New Zealand

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

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THE UNIVERSITY OF AUCKLAND
Whare Wānanga o Tāmaki Makaurau

*COMPASS Colloquium*

*Wellington*

*10 July 2014*

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# Outline

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- **Rationale**
  - What is BCASO?
  - Policy purpose
- Methods
  - Model construction
- Policy application
  - Policy scenario testing
- Conclusion

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# Rationale

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- 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?

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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

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- 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

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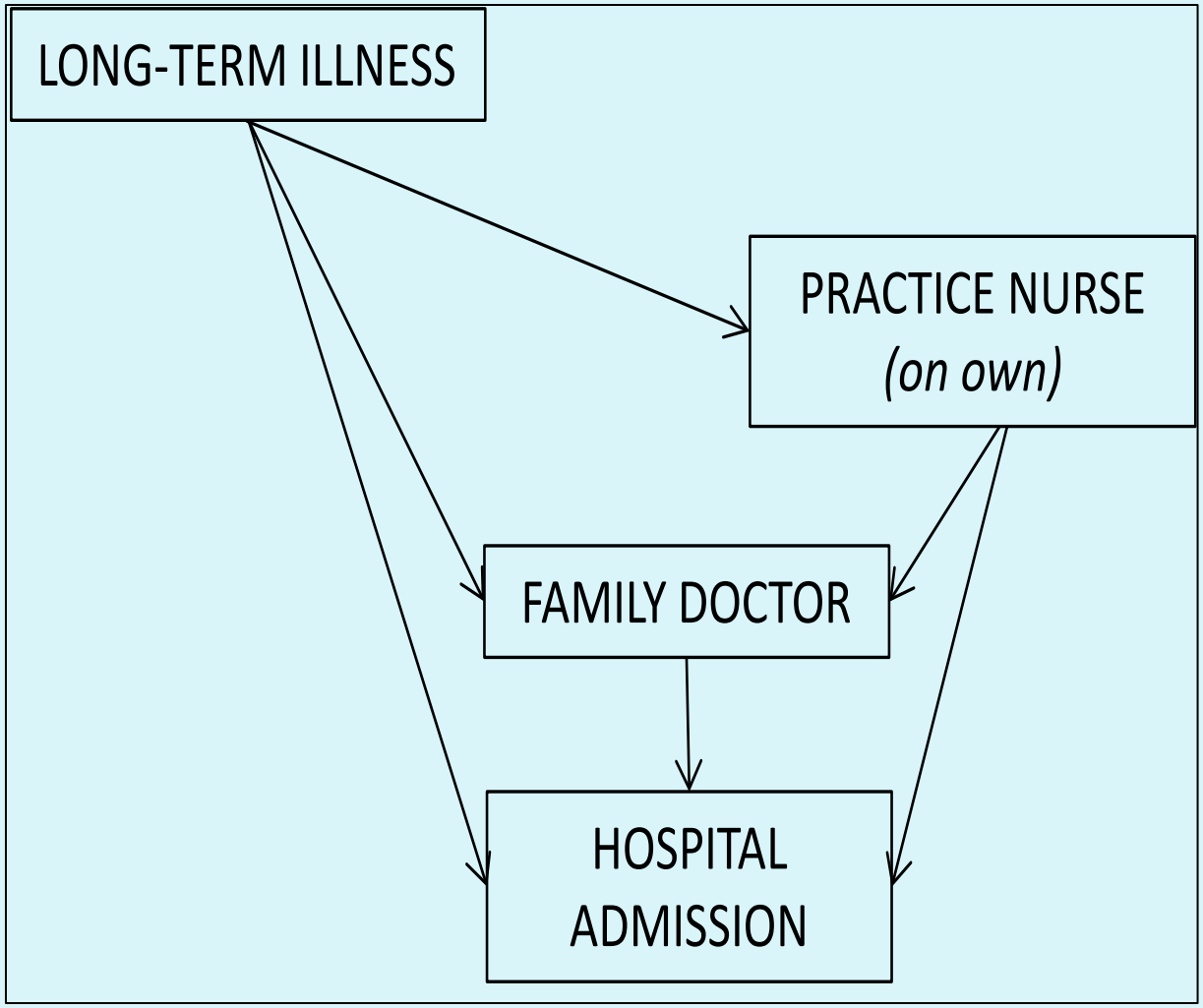
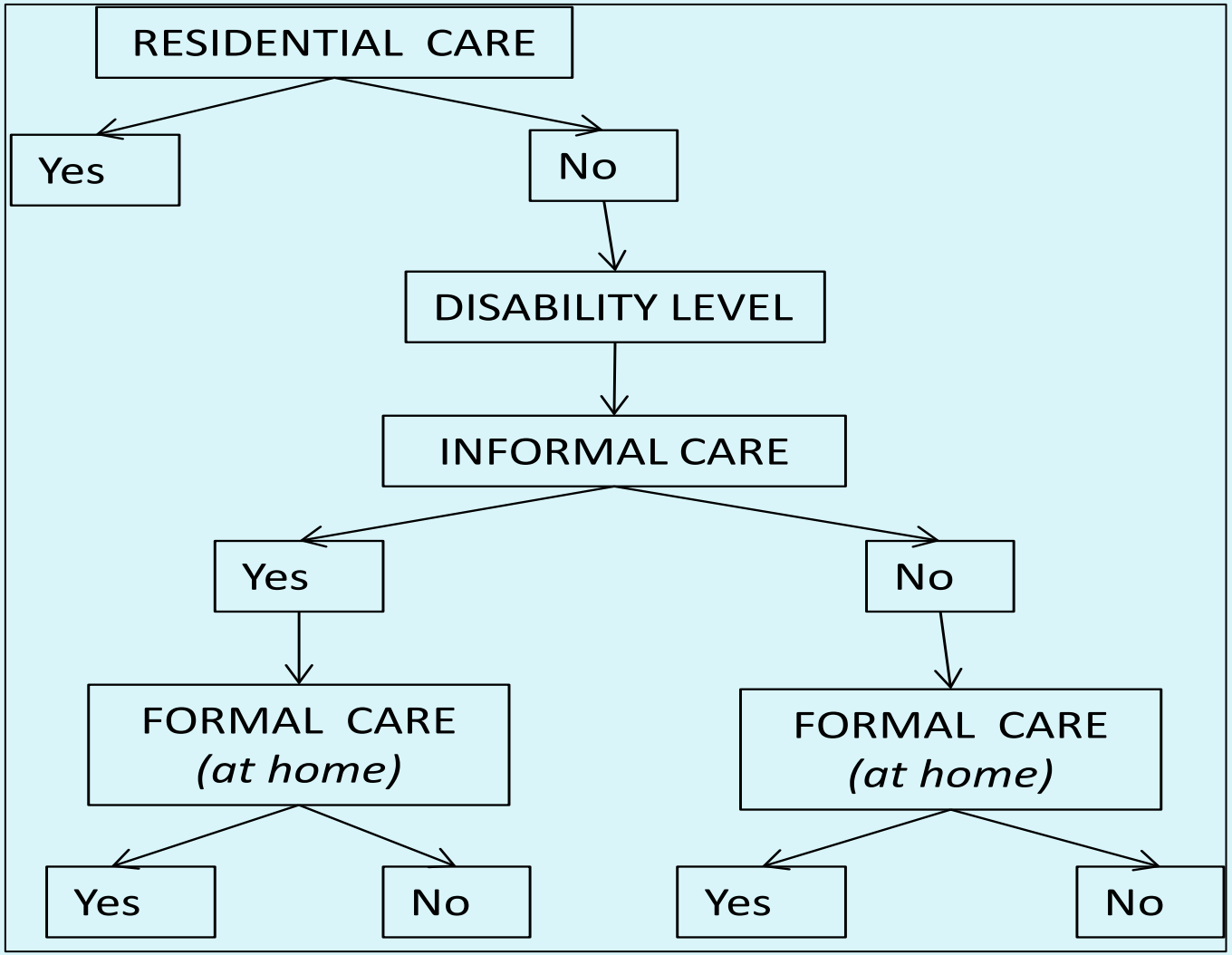
# Conceptual model: Health Care





