Pharmacoeconomics Workshop

2020-2021

A Workshop is a class exercise based on group work. Students will be given a number of tasks alongside some reading materials. You will be asked to work through them with your group and this would be followed by feedback and class discussion.

There will be no marks assigned to your work, however this would be highly advised to help you master the skills required for the midterm and final exams.

You will be allowed to use the lecture notes, text books or your own notes and a calculator.

Learning outcomes

By the end of the workshop you will be able to:

- Critically read an economic paper
- Practice further

Process

- Workshop introduction (5 minutes)
- In groups of 4-5 students; start to work through the worksheet of this workshop papers (40 minutes)
- During the workshop Dr. Rimal will be available to advice and facilitate group discussions, please raise your hand and she will call up to your group.
- Submit work with 30 minutes

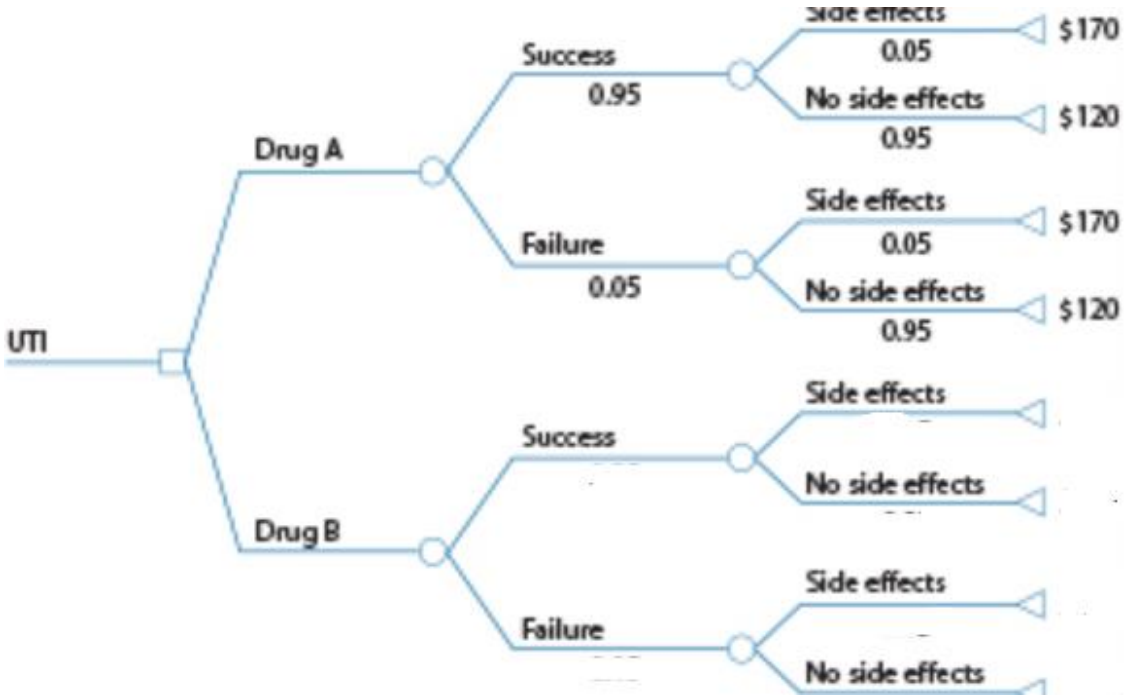
Exercise 1: Decision tree

You are a hospital manger and looking to compare two drugs: A and B for the treatment of UTI to decide which to purchase in the formulary. Please review **Table 1**summarizing outcomes and probability

Table 1

Outcome and probability	Drug A	Drug B
Effectiveness probability	0.95	0.85
Side effect probability	0.05	0.15
Cost of medication separately	$120	$100
Cost of side effects separately	$50	$50
Utility of medication without side effects	0.9	0.7
Utility of medications with side effects	0.5	0.6
Life year gained of medication without side effects	6	5
Life year gained of medications and side effects	6	5

Please help to complete the following decision tree (estimated working time 20 min)



Hint: use the calculation for Drug A as a guide to perform calculation to Drug B

Drug A	**Cost**	**Probability**	**Probability × Cost ($)**
Outcome 1	$120 + $50 = $170	0.95 × 0.05 = 0.0475	8.08
Outcome 2	$120	0.95 × 0.95 = 0.9025	108.30
Outcome 3	$120 + $50 = $170	0.05 × 0.05 = 0.0025	0.42
Outcome 4	$120	0.05 × 0.95 = 0.0475	5.70
Total		**1**	**122.5**

