

Cholesterol and cardiovascular mortality in Poland. Are we going in the right direction?

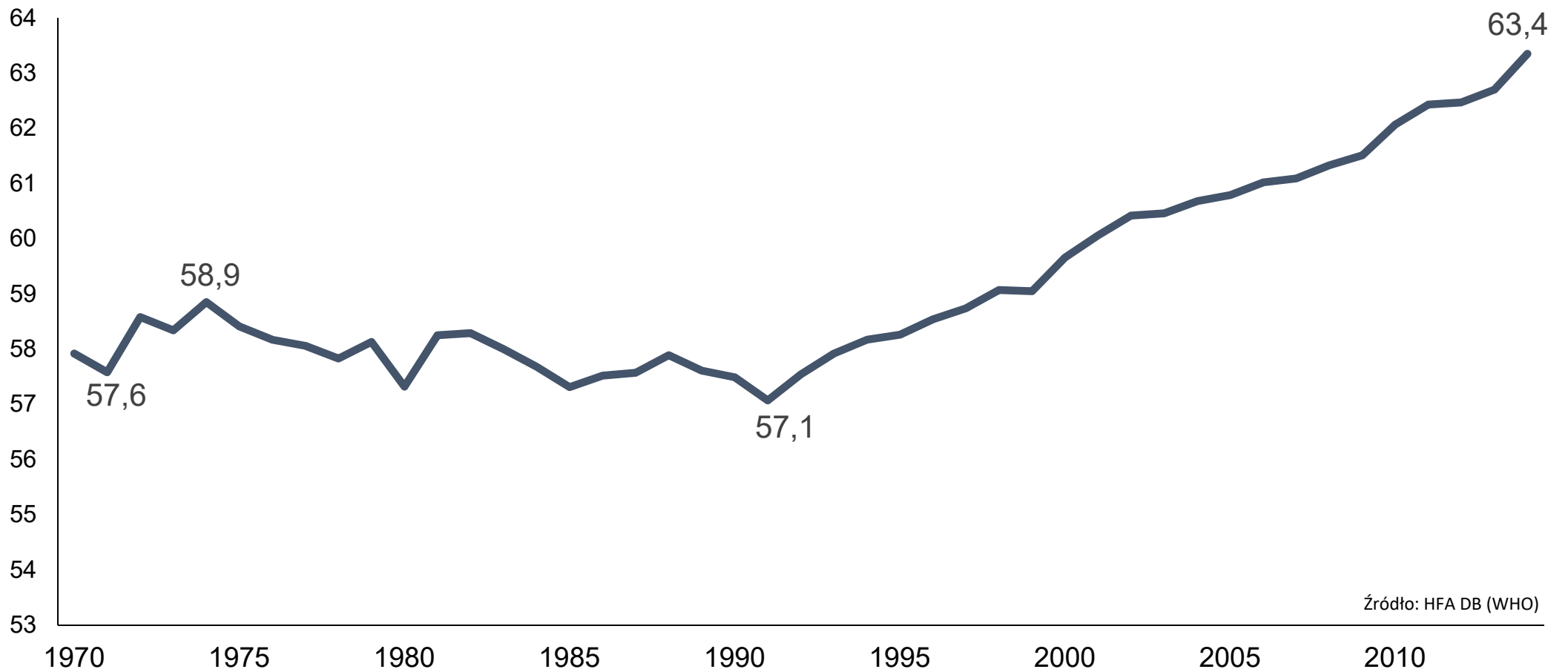
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University of Liverpool

Many thanks to:

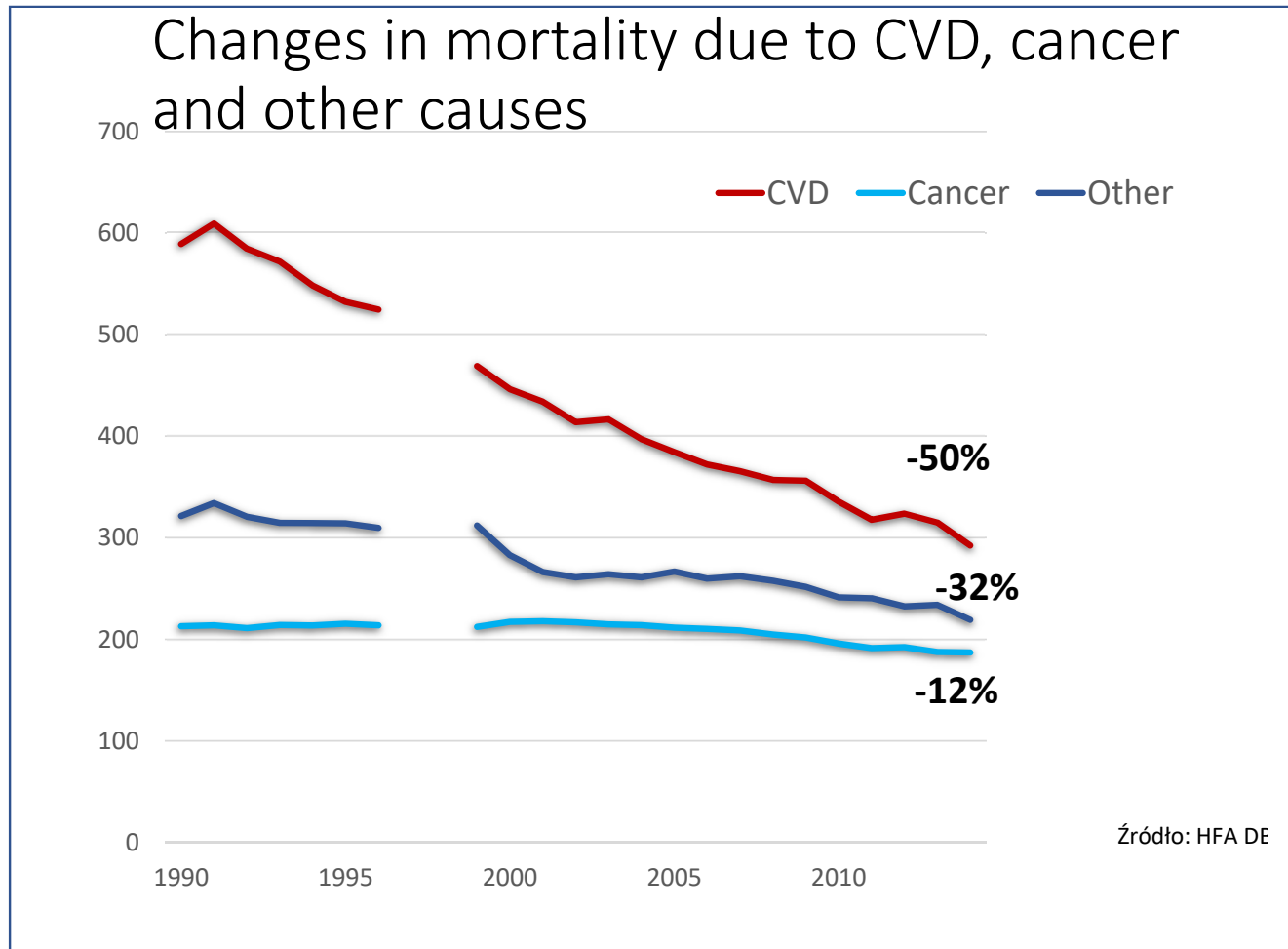
Prof. Tomasz Zdrojewski, Prof. Simon Capewell, Prof. Martin O'Flaherty,
Dr Chris Kypridemos, Dr Edyta Drzazga-Bandosz

Life expectancy in Poland (age 15+)



Źródło: HFA DB (WHO)

Which causes of deaths contributed to increased longevity?

