Economic value of nursing

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Focus

• *Critical* evaluation of the evidence base
  – *Important to know the weakness as well as the strengths*...
  – *Requirements for building the economic case*

• Hospital nurse staffing levels
  – *Key ‘structural’ investment for quality care*

• Health economic perspective, provider coast perspective
  – *There are many potential aspects of ‘value’*
  – *Costs (and benefits) can arise in many places*
  – *Providers ‘feel’ local costs and benefits*
Economic evaluation

• “... the **comparative** analysis of alternative courses of action in terms of both their costs and consequences.”
  – Drummond, Stoddard & Torrance, 1987

<table>
<thead>
<tr>
<th>Costs</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of extra resources used (loss to other patients)</td>
<td>Value of health gain for this patient group</td>
</tr>
</tbody>
</table>

**Current staffing level/skill mix**

**New staffing level/skill mix**
# Types of economic evaluation

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Value of resources</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression analysis</td>
<td>£</td>
<td>Multiple, statistical method to estimate relationship between variables (staffing/outcomes/factors/cost)</td>
</tr>
<tr>
<td>Cost / Cost impact</td>
<td>£</td>
<td>None</td>
</tr>
<tr>
<td>Cost-consequences</td>
<td>£ (disaggregated)</td>
<td>All outcomes (disaggregated)</td>
</tr>
<tr>
<td>Cost-benefit</td>
<td>£</td>
<td>Attaches a monetary value on outcomes: Willingness to pay (£)</td>
</tr>
<tr>
<td>Cost-effectiveness</td>
<td>£</td>
<td>Single indicator: Weight loss (kg), blood glucose control (HbA1c) deaths averted, life years saved...</td>
</tr>
<tr>
<td>Cost-utility</td>
<td>£</td>
<td>Combined index: Quality Adjusted Life Years (QALY)</td>
</tr>
</tbody>
</table>
Assessing cost effectiveness
Weighing up the benefits, harms and costs

△Cost (£)

New staffing level more expensive...
... but some savings from reduced need for care in future

New staffing level

△Effect (Outcome)

New Staffing level more effective...
... but harmful side effects for some people

Current practice
Assessing cost effectiveness

Value for money

Treatment options in the shaded region are judged to provide good value for money (are ‘cost effective’).

New staffing level dominates

Cost (£)

High extra cost; low Outcome gain

Low extra cost; high Outcome gain

Cost-per-Outcome threshold

New staffing level dominates

△Cost (£)

△Effect (Outcome)

£/Outcome
Staffing options in the shaded region are judged to provide good value for money (are ‘cost effective’).

Persuasive economic argument for increased nurse staffing

**$\Delta$Cost (£)**

Cost-per-Outcome threshold

Low extra cost; high Outcome gain

**$\Delta$Effect (Outcome)**

New staffing level
Issues with the evidence...

• We are a long way short of a compelling economic case
  – COSTS vary hugely by country
  – What is a ‘reasonable’ cost for a better outcome?
    • How do we know we can’t get more benefit from spending the money elsewhere...
    • “Standard” approaches use cost per QALY (cost utility) – we don’t have data
    • £20,000-£30,000 per qaly (NICE)
Nurse staffing in hospitals...

• Multiple sources of evidence establishes more nurses -> better outcomes
  – How much better, at what cost?
## Summary outcome and cost results from economic studies Hospital perspectives...

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Avoided ($840,000)</th>
<th>Avoided ($846,000)</th>
<th>Hospital days avoided</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dall (2009) USA</td>
<td>Increase RN hours to 75(^{th}) percentile, where required</td>
<td></td>
<td></td>
<td>3,600,000(^{b})</td>
<td>6,100(^{c})</td>
</tr>
<tr>
<td>Needleman (2006) USA</td>
<td>Option 1 – raise proportion of RN hours to 75(^{th}) percentile</td>
<td>1,507,493</td>
<td>1,053(^{e})</td>
<td>811</td>
<td>-242</td>
</tr>
<tr>
<td></td>
<td>Option 2 – raise licensed nurse hours to 75(^{th}) percentile</td>
<td>2,598,315</td>
<td>1,719(^{e})</td>
<td>7,538</td>
<td>5,819</td>
</tr>
<tr>
<td></td>
<td>Option 3 – combine option 1 and option 2</td>
<td>4,106,315</td>
<td>2,772(^{e})</td>
<td>8,488</td>
<td>5,716</td>
</tr>
<tr>
<td>Twigg (2013) AUS</td>
<td>Increased hours with Nurse Hours per Patient Day method</td>
<td>155</td>
<td>709</td>
<td>NR</td>
<td>7,142,466(^{g})</td>
</tr>
</tbody>
</table>

- Variation due to context, methods and staffing policies
- All scenarios substantial staff cost increase
- Most scenarios substantial net cost increase with uncertain cost-effectiveness
- Possible net cost reduction AND net benefit under some scenarios
### Societal costs

<table>
<thead>
<tr>
<th></th>
<th>ICU – increase RN staffing in this setting</th>
<th>648,378</th>
<th>NR</th>
<th>NR</th>
<th>1,478,933&lt;sup&gt;f&lt;/sup&gt;</th>
<th>589,680</th>
<th>-889,253</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shamliyan (2009) USA</td>
<td>Surgical – increase RN staffing in this setting</td>
<td>592,958</td>
<td>NR</td>
<td>NR</td>
<td>1,646,190&lt;sup&gt;f&lt;/sup&gt;</td>
<td>923,832</td>
<td>-722,358</td>
</tr>
<tr>
<td></td>
<td>Medical – increase RN staffing in this setting</td>
<td>425,568</td>
<td>NR</td>
<td>NR</td>
<td>1,244,061&lt;sup&gt;f&lt;/sup&gt;</td>
<td>982,800</td>
<td>-261,261</td>
</tr>
</tbody>
</table>

- Net societal benefit (including lost earnings etc.) in ALL scenarios....
Wessex CLAHRC vision

Improve the health of the people of Wessex and quality and cost-effectiveness of health care

- Step change in integration/pathways of care for people with long-term conditions
- Reduce hospital admissions/re-admissions – more appropriate health care utilisation
Cautions...

• Studies model different policies
  – Conclusions about value of nursing highly sensitive to specific policies
• Most studies use US health care costs
  – Will not generalise
  – Cost of adverse events is very high due to high healthcare costs
• Evidence is observational
• Limited range of outcomes considered
  – We cannot assume cause / effect
  – Costs of other outcomes omitted
• Many assumptions made in models
  – Open to criticism
  – Conclusions are likely sensitive to these assumption
The endogeneity problem:
patient factors drive outcome and staffing level

- Most likely consequence is to reduce apparent benefit of nursing...
The confounding problem:
Nurse staffing associated with other ‘quality’ featured

- Benefit of nursing over estimated because it is associated with other causal factors (e.g. medical staffing...)
Conclusions

• Limited economic evidence
• ‘best guess’
  – Net cost to providers
  – Likely / possibly cost effective
    • But needs country specific study / model
  – Invest in more highly qualified nurses
    • Prioritise quality over quantity?
  – Match nursing increase to measured patient need rather than blanket increase
  – Potential for great societal benefit
Thank you!

Our Partners and People

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- UNIVERSITY OF Southampton

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- 9
- Wessex NHS Trusts

- NHS
- Health Education Wessex

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