

Measuring Health

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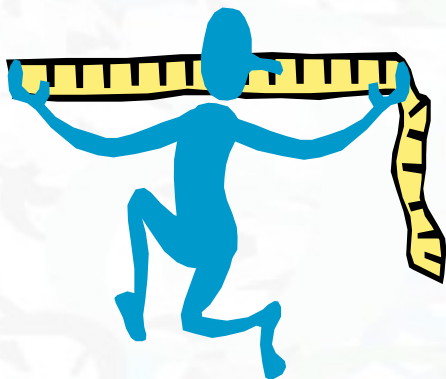
Measuring health

- Whose health?
- Why measuring it?
- How to do it correctly?

Whose health?

- Single Subject
- Groups of Subjects
- Populations

The individual



Health Outcomes
(Examples in Diabetes)

Surrogate Outcomes
Nerve Conduction Velocity

Intermediate Outcomes
Quality of Life
Glycated Haemoglobin

Long Term Outcomes
Retinopathy,
Foot Amputation

Terminal Outcomes
End Stage Renal Failure
Death

Patient Reported Outcome Measures (PROMs)

- Capture aspects of health that are of most concern to individuals
 - Describe or assess aspects of health (e.g. symptoms)
 - Physical, psychological and social impact of health problems
- At least N=1,275 instruments in English (Garrett et al, 2002)
- Generic Instruments: SF-36 (physical functioning, physical problems, emotional problems, social functioning, mental health, energy, pain, health perceptions); SF-12; EQ-5D; SIP...
- Disease-specific: Arthritis, Parkinson,

PROMs evaluation criteria

- Reliability (consistency, reproducibility)
- Validity (context)
- Responsiveness (changes over time)
- Precision (scoring)
- Interpretability (meaning)
- Acceptability (completeness)
- Feasibility (cost)

Monitoring groups: disease registers

Grant et al, Diabetes Care 27:2299–2305, 2004

Population Manager Application: Registry Page

Address: [rtby=DBP&top:so:thead=top:dbp&top:shownull=NO&top:nulldef=MISSOLDVAL&top:otherdef=EYE_EXAM&top:pcp=all&top:focus_pcp=GESMUNDO,%20JOSEPH&bottom:showall=](#)

Flagged Patients Hide nulls Show patients of GESMUNDO, JOSEPH

SUMMARY STATS OF PATIENT PANEL # patients = 50

min hba1c 5.5	max hba1c 11	avg hba1c 7.09
min ldl 69	max ldl 144	avg ldl 108
min sbp 90	max sbp 172	avg sbp 129
min dbp 1	max dbp 102	avg dbp 70

Panel summary

Patient Name	Unit #	PCP	DBP	LDL	Hb1AC	Eye Exam	Visit	Adh
BA	36	GESMUNDO, JOSEPH	142/102 153d	-- --d	--% --d	--d	60d	No
FR	24	GESMUNDO, JOSEPH	130/98 34d	113 367d	5.69% 33d	303d	24d	Yes
GE	36	GESMUNDO, JOSEPH	126/92 93d	-- --d	--% --d	307d	44d	No
JC	36	GESMUNDO, JOSEPH	120/92 139d	-- --d	--% --d	--d	5d	No
AF	26	GESMUNDO, JOSEPH	130/90 237d	-- --d	--% --d	--d	130d	Yes
PH	06	GESMUNDO, JOSEPH	130/90 150d	-- --d	--% --d	--d	60d	No
MA	36	GESMUNDO, JOSEPH	140/88 40d	-- --d	--% --d	--d	40d	No
FR	15	GESMUNDO, JOSEPH	148/86 177d	-- --d	--% --d	275d	--d	No
AE	36	GESMUNDO, JOSEPH	136/82 33d	-- --d	--% --d	--d	3d	No
DS	37	GESMUNDO, JOSEPH	130/82 128d	-- --d	--% --d	635d	128d	Yes

Previous 10 Next 10

Link to patient record

List sorted by parameter of interest

Followup Patients All headers

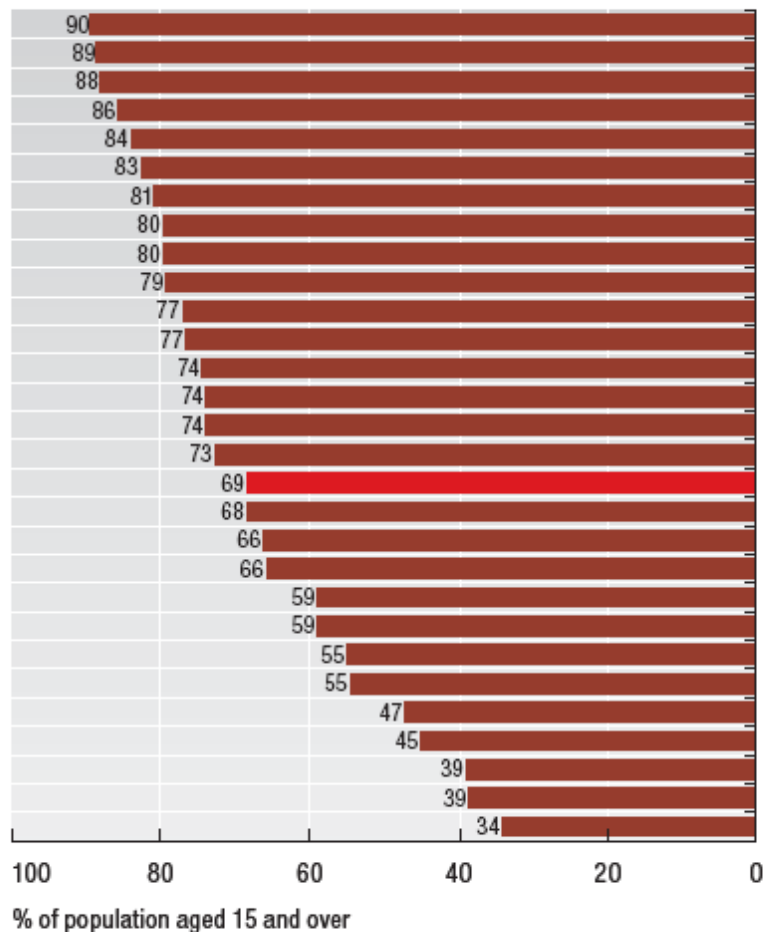
Patient Name	Unit #	PCP	Date Entered	Reminder Date	Priority	Comment
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Previous 10 Next 10

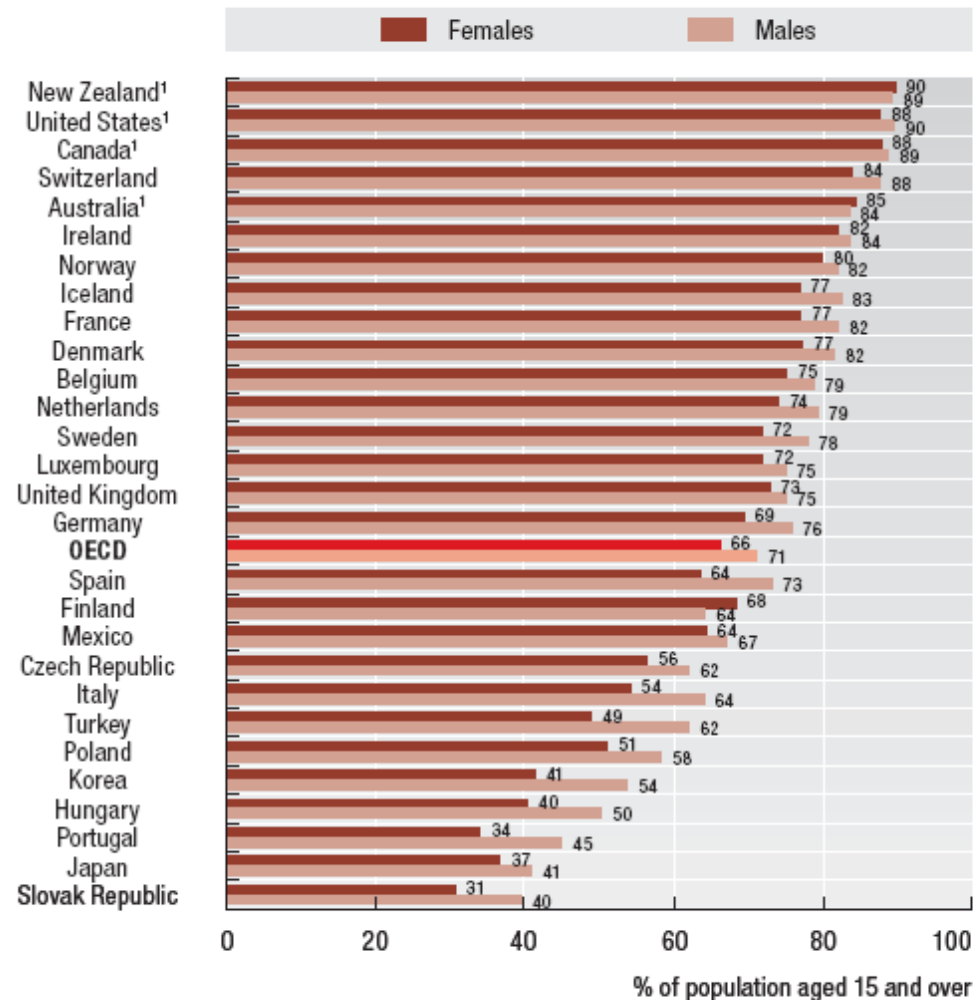
Local intranet

Measuring populations: OECD Perceived Health Status

2.11.1. Percentage of adults reporting to be in good health, females and males combined, 2005 (or latest year available)

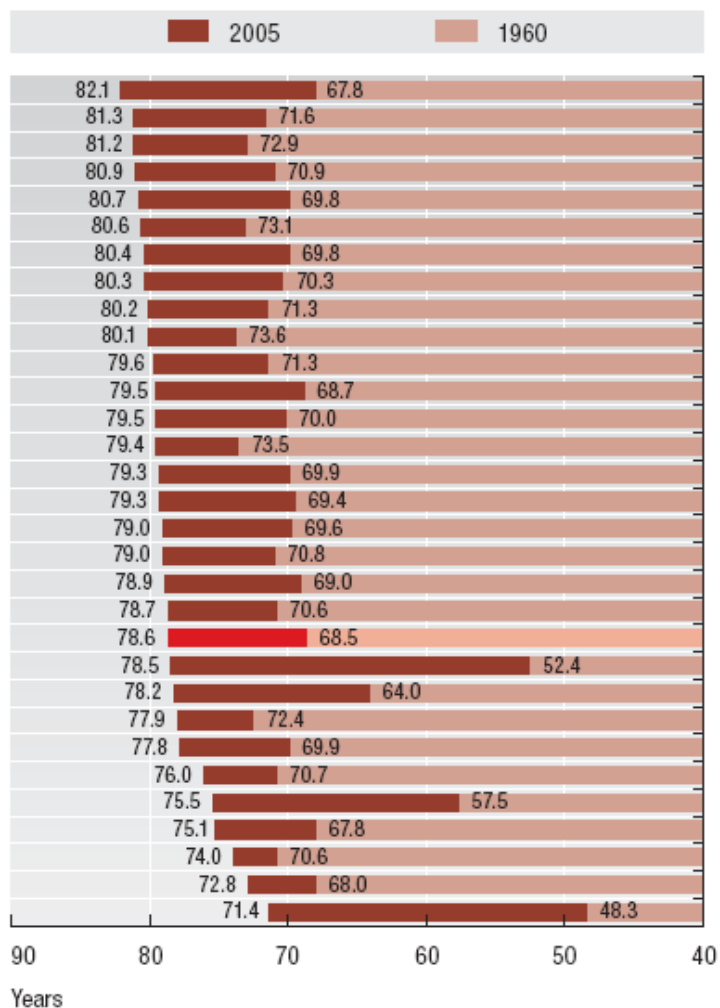


2.11.2. Gender differences in the percentage of adults reporting to be in good health, 2005 (or latest year available)

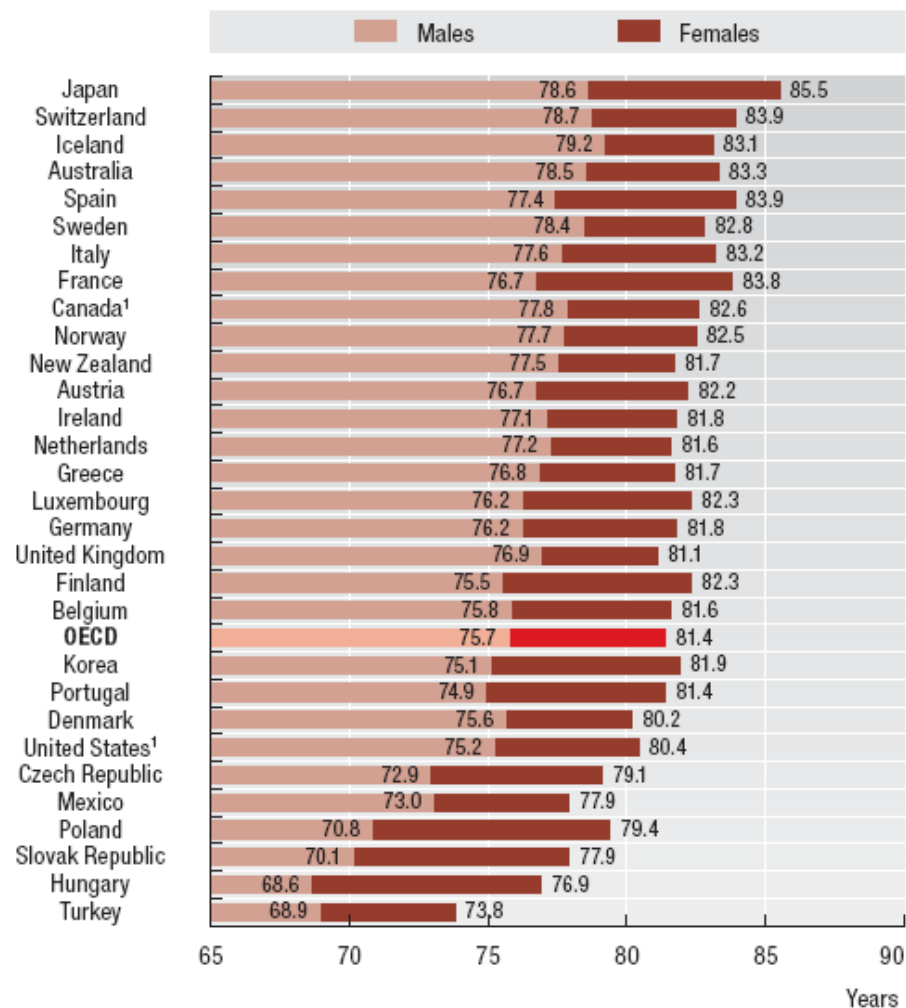


Measuring populations: OECD Life expectancy at birth

2.1.1. Life expectancy at birth, total population, 1960 and 2005



2.1.2. Life expectancy at birth, by gender, 2005



WHO World Health Survey

<http://www.who.int/healthinfo/survey>

Six core domains used to measure level of health
(based on the International Classification of
Functioning, Disability and Health - ICF)