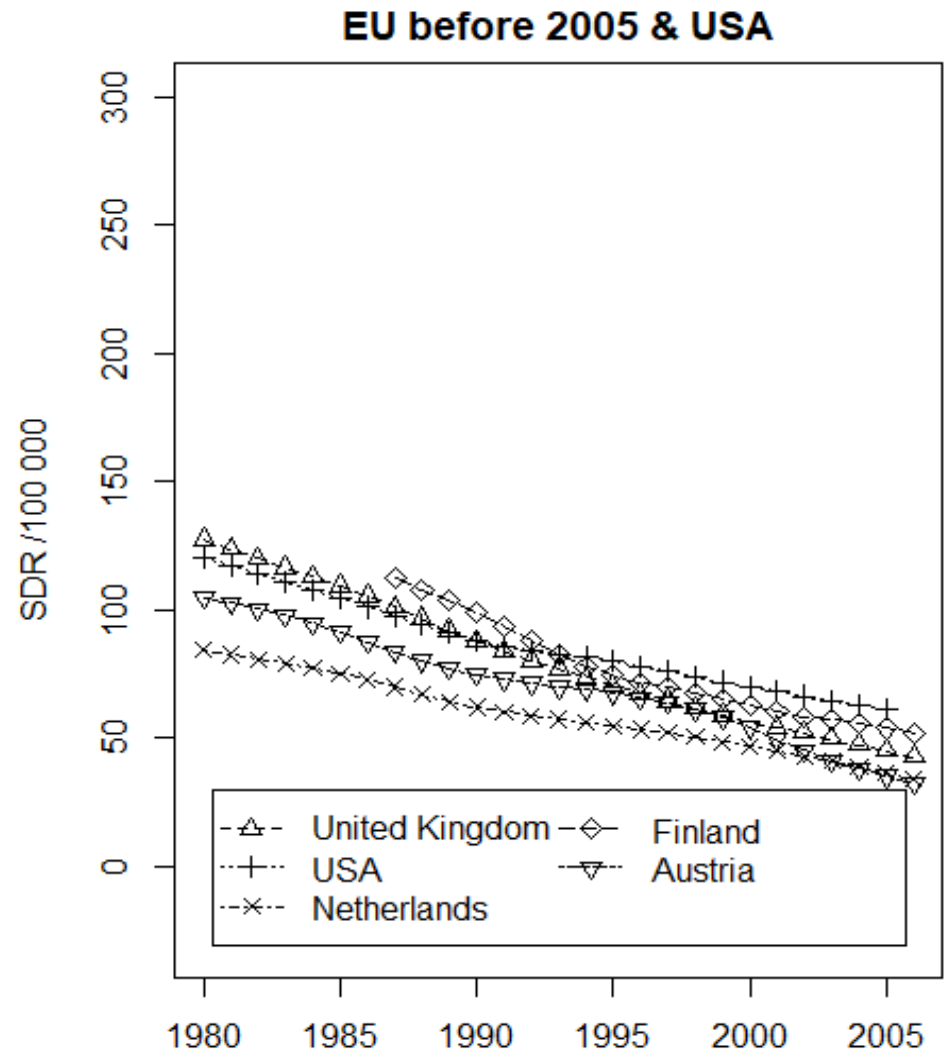
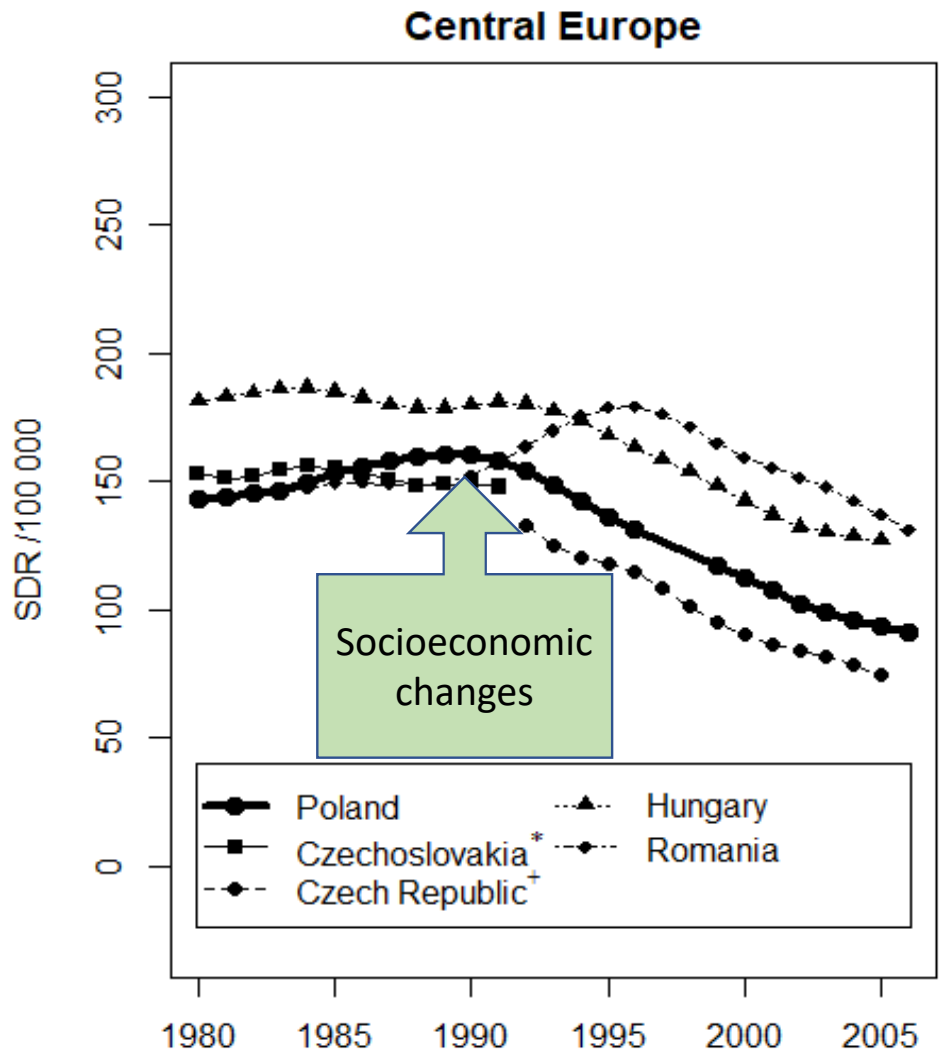


CVD is main cause of mortality

and

Changes in CVD mortality mainly contributed to recent total mortality decrease in Poland

Changes in premature cardiovascular mortality in Central Europe, former EU & US



The reasons for decline in cardiovascular mortality in Poland in 1990's

Ecological study

Zatoński et al., BMJ, 1998:

Main message:

- **“Candidate dietary explanations were the substitution of unsaturated for saturated fats and increased consumption of fresh fruit and vegetables”**

Modelling study

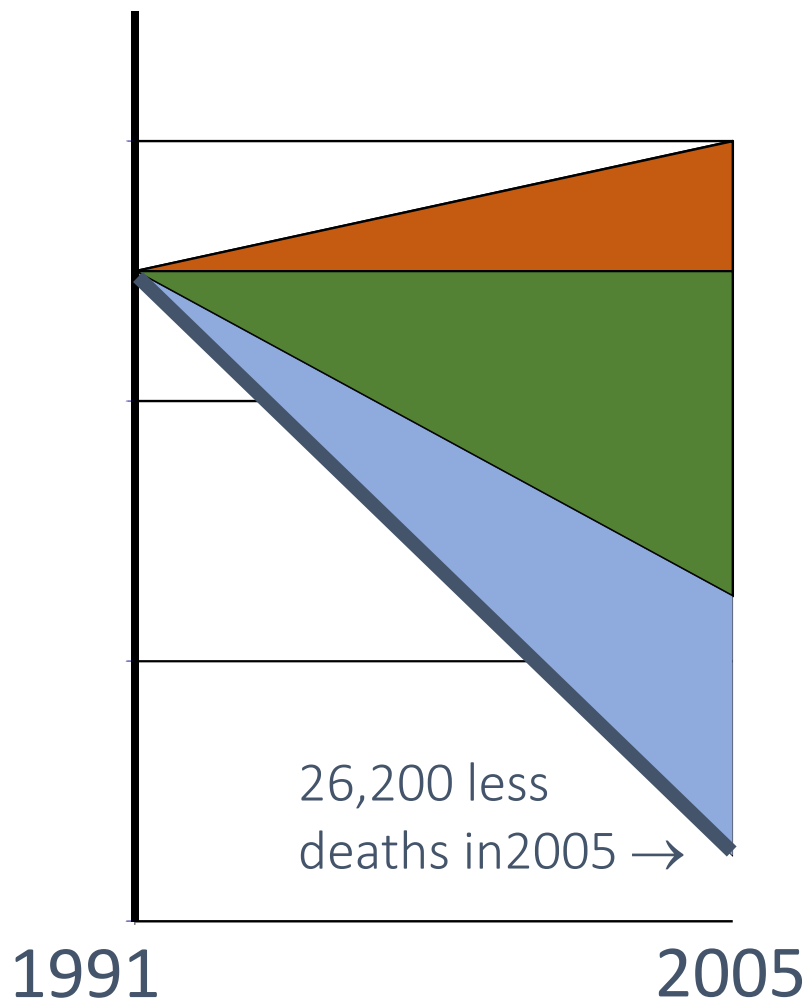
(IMPACT CHD Model)

