Cost-benefit of falls prevention in hospitals: Using a contingent valuation approach to measure more than the health benefit received

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Cost-benefit analysis

- Answer to question
  - “Is the program worthwhile?”

- Based on principles of welfare economics
  - Relevant source of value is the individual consumer

- Net benefit = Costs – benefits
  - Benefit measured in monetary terms

Contingent valuation

- Willingness to pay (or accept)
  - Can value a health outcome, a treatment, or access to a program
  - Can also measure
    - Future health care cost savings (Drummond et al. 1997)
    - Production gains and income effects (Drummond et al. 1997)
    - Intangible costs / benefits (eg. distress) (Fisman et al. 2002)

Falls in hospitals

- A leading form of adverse patient incident
  - ~20% of geriatric rehabilitation inpatients fall
  - ~30% of falls result in physical injury
  - ~2% result in fracture
  - Haines et al. 2004

- The direct health costs of falls can be measured relatively easily
  - eg. Surgery for fractures

- Other costs cannot
  - eg. patient anxiety, pain, fear of falling, effect on quality of life
Preventing hospital falls

- Falls in hospitals can be prevented through multifactorial programs
  - Cummings et al 2008
- Several other strategies may be effective
  - Choices with unknown patient preference
- We do not know if preventing in-hospital falls is worthwhile

Aims

- To value patient perspective of their own benefit from reducing risk of in-hospital falls
- To determine if the value depends on how the falls are prevented
  - Hypothesis
    - That if the health benefit received is the same, then people will prefer approaches that require less effort on their behalf

Method

- Design
  - Contingent valuation study amongst geriatric rehabilitation hospital inpatients (MMSE>23/30)
    - Princess Alexandra Hospital, Brisbane
  - Scenarios based upon findings of Haines et al 2004
    - RCT of multifactorial falls prevention program
    - Subacute / geriatric rehabilitation hospital
    - n=626

Interventions

- Additional exercise program
Interventions

• Education program

3 SIMPLE STEPS TO STOPPING FALLS
1 AVOID IF YOU NEED HELP TO WALK ABOUT
You get dizzy or feel that you are going to fall. If you feel this way, do not walk alone. Ask a friend or relative to help you walk. If you cannot get help, call for an ambulance.
2 USE YOUR FINGERS TO STOP FALLS
If you have difficulty walking, use your fingers to stop falls. If you cannot stop a fall, turn your body sideways to break the impact of the fall.
3 KEEP YOUR BODY STRONG
Exercise regularly to keep your bones and muscles strong. This will help you to reduce the risk of falls.

HINTS:
- Use walking aids if you need them.
- Use a cane or a walker when you are walking.
- Use a chair if you need it.
- Use a stool to lift your body up.
- Use a bath mat to prevent slipping.
- Use a walking stick if you need one.

30% reduction in rate of falls

Interventions

• Hip protectors

ARE YOU AT RISK OF “FALLING OVER”?

FALLS RISK FACTORS
1. You have a recent history of falls.
2. You have a history of falls.
3. You have a history of falling.
4. You have a history of falling.
5. You have a history of falling.
6. You have a history of falling.
7. You have a history of falling.
8. You have a history of falling.
9. You have a history of falling.
10. You have a history of falling.

HOW TO STOP THE FALLING
1. Use a walking aid to help you walk.
2. Use a cane to help you walk.
3. Use a walker to help you walk.
4. Use a chair to help you walk.
5. Use a stool to help you walk.
6. Use a bath mat to prevent slipping.
7. Use a walking stick to help you walk.
8. Use a bath mat to prevent slipping.
9. Use a walking stick to help you walk.
10. Use a bath mat to prevent slipping.

Interventions

• Falls risk alert card

30% reduction in rate of falls
Method

- Measures
  - Contingent valuation questionnaire
  - 6 willingness to pay questions
  - Valuing access to a ward with a falls prevention program that has a 30% lower falls rate than their current ward
  - It is the nature of the falls prevention program and the likely intangible costs / benefits that varies

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<tr>
<th>Maximum Willingness to pay</th>
<th>Constant</th>
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<tr>
<th>Future health savings</th>
<th>Variable</th>
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<table>
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<tr>
<th>Production / income</th>
<th>Variable</th>
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<th>Intangible costs/benefits</th>
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Falls programs

- Hip protectors
  - Pair of hip protectors provided
- Targeted combination of above interventions as per Haines et al 2004
  - Likelihood of receiving an intervention from the multifactorial program varied.
- Falls prevention expert reviews medical file and works with existing staff
  - Patient does not have to do anything differently

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- Exercise – 3 sessions per week for duration of inpatient stay
  - Demonstration provided of 3 exercises
- Education – 4 half hour education sessions with booklet and video
  - Booklet demonstration
- Education – Booklet with video only
  - Same booklet demonstration

Example

- “On this ward you are provided with three one hour exercise sessions per week in addition to your usual therapy, every week that you are in hospital. The exercises you perform are reasonably difficult for you to complete. The benefit to you is that you will be treated on a ward with 30% fewer falls.”
Eliciting valuation

- Interviewer administered at bedside
- Patient informed of risk of falls (one in four patients) and injury (one in three falls)
- Patient informed of hypothetical nature of upcoming question set
- Patient informed that providing a value would mean that they would have this much less to spend on other goods and services

Eliciting valuation

- One off payment from own pocket once discharged from hospital
- Closed questions
- Randomly selected starting bid
  - $100, $200, $300
- Pre-specified bidding algorithm
  - Ping-pong approach

Eliciting valuation

- Scenarios randomly ordered using Latin squares
  - Exception of full program valuation
    - Always last to aid understanding of this program
- Follow-up question
  - Did you consider how much it would cost to provide the intervention when making the valuation?
    - Arose after the first 8 respondents gave responses that did not match the research hypothesis followed by post-questionnaire interviews with the following 8 respondents asking what factors they considered when making their valuations

Results

- Demographics
  - n = 125
  - Age: mean (sd) = 79 (8) years
  - Gender (male): frequency (%) = 56 (45%)
  - MMSE: mean (sd) = 27 (2) out of 30
  - Diagnosis: frequency (%)
    - Orthopaedic / musculoskeletal = 41 (33%)
    - Amputation = 24 (19%)
    - Neurological = 19 (15%)
    - Respiratory = 11 (9%)
Results

- Were some interventions valued more highly than others?

- A linear regression model incorporating each scenario as dummy variables and clustered on participant explained 32% of variation in WTP data.

- Number that considered cost of providing intervention when making valuation = 69 out of 117 (59%).

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<tr>
<th>Intervention</th>
<th>Coefficient</th>
<th>95% CI</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Falls expert</td>
<td>-9</td>
<td>-51, 32</td>
<td>0.65</td>
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<tr>
<td>Exercise</td>
<td>19</td>
<td>-18, 56</td>
<td>0.32</td>
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<tr>
<td>Face-to-face education</td>
<td>-9</td>
<td>-48, 30</td>
<td>0.64</td>
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<tr>
<td>Booklet and video</td>
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<td>-56, -13</td>
<td>0.002</td>
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<td>Hip protectors</td>
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<td>-21, 23</td>
<td>0.92</td>
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<tr>
<td>Multifactorial program</td>
<td>1</td>
<td>-58, 0</td>
<td>0.97</td>
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The group of people who considered the cost of providing the intervention valued the intervention at the coefficient (95% CI) amount more than those who did not.
Discussion

- Patients do attach considerable value to reducing their risk of falls in hospital
  - It was a only a 30% reduction in risk provided
  - Consider limited income effects on older adult valuations

- The approach for reducing falls strongly influenced WTP amounts

New discovery

- 59% of older hospital patients considered the cost of providing an intervention when providing a contingent valuation
  - Evident when valuing a “cheap intervention”
  - Unfairly disadvantage cheap interventions in CBA

How to address this artefact

- Not wanted in CBA as may “double count” the cost of program provision
- Solution
  - Use residuals from WTP regressed against whether person considered this when making valuation to compensate
Limitations

- Exploratory data analysis requires confirmation
- Potentially limited generalizability to other areas
  - Findings may be specific to falls interventions, to subacute setting, to people with poorer levels of cognition

Future research

- Complete CBA of falls prevention strategy based on Haines et al 2004
- Mix CV survey with semi-structured interviews to understand the scope and importance of factors people take into account when making CV’s
- Determine if these factors change across different patient groups / types of interventions being valued

Acknowledgements

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References

- Haines et al. BMJ 2004;328:676-9