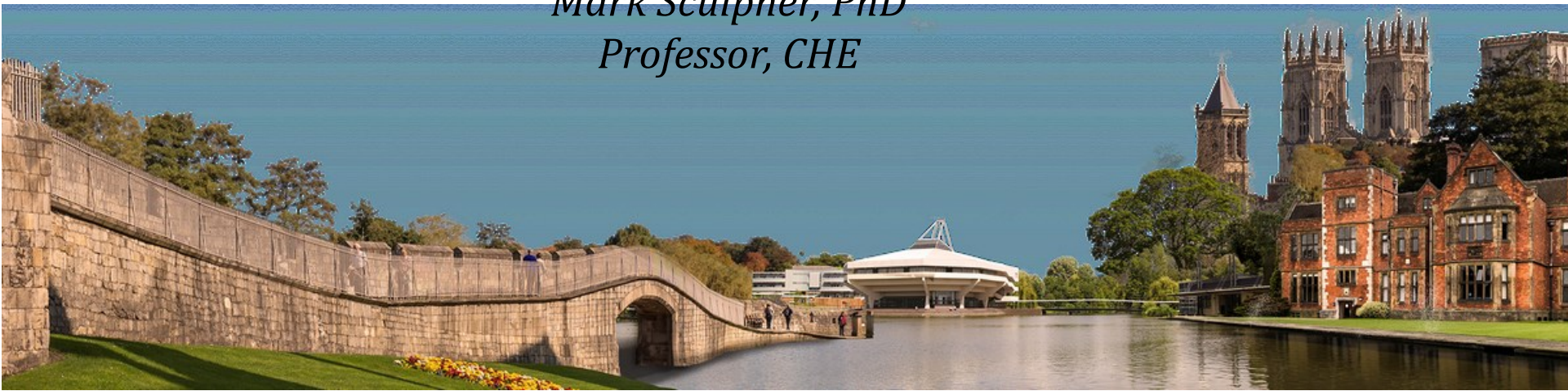
Online Advanced Methods for Cost-Effectiveness Analysis

Presentation 1: Analytical Starting Points
1.3: 'Decision rules'

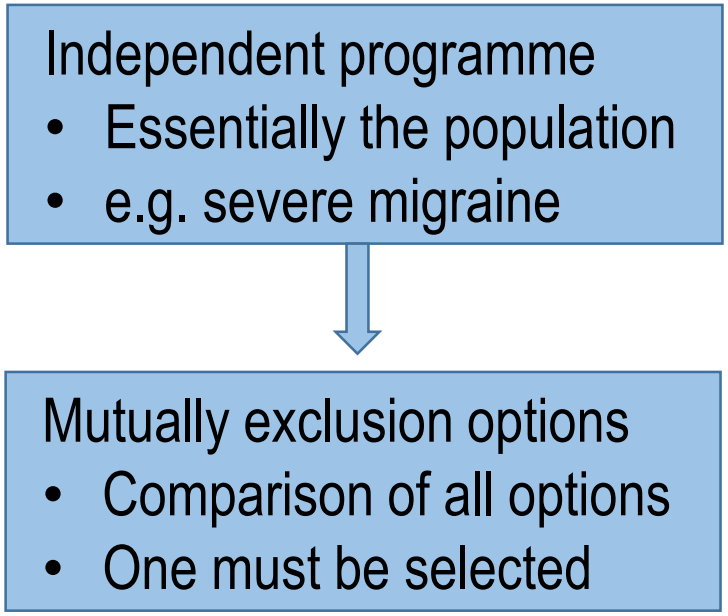
Mark Sculpher, PhD
Professor, CHE



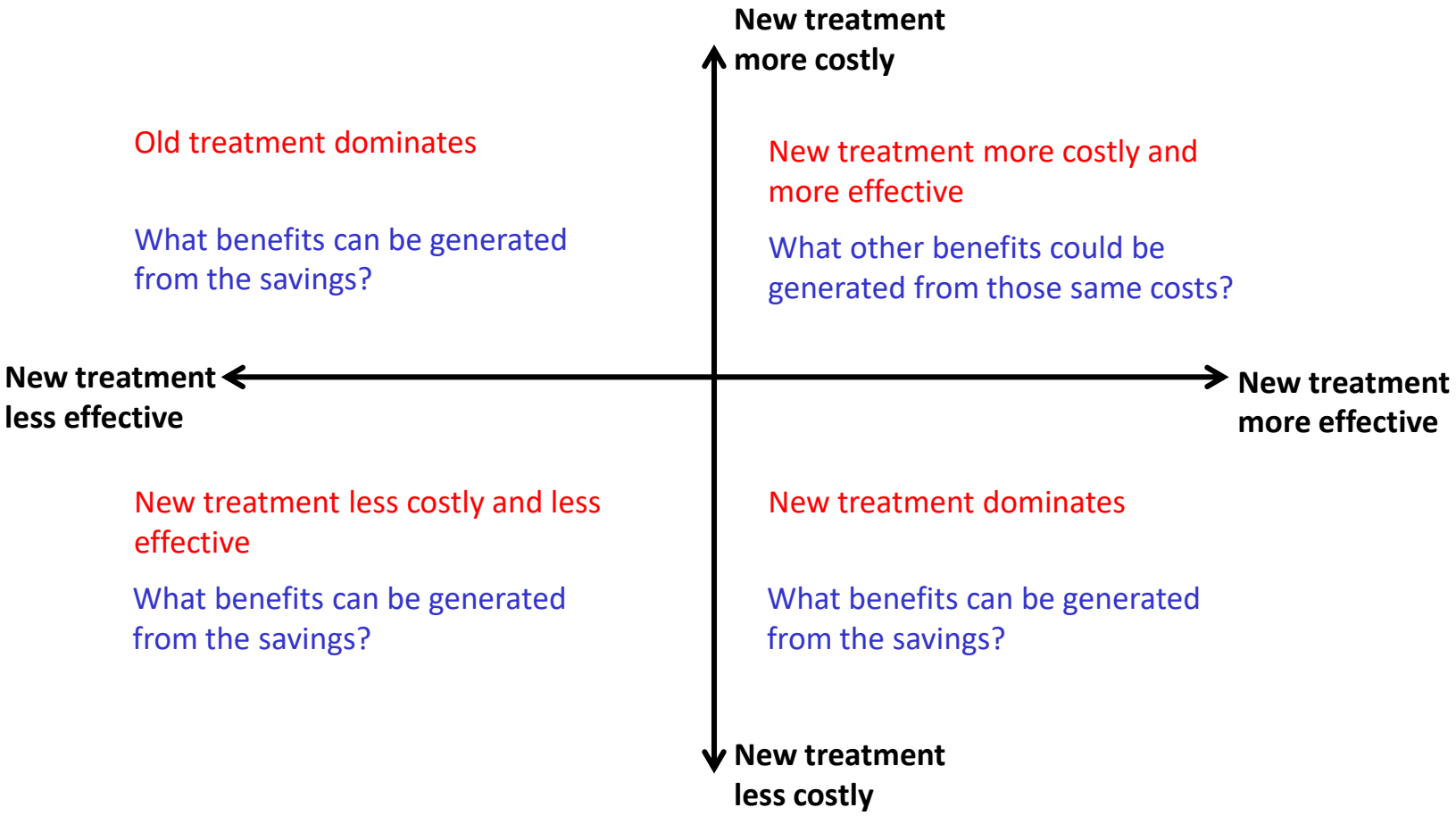
Objectives

- Distinguish between independent programmes and mutually exclusive options
- Appreciate details of cost-effectiveness plane
- Understand dominance and ICERs
- Consider role of cost-effectiveness threshold
- Beware its multiple meanings
- Understand importance of an empirical measure of opportunity cost

Programmes and options



Cost-effectiveness plane



Examples of mutually exclusive options within independent programmes

Management of angina			Breast screening			Treatment of HIV		
Option	Costs	Effects	Option	Costs	Effects	Option	Costs	Effects
A	20,000	8	A	110,000	20	A	30,000	25
B	30,000	4	B	120,000	29	B	56,000	40
C	50,000	19	C	150,000	50	C	78,000	42
D	60,000	23	D	190,000	60	D	115,000	62
E	110,000	20	E	240,000	70	E	150,000	74

Dominance

Management of angina

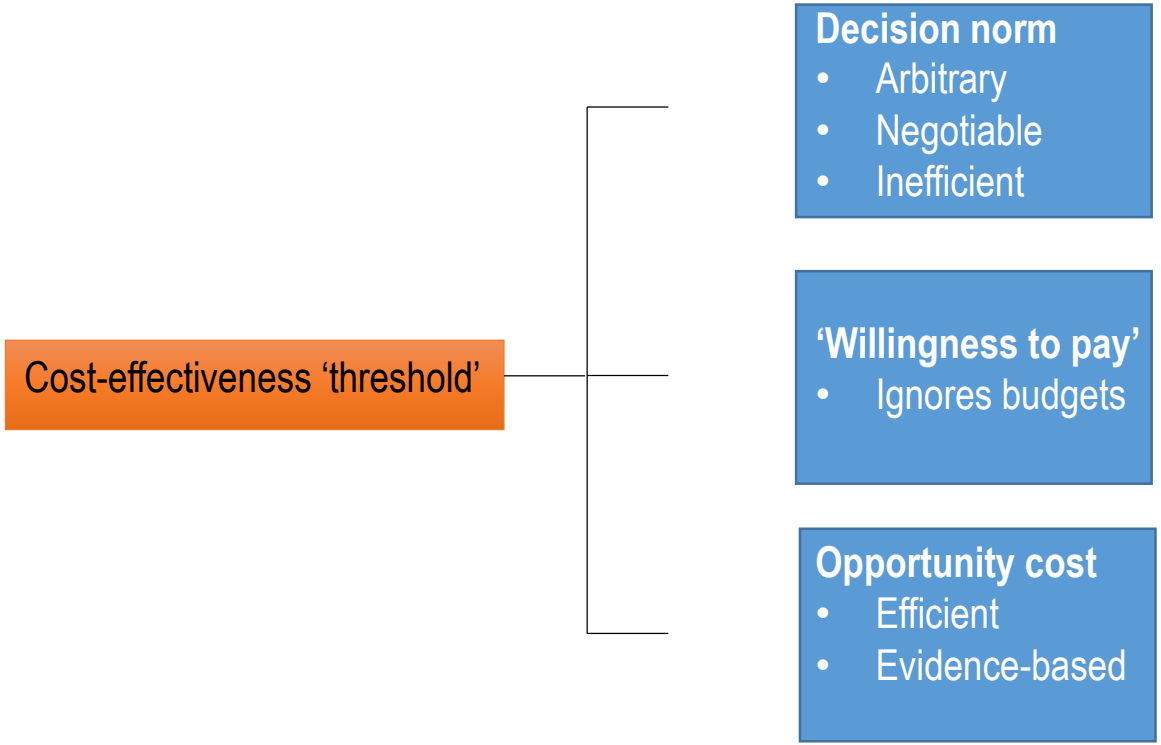
Option	Costs	Effects	
A	20,000	8	
B	30,000	4	→ Dominated: B and E have lower effects and higher cost than other options. B and E are removed from consideration.
C	50,000	19	
D	60,000	23	
E	110,000	20	→

Incremental cost-effectiveness ratios (ICERs)

Breast screening

Option	Costs	Effects	ΔC/Δ E
A	110,000	20	-
B	120,000	29	1,111
C	150,000	50	1,429
D	190,000	60	4,000
E	240,000	70	5,000

Making decisions from ICERs



Evidence of opportunity costs

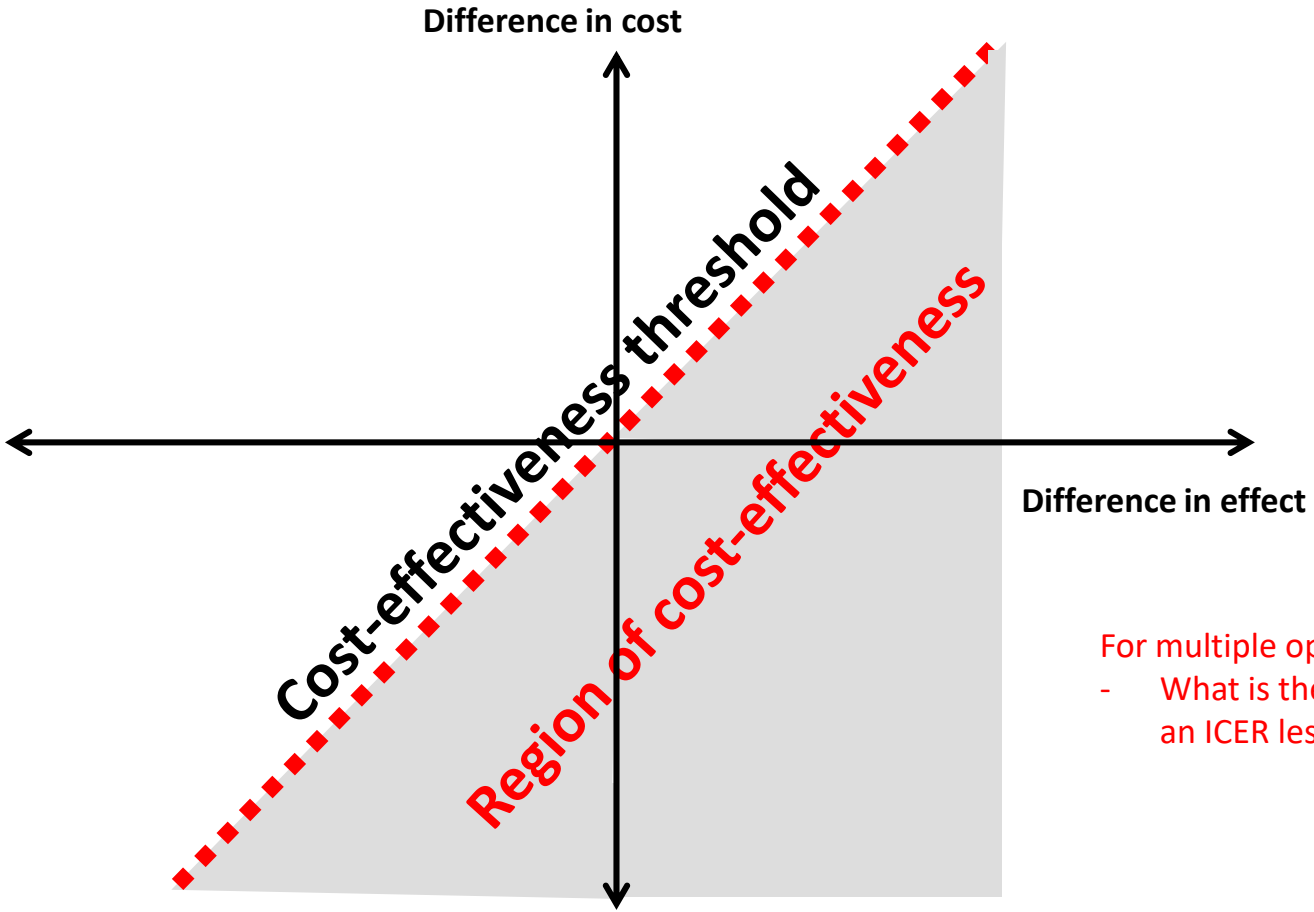
HEALTH TECHNOLOGY ASSESSMENT

VOLUME 19 ISSUE 14 FEBRUARY 2015
ISSN 1366-5278

Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold

Karl Claxton, Steve Martin, Marta Soares, Nigel Rice, Eldon Spackman, Sebastian Hinde, Nancy Devlin, Peter C Smith and Mark Sculpher

Cost-effective region of cost-effectiveness plane



For multiple options:

- What is the most effective with an ICER less then the threshold?

Extended dominance

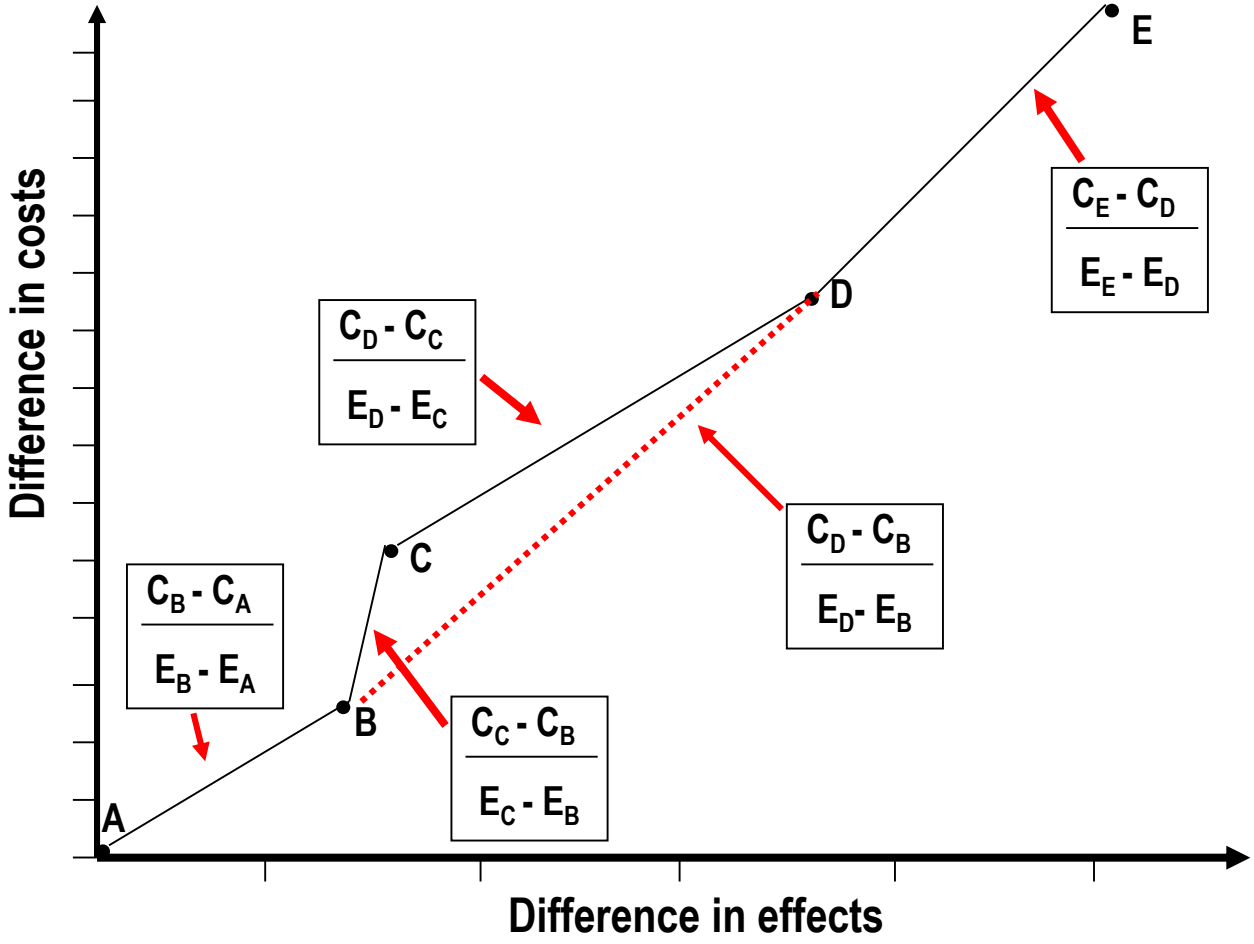
Option	Treatment of HIV Costs	Effects	ΔC/ΔE (1)	ΔC/ΔE (2)
A	30,000	25	-	-
B	56,000	40	1,733	1,733
C	78,000	42	11,000	ED
D	115,000	62	1,850	2,682
E	150,000	74	2,917	2,917

Option C is subject to extended dominance as it has a higher ICER than a more effective programme

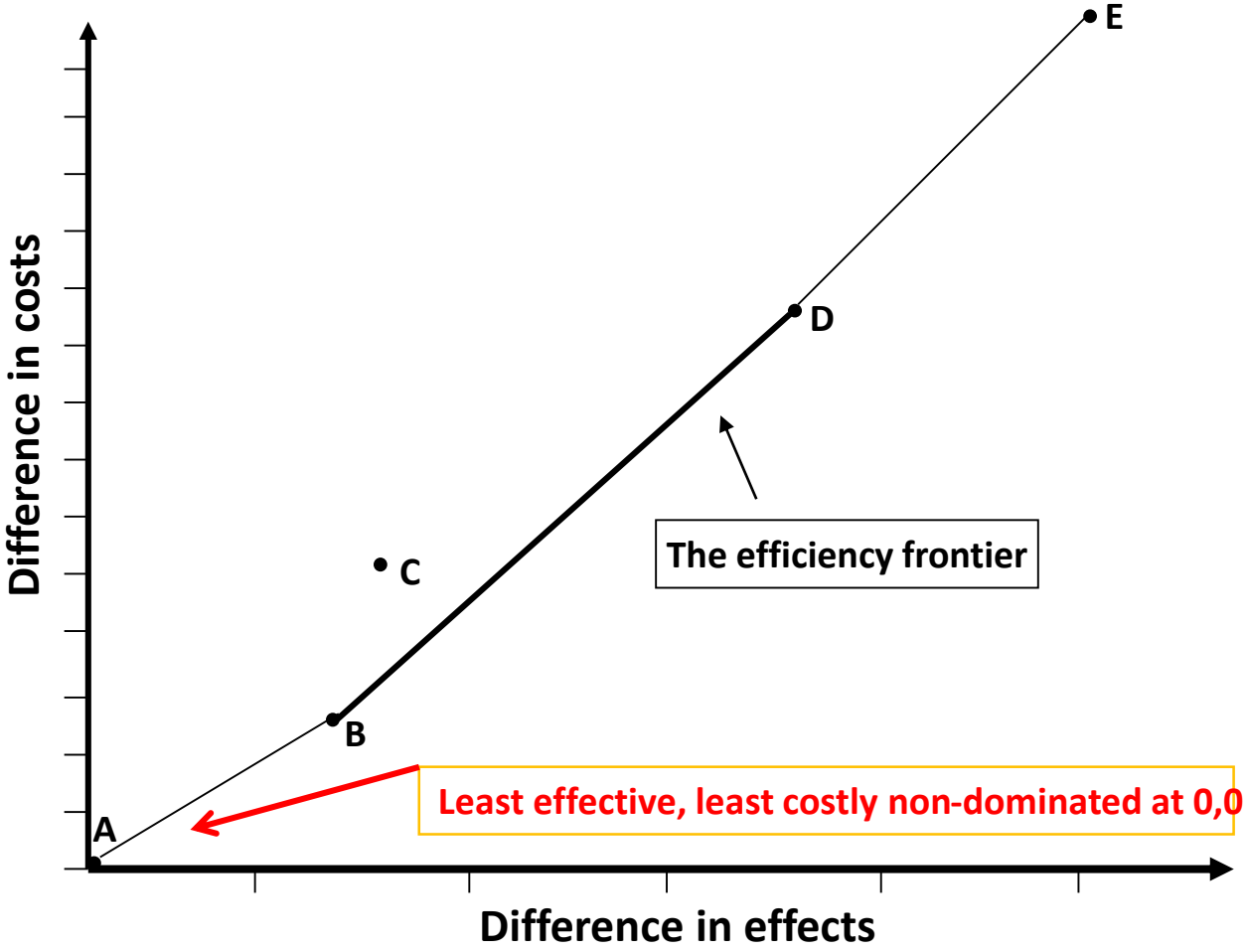
More on extended dominance

- Best way to understand this is that, for a given threshold, an option subject to extended dominance can never by cost-effective
- Practical way to identify extended dominance:
  i. Rank options by costs or effects
  ii. Exclude dominated options
  iii. Calculate ICERs for the remaining ones
  iv. If an option exists that has a higher ICER than a more effective one, it is subject to extended dominance and can be removed
  v. Recalculate ICERs
- Note that, for Step (iv) above, beware that the ICERs you are comparing with are not subject to change when extendedly dominated options are removed

Cost-effectiveness plane: management of HIV



Efficiency frontier: management of HIV



Summary

- Population/sub-population defines independent programme
- ICERs only relevant where no dominance
- ICERs apply in top right and bottom left quadrants
- Beware the concept cost-effectiveness ‘threshold’
- Opportunity costs central in cost-effectiveness analysis