

# The Global Burden of Disease Study 2010: What does this tell us about oral health inequality?

10<sup>th</sup> IADR WORLD CONGRESS ON PREVENTIVE DENTISTRY  
AS A JOINT MEETING WITH THE  
6<sup>th</sup> HUNGARIAN PREVENTIVE DENTAL CONFERENCE  
OCTOBER 9-12, 2013  
BUDAPEST, HUNGARY

**Professor Wagner Marcenes**  
Queen Mary University of London



Barts and The London  
School of Medicine and Dentistry

[w.marcenes@qmul.ac.uk](mailto:w.marcenes@qmul.ac.uk)

[www.smd.qmul.ac.uk](http://www.smd.qmul.ac.uk)

# **Global Burden of Disease (GBD) 2010 Study**

## **Aim:**

**To produce a worldwide comprehensive and comparable assessment of the magnitude of 291 diseases and injuries and their associated 1160 sequelae in 1990, 2005 and 2010.**



# Global Burden of Disease 2010 Study

- Prevalence/incidence
- Disability weights
- Years of Life Lost (YLL)
- Years Lived with Disabilities (YLDs)  
(YLDs=prevalence x disability weight)
- Disability-Adjusted Life Years (DALYs)  
(DALYs=YLLs + YLDs)



# GBD 2010 Study: Prevalence

**Oral conditions collectively  
affected 3.9 billion people.**



# Global prevalence of oral conditions:

	Rank	N (in thousands)	%
Untreated caries permanent dentition	1	2431636	35.29
Severe periodontitis	6	743187	10.79
Untreated caries of deciduous teeth	10	621507	9.02
Severe tooth loss	36	158284	2.3

**Oral conditions collectively affected 3.9 billion people**



# GBD 2010 Study: Disability weights for oral health conditions.

Oral condition	Disability weights
Severe periodontitis	0.0079
Untreated dental caries	0.012
Severe tooth loss	0.073



# GBD 2010 Study: Disability weights for oral health conditions.

The disability weight associated with severe tooth loss was between those reported for moderate heart failure and moderate consequences of stroke.

- Moderate heart failure (0.068)
- **Severe tooth loss (0.073)**
- Moderate consequences of stroke (0.074)

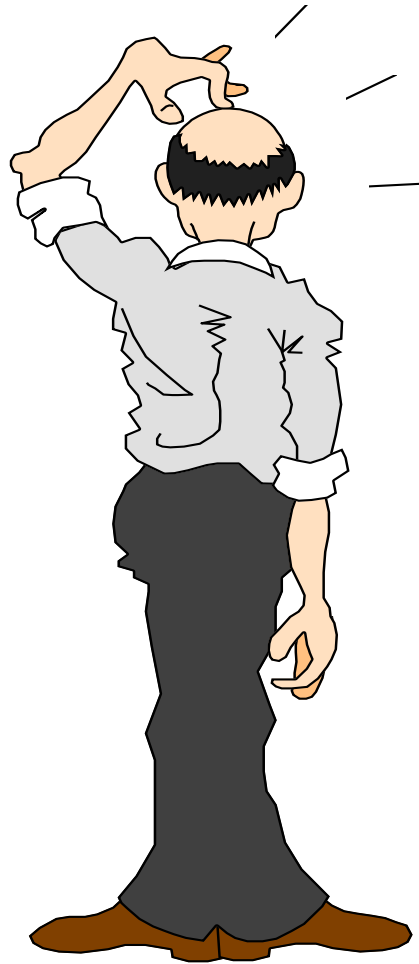


# **GBD 2010 Study: Years Lived with Disabilities and Disability- Adjusted Life Years (DALYs=YLDs)**

- Oral conditions accounted for an average health loss of 224 years per 100,000 people.**
- Oral conditions combined accounted for 15 million DALYs globally.**



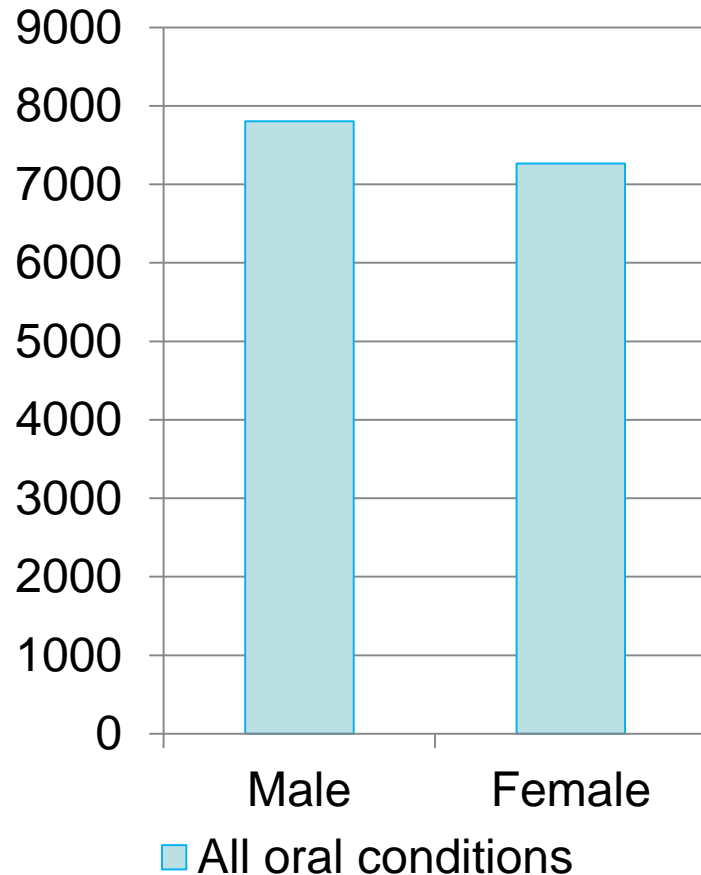




# GBD 2010 Study: What does this tell us about oral health inequality?



# Global Oral DALYs, in thousands by gender

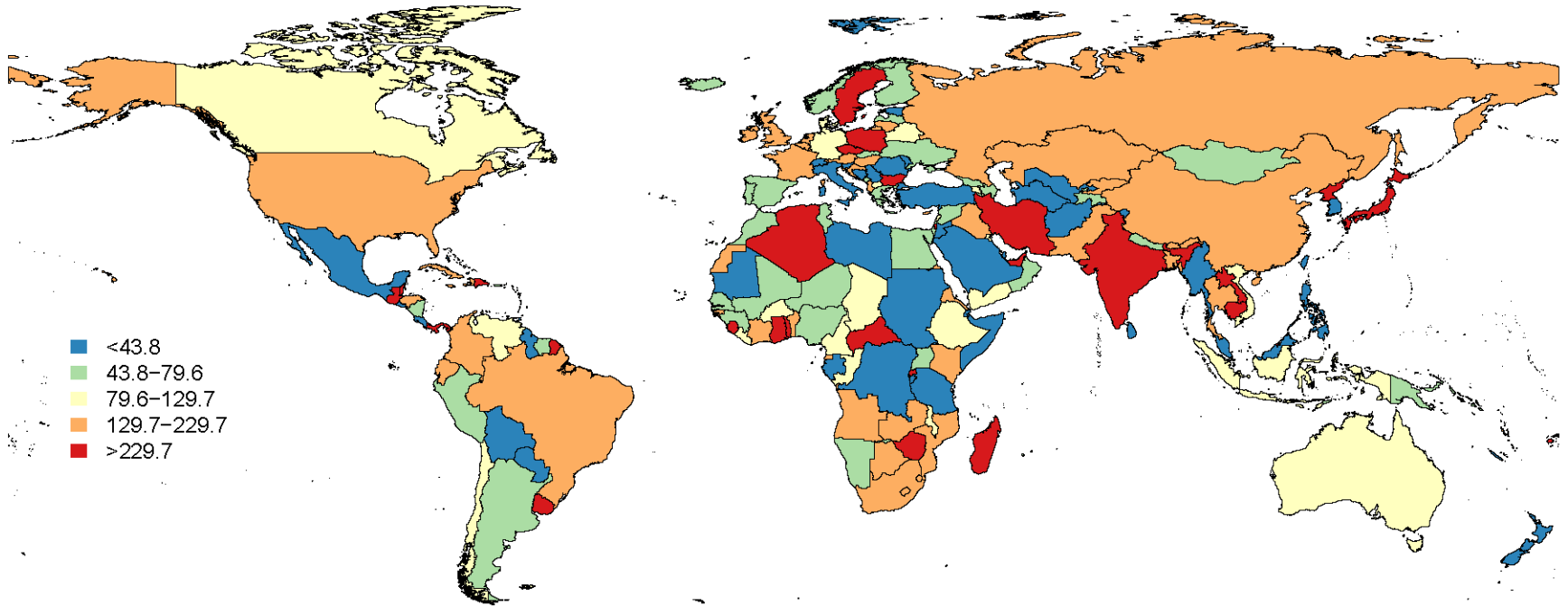


	DALYs in thousands
Male	7805
Female	7265

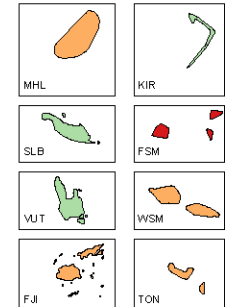
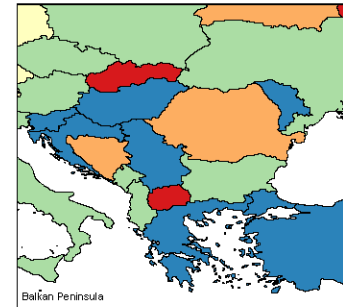
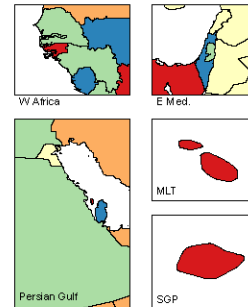
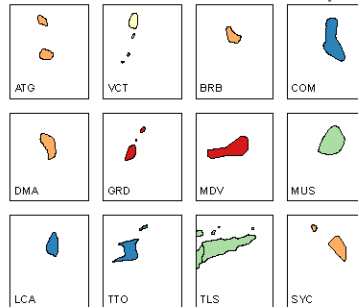
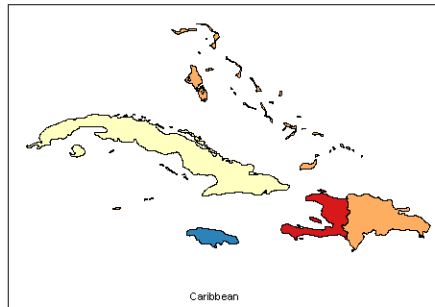
The difference in DALYs between women and men was not statistically significant .



# Edentulism and severe tooth loss DALYs per 1000 population Both sexes, 2010, All ages combined by burden quintile



- <43.8
- 43.8-79.6
- 79.6-129.7
- 129.7-229.7
- >229.7



**GBD 2010 Study: DALYs per thousand quintiles associated with tooth loss - both sexes and all ages combined - by indicators of socio-economic inequalities for two Caribbean countries sharing the same island, Haiti and Dominican Republic.**

<b>Country</b>	<b>Poverty ratio (%)*</b>	<b>GINI Coefficient**</b>	<b>DALYs per 1,000 pop.</b>
<b>Haiti</b>	<b>78%</b>	<b>0.59</b>	<b>&gt;229.7 (5th quintile)</b>
<b>Dominican Republic</b>	<b>40%</b>	<b>0.47</b>	<b>&gt;129.7-229.7 (4<sup>th</sup> quintile)</b>

**(\*) Per cent of the population living below the poverty line**

**(\*\*) Ratio of the area that lies below the line of equality and Lorenz curve over the total area under the line of equality.**

[w.marceses@qmul.ac.uk](mailto:w.marceses@qmul.ac.uk)

[www.smd.qmul.ac.uk](http://www.smd.qmul.ac.uk)

## GBD 2010 Study: DALYs per thousand quintiles associated with tooth loss - both sexes and all ages combined - by indicators of socio-economic inequalities for the USA and Cuba.

Country	GNP*	GINI Coefficient**	DALYs per 1,000 pop.
USA	\$15.685 trillion	0.47	>79.6-229.7 (3 <sup>rd</sup> Quintile)
Cuba	\$72.3 billion	0.41	>79.6-229.7 (3 <sup>rd</sup> Quintile)

(\*) Gross National Product

(\*\*) Ratio of the area that lies below the line of equality and Lorenz curve over the total area under the line of equality.

[w.marcenes@qmul.ac.uk](mailto:w.marcenes@qmul.ac.uk)

[www.smd.qmul.ac.uk](http://www.smd.qmul.ac.uk)



Barts and The London  
School of Medicine and Dentistry

## GBD 2010 Study: DALYs per thousand quintiles associated with tooth loss - both sexes and all ages combined - by indicators of socio-economic inequalities for Costa Rica.

Country	GNP*	Poverty ratio**	DALYs per 1,000 pop.
Costa Rica***	\$58.6 billion	21.3%	< 43.8 (1 <sup>st</sup> Quintile)

(\*) Gross National Product

(\*\*) Per cent of the population living below the poverty line

(\*\*\*) In 1948 Costa Rica abolished military and dedicated its budget to Education and Culture.

