How relevant is cost-effectiveness in different regions?

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- There is no conflict of interest for this presentation.

Outline

- Overview of CEA
- Factors affecting generalizability of HE data
- The findings of preliminary systematic review of HE studies in NSCLC

Efficacy, Effectiveness, Efficiency

Efficacy

- Does it work?

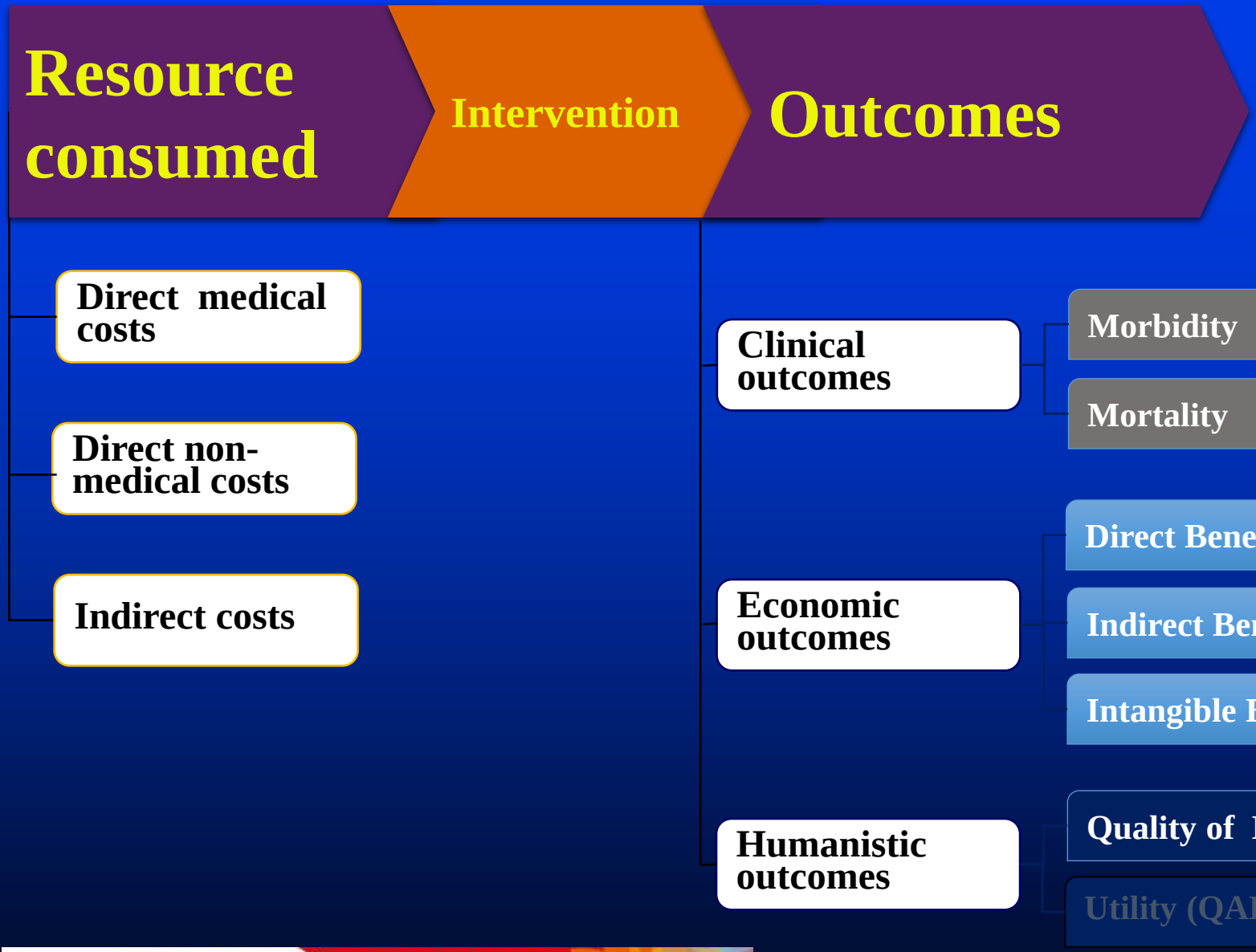
Effectiveness

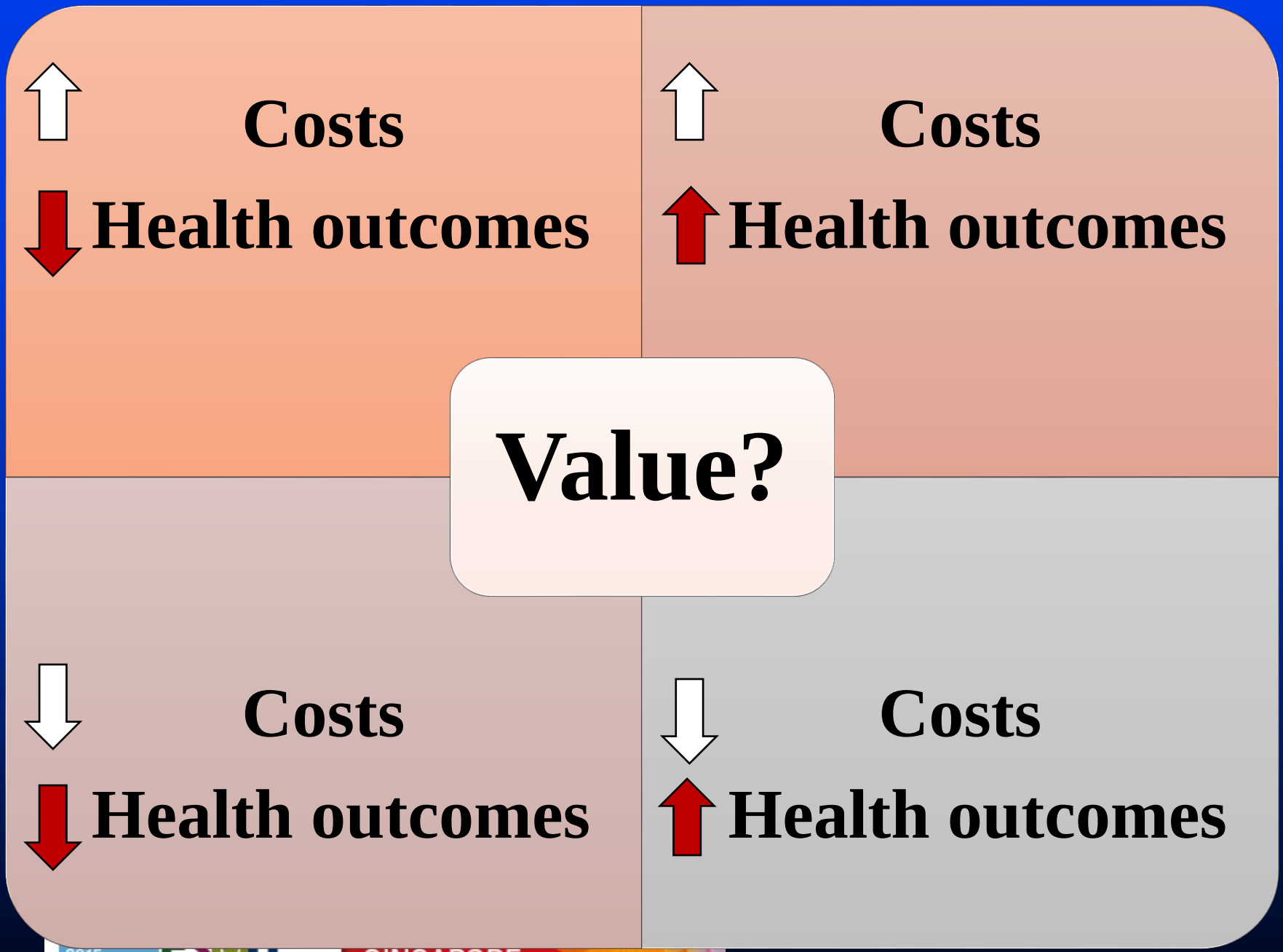
- Can it work in real setting?

