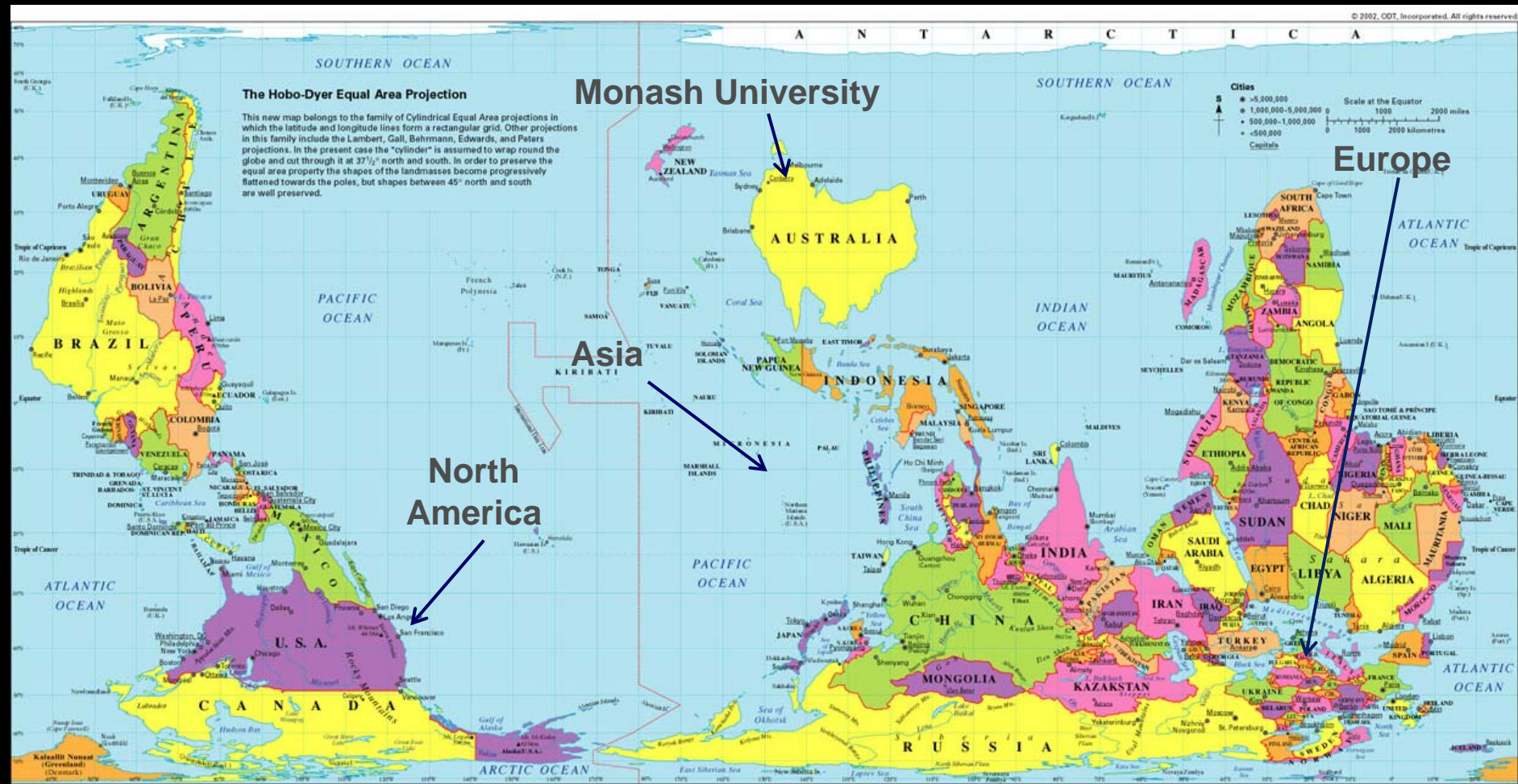


Value and Valuation of Health Technologies
'Developing a Swiss Consensus'
5-6 November 2010, Zurich

Why we should not minimise
Cost per QALY

Professor Jeff Richardson
Foundation Director, Centre for Health Economics
Monash University
<http://www.buseco.monash.edu.au/centres/che/>



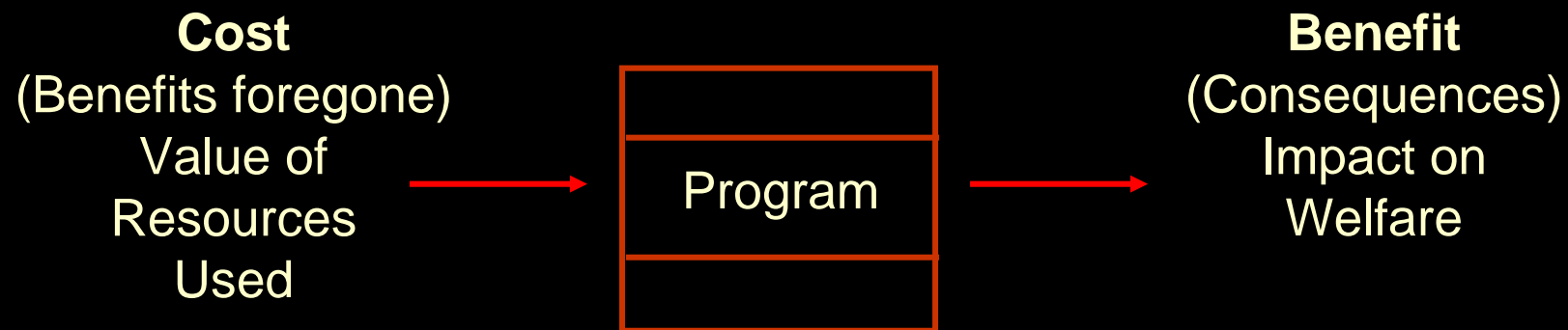
Contents

- I. Resume: Economic Evaluation
- II. Measurement of QALYs
- III. The logic of Min Cost/QALY:
New evidence on social objectives
 - a. Age
 - b. Social characteristics
 - c. Severity
 - d. Sharing per se
- IV. Policy: Lecture 2 Social Welfare

1. Resume Economic Evaluation

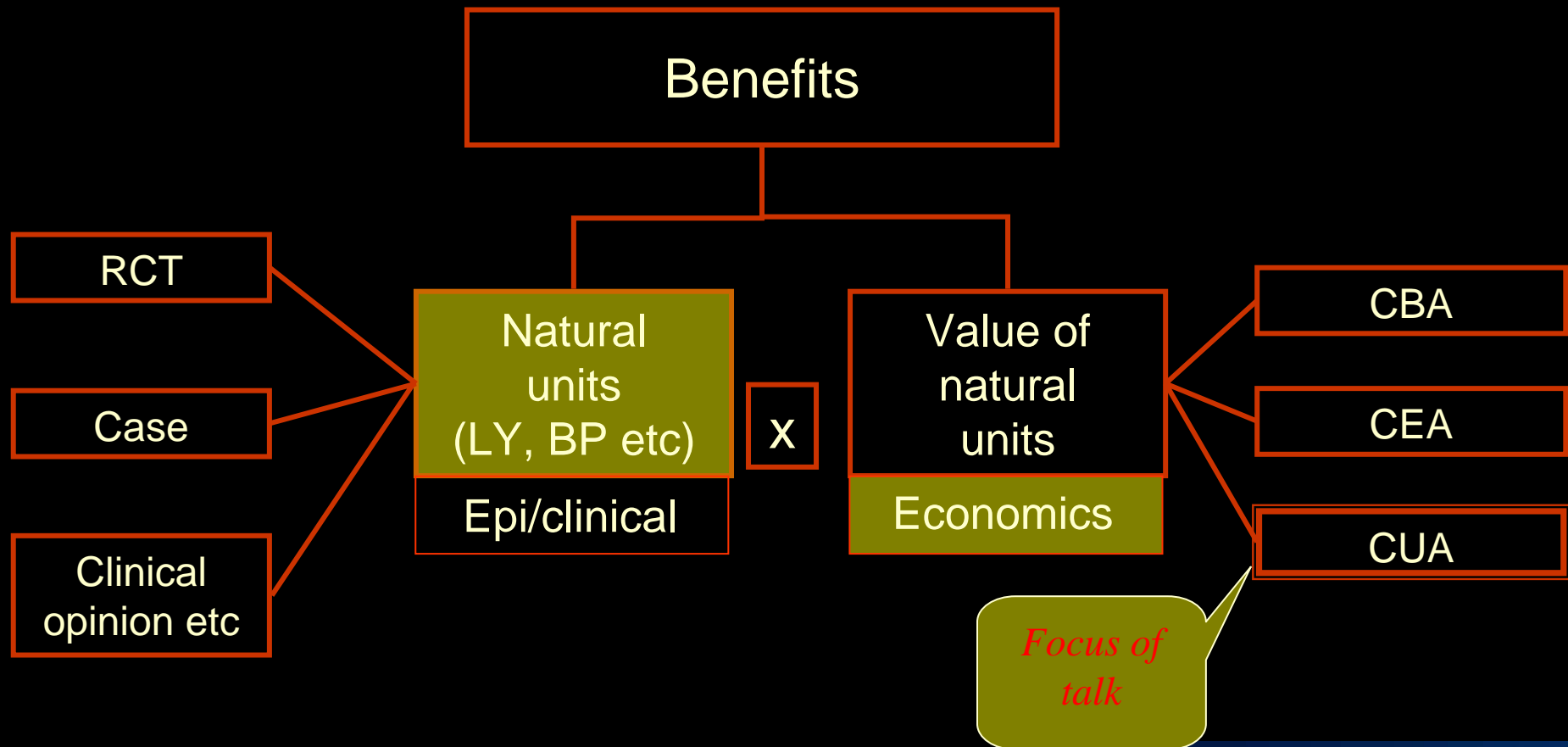
Definition: Benefits are the impact on wellbeing of *the consequences* of interventions

Focus of talk



Definition: Costs are the benefits *foregone* because of the resources used, ie the last *opportunities* to increase wellbeing elsewhere

Benefit Measurement in Health Economics Evaluation



CUA: Cost Utility Analysis

- Compare:
Costs,
Quality Adjusted Life Years (QALYs)

Constructing QALYs

$\text{QALYs} = \text{life years} \times \text{QoL (utility score)}$

Utility score

- (i) Describe health state scenario
- (ii) Convert scenario \rightarrow utility score

Summary of inputs

- Epidemiology of disease intervention
- Resource costs
- Consequences
 - QoL
 - Life extension

So far, so good

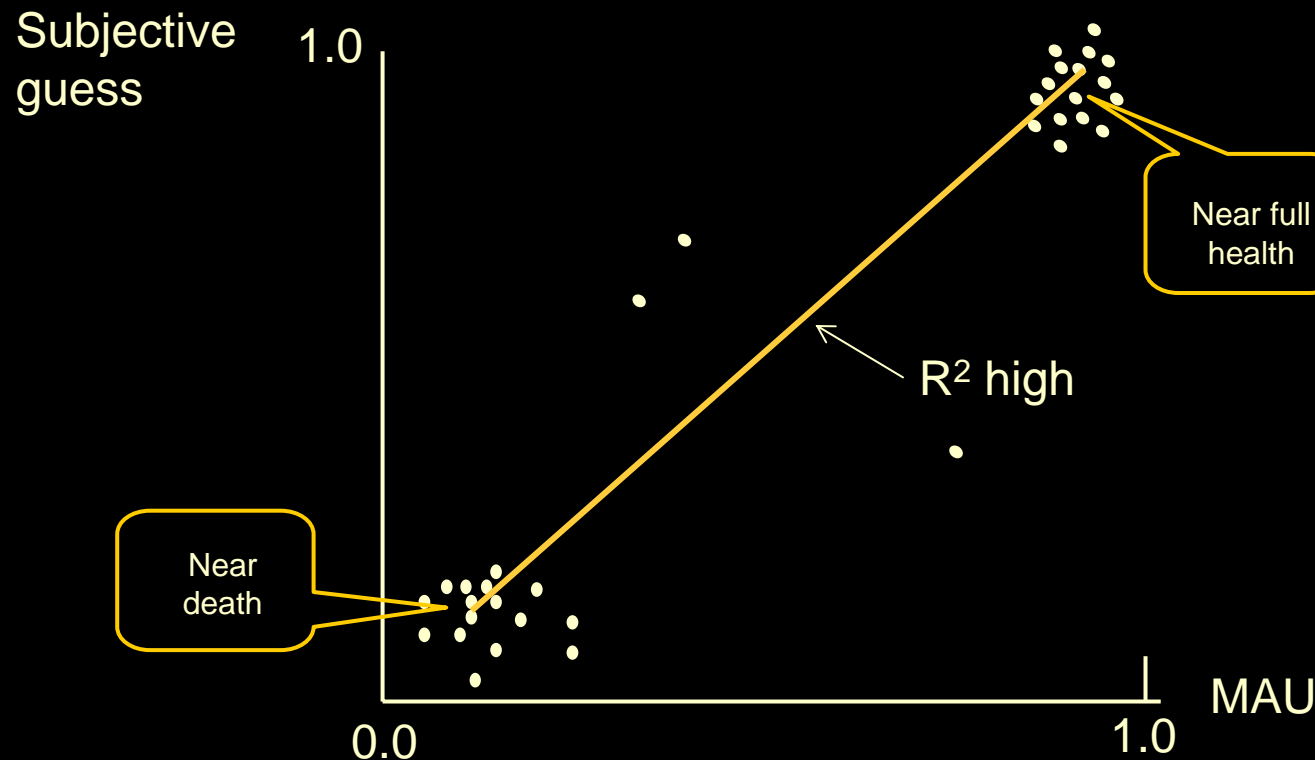
II. Measurement of QALYs

MAU measurement instruments

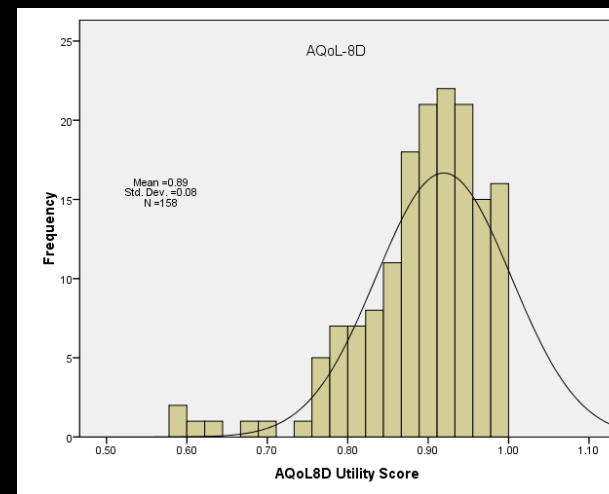
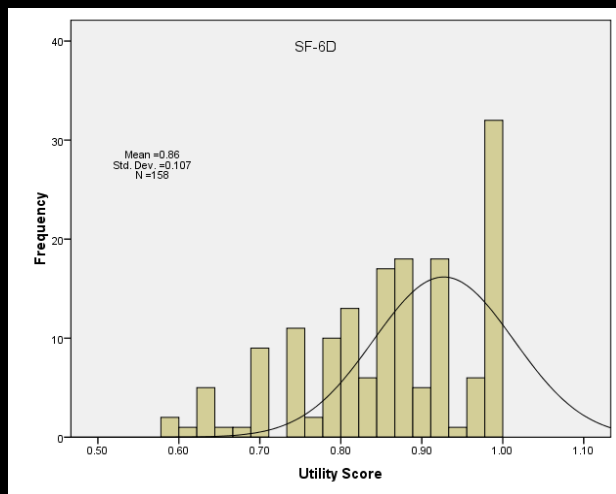
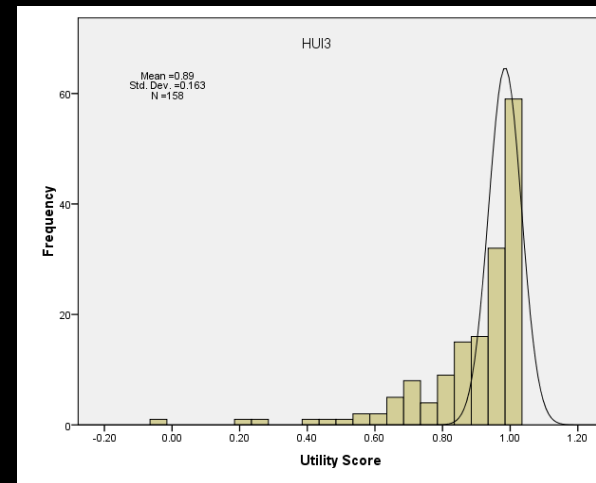
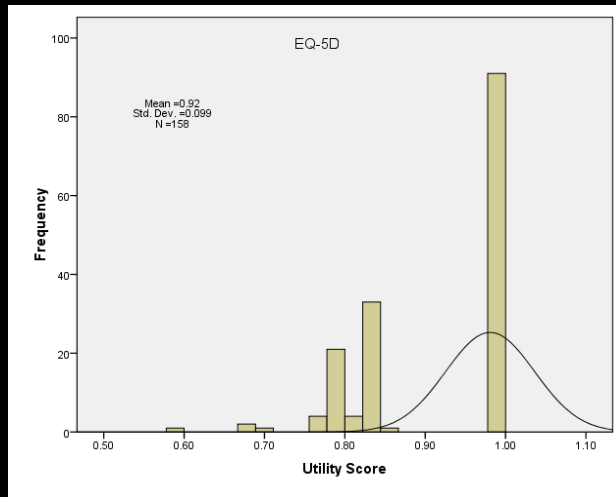
1. EQ5D
2. SF6D
3. 15D
4. HUI 1, 2, 3
5. AQoL 4D, 6D, 8D

Validity of QALYs in practice

- Correlation with disease specific instruments
- Correlation is extremely weak test



Split sample by instrument and dimension score



The reliability of QALYs

Proportion of variance explained by another instrument (R^2)

	AQoL-4D	EQ5D	HUI 3	15D	SF-6D
AQoL-4D	1				
EQ-5D	0.53	1			
HUI 3	0.55	0.41	1		
15D	0.64	0.58	0.55	1	
SF6D	0.55	0.56	0.44	0.59	1
MEAN	0.57	0.52	0.49	0.59	0.53

R^2 = correlation coefficient squared

Source: Hawthorne et al (2001) p369

The reliability of QALYs

Proportion of variance explained by another instrument (R^2)

	EQ5D	HUI 3	QWB SA	SF6D
EQ5D	1			
HUI 3	0.49	1		
QWB SA	0.41	0.45	1	
SF6D	0.50	0.52	0.43	1
MEAN	0.47	0.49	0.43	0.48

Source: Fryback, Palta et al. (2010) p4

Case study

Health Dimension	HUI 3	EQ5D
Physical health and mobility	<ul style="list-style-type: none"> Walks without difficulty Full use of hands and fingers Unable to see well even with glasses Some hearing difficulty 	<ul style="list-style-type: none"> No problems walking around
Activities of daily living	<ul style="list-style-type: none"> Bathes, eats and dresses normally 	<ul style="list-style-type: none"> No problems with personal care No problems performing usual activities
Bodily pain, general health	<ul style="list-style-type: none"> Moderate pain, occasionally disturbing normal activities Health rated as fair 	<ul style="list-style-type: none"> Moderate pain or discomfort
Social function	<ul style="list-style-type: none"> No problems with communicating 	
Emotion and mental health	<ul style="list-style-type: none"> Occasionally fretful, angry or depressed Somewhat forgetful, but able to think clearly 	<ul style="list-style-type: none"> Not anxious or depressed
	0.14	0.80

Case study

Delete HUI specific items

Health Dimension	HUI 3	EQ5D
Physical health and mobility	<ul style="list-style-type: none"> • Walks without difficulty • Full use of hands and fingers 	<ul style="list-style-type: none"> • No problems walking around
Activities of daily living	<ul style="list-style-type: none"> • Bathes, eats and dresses normally 	<ul style="list-style-type: none"> • No problems with personal care • No problems performing usual activities
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	0.14	0.80

II The case for minimising Cost per QALY

1. Aim of health system: Maximise length, QoL
2. Therefore: Maximise QALYs
3. Constraint: Finite budget
4. Therefore: Minimise cost/QALY
→ maximum QALYs

Simple ... Logically compelling ... Wrong

Logic of Min Cost/QALY

Key assumption

- QALYs embody all relevant values
 - ie
 - Length of life
 - Quality of Life
- Other values (if any) quantitatively small
(in practice, generally ignored)

Evidence from the Empirical Ethics literature

Topic	Argument/evidence
Welfarism vs Extra Welfarism	<ul style="list-style-type: none"> ▪ Culyer et al; Olsen, Norway Australia
Transfer payments	<ul style="list-style-type: none"> ▪ Relevant to how much informed taxpayers will pay (Richardson & McKie 2007)
Age	<ul style="list-style-type: none"> ▪ Importance of benefit varies by age UK, Australia, USA, Spain, Norway
Severity	<ul style="list-style-type: none"> ▪ Importance of given health gain varies with severity of start point (Australia, Spain, USA, Norway)
Health Potential	<ul style="list-style-type: none"> ▪ Importance of health gain varies with capacity to gain (Oregon)
Rule of Rescue	<ul style="list-style-type: none"> ▪ Context matters (McKie & Richardson 2003)
Cause/Context of disease	<ul style="list-style-type: none"> ▪ Discriminate against smokers disagree 38.8; agree 44.6

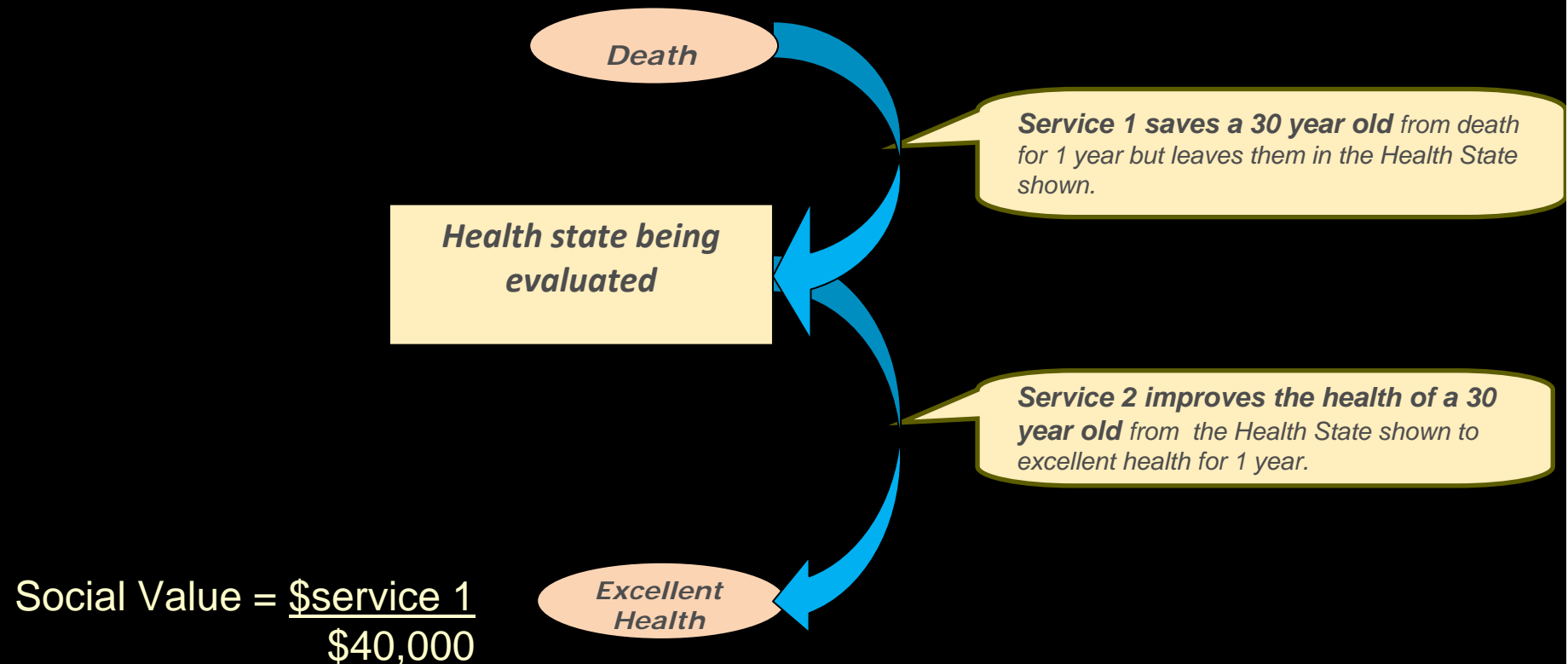
New Empirical Results

a. Age Weights

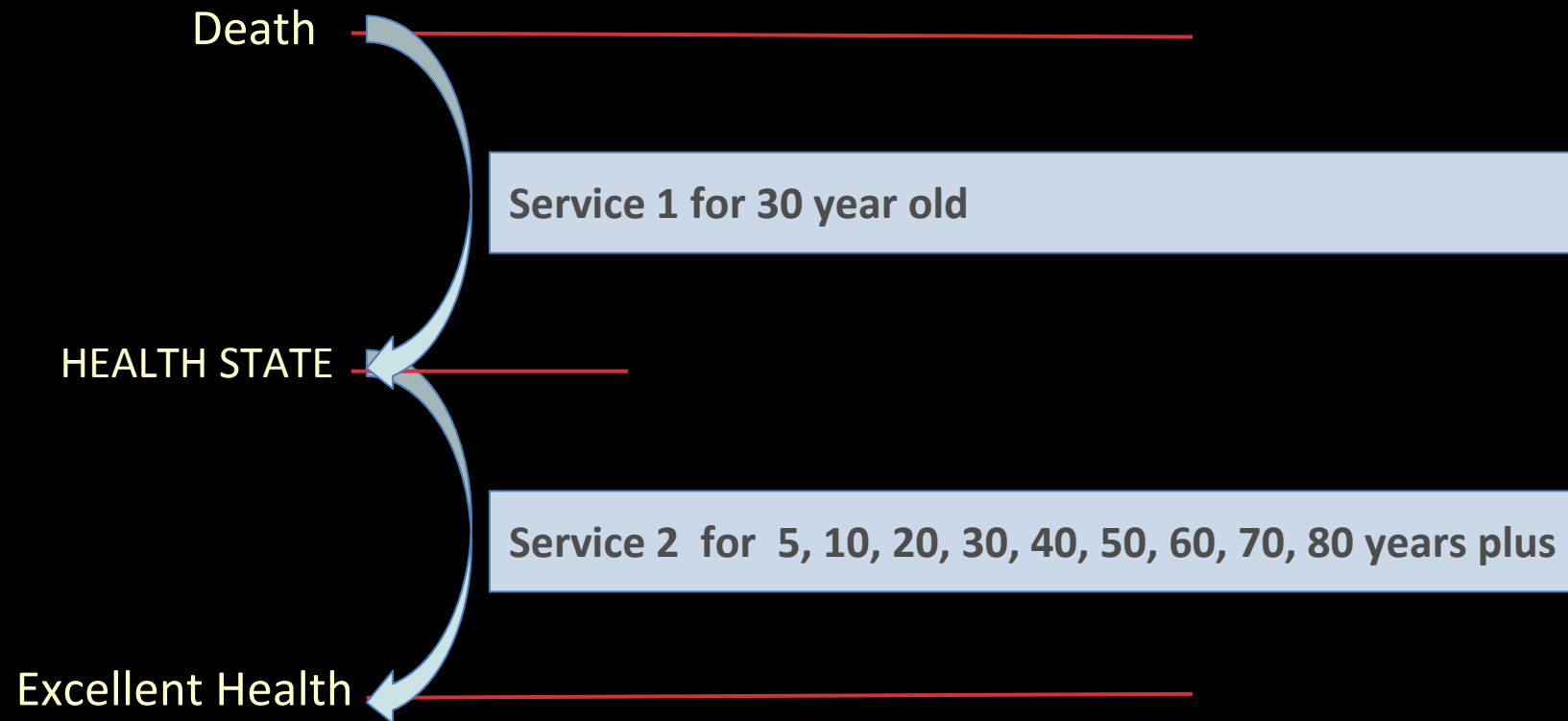
Relative Social Willingness To Pay question:

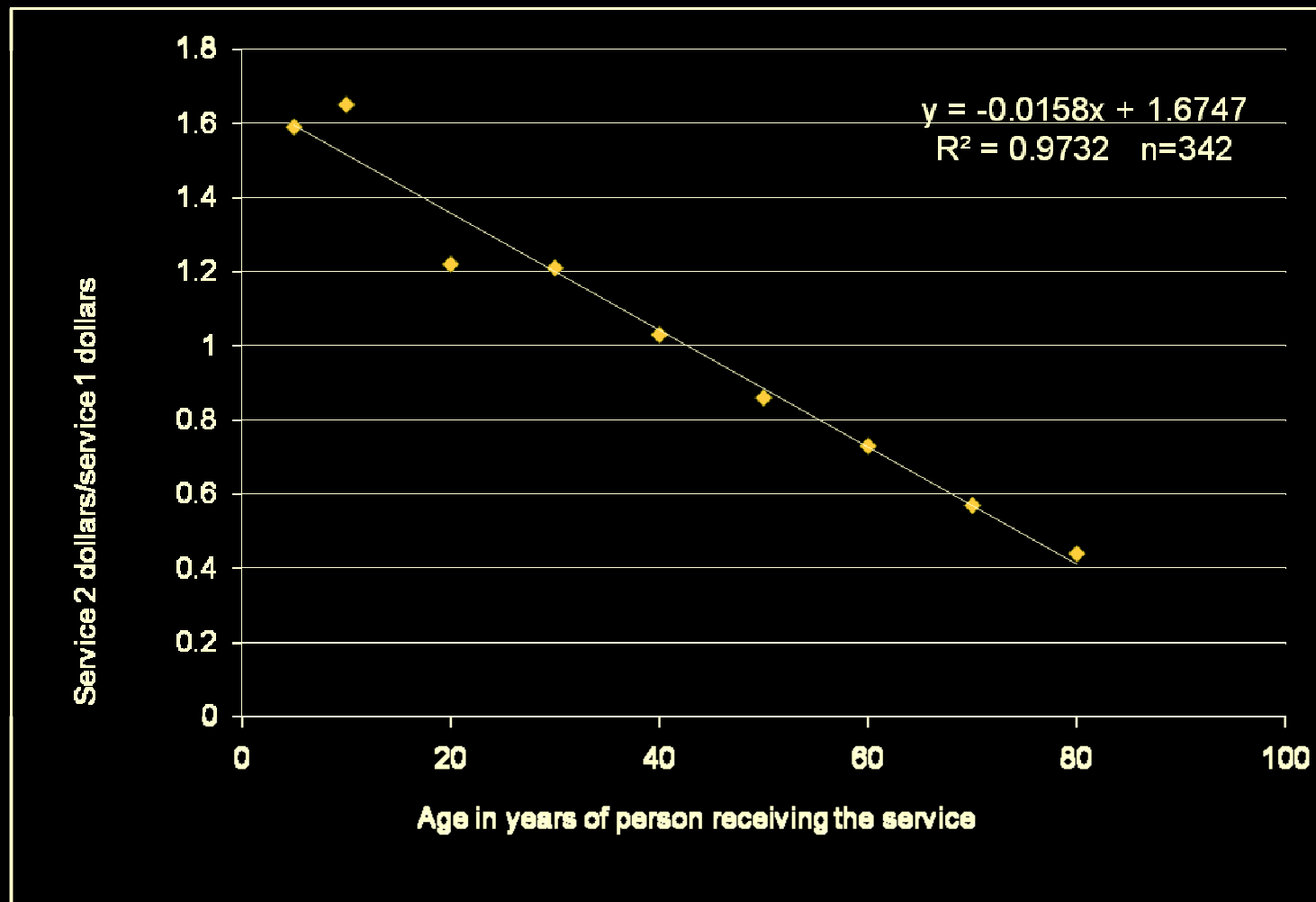
“Taking everything you believe to be important into account, divide the money available between service 1 and service 2, so that **the amounts of money indicate your view of how Medicare should value the services.**”

The benefit from each service lasts for **one** year. The service may be given again, but require new funding.”



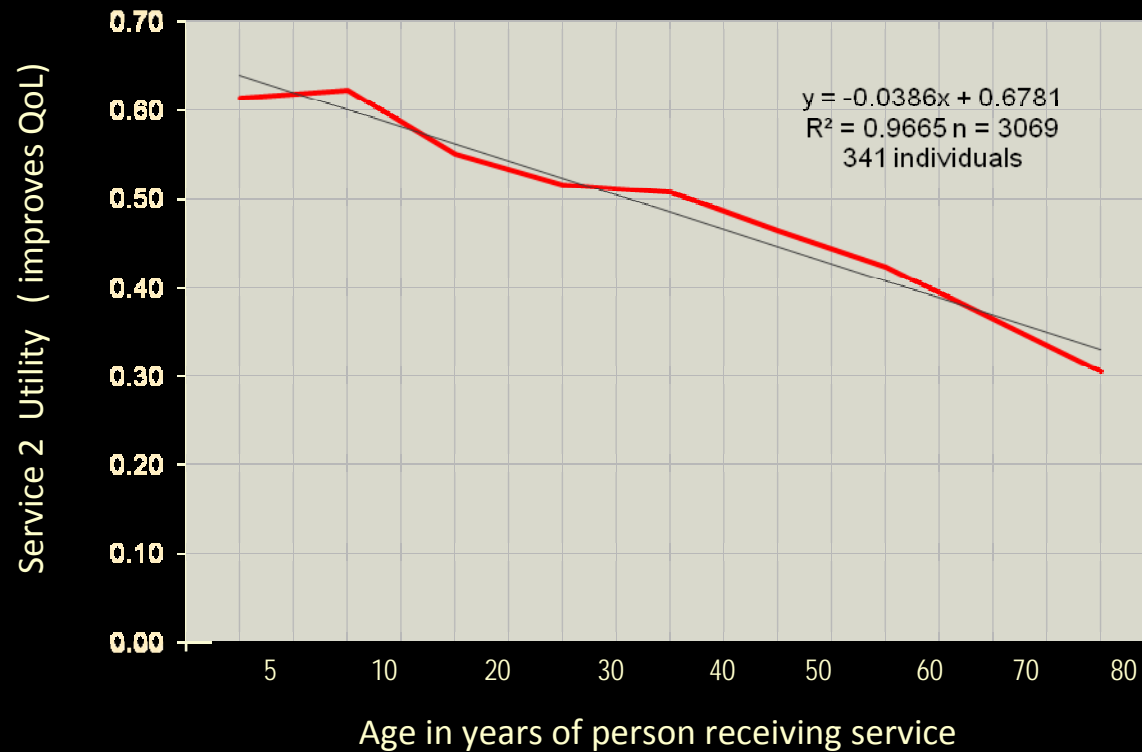
Different ages





AGE in years	5	10	20	30	40	50	60	70	80
SERVICE 2/SERVICE 1	1.59	1.65	1.22	1.21	1.03	0.86	0.73	0.57	0.44

Age weights persons 65+

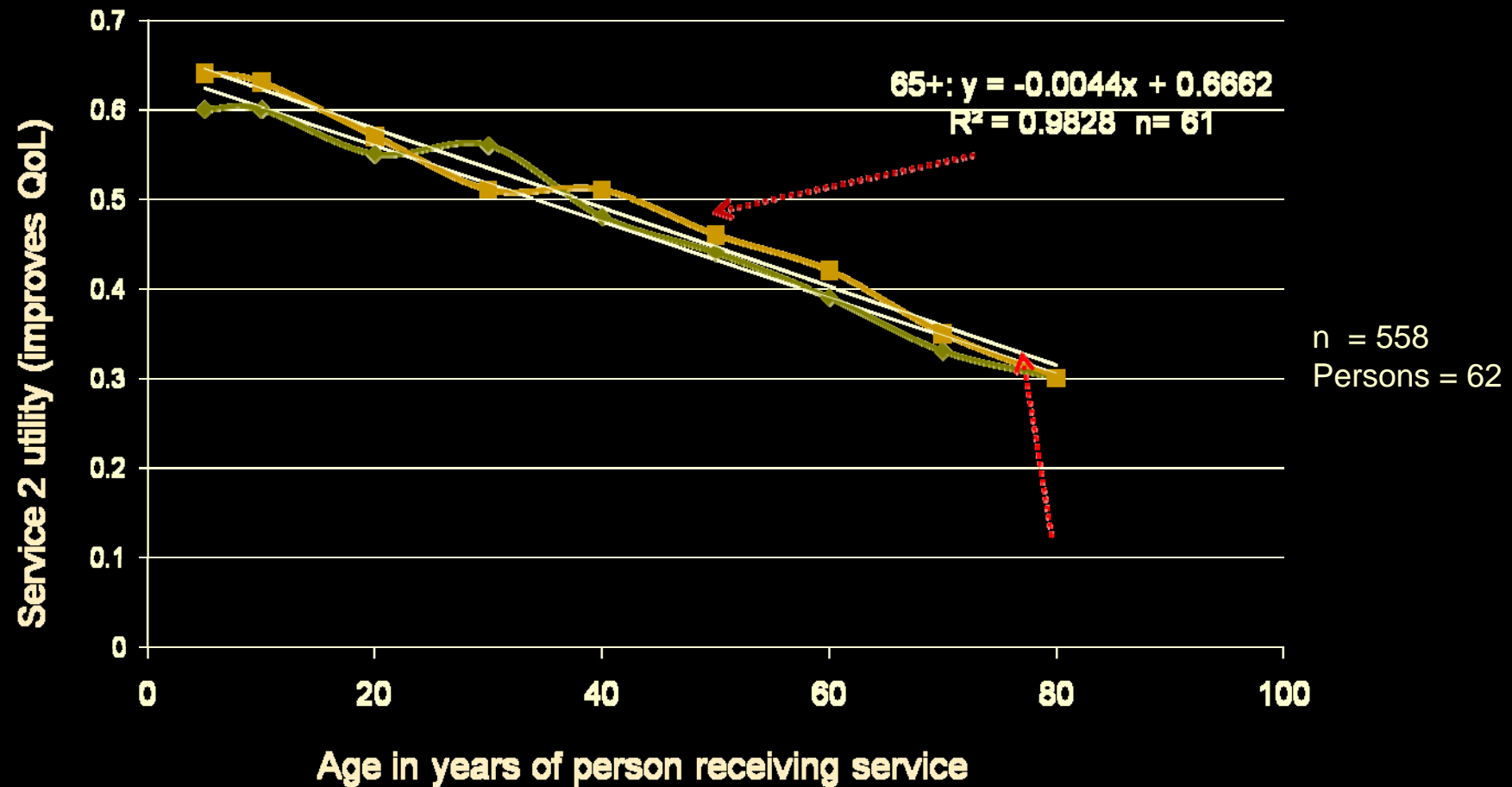


n = 3060
 Persons = 340

		GENDER			EDUCATION		
		MALE	FEMALE	TOTAL	HIGH SCHOOL	<UNI	UNI +
AGE	18-24	19	25	44	13	15	16
	25-34	26	38	64	20	21	23
	35-44	33	38	71	22	23	26
	45-54	27	30	57	18	17	22
	55-64	20	22	42	15	15	12
	65+	26	36	62	20	21	21
	TOTAL	151	189	340	108	112	120

		EDUCATION			TOTAL
		HIGH SCHOOL	<UNI	UNI +	
GENDER	MALE	50	45	56	151
	FEMALE	58	67	64	189
	TOTAL	108	112	120	340

Age weights



Summary age weights

If $\text{Benefit} = \text{age weight} \times \text{QALY}$

Then $\text{Min Cost/Benefit} \neq \text{Min Cost/QALY}$

New Evidence

b. Patient Characteristics

Patient characteristics and RS-WTP

Service 1 ... 30 year old

Service 2 ... Member group X

Groups		
Social characteristics	Cause of illness	Physical disability (double jeopardy)
1. Physical and sex abuse 2. Aboriginal and Torres Strait 3. Disadvantaged social group 4. High Medicare, past 5. Single parents 6. Medical error 7. Return to workplace	8. Alcoholic 9. Cigarette 10. Obese	11. Blind 12. Deaf 13. Quadriplegic

Patient characteristics and RS-WTP

Groups		
Social characteristics	Cause of illness	Physical disability (double jeopardy)
1. Physical and sex abuse 2. Aboriginal and Torres Strait 3. Disadvantaged social group 4. High Medicare, past 5. Single parents 6. Medical error 7. Return to workplace	8. Alcoholic 9. Cigarette 10.	11. Blind 12. Deaf 13. Quadriplegic

Health state is a result of physical and sexual abuse in childhood

Arguments

Question 4 . Physical and Sexual Abuse

People receiving Service 2 have been physically and sexually abused in childhood and this has caused their problems.

Possible arguments

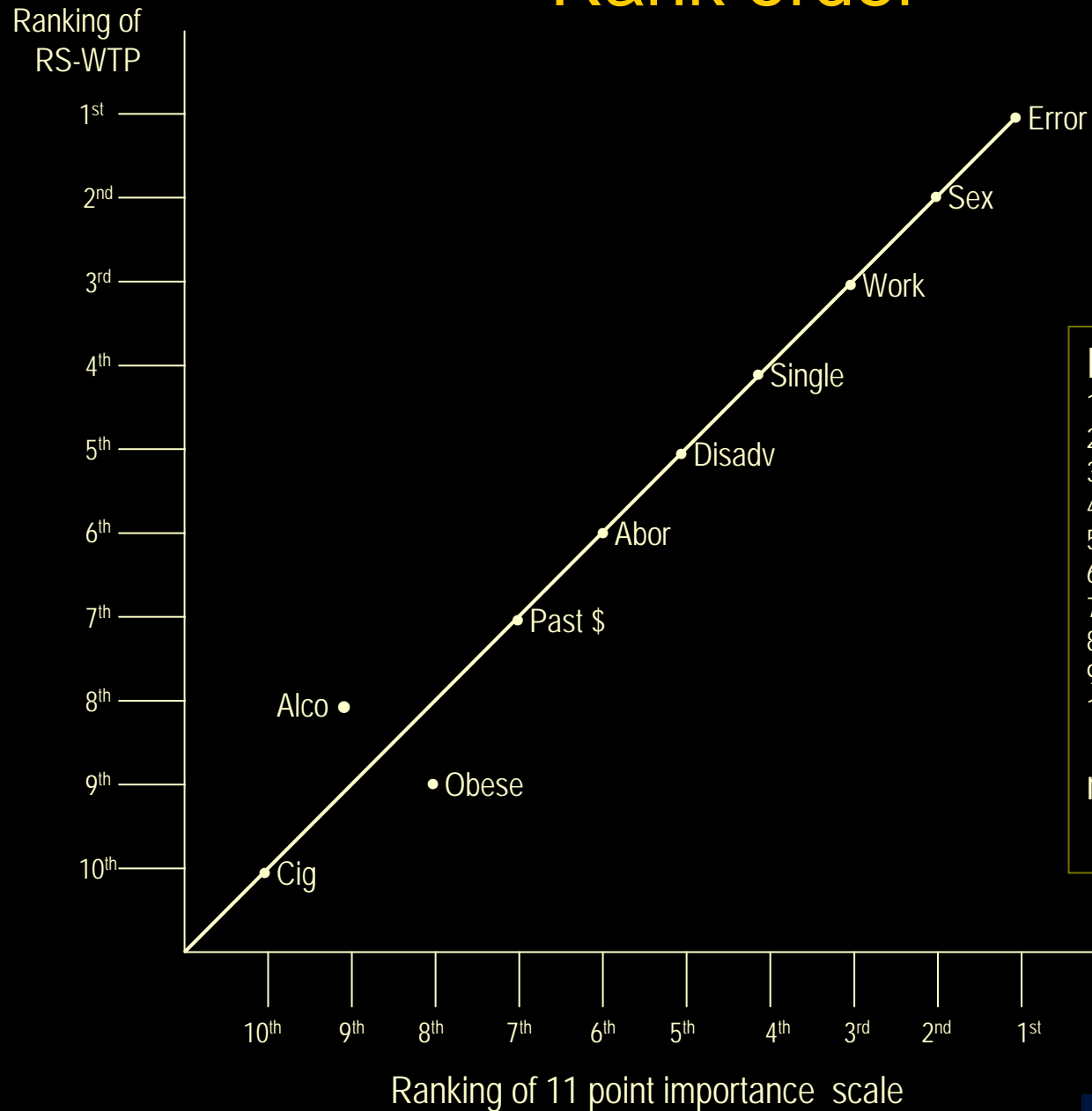
*People who are in the health state **have been unfairly treated and this has caused the problems they suffer.** It is fair to treat them more generously as compensation.*

*People who are in the health state are suffering no matter what the reason.
The reason should not count.*

Patient characteristics

Groups		
Social characteristics	Cause of illness	Physical disability (double jeopardy)
<ol style="list-style-type: none"> 1. Physical and sex ab 2. Aboriginal and Tor 3. Disadvantaged so 4. High Medicare, pas 5. Single parents 6. Medical error 7. Return to workplace 	<p>Service 1 saves quadriplegic from death: leaves them in health state plus quadriplegia</p>	<ol style="list-style-type: none"> 11. Blind 12. Deaf 13. Quadriplegic

Rank order



Key:

1. Error = Medical error
2. Sex = Physical and sex abuse
3. Work = Return to workplace
4. Single = Single parents
5. Disadv = Disadvantaged group
6. Abor = Aboriginal & Torres Strait
7. Past = High Medicare, past
8. Alco = Alcoholic
9. Obese = Obese
10. Cig = Cigarettes

n = 340

Ratio RS-WTP (Group X)/SWTP

	Age 30	Age 60
1 Medical error	1.08	1.34
2 Physical and sex abuse	1.06	1.31
3 Return to work place	1.03	1.27
4 Single parents	1.01	1.25
5 Disadvantaged group	0.99	1.23
6 Aboriginal and Torres Strait	0.99	1.23
7 High Medicare, past	0.94	1.17
8 Alcoholic	0.88	1.09
9 Obese	0.87	1.07
10 Cigarette	0.87	1.07
n = 300		

Conclusion: Patient Characteristics

If Minimise Cost/(weight * QALY)

≠

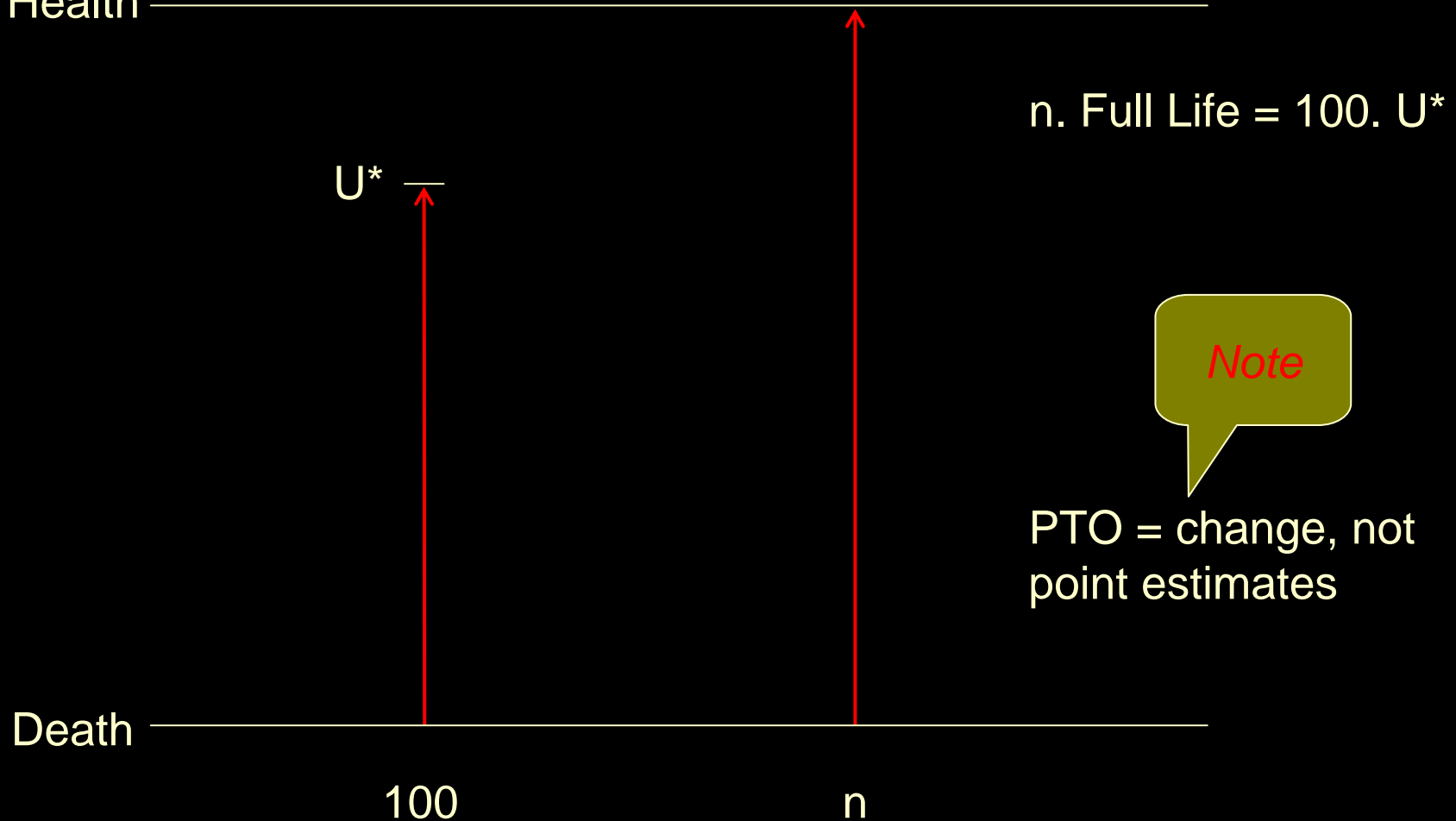
Minimise Cost/QALY

New Evidence

c. Severity

Person trade-off

Full Health



Severity

Previous result using PTO

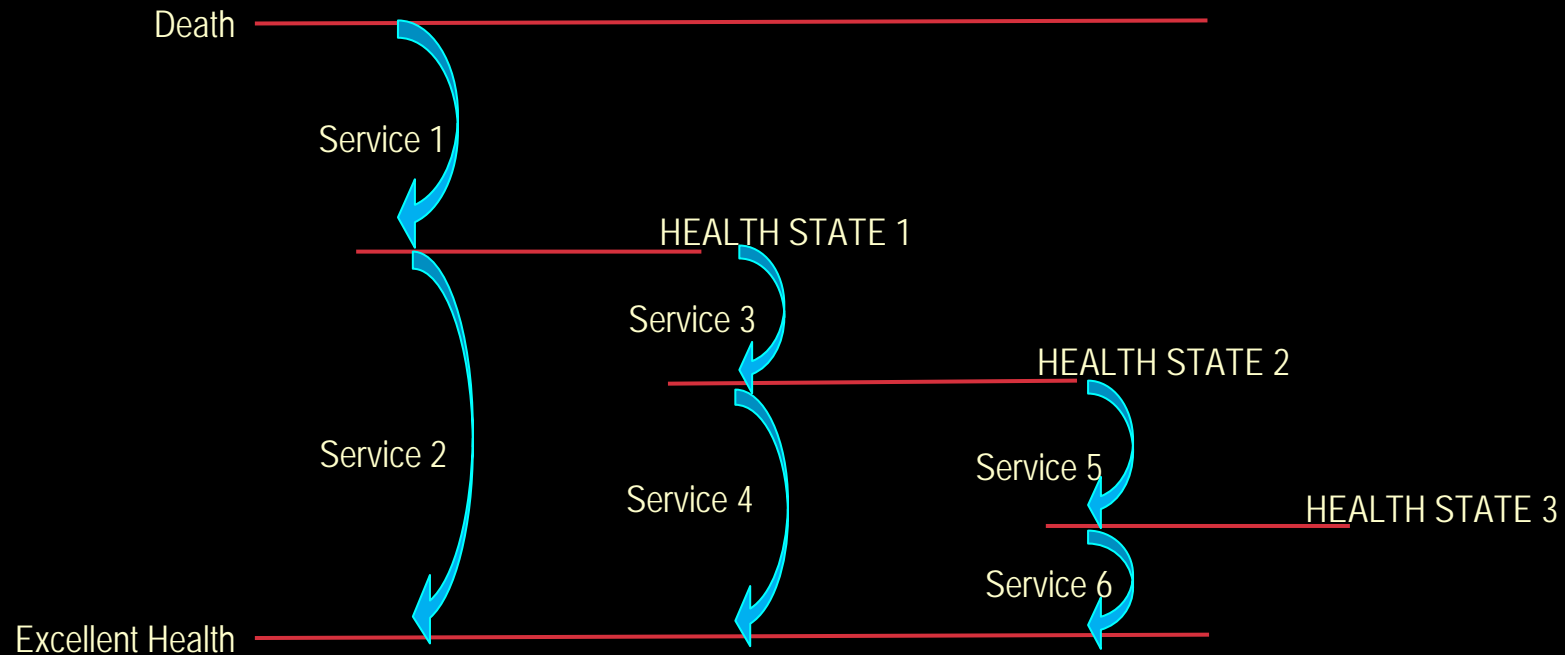
$$\text{PTO} = (U_1 - U_2)^{0.47} \cdot \text{DU}^{0.46}$$

wold = 440

European J of Health Economics

Revision using step RS-WTP

RS-WTP steps



Result

$$\text{RS-WTP} = 0.17 + 0.39(U_1 - U_2) + 0.19\text{DU} + 0.07 \text{ Death}$$

$$R^2 = 0.41$$

To be continued

Conclusion: Severity

If Benefits = f[U gain, severity]

Then Benefits \neq QALYs

New Evidence

d. Sharing vs Cost/QALY

Allocation principles by Commissions in different countries

Country	Order of priority	Role of cost
Norway Lanning Committee 1987/97	Severity	3 rd criteria
Netherlands Dunning 1992/95	Necessity; Effectiveness	CE relevant for substitutes
Sweden 1993/95	Dignity; Solidarity (sharing); CEA	3 rd criteria
Denmark 1997 Council of Ethics	Human worth; Solidarity (sharing); Partial goal: CEA	NA
Israel 1995 Med T Forum	Effectiveness; Sharing; Cost	3 rd criteria
New Zealand 1993 Core Services Committee	Effectiveness; Equity; Cost	Technical efficiency (substitutes?)
Oregon 1989	CEA abandoned; Commission judgment	Rejected
UK NICE 1999	CEA; Debate over necessities Source Sabik and Li, IJEH Jan 08	Primary

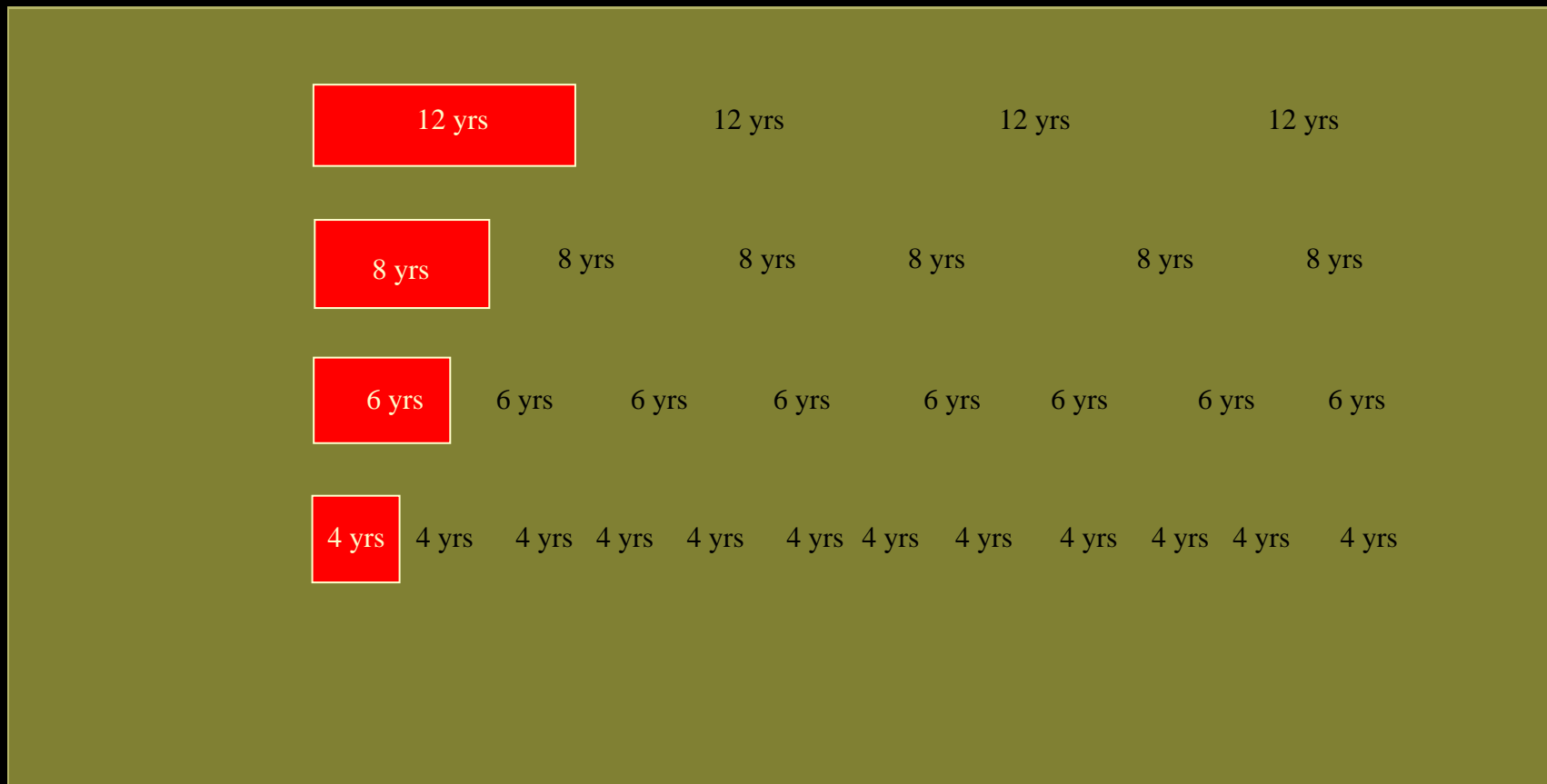
Source: Sobik and Lie (2008)

Sharing: The Ultimate Game

- Powerful propensity to share
Non sharing → self harming revenge

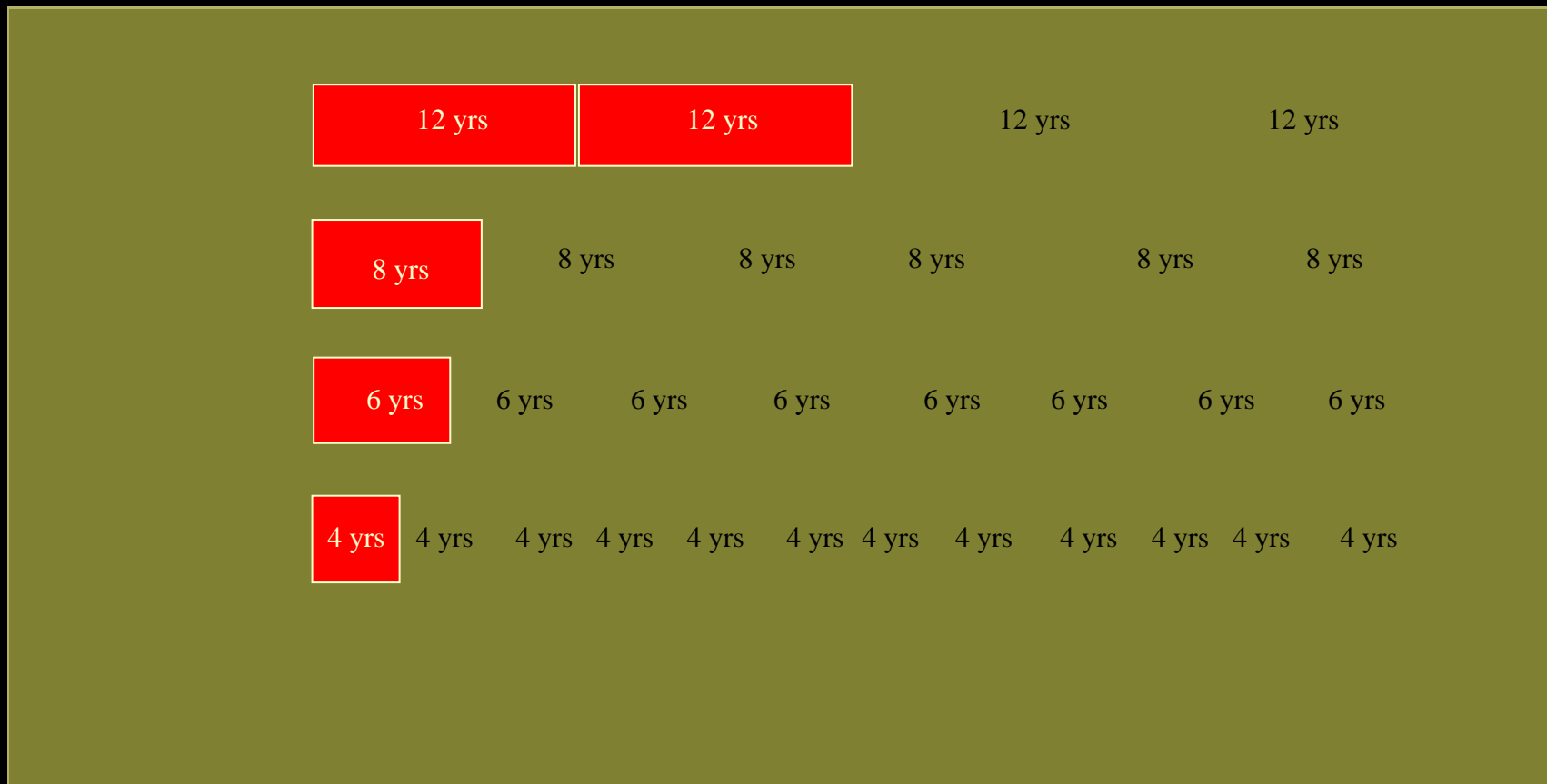
Web based allocation exercise

The diagram below represents 4 patients and the age when they will die which is shown in red
Click on the box where you think Medicare should spend \$10,000

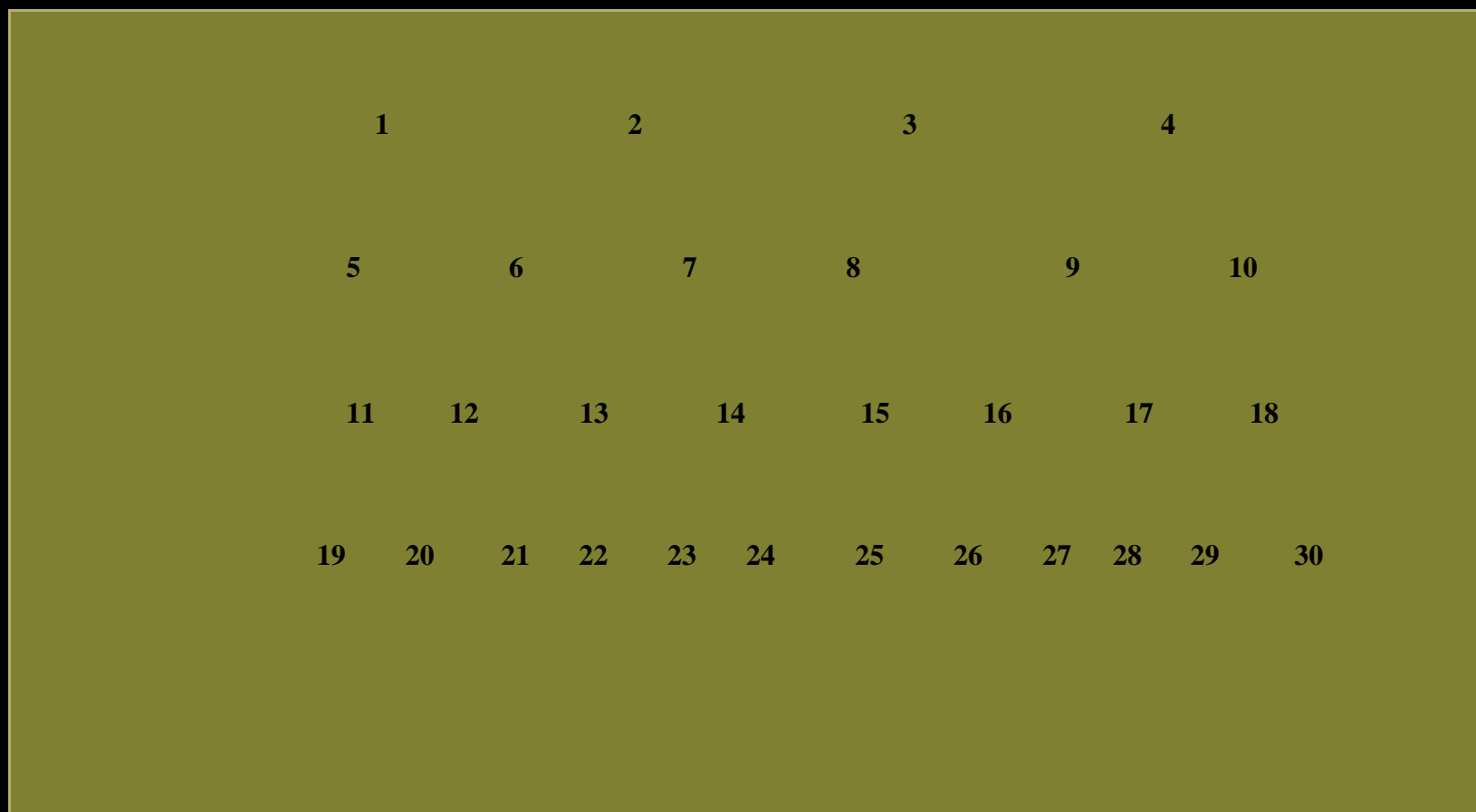


Web based allocation exercise

The diagram below represents 4 patients and the age when they will die which is shown in red
Click on the box where you think Medicare should spend \$10,000



Orthodox Economic Ranking



Fairness Index

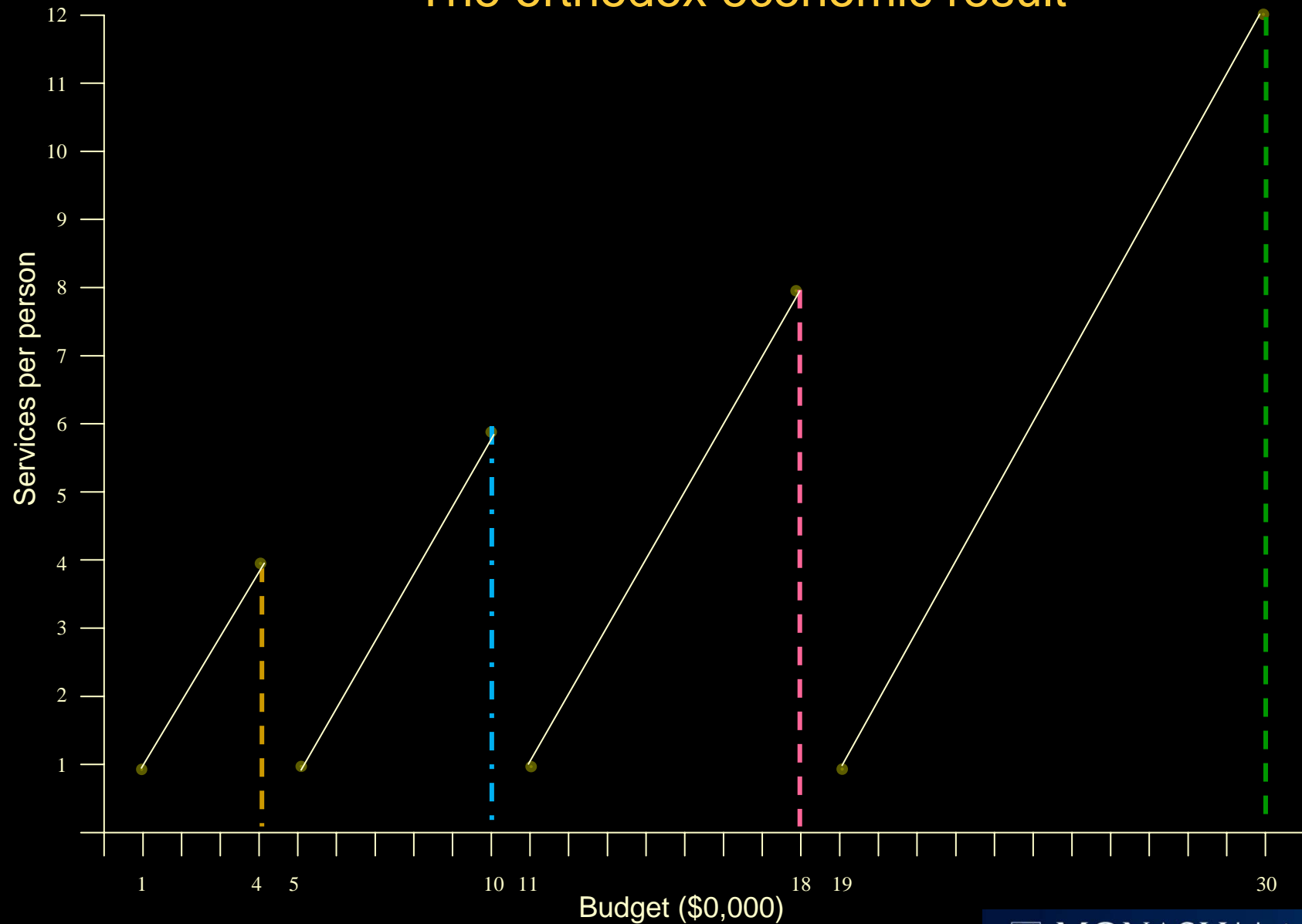
$$\text{Index} = \left(\sum_{i=1}^n \text{Years Allocated} \right) / \left(\sum_{i=1}^n \text{Max Potentially Allocated} \right)$$