Bandosz i wsp., BMJ, 2012

Main message:

- ↑ uptake of treatments explained 37% of observed mortality decline
- Improve in RFs explained 54%
- **Most important driver:**
↓ cholesterol (diet) explains 39% of mortality decrease

IMPACT CHD Model: Mortality decrease attributable to treatments and risk factor changes in Poland 1991-2005



Risk factors worse +7%

Obesity	+4.5%
Diabetes	+2.5%

Risk factors better -61%

Cholesterol (diet!) -39%

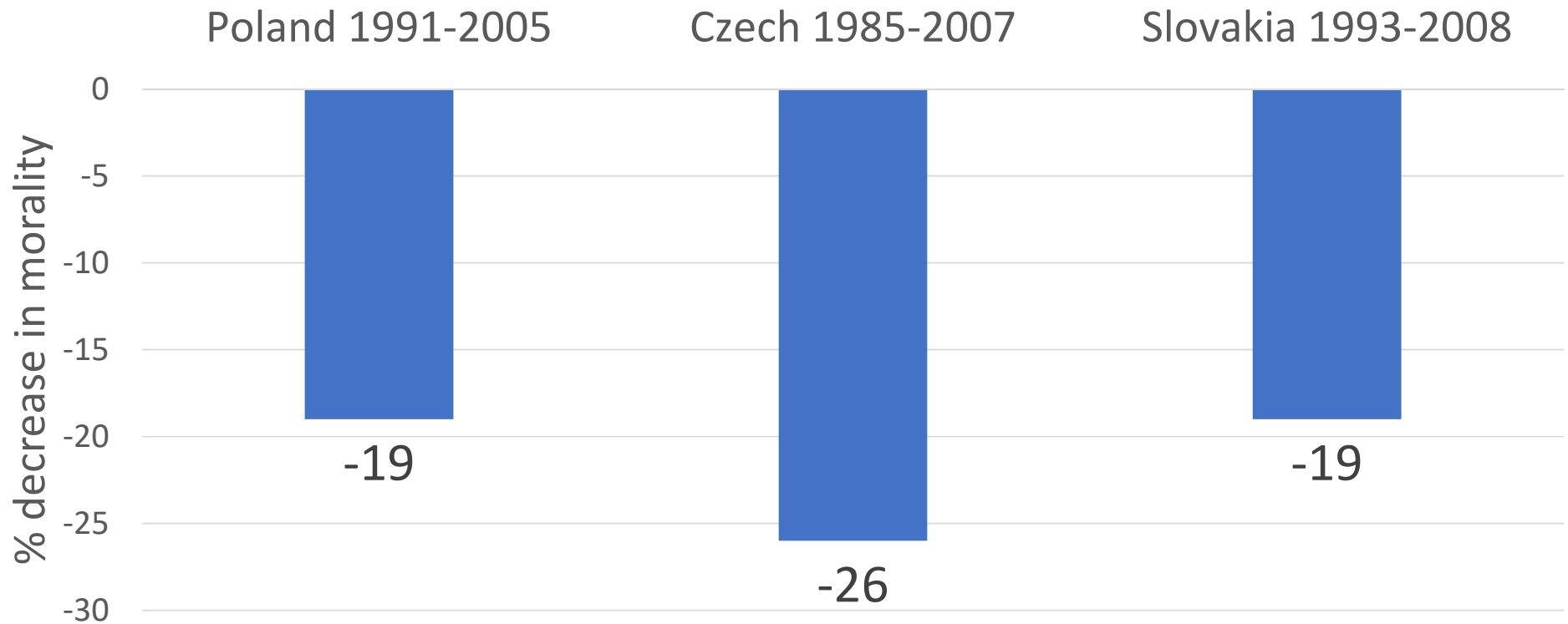
Smoking	-11%
Physical activity	-10%
Population blood pressure	0%
(↑M ↓K)	

Treatments -37%

Acute Coronary Syndrome	-9%
Secondary prevention	-7%
Heart failure	-12%
Angina	-3%
Hypertension treatment	-2%
Primary Prev. Statins	-3%

unexplained -10%

Reduction (%) in CHD mortality caused by decrease in cholesterol level in Poland, Czech and Slovakia



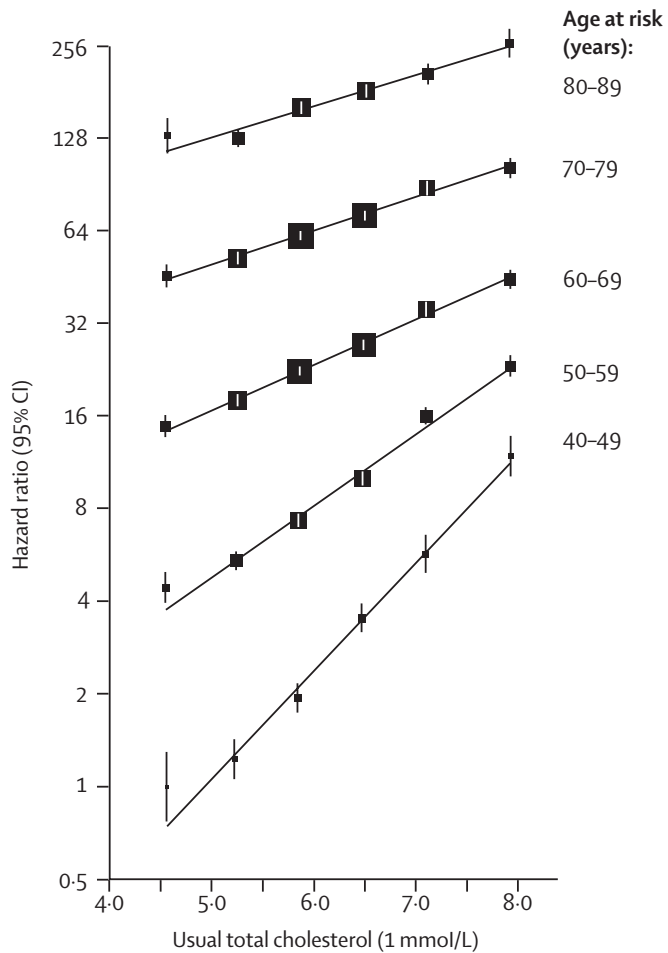
¹Bandosz et al., BMJ. 2012 Jan 25;344:d8136. doi: 10.1136/bmj.d8136

²Psota et al., JECH 2014;68:Suppl 1 A28-A29 doi:10.1136/jech-2014-204726.57

³Bruthans et al., Eur J Prev Cardiol. 2012 Nov 24;21(7):829-839

Usual cholesterol and CHD mortality

Meta-analysis from observational studies



Total cholesterol concentration lower by **1 mmol/L** is associated with CHD mortality lower by:

