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Welcome to the InstEAD Annual Lecture 2014
Professor Karl Claxton, Centre for Health
Economics, University of York

Health (and ethics) Needs Economics: Which
Health Technologies, at What Price and for
Whom?



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Inst
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Institute for
Economic Analysis
of Decision-making.

Health (and ethics) needs economics: which health technologies, at what price and for whom?

Karl Claxton,^{1,2}

1. Centre for Health Economics, University of York, UK

2. Department of Economics and Related Studies, University of York, UK

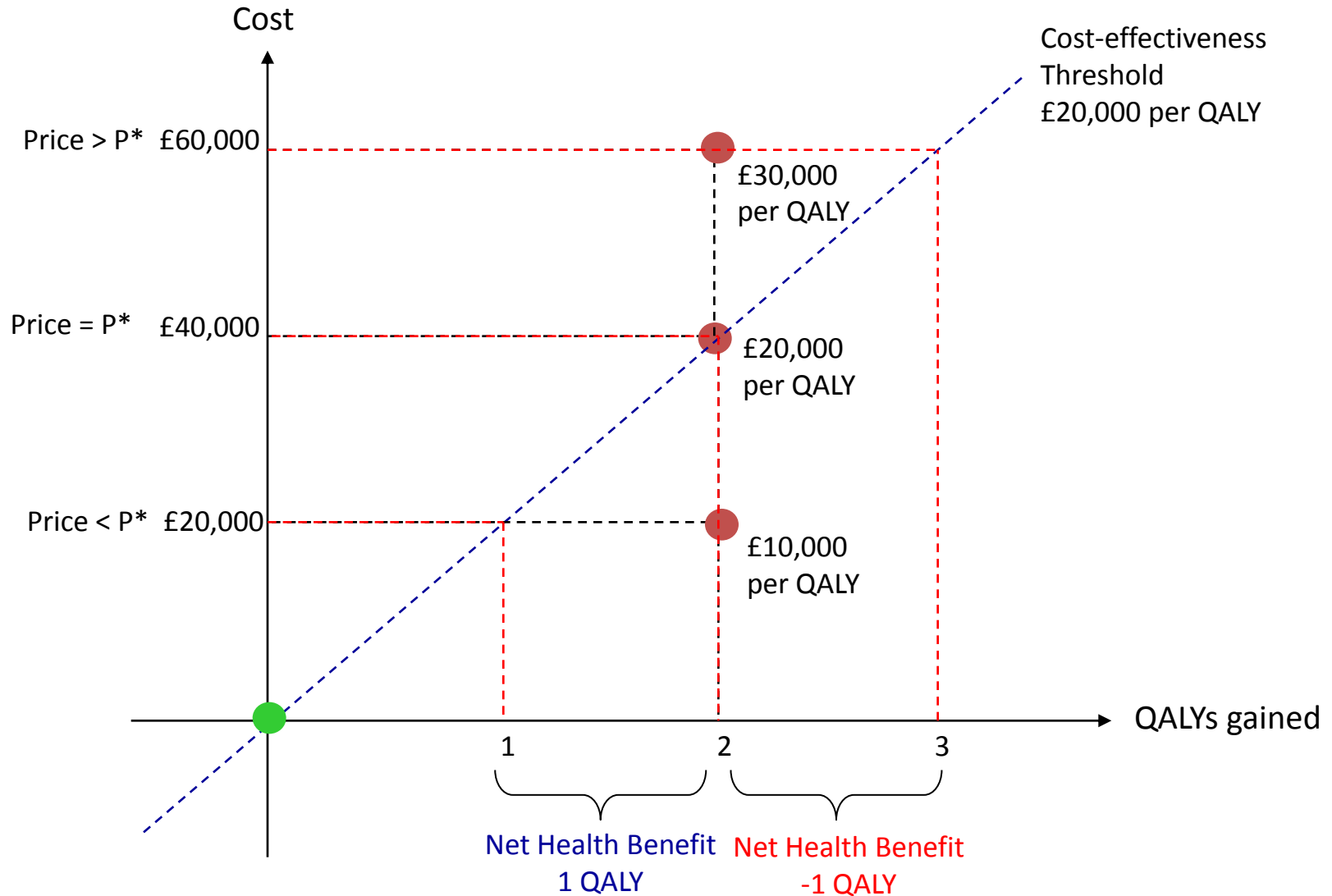
Some principles

- Primary purpose of health care is to improve health
- The NHS budget is an expression of how much we wish to spend on health care
- Everyone's health matters