Efficiency

Value for money

- How worth is it?
- Weigh input and outcome




↑ Costs
↓ Health outcomes
↑ Costs
↑ Health outcomes
Value?
↓ Costs
↓ Health outcomes
↓ Costs
↑ Health outcomes

Economic Analysis

Methodology	Cost Unit	Outcome Unit
Cost-benefit	Dollars	Dollars
Cost-effectiveness[i]	Dollars	Natural Units
Cost-minimization	Dollars	Not different
Cost-utility	Dollars	QALY's

Cost-effectiveness analysis

- Provide the economic evidence to inform decision makers of efficiency questions.
- Optimal use of healthcare resources in the distribution or production of a given health intervention.

Evidence for decision making

- **The main vehicles for HE analysis of a new technology:**
  - **The patient-level HE studies conducted along clinical studies, especially phase III, IV trial**
  - **Decision models which use data on treatment efficacy and resource use from the patient-level trials.**

Generalizability of HE Data

Do we have to conduct HE study in all medicines in each country?

Can the findings from one country apply to the local context?

What are the factors that need to be taken into consideration?

Factors affecting the generalizability of HE data

1. Patient characteristics
2. Disease characteristics
3. Provider characteristics
4. Health care system characteristics
5. Methodological characteristics

Goeree R, et.al. Current Medical Research and Opinion2007: 23:671-82.

1.Patient characteristics

- Demographics (age, gender, race), education, socio-economic status.
- Lifestyle, genetic factors, co-morbidities.
- Mortality rates, life expectancy.

These patient characteristics can affect the baseline risk of disease and have impact on clinical effectiveness when performing HE studies

1.Patient characteristics

- Different types of insurance coverage (fee-for service, co-payment, out-of-pocket payment) can have an influence of treatment decision.
- Population values (utility) can vary across countries.

2.Disease characteristics

- Epidemiology (incidence/prevalence, disease severity)
- Disease-specific mortality

They can be very different from one region compared to another region.

3.Provider characteristics

- Clinical practice, guidelines, experience, education

These factors can have a significance on the effectiveness of intervention.

4.Health care system characteristics

- Each country will differ in terms of the structure of health care system, organization of delivery system, the magnitude of resources or services that are available.

- There are differences in unit cost across countries.

5.Methodological characteristics

- **Heterogeneity of cost measures.**
  - **Type of costs are included in the analysis.**
- **Heterogeneity of outcome measures.**
  - **Various instrument is used to measure utility.**
- **Study perspective**
  - **Different perspectives are used such as societal, provider, or payer's perspectives.**
- **Discount rates**

The situation of HE studies along with clinical trial in NSCLC?

HE studies along with clinical trial in NSCLC:

- Systematic review
- PubMed database: inception-Sep 2015
- Searching terms:
  - (Non-small cell lung cancer) AND
  - (cost-effectiveness OR cost-utility) AND
  - (randomized controlled trial) NOT
  - (surgery) NOT
  - (radiotherapy)

Findings of the study

Initial search 66 studies

1. No chemotherapy (3)
2. Meta-analysis, systematic review (7)
3. Article review (13)
4. Model-base CEA/CUA (10)
5. Not CEA/CUA such as cost analysis (11)
6. Others such as SCLC (8)
7. No full text available prior to 1997 (3)

Paper included 11 studies

Results

- Of those 11 studies, 7, 3, and 1 are from Europe, Canada, and Asia respectively.
- In general, resource uses were obtained from clinical trial, then applied unit cost based on national source in each country.
- All studies considered Health Care system perspective.
- Direct medical costs were included.

