

Socioeconomic Influences on Cardiovascular Disease

Emphasis on the developing world

Torino 2017

Stages of Epidemiologic Transition

Description	Life expectancy	Proportion of death due to CVD (%)	Dominant form of CVD death
Stage 1 Pestilence and famine	35 yr	<10	Infectious (RHD) Nutritional
Stage 2 Receding pandemics	50 yr	10-35	Infectious (RHD) Stroke – hemorrhagic

Omran: Milbank Mem Fund Q, 1971; Olshansky: Millbank Mem Fund Q, 1986

Stages of Epidemiologic Transition

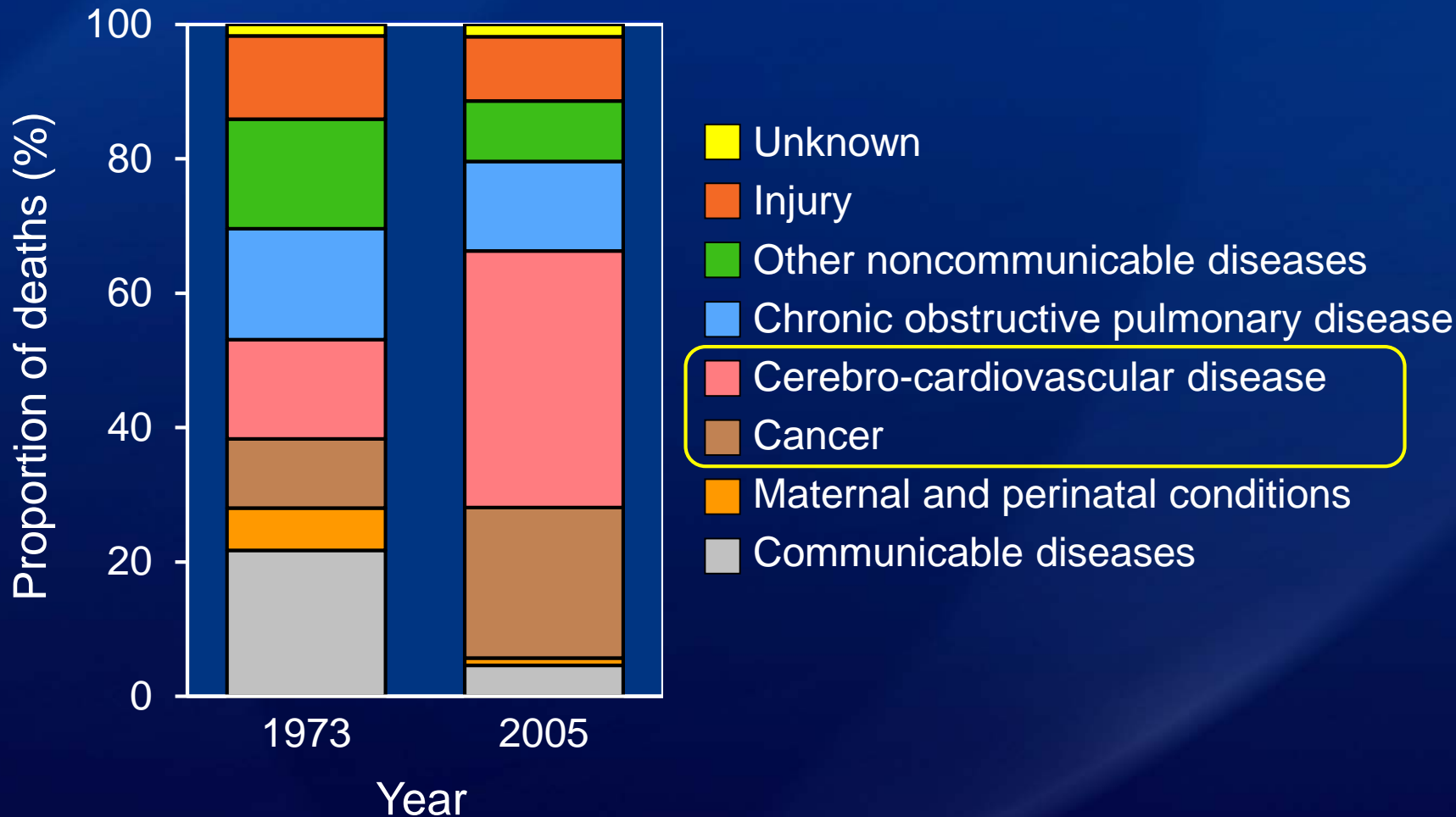
Description	Life expectancy	Proportion of death due to CVD (%)	Dominant form of CVD death
Stage 3 Degenerative and man-made diseases	>60 yr	35-65	IHD* Stroke — Hemorrhagic — Ischemic
Stage 4 Delayed degenerative diseases	>70 yr	40-50	<ul style="list-style-type: none"> • IHD** • Stroke — Ischemic • CHF