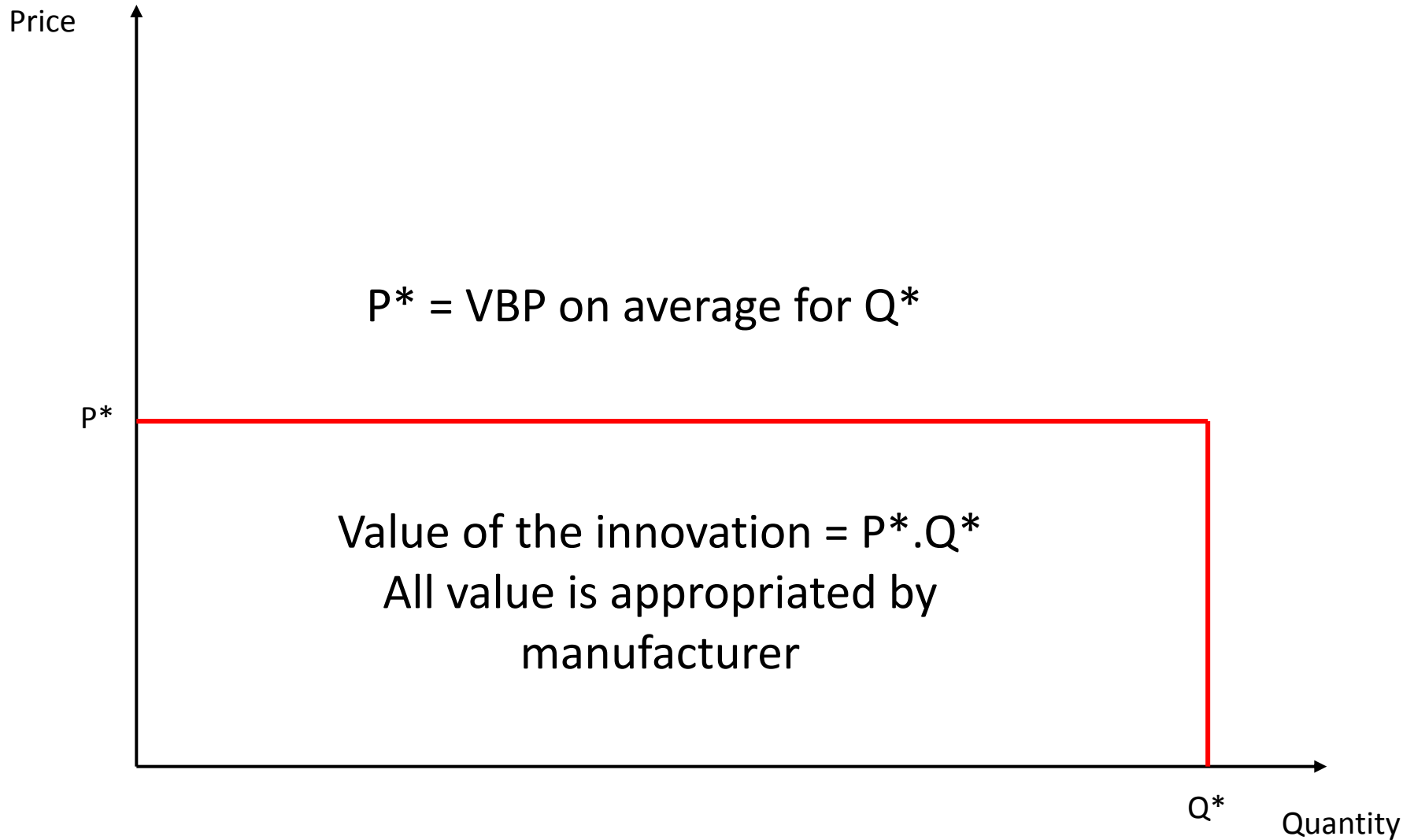
Some implications

- Ethical decisions are impossible without economics
- Some effective technologies should be rejected because the costs are too high

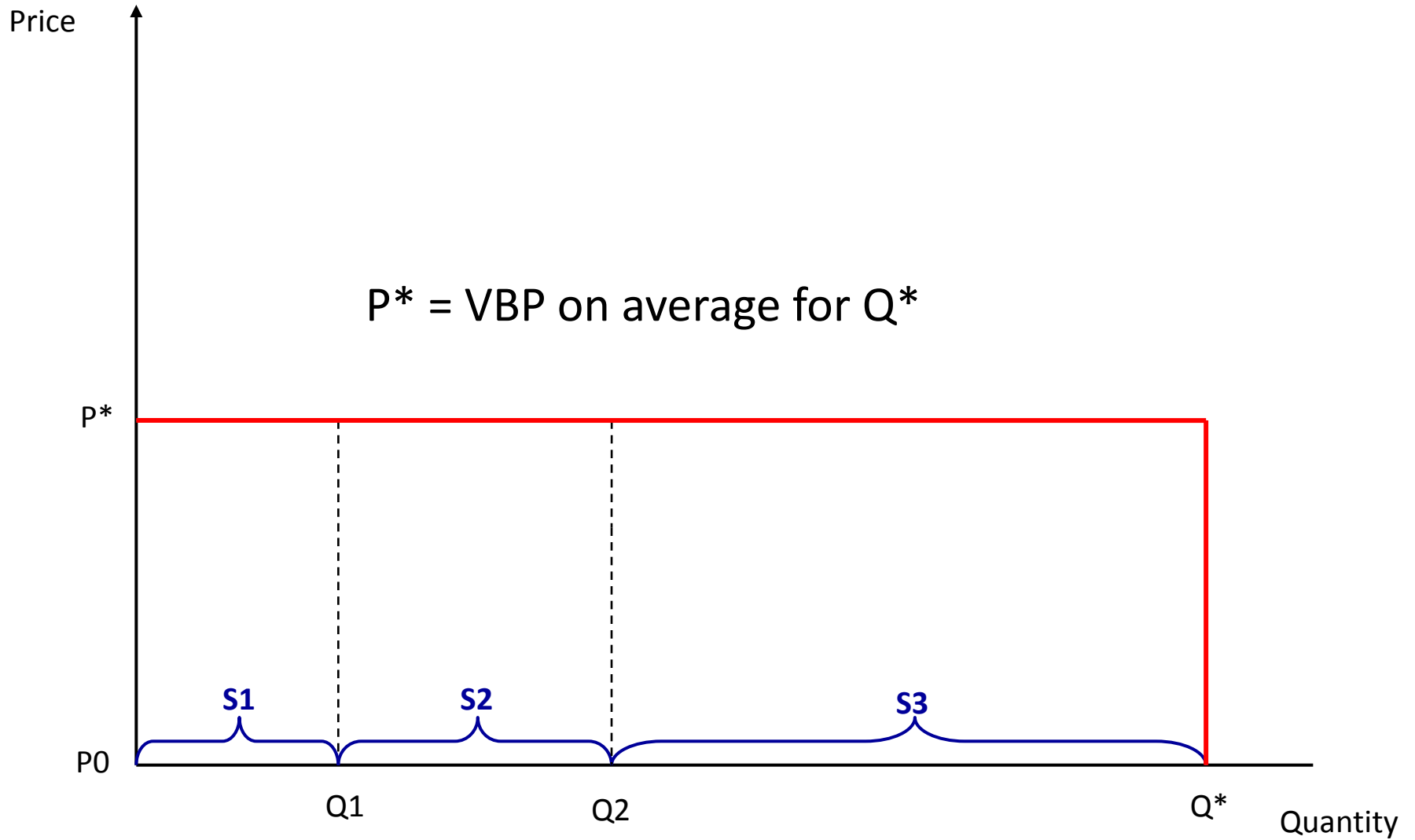
Which technologies?



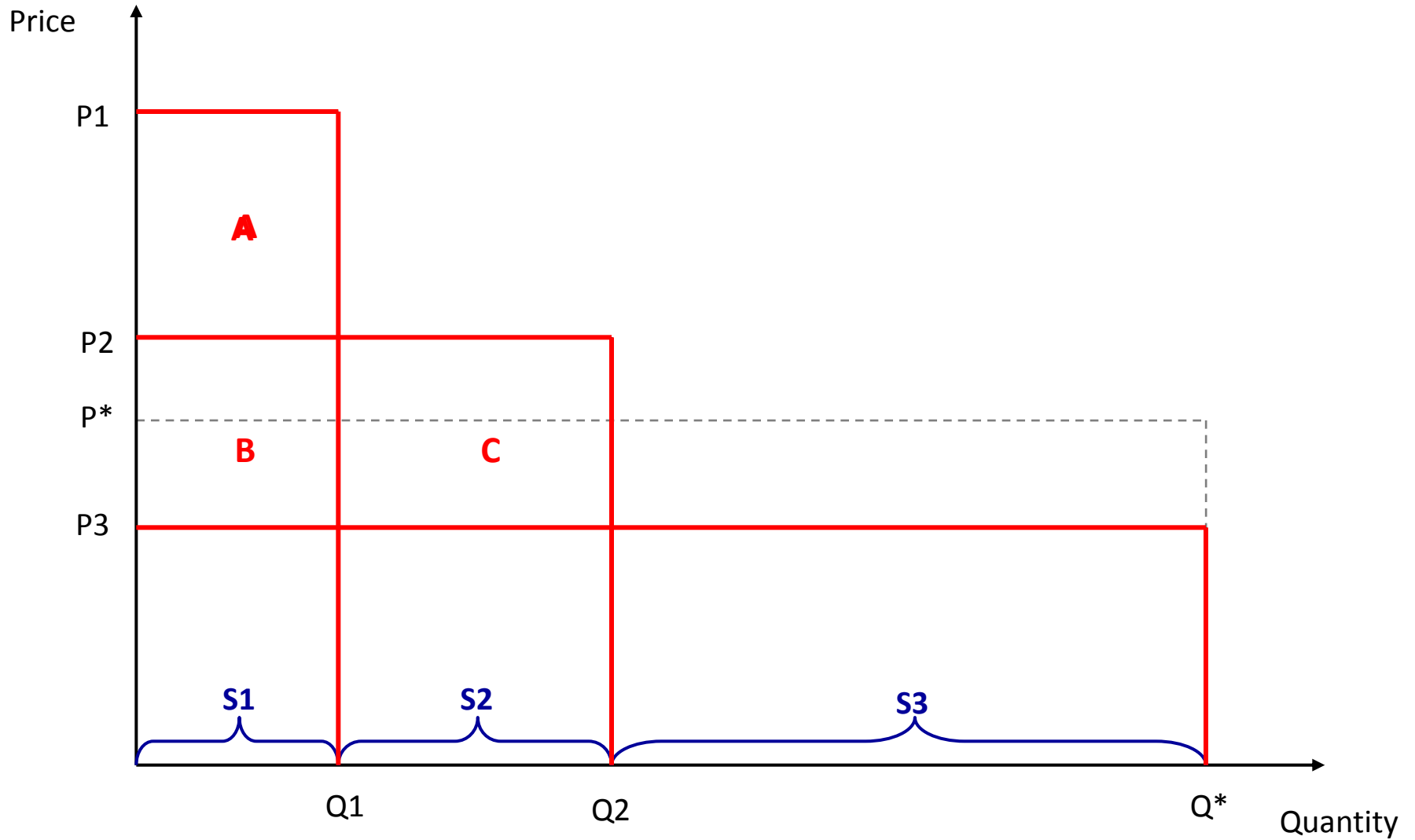
At what price?