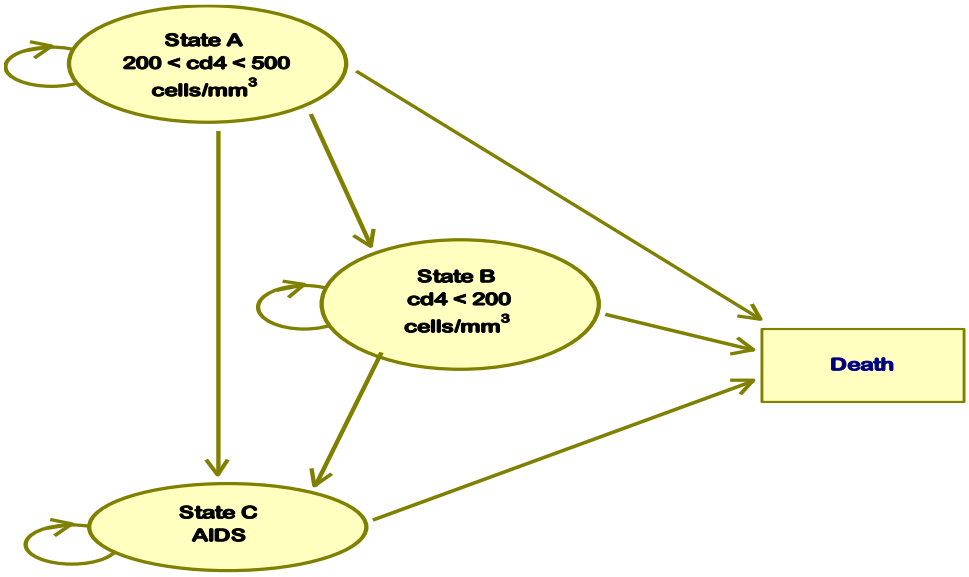
Drug B calculation

Drug B	**Cost**	**Probability**	**Probability × Cost ($)**
Outcome 1			
Outcome 2			
Outcome 3			
Outcome 4			
Total			

Calculate ICUR using the above two table

Exercise 2: Markov Model

The following is the basic structure of the model which evaluated the use of combination therapy (Lamivudine and AZT) for two years against monotherapy (AZT alone)



The cycle length is one year and it is evaluated for **5 years**

Use the data given below to populate the model and calculate the incremental cost-effectiveness ratio for monotherapy

Transition probabilities

They were calculated from the counts of individuals that were observed to move between four health states each year. These counts were as the following.

	A	B	C	D	Total
A	1251	350	116	17	1734
B	0	731	512	15	1258
C	0	0	1312	437	1749

Calculate the transition probabilities from each state

	A	B	C	D
A	=1251/1734			
B				
C				

State costs

The costs for each state were reported as the following for Monotherapy

Costs	A	B	C
Direct medical cost	3,979	4,052	9,226

Discounting

Consider yearly discounting of 3.5% for both costs and outcomes

Filling the following tables will help you to estimate the cost-effectiveness ratio

1. First, calculate the possible transition to each state within each cycle (example in the first cycle)
2. Second, calculate the LYG for each year and then discounted yearly using the discounting formula = undiscounted benefit/ (1+r)^t where t the number of cycle; r equals to the discount rate
3. Third, calculate the cost for each year and then discounted yearly
4. Fourth, sum the discounted LYG and cost across all the cycles for each therapy
5. Calculate the ICER

	MONOTHERAPY					**LYG**		**Cost**	
Year	A	B	C	D		undisc	disc	undisc	disc
0	1000				*check*				
1	Number of patients in A*tpA2A 1000*0.72= 720	Number in A*tpA2B+ Number in B *tpB2B	Number in A* tpA2C+Number in B*tpB2C+Number in C*tpC2C	=0.01*1000+ 0.012*0 +0.25*0= 10	*1000*	Sum (A:C)/100 0	No discounted/ (1+0.035)^1	Total Prob in A*costA+ Total Prob in B*costB+ Total Prob in C* costC=	=undis counte d/ (1+0.0 35)^1
2									
3									
4									
5									
					sum				

Year	COMBINATIONT HERAPY A	B	C	D		LYG no disc	disc	Cost no disc	disc
0	1				*check*				
1	858	103	34	5	*1000*	0.995	0.961	£ 7,328	£ 7,080
2	737	169	80	14	*1000*	0.986	0.920	£ 7,571	£ 7,067
3	531	247	178	44	*1000*	0.956	0.863	£ 6,002	£ 5,414
4	383	251	270	96	*1000*	0.904	0.788	£ 6,310	£ 5,499
5	277	223	330	170	*1000*	0.830	0.699	£ 6,305	£ 5,309
					sum				