- **1/2** at age 40-49
- **1/3** at age 50-69
- **1/6** at age 70-89

No threshold value

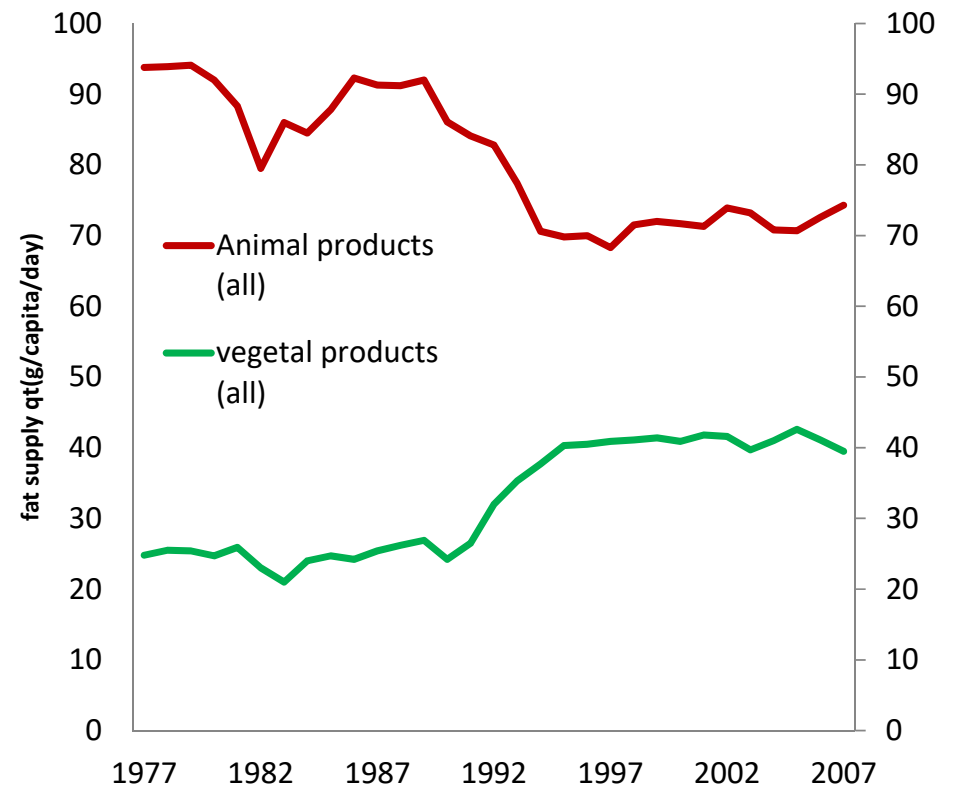
Blood cholesterol and vascular mortality by age, sex, and blood pressure: a meta-analysis of individual data from 61 prospective studies with 55 000 vascular deaths. *The Lancet* 2007;**370**:1829–39.

DIET

Lifestyle and cholesterol	cholesterol
Saturated fatty acids	↑
Polyunsaturated fatty acids	↓
Monounsaturated fatty acids	↓
Fish fat	↓
Alcohol	?
Obesity	↑
Soluble fiber	↓
Smoking	-
Physical activity	↓

Fat supply quantity

Poland



Source: FAOSTAT

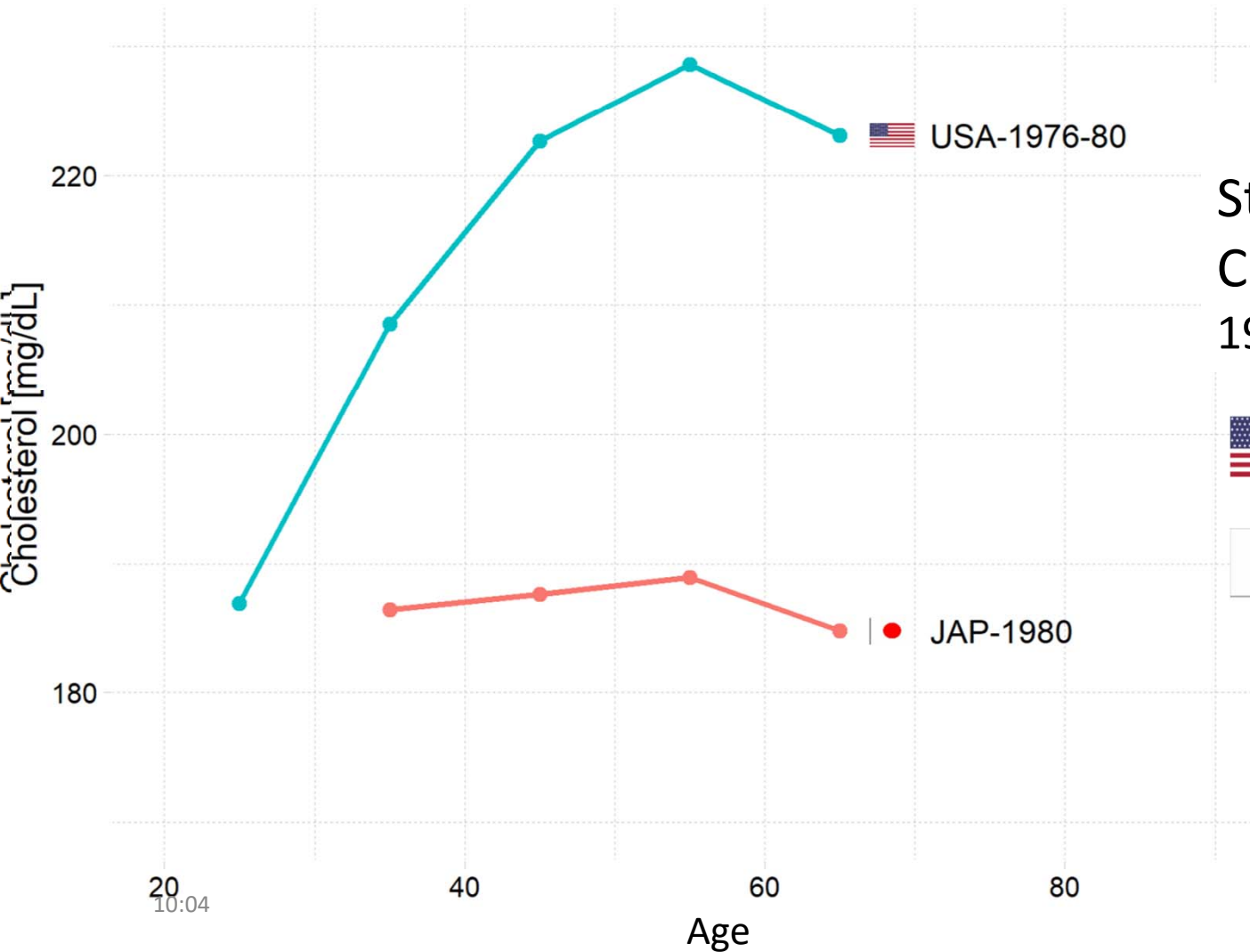
- Change in atherogenicity of diet was the main driver for impressive increase in life expectancy in Poland (and also Czech and Slovakia) in 1990's
- This was mainly related to economical reasons – changes in relative prices of food products and increased availability of different food products
- This natural experiment is a equivalent to **structural intervention**

Structural intervention in public health: modification of contextual or environmental factors that influence risk behavior rather than intervention in characteristics of individuals who engage in risk behaviors.



- Can we go further?
- Is cholesterol level in Poland already optimal?

