New Zealand

Testing Policy Scenarios for Ageing

Micro-simulation using Data from Three Surveys

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

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hrc

The University of Auckland

Presentation Outline

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- Summary
- Background and Methods
- Results
- Conclusion
  - Published – Health Policy, 2010
  - Co-authors – Roy Lay-Yee, Janet Pearson
  - Funding – Health Research Council of New Zealand

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Summary

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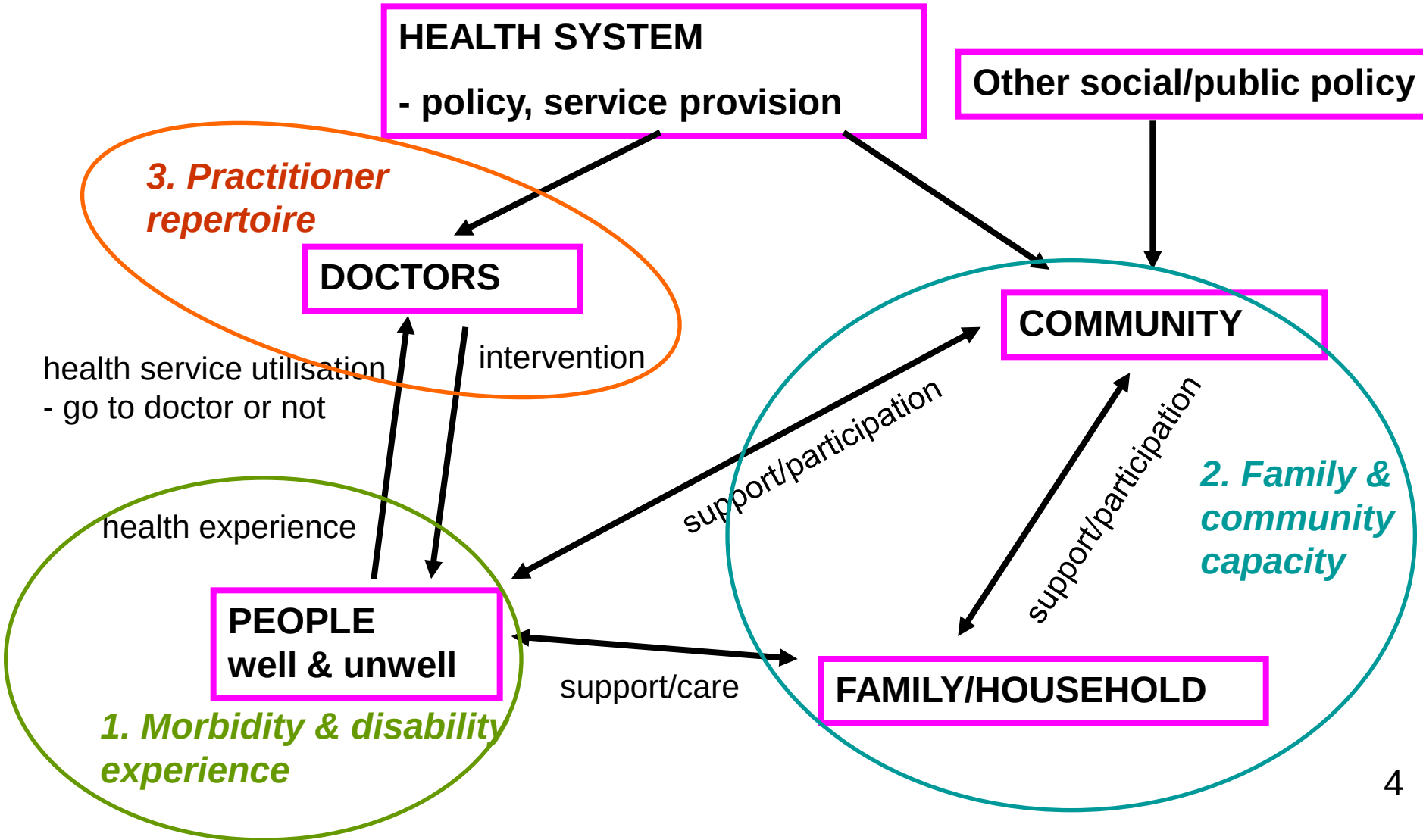
- We use micro-simulation techniques to test policy scenarios for demographic ageing in New Zealand
- We are able to combine information from three different surveys to create a synthetic data set.
- We provide projections and test a range of scenarios.
- The project demonstrates the potential of micro-simulation and related techniques for combining data and testing scenarios