- Cognition (understanding, communication)
- Mobility (moving around)
- Self-care (washing, toileting, eating)
- Affect (depression, anxiety)
- Pain (physical bodily pain)
- Usual activities (housework, work, school)

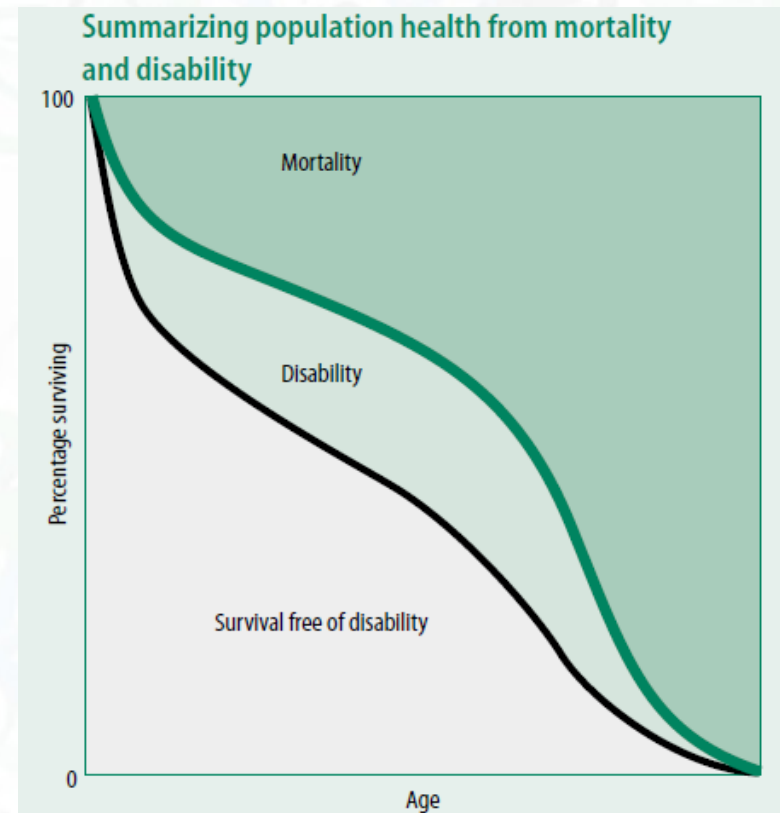
WHO systems approach (2000)



Disability-adjusted life expectancy (DALE): area for survival plus part of that for disability

DOMAIN SCALE
(measured or latent)

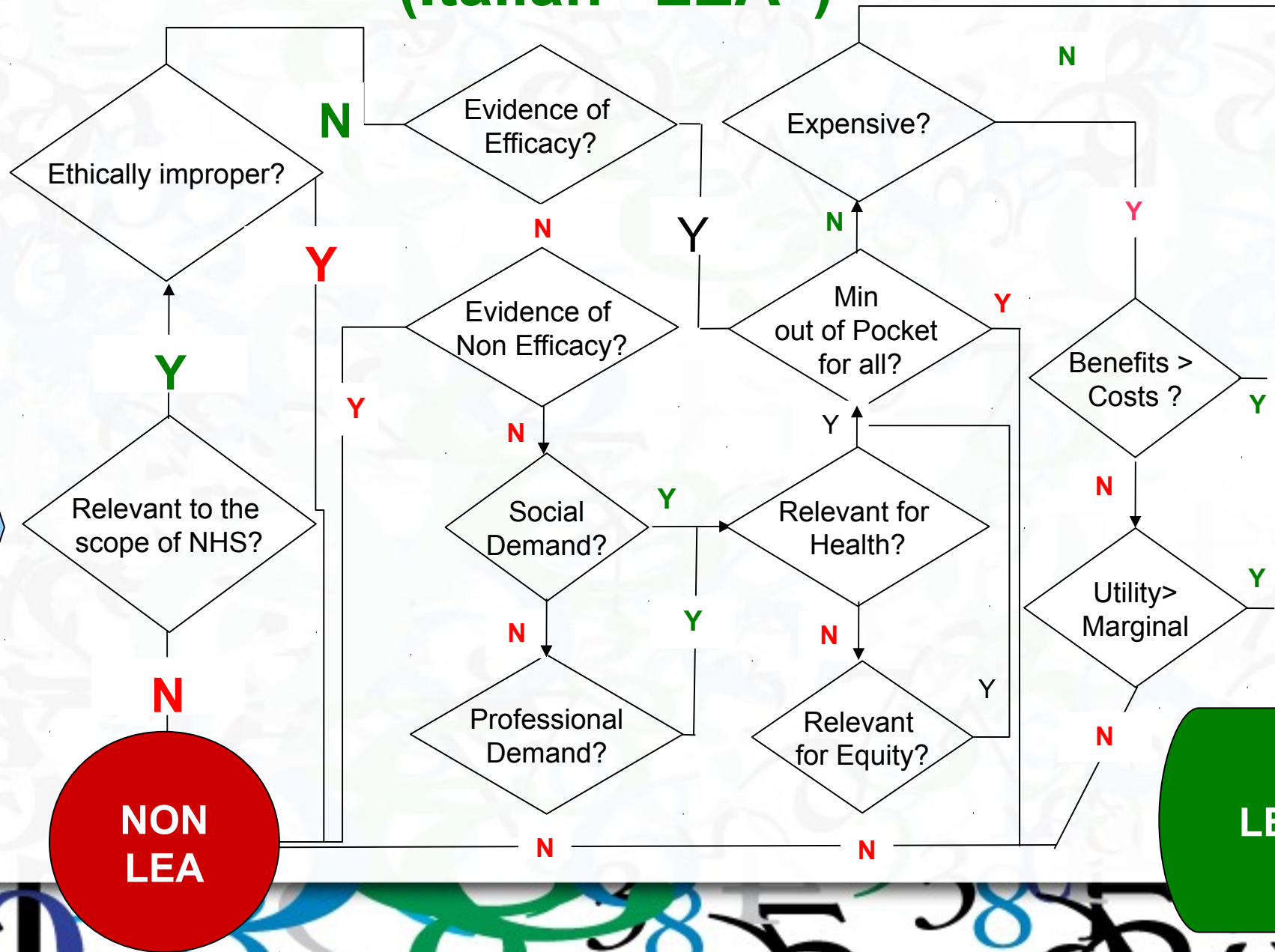
DALE estimated from: fraction of the population surviving to each age, prevalence of each type of disability at each age; and the weight assigned to each type of disability.



Why measuring health?

- Therapeutic Efficacy
- Clinical Effectiveness
- Health System Performance

Essential Level of Services (Italian "LEA")



Assess New Service

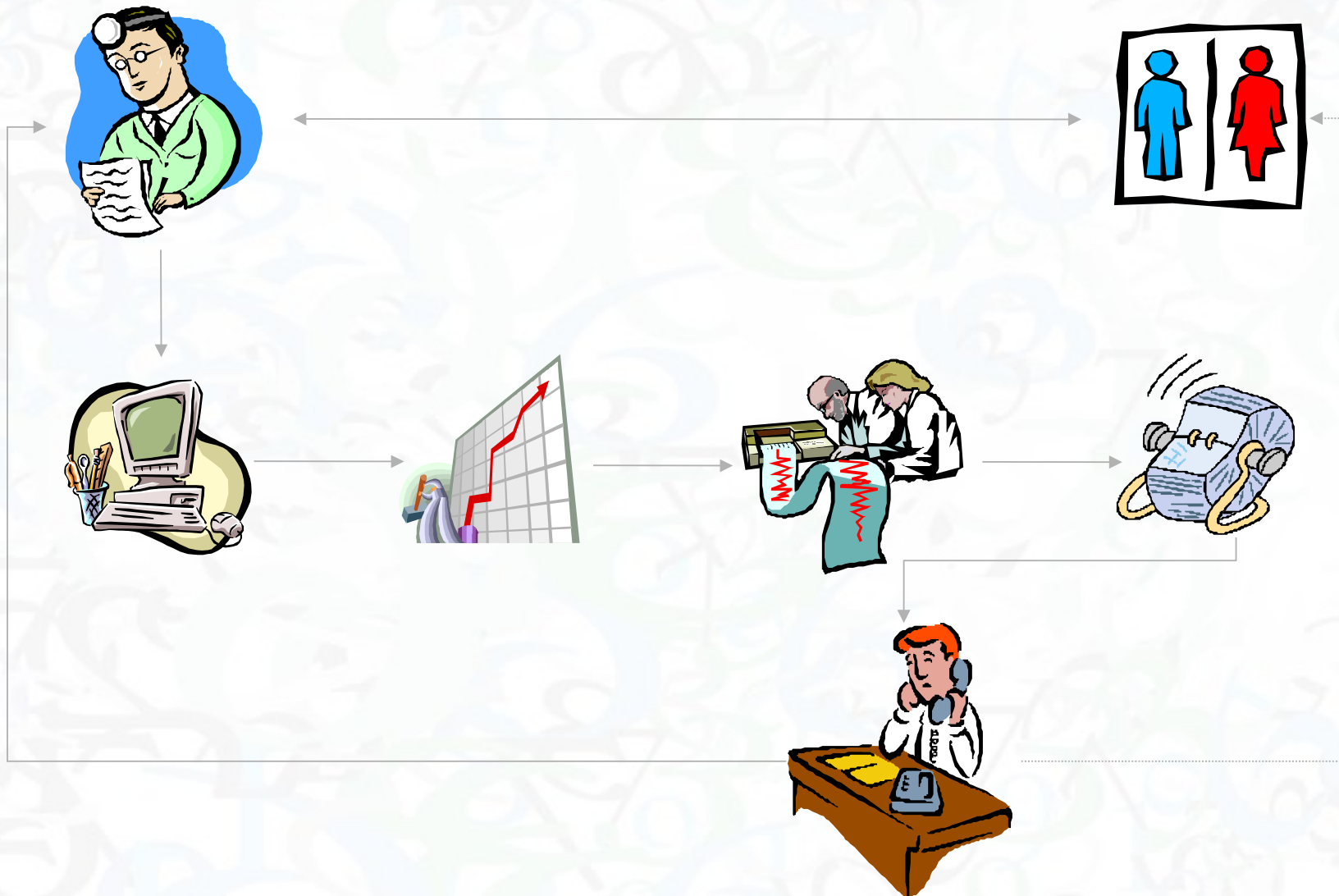
NON LEA

LEA

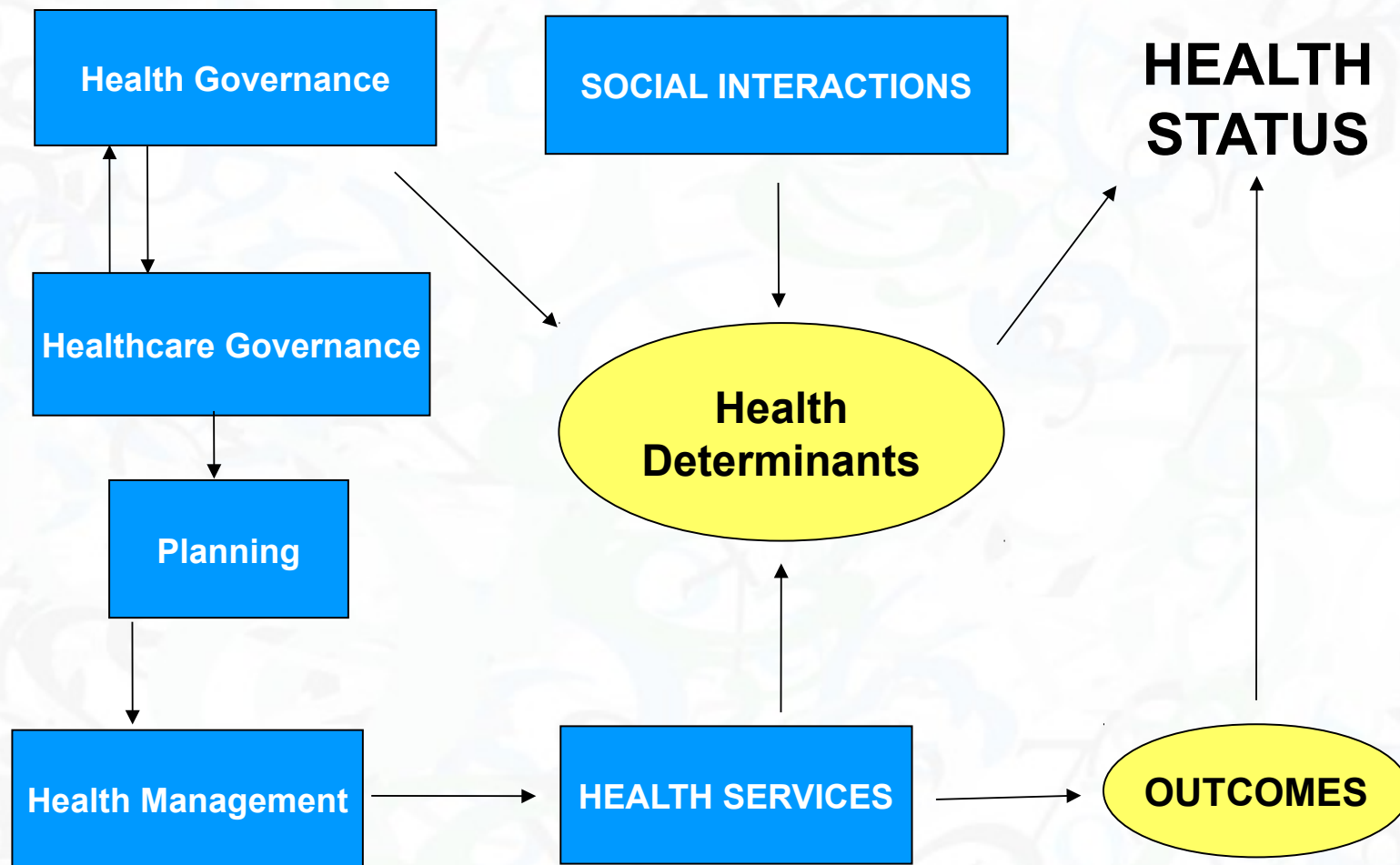
Using PROMs to evaluate health care

- The UK NHS is trialling PROMs in everyday practice
- EQ-5D + procedure-specific scores
- The scope is to evaluate the relative clinical quality of providers of elective procedures and benchmark performance, to