)
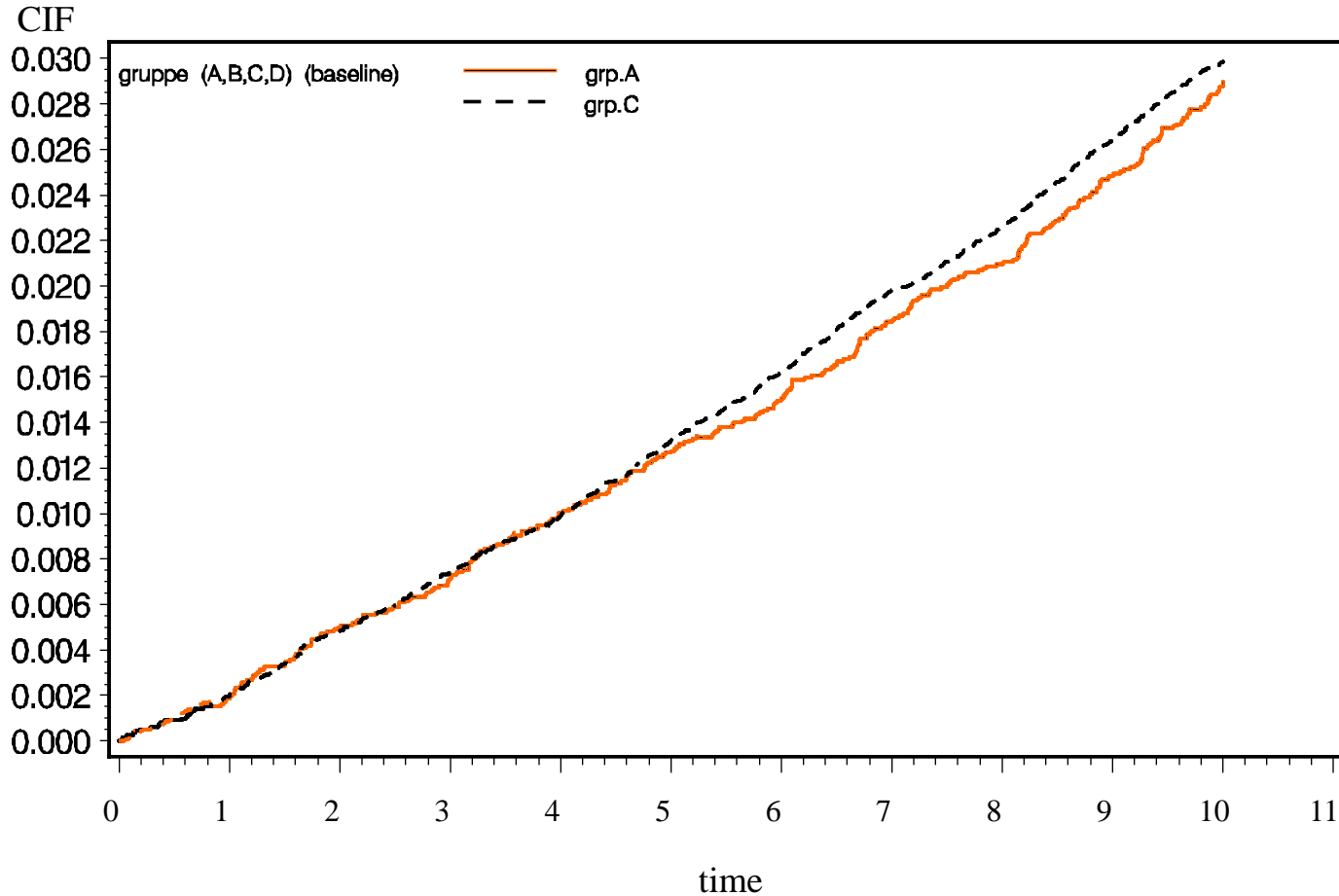
M. Binder, 2012

10 years incidence of