# Conceptual model: Social Care





# Policy questions: Health and social care

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- 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)

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- 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

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- 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):
  - NZHS 2002, 2006; NZDS 1996, 2001

# Health Care module – modalities of care

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- 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

# Outline



- Rationale
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**ANY BRIEF QUESTIONS AT THIS POINT?**

- **Policy application**
  - Policy scenario testing
- Conclusion

# Policy scenario testing

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- '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

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- 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

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| | Morbidity | |
|---|---|---|
| | Long-term illness (%) | Moderate or severe disability (%) |
| **2001:** **Base simulation** | 85.6 | 36.0 |
| **2021:** **Base projection - simulated** | 87.4 | 40.8 |
| **Change 2001 to 2021** | +1.8 | +4.8 |

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

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# Base projection 2001 to 2021: for 85+ living in the community

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| | Morbidity | |
|---|---|---|
| | **Long-term illness (%)** | **Moderate or severe disability (%)** |
| **2001: Base simulation** | 85.7 | 76.7 |
| **2021: Base projection - simulated** | 97.1 | 78.5 |
| **Change 2001 to 2021** | +11.4 | +1.8 |

- 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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# Morbidity scenario: for 65+ living in the community

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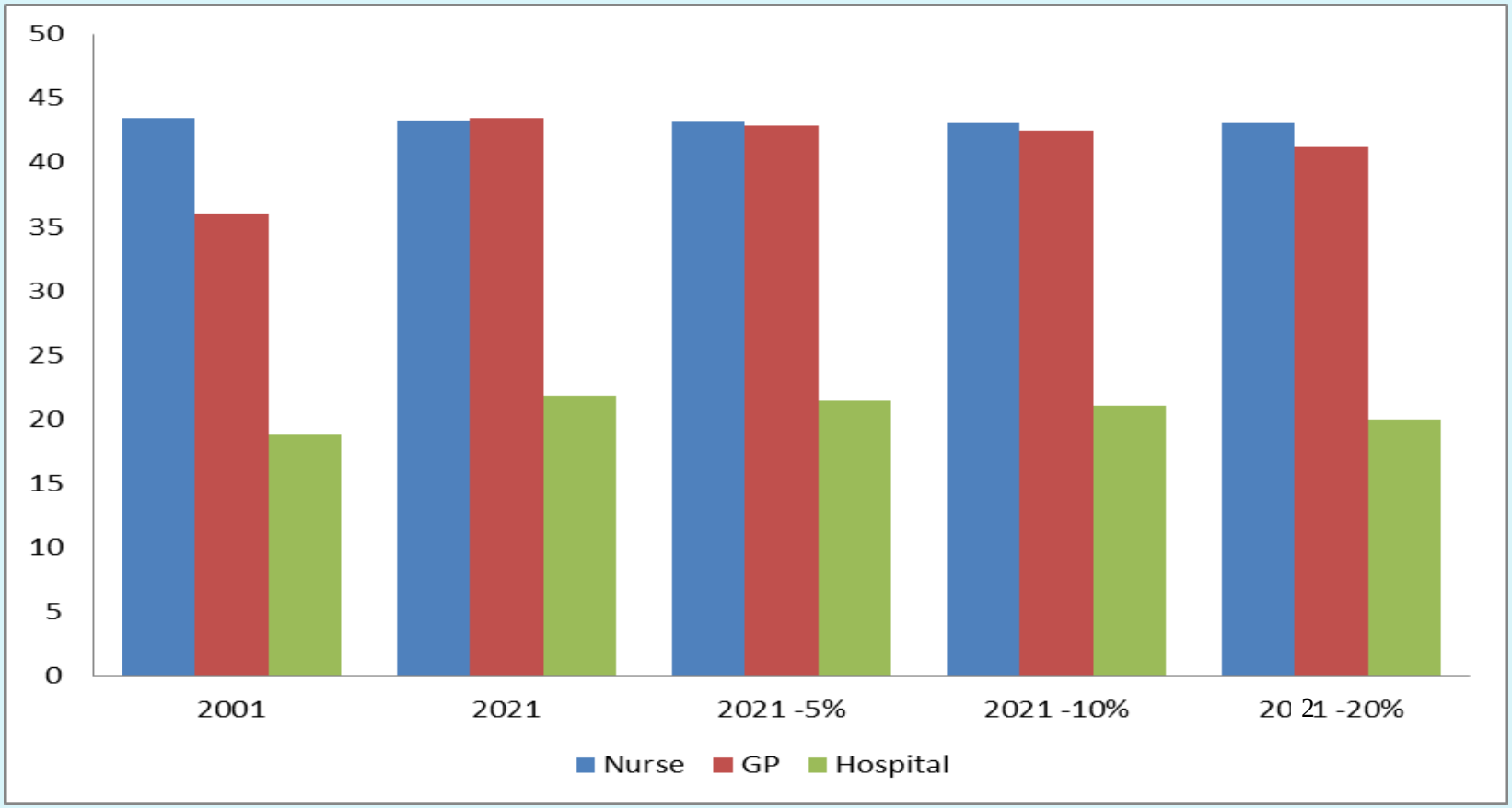


- Projected simulation - increase in GP (more so) & hospital use (but not nurse)
- Scenarios implemented by decreasing morbidity levels – i.e. compression - slightly reduced the use of health care (similar pattern by age grouping)

# Care Scenario: for people 65+ living in the community. *Increasing practice nurse use*

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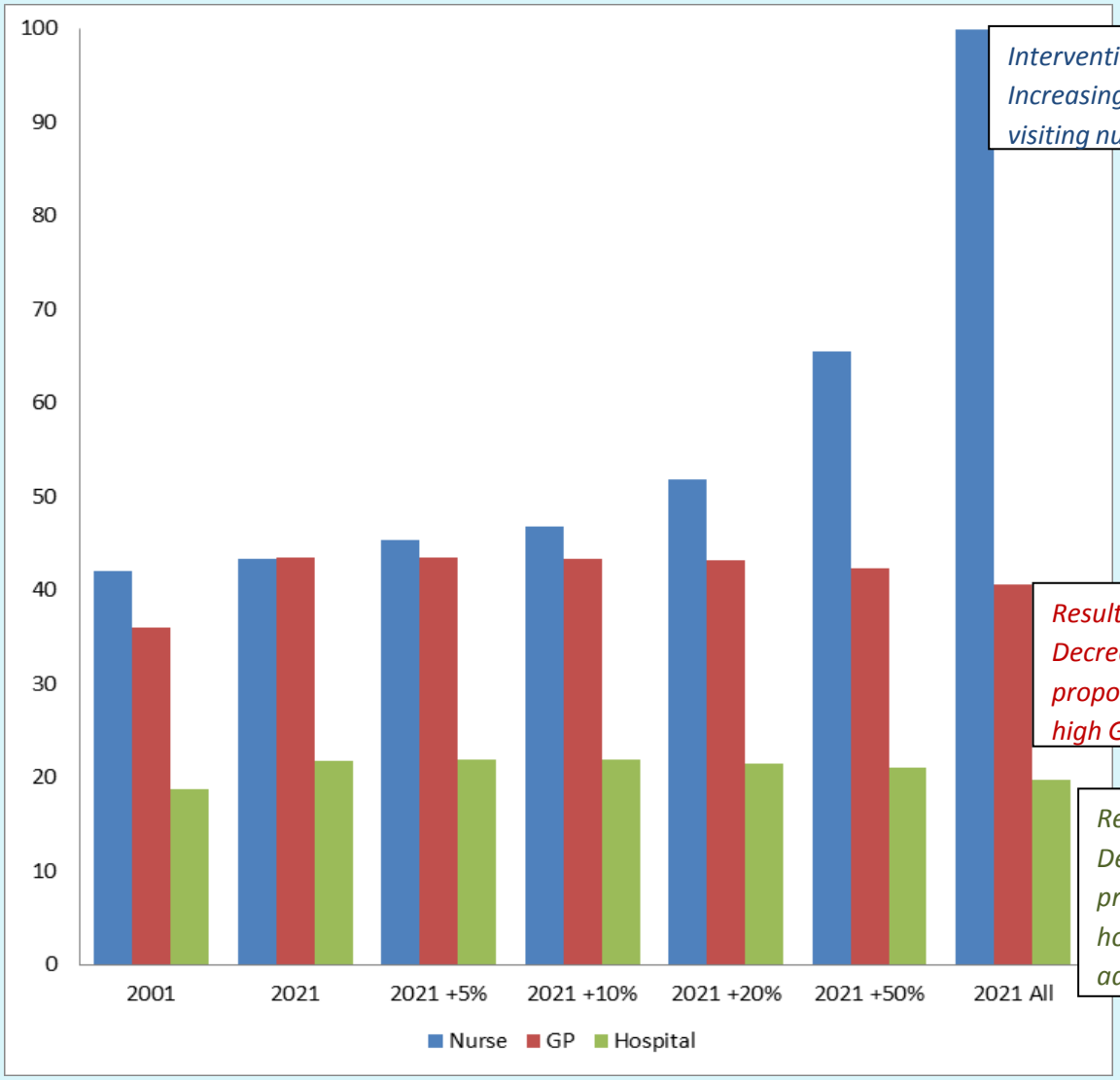


