Outcomes Valuation Exercise

Health state utility and willingness to pay valuation

- **The purpose of this exercise is to show you how to construct and to answer health state utility and willingness to pay questions.**

- **This exercise takes you through a set of 'direct valuation' exercises for the health states 'Mild Chronic Hepatitis' and 'Severe Chronic Hepatitis'.**

- **There is no trick in this; it is not a test. We simply want to pick up any natural variation in responses and are interested in your view.**

- **Appendix 1 and 2 at the end of the document are provided to help you with converting your values into utility scores.**

- **The summary sheet on the last page is provided for your own use, so that you can compare the different values each of the elicitation methods gives.**

HEALTH STATE UTILITY ASSESSMENT

The purpose of this exercise is to present four different methods for health state preference or "utility" assessment. They are:

- visual analogue;
- standard gamble;
- time trade-off;
- willingness to pay.

The example is based on two health states: mild and severe chronic hepatitis and two reference states.

Please read the descriptions of these states carefully and then go onto the exercises on the next three pages, where you are asked to give your assessment of the utility of the health states. You will be asked to provide values for both mild and severe chronic hepatitis using all the valuation methods.

When doing the exercise, try to think of the utility of being in the health state relative to the two reference states. It is your valuation which is important. There are no right or wrong answers to the questions asked.

Health states

1. **Healthy:** A state of normal (or full) health for a person of the age given.

2. **Mild chronic hepatitis:**
   This means you are a carrier of the virus which affects your liver. You can transmit the infection to others, for example, members of your family. You can expect that some people are reacting negatively to the fact that you are a carrier of the virus, and this can limit your social and work opportunities. You will generally feel well, but occasionally you will have symptoms such as abdominal pain, nausea, headache and fever. There is a need for an annual medical test.

3. **Severe chronic hepatitis:**
   This means you are a carrier of the virus which affects your liver. You can transmit the infection to others, for example, members of your family. You can expect that some people are reacting negatively to the fact that you are a carrier of the virus. Your social and work abilities are severely affected. You will have repeated episodes of severe abdominal pain, nausea, headache and fever symptoms that require hospitalization and liver biopsy.

4. **Dead.**

States 'Healthy' and 'Dead' are reference states. We assume that you contract the disease at age 30 and that you can expect to have it until death at age 70, i.e. you have **40** years in these states.

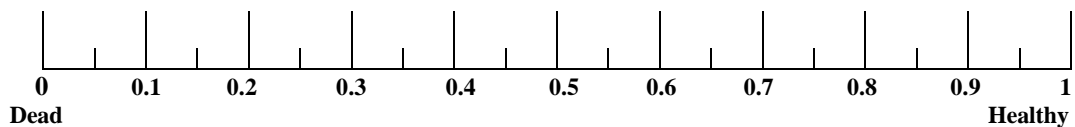**Exercise 1a   VISUAL ANALOGUE SCALE (VAS)**

Mild chronic hepatitis

By marking a cross on the line below, place the health state "***mild*** chronic hepatitis" on a scale of severity where "0" is equivalent to "death" and "1" is equivalent to "healthy":

0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1**
Dead										**Healthy**

Exercise 1b

Severe chronic hepatitis

By marking a cross on the line below, place the health state "***severe*** chronic hepatitis" on a scale of severity where "0" is equivalent to "death" and "1" is equivalent to "healthy":