For whom?



For whom?



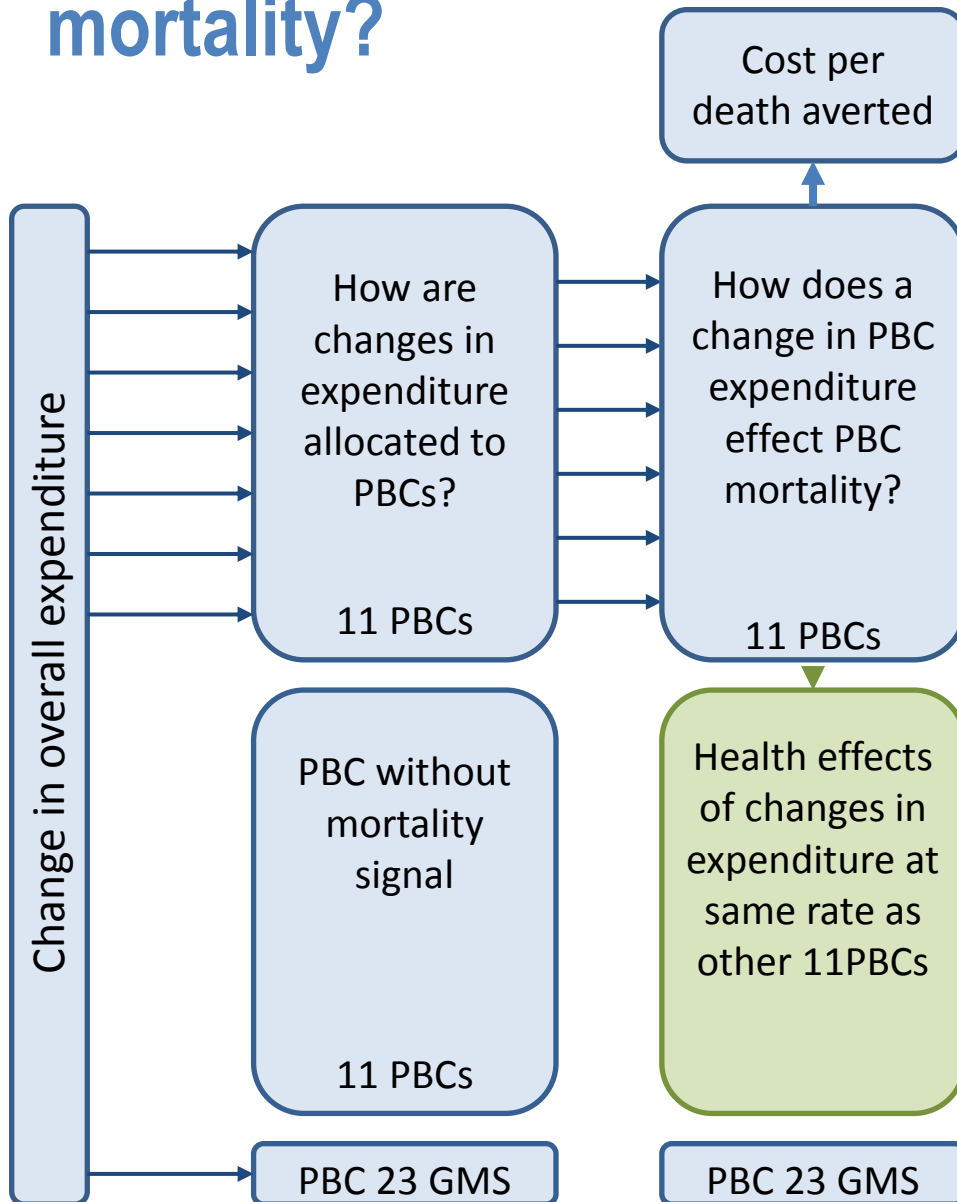
What do we need?

- Estimate health *expected* to be gained
- Estimate additional (net) costs *expect* to impose
- Health *expected* to be lost due to these additional costs
 - Expected health effects of changes in NHS expenditure

How can we estimate it?

- Implied value from past decisions based on informal judgements
 - NICE threshold range (2004)
 - £20,000 to £30,000 per QALY
- Estimate the relationship between changes in expenditure and outcomes
 - 23 Programme Budget Categories (PBCs)
 - Disease areas (groups of ICD codes)
 - All expenditure allocated to each PBC
 - 152 Primary Care Trusts (PCTs)
 - Local expenditure within each PBC
 - Local mortality within each PBC