*Intervention: Increasing proportion visiting nurse*

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

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

*Result: Decreased proportion with hospital admission*

# Care Scenario: for people 85+ living in the community. *Increasing practice nurse use*

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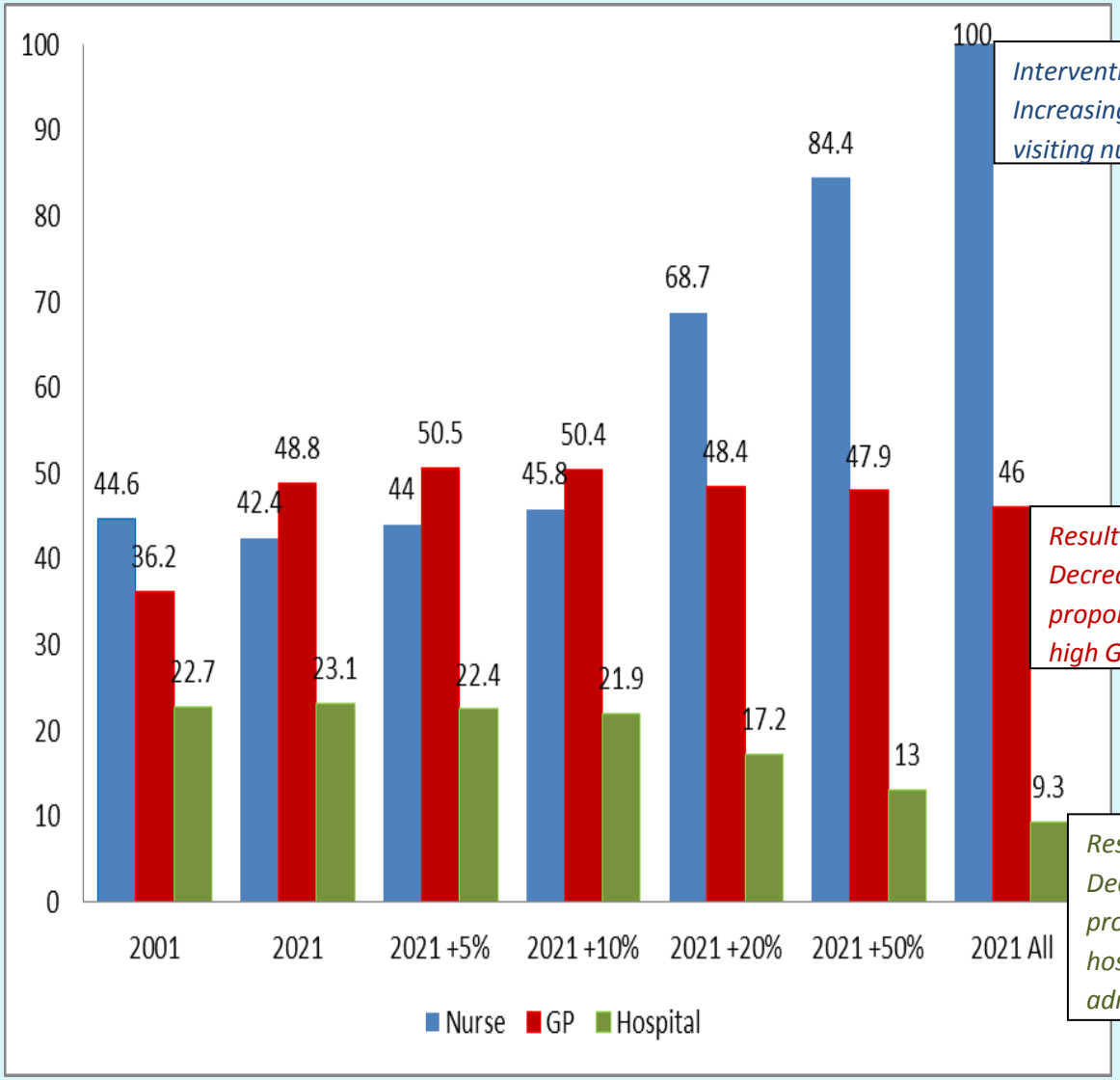


