

# COST EFFECTIVENESS ANALYSIS

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JAKARTA, 22 MEI 2017

# INTRODUCTION


- ▶ Economic evaluation in which the costs and consequences of health interventions are evaluated
- ▶ A systematic technique used to compare two or more pharmaceutical products or health intervention systems by measuring their costs and consequences

# CEA

- ▶ Comprehensive economic analysis
- ▶ consequences in their natural form are widely used by clinicians and decision makers
- ▶ The monetary approach is the main tool in cost-effectiveness analysis to assess the benefits of health services

# Perspective on CEA

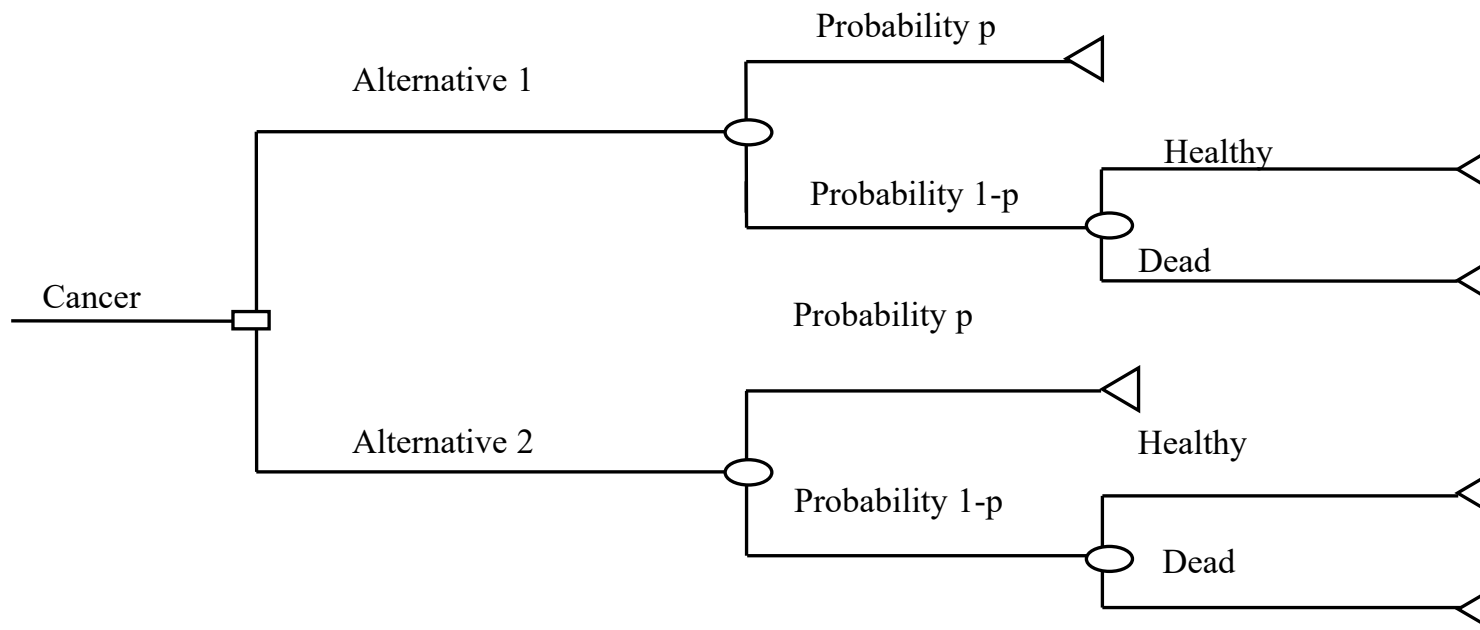
- ▶ The community perspective is the most comprehensive because all costs are calculated including health care costs, productivity costs and family costs
- ▶ Generally only done without perspective limitations such as the payer's perspective



The use of data in CEA must meet the criteria :