help patients and GPs exercise choice, to evaluate efficiency and appropriateness
- PROMs calculate the health gain after surgical treatment using pre and post operative surveys.
- From 1 April 2009, all providers of NHS-funded care have been required to collect PROMs for four clinical areas: hip and knee replacements, hernia and varicose veins

Improving Disease Management



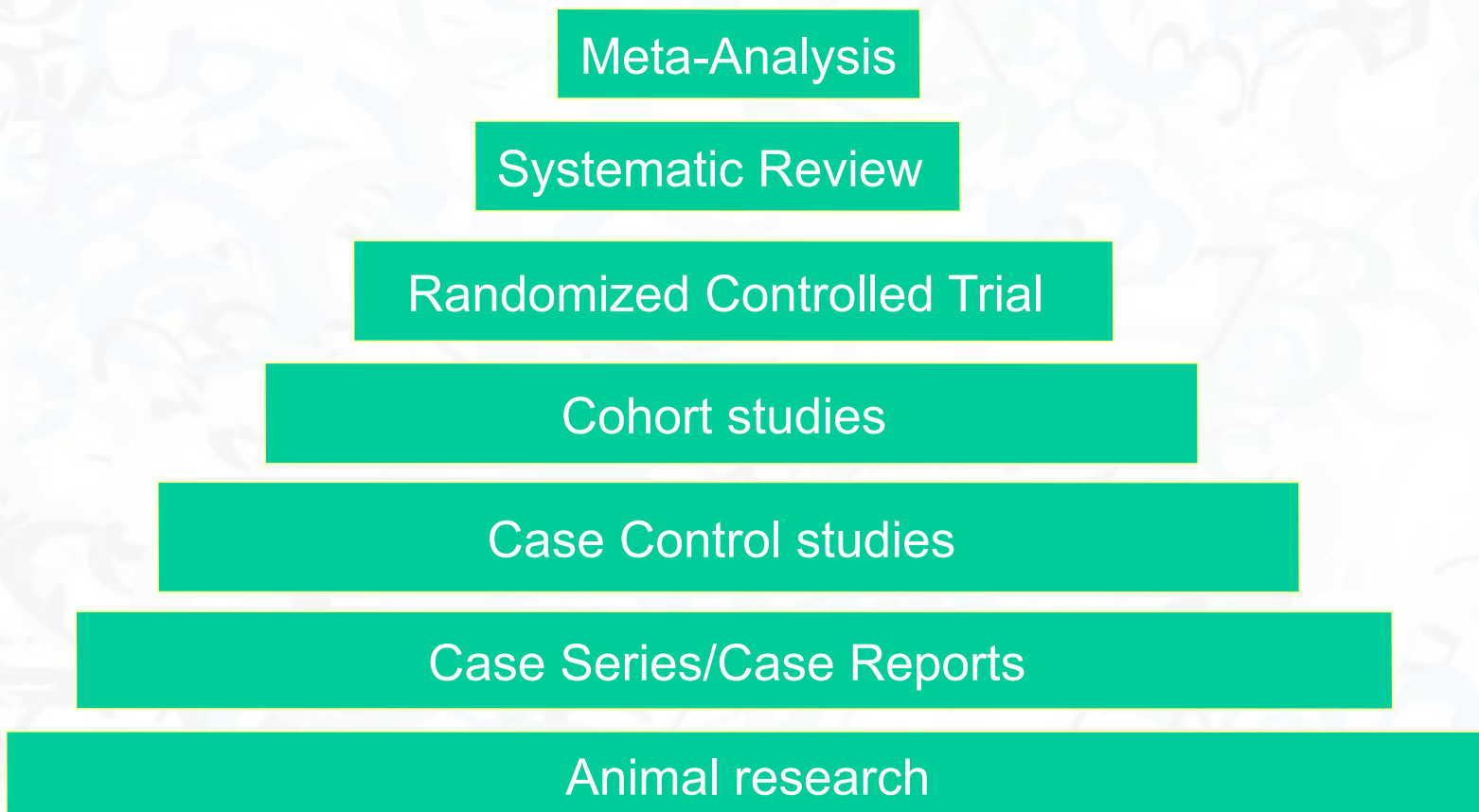
Modeling effects on health status to improve systems policy



Measuring Health: how?