*Intervention: Increasing proportion visiting nurse*

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

*Result: Decreased proportion with hospital admission*

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

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# Reprise … Policy questions: Social care

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- 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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| | Morbidity | |
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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

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# Morbidity scenario: for 65+ living in the community

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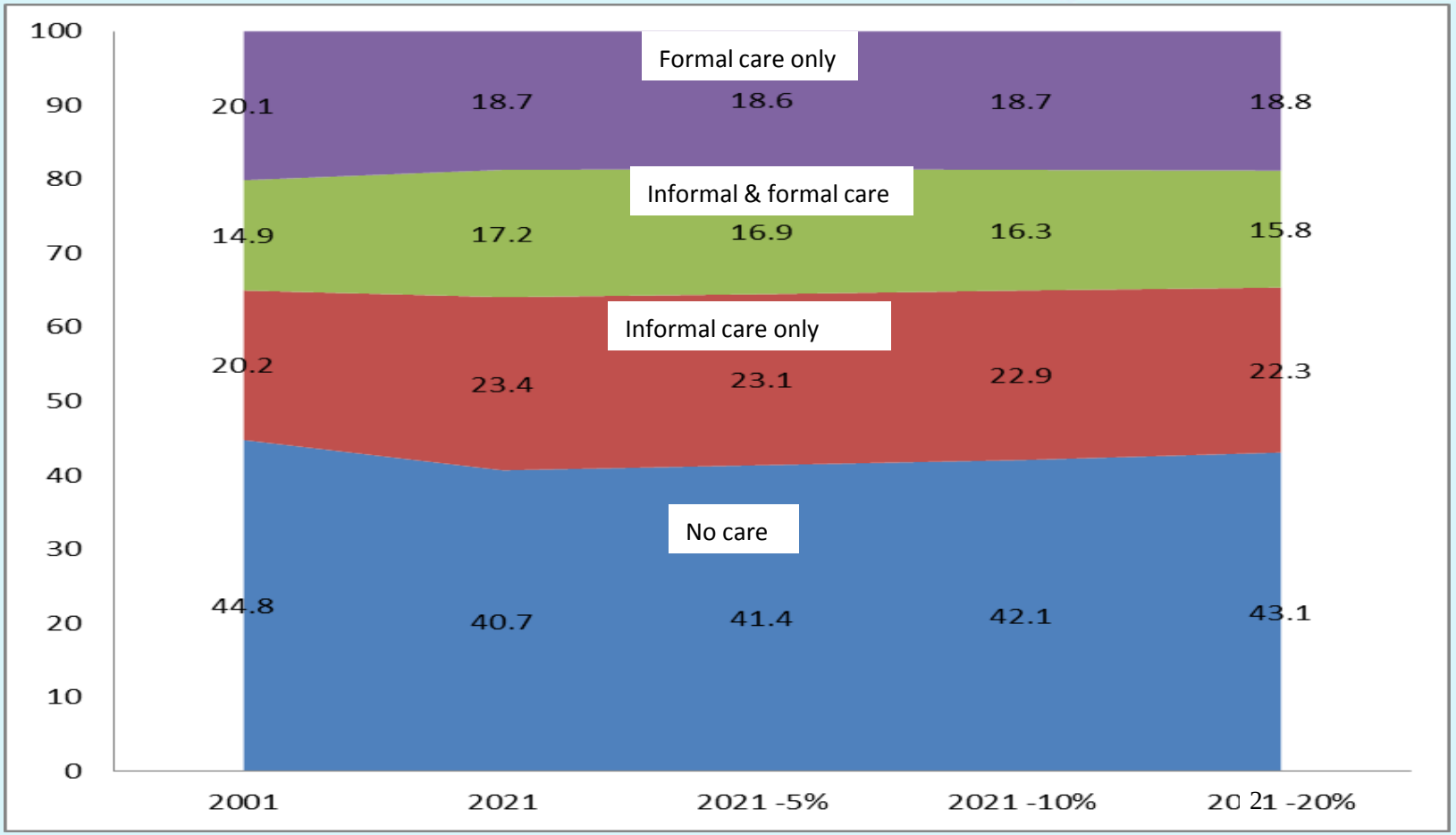


- Projected simulation - moderate increase in use of social care
- Scenarios implemented by decreasing morbidity levels – i.e. compression - only slightly reduced the use of social care

# Care Scenario 1: for people 65+ in the community needing assistance in daily living. *Increasing informal care use*

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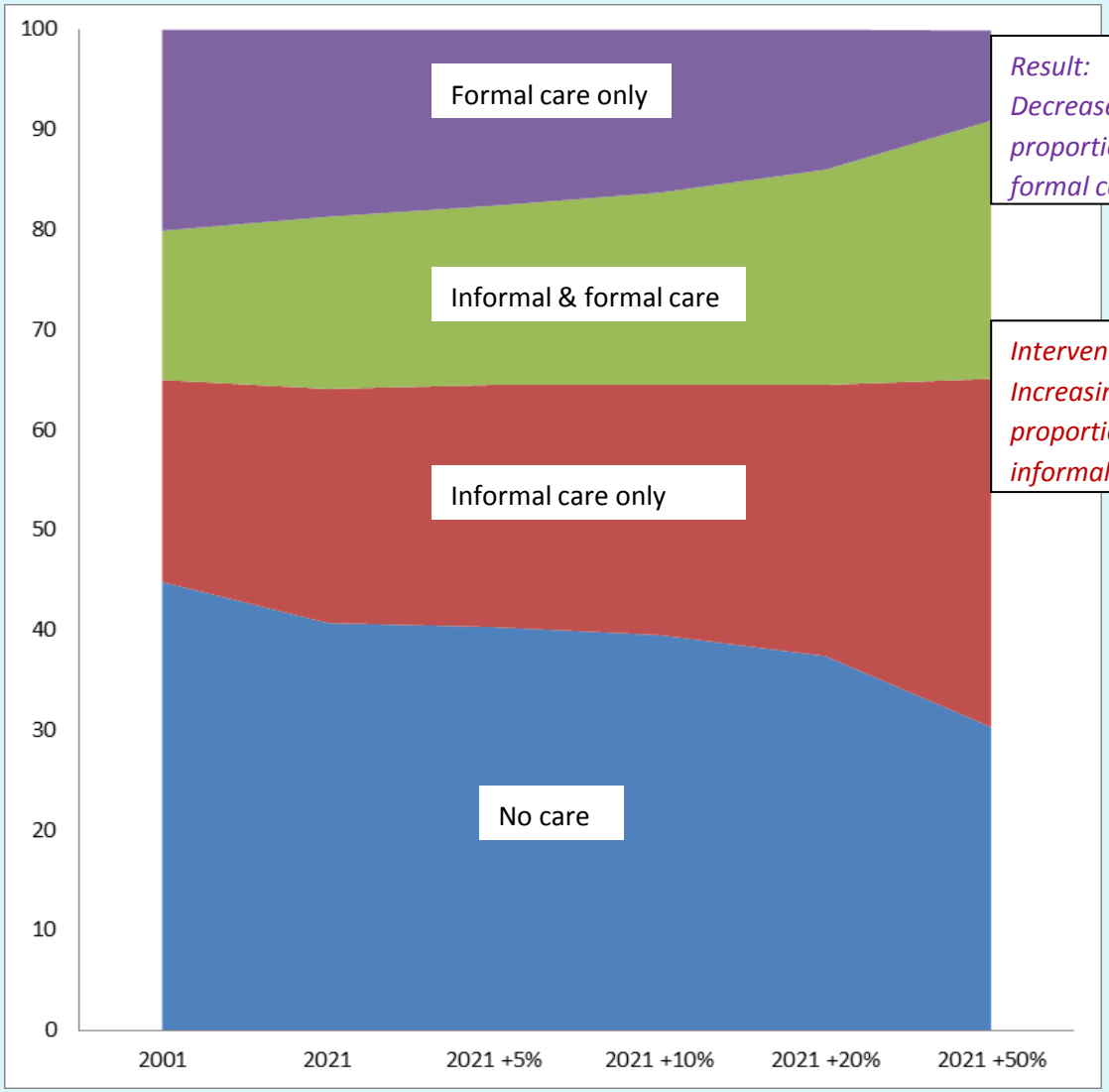


Scenarios implemented by increasing the use of informal care reduced the use of formal care (particularly with increasing age).