Model of primary care



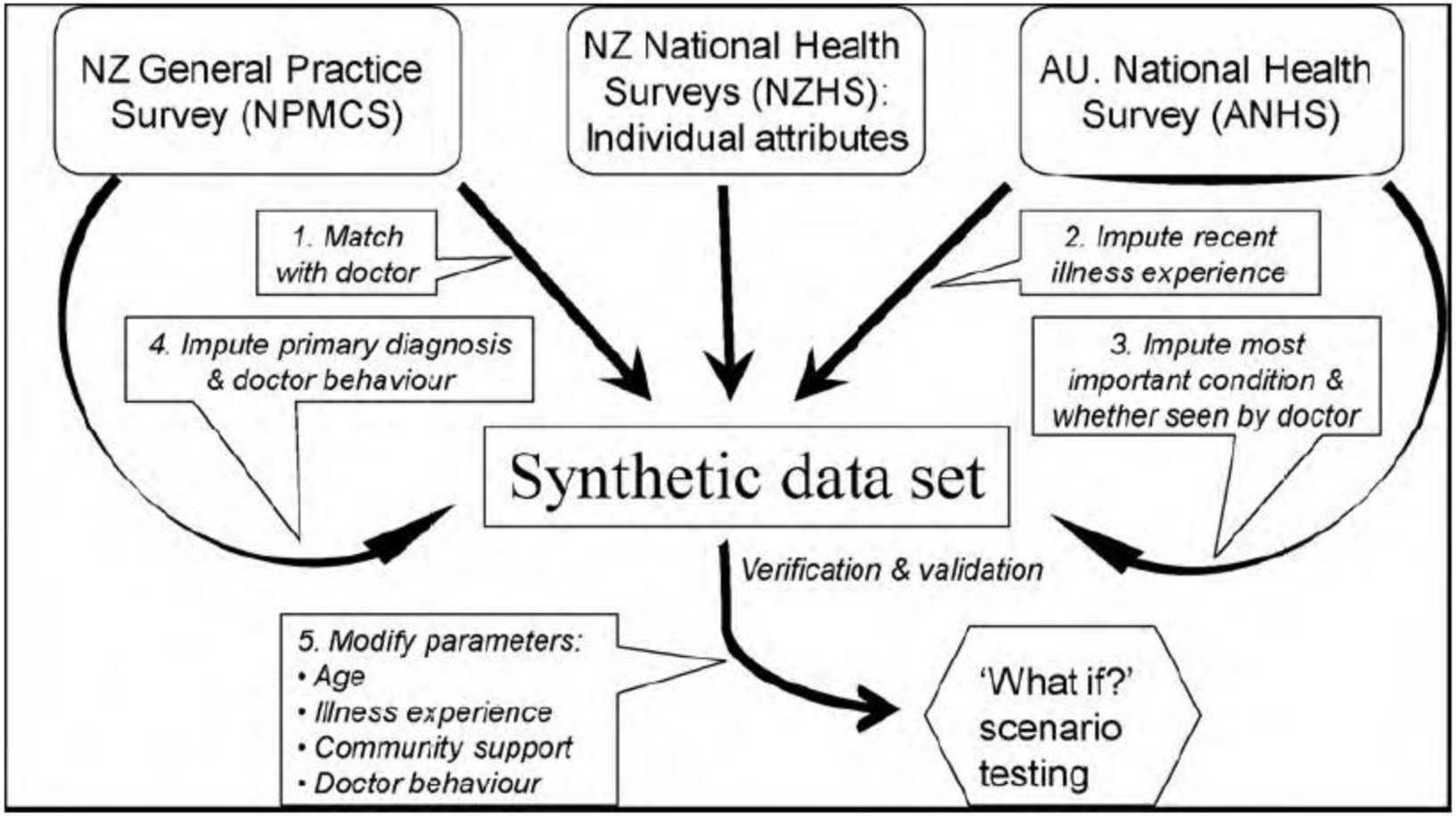


Fig. 1. The model: data synthesis, simulation and scenario testing.