Mean cholesterol levels in different populations (USA & Japan)

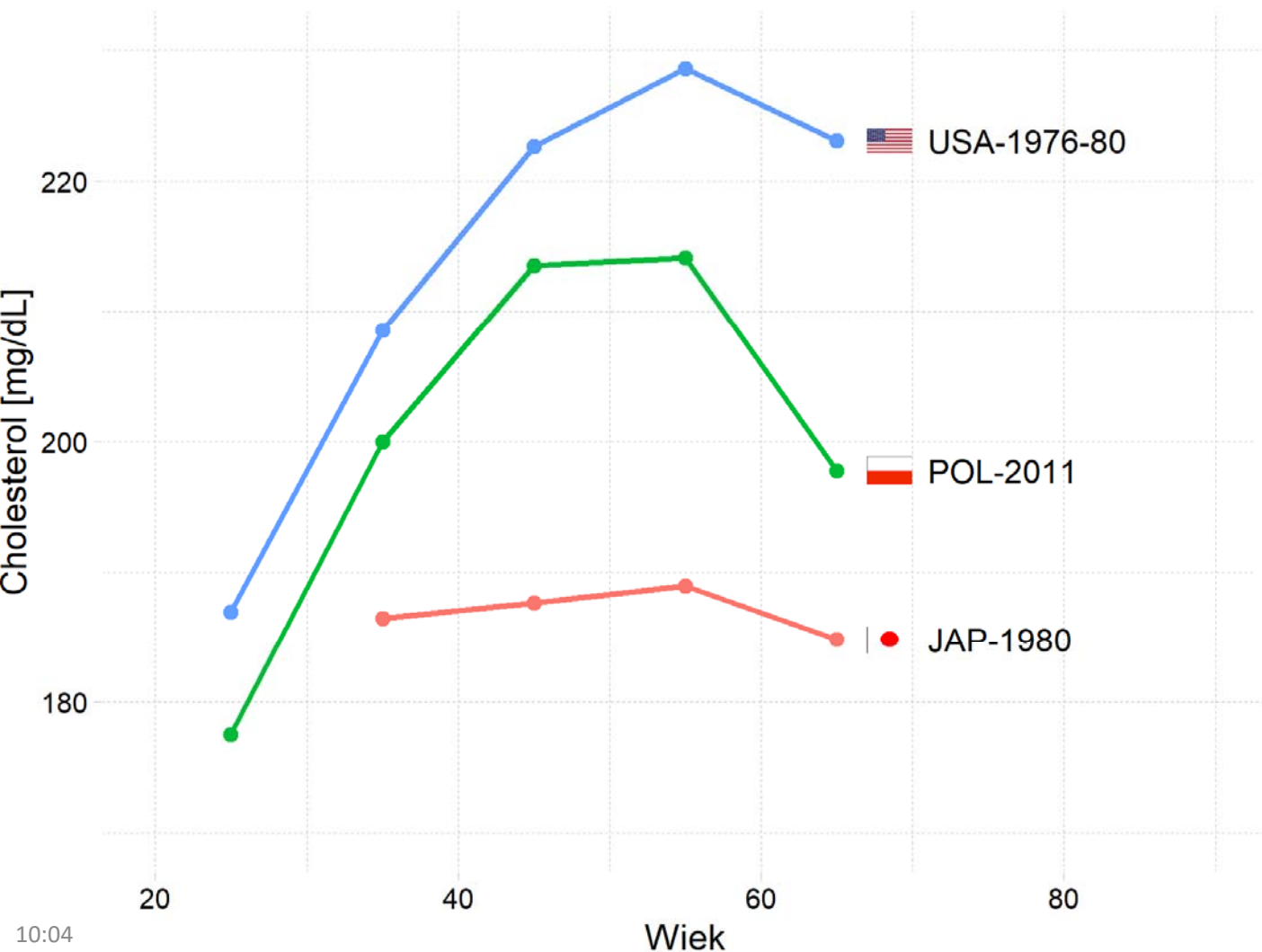


Standardized death rate,
CHD:
1980

 USA: 261,7

 Japan: : 52,9

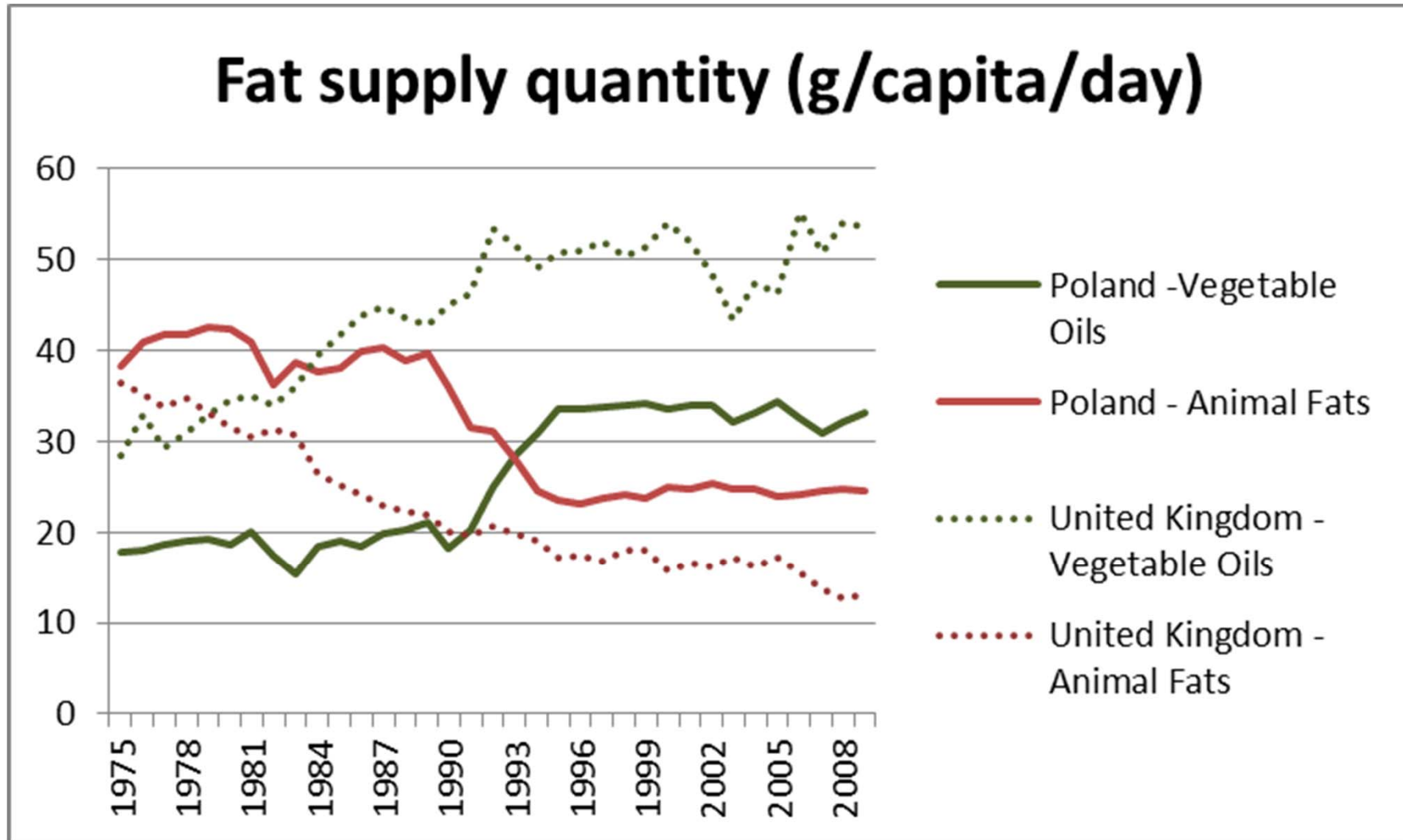
Mean cholesterol levels in different populations



Mean cholesterol level in Japan in people aged 40-60 was ~25mg/dL lower in Japan (1980) than in Poland (2011)

Dane dla Japonii i USA pochodzą z pracy Ueshima, H. Journal of Atherosclerosis and Thrombosis Vol.14, No.6

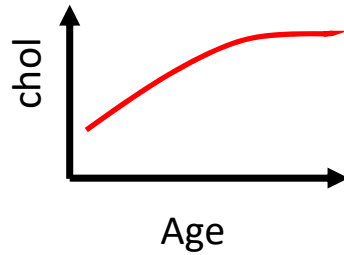
Favourable changes of the atherogenicity of diet in Poland are no longer existing



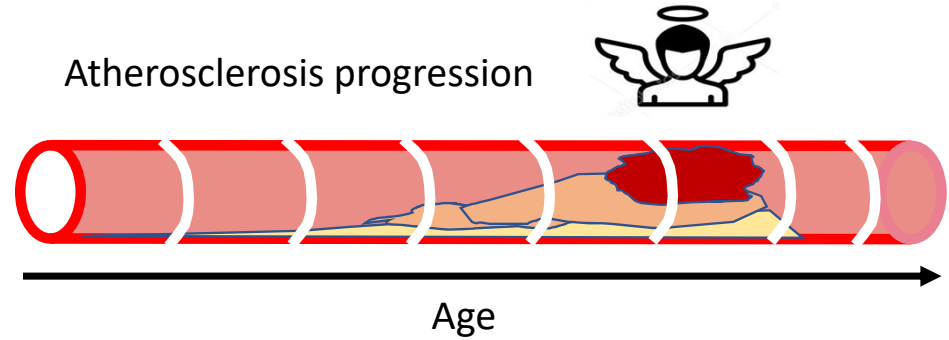
A victory for
l falls in Poland
ional Journal of
Cardiology 2010, 109: 915-9.

