
The biology of poverty and social chaos

RACP

17th May 2016

How doctors can change the world

RACP

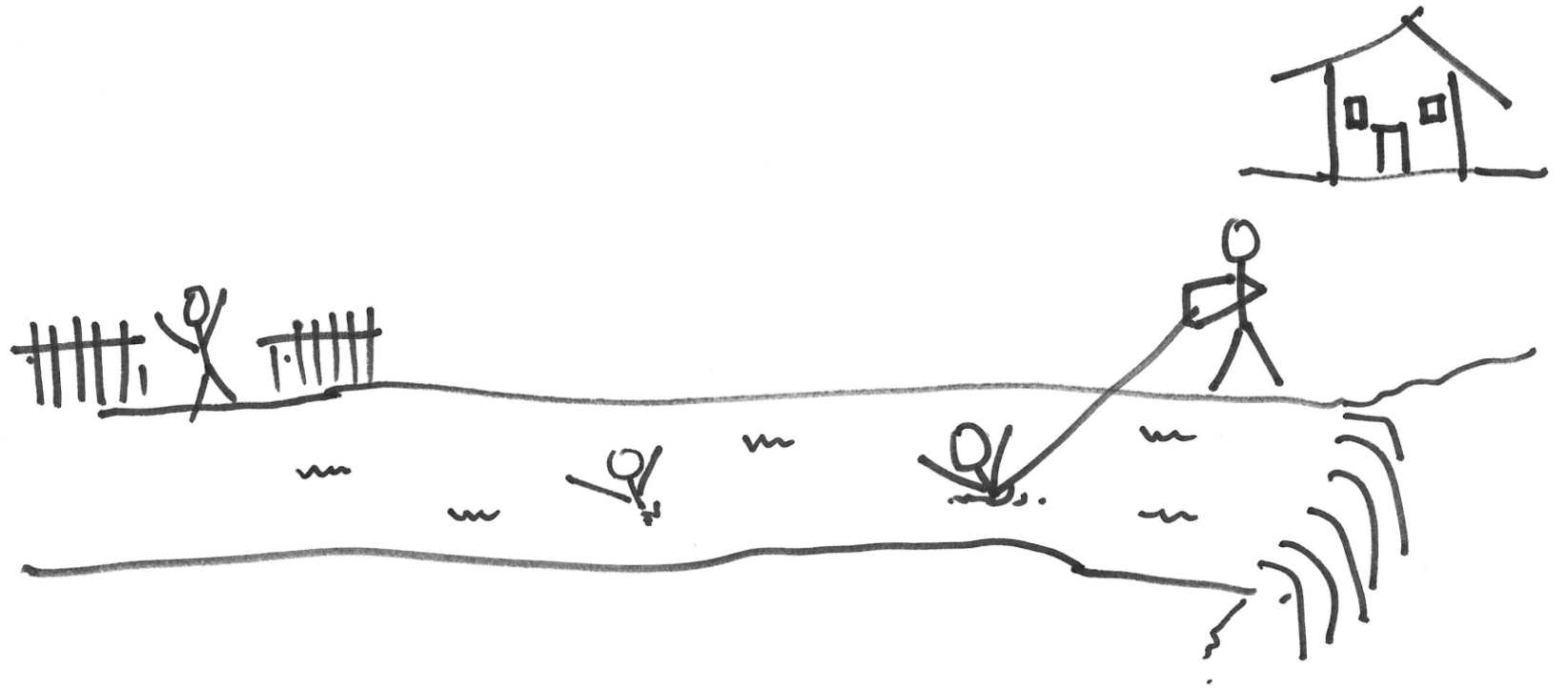
17th May 2016

@harryburns16

The pathogenesis paradigm

- u “Health is a complete state of physical, mental and social wellbeing and not merely the absence of disease or infirmity”

WHO 1948





Wellbeing

- u What is it?
- u What causes it?
- u How we create it?
- u Why do we need it?

A new definition of health

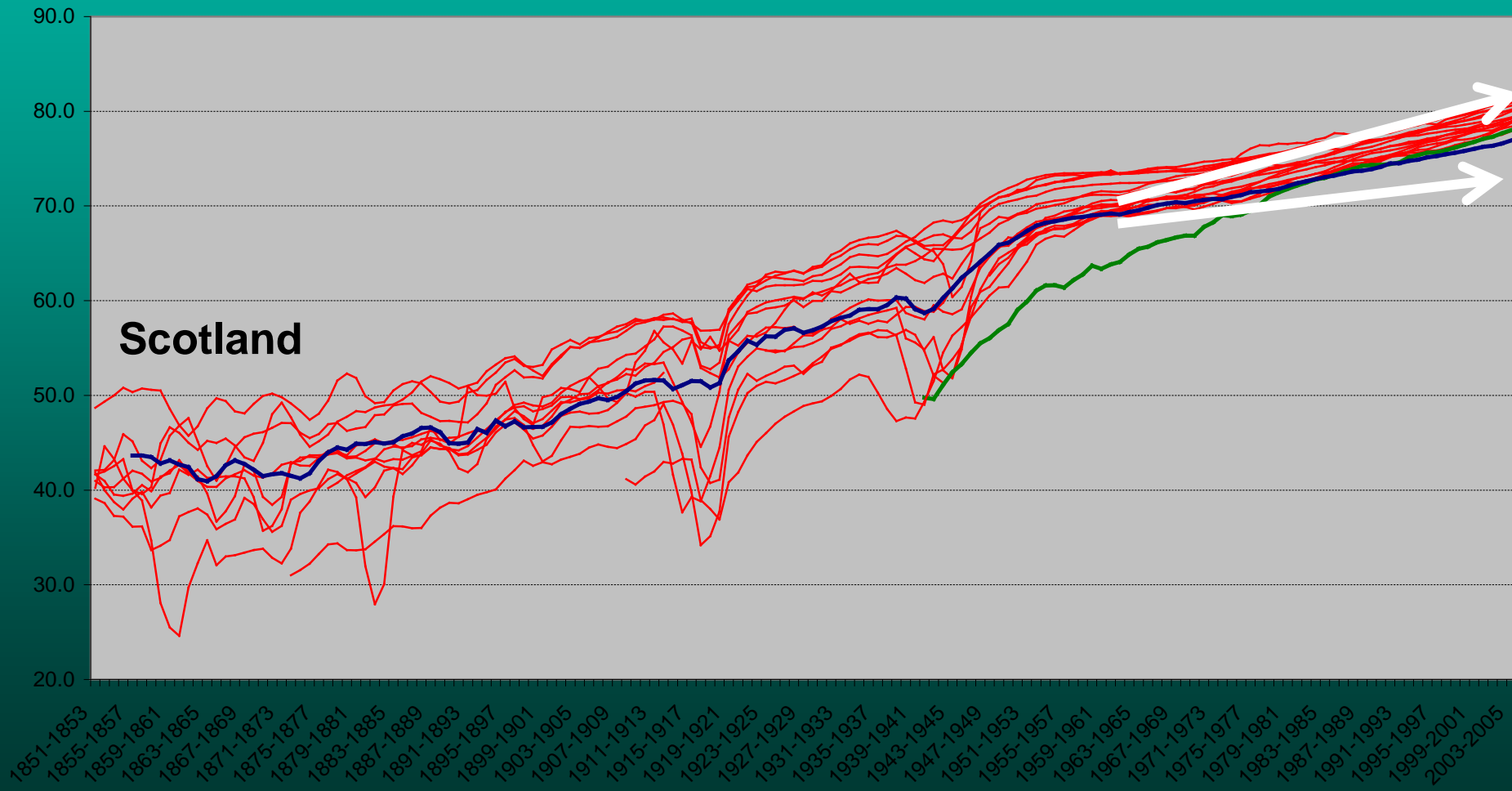
- u Just as environmental scientists describe the health of the earth as the capacity of a complex system to maintain a stable environment within a relatively narrow range, we propose the formulation of health as the ability to adapt and to self manage.

What people believe about Scotland's health

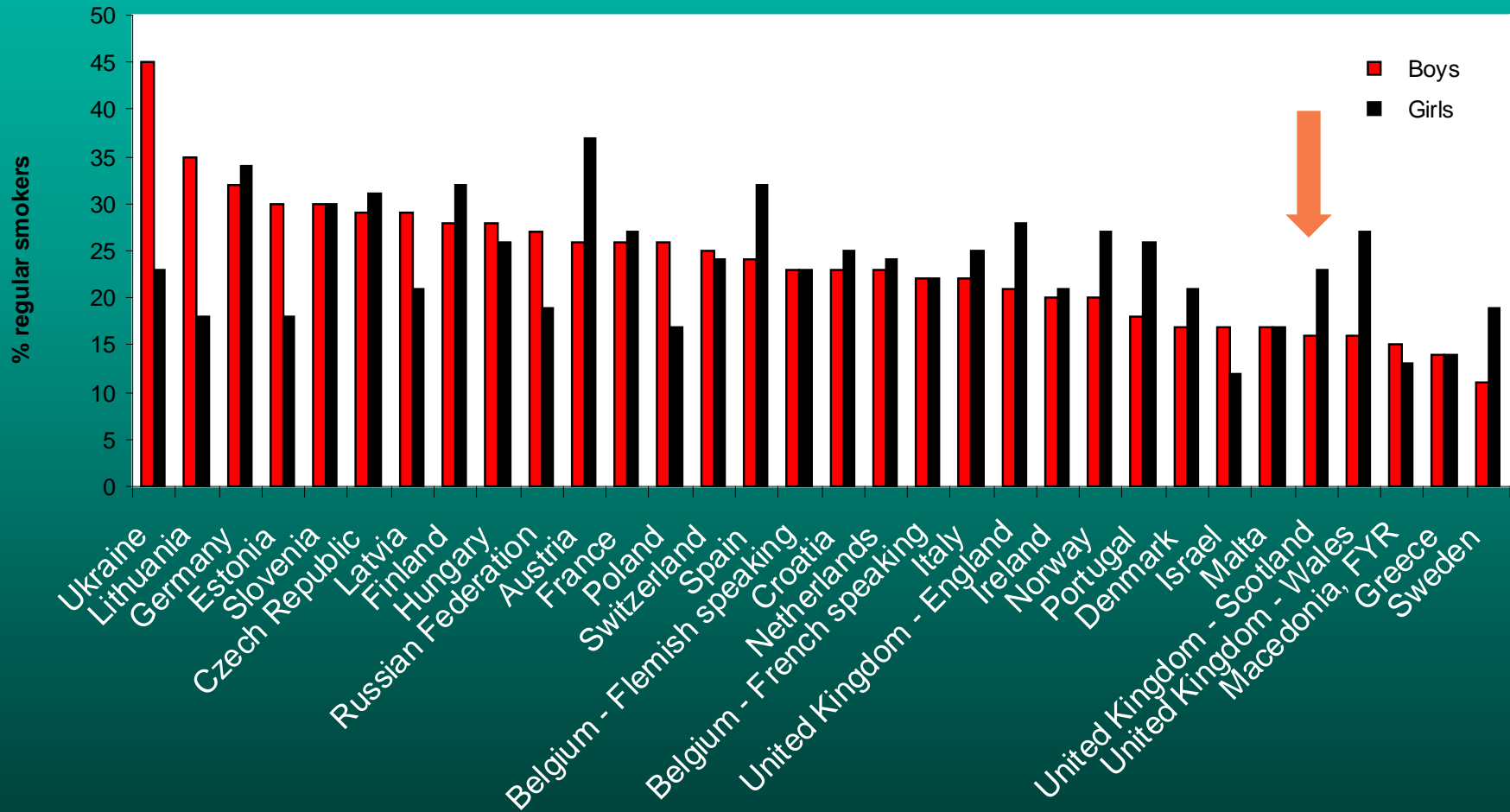
- u The Scots are unhealthy
- u It's because they smoke a lot
- u They eat the wrong kind of food
- u They drink too much
- u If only they adopted healthy habits, they would be healthy
- u **Only ONE of these statements is true!**

Life expectancy trends

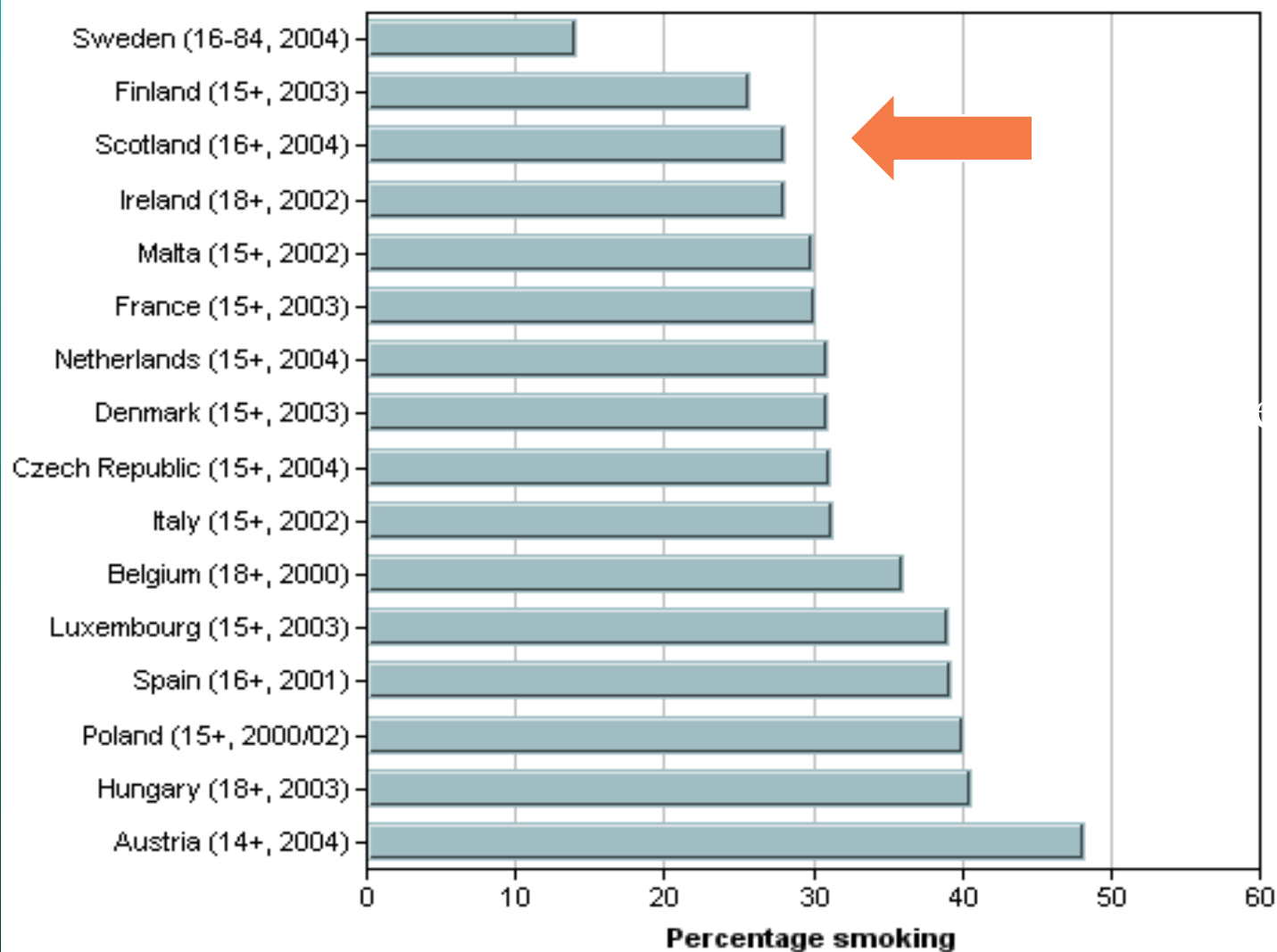
Life expectancy: Scotland & other Western European Countries, 1851-2005
Source: Human Mortality Database



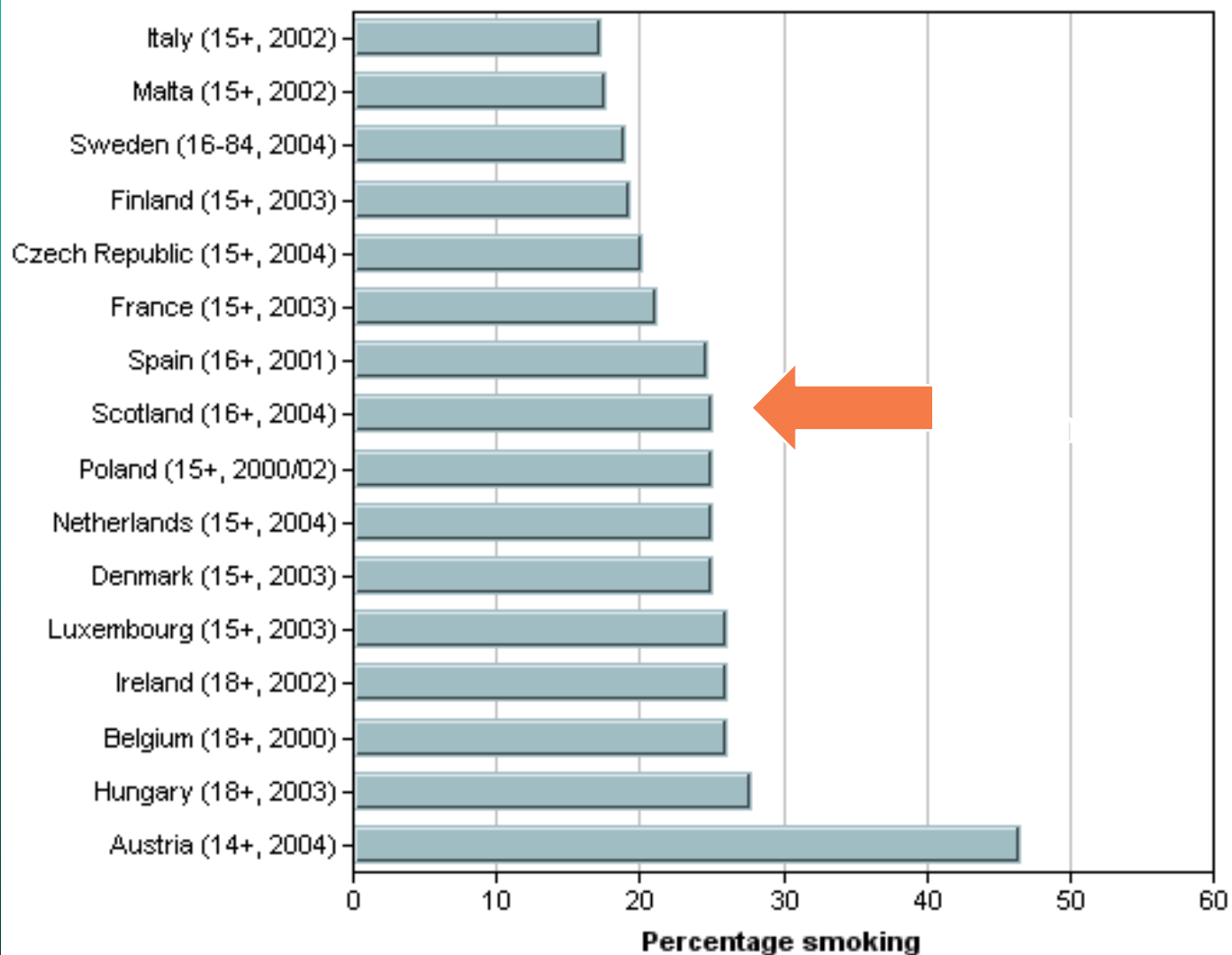
Prevalence of smoking by country, in 15 year olds by sex, 2000/01, Europe



Smoking prevalence - Males

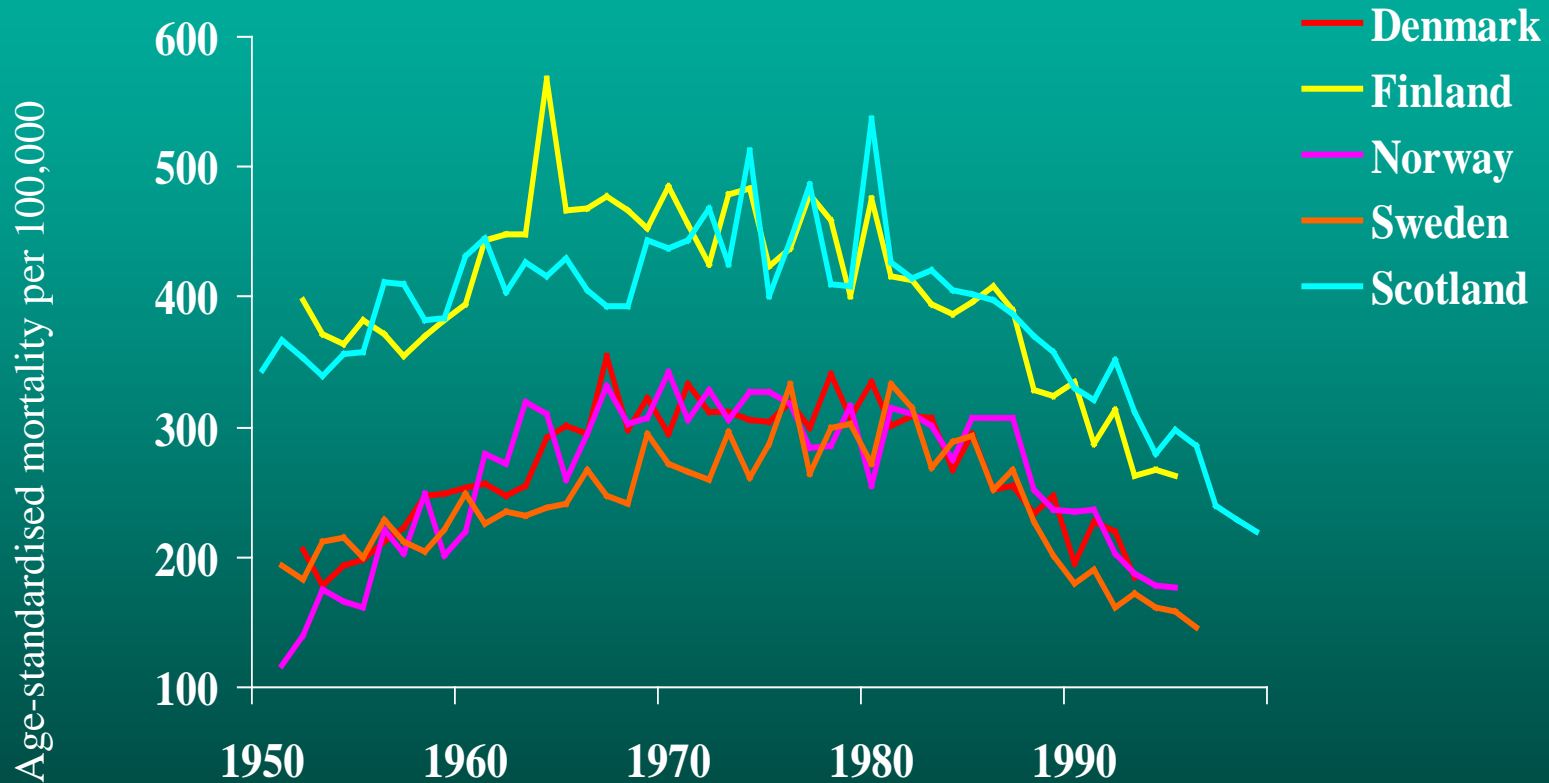


Smoking prevalence - Females

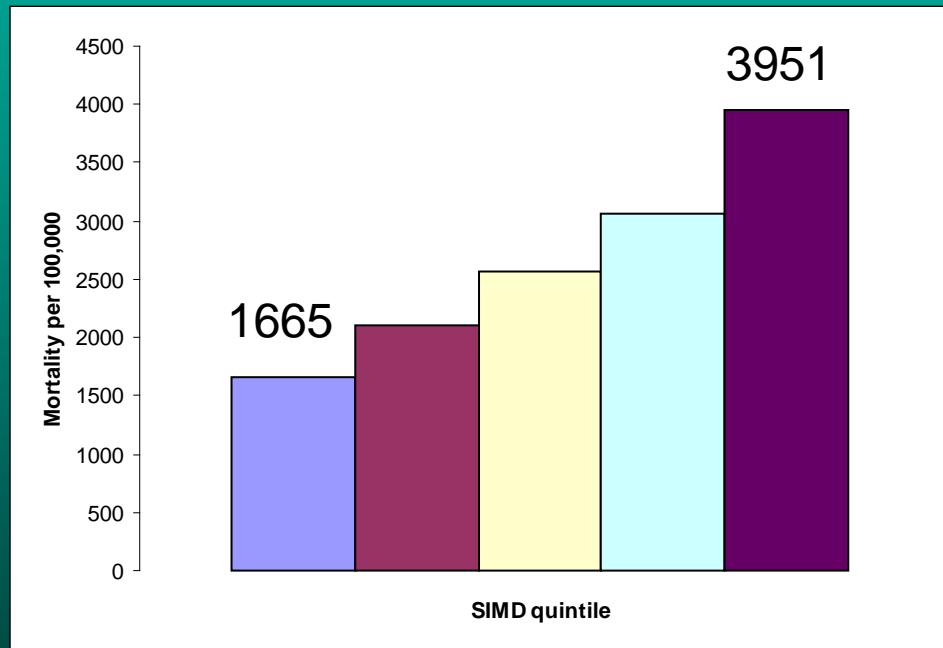


Coronary heart disease mortality

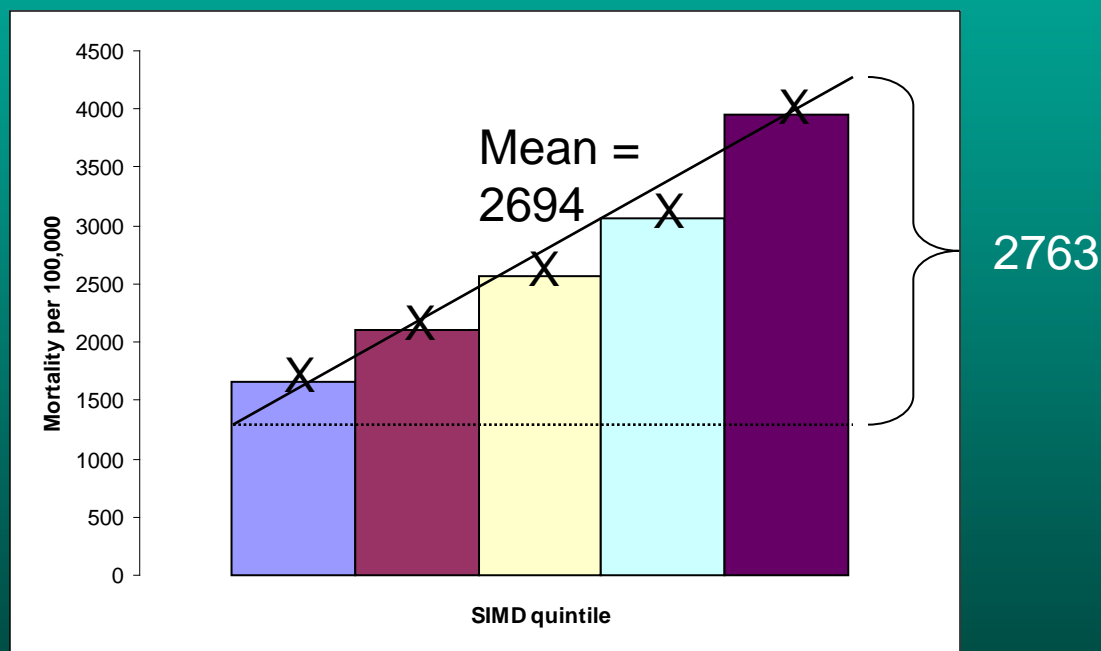
Men aged 15-74 years



Slope index of inequality

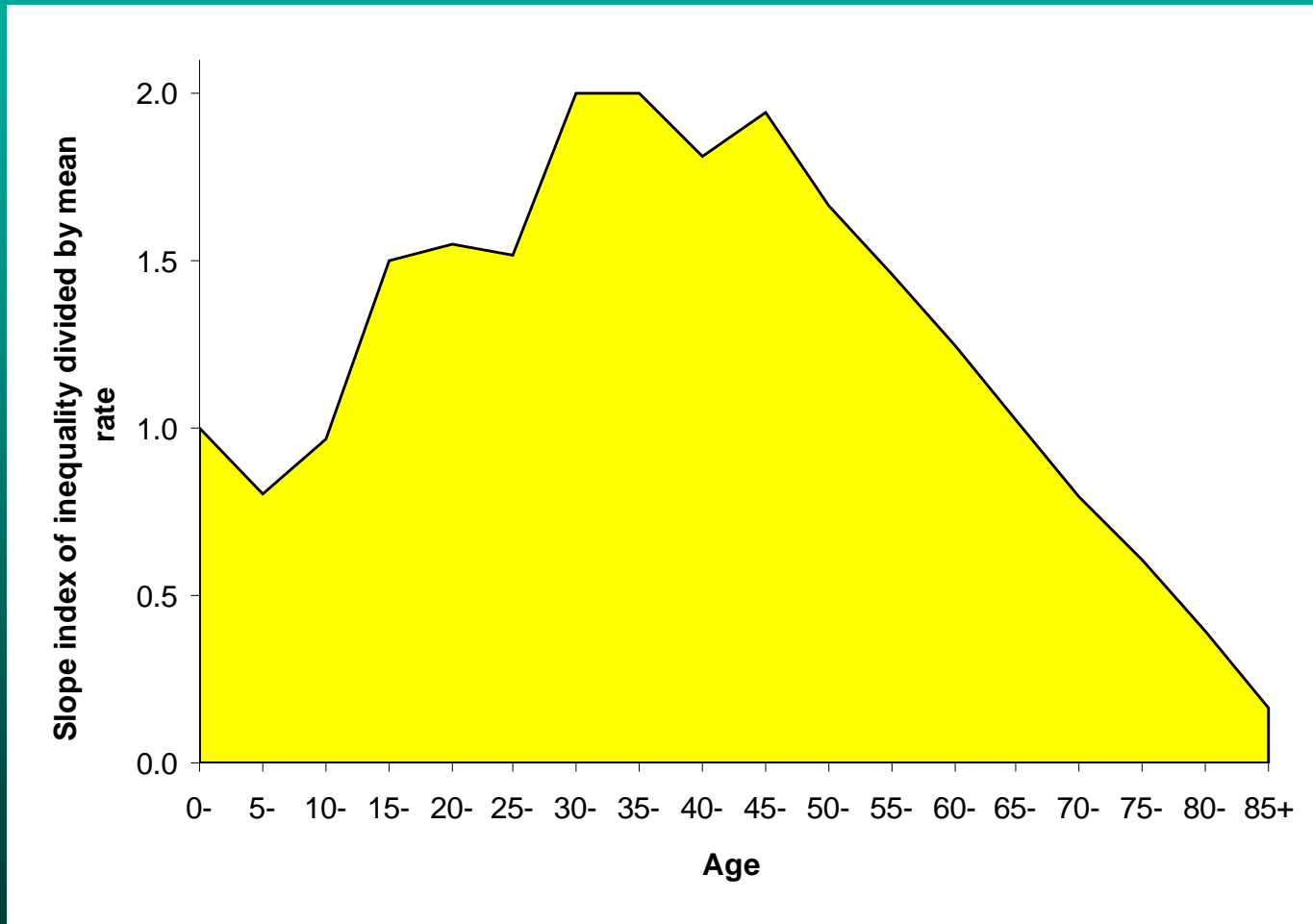


All cause mortality, men 65-69

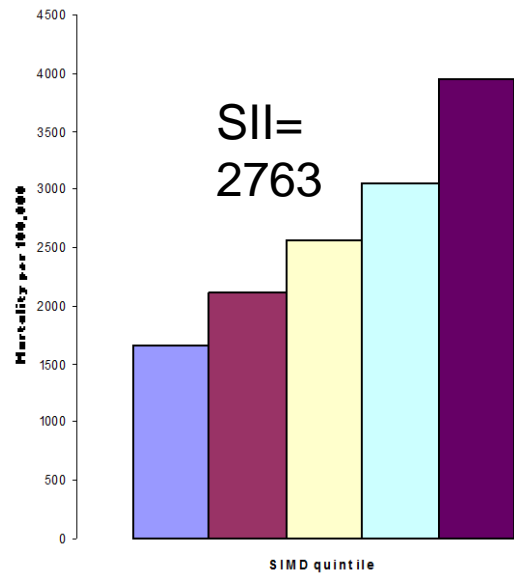


All cause, M65-69
 $2763/2694 = 1.025$

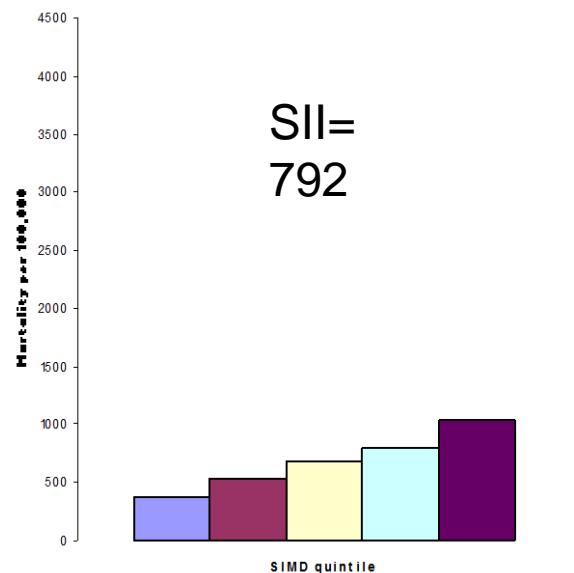
Male inequalities, all causes, all ages



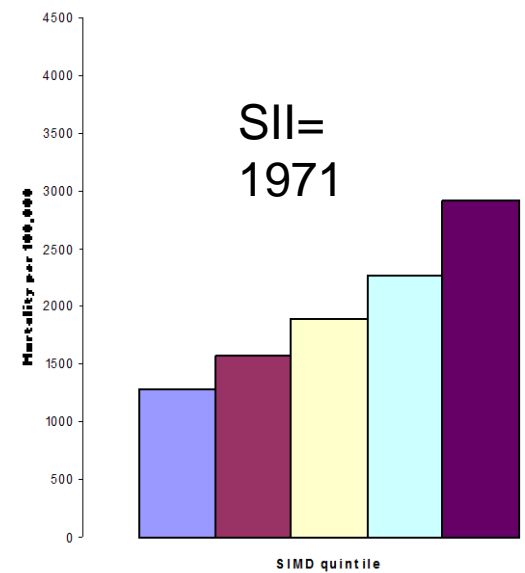
Slope index of inequality breakdown by cause of death



All cause

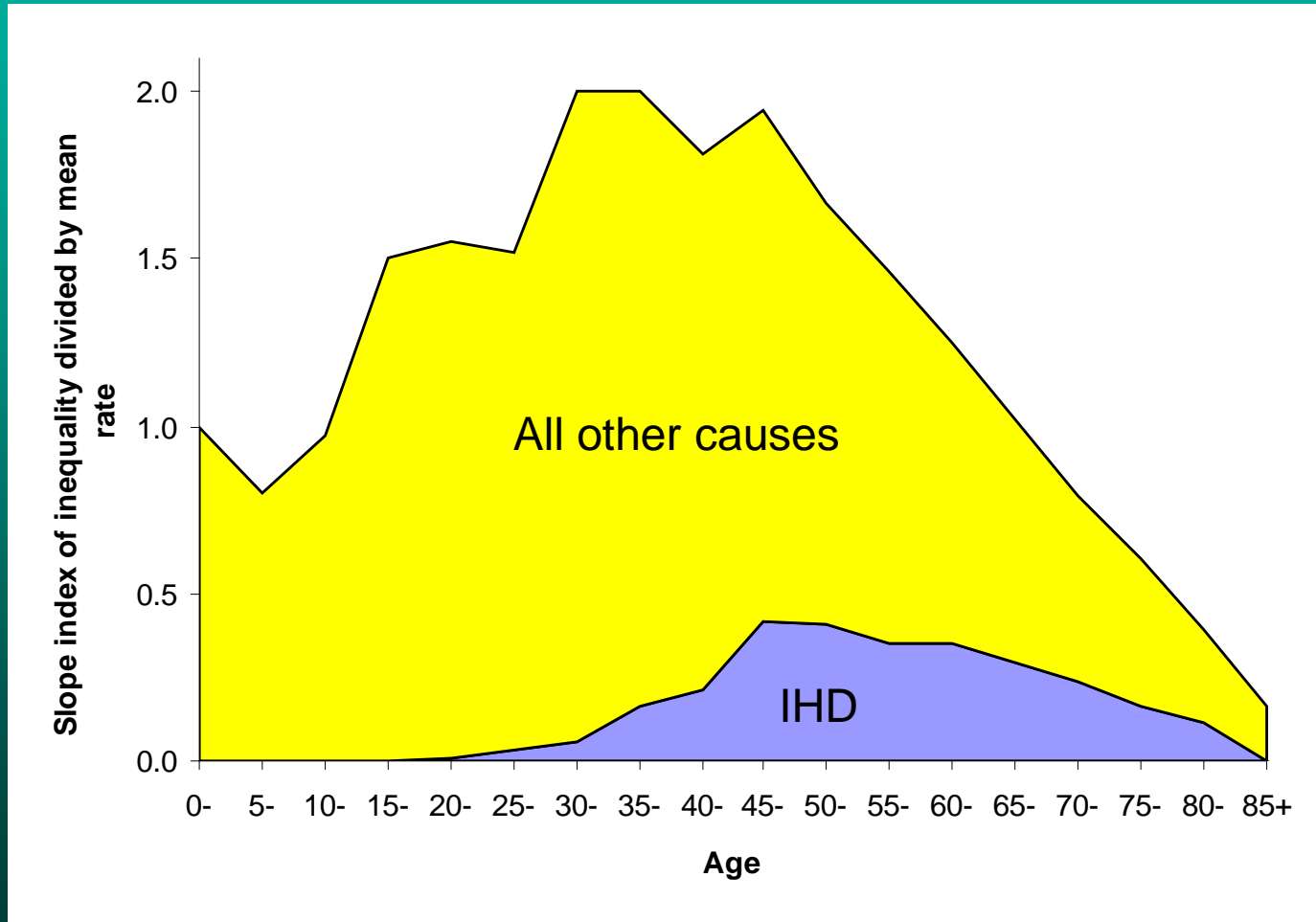


IHD



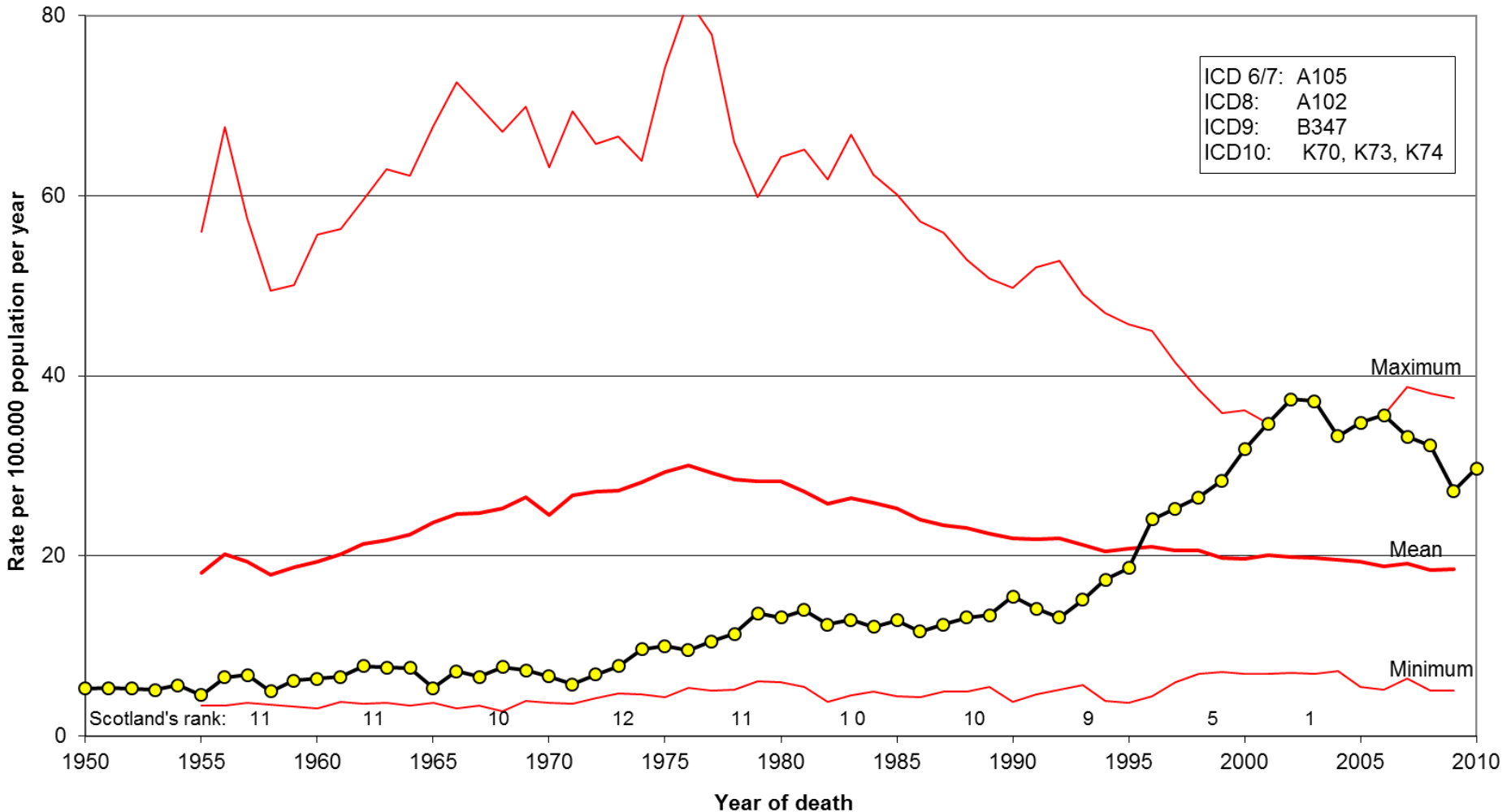
Other causes

Male inequalities, all ages, by cause



Chronic liver disease, including cirrhosis

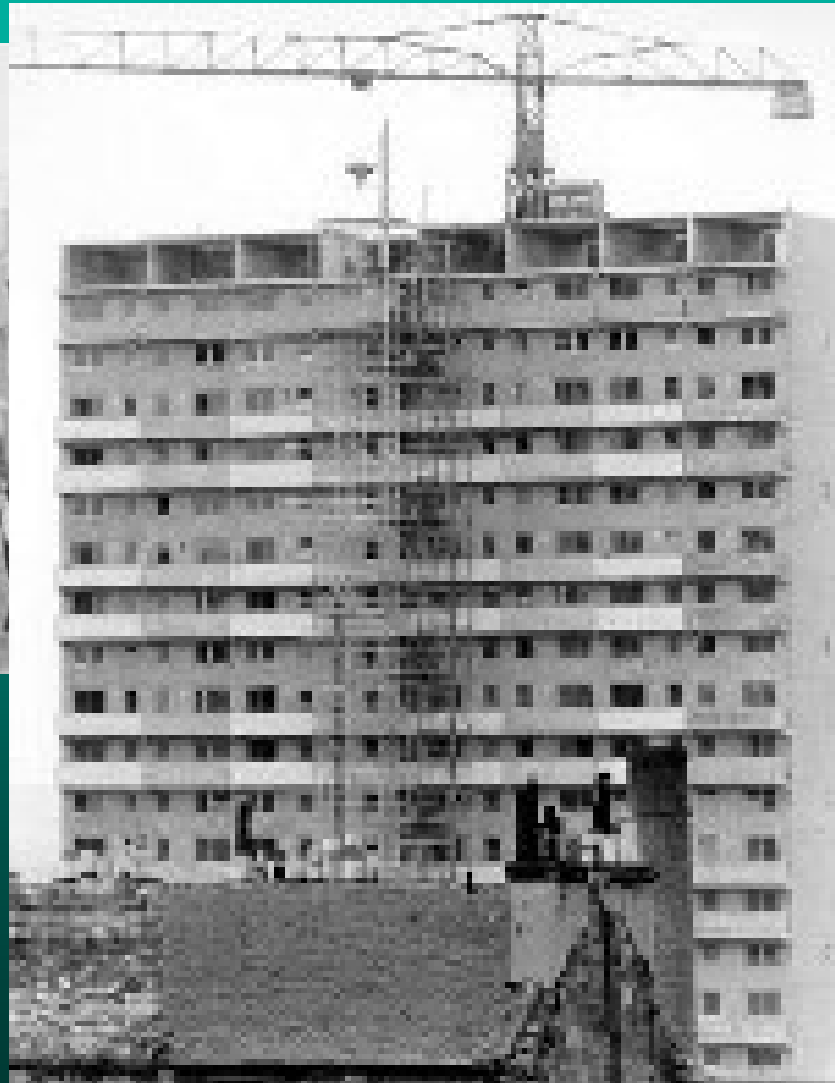
Figure N1M
Mortality from chronic liver disease, incl. cirrhosis, age standardised rates among men 15-74 years
Scotland in context of maximum, minimum, and mean rates for 16 Western European countries
Source: WHOSIS (April 2012)



Workers in the 1950s



More liveable housing?



Salutogenesis

An assets approach

Gratitude
(McGullough)

Humour
(Martin)

Self-efficacy
(Bandura)

Hardiness
(Kobasa)

Empathy
(Eisenberg)

Coping
(Lazarus)

Learned resourcefulness
(Rosenbaum)

Cultural capital
(Bourdieu)

Social capital
(Putnam)

Empowerment
(Freire)

Locus of control
(Rotter)

Learned optimism
(Seligman)

Quality of Life
(Lindström)

Resilience
(Werner)

Will to meaning
(Frankl)

Wellbeing
(Diener)

Learned hopefulness
(Zimmerman)

Connectedness
(Blum)

Flourishing
(Keyes)

Ecological system theory
(Bronfenbrenner)

Sence of coherence
(Antonovsky)

Emotional intelligence
(Goleman, Akerjordet et al)

Action competence
(Bruun Jensen)

Interdisciplinarity
(Klein)

Attachment
(Bowlby)

Aaron Antonovsky 1923-1994



Sense of coherence....

“.....expresses the extent to which one has a feeling of confidence that the stimuli deriving from one's internal and external environments in the course of living **are structured, predictable and explicable**, that one has the **internal resources** to meet the demands posed by these stimuli and, finally, that these demands are seen as **challenges, worthy of investment and engagement.**”

Antonovsky 1979

For the creation of health....

...the social and physical environment must be:

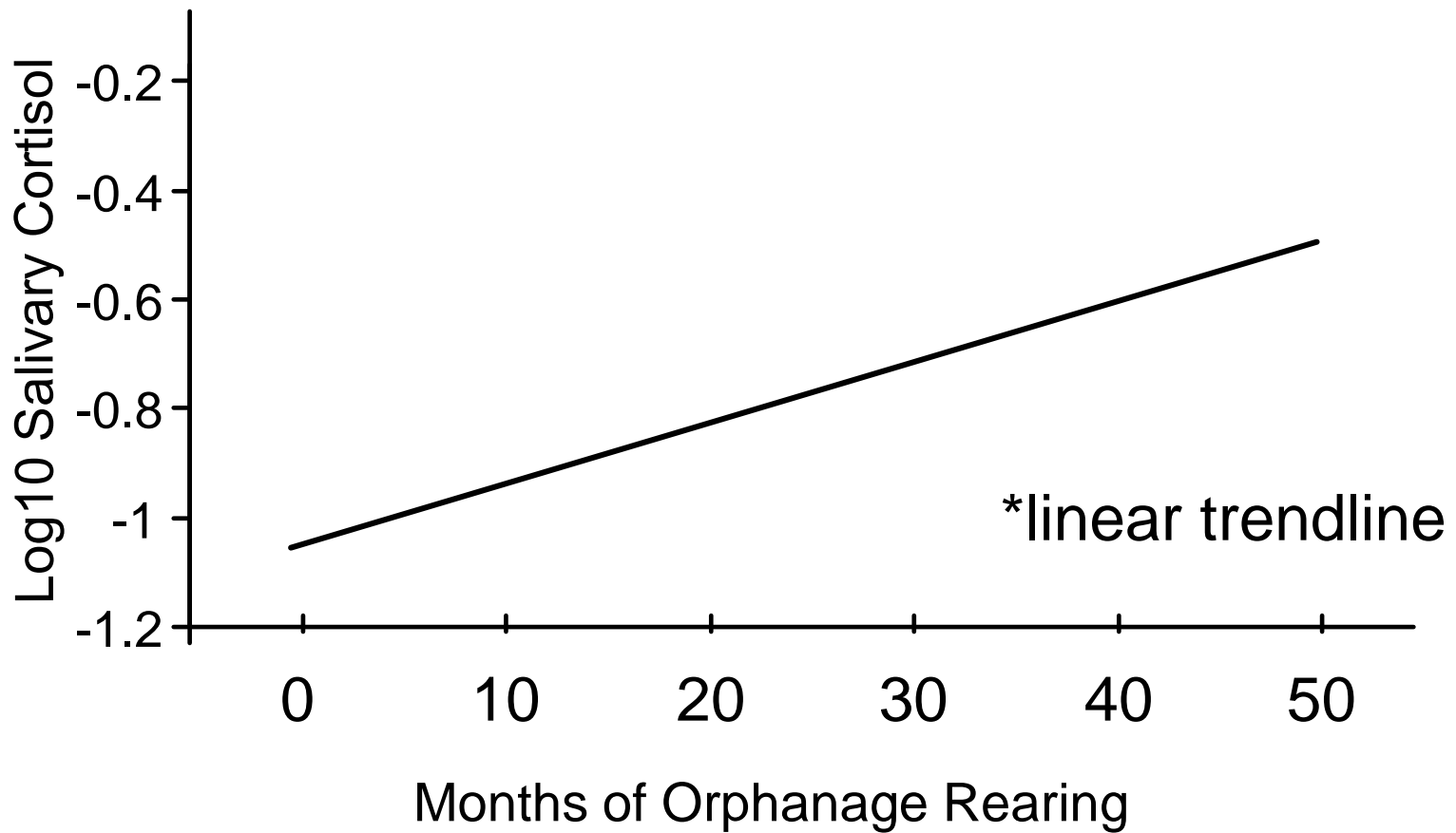
- u Comprehensible

- u Manageable

- u Meaningful

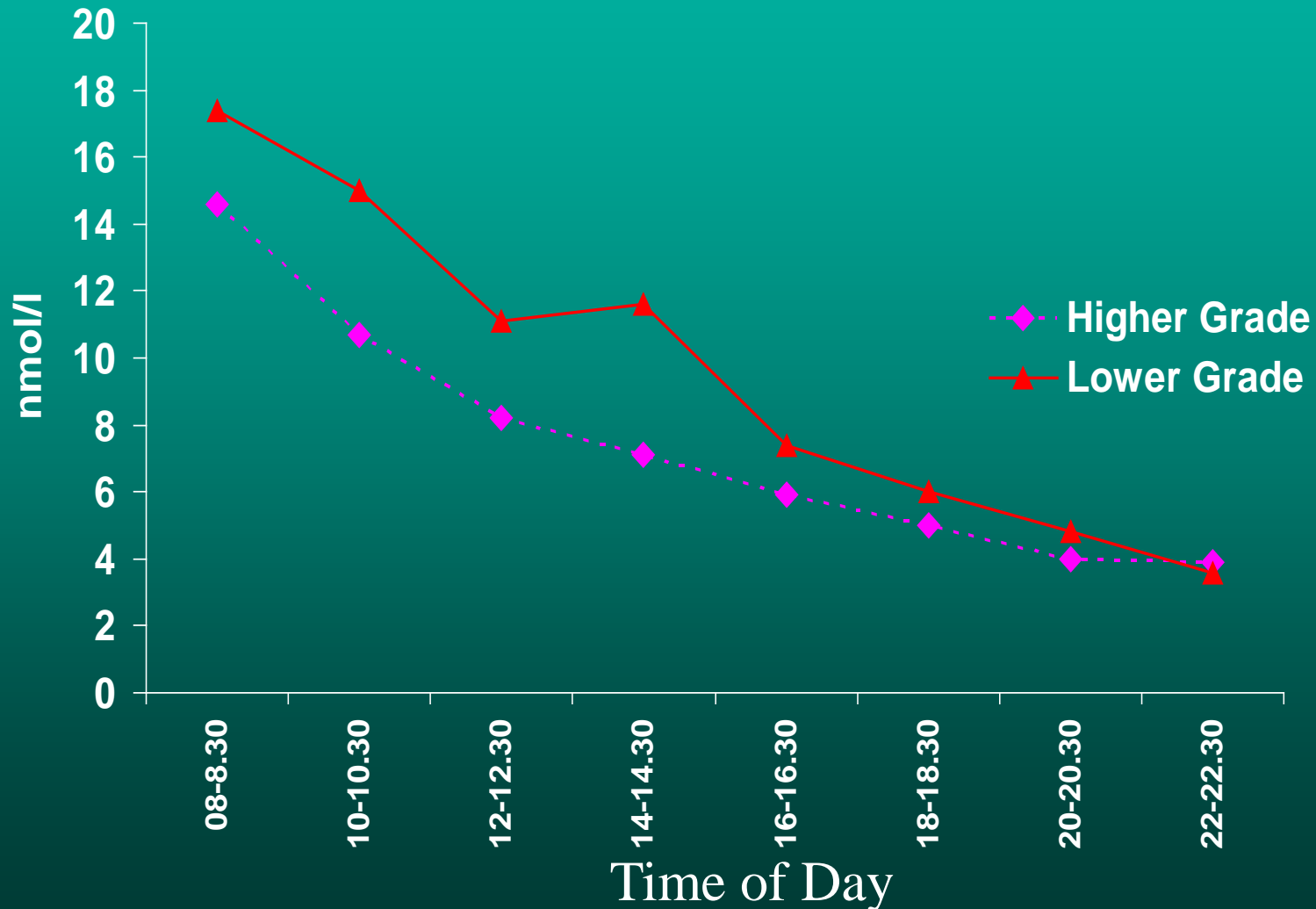
- uor the individual would experience chronic stress

Evening Cortisol Levels Increase with Months of Orphanage Rearing *



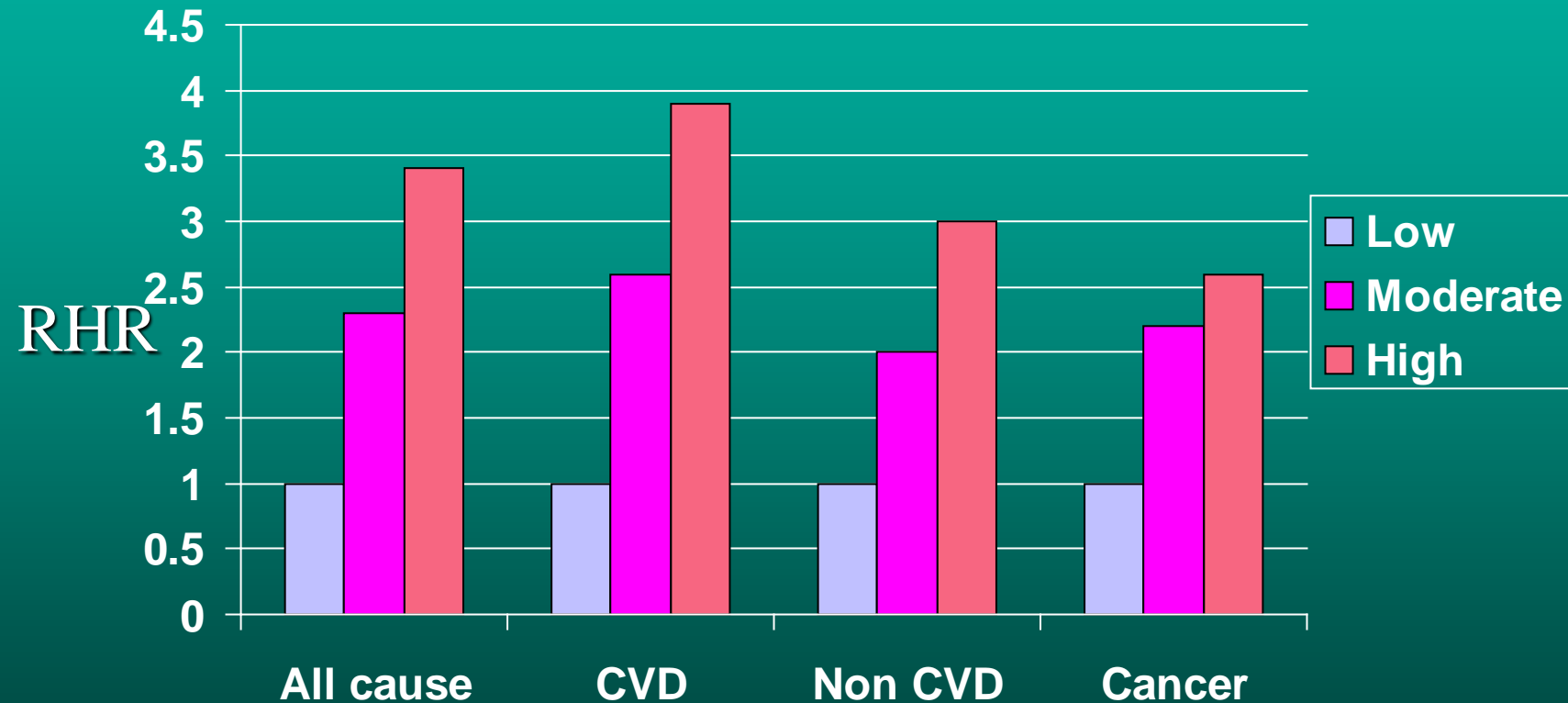
STRESS AND GRADE OF EMPLOYMENT: MEN

Salivary Cortisol



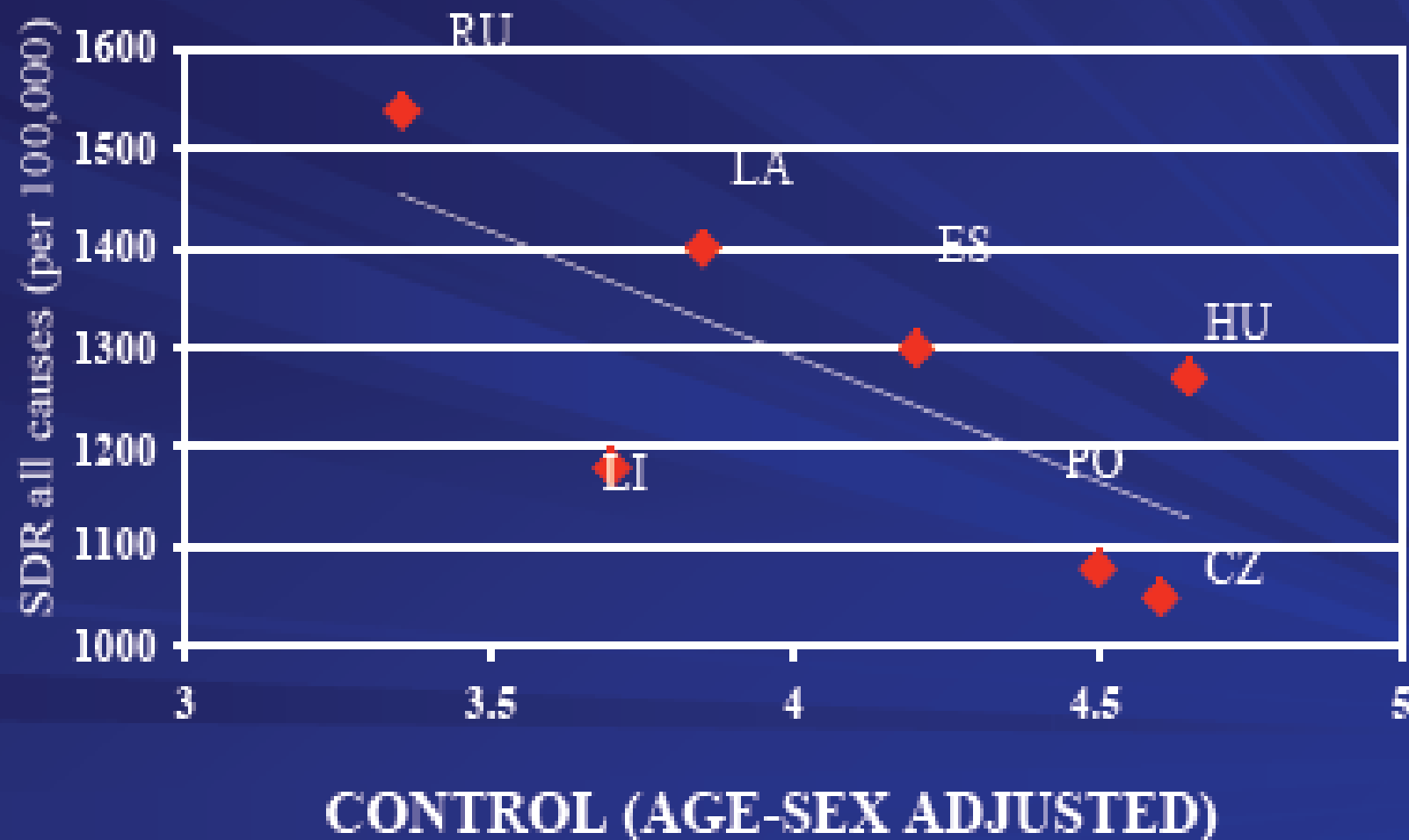
Risk of death

- by level of hopelessness



Everson et al 1996

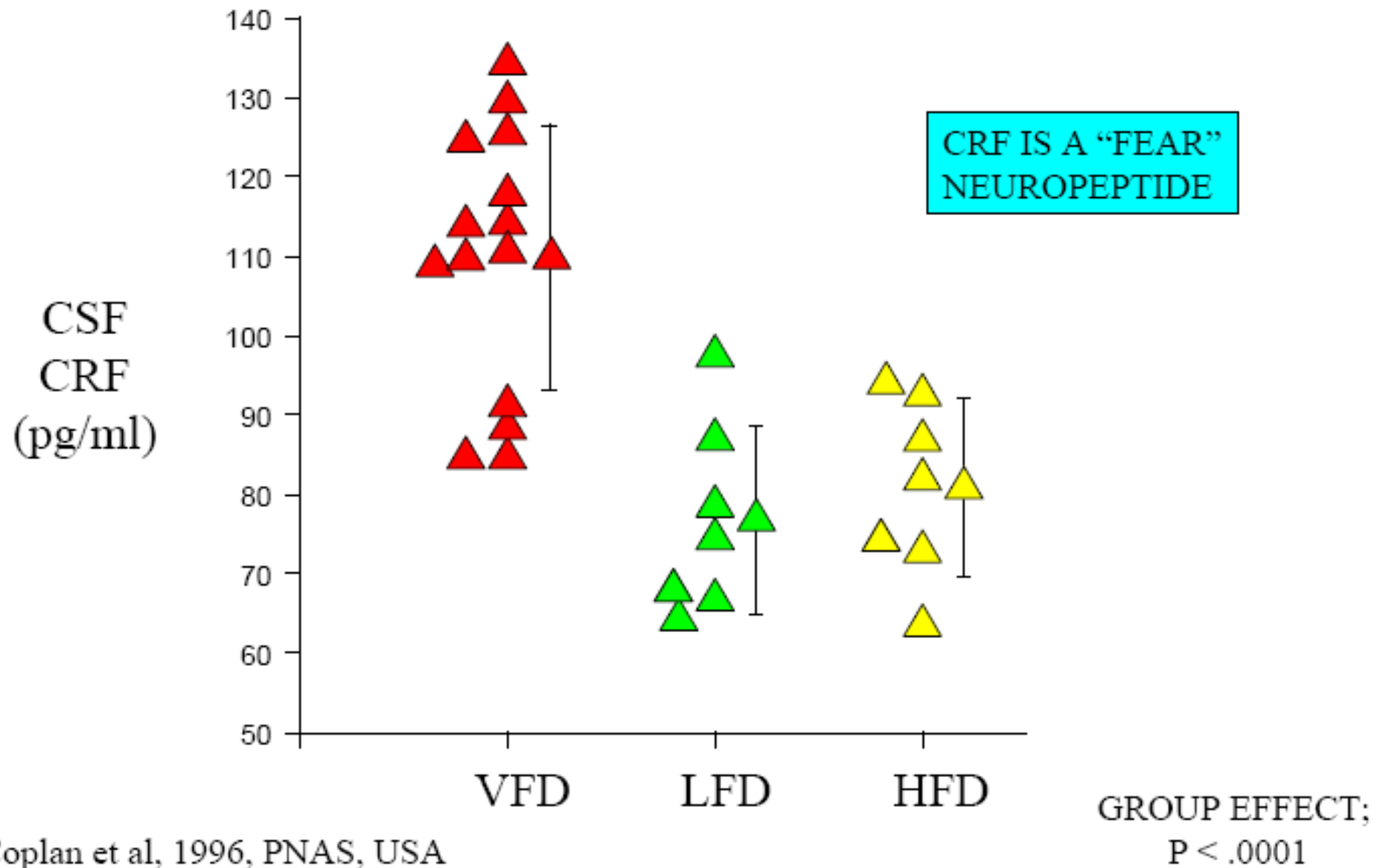
PERCEIVED CONTROL IN NATIONAL SAMPLES AND ALL CAUSE MORTALITY



Pikhart, Bobak et al 2000



CSF CRF CONCENTRATIONS IN DIFFERENTIALLY-REARED JUVENILE PRIMATES:

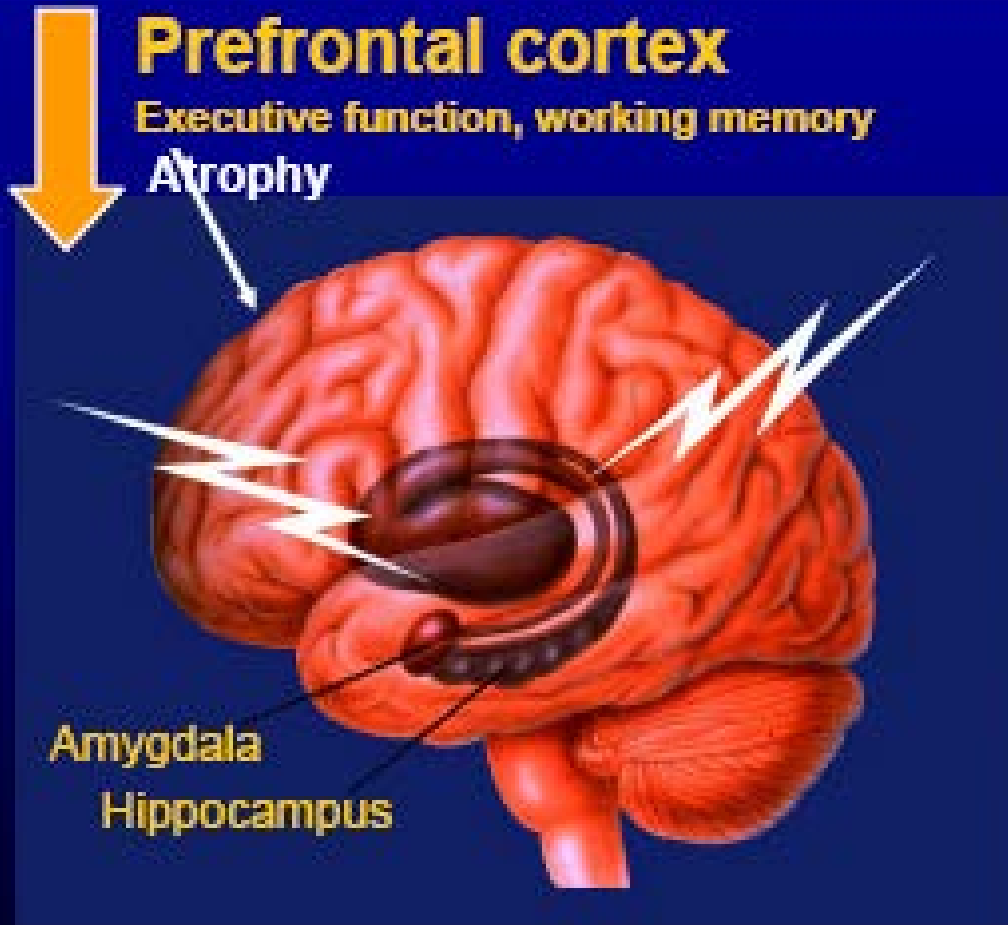


The Human Brain Under Stress: key brain regions

Prefrontal cortex

Executive function, working memory

Atrophy



Hippocampus

Contextual, episodic, spatial memory

Atrophy

Amygdala

Emotion, fear, anxiety

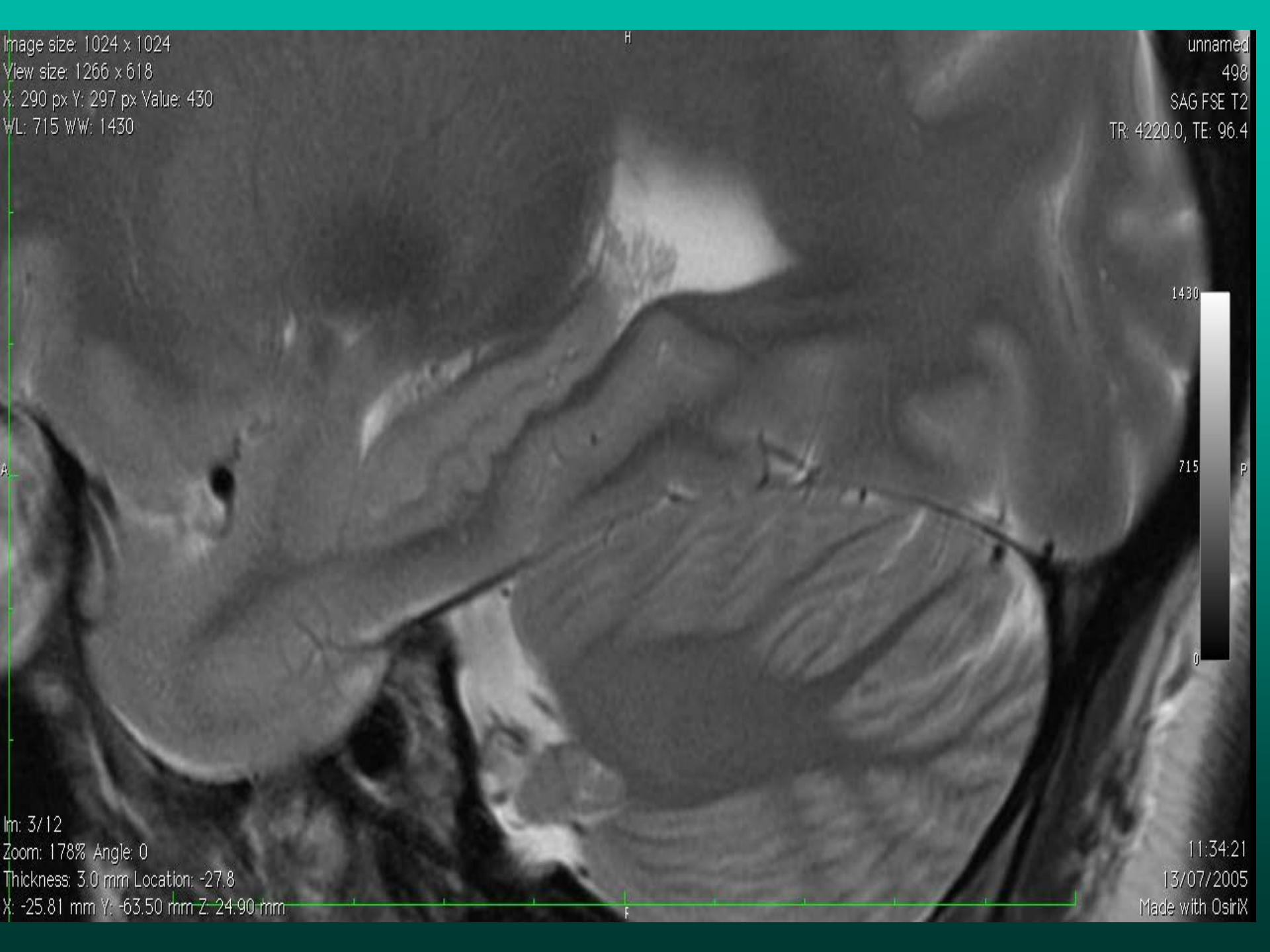
Hypertrophy.

later atrophy

Image size: 1024 x 1024
View size: 1266 x 618
X: 290 px Y: 297 px Value: 430
WL: 715 WW: 1430

H

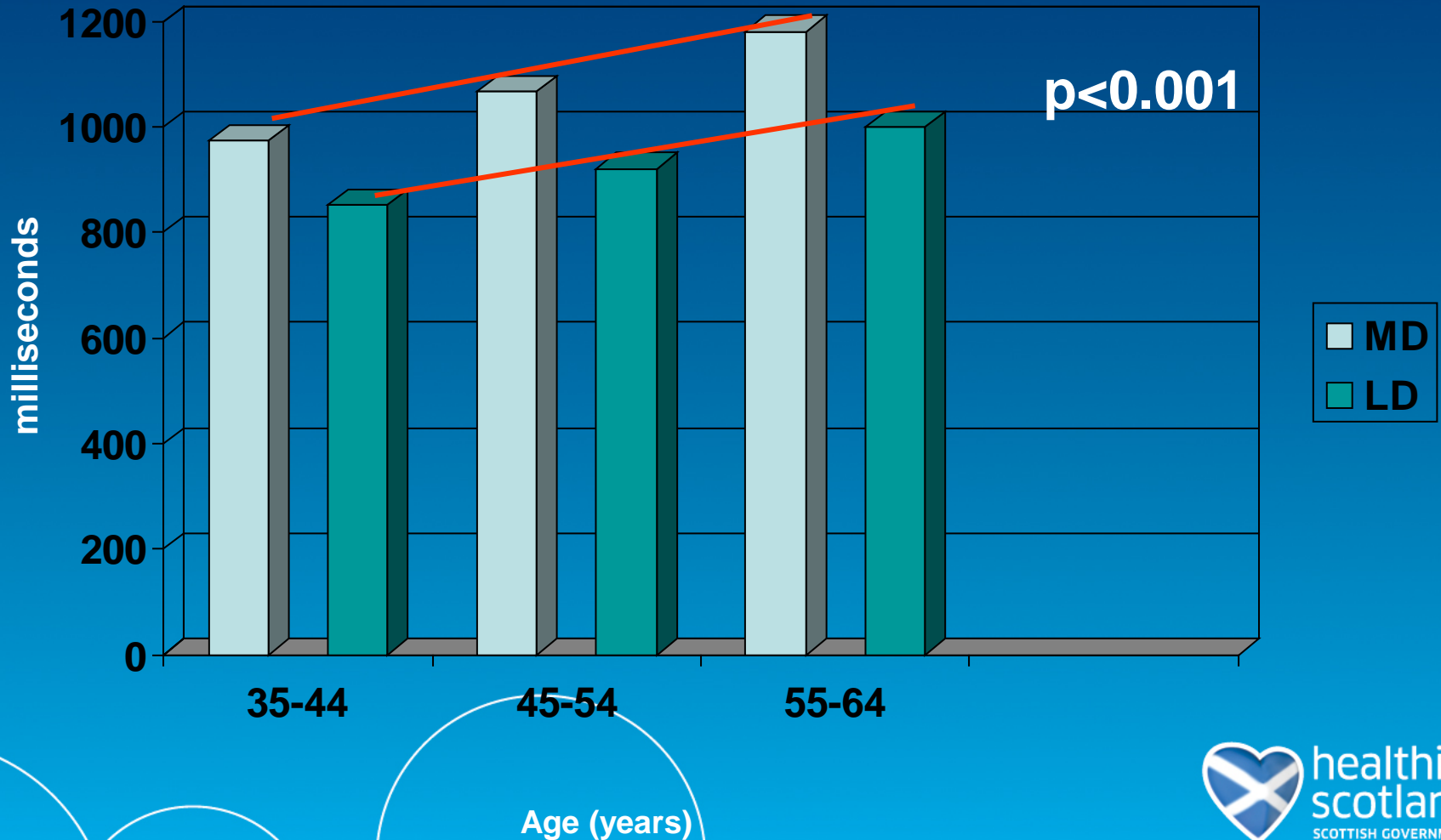
unnamed
498
SAG FSE T2
TR: 4220.0, TE: 96.4



Im: 3/12
Zoom: 178% Angle: 0
Thickness: 3.0 mm Location: -27.8
X: -25.81 mm Y: -63.50 mm Z: 24.90 mm

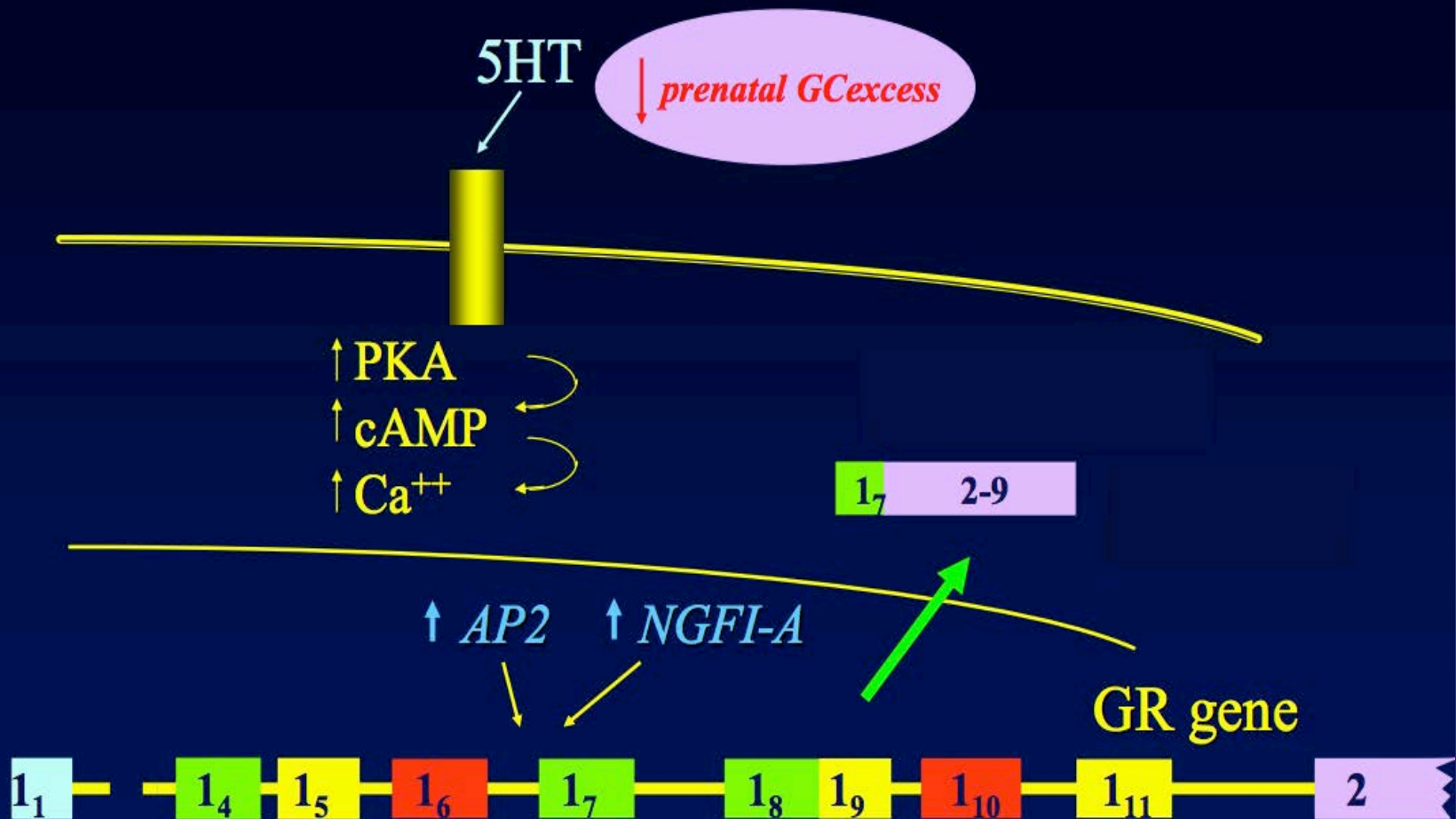
11:34:21
13/07/2005
Made with OsiriX

pSoBid: Choice reaction time



The molecular biology of a hug

5HT regulates hippocampal GR gene transcription



MAOA – “The warrior gene”



Överkalix



Oversupply of food affected life expectancy of grandsons not granddaughters

Epigenetic effects across generations

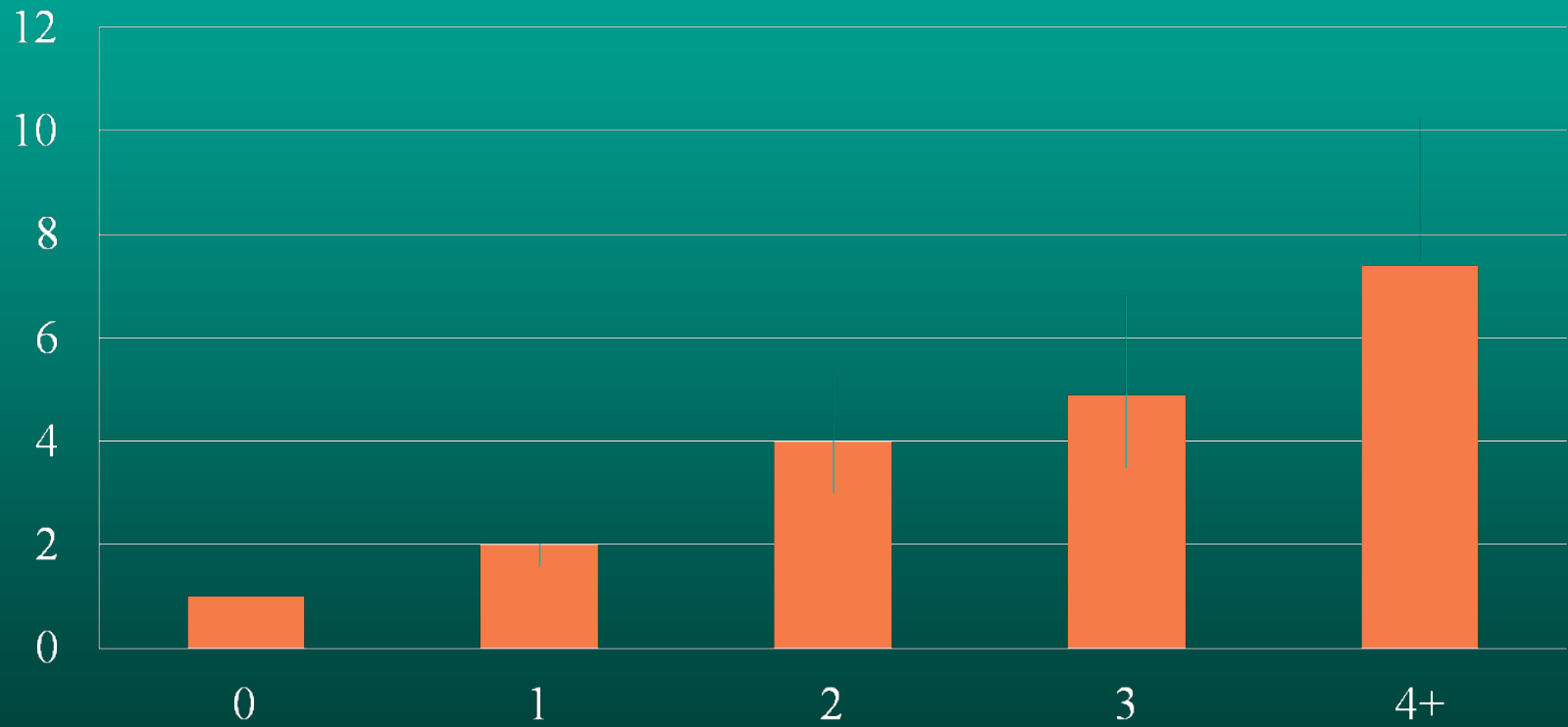
- u Overkalix – nutritional experience as a child can increase risk of heart disease which is inherited by sons and grandsons
- u Rachel Yehuda – PTSD experienced during pregnancy after 9/11 led to abnormal stress responses in babies
- u Pregnant women in Lanarkshire in the 1950s put on a carb free diet. Children and grandchildren have high incidence of hypertension

Adverse childhood events study

- u Physical/sexual/emotional abuse
- u Neglect (physical/emotional)
- u Domestic substance abuse
- u Domestic violence
- u Parental mental illness
- u Parental criminality

Adverse childhood events risk of alcoholism

Odds ratio

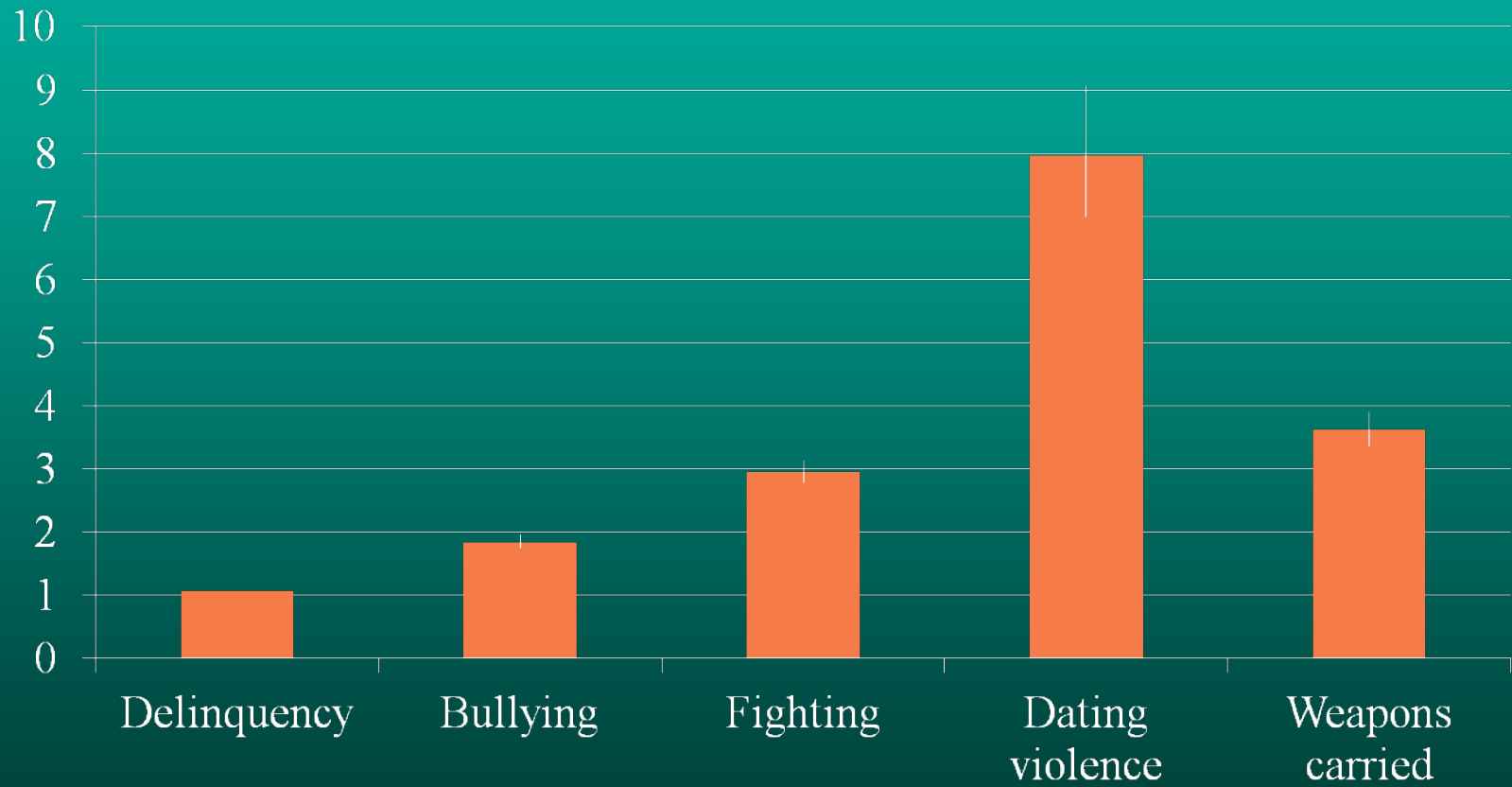


Hillis et al 2011

Adverse childhood events

risk of perpetrating violence

Boys experiencing physical abuse



Duke et al 2010

The Dunedin cohort

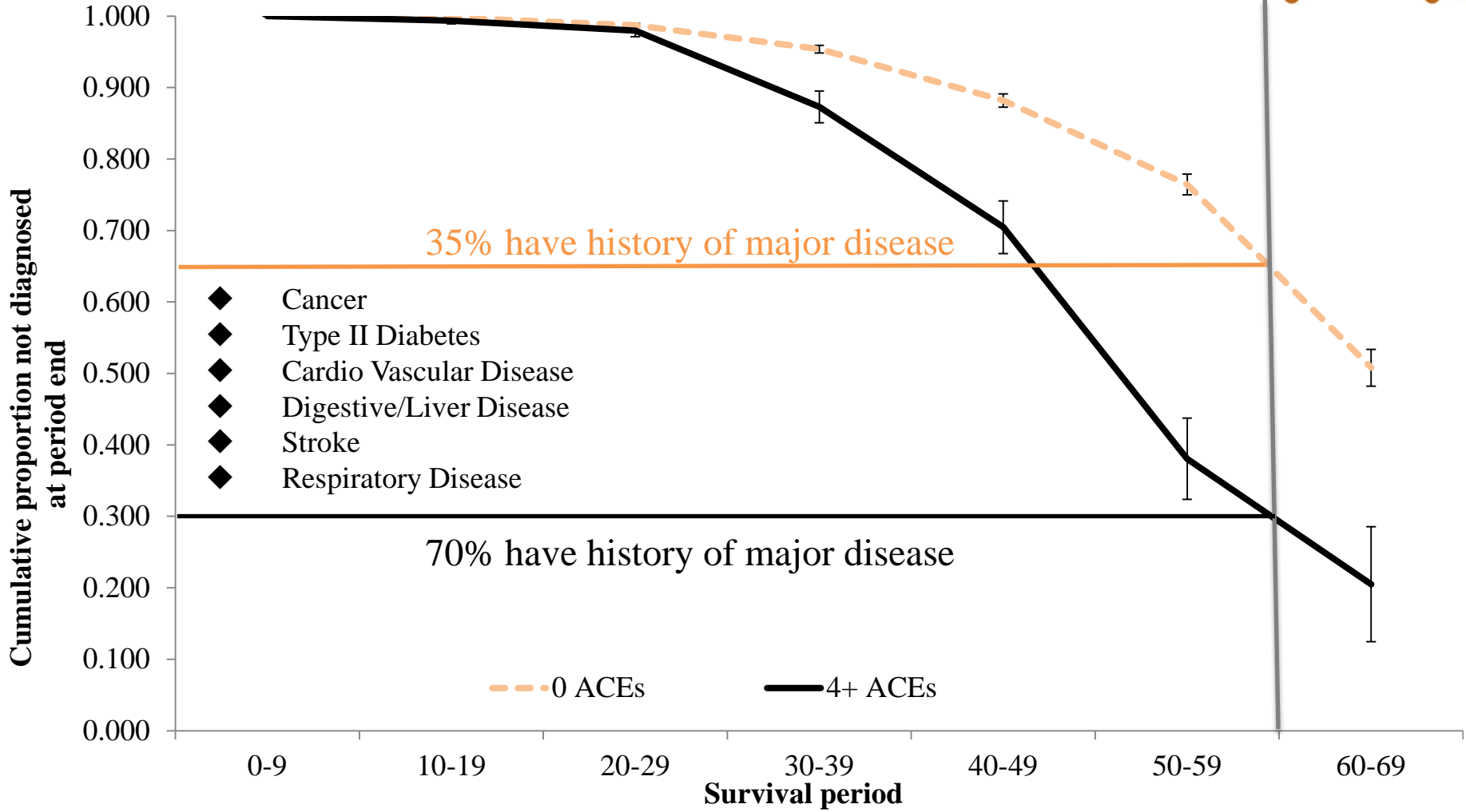
- 1000 children recruited in late 1972/3
- At age 3, “at risk” children identified on the basis of chaotic circumstances, emotional behaviour, negativity and poor attentiveness
- As adults, those “at risk” were more likely to :
 - be unemployed
 - have criminal convictions (especially for violence)
 - been pregnant as a teenager
 - have a substance abuse problem
 - exhibit signs of insulin resistance and metabolic syndrome



Cumulative Proportion of Individuals

not diagnosed with a Major Disease with Age

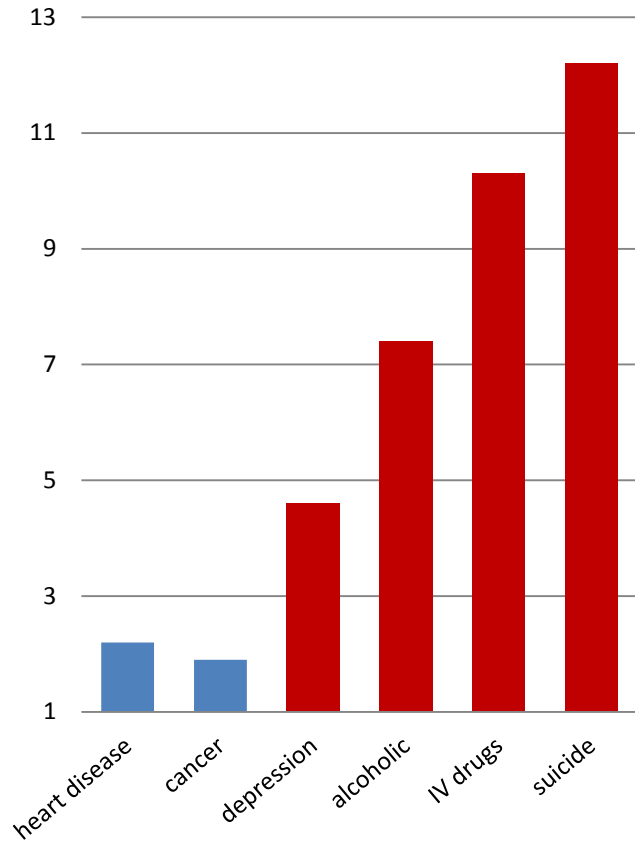
Aged 18 to 69 (n = 3,885) Bellis et al, Journal of Public Health, 2014



Differences are independent of Deprivation

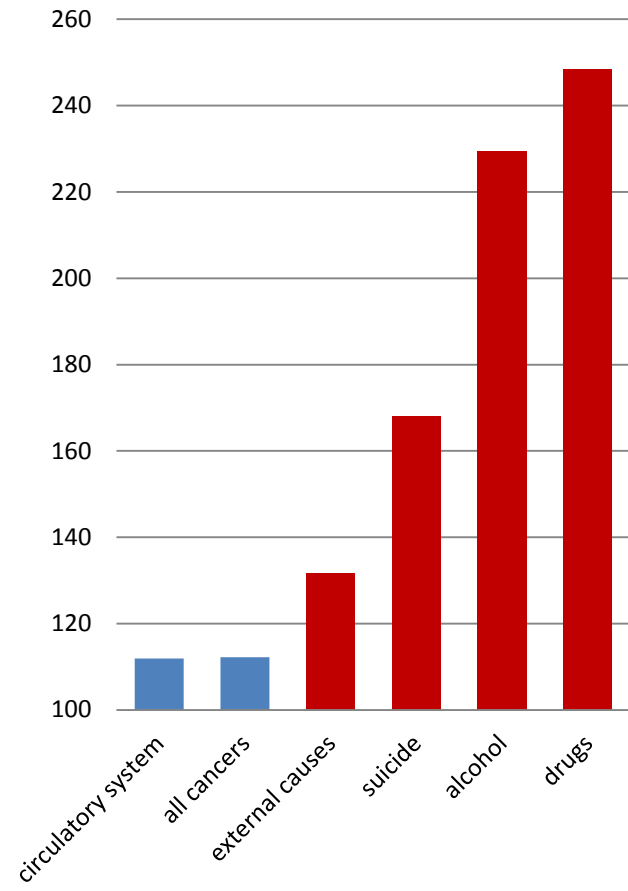
ACE and morbidity

(adjusted odds ratio, 4+ ACE)



Glasgow excess mortality

(cause-specific SMR, compared to Liverpool & Manchester)



The cycle of violence

- u ‘Childhood abuse and neglect have a significant impact on the likelihood of arrest for delinquency, adult criminality, and violence. By the age of 32 years, almost half of the victims of abuse and neglect were arrested for a nontraffic offense.’
- u “By responding to incidents of child abuse and neglect, health care professionals can play an important role in preventing future violence

Economic cost of child maltreatment

- u “The total lifetime economic burden resulting from new cases of fatal and nonfatal child maltreatment in the United States in 2008 is approximately \$124 billion in 2010 dollars. This economic burden rivals the cost of other high profile public health problems, such as stroke and Type 2 diabetes (Fang et al., 2012).”

The cycle of alienation

Initial event

Unequal outcomes

Consequences

Mental
health
problems

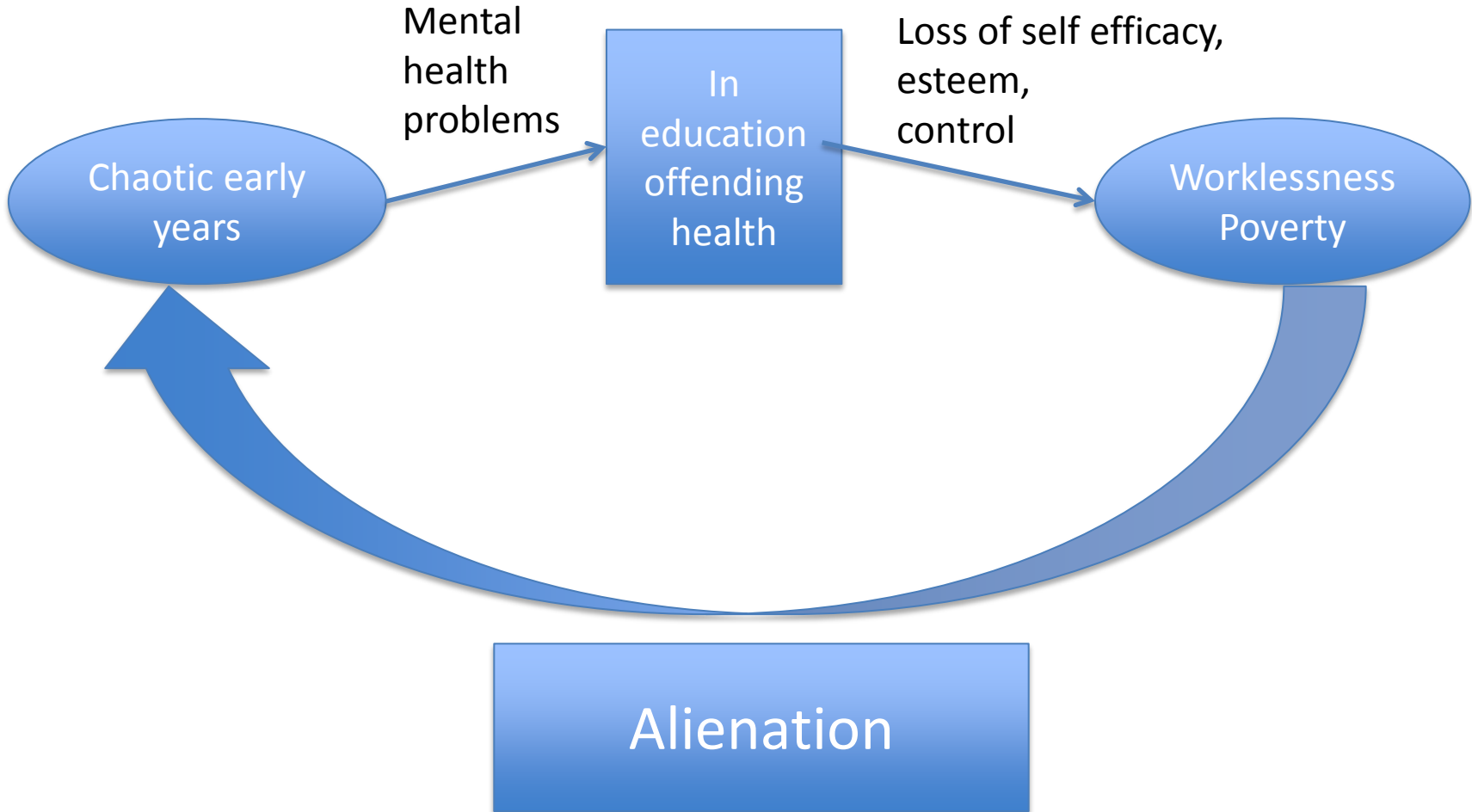
Loss of self efficacy,
esteem,
control

Chaotic early
years

In
education
offending
health

Worklessness
Poverty

Alienation



Reversing the effects of a difficult life

- u The evidence supports
 - Physical activity
 - Mindfulness
 - Having strong social connections

Zaatari Refugee Camp, Jordan



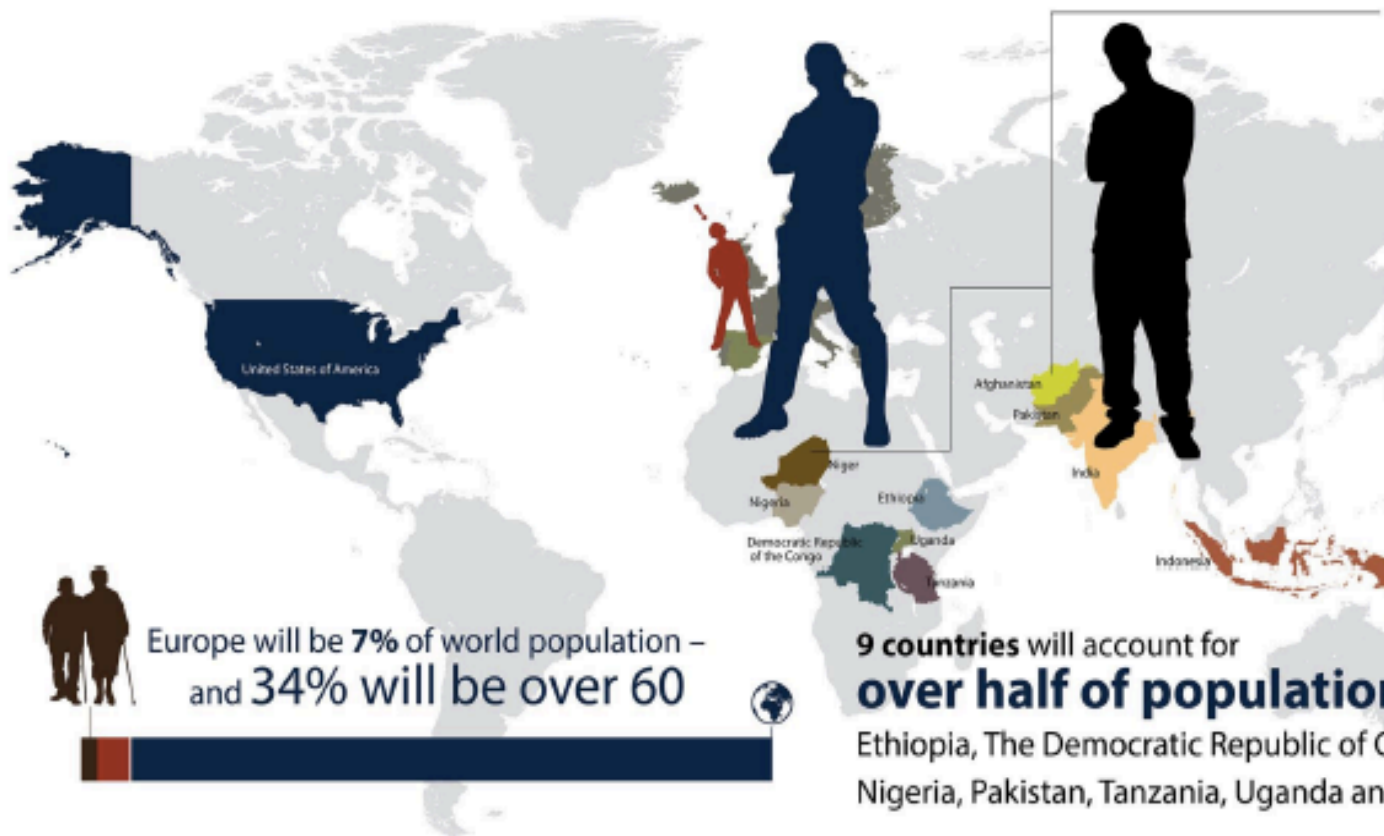
Demography is changing our world

The world population will exceed **10 billion** by 2100

Africa will grow the fastest

becoming 4x more populous than Europe
and nearly as populous as Asia

By 2100, Afghanistan
will be larger
than Russia
and Niger will be
larger than both



Europe will be **7%** of world population –
and **34%** will be over 60



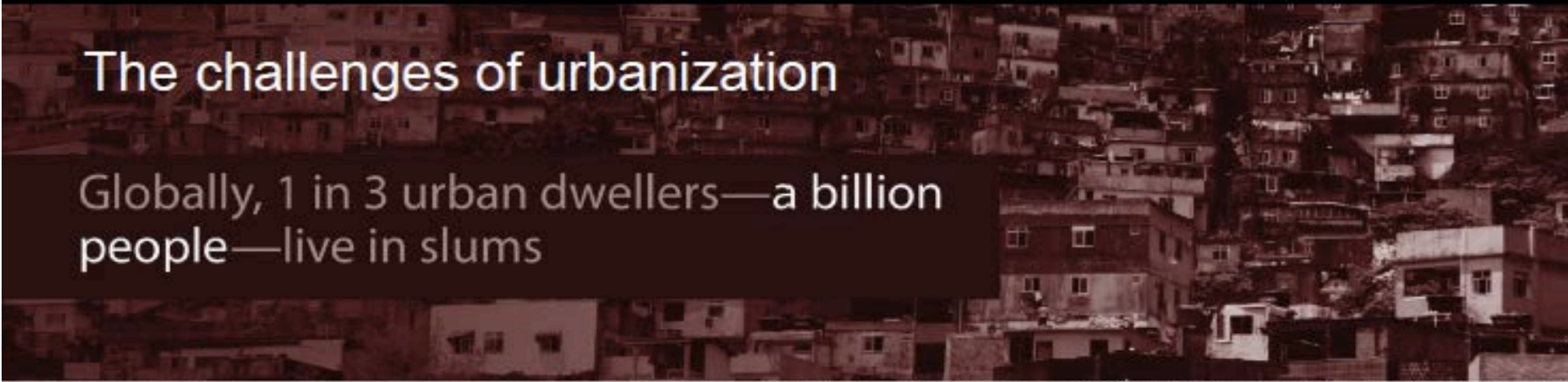
9 countries will account for
over half of population growth

Ethiopia, The Democratic Republic of Congo, Indonesia, India,
Nigeria, Pakistan, Tanzania, Uganda and the U.S.

Demography is changing our world


World's largest cities in 2050



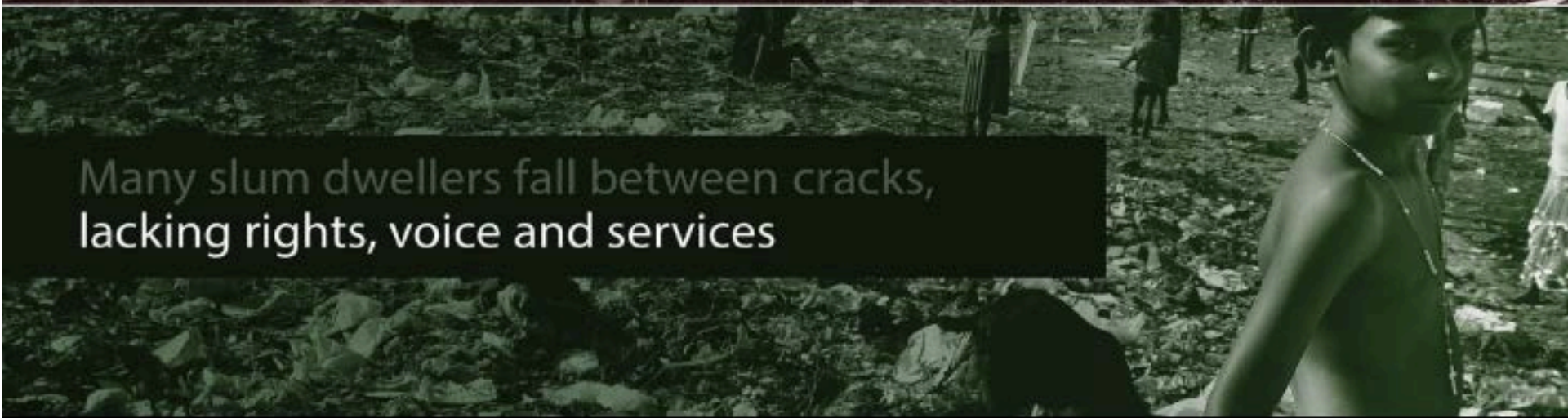


The challenges of urbanization

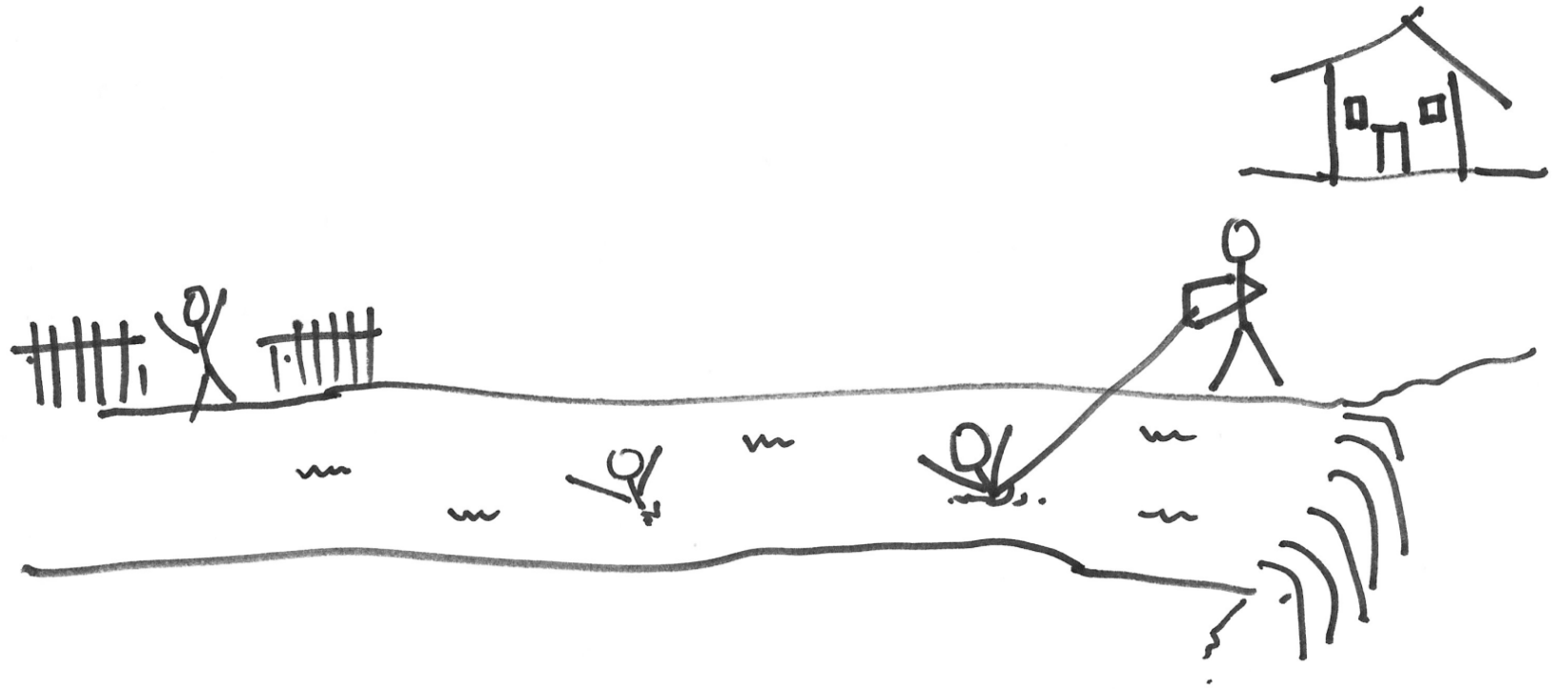
Globally, 1 in 3 urban dwellers—a billion people—live in slums

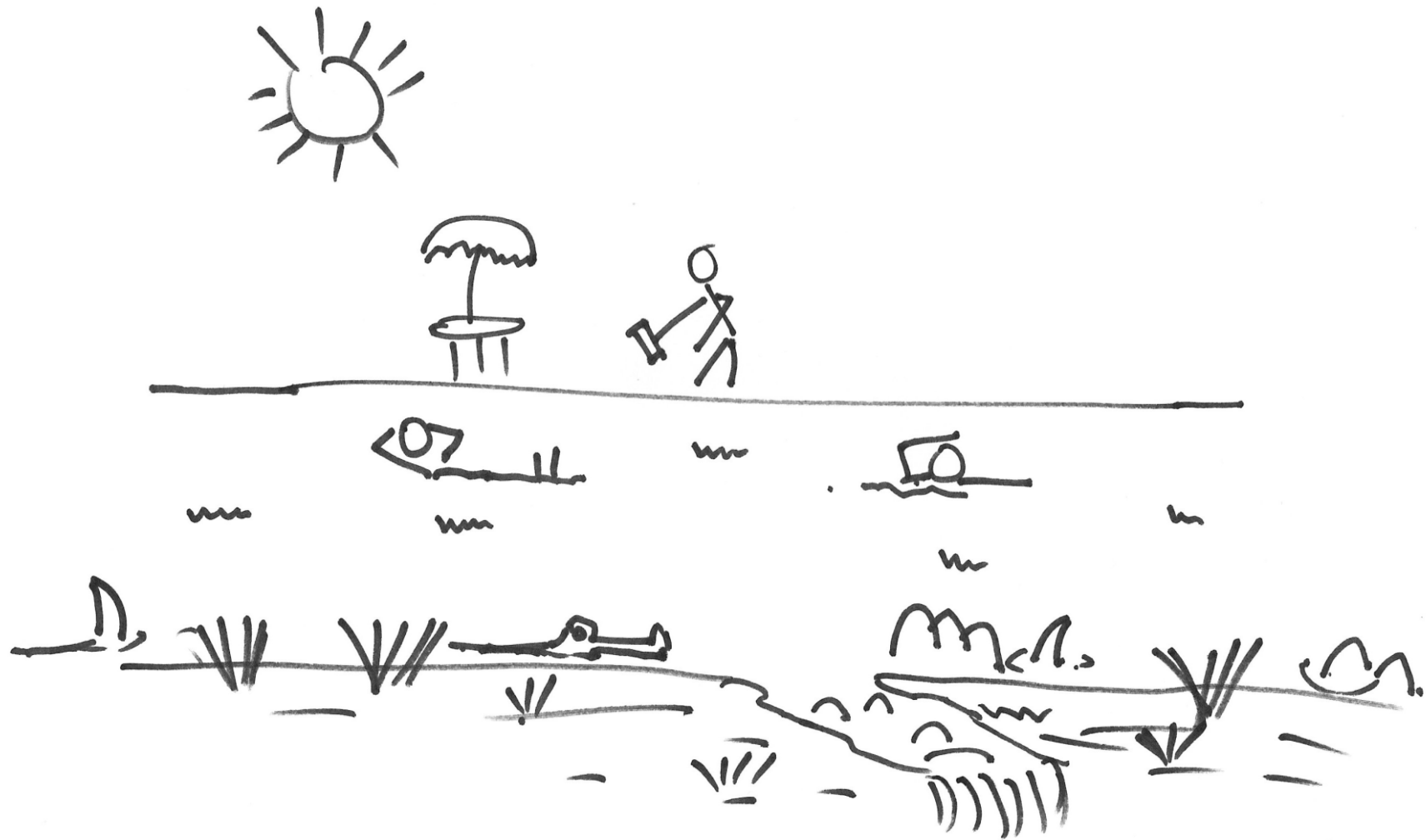


$\frac{1}{3}$ of Asia's and $\frac{2}{3}$ of Africa's urban dwellers live in slums



Many slum dwellers fall between cracks, lacking rights, voice and services





Jimmy Reid 1971



Trade Union leader

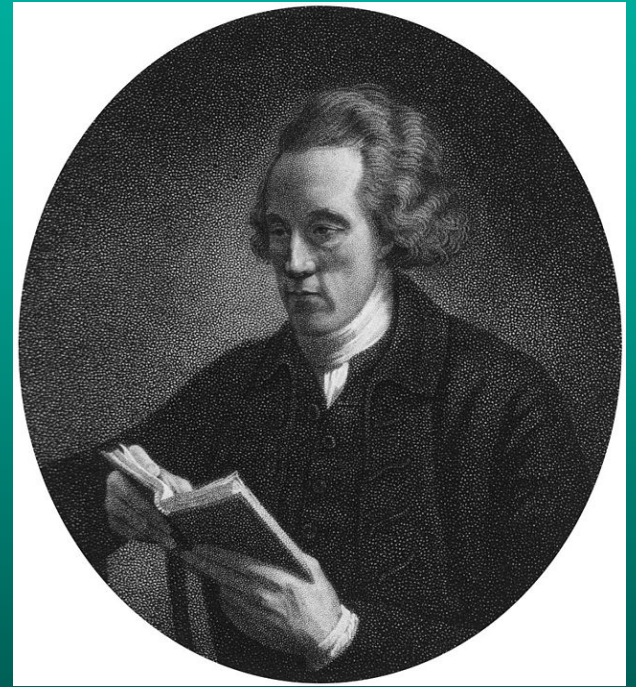
**Elected by students as Rector of Glasgow
University**

Rectorial Address

- “Let me right at the outset define what I mean by alienation. It is the cry of men who feel themselves the victims of blind economic forces beyond their control. It's the frustration of ordinary people excluded from the processes of decision making. The feeling of despair and hopelessness that pervades people who feel with justification that they have no real say in shaping or determining their own destinies....”

Joseph Townsend 1739-1816

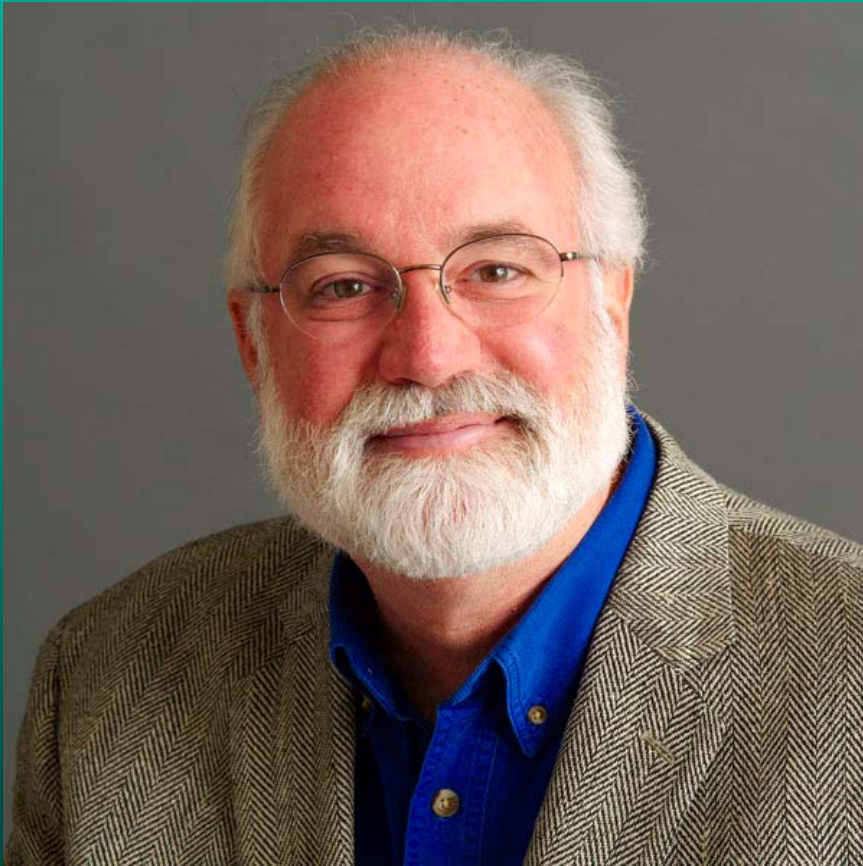
- u “Hunger will tame the fiercest animals. “It will teach decency and civility, obedience and subjection ... it is only hunger which can spur and goad the poor on to labour.”





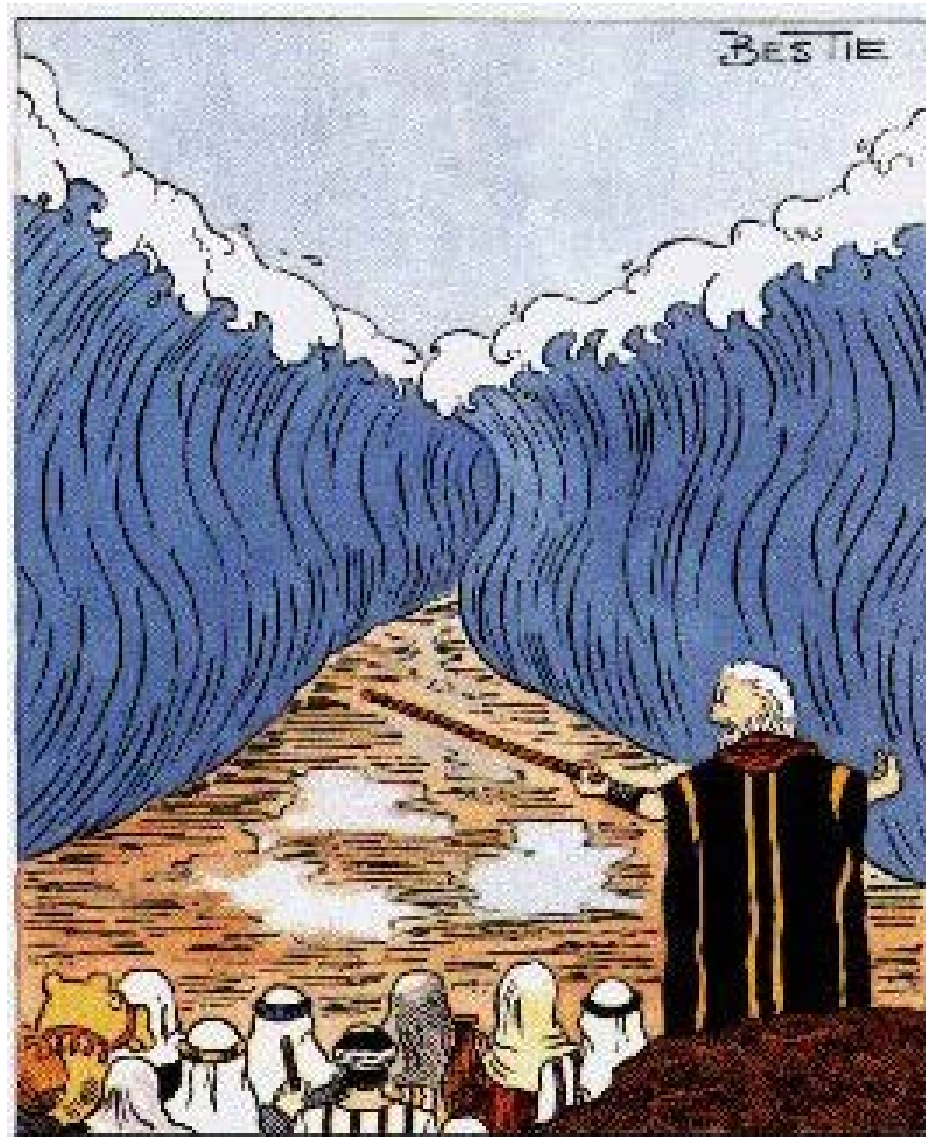


Fr Greg Boyle – Homeboy Industries



“Here is what we seek: a compassion that can stand in awe at the burdens the poor have to carry rather than one that stands in judgment at how they carry them.”

— Gregory Boyle



What do you mean, “it’s a bit muddy”?