ischemic heart disease
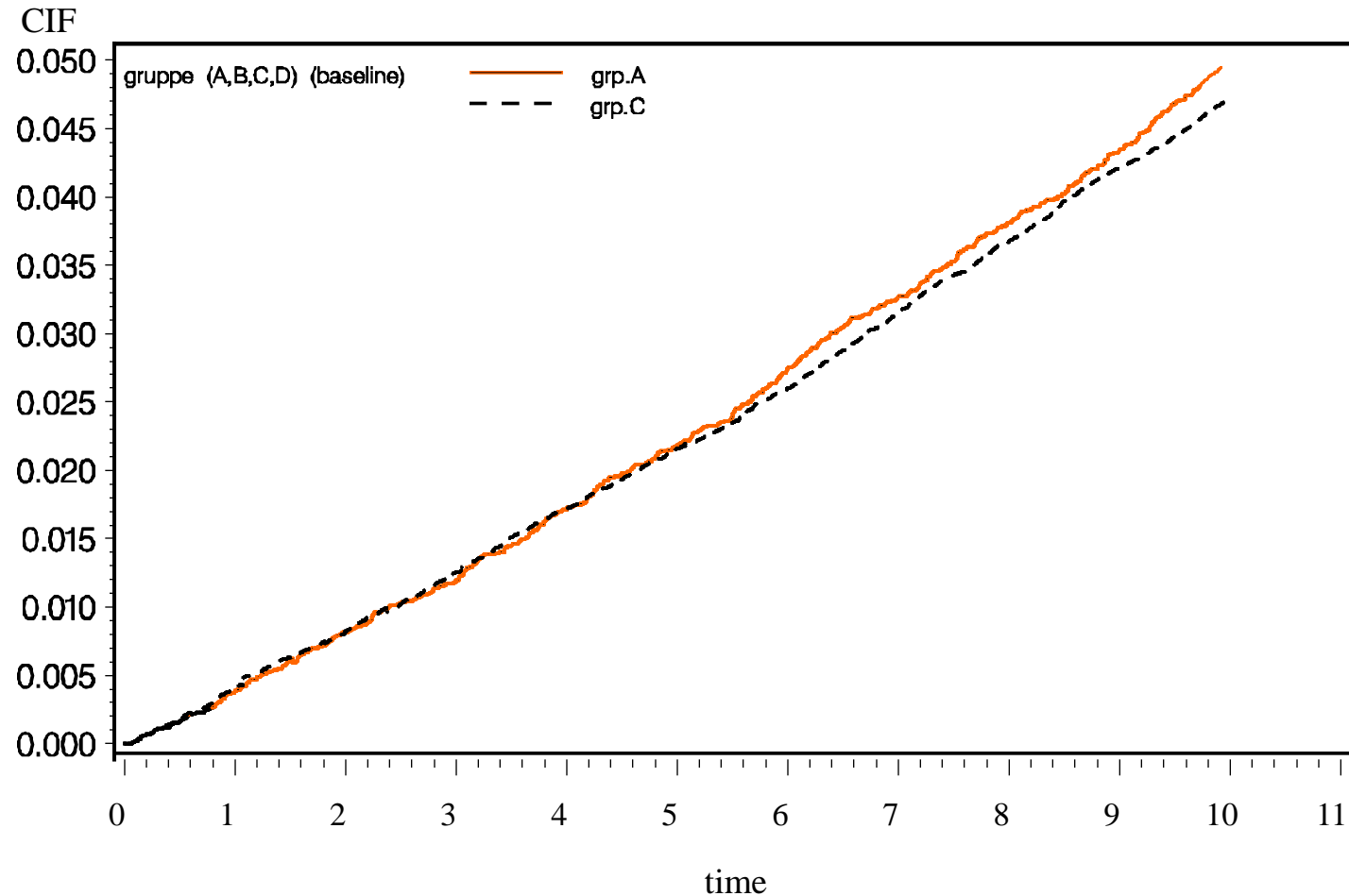
HR = 1.04 (0.95-1.14)

