Rebalancing health and social care for older people. Simulating policy options

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Outline

- **Rationale**
  - What is BCASO?
  - Policy purpose

- **Methods**
  - Model construction

- **Policy application**
  - Policy scenario testing

- **Conclusion**
Rationale

- Demographic ageing in NZ has greatly increased the proportion of older people with major implications for the provision of health and social care.

- Policy options include promoting healthier ageing, and changing the balance of care.

- To test these options, we first constructed a micro-simulation model of the 65+ life course using data from NZ official survey series on health and disability respectively.

- We then used the model to artificially modify morbidity levels or the balance of care, and to observe the impact on the overall use of care.
What is BCASO?

BCASO = Balance of Care in an Ageing Society

- Data-driven simulation model of health and social care in older people

- **BCASO** is funded by the Health Research Council
- Investigators: Prof Peter Davis, Prof Ngaire Kerse, Prof Laurie Brown (Canberra), et al
- Project team: Roy Lay-Yee (Co-investigator), Janet Pearson (Statistician), Martin von Randow (Analyst), et al
- Data provided by Ministry of Health and Statistics NZ
Policy purpose

- Model can account for core processes involved in determining levels of health and social care in older people
- Model is representative of the NZ population
- Model can be used to
  - Describe status quo
  - Project impact of demographic ageing
  - Test policy-relevant scenarios
Conceptual model: Health Care

LONG-TERM ILLNESS

PRACTICE NURSE
(on own)

FAMILY DOCTOR

HOSPITAL ADMISSION
Conceptual model: Social Care

RESIDENTIAL CARE

| Yes | No |

DISABILITY LEVEL

| No | Yes |

INFORMAL CARE

| Yes | No |

FORMAL CARE (at home)

| Yes | No |

FORMAL CARE (at home)

| Yes | No |
Policy questions: Health and social care

- What will be future levels of health and social care use for older people under the status quo?  
  *(Base projection)*

- What is the impact of reducing morbidity levels on use of care?  
  *(Morbidity scenario)*

- What is the impact of changing the balance among providers on levels of care use?  
  *(Care scenario)*
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Construction

- Creating a virtual cohort using microsimulation

- Data sources

- Two modules: ‘Health’ & ‘Social’ care

- Each module has:
  - A change element (2001 to 2006, etc)
  - A constant, cross-sectional element
Creating a virtual cohort (microsimulation)

- Use starting cohort of 2807 older people representing 65+ NZ pop.
- Derive rules from national survey data
- Apply these rules to ‘age’ the cohort (stochastic process)
- Allow for mortality, rejuvenation, and SNZ-projected demographics
- Reproduce patterns found in real data
Data Sources

- No longitudinal data available – repeated 5-yearly cross-sectional surveys – health (NZHS: MoH) & disability (NZDS: SNZ) - so simulation interval = 5 yrs.

- Starting sample (n=2807):
  - NZHS 2002 – living in households (n=2206)
  - + NZDS 2001 – residential (n=601)

- Deriving – statistical equations & transition probabilities (rules for the simulation):
Health Care module – modalities of care

- **Practice nurse visit (yes/no)**
  ~ long-term illness + age + gender + ethnicity + deprivation + partnership status

- **GP visit (ordinal categories)**
  ~ practice nurse visit + long-term illness + age + gender + ethnicity + deprivation + partnership status

- **Public hospital admission (yes/no)**
  ~ GP-visit + practice nurse visit + long-term illness + age + gender + ethnicity + deprivation + partnership status
Social Care module: a continuum of care

- Informal care (yes/no)
  ~ disability + age + gender + ethnicity + deprivation + partnership status

- Formal care (yes/no)
  ~ informal care + disability + age + gender + ethnicity + deprivation + partnership status

- Residential care (yes/no)

- Informal / formal care ~ Residential care
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  ANY BRIEF QUESTIONS AT THIS POINT?
- Policy application
  - Policy scenario testing
- Conclusion
Policy scenario testing

- ‘What if’ questions - what might happen if conditions were to change … what would be the impact of a policy intervention that could shift the balance of care? …

- **Base projection** (of status quo) - people live longer but suffer same pattern of illness *(expansion of morbidity)*

- **Morbidity scenario** - years of disability at end of life are reduced by improvement in health – gradual, incremental *(compression of morbidity)*

- **Care scenario** – changing the balance of care – quantum leap via policy intervention? *(substitution of care?)*
Reprise … Policy questions: Health care

- What will be future levels of health service use for older people under the status quo?  
  (Base projection)

- What is the impact of reducing morbidity levels on health service use?  
  (Morbidity scenario)

- What is the impact of changing the balance among providers on levels of health service use?  
  (Care scenario)
Health Care: scenarios (What if?)