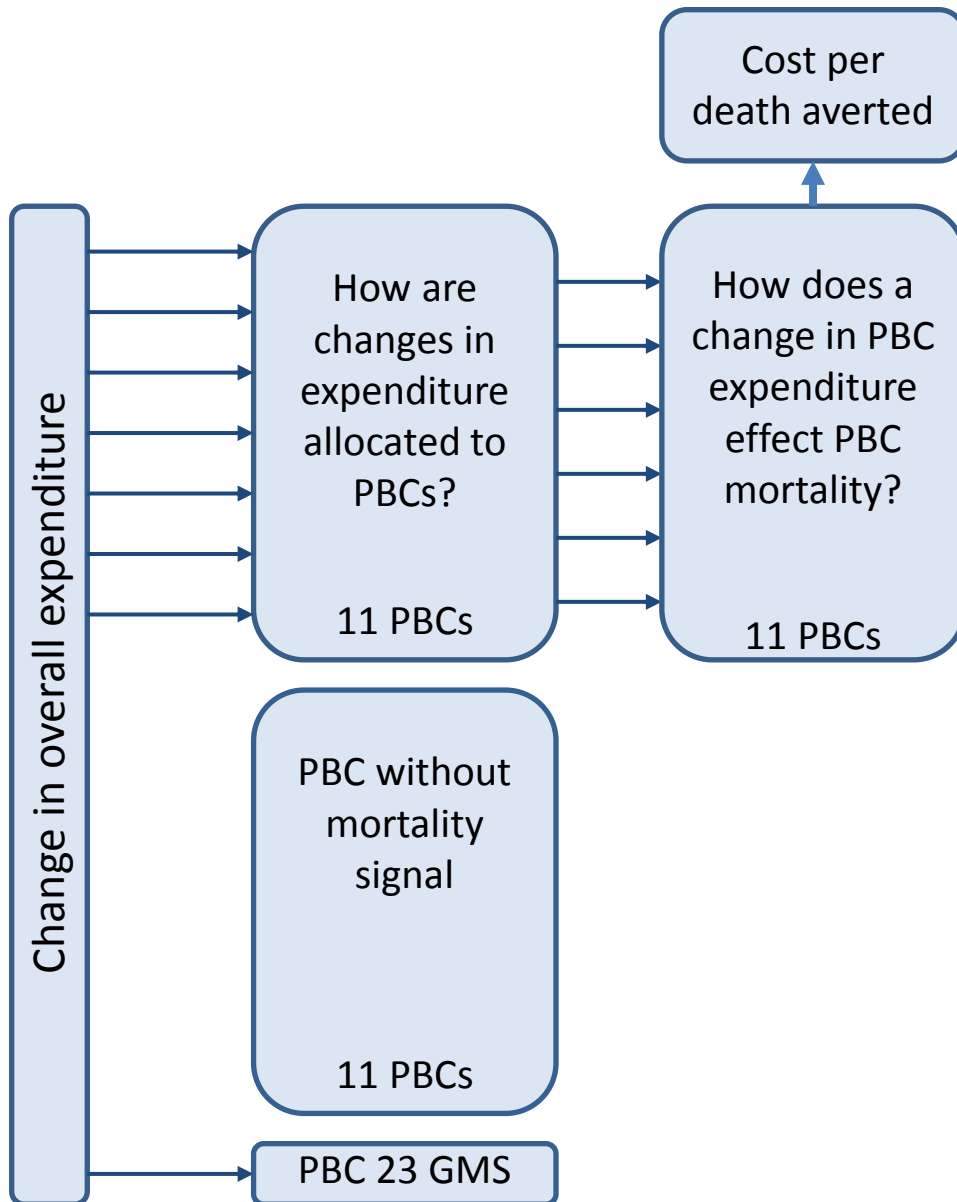
How can we estimate effects of expenditure on mortality?



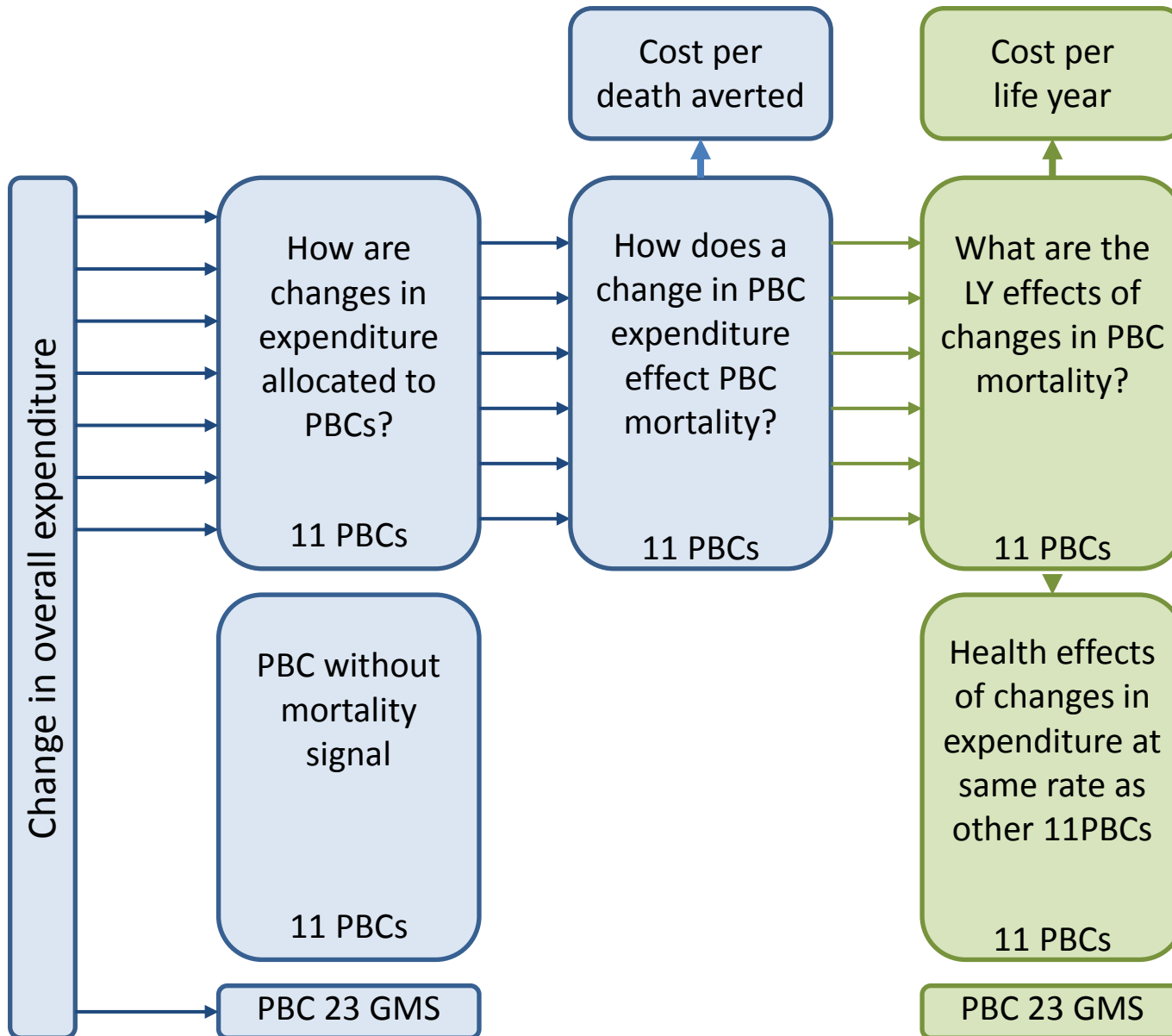
Estimates of the threshold (2008-09)

	Cost per death averted
<i>Qol associated with LYs</i>	-
<i>Qol during disease</i>	-
<i>YLL per death averted</i>	-
<i>QALYs per death averted</i>	-
11 PBCs (with mortality)	£105,872
All 23 PBCs	£114,272