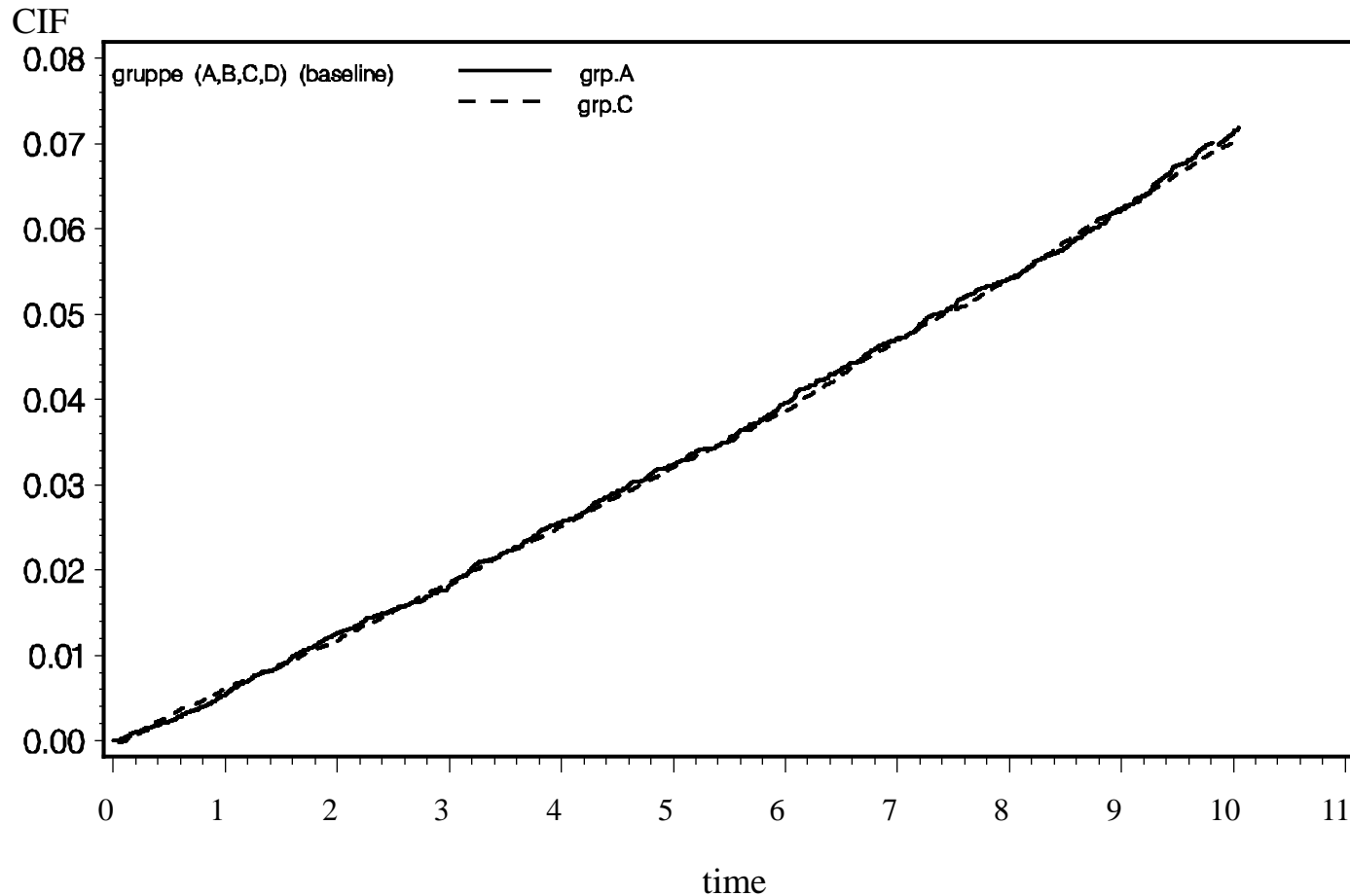**Adjusted for age, sex, ethnicity, education, cohabitation**

10 years incidence of stroke

HR = 0.99 (0.88-1.12)

Adjusted for age, sex, ethnicity, education, cohabitation

10 years incidence of cardiovascular diseases (ischemic heart disease & stroke)

HR = 1.01 (0.94-1.10)

Adjusted for age, sex, ethnicity, education, cohabitation

10 years total mortality

HR = 1.00 (0.91-1.09)

Adjusted for age, sex, ethnicity, education, cohabitation

Conclusion

- **Health screening and counselling on life style does not reduce cardiovacular disease or total mortality in the general population**
- **Because we do not reach those who are in the highest need?**
- **Future research**
  - *Screening and counselling in subgroups?*
- **Concentrate on structural changes in society – they work**
    - *Jørgensen T, Eur J Prev Cardiol 2012*
    - *Mozaffarian D, Circulation 2012*