Background and Methods

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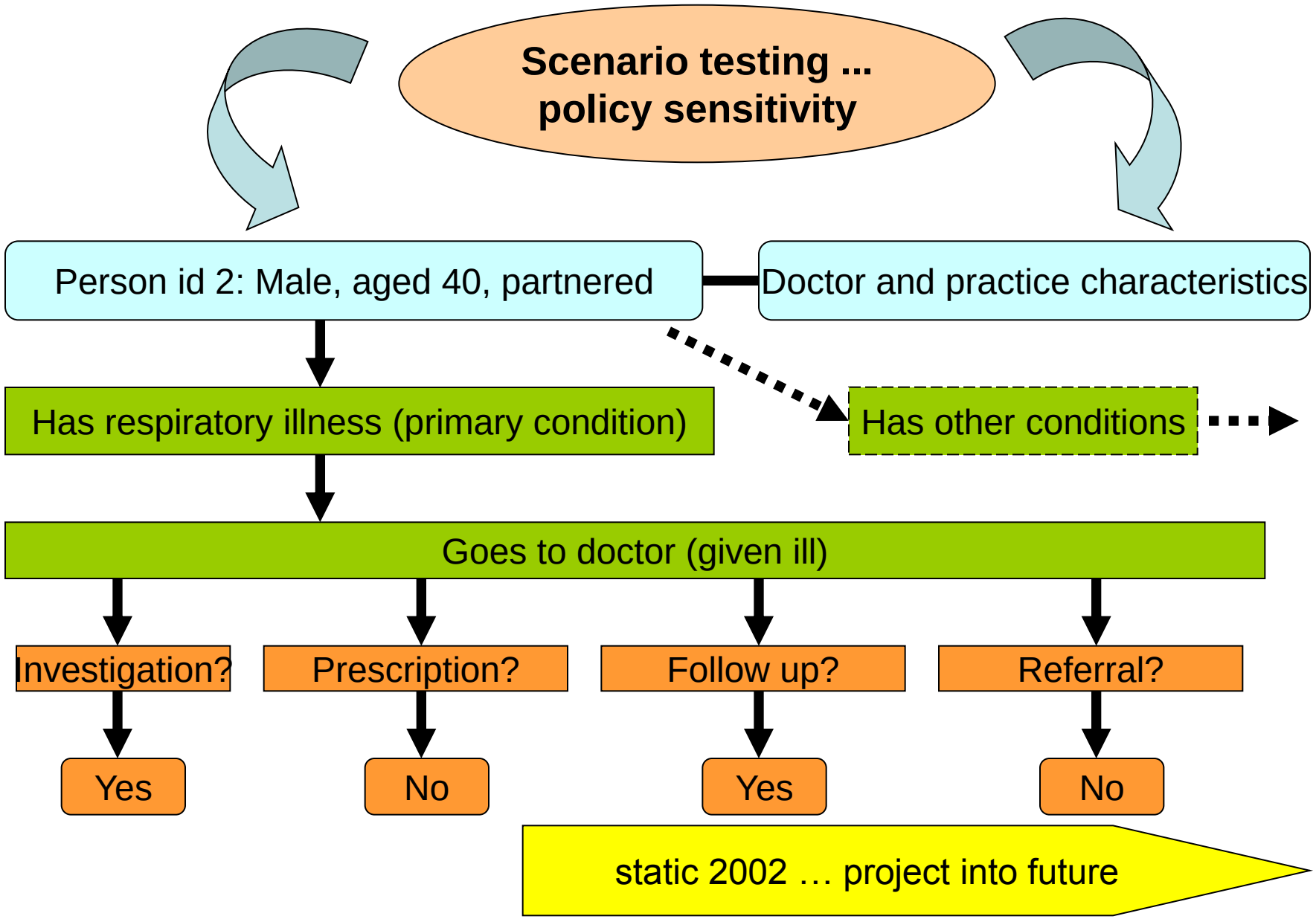
- New Zealand like other developed societies is undergoing a demographic transition.
- Pertinent data are available from a number of independent sources, but are not readily combined.
- We use data from three surveys to create a synthetic representation of the process and context of service use.
- We test our model against external benchmarks to establish its validity.

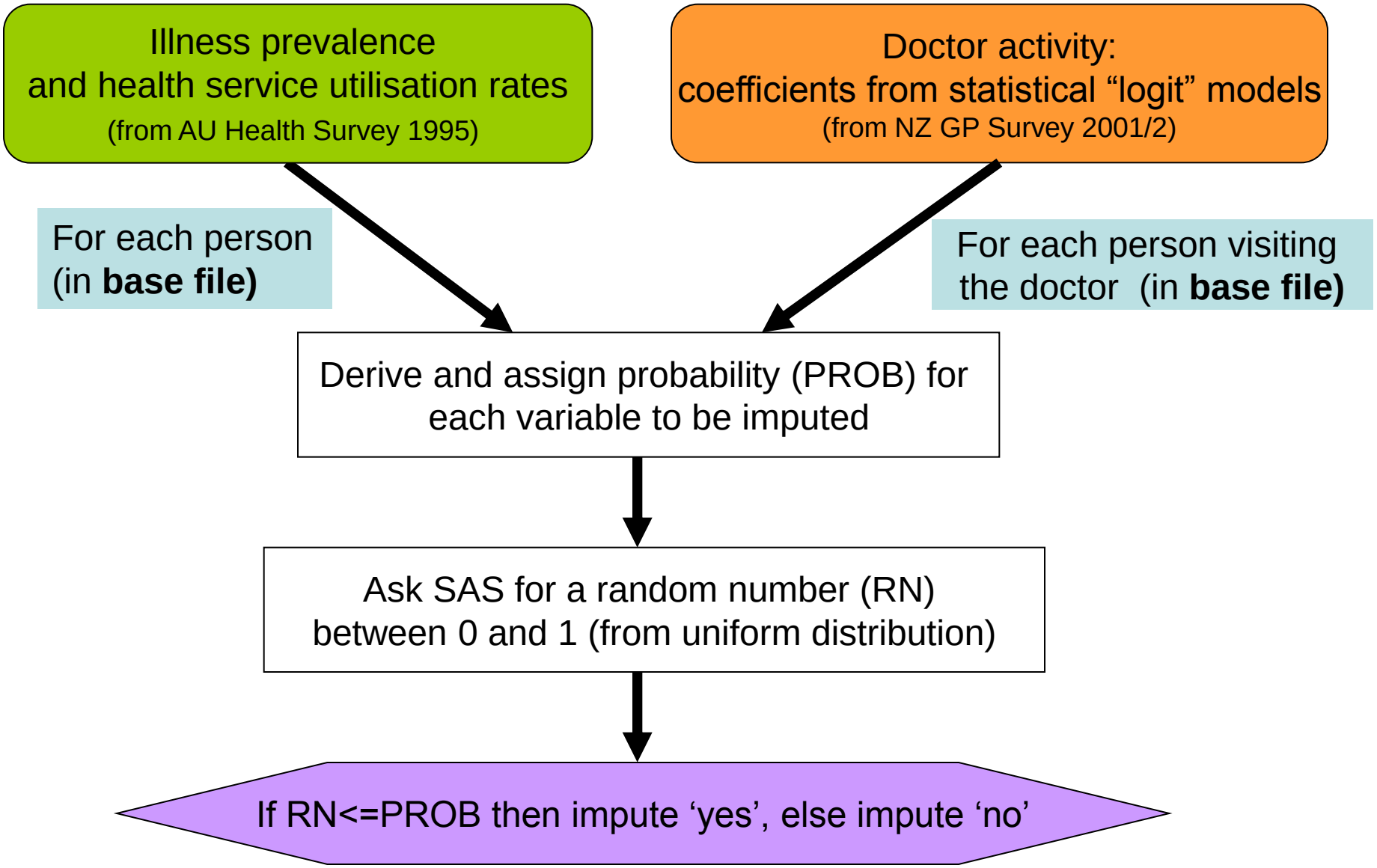
Synthesised base file + imputed + imputed

NZ Health Surveys 1996/7 (children) & 2002/3 (adults) [n=13,548]	NZ GP Survey 2001/2: Doctor & Practice (via patient visits) [n=244 GPs]	AU Health Survey 1995 [n=53,828]	NZ GP Survey 2001/2 : Patient visits [n=9,272]
Age		Age	Age
Gender		Gender	Gender
Ethnicity			Ethnicity
Deprivation			Deprivation
Number of visits in last 12 months			Number of visits in last 12 months
Living arrangements		Living arrangements	
Long-term conditions		Short-term & long-term condition categories	Primary diagnosis categories
		Go to doctor	
		1st listed reason for last visit in last 2 weeks	
		Number of visits in last 2 weeks	
	Doctor age, gender, ethnicity, etc		Doctor actions
	Practice type, location, number of doctors		

An individual's health history unfolding …



How variables are imputed



TOP 10 : 2002

for each condition category, percentage of all conditions seen in a year

	Simulation 2002	NZ GP Survey 2001/2	Absolute error
Condition category	**Percent of all conditions**		
Respiratory system diseases	16.0	14.8	1.2
Cardiovascular/circulatory diseases	9.7	9.3	0.4
Musculoskeletal and connective tissue diseases	9.4	5.7	3.7
Digestive system diseases	6.8	4.4	2.4
Nervous system/sense organ diseases	6.1	8.2	2.1
Skin and subcutaneous tissue diseases	5.8	6.7	0.9
Endocrine/nutritional/metabolic/immunity disorders	5.4	4.1	1.3
Injury and poisoning	5.0	7.1	2.1
Genitourinary system diseases	3.3	4.6	1.3
Mental disorders	3.0	5.0	2.0
…	…	…	…
Total	**100%**	**100%**	
		Average error	1.4

Percentage of visits per year with each type of doctor activity: 2002

	Simulation 2002	NZ GP Survey 2001/2	Absolute error
GP activity	**Percent of visits**		
Investigation	27.8	24.9	2.9
Prescription	64.5	66.2	1.8
Non-drug treatment	62.6	62.1	0.6
Follow-up	60.3	57.3	3.1
Referral	18.3	15.9	2.5
		Average error	2.2

Results

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- Scenario age projection (2021)
  1. *Average number of GP visits*
  2. *Distribution of visits by diagnosis*
  3. *Rate of GP activity*
- Map of policy scenarios

Scenario projection (2021)

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- 2002 population adjusted by age, gender, ethnicity.
- Re-weighted to SNZ projection to 2021 assuming medium birth, mortality and migration rates.

	Base 2001 NZ Census	2021 multipliers
Age group	%	
0–14	22.7	0.99
15–64	65.3	1.24
65+	12.0	1.74
Gender		
Male	48.8	1.19
Female	51.2	1.18
Ethnic group		
European	80.1	1.05
Maori	14.7	1.29
Pacific	6.5	1.59
Asian	6.6	2.45

1 A. Demographic ageing …

Average number of visits per year : 2002 vs 2021

	Simulation 2002	**Simulation 2021**	**Change**
Population	5.3	5.5	0.2
GP users	6.7	6.9	0.2

Results

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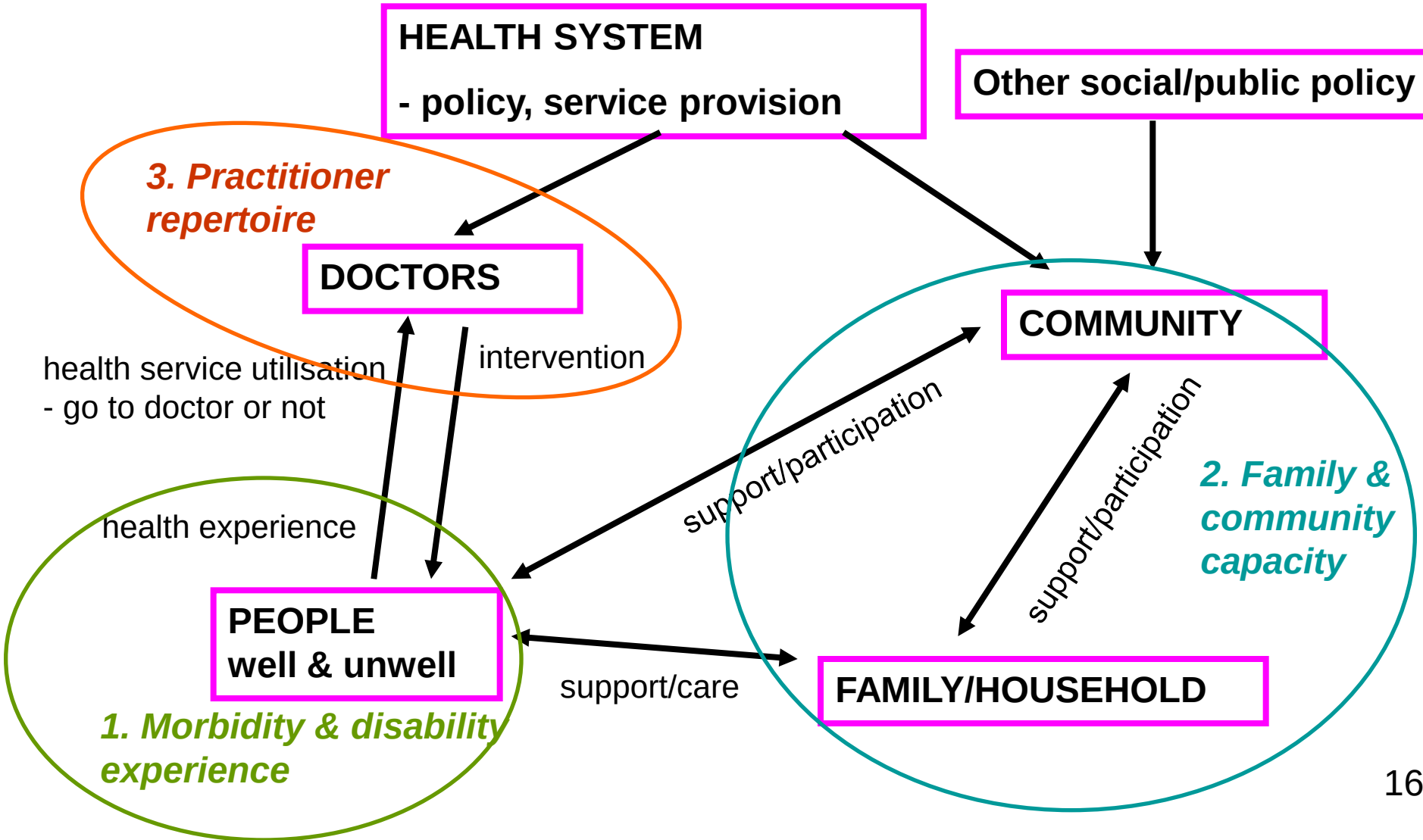
- Scenario age projection (2021)

- Map of policy scenarios
  1. *Morbidity experience*
  2. *Community support*
  3. *Doctor activity*

Average number of visits per year;
Percentage: prescribed, referred

Model of primary care



Core scenarios for simulation

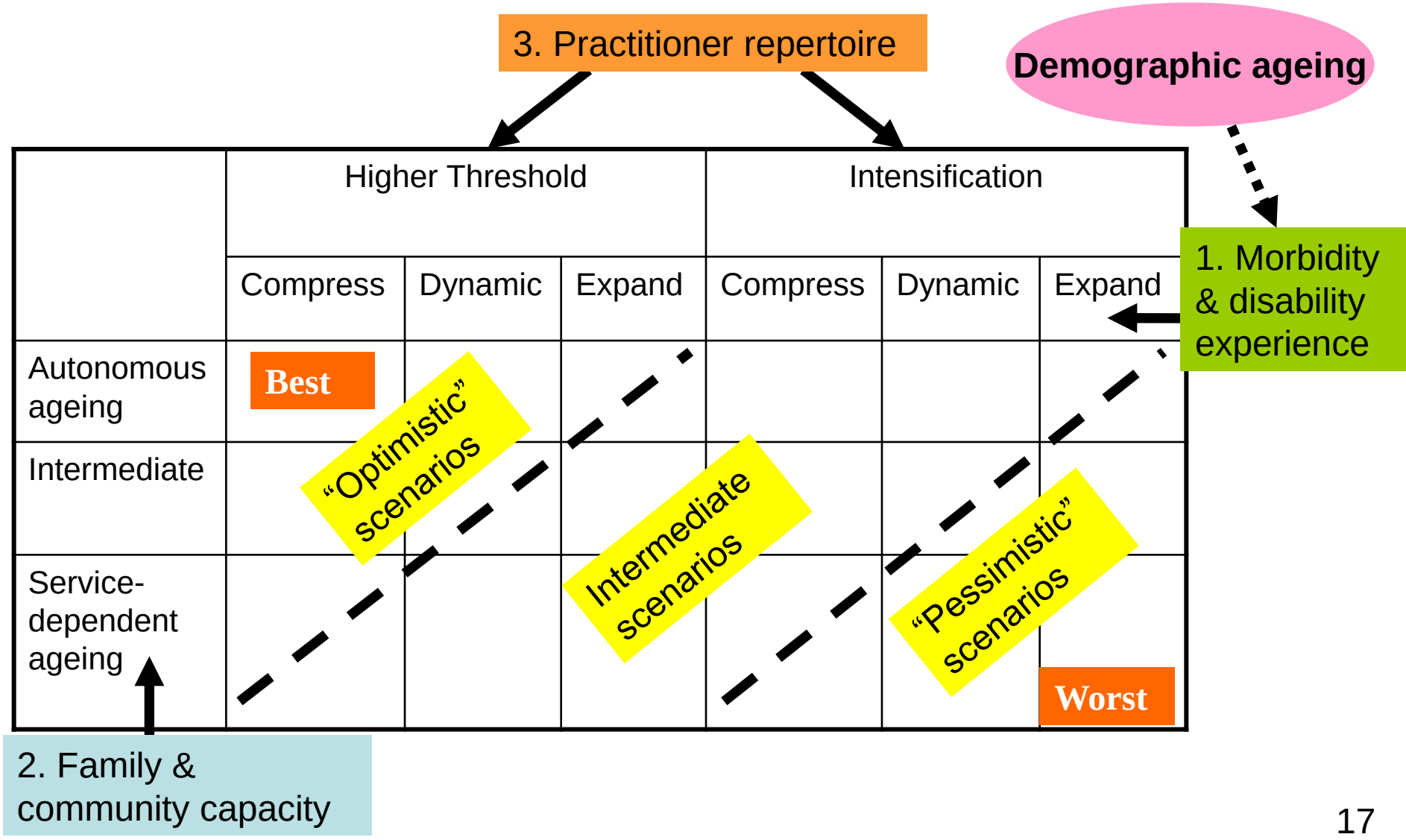


Table 4
Mean number of visits per year for GP users aged 65+ in 2021.

Social support[b]	Morbidity experience[a]	
	Compress (+)	Expand (–)
Autonomous ageing (+)	8.8	15.3
Service-dependent ageing (–)	8.7	15.2

[a] 'Compress (+)' signifies that all GP users have below the median number of visits; 'Expand (–)' signifies that all GP users have above the median number of visits.

[b] 'Autonomous ageing (+)' signifies that no GP users are living alone; 'Service-dependent ageing (–)' signifies that all GP users are living alone.

Table 5

Percentage of visits (average number of visits p.a.) prescribed for GP users aged 65+ in 2021.

Social support[b]	Practitioner repertoire[c]			
	Higher threshold (+)		Intensification (–)	
	Morbidity experience[a]			
	Compress (+)	Expand (–)	Compress (+)	Expand (–)
Autonomous ageing (+)	46.2% (=4.1 visits p.a.)	47.0% (=7.2 visits p.a.)	87.0 (7.7)	87.9 (13.4)
Service-dependent ageing (–)	46.9 (4.1)	44.4 (6.7)	86.0 (7.5)	87.7 (13.3)

[a] 'Compress (+)' signifies that all GP users have below the median number of visits; 'Expand (–)' signifies that all GP users have above the median number of visits.

[b] 'Autonomous ageing (+)' signifies that no GP users are living alone; 'Service-dependent ageing (–)' signifies that all GP users are living alone.