- ▶ Quality
- ▶ Relevant
- ▶ Comprehensive

# Decision Tree



Decision Tree ISPOR, 2003

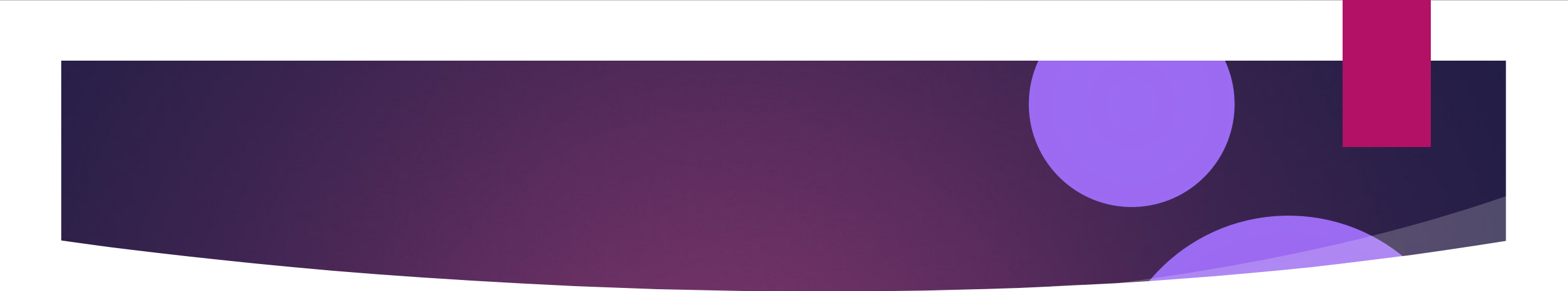
# CEA

▶ The analysis used to interpret the results of a program is

▶ *Average Cost Effectiveness Ratio (ACER)*

The ratio of the total cost and effectiveness of the two interventions

$$\begin{aligned} - \quad ACER &= \frac{\text{Total cost}}{\text{Effectiveness}} \end{aligned}$$

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- ▶ *Incremental cost effectiveness Ratio (ICER)*  
the ratio of the additional costs to produce a unit increase in output relative to the alternative intervention.

$$\text{ICER} = \frac{\text{intervention cost A} - \text{intervensi cost B}}{\text{Effectiveness A} - \text{Effectiveness B}}$$



# SENSITIVITY ANALYSIS

- To analyze the impact of uncertainty from an economic analysis
- Analysis one way sensitivity : Tornado Chart (value lowers and lowers 20% of the ICER value)
- *Probabilistic Sensitivity Analysis : scatter plot on curve effectiveness plane*

# Example

- ✓ Patient have a symptoms indicating a stomach ulcer. The health care provider may make a diagnosis based on the interview with the patient or based on the results of endoscopy.
- ✓ Measuring the results or outcomes of medications used to treat stomach ulcers may based on patient symptoms reduction or follow up endoscopies.

# Example

- ✓ Patients were treated with three options Medicine A or B or C and using two outcome measures :
  - Symptoms-free days (SFDs, how many days, on average patient did not have gastrointestinal symptoms during the year.
  - Percent healed (patient in whom endoscopy indicated the ulcer was healed)

# Ways to Present Cost and Effectiveness Results (1)

	DRUG A	DRUG B	DRUG C
<b>Method 1 : cost-consequence analysis</b>			
Cost outcomes	\$600 per year	\$ 210 per year	\$530 per year
GI SFDs	130	200	250
% Healed	50%	70%	80%
<b>Method 2 : Average cost-effectiveness ratios</b>			
	$\$600/130 = 4.61$ per SFD	$\$210/200 = \$1.05$ per SFD	$\$530/250 = \$ 2.12$ per SFD
	$\$600/0.5 = \$1200$ per cure	$\$210/0.7 = \$ 300$ per cure	$\$530/0.8 = \$ 662$