*Greater in high socioeconomic groups

**Younger pt – lower socioeconomic status; Elderly – higher socioeconomic status

Changing Distribution of the Causes of Death the Peoples Republic of China

An epidemiologic catastrophe amidst growing prosperity



Yang: Lancet, 2008

Attained Education Level (AEL) and Impact on Risk Factors

- REACH registry
- 61,332 subjects
- Established CVD or multiple risk factors

Education levels

- 0-8 yr
- 9-12 yr
- Trade/technical
- University/college

Associations with AEL

Risk factor	HIC	LIC
Obesity	↓	↑
Smoking	↓	↔ [*]
Hypertension	↓	↔
Diabetes	↓	↓
Hypercholesterolemia	↑	↑
Disease in ≥2 vascular beds	↓	↑

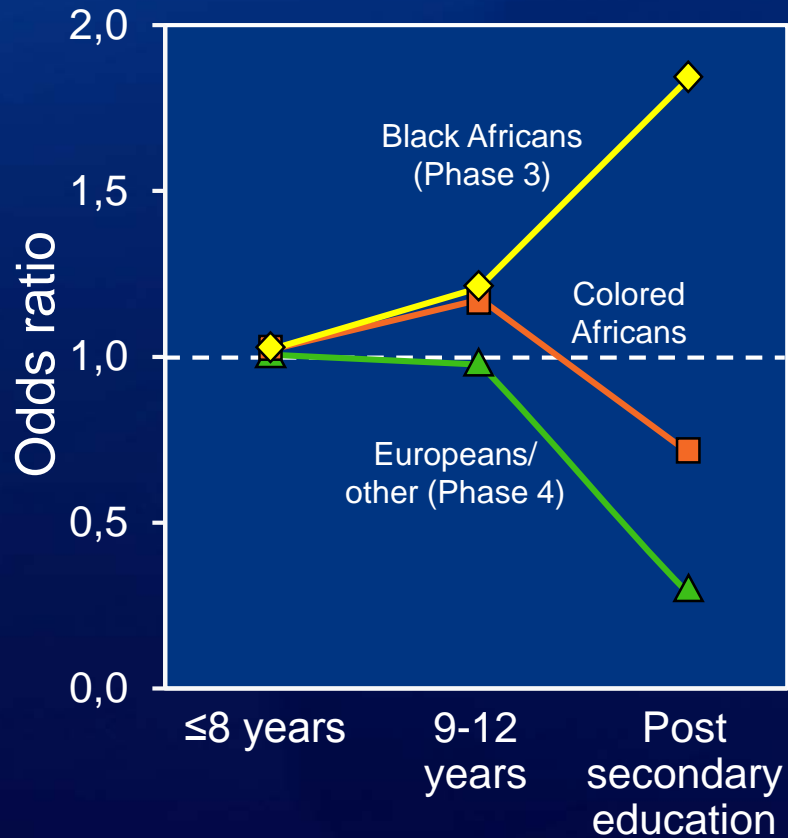
* Increased among women; Goyal: Circ, 2010

