

Case Studies

Lecture 2

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Cost Of Illness

Estimates the cost of a disease on a defined population

Cost Of consequences

Not commonly used, just list of consequences (no calculations)



Cost Effectiveness Analysis (CEA)



Cost effectiveness analysis of adding a second agent to inhaled corticosteroids for patients with asthma

The aim of the study is to compare the costs and effectiveness of 2 new adjunctive therapies, Breathagain and Asthmabegone with ICS use alone.



Efficacy and Cost Comparisons

Outcome	ICS + Placebo (<i>n</i> = 220)	ICS + Breathe Again (<i>n</i> = 210)	ICS + AsthmaBe Gone (<i>n</i> = 213)
Clinical Outcomes			
Number (%) with FEV ₁ increase \geq 12%	77 (35%)	126 (60%)	130 (61%)
Number (%) of SFDs in 6 months per patient [N (%)]	9900 45 (25%) per pt	18,900 90 (50%) per pt	19,170 90 (50%) per pt
6-Month Costs			
Medication costs	\$64,900 (\$295 per patient)	\$112,140 (\$534 per patient)	\$80,514 (\$378 per patient)
Unscheduled office visits	23 visits = \$1380 (\$6 per patient)	7 visits = \$420 (\$2 per patient)	6 visits = \$360 (\$2 per patient)
Emergency room visits	Four visits = \$1100 (\$5 per patient)	One visit = \$275 (\$1 per patient)	One visit = \$275 (\$1 per patient)
Hospitalizations	1 = \$3080 (\$14 per patient)	0	0
Total Costs	\$70,460 (\$320 per patient)	\$112,835 (\$537 per patient)	\$81,149 (\$381 per patient)

ICS alone= less costly & less effectively

Incremental Cost-Effectiveness Ratios (ICERs)

Comparison	ICER—Success*	ICER—SFDs
BreatheAgain vs. ICS (B-I)	$(\$537 - \$320)/(0.60 - 0.35)$ = \$868 per extra success	$(\$537 - \$320)/(90 \text{ d} - 45 \text{ d})$ = \$4.82 per extra SFD
AsthmaBeGone vs. ICS (A-I)	$(\$381 - \$320)/(0.61 - 0.35)$ = \$235 per extra success	$(\$381 - \$320)/(90 \text{ d} - 45 \text{ d})$ = \$1.35 per extra SFD
AsthmaBeGone vs. BreatheAgain (A-B)	A dominates B	A dominates B

Asthma begone had similar effectiveness but at lower cost..



Cost Minimization Analysis (CMA)



ECONOMIC ANALYSIS OF ONCOPLATIN ALONE (A CHEMOTHERAPY AGENT) COMPARED WITH ONCOPLATIN COMBINED WITH NONAUSEA (AN ANTINAUSEA AGENT)

The objective of the study was to compare the cost of Oncoplatin given in two doses with Oncoplatin combined with NoNausea administered in one dose.



Adverse effects should be taken into account...

Patient Comparisons

	Split Dosing of Oncoplatin (<i>n</i> = 293)	Full Dose of Oncoplatin Plus NoNausea (<i>n</i> = 295)
Gender (% women)	54.6%	52.5%
Mean age (SD)	58.3 (10.0)	59.2 (11.0)
Ethnicity (% white)	79.9%	80.7%
Adverse events [N (%)]		
Nausea	13 (4.4%)	12 (4.1%)
Fever	14 (4.8%)	13 (4.4%)
Fatigue	10 (3.4%)	8 (2.7%)
Pain	6 (2.0%)	7 (2.4%)
Other	8 (2.7%)	9 (3.0%)

Savings once per cycle dose was 88\$

Costs for First Cycle of Treatment

	Split Dosing of Oncoplatin (<i>n</i> = 293)	Full Dose of Oncoplatin Plus NoNausea (<i>n</i> = 295)
Average cost of Oncoplatin ^a	\$2964	\$2980
Average cost of NoNausea (35 mg) ^a	N/A	\$40
Cost of IV administration ^b	\$160	\$80
Cost of physician or clinic visit ^b	\$128	\$64
Total cost per patient	\$3252	\$3164



Cost Utility Analysis



Cost Utility Analysis Of Best Supportive Care Versus Oncoplatin And Oncotaxel In The Treatment Of Recurrent Metastatic Breast Cancer

Utility scores were collected via Time trade off



Data

	BSC (n = 29)	Oncoplatin (n = 36)	Oncotaxel (n = 35) †
Treatment charges: Mean (SD)	\$5000 (\$1000)	\$10,000 (\$2000)	\$7000 (\$2000)
Survival (days): Mean (range)	130 (110–140)	200 (180–215)	160 (110–190)
Utility scores: Oncology nurses	0.60	0.35	0.35
Utility scores: Non-oncology patients	0.61	0.32	0.32

Utility scores was higher for BSC

Chemotherapy is more effective but at higher cost ... 

Calculations

	BSC (<i>n</i> = 29)	Oncoplatin (<i>n</i> = 36)	Oncotaxel (<i>n</i> = 35)
Cost Effectiveness			
Cost per LYS = (cost/days) * 365 days/year	\$14,038	\$18,250	\$15,969
Incremental cost per LYS = (Δ Costs/ Δ days) * 365 days/year		Oncoplatin vs. BSC = \$26,071 per additional LYS	Oncotaxel vs. BSC = \$24,333 per additional LYS
Cost Utility			
QALY = Days * utility/365 days	O = 0.21 QALY P = 0.22 QALY	O = 0.19 QALY P = 0.17 QALY	O = 0.15 QALY P = 0.14 QALY
Average cost per QALY	O = \$23,809 P = \$22,727	O = \$52,631 P = \$58,823	O = \$46,667 P = \$50,000
Incremental cost per QALY = Δ Costs/ Δ QALYs	Both Oncoplatin and Oncotaxel dominated by BSC for both O and P estimates	Oncoplatin vs. Oncotaxel O = \$75,000 per additional QALY P = \$100,000 per additional QALY	



Cost Benefit Analysis



Cost benefit Analysis Of a Roseolitis vaccination for senior pharmacy students in US

The aim of the study is to conduct an economic analysis to determine if requiring all US senior pharmacy students to be vaccinated against Roseolitis would be cost beneficial



Base Case Assumptions

	Without Vaccine	With Vaccine	Difference
Costs			
Cost of vaccine	—	$8000 \times \$50 = \$400,000$	\$400,000
Administration of vaccine	—	$8000 \times \$15 = \$120,000$	\$120,000
Total vaccination costs	—		\$520,000
Benefits			
Number of cases of roseolitis: 90% effectiveness	8000×0.02 $= 160$	$8,000 \times 0.02 \times .1$ $= 16$	144 cases avoided
Cost for treatment: \$50/doctorvisit + \$10 medication	$160 \times \$60$ $= \$9600$	$16 \times \$60$ $= \$960$	\$8640 saved
Number of severe infections	160×0.20 $= 32$	16×0.20 $= 3.2$	28.8 infections avoided
Cost of infection: \$3000	$32 \times \$3000$ $= \$96,000$	$3.2 \times \$3000$ $= \$9600$	\$86,400 saved
Total direct medical savings			\$95,040
Lives saved	32×0.03 $= 1 \text{ life}$	3.2×0.03 $= 0.1 \text{ life}$	1 life $= \$3,200,000$
Total direct and indirect savings			\$3,295,040

The number of patients with "FEV₁ increase" on therapy A is 70 patients while for therapy B (New therapy) equals 110 patients. The medication costs are EGP300 for therapy A but therapy B increases it by 10%. The costs of hospitalization for therapy A and B are EGP2000 and EGP1000 respectively. The cost of concomitant drugs for therapy A and B equals EGP1100 and EGP400 respectively but there was no difference in the resource use. The costs of transportation and family care are EGP8,500 and EGP5,500 for therapy A and B respectively.

- Mention all the types of costs included in this study and give examples? and is this outcome a surrogate marker?
- Calculate the ICER from the societal perspective and interpret your decision according to the national threshold in Egypt (EGP70,000)?

- 1-Direct medical costs, ex: medication costs & cost of hospitalization and concomitant drugs

2-direct non-medical costs, ex: costs of transportation and family care
yes, it is a surrogate marker.

- Total costs for A=300+2000+1100+8500=11900

Total costs for B=330+1000+400+5500=7230

$$\text{ICER} = (7230 - 11900) / (110 - 70)$$

Therefore drug B is the dominant

In a private hospital, let's assume that the total average SFDs of 100 patients on Therapy A equals 70 days while for patients on Therapy B (New therapy) equals 85 days per patient. The medication costs are EGP500 for therapy A but therapy B reduces it by 20%. The costs of hospitalization (variable costs) for therapy A and B are EGP1000 and EGP1800 respectively. The fixed cost of hospitalization per patient equals EGP400. The average cost of office visit is EGP200 per patient. The resource use of patients on therapy A and B are 5 and 7 visits respectively. The emergency room visit costs EGP600 but there was no difference between therapy A and B in the resource use.

Mention the type of costs included in this study?

Calculate the ICER from the patient perspective and interpret your decision given that the threshold is EGP70,000?



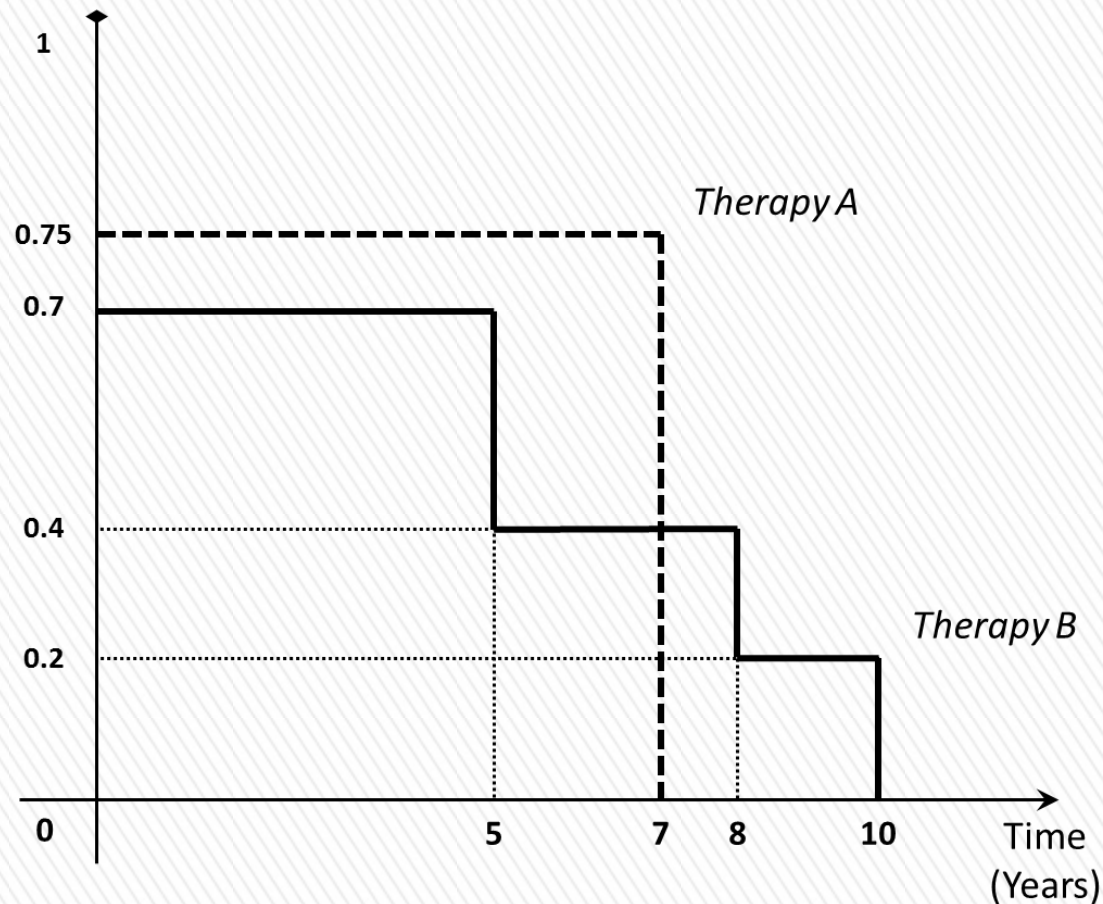
The total average life years gained of patients on Therapy X equals 5 years while for patients on Therapy Y (standard therapy) equals 3 years. The utilities are 0.7 and 0.6 for patients on therapy X and Y respectively. The medication costs are EGP2,500 and EGP1,500 for therapy X and Y. The costs of hospitalization for therapy X and Y are EGP5,000. The costs of productivity are EGP8,500 and EGP10,500 for therapy Y and X respectively.

Mention the type of this pharmacoeconomic study and the type of the outcome used (final or intermediate).

Calculate the ICER from the health care provider perspective and interpret your decision given that the threshold is EGP70,000.



Therapy B extends the life expectancy of patients compared to Therapy A by 3 years. Calculate its quality adjusted life years (QALY) gain versus Therapy A.



	Drug A		Drug B		Drug C	
Efficacy	Bioequivalence		At 52 w, Efficacy Rate (ER): 80%		At 52 w, ER: 70%	
Effectiveness data	No		Yes observational		No	
Safety (AEs)	5% of patients		4%		7%	
Tolerability	95%		92%		98%	
Compliance	85% in RCT s		95% in RCT s		80% In RCTs	
indications	2		5		1	
Years approved	3		13		1	
Mode of Administration	Self injection		Hospital		Oral	
Interactions	None		None		With Ace inhibitors	
Quality of evidence	Modest		Very Good		Good	
Population	Adults		Adults, pediatric		Adults	
Cost Per month	EGP 1000		EGP 1500		EGP 2000	
Cost Effectiveness	Cost Effective (3*GDP/Capita)		1*GDP/Capita		1*GDP/Capita	
On/off patent	Biosimilar		Original off patent		New Innovative	
Manufacturer	Korea		USA		European	
Local Presence	Yes		Yes		Yes	
Firm years in Egypt	25		25		10	
Strengths available	1		2		3	
Local Production	No		No		No	
QoL data	67		65		70	

Thanks for Paying Attention