Statins used in middle/old age are leaving important residual risk

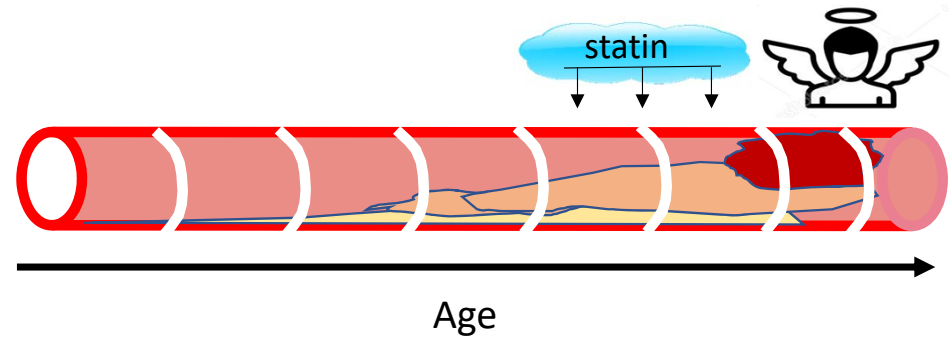
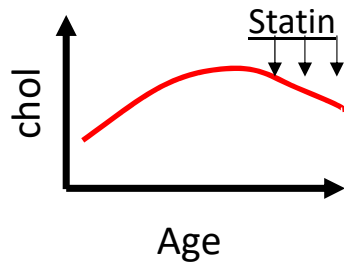
No intervention



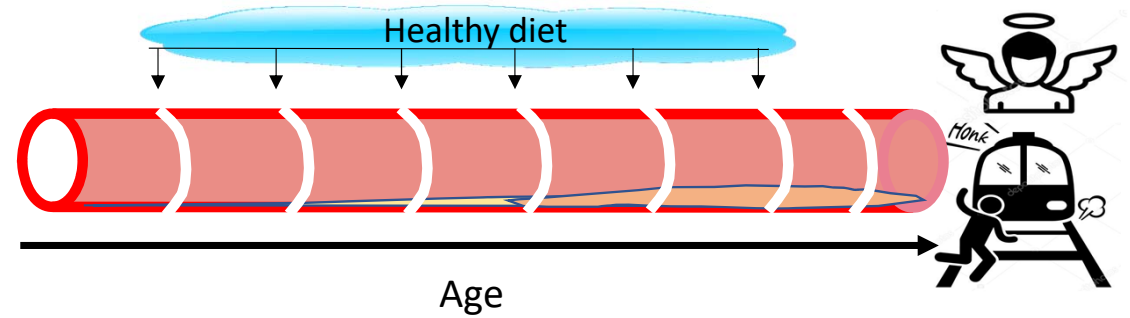
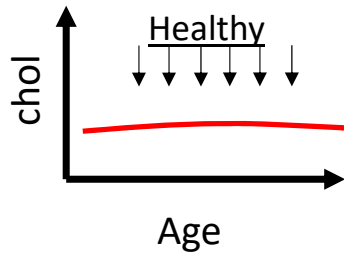
Atherosclerosis progression



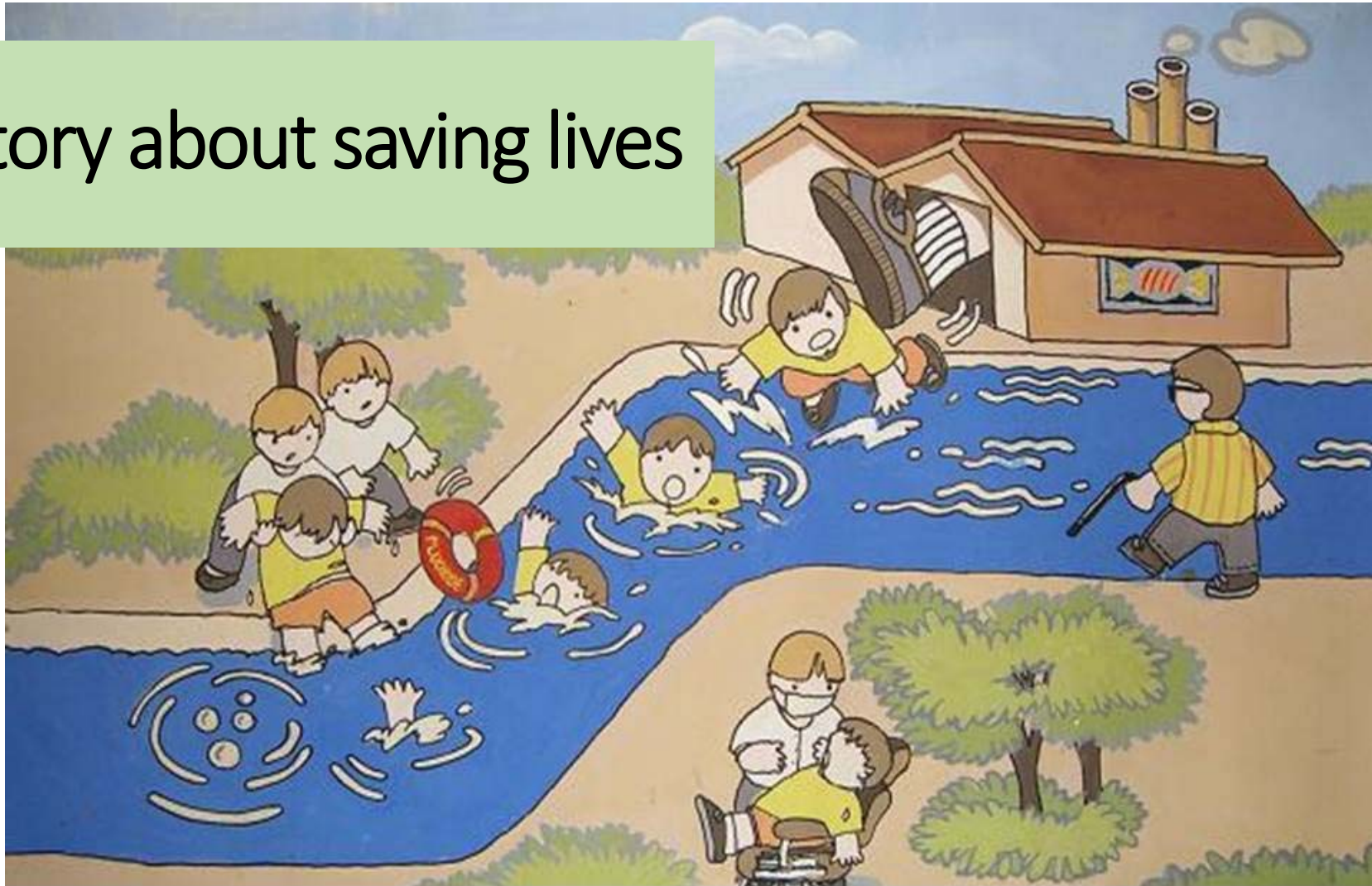
High risk strategy
(using statins)