How can we estimate effects on life years



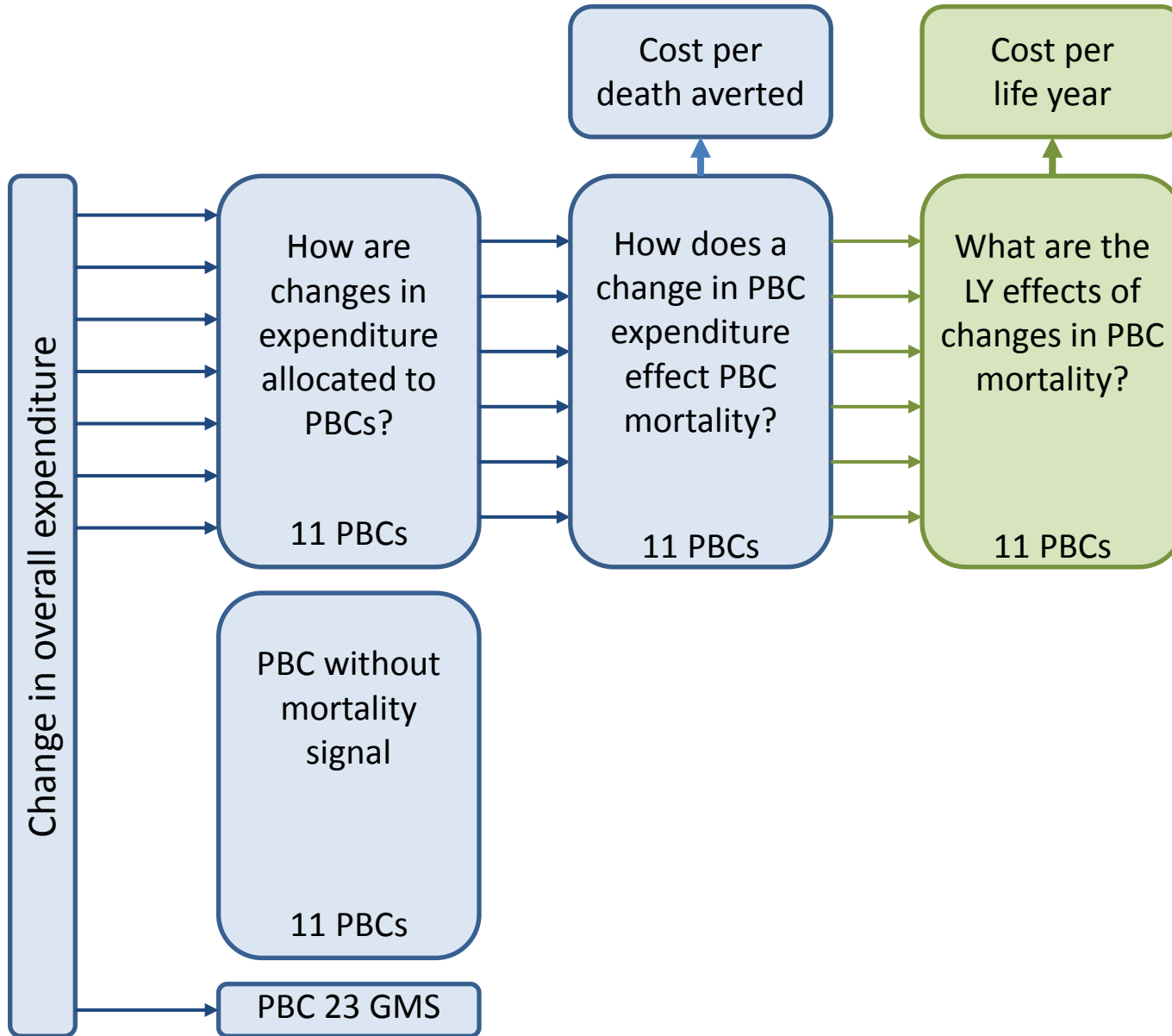
How can we estimate effects on life years



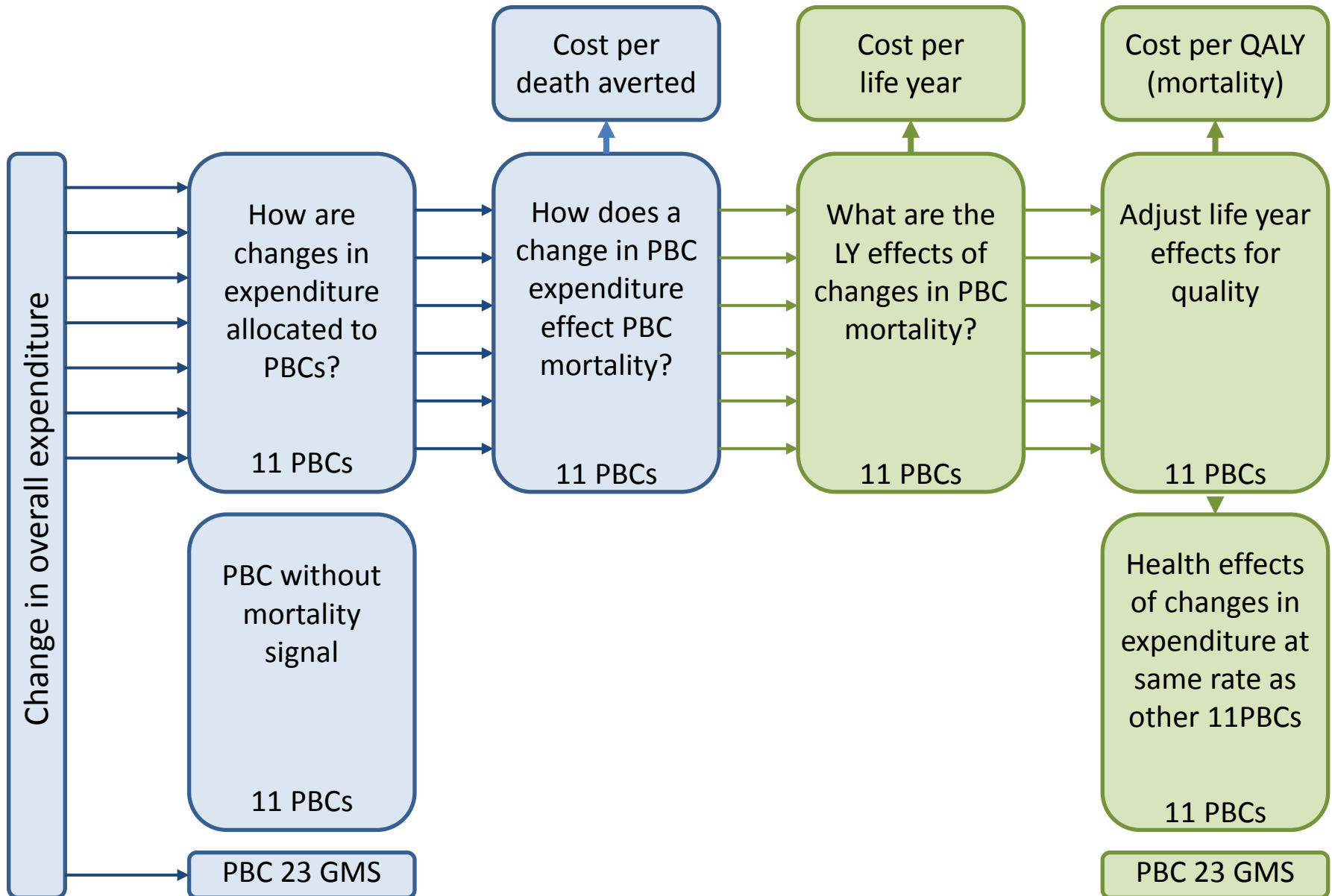
Estimates of the threshold (2008-09)

	Cost per death averted	Cost per life year
<i>Qol associated with LYs</i>	-	1
<i>Qol during disease</i>	-	0
<i>YLL per death averted</i>	-	4.5 YLL
<i>QALYs per death averted</i>	-	4.5 YLL
11 PBCs (with mortality)	£105,872	£23,360
All 23 PBCs	£114,272	£25,214

How can we adjust life years for quality?