Results

- Methodological inconsistency
  - Selection of comparator
  - Data collection and sample size
  - Heterogeneity of cost and outcome measures used in economic evaluation
    - Cost measurement
    - Utility measurement

Study	Intervention vs Comparator	First-line	Second line	Maintenance	Adjuvant	n/a
1	Erl vs Chemo	/				
2	Carbo+Pac vs Cis+Eto	/				
3	Gem+Doc vs Doc	/				
4	Gem+BSC vs BSC Gem+Cis vs Cis+Eto Gem+Cis vs MIC Gem+Cis vs MVP Gem+Cis vs Pac+Cis Gem+Cis vs Doc+Cis Gem+Cis vs Vin+Cis	/				
5	Vin+Cis vs BSC CAP vs BSC	/				
6	Pac+Cis vs Ten+Cis	/				
7	Pem vs Doc		/			
8	Erl vs Placebo		/			
9	Gem vs Obs Erl vs Obs			/		
10	Vin+Cis vs Obs				/	
11	MIC+PC vs PC					/

BSC: Best supportive care; CAP: Cyclophosphamide+Doxorubicin; Carbo:Carboplatin; Chemo:Chemotherapy; Cis: Cisplatin; Eto: Etoposide; Erl:Erlotinib; MIC: Mitomycin+Ifosfamide+Cisplatin; MVP: Mitomycin+Vinblastine+Platinum; Obs:Observation; PC: Palliative care; Vin: Vinorebline

Methodology	Number	Percent
-Data collection (n=11)		
Prospective	6	54.5
Retrospective	5	45.5
-Sample size (n=16)		
<100	5	31.3
100-300	6	37.5
>300-600	3	18.8
>600	2	12.4
-Type of analysis (n=12)		
CEA	7	58.3
CUA	5	41.7
-Utility value in CUA (n=5)		
-Literature review	3	60.0
-Direct measurement	1	20.0
-Expert opinion	1	20.0
-Effectiveness in CEA (n=7)		
-Life year gained	5	71.4
-Others: RR, progression free life year	2	28.6
-Cost items included (First line study, n=6)		
-Not include cost of second-line	5	83.3
-Include cost of second-line	1	16.7
-Discounting		
Yes	1	9.1
No	10	90.9

Results

- One study compared teneposide plus cisplatin (TENCIS) vs paclitaxel plus cisplatin (TAXCIS) across four countries in Europe (Netherlands, Belgium, Span, France).

Table 3. Drug and administration costs (US$) associated with chemotherapy based on clinical opinion (Delphi)

	The Netherlands		Belgium		Spain		France	
	TENCIS	TAXCIS	TENCIS	TAXCIS	TENCIS	TAXCIS	TENCIS	TAXCIS
Total cost of chemotherapy drugs	*1383*	*8573*	*841*	*6267*	*750*	*5970*	*438*	*6349*
Administration cost—1st cycle	*964*	*489*	*583*	*265*	*642*	*182*	*1508*	*804*
% day-clinic—1st cycle	50	0	59	57	67	85	11	21
cost per day for day-clinic	182	182	133	133	136	136	222	222
% hospital—1st cycle	100	100	42	43	33	15	89	79
length of stay—1st cycle	3.13	1.75	3.17	2.00	4.13	1.88	2.26	1.86
cost per day for hospital stay	279	279	220	220	237	237	514	514
Administration cost—next cycles	*964*	*489*	*561*	*207*	*628*	*168*	*1470*	*749*
% day-clinic—next cycles	50	0	65	72	63	92	21	29
cost per day for day-clinic	182	182	133	133	136	136	222	222
% hospital—next cycles	100	100	35	28	38	8	79	71
length of stay—next cycles	3.13	1.75	3.33	1.80	3.63	2.25	2.42	1.88
cost per day for hospital stay	279	279	220	220	237	237	514	514
Total administration cost—all cycles	*3855*	*1955*	*2267*	*885*	*2526*	*687*	*5918*	*3050*

Annemans L, et.al. Anti-Cancer Drug 1999

Conclusion

- Cost-effectiveness results can vary across countries due to a number of factors that pose as threats to generalizability.
- No country has yet been able to conduct all the studies that can provide input data for all possible interventions. The tendency is that cost inputs are specific to the local country, but borrow clinical inputs from the landmark trial.