Population strategy
affecting nutrition



A story about saving lives



Downstream

Upstream

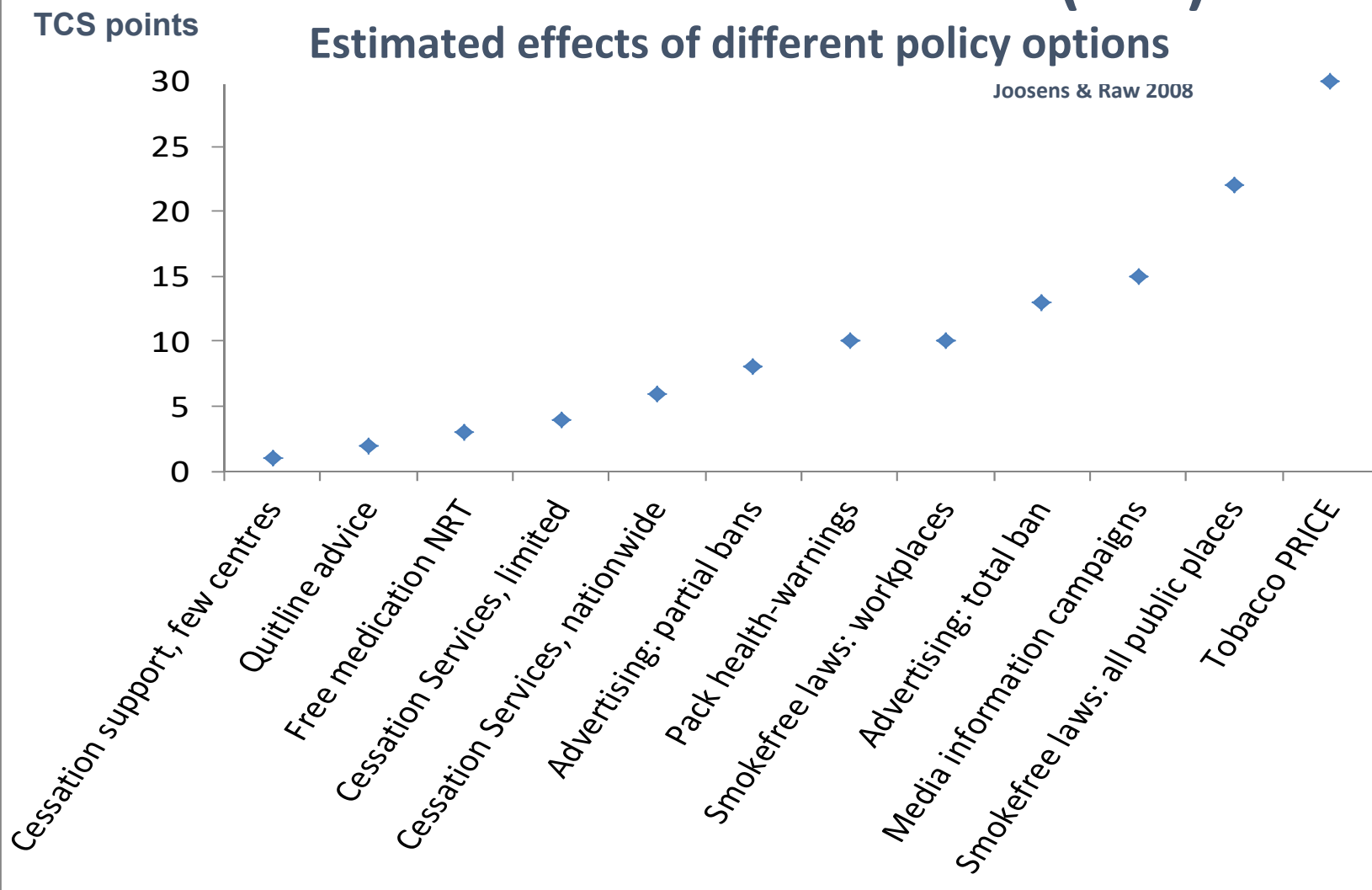
How to improve atherogenicity of the diet in the population?

Let's use experiences from
successful anti-tobacco policies!

Tobacco Control Scale (TCS)