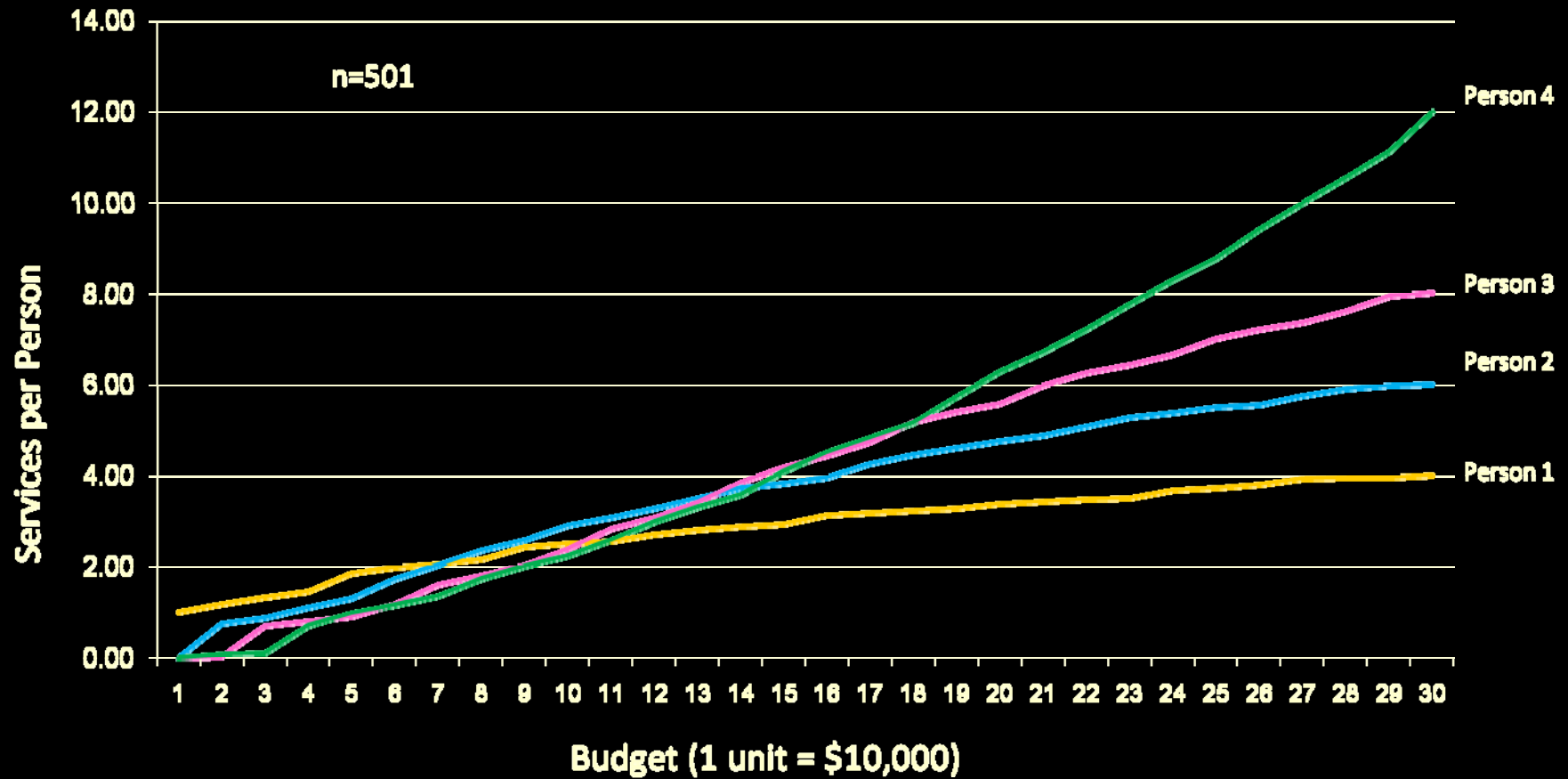
Fairness Index, n = 511

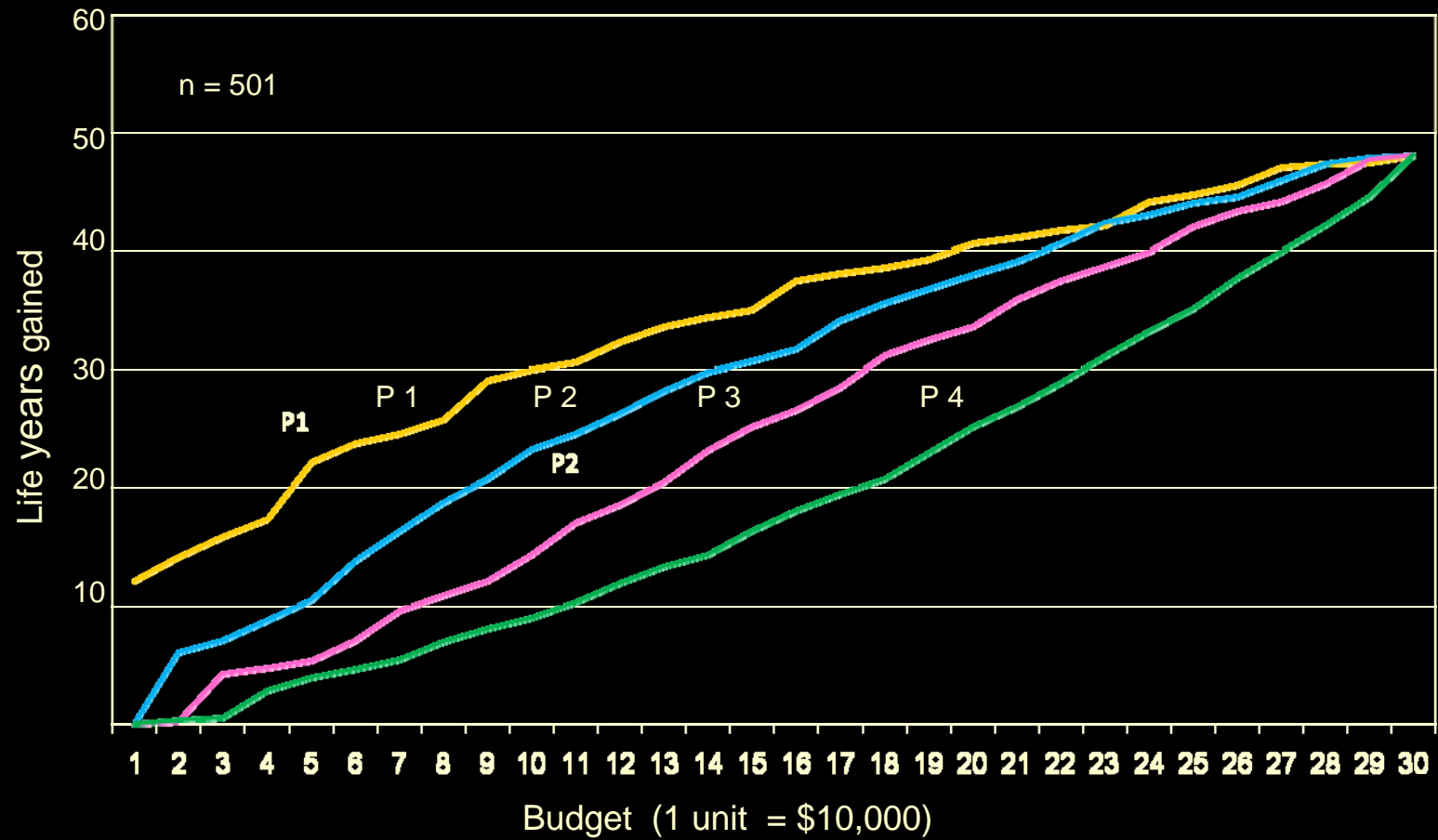
Sharing indices: average values

B	Education	Mean	se	n		Mean	se	n
	1	.620	.007	121	Total	.626	.004	511
	2	.624	.009	125	Economists	.655	.019	33
	3	.600	.011	59				
	4	.640	.007	209				
Ed 4, Ed 3 differ at .008 confidence level								

Hypothetical services per person vs income increases: The orthodox economic result







Conclusion: Sharing

If Expenditures (costs) are shared

Then Cost/unshared QALY violates preferences

Overall Conclude

If

Priority = f(Cost, QALYs, age,
attributes, severity, sharing)

Then

Priority ~~↔~~ cost/QALY

Conclusion

Where has theory gone wrong?

■ Key variables

- Cost
 - Consequences
 - epidemiology
 - QoL
- } Important

■ Shortcoming

- All else is NOT equal
- Society has other goals

■ Quantitative importance

- Cost less important than fairness objectives

Combining values into overall social values

Lecture 2