[w.marceses@qmul.ac.uk](mailto:w.marceses@qmul.ac.uk)

[www.smd.qmul.ac.uk](http://www.smd.qmul.ac.uk)



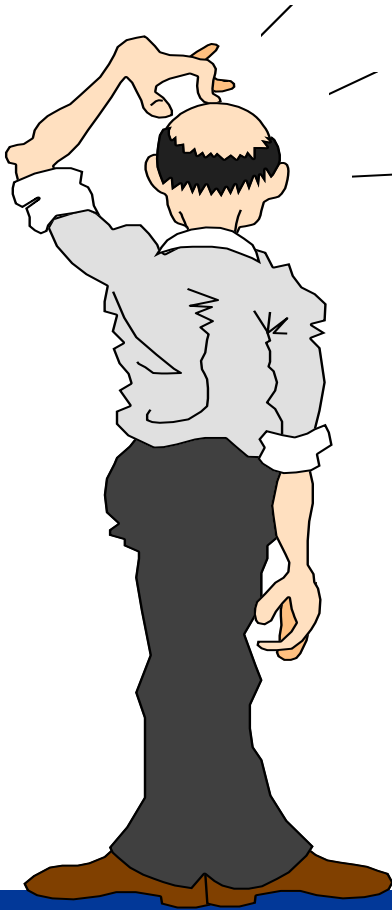
Barts and The London  
School of Medicine and Dentistry

**The emerging field of research into health inequality has given rise to many questions and debates about the definition of concepts, analytical strategies, interpretation of findings, explanatory models, health strategies and policies.**





# Definition of concepts: Oral health Inequality or Inequity?



- Inequality and equality are dimensional concepts, simply referring to measurable quantities.
- Inequity and equity, by contrast, are political concepts, expressing a moral commitment to social justice.



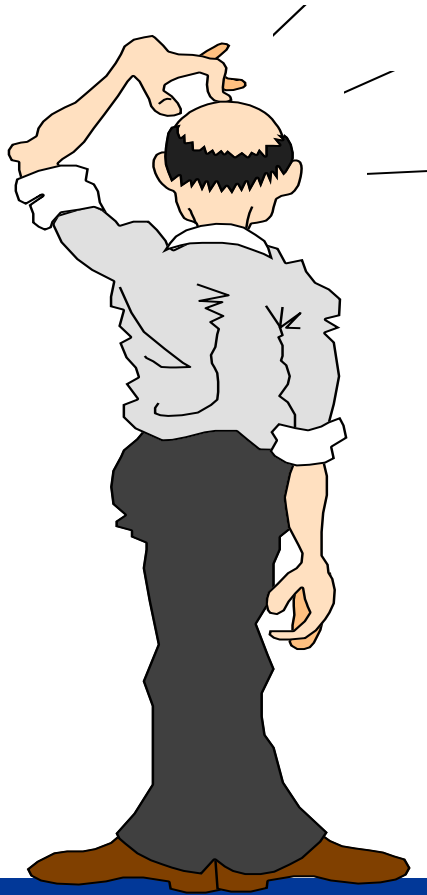


# **Social Injustice (Inequity) in Oral Health exists**

**Oral diseases can be prevented and treated. Poor oral health states are more prevalent among less valued groups. This uneven distribution due social determinants of oral health are unnecessary and avoidable as well as unjust and unfair, so the resulting oral health inequalities also lead to inequity in oral health.**



# Definition of concepts: Equality of Opportunity or Equality of Outcome?



## Equality of Opportunity:

The effects of individual choices and the open processes of a free society are not distributed according to a recognizable principle of justice.

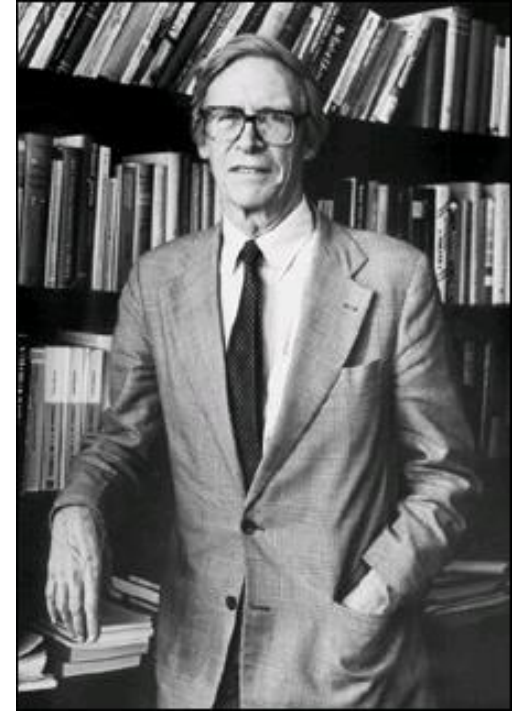


# Social Justice



**Thomas Aquinas**  
**1225-1274**

The term 'social justice' implies fairness and mutual obligation in society: that we are responsible for one another.



