POPHLTH 720

Cost Effectiveness Evaluation

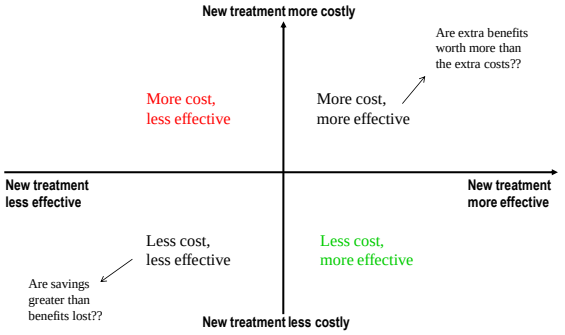
Day 4
Interpreting results
William Leung

Plan for the session

1. Revision
2. Dominance
3. Thresholds
4. ICER
5. Confidence ellipses
6. Cost effectiveness acceptability curves

1. Revision

Cost effectiveness plane



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ICER

We have two options, *A*, a new treatment, and *B*, the old treatment, the incremental cost-effectiveness ratio is

$$\frac{(\text{Average cost}_A - \text{Average cost}_B)}{(\text{Average effects}_A - \text{Average effects}_B)} = \text{ICER}$$

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2. Dominance

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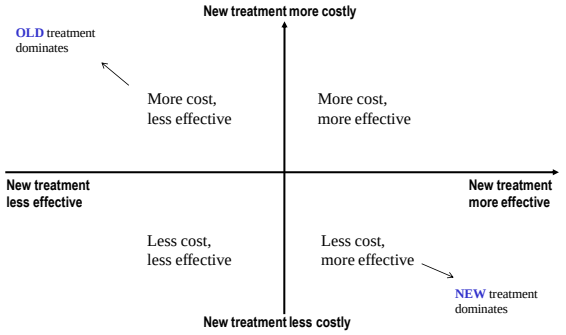
Strict dominance



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Exercise

- From Fox-Rushby & Cairns (2005), consider a comparison of different treatment strategies below. The comparator is no treatment.
- There are 2 drugs, A & B. Drug A could be tried and continued until there is no evidence of an effect, or evidence of an adverse reaction, and similarly for Drug B.
- Alternatively, one drug could be tried first and in the event that there is no beneficial effect (or if there was an adverse reaction) the other drug could be tried.

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Exercise

Strategy	Cost	QALY
Drug A → no treatment	1000	0.17
Drug B → no treatment	800	0.13
Drug A → Drug B → no treatment	1100	0.18
Drug B → Drug A → no treatment	900	0.19
No additional treatment	400	0.10

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Exercise

1) Sort on cost

Strategy	Cost	QALY
1) No additional treatment	400	0.10
2) Drug B → no treatment	800	0.13
3) Drug B → Drug A → no treatment	900	0.19
4) Drug A → no treatment	1000	0.17
5) Drug A → Drug B → no treatment	1100	0.18

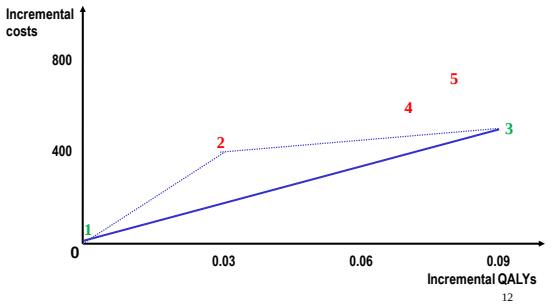
Exercise

2) Identify strictly dominated

Strategy	Cost	QALY
1) No additional treatment	400	0.10
2) Drug B → no treatment	800	0.13
3) Drug B → Drug A → no treatment	900	0.19
~~4) Drug A → no treatment~~	1000	0.17
~~5) Drug A → Drug B → no treatment~~	1100	0.18

Exercise

3) Plot strategies



Exercise

Strategy	Cost	QALY	
1) No additional treatment	400	0.10	
2) Drug B → no treatment	800	0.13	Dominated (extended)
3) Drug B → Drug A → no treatment	900	0.19	ICER = per QALY
4) Drug A → no treatment	1000	0.17	Dominated (strict)
5) Drug A → Drug B → no treatment	1100	0.18	Dominated (strict)

Calculate ICERs of:

a) Strategy 3 vs 1
b) Strategy 2 vs 1
c) Strategy 3 vs 2

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3. Thresholds

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WTP

- Maximum willingness to pay for a QALY improvement
  - Decision makers
  - Not absolute
  - Varies between countries
  - Toni later...

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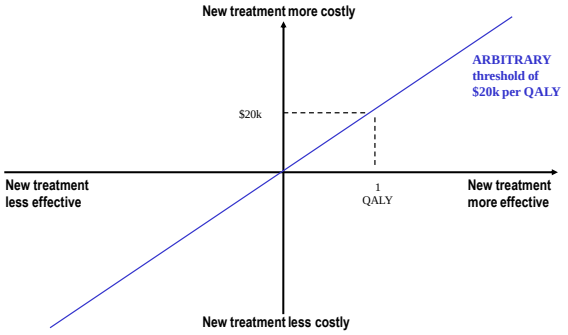
Threshold example



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Question

- Is an ICER of $35,000 cost effective?
  A. Yes
  B. No
  C. Need information on...

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4. ICERs

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Bootstrapping

- Point estimate of ICER unlikely to be adequate
  - Sensitivity analysis (Laura next session)
  - Confidence intervals around ICER
- Bootstrapping
  - Common approach

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Bootstrapping example

- RCT
  - Background
  - ICER is $2,340
- Bootstrapping results
  - Mean ICER is $2,615 per QALY
  - 95% confidence interval is from -$20,841 to $30,386

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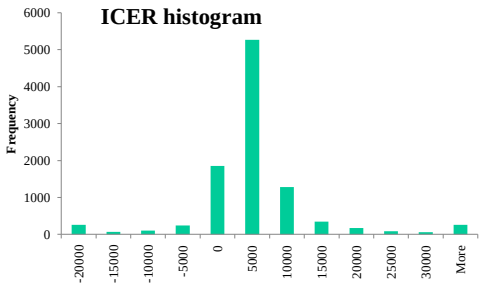
Bootstrapping example



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Bootstrapping example

- In this simulation
  - Minimum ICER is less than -$9,600,000
  - Maximum ICER is more than $7,600,000
  - Could be worse
- Confidence interval crosses zero
  - How to interpret?

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5. Confidence ellipses

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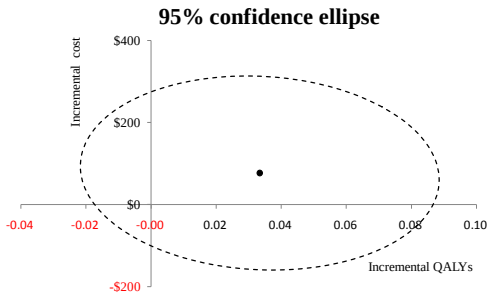
Bootstrapping example



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6. Cost effectiveness acceptability curves

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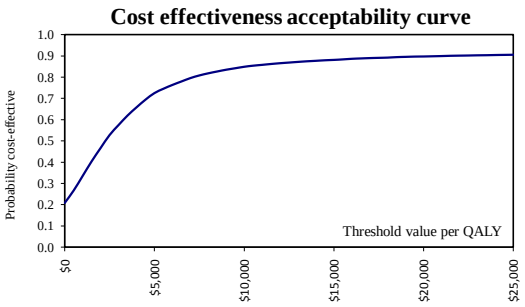
Bootstrapping example



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Questions?

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