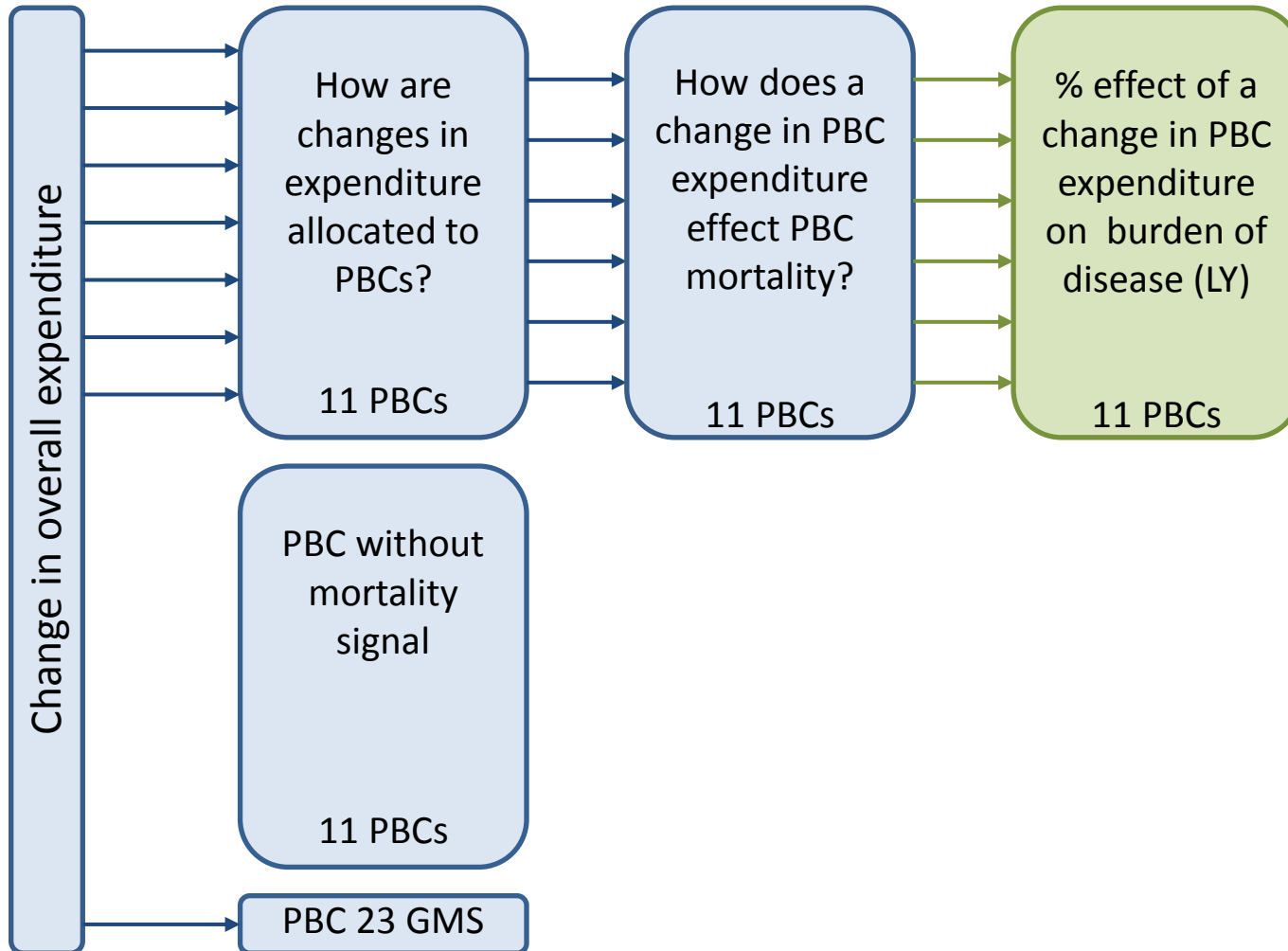
How can we adjust life years for quality?



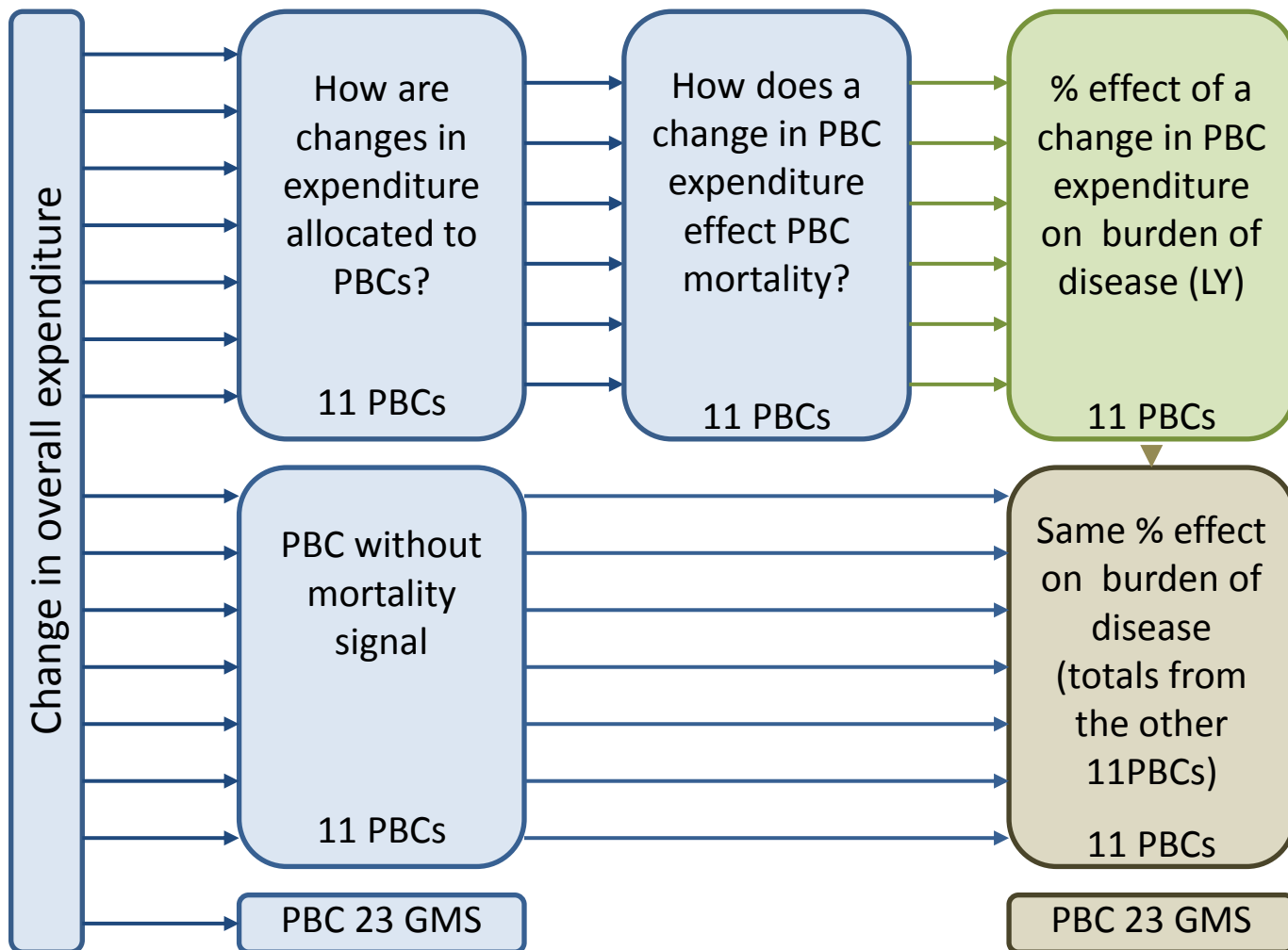
Estimates of the threshold (2008-09)