Estimated effects of different policy options

Joosens & Raw 2008



Downstream

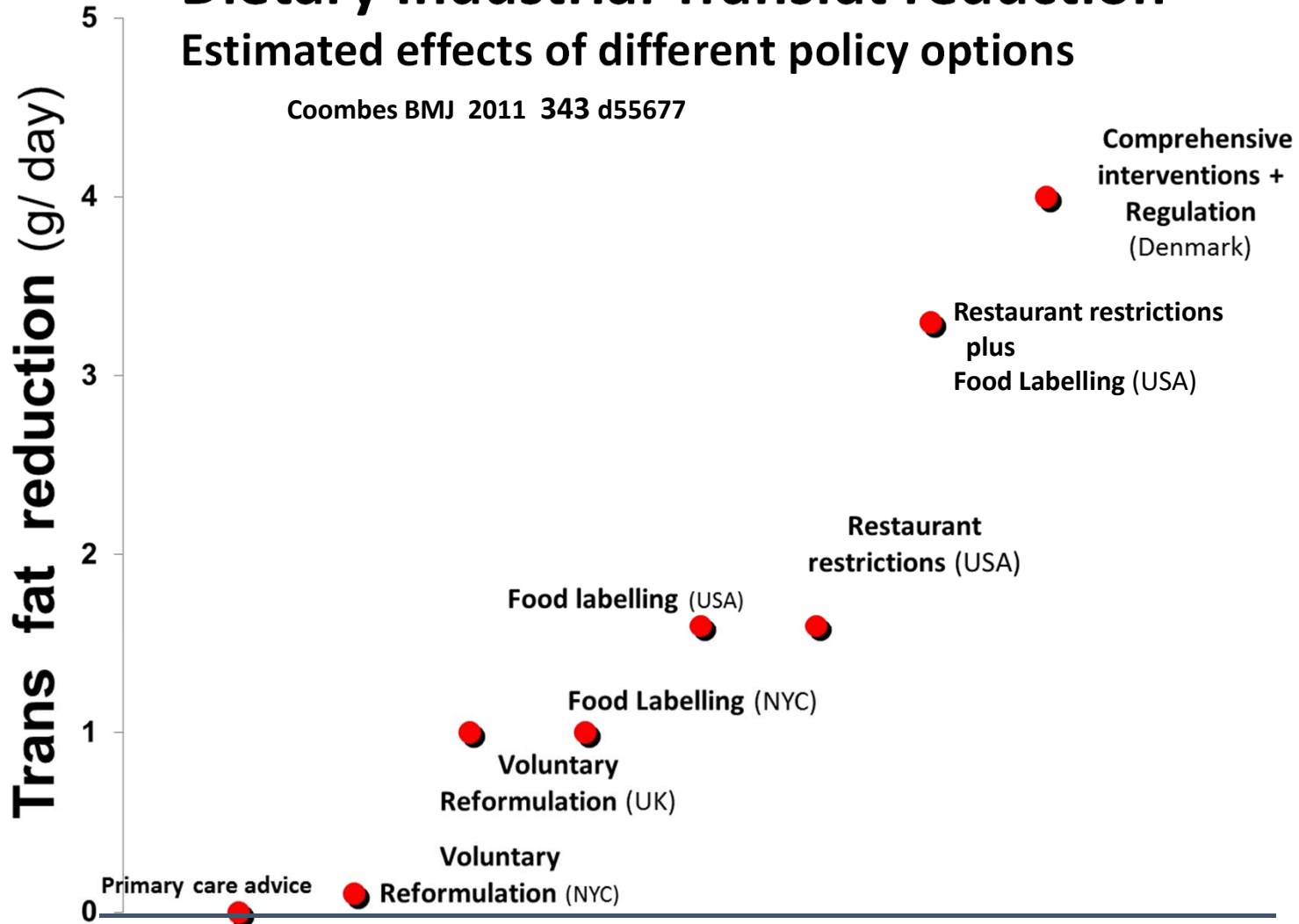


Upstream

Dietary Industrial Transfat reduction

Estimated effects of different policy options

Coombes BMJ 2011 343 d55677

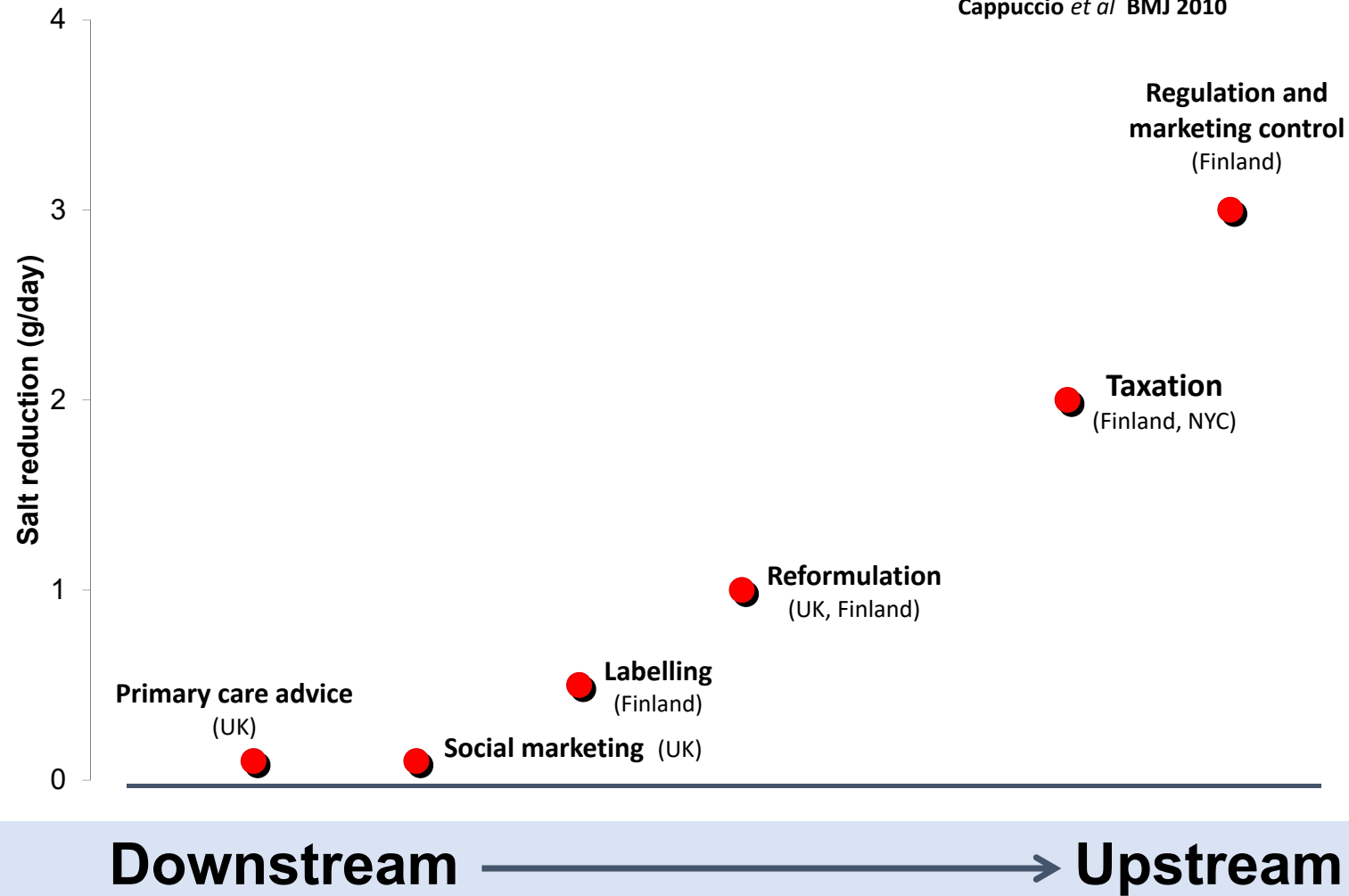


Downstream → Upstream policies

Dietary Salt Reduction

Estimated effects of different policy options

Cappuccio *et al* BMJ 2010



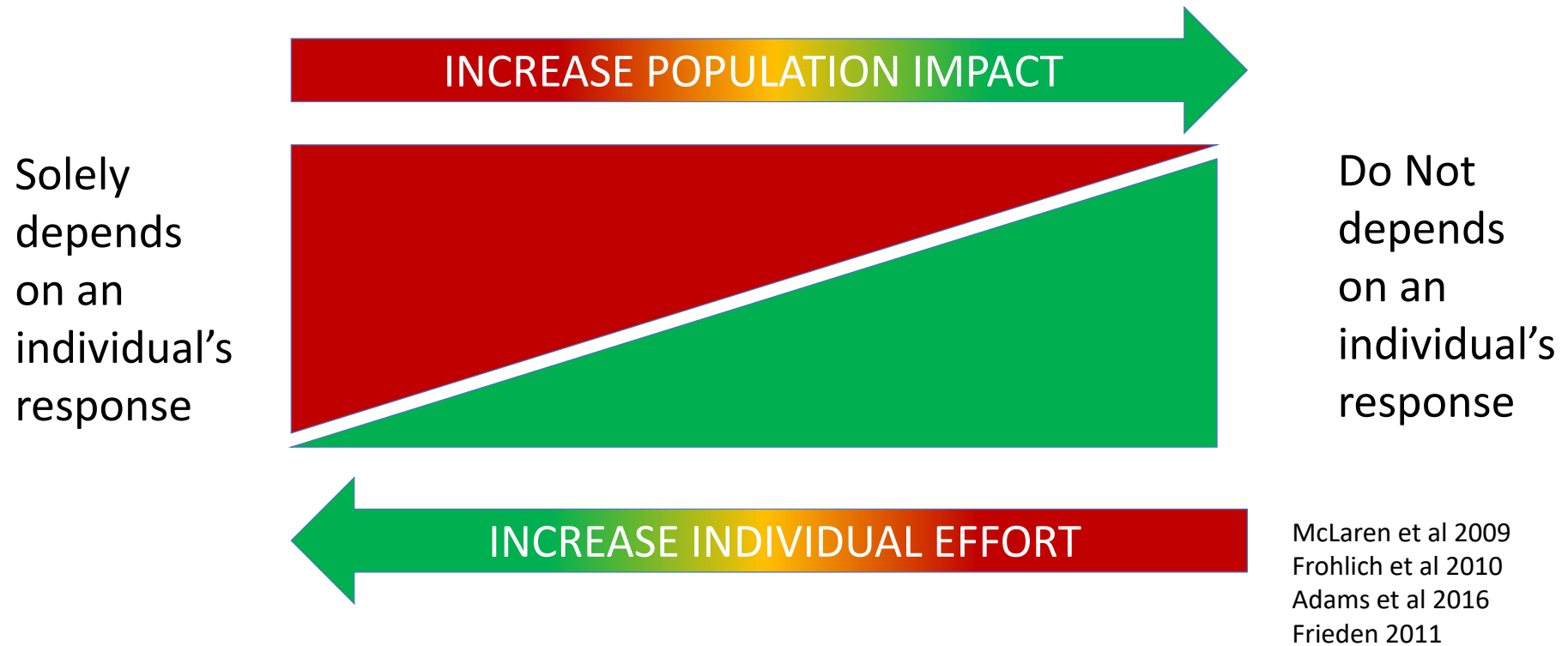
An Effectiveness Hierarchy for Public Health

“Downstream” prevention interventions
targeting individuals

consistently achieve a smaller public health impact
than

“upstream” policies such as regulation or taxes...

Agency and Structure



Population strategy based on regulation is widely used:

- Sanitary security
- Road traffic
- Immunization
- Smoking (lessons to learn here)
- Many more



But the main (and avoidable) killer is atherogenic diet

... and we have (almost) no structural policies here.

Final thoughts

- Diet seems to be too important to be just left in hands of food industry; Companies prioritize benefit rather than health value
- We need to think about regulations and fiscal policies aiming to decrease atherogenicity of diet
- In our country we are even not systematically monitoring our biggest killer (diet & cholesterol)