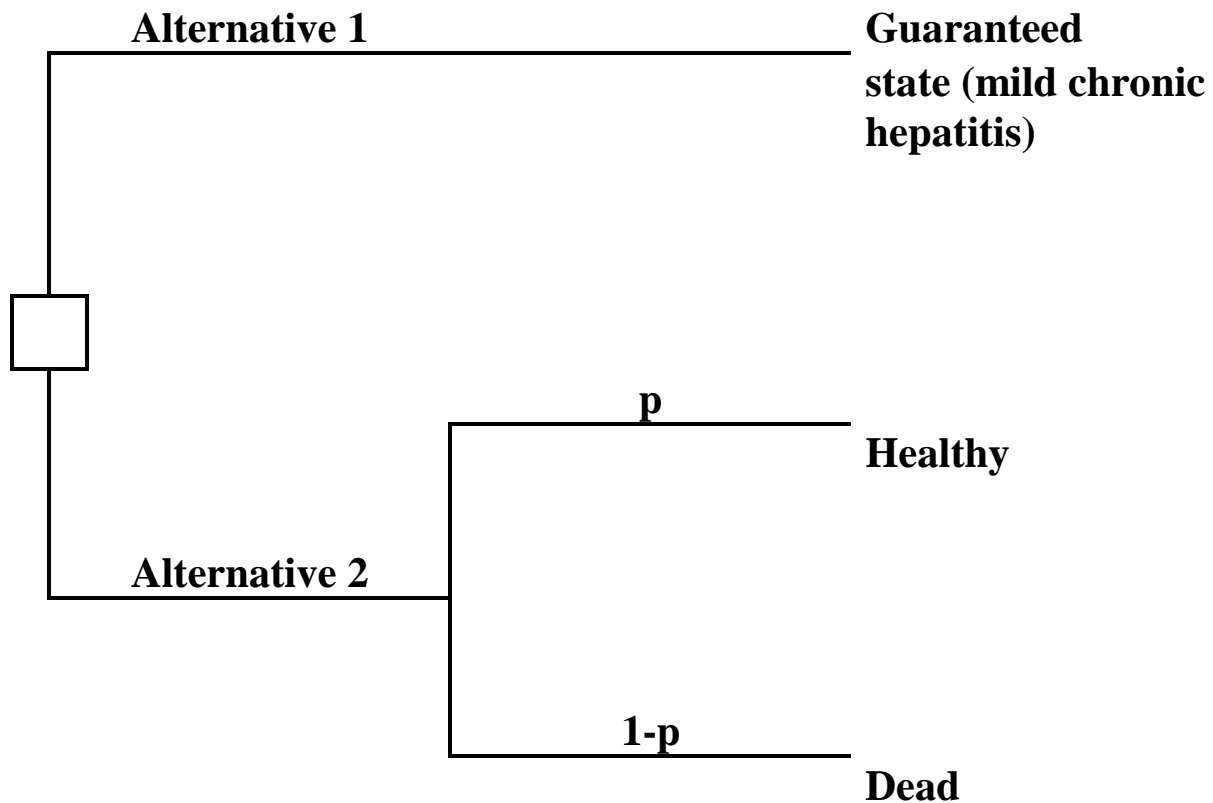|										
0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1**
Dead										**Healthy**

Now look at the cross on the visual analogue scale and work out its actual value to two decimal places (e.g. 0.75) and put the values in their correct boxes below.

Utility weights from above exercises: Weight (between 0-1)

1a   *Mild* **chronic hepatitis**

1b   *Severe* **chronic hepatitis**

Exercise 2a   **STANDARD GAMBLE ~ Mild chronic hepatitis**

Alternative 1 ──────────────── **Guaranteed state (mild chronic hepatitis)**

p ──── **Healthy**

Alternative 2

1-p ──── **Dead**

You are offered two alternatives:

Alternative 1 has the certain outcome of *mild* chronic hepatitis for the rest of your life; and
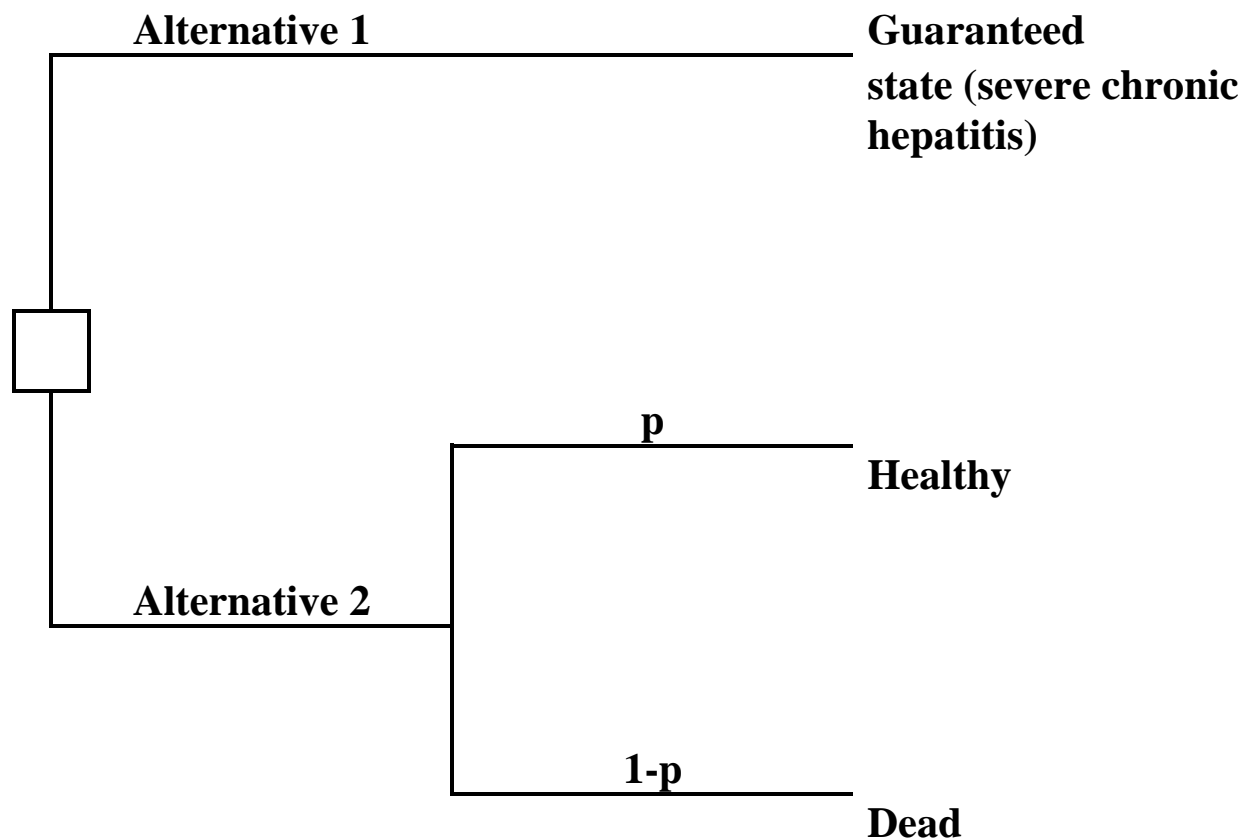
Alternative 2 is a treatment with two possible outcomes. Either you are returned to normal health to live another 40 years (probability, **p**) or you die immediately (probability, **1-p**).

State the probability, **p**, of returning to full health at which you are indifferent between alternatives 1 and 2 (i.e. the probability at which you cannot choose between the two options).
P = _____

Now, to turn this into a utility weight you have to divide this figure by 100 *[e.g. if your probability of indifference between the alternatives was 80% then your utility score is 0.8]*. See Appendix 1 for a conversion table.

Utility weight =

Exercise 2b   **STANDARD GAMBLE ~ Severe chronic hepatitis**

Alternative 1 ——————————————— **Guaranteed state (severe chronic hepatitis)**

Alternative 2 ————— **p** ————— **Healthy**

————— **1-p** ————— **Dead**

You are offered two alternatives:

Alternative 1 has the certain outcome of *severe* chronic hepatitis for the rest of your life; and

Alternative 2 is a treatment with two possible outcomes. Either you are returned to normal health to live another 40 years (probability, **p**) or you die immediately (probability, **1-p**).

State the probability, **p**, of returning to full health at which you are indifferent between alternatives 1 and 2 (i.e. the probability at which you cannot choose between the two options).
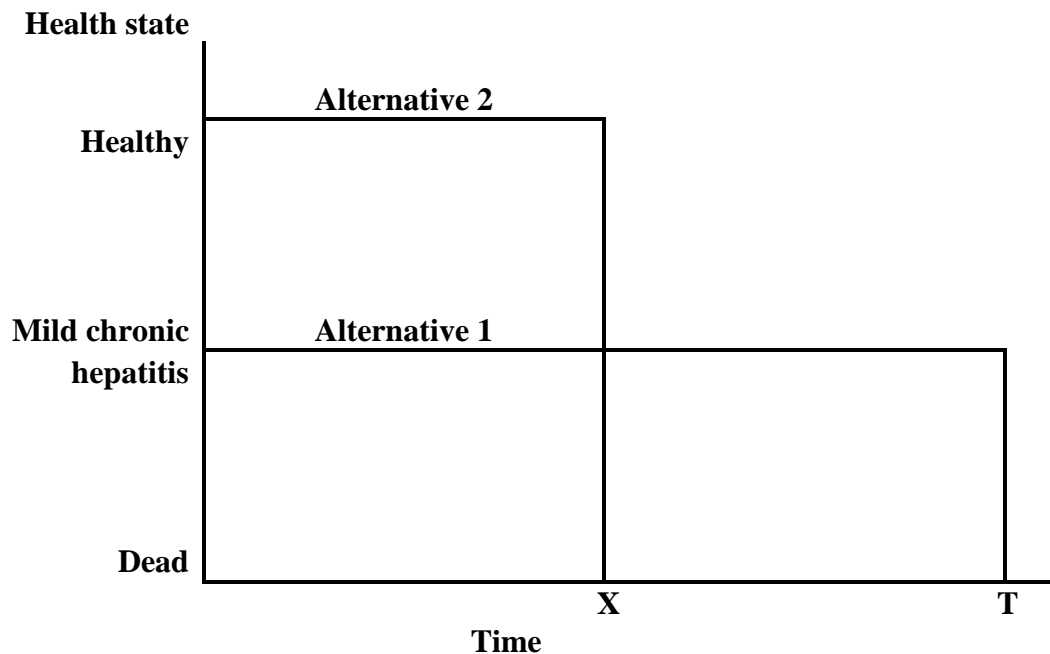**P =** _____

Now, to turn this into a utility weight you have to divide this figure by 100 *[e.g if your probability of indifference between the alternatives was 80% then your utility score is 0.8]*. See Appendix 1 for a conversion table.

Utility weight =

Exercise 3a   TIME TRADE OFF ~ Mild chronic hepatitis

Again, you have two alternatives:

Alternative 1 is to have *mild* chronic hepatitis for T years (in this case T=40); and

Alternative 2 is to be healthy for X years (where X is less than T) followed by death.

With T = 40, give the number of years (X) at which you are indifferent between alternatives 1 and 2, i.e. where you are indifferent between having *mild* chronic hepatitis for the rest of your life and being healthy for X years (X is less than 40). The utility weight is X/T. To do this exercise, think about the number of years at the end of your health life you are willing to give up to avoid being in the chronic health state. (If you need more help, see Appendix 2 for a conversion Table).

X = ___ years   *Example*   *X = 35 years*

Utility weight =   ___ / 40   *Utility weight = 35 / 40*

Utility weight = [   ]   *Utility weight =* [0.875]

Exercise 3b   **TIME TRADE OFF ~ Severe chronic hepatitis**
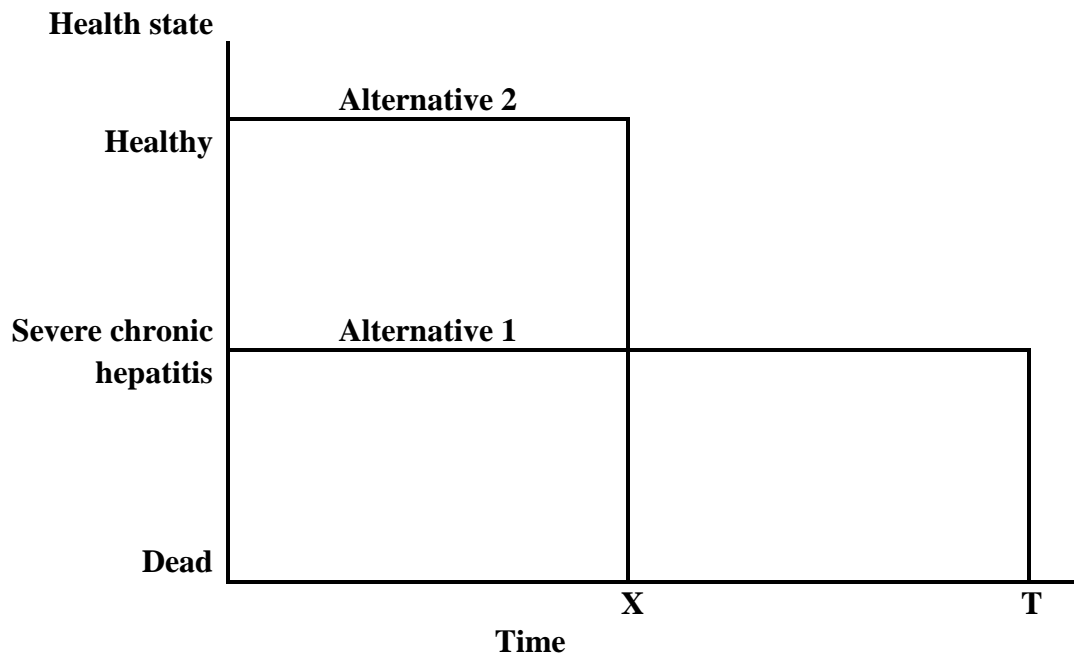
Again, you have two alternatives:

Alternative 1 is to have *severe* chronic hepatitis for T years (in this case T=40); and

Alternative 2 is to be healthy for X years (where X is less than T) followed by death.

With T = 40, give the number of years (X) at which you are indifferent between alternatives 1 and 2, i.e. where you are indifferent between having *severe* chronic hepatitis for the rest of your life and being healthy for X years (X is less than 40). The utility weight is X/T. To do this exercise, think about the number of years at the end of your health life you are willing to give up to avoid being in the chronic health state. (If you need more help, see Appendix 2 for a conversion Table).

X = ____ years   *Example* $X = \underline{30}\ years$

Utility weight = ____ / 40   *Utility weight = $\underline{30}$ / 40*

Utility weight = [   ]   *Utility weight =* [*0.75*]

Exercise 4a **WILLINGNESS TO PAY**

Assume that you have contracted *mild* chronic hepatitis.

What would you be willing to pay annually for the rest of your life for a treatment that would restore you to full health?

WTP = £

Exercise 4b **WILLINGNESS TO PAY**

Assume that you have contracted *severe* chronic hepatitis.

What would you be willing to pay annually for the rest of your life for a treatment that would restore you to full health?

WTP = £

Appendix 1

Conversion Table ~ Converting standard gamble probabilities into utility weights

Probability of Indifference (P) %	Probability of Immediate death (1-P) ⟶ %	Utility Weight
100	0	1
95	5	0.95
90	10	0.9
85	15	0.85
80	20	0.8
75	25	0.75
70	30	0.7
65	35	0.65
60	40	0.6
55	45	0.55
50	50	0.5
45	55	0.45
40	60	0.40
35	65	0.35
30	70	0.30
25	75	0.25
20	80	0.20
15	85	0.15
10	90	0.10
5	95	0.05
0	100	0

Note: a probability indifference of 100 implies that you are not prepared to trade any life years for an improvement in health status.

Appendix 2

Converting time-trade off years into utility weights

Indifference Point X	*i.e.* *Years of life 'traded' in* *order to live remaining* *years in good health*	Utility weight (X/40)
40	*0*	1
39	*1*	0.975
38	*2*	0.95
37	*3*	0.925
36	*4*	0.9
35	*5*	0.875
34	*6*	0.85
33	*7*	0.825
32	*8*	0.8
31	*9*	0.775
30	10	0.75
29	11	0.725
28	12	0.7
27	13	0.675
26	14	0.65
25	15	0.625
24	16	0.6
23	17	0.575
22	18	0.55
21	19	0.525
20	20	0.5
19	21	0.475
18	22	0.45
17	23	0.425
16	24	0.4
15	25	0.375
14	26	0.35
13	27	0.325
12	28	0.3
11	29	0.275
10	30	0.25
9	31	0.225
8	32	0.2
7	33	0.175
6	34	0.15
5	35	0.125
4	36	0.1
3	37	0.075
2	38	0.05
1	39	0.025
0	40	0

------------------------------- ✂ -------------- ------

Summary sheet

Please transfer your answers from the exercises (see shaded boxes on each page) to the following table.

Number: [   ]

Name:_____(optional)

Exercise	Utility Weight (between 0 –1)
1a	
1b	
2a	
2b	
3a	
3b	
	WTP (£)
4a	£
4b	£