	Cost per death averted	Cost per life year	Cost per QALY (mortality effects)
<i>Qol associated with LYs</i>	-	1	<i>Norms</i>
<i>Qol during disease</i>	-	0	0
<i>YLL per death averted</i>	-	4.5 YLL	4.5 YLL
<i>QALYs per death averted</i>	-	4.5 YLL	3.8 QALY
11 PBCs (with mortality)	£105,872	£23,360	£28,045
All 23 PBCs	£114,272	£25,214	£30,270

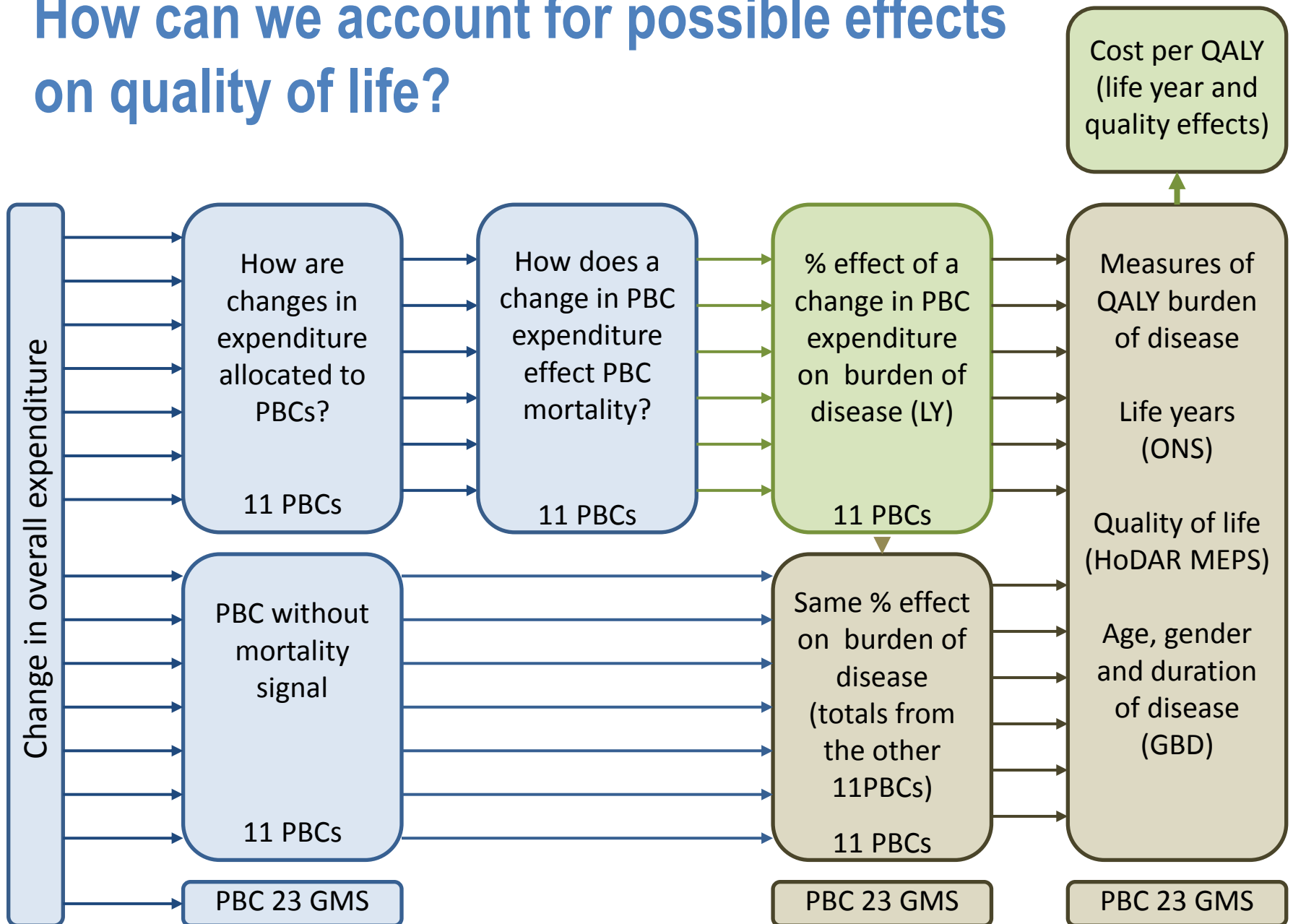
How can we account for possible effects on quality of life?



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Estimates of the threshold (2008-09)

	Cost per death averted	Cost per life year	Cost per QALY (mortality effects)	Cost per QALY
<i>Qol associated with LYs</i>	-	1	<i>Norms</i>	<i>Based on burden</i>
<i>Qol during disease</i>	-	0	0	<i>Based on burden</i>
<i>YLL per death averted</i>	-	4.5 YLL	4.5 YLL	4.5 YLL
<i>QALYs per death averted</i>	-	4.5 YLL	3.8 QALY	12.7 QALY
11 PBCs (with mortality)	£105,872	£23,360	£28,045	£8,308
All 23 PBCs	£114,272	£25,214	£30,270	£12,936

What are the expected health consequences of £10m?

	Change in spend	Additional deaths	LY lost	Total QALY lost	Due to premature death	Quality of life effects
Totals	10 (£m)	51	233	773	150	623
Cancer	0.45	3.74	37.5	26.3	24.4	1.9
Circulatory	0.76	22.78	116.0	107.8	73.7	34.1
Respiratory	0.46	13.37	16.1	229.4	10.1	219.3
Gastro-intestinal	0.32	2.62	24.7	43.9	16.2	27.7
Infectious diseases	0.33	0.72	5.3	15.7	3.6	12.1
Endocrine	0.19	0.67	5.0	60.6	3.2	57.3
Neurological	0.60	1.21	6.5	109.1	4.3	104.8
Genito-urinary	0.46	2.25	3.3	10.6	2.1	8.5
Trauma & injuries*	0.77	0.00	0.0	0.0	0.0	0.0
Maternity & neonates*	0.68	0.01	0.4	0.2	0.2	0.1
Disorders of Blood	0.21	0.36	1.7	21.8	1.1	20.7
Mental Health	1.79	2.83	12.8	95.3	8.3	87.0
Learning Disability	0.10	0.04	0.2	0.7	0.1	0.6
Problems of Vision	0.19	0.05	0.2	4.2	0.2	4.1
Problems of Hearing	0.09	0.03	0.1	14.0	0.1	13.9
Dental problems	0.29	0.00	0.0	6.8	0.0	6.8
Skin	0.20	0.24	1.1	1.9	0.7	1.2
Musculo skeletal	0.36	0.39	1.8	23.2	1.2	22.1
Poisoning and AE	0.09	0.04	0.2	0.8	0.1	0.7
Healthy Individuals	0.35	0.03	0.2	0.7	0.1	0.6
Social Care Needs	0.30	0.00	0.0	0.0	0.0	0.0
Other (GMS)	1.01	0.00	0.0	0.0	0.0	0.0

Accounting for other aspects of value?

