Survival with tracheostomy and artificial speech

Surgery

Death

Survival with normal anatomy and normal speech

Radiation Therapy

Death

RANKING AND SCALING OUTCOMES

<table>
<thead>
<tr>
<th>Rank</th>
<th>Value</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>25-year survival with normal anatomy and normal speech</td>
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<td>25-year survival with tracheostomy and artificial speech</td>
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### RANKING AND SCALING OUTCOMES

<table>
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<th>Rank</th>
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<th>Outcome</th>
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<tr>
<td>5</td>
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#### SUMMARY OF RANK-AND-SCALE METHOD

1. Identify the outcomes
2. Rank the outcomes
3. Define the scale range and units
4. Anchor each end of the scale with an outcome
5. Assign scale values to the intermediate outcomes
6. Check to make sure the ranks and values are compatible
Certainty

Gamble

0.5

0.5

Intermediate-Duration Survival

Certainty

Gamble

Long-Duration Survival

0.5

Early Death

0.5

Certainty-Equivalent Standard Reference Gamble

25 years

Certainty

Gamble

Intermediate-Duration Survival

25 years

Certainty

Gamble

? years

0 years

25 years

Certainty

Gamble

0 years

0.5

0.5

0.5

0.5
SUMMARY OF THE STANDARD GAMBLE METHOD

1. Explain that the choice is between a certain outcome and a gamble
2. Define the probabilities of the gamble
3. Define the best outcome, and make it part of the gamble
4. Define the worst outcome, and make it part of the gamble
5. Ask for a certain intermediate outcome that is equivalent to the gamble
THE TIME-TRADEOFF METHOD

Assume your life expectancy is 25 years. If you had a tracheostomy with artificial speech, would you be willing to accept a somewhat shorter survival in exchange for normal anatomy with normal speech? If so, how many out of 25 would you give up for normal anatomy with normal speech? For example, would you give up 5 years and choose 20 years with normal speech rather than 25 years with artificial speech? If not, what number of years with normal speech would be equal to 25 years with artificial speech?

Assume your life expectancy is 10 years. If you had a tracheostomy with artificial speech, would you be willing to accept a somewhat shorter survival in exchange for normal anatomy with normal speech? If so, what number of years with normal speech would equal 10 years with artificial speech?

EQUIVALENT YEARS OF LIFE

<table>
<thead>
<tr>
<th>Normal Anatomy with Normal Speech</th>
<th>Tracheostomy with Artificial Speech</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>12.5</td>
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<td>10</td>
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0 5 10 15 20 25
Years of Survival

Normal Speech

Utility

0 20 40 60 80 100

0 5 10 15 20 25
Years of Survival

Normal Speech

Utility

0 20 40 60 80 100

0 5 10 15 20 25
Years of Survival

Normal Speech

Utility

0 20 40 60 80 100

0 5 10 15 20 25
Years of Survival

Tracheostomy and Abnormal Speech
SUMMARY OF THE TIME-TRADEOFF METHOD

1. Define the outcomes
2. Select time periods for comparison
3. For each time period, determine the number of years in the better health state that is equivalent to the given number of years in the worse health state

Asian Viral Disease

Imagine that the U.S. is preparing for an epidemic of an unusual viral disease from Asia, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the consequences of the programs are as follows.
Asian Viral Disease

If Program A is adopted, 200 people will be saved.

If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved.

If Program A is adopted, 400 people will die.

If Program B is adopted, there is a 1/3 probability that no people will die, and a 2/3 probability that everyone will die.

Which of the two programs do you favor?

Program A  Program B
Live  Die

Review: RANK-AND-SCALE METHOD

1. Identify the outcomes
2. Rank the outcomes
3. Define the scale range and units
4. Anchor each end of the scale with an outcome
5. Assign scale values to the intermediate outcomes
6. Check to make sure the ranks and values are compatible
**Review: THE STANDARD GAMBLE METHOD**

1. Explain that the choice is between a certain outcome and a gamble
2. Define the probabilities of the gamble
3. Define the best outcome, and make it part of the gamble
4. Define the worst outcome, and make it part of the gamble
5. Ask for a certain intermediate outcome that is equivalent to the gamble

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**Review: THE TIME-TRADEOFF METHOD**

1. Define the outcomes
2. Select time periods for comparison
3. For each time period, determine the number of years in the better health state that is equivalent to the given number of years in the worse health state

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**OPTIONS FOR SOLVING THE UTILITY-MEASUREMENT PROBLEM**

1. Do not perform decision tree analysis
2. Create a decision tree whose outcomes can be compared on a natural scale
3. Identify and resolve inconsistencies while utilities are being measured
4. Use more than one method to measure utilities
5. Always perform sensitivity analyses

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**Summary Issues**

- Any of these 3 methods could be used alone to measure utilities for this decision problem
- Few published studies use any of these 3 methods; most use other methods that are less correct theoretically