**John Rawls**  
**1869-1945**



# Analytical strategies and explanatory models: Randomised Controlled Trials or Non-randomised study designs?

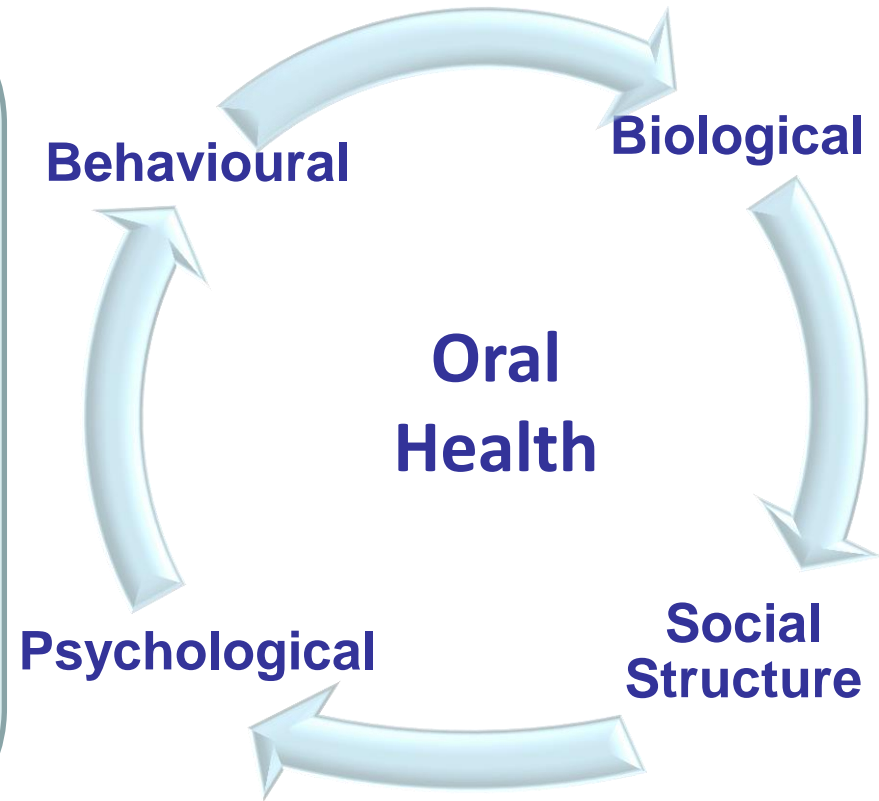


**RCTs provides the best evidence based for adopting a medical intervention, but may obscure the effect of social conditions, unless a very cost and complex cluster trial design is adopted.**



# Analytical strategies and explanatory models:

**Oral health inequity results from a complex interplay between social, psychological, behavioural, and biological processes.**



# **Social conditions: the fundamental cause of health inequalities (Link & Phelan 1995)**

- **Influences multiple outcomes, including oral health.**
- **Affects disease outcomes through multiple factors.**
- **Involves access to resources to avoid risk, and minimise consequences of diseases.**
- **Reproduces over time, because higher socio-economic groups are better equipped to benefit from new knowledge.**