# Care Scenario 1: for people 85+ in the community needing assistance in daily living. *Increasing informal care use*

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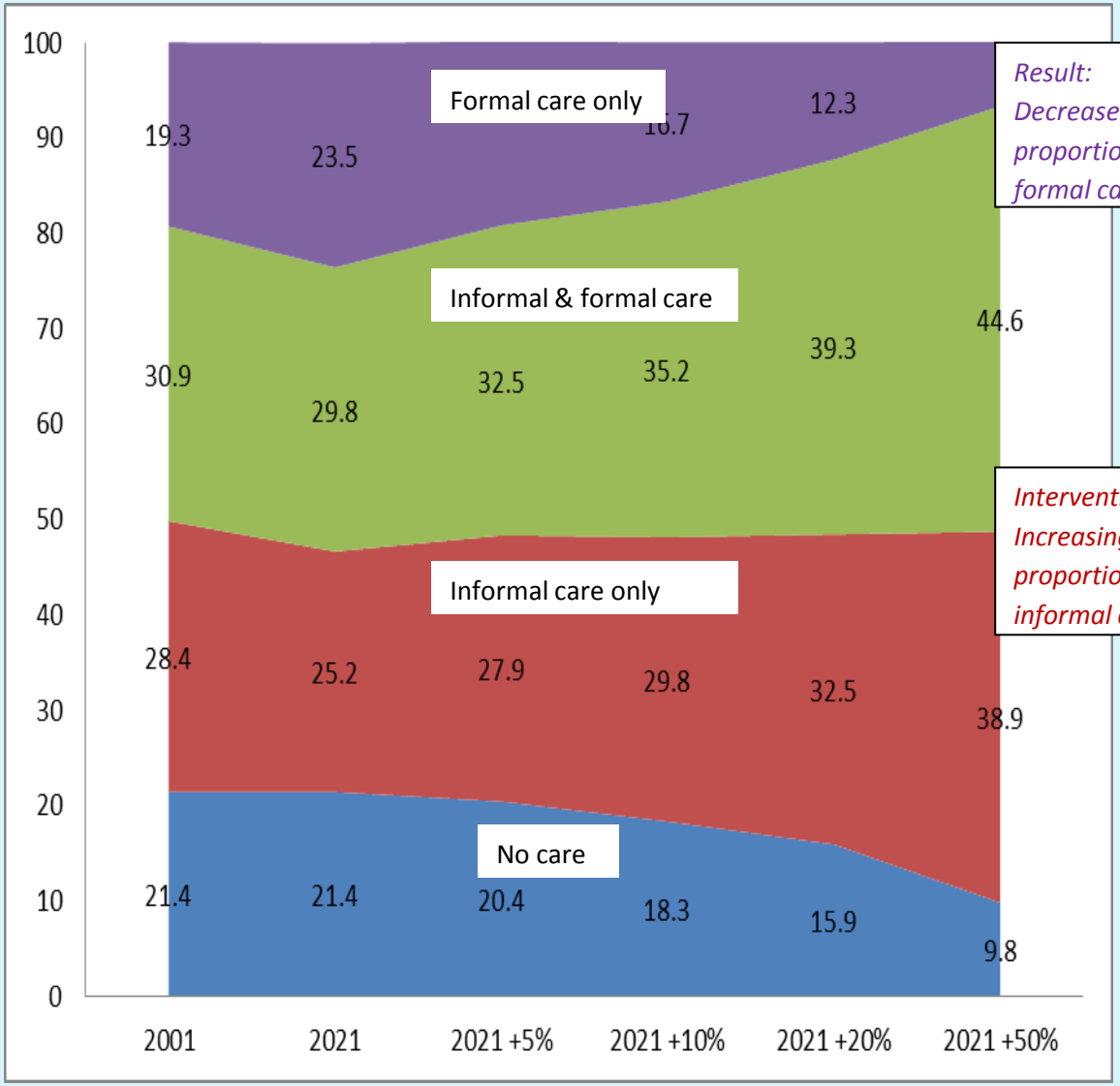


*Result: Decreased proportion using formal care*

*Intervention: Increasing proportion using informal care*

Scenarios implemented by increasing the use of informal care reduced the use of formal care

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# Care Scenario 2: *Achieving reductions in residential care for people aged 65+*

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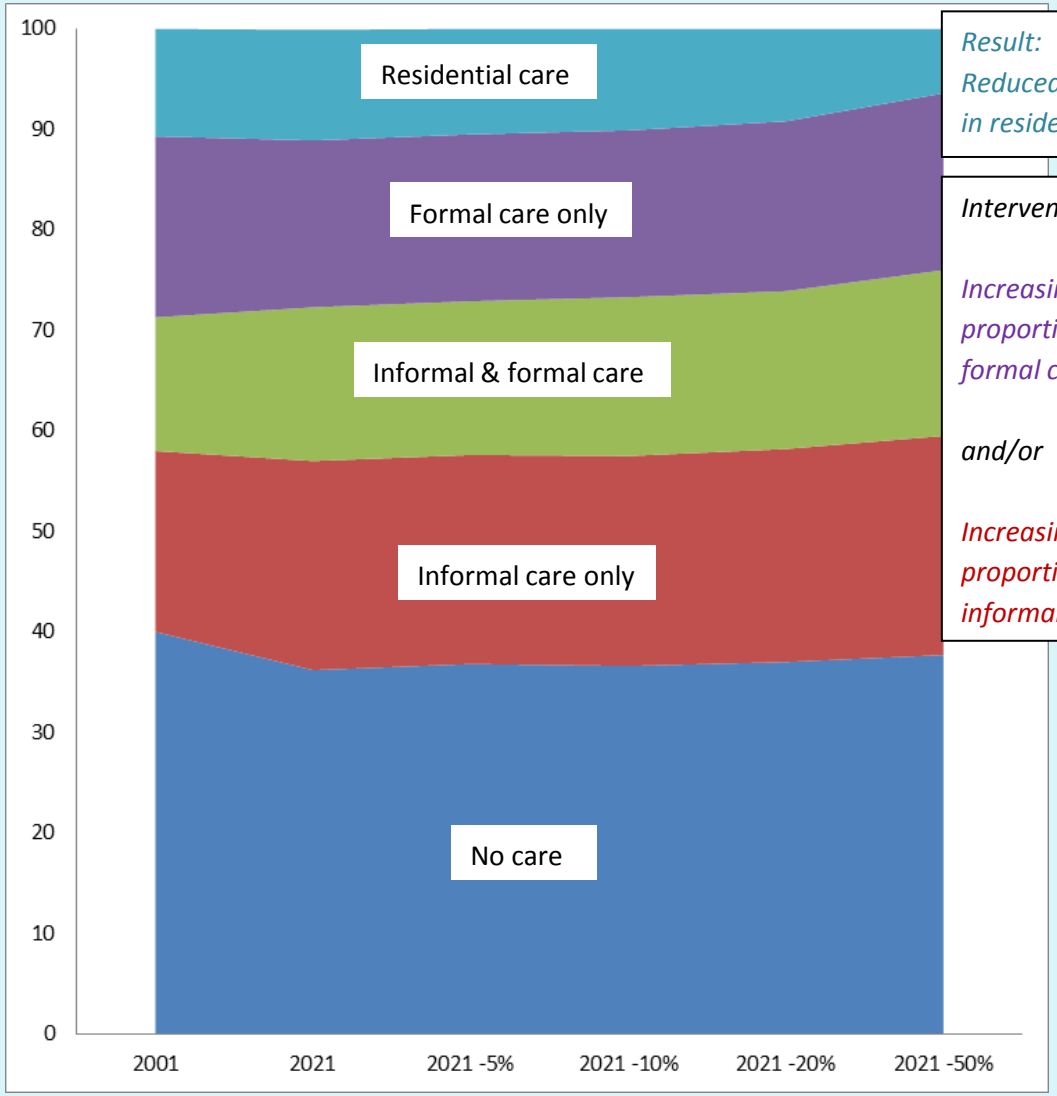


