**Delfini Pearls**  
**Key Points About Quality Adjusted Life Years (QALYs)**

**Goal of cost-utility analyses** is to determine the cost per QALY. Quality of Life (QOL) ranges from 0 (dead) to 1 (full health).

<table>
<thead>
<tr>
<th>Time</th>
<th>X (Quality) (Utility)</th>
<th>= QALY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year of life</td>
<td>Perfect Health</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Utility=1</td>
<td></td>
</tr>
<tr>
<td>0.5 years of life</td>
<td>Perfect Health</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Utility=1</td>
<td></td>
</tr>
<tr>
<td>1 year of life</td>
<td>Bedridden</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Utility=0.5</td>
<td></td>
</tr>
</tbody>
</table>

The **incremental cost-effectiveness ratio (ICER)** is an equation.

- ICER is the ratio of the change in costs to incremental benefits of a therapeutic intervention or treatment.
- The equation for ICER is—
  \[
  \text{ICER} = \frac{(C1 - C2)}{(E1 - E2)}
  \]
- C1 and E1 are the cost and effect in the intervention or treatment group.
- C2 and E2 are the cost and effect in the control care group.
- Costs are usually described in monetary units while benefits/effect in health status is measured in terms of QALYs gained or lost.

**Modeling to Obtain Cost of QALYs Save and Cost of ICER Per QALY**

- QALYs are frequently derived using decision analytical models which incorporate efficacy and safety data from clinical trials and utilities.
- Utilities are values that represent the strength of an individual’s preferences for specific health-related outcomes and are used to represent the strength of an individual’s preferences for specific health-related outcomes.
- Measuring health utilities involves two main steps: defining a set of health states of interest, and valuing those health states.
- Utilities are weighted between 0 and 1 frequently using:
  - **Time-trade-off (TTO):** Respondents are asked to choose between remaining in a state of ill health for a period of time, or being restored to perfect health but having a shorter life expectancy.
  - **Standard Gamble (SG):** Respondents are asked to choose between remaining in a state of ill health for a period of time, or choosing a medical intervention which has a chance of either restoring them to perfect health, or killing them.
  - **Visual Analogue Scale (VAS):** Respondents are asked to rate a state of ill health on a scale from 0 to 100, with 0 representing death and 100 representing perfect health. This method has the advantage of being the easiest to ask, but is the most subjective.
- **Health or treatment states** are frequently developed based on literature review, interviews with patients or focus groups of clinical experts.
- **Time in treatment states** is frequently based on published evidence.

**Problems with Economic Modeling Using QALYs:** Cost numbers depend upon what is included in the model; is your situation similar?

- Validity of studies used for outcomes
  - Distortion size of efficacy outcomes (amount of benefit)
  - Frequency of adverse events
  - Ratcheting down from efficacy to effectiveness
- Determining mathematical value of utilities
  - Preferences and ratings likely to vary person-to-person