Risk Factors Associated With MI in Africa

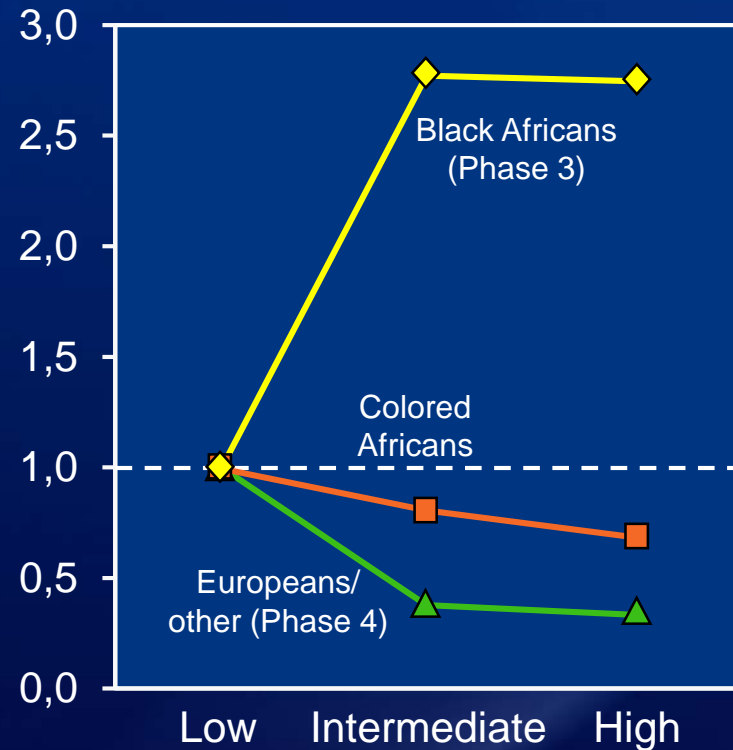
INTERHEART Study

Socioeconomic Status and OR for MI

Years of Formal Education



Income



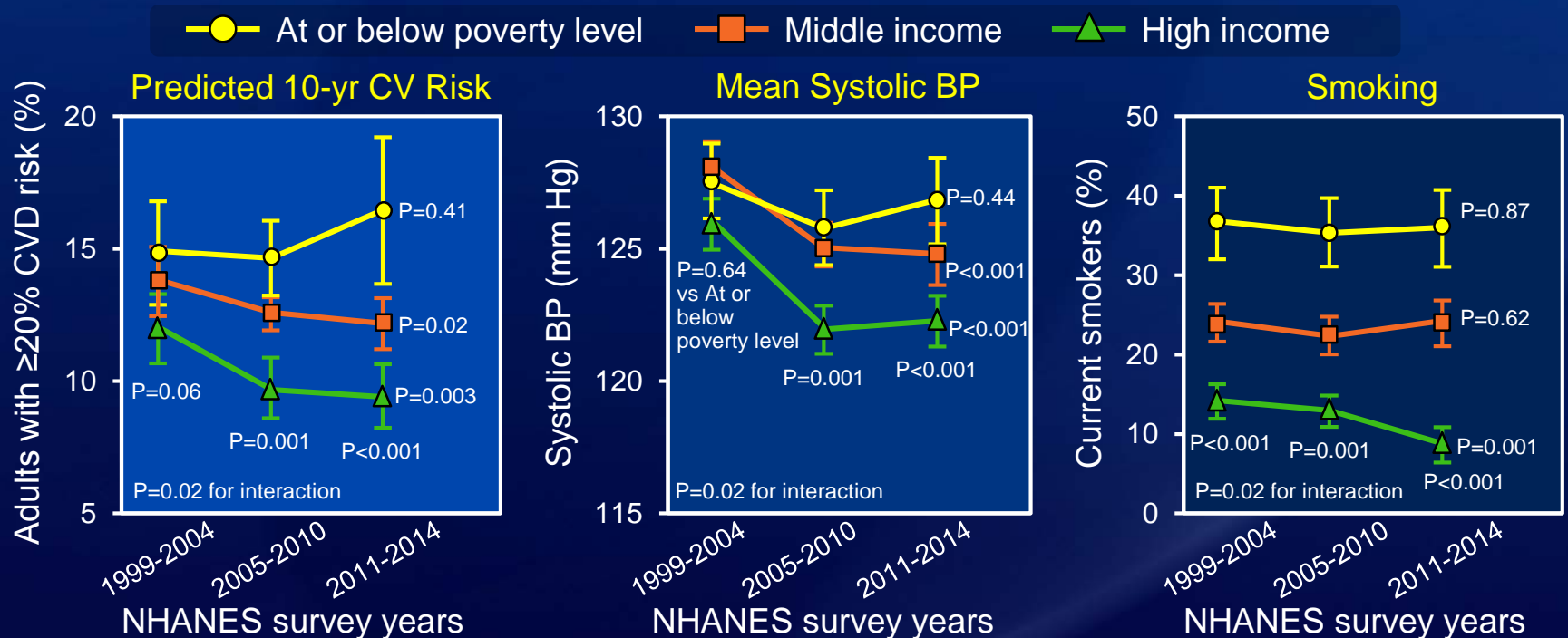
Steyn: Circ, 2005

Income Disparities in Absolute CV Risk and CV Risk Factors in the USA – 1999-2004

- NHANES survey
- 17,199 adults
- Aged 40-79 yrs

* No trends noted for diabetes, and serum cholesterol with absolute rates of diabetes higher in lower income groups

10 Year Trends



Odutayo et al: JAMA Cardiol, 2017

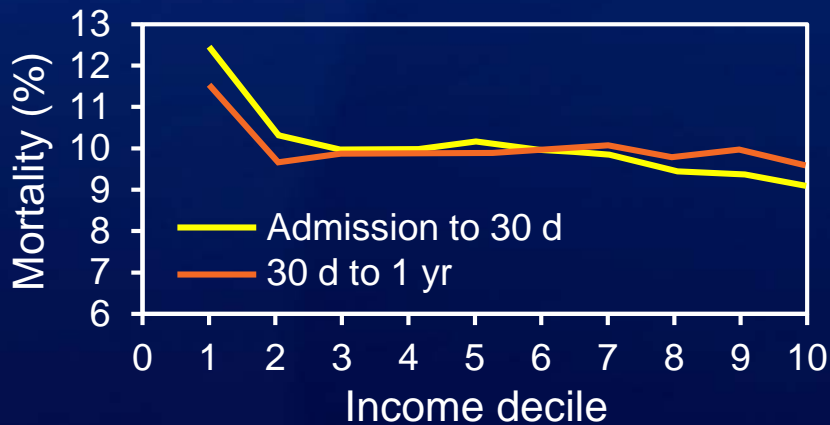
Socioeconomic Status and Outcome Following Acute Myocardial Infarction in Elderly Patients

Sunil V. Rao, MD; Kevin A. Schulman, MD; Lesley H. Curtis, PhD; Bernard J. Gersh, MB, ChB, DPhil; James G. Jollis, MD