*Result:*
*Reduced proportion in residential care*

*Intervention:*

*Increasing proportion using formal care*

*and/or*

*Increasing proportion using informal care*

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

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# Care Scenario 2: *Achieving reductions in residential care for people aged 85+*

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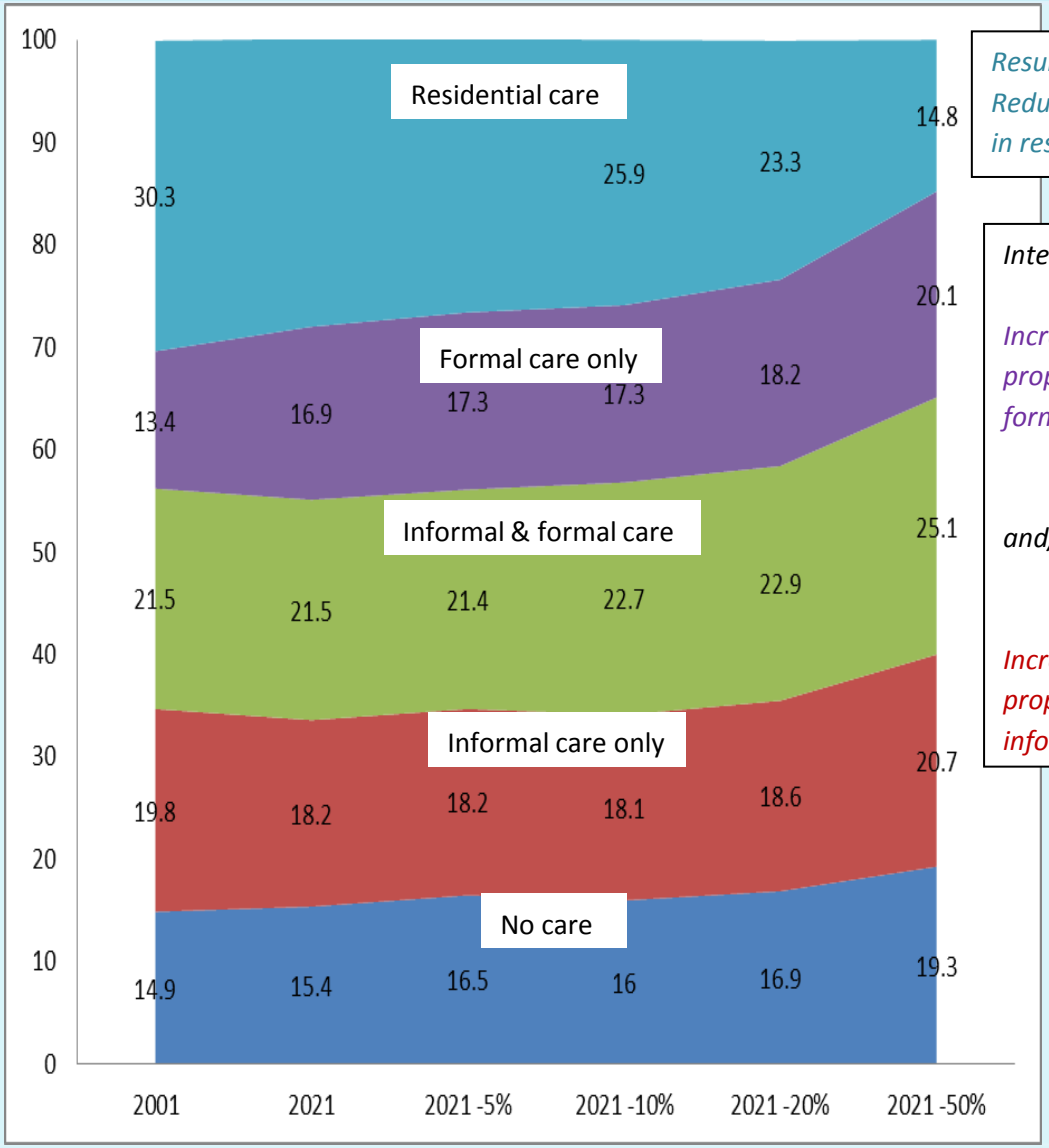


*Result:*
*Reduced proportion in residential care*

*Intervention:*

*Increasing proportion using formal care*

*and/or*

*Increasing proportion using informal care*

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

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# 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

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- 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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