[c] 'Higher threshold (+)' signifies probability of practitioner activity set at level below the median rate; 'Intensification (–)' signifies probability of practitioner activity set at level above the median rate.

Table 6

Percentage of visits (average number of visits p.a.) referred for GP users aged 65+ in 2021.

Social support[b]	Practitioner repertoire[c]			
	Higher threshold (+)		Intensification (–)	
	Morbidity experience[a]			
	Compress (+)	Expand (–)	Compress (+)	Expand (–)
Autonomous ageing (+)	5.5% (=0.5 visits p.a.)	4.9% (=0.7 visits p.a.)	32.6 (2.9)	32.4 (5.0)
Service-dependent ageing (–)	5.1 (0.4)	4.6 (0.7)	32.5 (2.8)	33.5 (5.1)

[a] 'Compress (+)' signifies that all GP users have below the median number of visits; 'Expand (–)' signifies that all GP users have above the median number of visits.

[b] 'Autonomous ageing (+)' signifies that no GP users are living alone; 'Service-dependent ageing (–)' signifies that all GP users are living alone.

[c] 'Higher threshold (+)' signifies probability of practitioner activity set at level below the median rate; 'Intensification (–)' signifies probability of practitioner activity set at level above the median rate.

Conclusion

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- A static micro-simulation model of the health care process can be created with acceptable validity.
- Age projection scenarios for the 2002-2021 period indicate little change in salient GP visit characteristics.
- Mapping policy scenarios suggests that GP behaviour could be the most important driver of change.
- The project demonstrates the potential of combining data from different sources to populate and run policy models.