Arch Intern Med, 2004

- 132,130
- Medicare beneficiaries
Cooperative Cardiovascular Project

Unadjusted Mortality by Deciles of Income



“Wealth is independently associated with health”

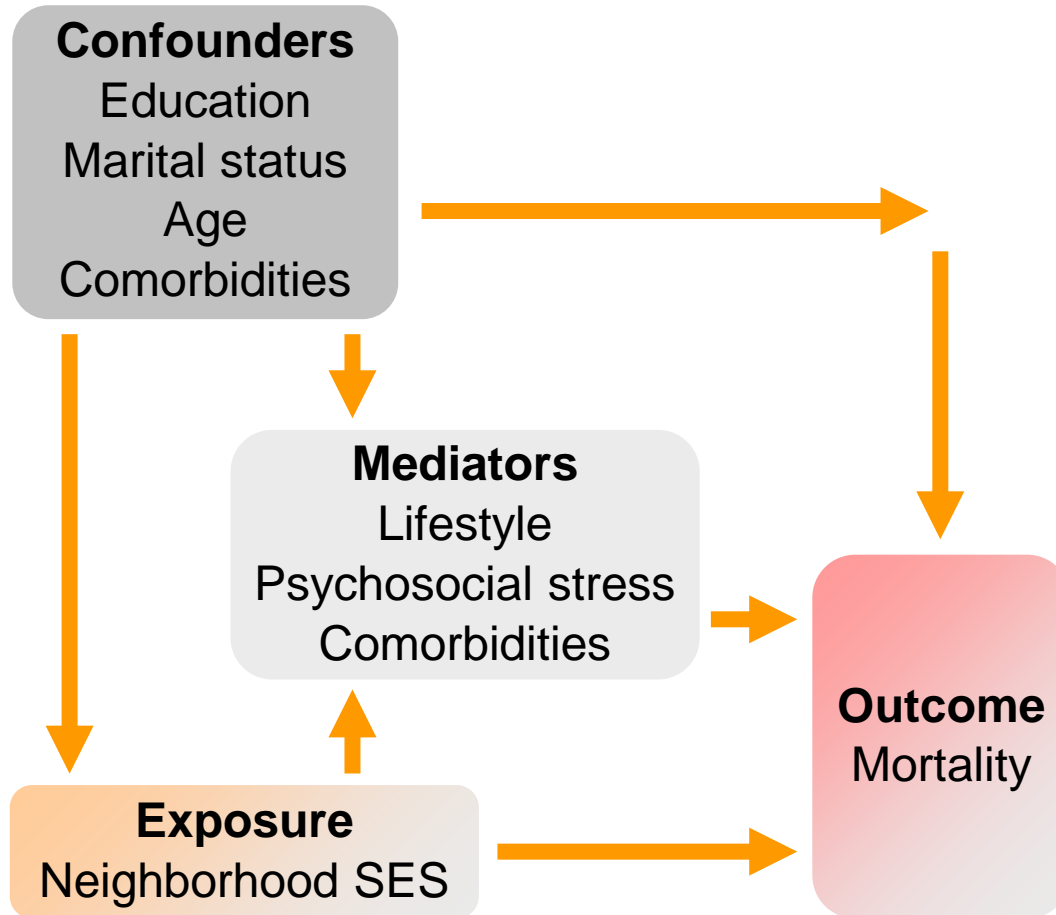
Adjusted Relative Risk (Reference is Middle Income Group)

	Lower mortality	Higher mortality
High-Income group		
Income level	0.91	
Income level + clinical predictors	0.88	
Income level + clinical predictors + treatment +	0.89	
Low -Income group		
Income level		1.07
Income level + clinical predictors		1.10
Income level + clinical predictors + treatment +		1.09
	1.00	

Associations Between Neighborhood Socioeconomic Status and All-Cause Mortality

Swedish Primary Care Population With AFib

Potential Explanations



Wändell et al: Int J Cardiol 202:776, 2016

Phase 5

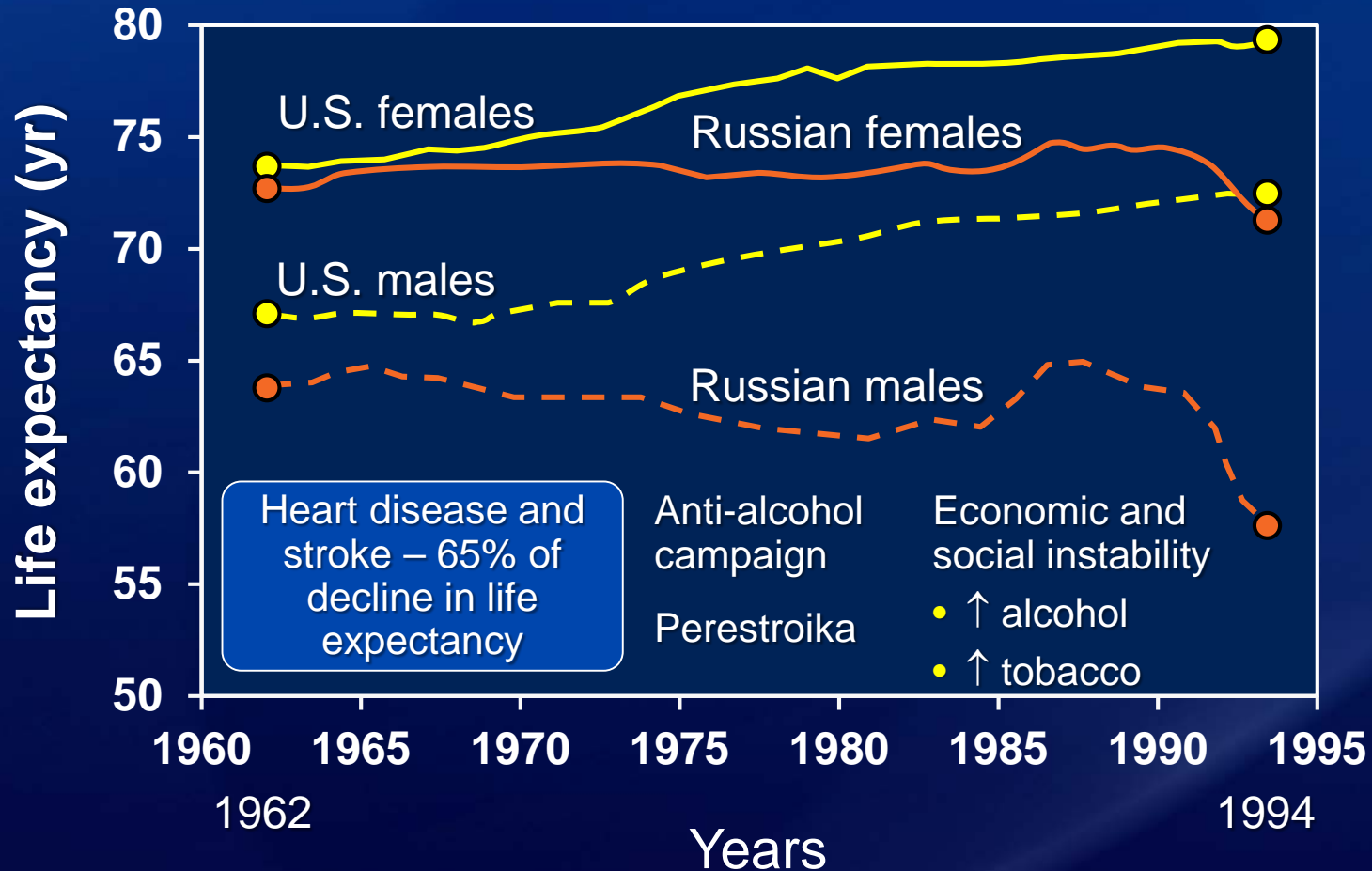
(phase of increasing CV mortality)



- The negative impact of social upheaval and health regression
- The age of inactivity and obesity

Declining Life Expectancy in Russia

Life Expectancy at Birth



Notzon: JAMA, 1998

Time course of the epidemic

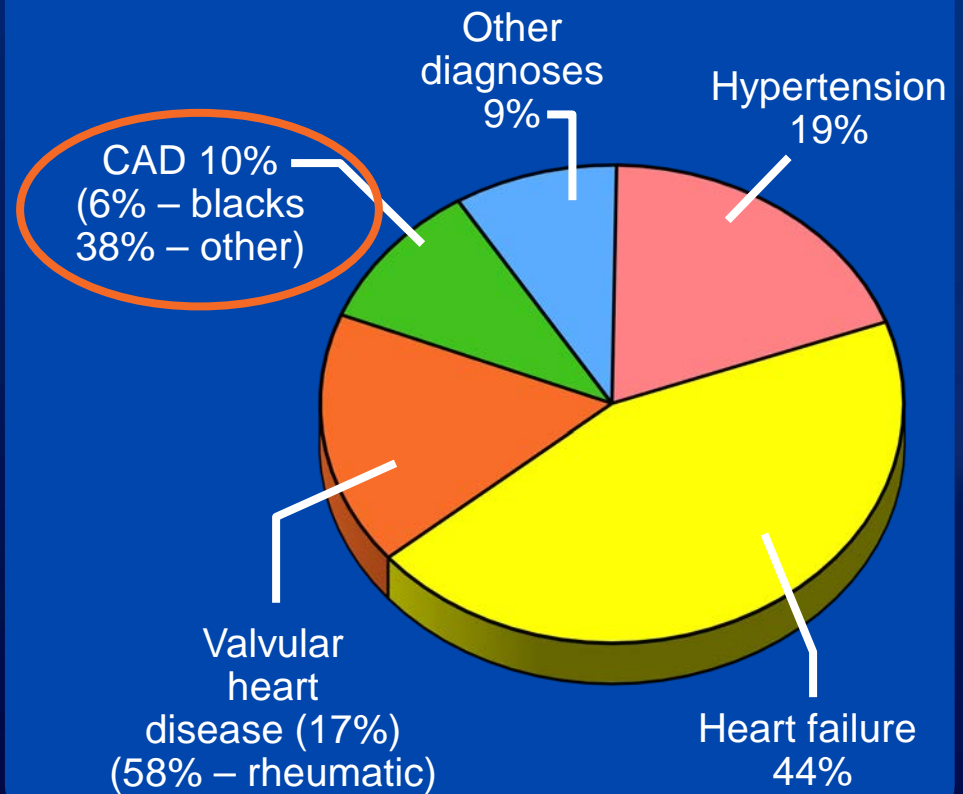
Rapid onset but control of risk factors
can have surprisingly positive and
early benefits

Spectrum of Heart Disease in Urban Blacks in S Africa – 2006

The Heart of Soweto Study

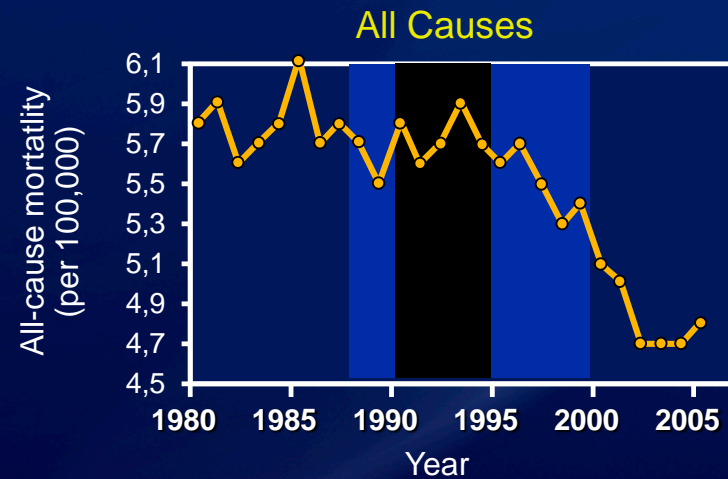
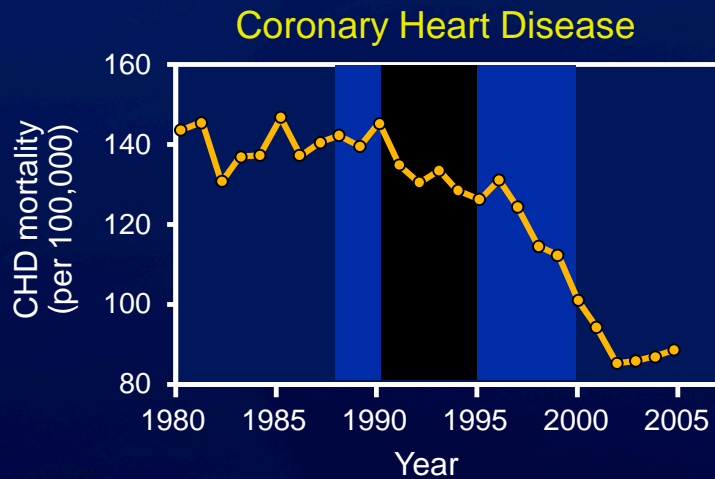
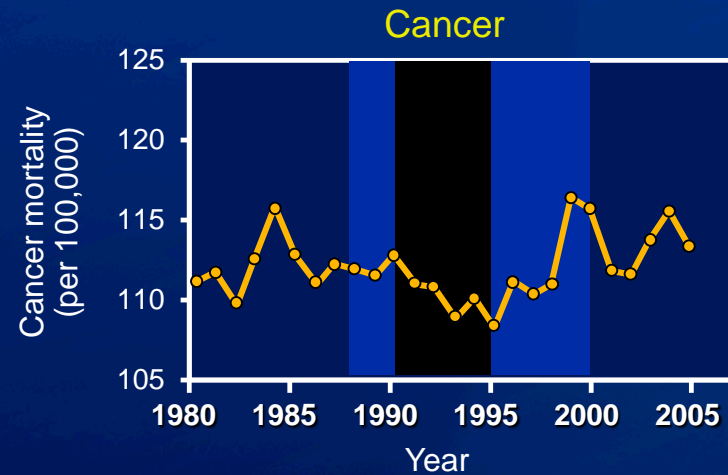
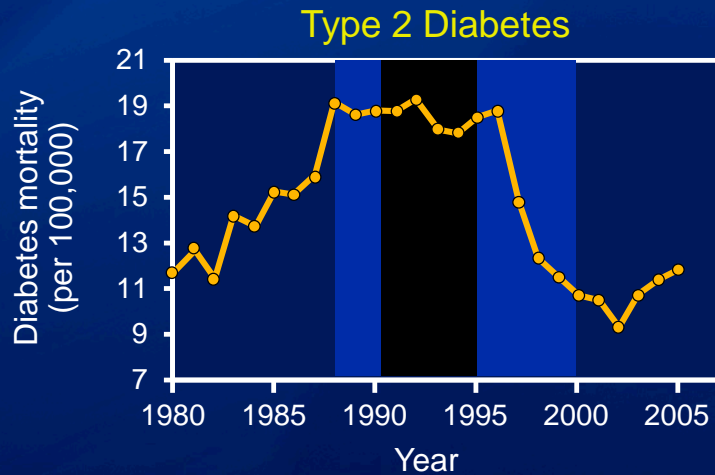
- 1.1 million est.
- 85% black
59% women
Mean age 52-8 yr
CV risk factors – 87%

1,593 New Cases of Cardiovascular Disease



Sliwa: Lancet, 2008

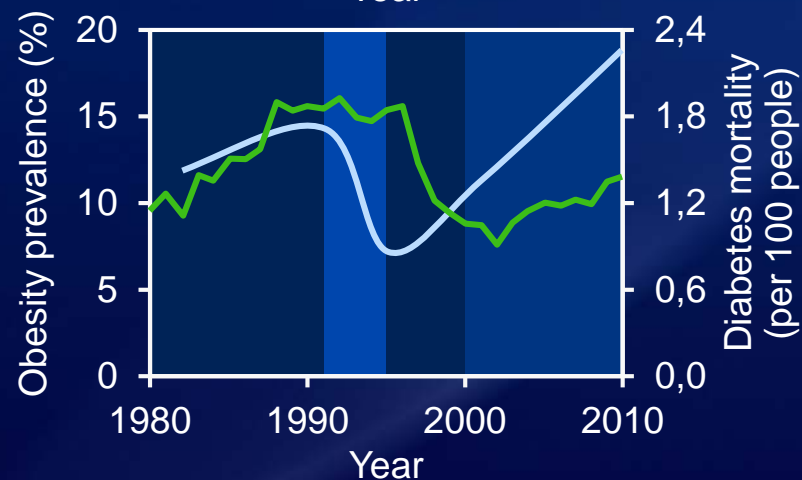
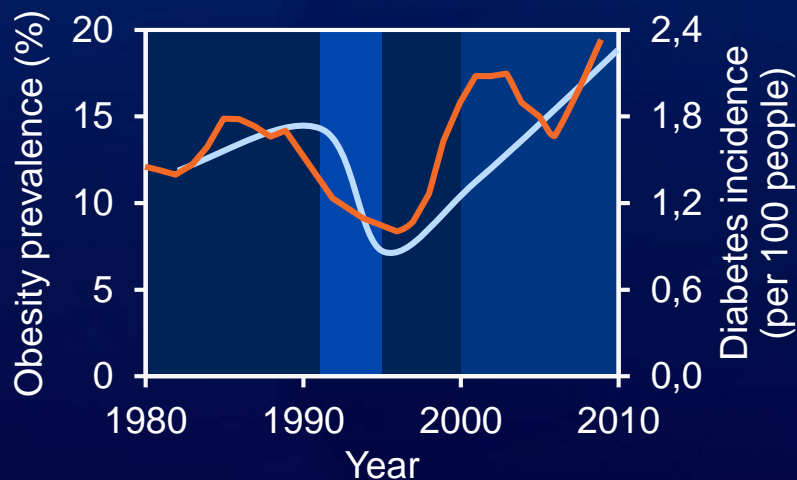
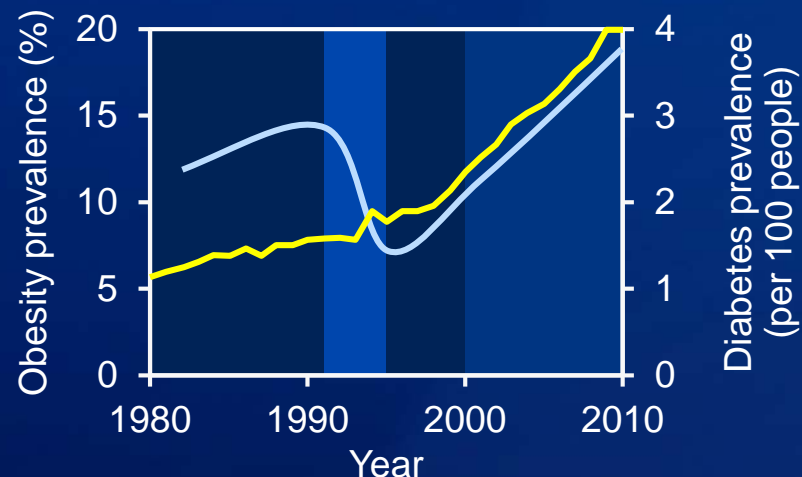
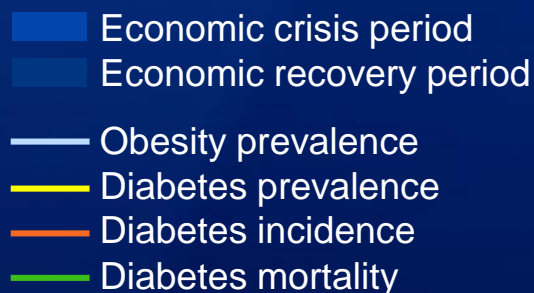
Trends in Age-Adjusted Mortality in Cuba Economic Crisis 1989-2000



Franco: Am J Epidemiol, 2007

Population-Wide Weight Loss and Regain in Relation to Diabetes Burden and CV Mortality in Cuba

- Cross-sectioned surveys
- 1980-2010



Franco: BMJ 2013

The Positive Model of the Hunter-Gatherer Life Style

- 10 Aborigines
- Derby, Western Australia
- Diabetics

Baseline

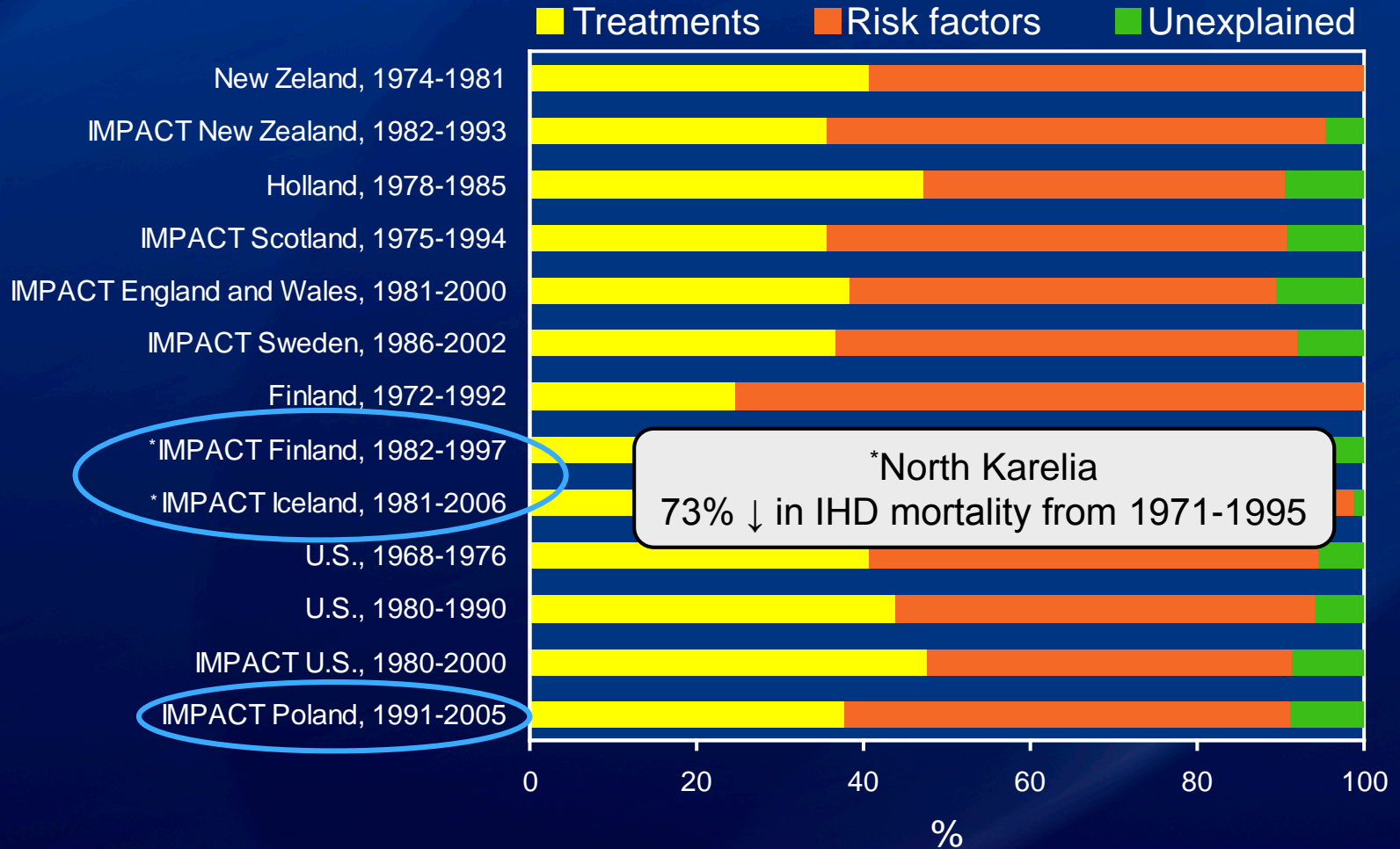
|
7 weeks as
hunter-gatherers

“The major metabolic abnormalities of diabetes were either greatly improved or completely normalized”



O’Dea: Diabetes, 1984
Brown, 2011

Proportion of Reduction in Deaths Due to CHD Attributable to Treatments and Changes in Risk Factors



Socioeconomic status and health

It is a complex relationship with risk factor control, access to care and adherence to therapy the common denominators