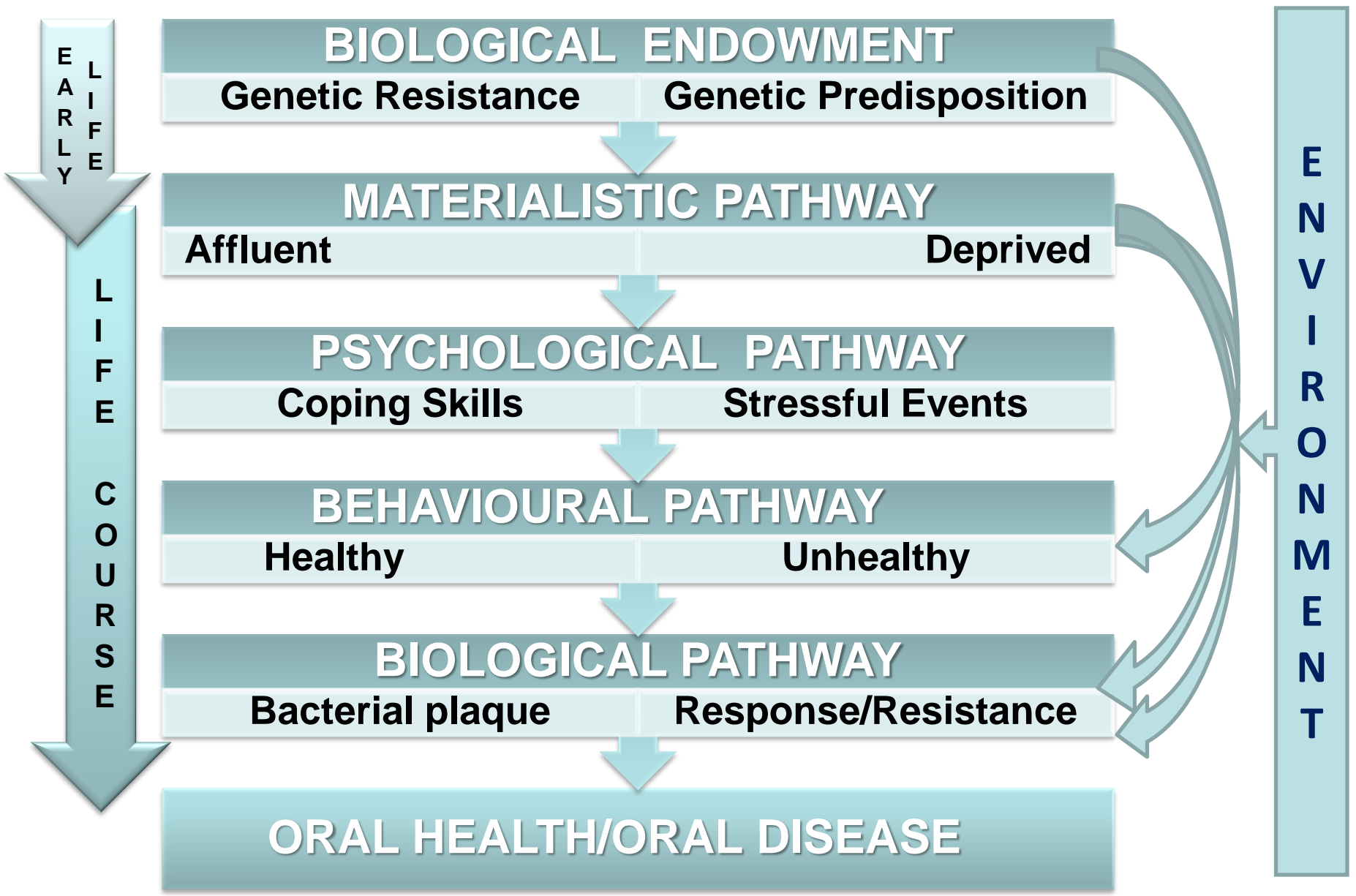




# Analytical strategies and explanatory models:

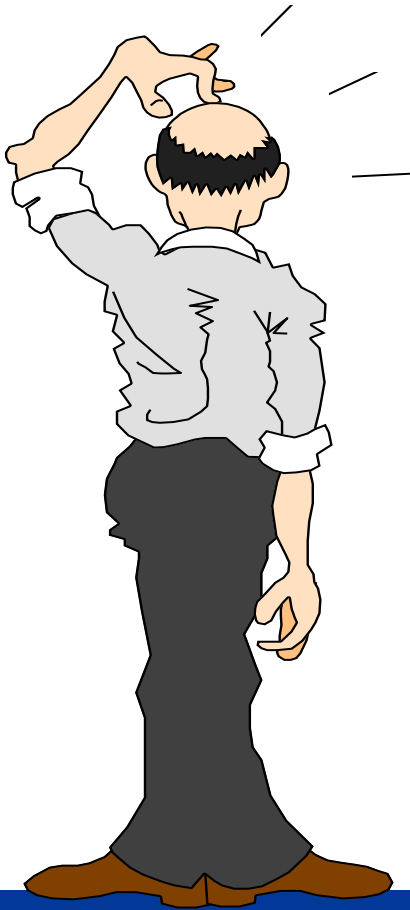
Data analysis should be based on hierarchical modeling and complex theoretical frameworks. The life course theory should provide the framework to researchers to study the interaction between nature and nurture. Social conditions, the fundamental cause of oral diseases should be treated as the most distal determinant of oral health as advantage or disadvantage accumulates at all levels and over the life course. Socio-psychological factors should be included as effect modifiers either as mediator or moderators of health related behaviour and biological processes.







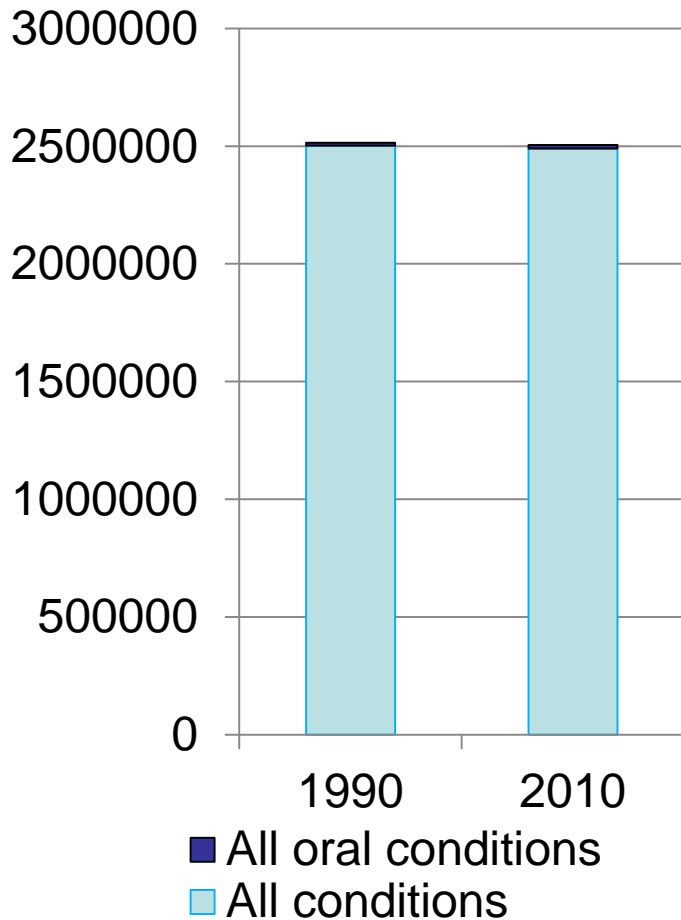
# Health strategies and policies: Improve oral health or reduce oral health inequality?



**Improving Oral Health  
does not mean reducing  
Oral Health Inequality.**



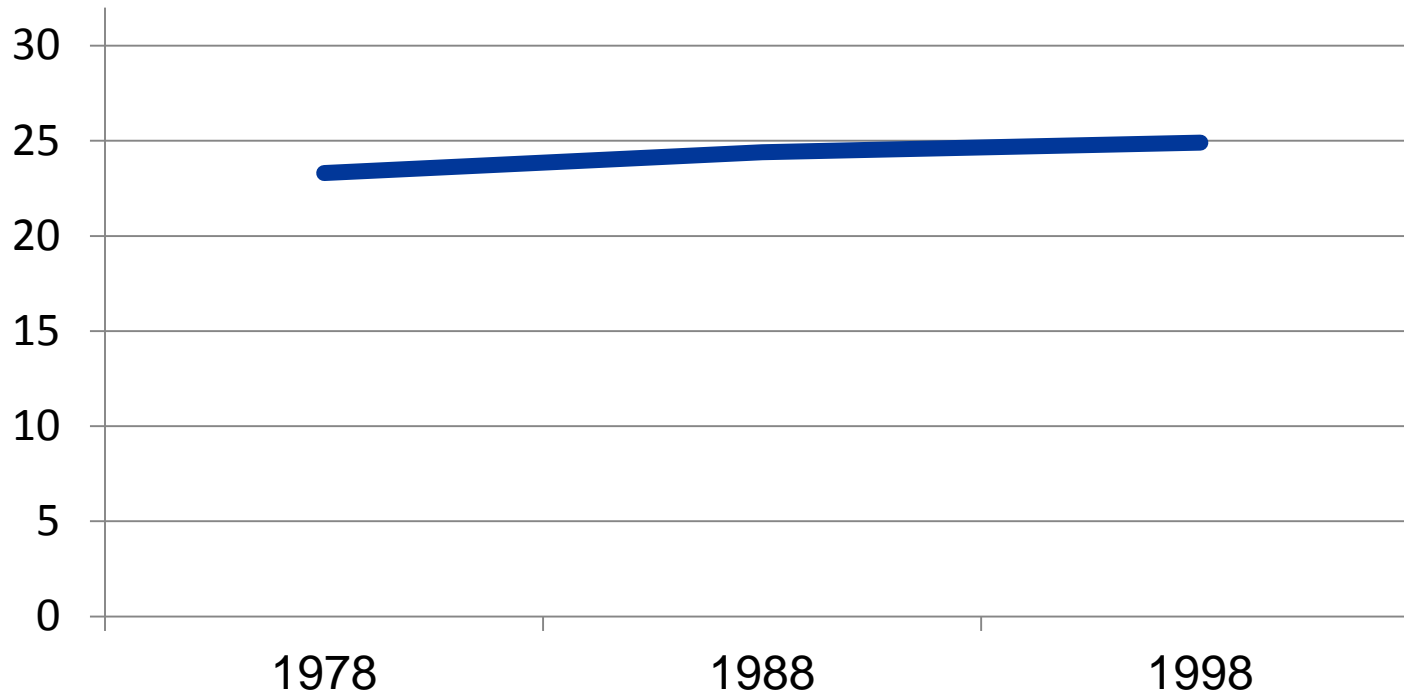
# Changes in Global DALYs in thousands between 1990 and 2010



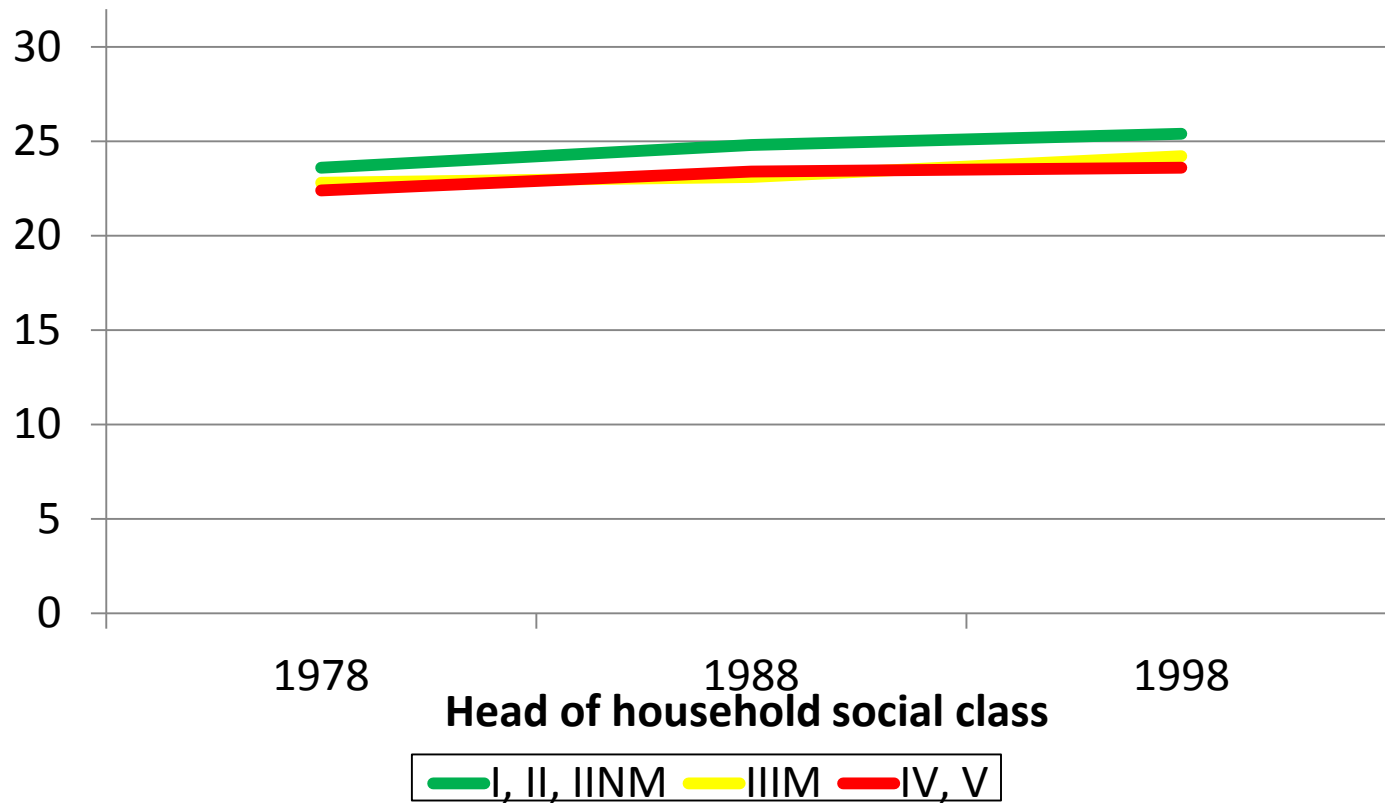
Condition	% differences 1990-2010	
	DALYs in thousands	DALYs per capita
All conditions	-0.5	-23
All oral conditions	20.8	-7.6



# Trends in number of teeth in adults in the UK.



# Trends in number of teeth in adults in the UK by Registrar General's Social Classes (RGSC)



# GBD 2010 study: What does this tell us about oral health inequality?

- The global burden of oral conditions is substantial and oral health is a significant public health challenge.
- Social Injustice (Inequity) in oral health exists at global, national and community level.
- The global burden of oral conditions (DALYs per capita) reduced from 1990 to 2010, but oral health inequalities seems to remain at the same level.
- A fair and well organised primary health care system based on the concept of social justice may successfully reduce oral health inequalities.

[w.marceses@qmul.ac.uk](mailto:w.marceses@qmul.ac.uk)

[www.smd.qmul.ac.uk](http://www.smd.qmul.ac.uk)



Barts and The London  
School of Medicine and Dentistry