- Morbidity scenario: Reduce long-term illness; disability
  → health service use (practice nurse, GP, hospital)

- Care scenario: Increase practice nurse (alone) visit
  → GP visits & public hospital admissions

**Note:** Interpretation of impact – direction and magnitude more important than specific point estimates
Base projection 2001 to 2021: for 65+ living in the community

<table>
<thead>
<tr>
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<th>Long-term illness (%)</th>
<th>Moderate or severe disability (%)</th>
</tr>
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<tbody>
<tr>
<td>2001: Base simulation</td>
<td>85.6</td>
<td>36.0</td>
</tr>
<tr>
<td>2021:</td>
<td>87.4</td>
<td>40.8</td>
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<td>Change 2001 to 2021</td>
<td>+1.8</td>
<td>+4.8</td>
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Projected simulation from 2001 to 2021 shows a moderate increase in morbidity (more so for disability) - i.e. expansion of morbidity.
## Base projection 2001 to 2021: for 85+ living in the community

Projected simulation from 2001 to 2021 shows a moderate increase in morbidity (more so for long-term illness) - i.e. expansion of morbidity

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<tr>
<td><strong>2001:</strong></td>
<td>85.7</td>
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<tr>
<td><strong>2021:</strong></td>
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<td>78.5</td>
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<td>Base projection - simulated</td>
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Morbidity scenario: for 65+ living in the community

- Projected simulation - increase in GP (more so) & hospital use (but not nurse)
- Scenarios implemented by decreasing morbidity levels – i.e. compression - slightly reduced the use of health care (similar pattern by age grouping)
Care Scenario: for people 65+ living in the community.

*Increasing practice nurse use*

**Intervention:**
Increasing proportion visiting nurse

**Result:**
Decreased proportion with high GP visits (5+)

Scenarios implemented by increasing levels of practice nurse use reduced high GP-users (5+ visits) and public hospital admission (with increasing age grouping)
Care Scenario: for people 85+ living in the community.

*Increasing practice nurse use*

Scenarios implemented by increasing levels of practice nurse use reduced high GP-users (5+ visits) and public hospital admission.

**Result:**
- Decreased proportion with high GP visits (5+)
- Decreased proportion with hospital admission
Reprise … Policy questions: Social care

- What will be future levels of social care use for older people under the status quo?  
  *(Base projection)*

- What is the impact of reducing morbidity levels on social care use?  
  *(Morbidity scenario)*

- What is the impact of changing the balance among providers on levels of social care use?  
  *(Care scenario)*
Social Care: scenarios (What if?)

- Morbidity scenario: Reduce long-term illness; disability → social care use (informal, formal)

- Care scenario 1: Increase informal care → formal care

- Care scenario 2: Reduce residential care → informal, formal care

Note: Interpretation of impact – direction and magnitude more important than specific point estimates
Base projection 2001 to 2021: for 65+ living in the community

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Projected simulation from 2001 to 2021 shows a moderate increase in morbidity (more so for disability) - i.e. expansion of morbidity
Morbidity scenario: for 65+ living in the community

- Projected simulation - moderate increase in use of social care
- Scenarios implemented by decreasing morbidity levels – i.e. compression - only slightly reduced the use of social care
Care Scenario 1: for people 65+ in the community needing assistance in daily living. *Increasing informal care use*

**Result:** Decreased proportion using formal care

**Intervention:** Increasing proportion using informal care

Scenarios implemented by increasing the use of informal care reduced the use of formal care (particularly with increasing age).
Care Scenario 1: for people 85+ in the community needing assistance in daily living. Increasing informal care use

Scenarios implemented by increasing the use of informal care reduced the use of formal care.
Care Scenario 2: Achieving reductions in residential care for people aged 65+

Scenarios implemented by setting reduced levels of residential care show that such reductions can be achieved by moderate increases in informal and formal care.
Care Scenario 2: Achieving reductions in residential care for people aged 85+

Scenarios implemented by setting reduced levels of residential care show that such reductions can be achieved by moderate increases in informal and formal care.
Further work

- Scenario testing showed moderate relative effects, but absolute numbers of people affected (and associated costs) may still be considerable.

- Estimate cost savings related to scenario impacts on outcomes, especially for 85+ where benefits are greatest.
Conclusions: Technical

- We used microsimulation to bring together real data from various sources
  - We added value to existing public data

- Strength – representative of NZ pop; replicates real world benchmarks

- Limitation – small sample, lack of rich detail / finer grain

- We created a virtual cohort – data platform - that can be used to test policy-relevant scenarios

- Model shows the system is robust to change; major changes required to make any impact
Conclusions: Substantive

- Demographic ageing may not have a major negative impact on system resources especially with healthier populations over time.

- While facilitating ageing in place, changing the balance of care (shifting to more timely and less costly modalities) may make better use of finite system resources.

Potential policy interventions:
- Compulsory (free) practice nurse visits for 85+ - could reduce proportion of high GP-users (5+ visits) by 6%, and proportion with at least one public hospital admission by 60%.

- Supporting community care for 85+ – increasing informal (by 5%) & formal (by 7%) could reduce residential care use by 20%.
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ANY FURTHER QUESTIONS?

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