Costing & cost-effectiveness in falls prevention

NSW Falls Prevention Network Forum
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Surveillance, Monitoring & Costing

Defining the magnitude of the problem & monitoring the impact of interventions
The public health approach

1. Defining the problem
2. Identifying risk factors
3. Developing & trialling interventions
4. Implementing programs
5. Evaluating programs

Surveillance, monitoring & costing
Falls & medically treated fall injuries, 65 years & older, NSW

Sources: NSW Population Health Survey & 2009 Baseline Falls Prevention Survey

Diagram showing the proportion of the population experiencing falls and medically treated injuries from 1999 to 2009.
Fall-related admission rates
65 years & older, NSW

Average annual change = + 1.7%

Cost of older persons’ fall-related injuries, NSW, 2006/07

- Medical treatments: $34 million (6%)
- Pharmaceuticals: $9 million (1.5%)
- Allied Health: $19 million (3.5%)
- Ambulance: $22 million (4%)
- Community nursing: $9 million (1.5%)
- Domiciliary services: $13.5 million (2.5%)
- Residential aged care: $128 million (23%)
- ED & Outpatient: $61 million (11%)
- Hospital inpatient: $263 million (47%)

Total cost: $558.5 million

Source: Watson, Clapperton & Mitchell, 2010
Current vs earlier projections: admissions

- Moller (2003): separations
- Watson et al (unpub): Incident admissions

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<thead>
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<tbody>
<tr>
<td>2011</td>
<td>16,300</td>
<td>28,250</td>
</tr>
<tr>
<td>2021</td>
<td>34,400</td>
<td>73,500</td>
</tr>
<tr>
<td>2031</td>
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<tr>
<td>2041</td>
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<td>2051</td>
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Current vs earlier projections: bed-days

- **Hospital bed-days**

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<tbody>
<tr>
<td>2011</td>
<td>211,600</td>
<td></td>
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<tr>
<td>2021</td>
<td></td>
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<tr>
<td>2031</td>
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<tr>
<td>2041</td>
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<tr>
<td>2051</td>
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</table>

- **2011**
  - Moller (2003): 211,600
  - Watson et al (unpub): 0

- **2021**
  - Moller (2003): 454,100
  - Watson et al (unpub): 454,100

- **2031**
  - Moller (2003): 1,294,441
  - Watson et al (unpub): 1,294,441

- **2041**
  - Moller (2003): 1,294,441
  - Watson et al (unpub): 1,294,441

- **2051**
  - Moller (2003): 1,294,441
  - Watson et al (unpub): 1,294,441
Projected cost of hospital inpatient care, 65 years & older, NSW (2006/07 $AUD)

Historical

Estimated cost ($millions)

Source: Watson, Yang & Mitchell (unpublished data)
Adequate physical activity
Females, 45 years & older, NSW

Proportion of population

Year

2002  2003  2004  2005  2006  2007  2008  2009

45-54 years
55-64 years
65-74 years
75 years +

Fall-related hip fractures

Average annual change = -2.1%

Summary

• Over the past decade:
  – Rate of self-reported falls has remained relatively stable
  – Falls hospitalisation number & rate continued to increase significantly

• Projections suggest:
  – Major impact on hospital services even if falls hospitalisation rate contained at 2008 level

• Trends which may ameliorate these impacts:
  – Proportion of older women undertaking adequate exercise increasing significantly (except 75 years+)
  – Rate of hip fracture decreasing significantly
Economic evaluation

Cost-effectiveness modelling, priority-setting & resourcing
1. Defining the problem
2. Identifying risk factors
3. Developing & trialling interventions
4. Implementing programs
5. Evaluating programs

Surveillance, monitoring & costing

Cost of injury data

Cost-effectiveness modelling, priority-setting & resourcing

Cost-effectiveness modelling, priority-setting & resourcing

The public health approach
## Population modelling of C-E, NSW

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<tbody>
<tr>
<td><strong>General population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tai chi</td>
<td>+++</td>
<td>Most cost-effective of general interventions</td>
<td>Maybe C-E if cost per participant can be reduced</td>
<td></td>
</tr>
<tr>
<td><strong>High risk groups (recent falls history)</strong></td>
<td></td>
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<tr>
<td>• OT delivered home hazard assessment &amp; modification</td>
<td>++</td>
<td>Included in active multi-factorial intervention (not cost-effective)</td>
<td>Most cost-effective of all interventions modelled</td>
<td></td>
</tr>
<tr>
<td>• Multi-factorial risk management*</td>
<td>++</td>
<td>Not cost-effective</td>
<td>Good clinical practice but not for widespread implementation</td>
<td></td>
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</tbody>
</table>