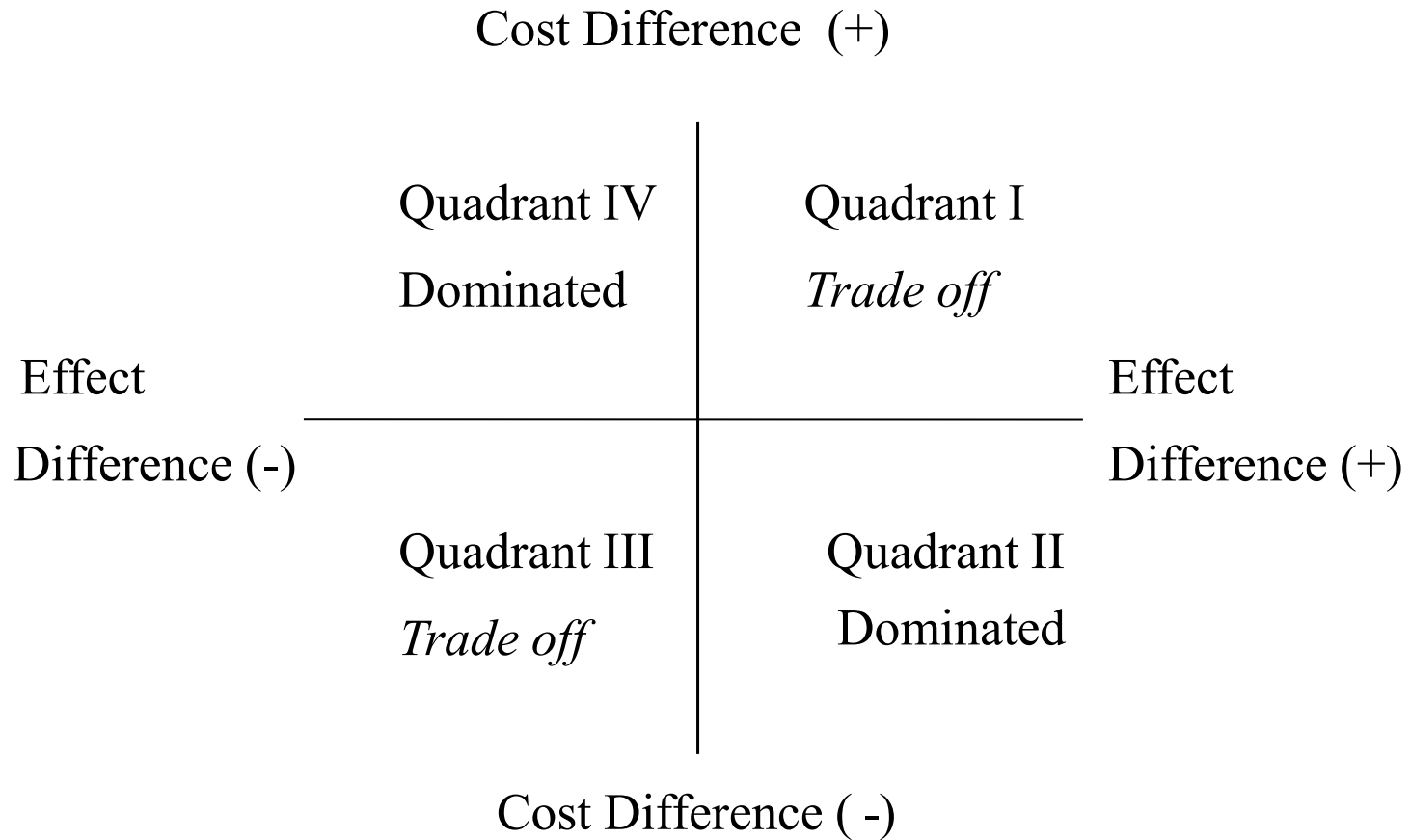
# Cost Effectiveness Grid

- Cost effectiveness grid can be used to illustrate the definition of “cost-effectiveness”
- To determine if cost therapy is cost effective, both the cost and effectiveness must be considered
- The cells below represent possible result when comparing two alternatives with regard to cost and effectiveness

# Cost Effectiveness Grid

<b>COST EFFECTIVENESS</b>	<b>Lower cost</b>	<b>Same Cost</b>	<b>Higher Cost</b>
<b>Lower Effectiveness</b>	<b>A</b> Conduct ICER	<b>B</b>	<b>C</b> Dominated
<b>Same Effectiveness</b>	<b>D</b>	<b>E</b> Arbitrary	<b>F</b>
<b>Higher effectiveness</b>	<b>G</b> Dominant	<b>H</b>	<b>I</b> Conduct ICER

# Cost Effectiveness plane



THE END



Source image: [www.michellecederberg.com](http://www.michellecederberg.com)

