The woods decay, the woods decay and fall,
The vapours weep their burthen to the ground,
Man comes and tills the field and lies beneath,

And after many a summer dies the swan.

Me only cruel immortality
Consumes; I wither slowly in thine arms,
Here at the quiet limit of the world,
A white-hair’d shadow roaming like a dream
The ever-silent spaces of the East,
Far-folded mists, and gleaming halls of morn.

Tennyson
Questions of fact and questions of value?

- When costs displace health ($\Delta c_h$)
  \[
  \Delta h - \frac{\Delta c_h}{k} \geq 0 \quad \text{or} \quad \frac{\Delta c_h}{\Delta h} \leq k
  \]
  Health gained
  Health forgone

- When costs displace consumption ($\Delta c_c$)
  \[
  \Delta h - \frac{\Delta c_c}{v} \geq 0 \quad \text{or} \quad \frac{\Delta c_c}{\Delta h} \leq v
  \]
  Consumption forgone

- Costs fall on both
  \[
  \Delta h - \frac{\Delta c_h}{k} - \frac{\Delta c_c}{v} \geq 0 \quad \text{or} \quad \frac{\Delta c_h - k\Delta c_c}{k\Delta h} \equiv 0
  \]

*Fact:* $k = \text{how much health displaced by increased HCS costs}$?

*Value:* $v = \text{how much consumption should we give up for health}$?
A scientific question of fact

- Previously (Martin et al JHE 2008)
  - Variations in expenditure and outcomes within programmes
  - Reflect what actually happens in the NHS by programme

<table>
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<tr>
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<th>Cancer</th>
<th>Circulation</th>
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<th>Gastro-int</th>
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- Need estimate the overall threshold:
  - How changes in overall expenditure gets allocated across all the programmes
  - How changes in mortality might translate into QALYs gained
  - More (all) programmes (types of QALYs gained and forgone)
  - Reflect uncertainty in any overall estimate (parameters and identification)
  - How it changes with the sign and scale of expenditure change
  - How it changes over time
Social value of different types of health?

- Value of health gained (*and health forgone*)
  - Burden and severity
    - $\Delta h$ lost as consequence of the condition with current treatment
  - Therapeutic improvement
    - Scale of $\Delta h$ (some threshold below which it is less valuable)
  - Wider social benefits (-$\Delta c_c$
    - Cost of care born by patients and carers
    - External consumption effects
  - End of life

- Need to reflect the type and value of health and $\Delta c_c$ forgone
Social value of health forgone (a single threshold)

- Unweighted QALYs
  \[ k = \frac{1}{\sum_{i=1}^{I} q_i}, \quad q_i = QALYs \text{ of type } i \text{ per NHS £} \]

- Weighted QALYs
  \[ k^* = \frac{1}{\sum_{i=1}^{I} w_i \cdot q_i}, \quad w_i = \text{weight for QALYs of type } i \]

- Weighted QALYs plus WSBs
  \[ k^{**} = \frac{1}{\sum_{i=1}^{I} w_i \cdot q_i - \sum_{i=1}^{I} c_i \cdot q_i / v}, \quad c_i = \text{WSC associated with QALYs of type } i \]

- Some implications

  \[ k > k^* \text{ if some } w_i > 1 \text{ when } q_i > 0 \quad k^* > k^{**} \text{ if some } c_i < 0 \text{ when } q_i > 0 \]

  \[ k^* \neq w_j \cdot k, \quad w_j = \text{weight associated with QALYs gained from technology } j \]
End of life?

- NICE supplementary advice for EoL treatments (2009)
  - Criteria
    - Short life expectancy (normally less than 24 months)
    - Evidence of life extension (normally 3 months)
    - Indicated for small patient populations (supply side motive)
  - Advice
    - Life extension lived at normal quality of life (diminishing MRS)
    - What additional weight would be required make it cost-effective
  - Questions for NICE
    - Is life extension more important than quality at EoL?
    - Do social preferences suggest an additional weight (how large)?
    - Are cut offs or criteria reflective of social preferences?
Pilot study (Koonal Shah, Aki Tsuchiya, Allan Wailoo, NICE DSU June 2011)

- 5 Scenarios (social preferences)
  - EoL (at EoL or unexpectedly at EoL)
  - Life extension
  - Quality of life
  - Time preference
  - Age (preference for young)
  - Qualitative information about the source of preference

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<tr>
<td>B</td>
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So what role for $v$?

- Relative value of consumption effects
  
  \[ \frac{\Delta c_h - \frac{k}{v} \Delta c_c}{\Delta h} \leq k \]

- Weight of different types of health
  
  \[ k^* = \frac{1}{\sum_{i=1}^{I} v_i \cdot q_i} \]
  
  \[ v_i = \text{consumption value of QALYs of type } i \]

- Equivalent of consumption benefits forgone
  
  \[ k^{**} = \frac{1}{\sum_{i=1}^{I} v_i \cdot q_i - \sum_{i=1}^{I} c_i \cdot q_i / v_i} \]

- Compare an ICER to a $k$ not a $v$

- Value based prices are determined by a $k$ not a $v$
  
  - $v$ only determines the scale of consumer surplus (if there is any)
Mishan’s wild goose chase

- Value a certain state conditional on events
  - Normative content of the axioms of EUT (should we pay for irrationality, regret)?
- Value of a uncertain prospect
  - Low probability of large benefit (variability = unexploited value in the joint distribution)
- Ex-ante or (almost) ex-post
  - Which v would you like?
  - Just choose the thickness of your veil
  - Individual values
  - Moment of the distribution
    - Inconsistent with concern for income or health distribution
Positive hats and normative rabbits

- John Broome
  - Some things cant not be compensated by roses (or consumption)
  - Only finite compensation if the life is unknown
  - Distinction of known and unknown not relevant for social decisions
  - Not unbounded (large) social value, just using the wrong ruler

- Specify (implicitly) complete and legitimate SWF?
  - $v$ is the measure of social value and presupposes a complete SWF
  - $k$ is simply an inefficient nuisance preventing welfare maximisation

- Welfare function is unknown/latent
  - Partially revealed by legitimate social processes
  - Social good is more than
    - the satisfaction of private wants and desires
  - Purpose of science and discovery is more than
    - the creation of futile hopes and amelioration of private fear
  - $k$ is more than a mere fact

- It is a revealed expression of social value of health generated by collectively funded health care