- Level of evidence
- Risk adjustment
- Cluster correlation

The pyramid of evidence

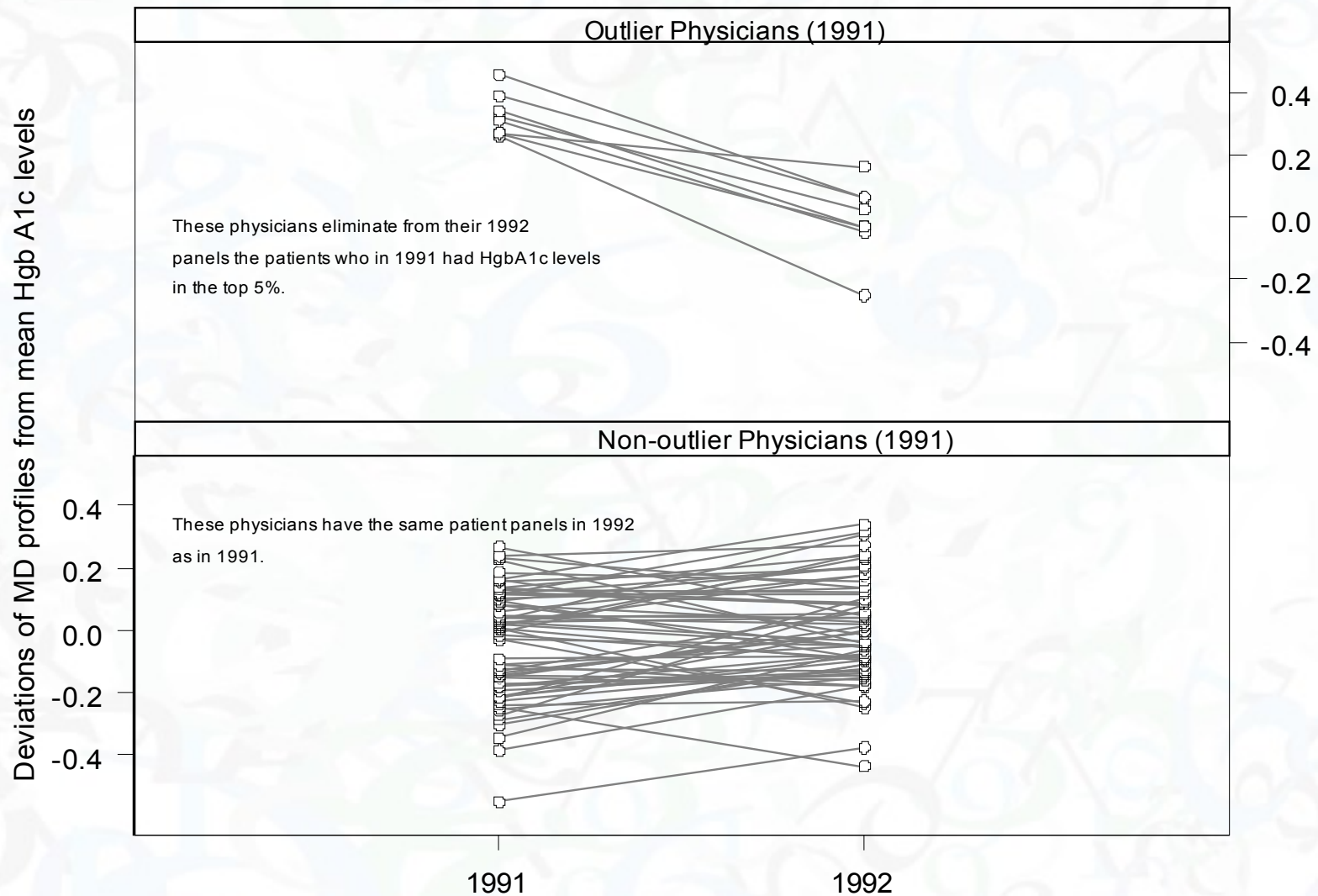


Intervention Trials

- assess the *efficacy* and *safety* of a new intervention
- compare alternative treatments
- evaluate the *effectiveness* and *efficiency* of service provision
- provide direct evidence that a suspected action alters disease

Problems of Clinical Report Cards

Hofer TP et al., The unreliability of individual physician "report cards" for assessing the costs and quality of care of a chronic disease, JAMA. 1999 Jun 9;281(22):2098-105



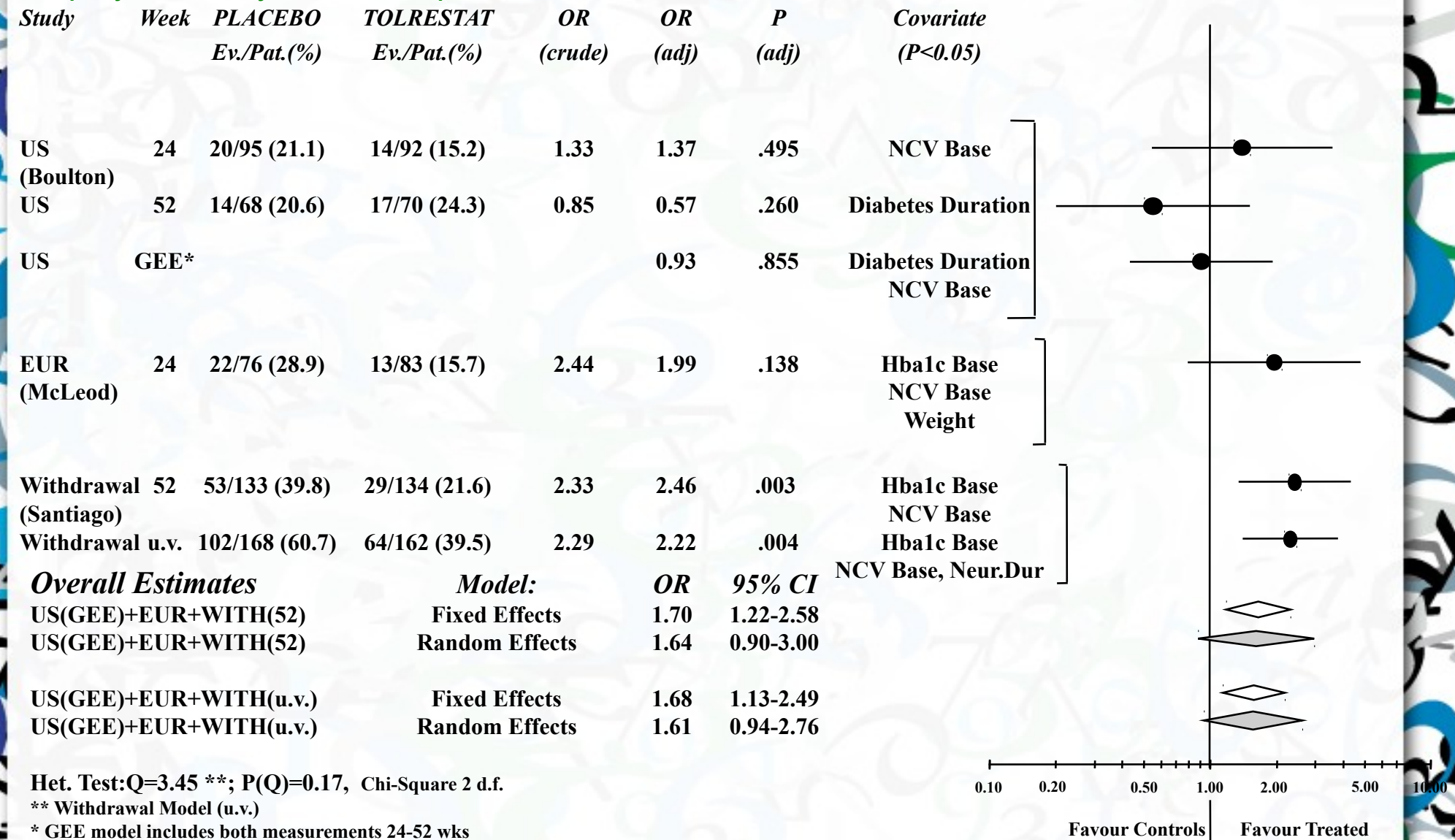
Testing Efficacy/Effectiveness

- The **type** of outcome used to measure change in health status is **key** to judge results in terms of efficacy/effectiveness
- Results must be **both** statistically significant **AND** clinically meaningful
- How does the benefit translate into quantifiable health improvements?
- **Transformations** of original measurements (particularly continuous ones) may help interpretation

Example: Aldose-Reductase Meta-Analysis

Individual Data – Endpoint: at least two motor nerves 2m/s reduction

Nicolucci A., Carinci F., Graepel J., Hohman T., Ferris R. and Lachin J.M., The efficacy of tolrestat in the treatment of diabetic peripheral neuropathy: a meta-analysis of individual patient data, *Diabetes Care*, 19, 10:1091-1096, 1996



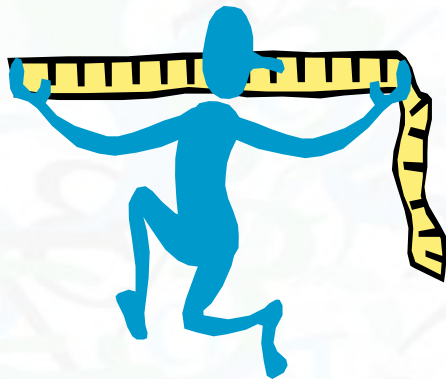
Measuring association and assessing causality

Individual

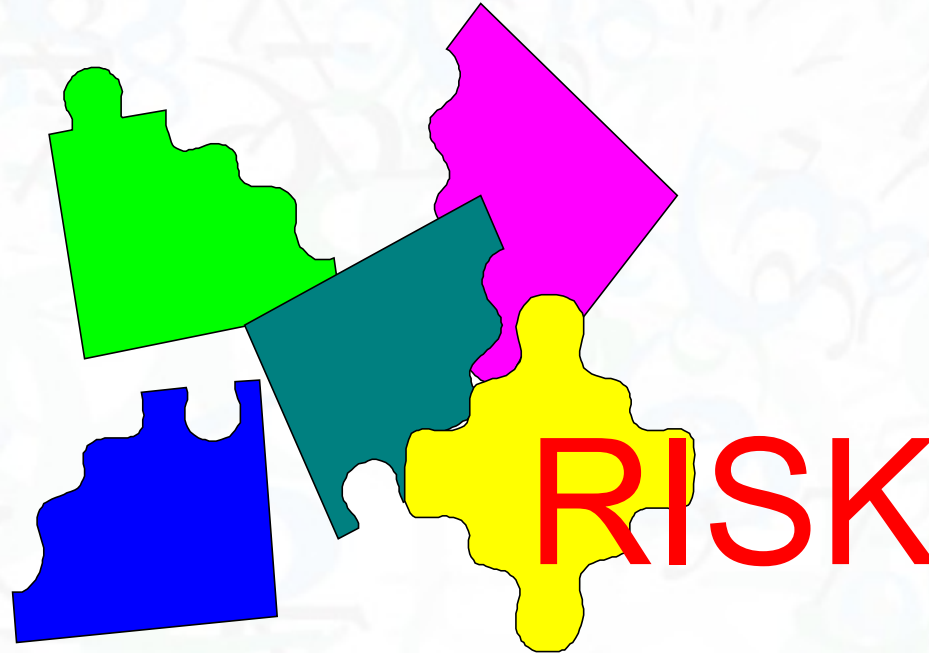
Society

Income

Education



Risk Modeling (Adjustment)

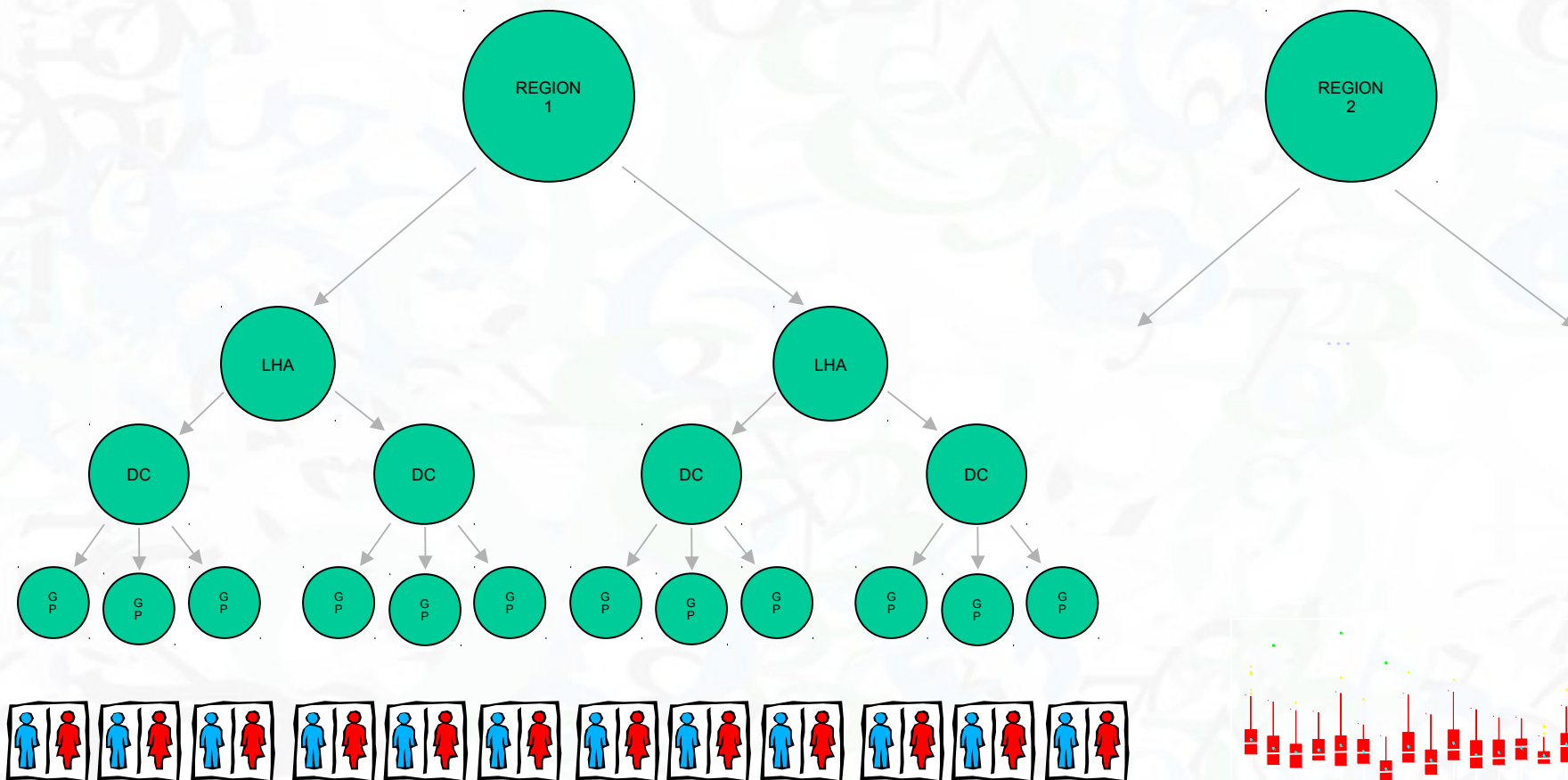


- Heterogeneity
- Accuracy
- Multidimensionality

Outcome Measures

Mortality
Chronic disease/morbidity
Physical functional status
Psychosocial functioning
Quality of life
Disease and medical care complications

Clustered Effects (Multilevel Modeling)

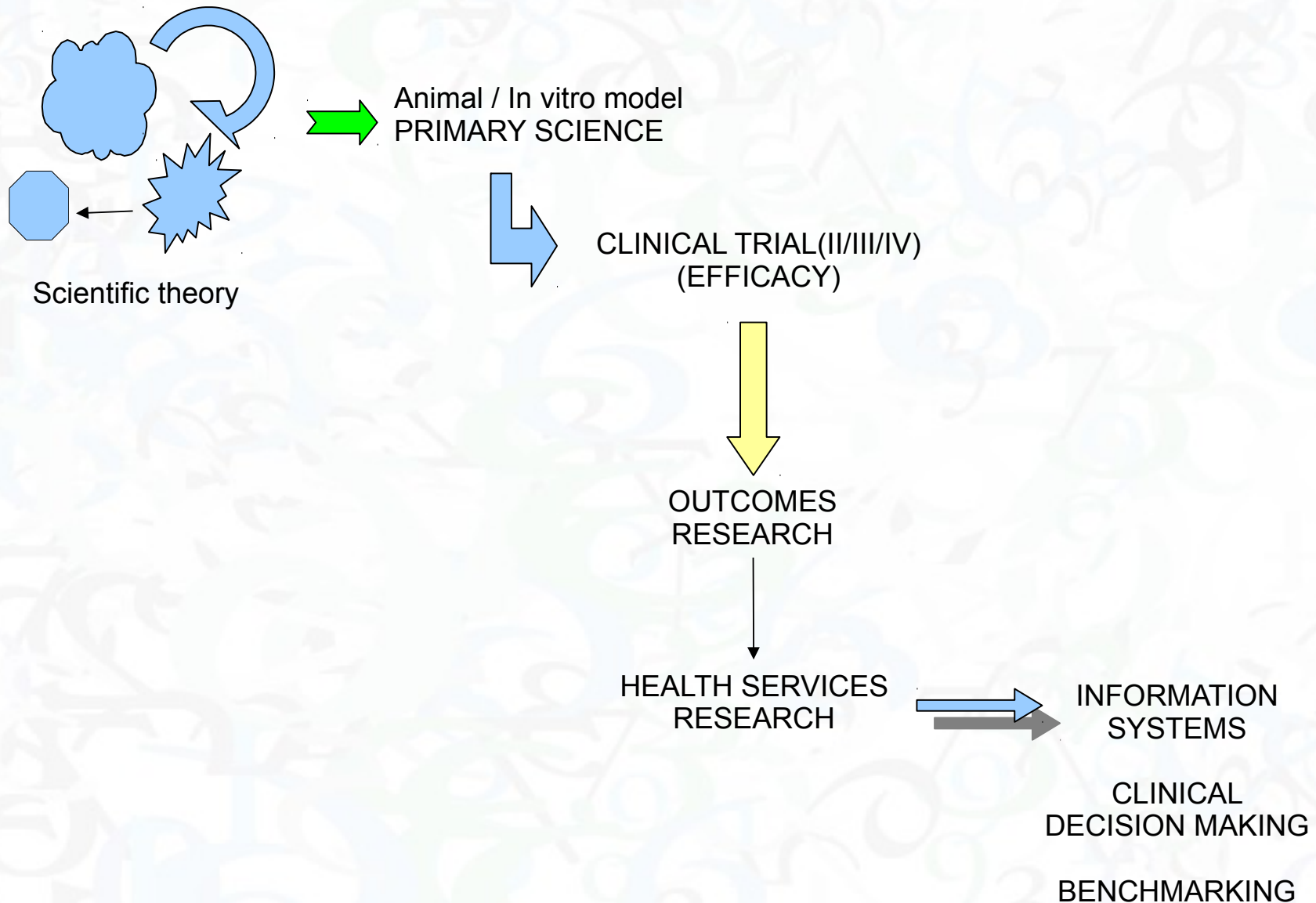


Health System Performance

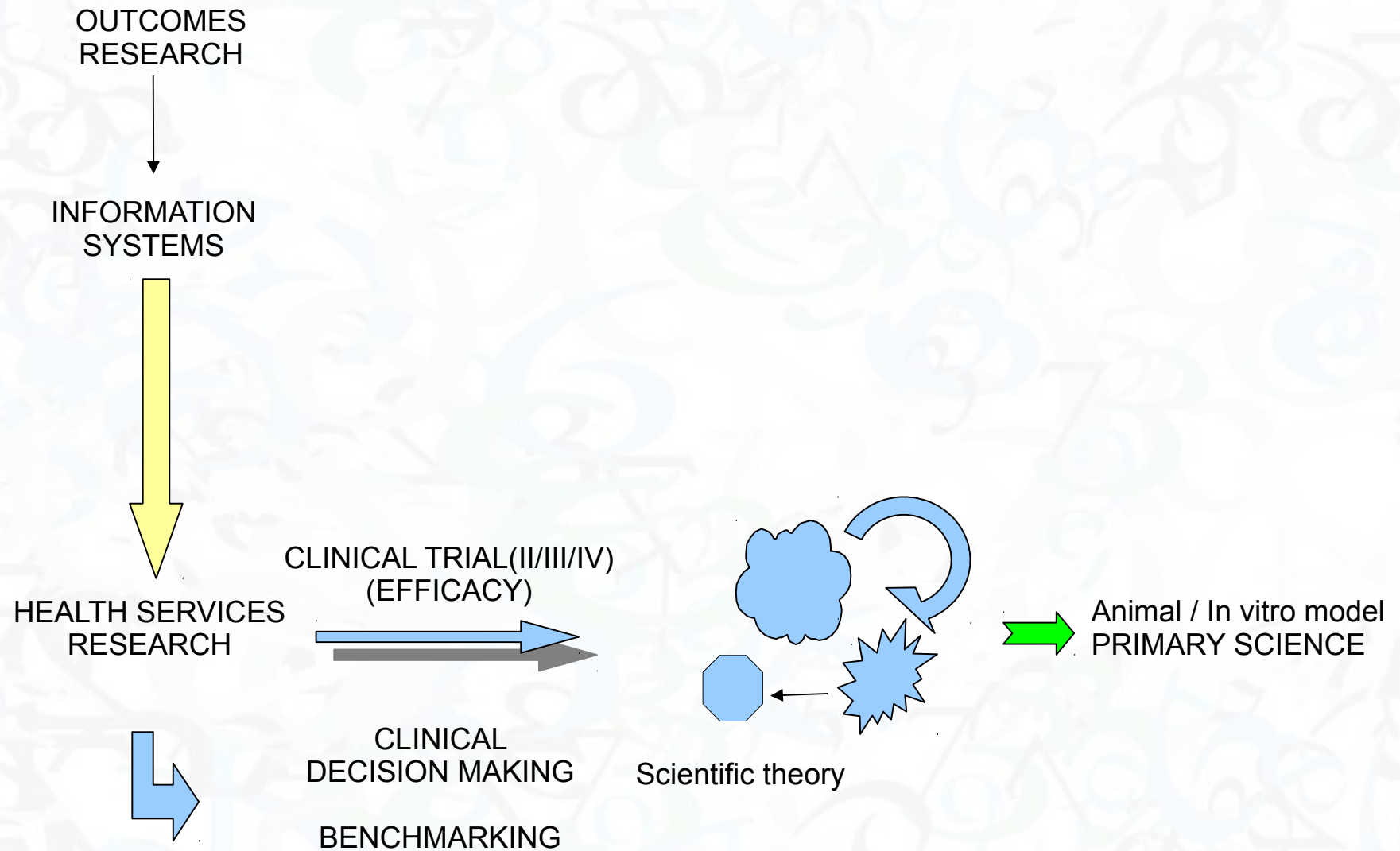
- Measured using batteries of indicators
- Health outcomes constitute a fundamental dimension in all available approaches (e.g. WHO HSPA, OECD QCI)
- A composite measure can be used for each dimension (and overall) to identify a specific score of health system performance (as in the highly controversial WHO Report 2000)

Osteopathy?

...from the direct research cycle



...to the reverse research cycle



Thanks for your attention!