- How much and what type of health and for whom?
 - Life years and quality of life effects
 - By age, gender and ICD code
- Severity, unmet need and burden
 - Burden of disease
 - Expected QALE without and with disease
 - Absolute and proportionate shortfall
- Wider social benefits
 - Net production effects of a change in health
 - Marketed and non market production
 - Net of marketed and non marketed consumption

Proportionate Shortfall (% QALY loss)			Absolute Shortfall (QALY loss)			Wider Social Benefits (net production)		
C22	Liver cancer	73%	C22	Liver cancer	10.70	M05	Rheumatoid arthritis	£30,034
C25	Pancreatic cancer	73%	C25	Pancreatic cancer	9.97	E11	Diabetes	£27,421
C34	Lung cancer	71%	C34	Lung cancer	9.68	M45	Ankylosing spondylitis	£26,190
C92	Myeloid leukaemia	38%	F20	Schizophrenia	7.62	F30	Depression	£23,489
G20	Parkinson's disease	31%	G35	Multiple sclerosis	6.18	F20	Schizophrenia	£22,697
C90	Myeloma	31%	C92	Myeloid leukaemia	6.15	J45	Asthma	£20,100
C64	Kidney cancer	22%	G20	Parkinson's disease	4.60	M81	Osteoporosis	£17,910
G35	Multiple sclerosis	18%	C90	Myeloma	4.45	G35	Multiple sclerosis	£15,482
J43	Emphysema and COPD	17%	J43	Emphysema and COPD	3.80	J43	Emphysema and COPD	£14,525
G30	Alzheimer's disease	14%	C64	Kidney cancer	3.75	G40	Epilepsy	£14,245
F03	Dementia	14%	F30	Depression	3.63	L40	Psoriasis	£11,890
F20	Schizophrenia	12%	M05	Rheumatoid arthritis	2.83	Displaced	Average of displaced QALYs	£11,611
M05	Rheumatoid arthritis	11%	E11	Diabetes	2.68	E66	Obesity	£8,138
C61	Prostate cancer	11%	Displaced	Average of displaced QALYs	2.07	C53	Cervical cancer	£6,912
I26	Embolisms, fibrillation, thrombosis	11%	J45	Asthma	1.86	K50	Irritable Bowel Syndrome	£6,284
E11	Diabetes	11%	G30	Alzheimer's disease	1.68	J30	Allergic rhinitis	£5,234
C18	Colon cancer	10%	F03	Dementia	1.68	G20	Parkinson's disease	£3,102
I21	Acute myocardial infarction	9%	G40	Epilepsy	1.32	C50	Breast cancer	£2,888
I64	Stroke	8%	C18	Colon cancer	1.28	G30	Alzheimer's disease	£351
Displaced	Average of displaced QALYs	8%	I26	Embolisms, fibrillation, thrombosis	1.16	A40	Streptococcal septicaemia	-£513
F30	Depression	6%	C61	Prostate cancer	1.06	F03	Dementia	-£2,430
G40	Epilepsy	4%	I21	Acute myocardial infarction	1.00	I64	Stroke	-£6,949
J45	Asthma	4%	I64	Stroke	0.83	C18	Colon cancer	-£8,061
C50	Breast cancer	3%	C53	Cervical cancer	0.60	C61	Prostate cancer	-£10,602
C53	Cervical cancer	3%	C50	Breast cancer	0.55	C64	Kidney cancer	-£13,211
L40	Psoriasis	2%	A40	Streptococcal septicaemia	0.38	I21	Acute myocardial infarction	-£14,395
J10	Influenza	2%	J30	Allergic rhinitis	0.30	I26	Embolisms, fibrillation, thrombosis	-£16,752
M81	Osteoporosis	2%	M81	Osteoporosis	0.28	J10	Influenza	-£21,568
J30	Allergic rhinitis	2%	K50	Irritable Bowel Syndrome	0.26	C90	Myeloma	-£23,382
A40	Streptococcal septicaemia	2%	J10	Influenza	0.19	C92	Myeloid leukaemia	-£24,813
K50	Irritable Bowel Syndrome	1%	L40	Psoriasis	0.19	C22	Liver cancer	-£32,709
E66	Obesity	0%	E66	Obesity	0.18	C34	Lung cancer	-£36,067
M45	Ankylosing spondylitis	0%	M45	Ankylosing spondylitis	0.11	C25	Pancreatic cancer	-£53,860

Accounting for other aspects of value?

- Set of weights
 - Relative value of different types of health (burden)
 - Consumption value of health (WSBs)
- Cost per QALY threshold
 - Basic threshold
- Cost per weighted QALY threshold
 - Burden, WSB or both
- Adjust the basic threshold
 - Weight on health gained/weight on health displaced

Consequences of recent proposals?

- Recent proposals
 - No explicit weights
 - Upper bound extended to £50,000
- Evidence of acceptance creep
 - No technologies rejected ICER under £30,000
 - Lower bound has become irrelevant
 - ICERs of £39,417 to £43,949 = 0.5 probability of rejection
- Health consequences (every £10m NHS costs)
 - Threshold of £20,000 or lower
 - Every £10m means loss of at least 500 QALYs

ICER	Health gained	Health lost	Net loss
£30,000	334 QALYs	500 QALYs	166 QALYs
£50,000	200 QALYs	500 QALYs	300 QALYs

Accountable deliberation

- Appraisal of ranibizumab (Lucentis) for diabetic macular oedema 2011
 - Retinal thickness ≥ 400 subgroup before PAS
 - Additional costs = £3,506 per patient
 - Incremental cost-effectiveness = £25,000 per QALY
 - 23,000 eligible patients each year

Attributes	Investment	Disinvestment
	Lucentis for diabetic macular oedema (£80m pa)	Expected effects of £80m pa
Deaths	0	-411
Life years	0	- 1,864
QALYs	3,225	- 6,184
Burden of disease		
Absolute QALY loss	2.68	2.07
Proportionate QALY loss	11%	8%
Net production effects		
Consumption (£)	85.2m	- 49.8m
QALY equivalent	1,420	- 830

Implications for policy

- NICE
 - Upper bound of the NICE threshold is certainly too high
 - NICE guidance is currently doing more harm than good
 - Paying too much not to little for new drugs
- Pharmaceutical pricing
 - Rational, predictable, accountable evidence based pricing
 - Mechanisms for differential global prices
- Accountable and ethical decisions
 - Makes unidentified NHS patients more real
 - Exposes reality of the choices face with current resources
 - Contribute to informed debate and social change