* A study by Wu et al (2010) modelled a “falls rehabilitation program” (multi-factorial risk assessment with a supervised exercise program) for the U.S. Medicare population and found it to be cost-effective.
## Population modelling of C-E, NSW

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<tbody>
<tr>
<td><strong>Specific populations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Expedited cataract surgery</td>
<td>+</td>
<td>Cost-effective</td>
<td>Limited potential to impact falls rates</td>
<td></td>
</tr>
<tr>
<td>• Psychotropic medication withdrawal</td>
<td>+</td>
<td>Cost-effective</td>
<td>High relative C-E but issues with implementation need to be addressed</td>
<td></td>
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<tr>
<td><strong>Residential aged care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Medication review</td>
<td>+</td>
<td>Highly cost-effective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Vitamin D</td>
<td>+++</td>
<td>Cost-effective</td>
<td></td>
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Resourcing - Return On Investment

• CEAs do not inform policy-makers of the size a program needs to be, and therefore the threshold of investment required, to be cost-saving

• Need to establish potential ROI for community-based falls prevention programs

• To be efficient, it is important to know the:
  – number of clients that a program needs to service to break-even
  – ideal type of client the program should target
Examples of “break-even” analyses

• Comans et al (2009)
  – A break-even analysis of a community rehabilitation falls prevention service (*ANZJPH*)
    • Program: 2 variations of multi-disciplinary falls prevention service (group-based & individual home-based)

• Miller et al (2011)
  – Assessing the cost and potential returns of evidence-based programs for seniors (*Evaluation & the Health Professions*)
    • Program: “A Matter of Balance/Volunteer Lay Leader Model”
Conducting a "break-even" analysis

• Step 1: Review literature & estimate potential benefits of the intervention

• Step 2: Develop a cost model to estimate:
  – Fixed costs of program
  – Variable costs (per additional client)
  – Savings (medical costs averted)

• Step 3: Determine the required effect size to achieve a specified ROI
  – Number of Falls Needed to be Averted (NFNA)
  – Number of clients needed to achieve the NFNA

• Step 4: Establish the threshold of funding required
## Relevant data for cost savings

<table>
<thead>
<tr>
<th>Place of residence by level of care</th>
<th>Average cost ($)</th>
<th>Male</th>
<th>Female</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital admissions</td>
<td>19,478</td>
<td>21,081</td>
<td>20,563</td>
<td></td>
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<tr>
<td>ED attendances</td>
<td>4,119</td>
<td>2,607</td>
<td>3,169</td>
<td></td>
</tr>
<tr>
<td>Non-hospital treatments</td>
<td>327</td>
<td>549</td>
<td>462</td>
<td></td>
</tr>
<tr>
<td>Total Community</td>
<td>4,147</td>
<td>5,290</td>
<td>4,722</td>
<td></td>
</tr>
<tr>
<td><strong>Residential Aged Care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital admissions</td>
<td>11,808</td>
<td>10,999</td>
<td>11,196</td>
<td></td>
</tr>
<tr>
<td>ED attendances</td>
<td>2,826</td>
<td>1,762</td>
<td>1,985</td>
<td></td>
</tr>
<tr>
<td>Non-hospital treatments</td>
<td>241</td>
<td>175</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>Total Residential Aged Care</td>
<td>1,864</td>
<td>2,025</td>
<td>1,979</td>
<td></td>
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<tr>
<td><strong>All NSW</strong></td>
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<tr>
<td>Hospital admissions</td>
<td>18,100</td>
<td>18,609</td>
<td>18,454</td>
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<tr>
<td>ED attendances</td>
<td>3,789</td>
<td>2,241</td>
<td>2,721</td>
<td></td>
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<tr>
<td>Non-hospital treatments</td>
<td>280</td>
<td>424</td>
<td>369</td>
<td></td>
</tr>
<tr>
<td>TOTAL NSW</td>
<td>3,366</td>
<td>4,211</td>
<td>3,906</td>
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</tbody>
</table>

Source: Watson, Clapperton & Mitchell, 2010
Summary

• Strong evidence for effective interventions to prevent falls in older people
• CEAs have identified interventions that are likely to be cost-effective
• The next step requires the translation of these interventions into community-based/population level programs
• The use of break-even analysis in this process can assist in:
  – informing intervention priorities in this area,
  – providing an estimate of the threshold of investment
  – ensuring that finite resources are efficiently allocated.
Conclusion

• Population level planning a priority
• Need for coordinated implementation of high intensity prevention programs
  – Population health resources directed at reducing generic distal risk factors (generating a “low risk” population)
  – Clinical resources directed at reducing proximal risk factors (the “high risk” groups)
• *NSW Health Plan for Prevention of Falls and Harm from Falls among Older People: 2011-2015*
References: