ARC CENTRE OF EXCELLENCE IN POPULATION AGEING RESEARCH

Estimating and projecting the population with long-term health conditions at the local area scale in Australia

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Australian Government
Australian Research Council
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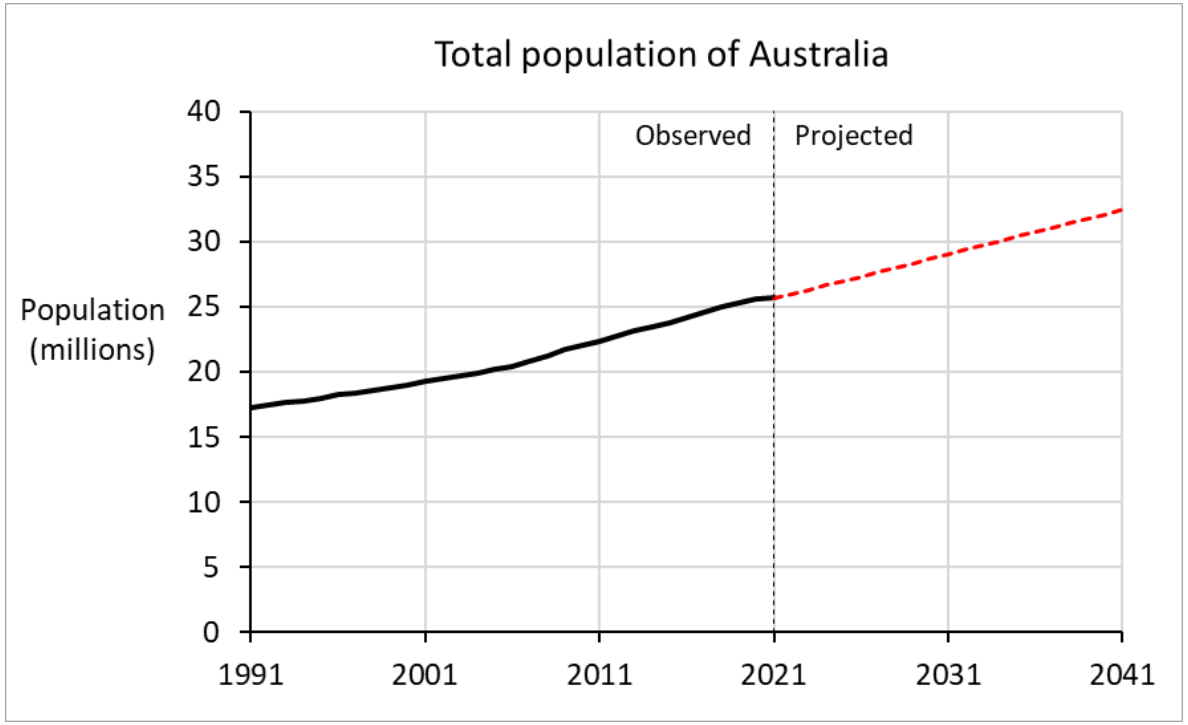
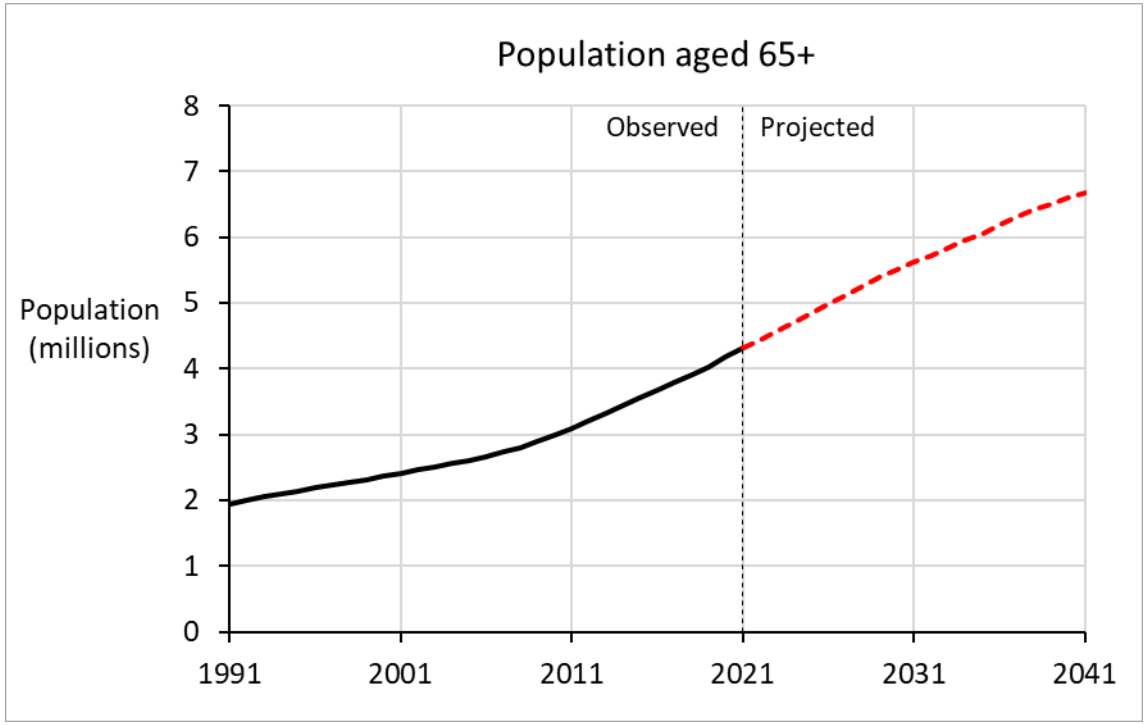
Introduction

Australia's population is growing, especially at the oldest ages





Introduction

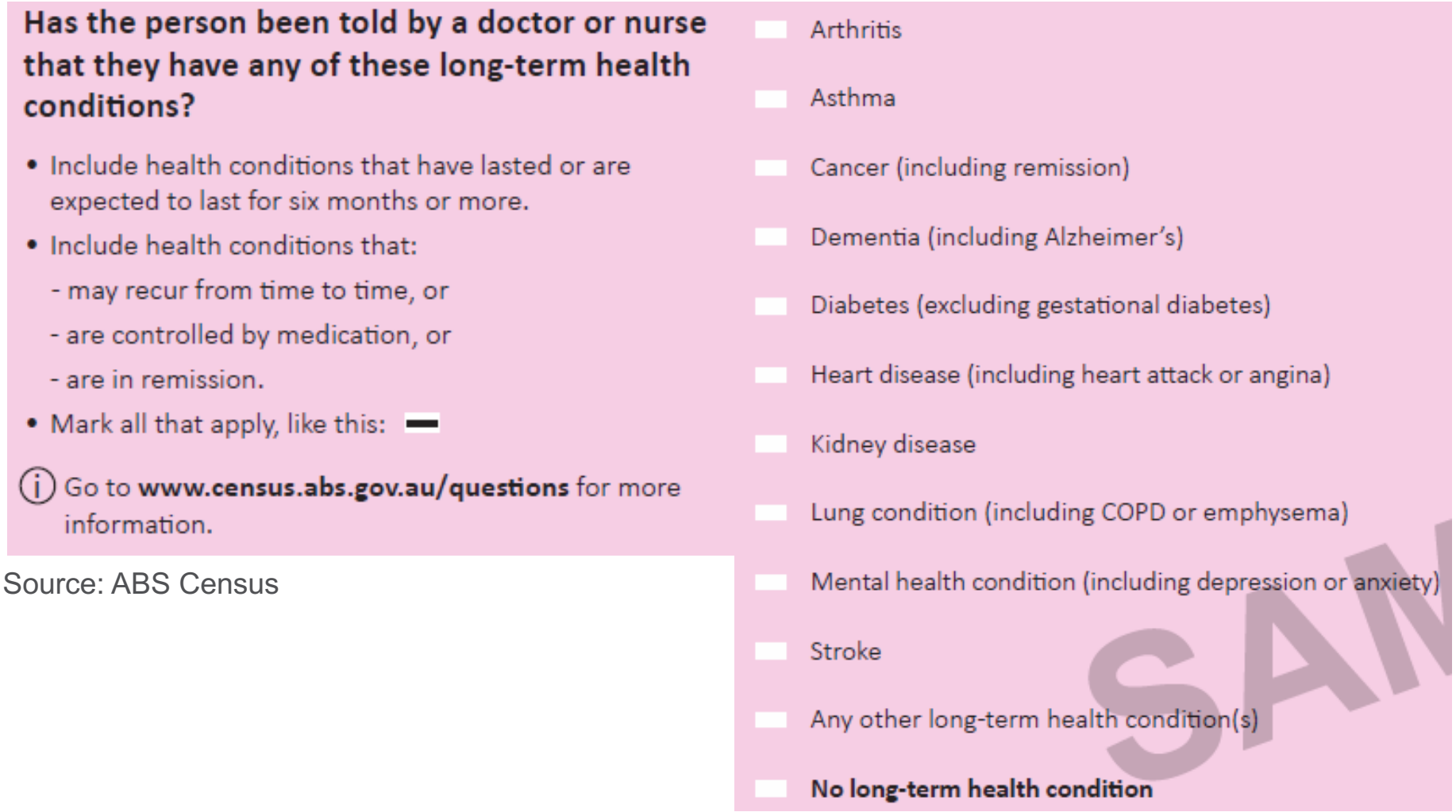
Population growth will be accompanied by an increase in the no. of people living with long-term health conditions (e.g., arthritis, cancer, diabetes, heart disease, and lung conditions)

Many studies on projecting specific health conditions; fewer on multiple conditions

Prevalence and numbers will vary considerably geographically

Introduction

New data on people living with long-term health conditions from 2021 Census



Has the person been told by a doctor or nurse that they have any of these long-term health conditions?

- Include health conditions that have lasted or are expected to last for six months or more.
- Include health conditions that:
  - may recur from time to time, or
  - are controlled by medication, or
  - are in remission.
- Mark all that apply, like this: ▬

ⓘ Go to **www.census.abs.gov.au/questions** for more information.

- ☐ Arthritis
- ☐ Asthma
- ☐ Cancer (including remission)
- ☐ Dementia (including Alzheimer's)
- ☐ Diabetes (excluding gestational diabetes)
- ☐ Heart disease (including heart attack or angina)
- ☐ Kidney disease
- ☐ Lung condition (including COPD or emphysema)
- ☐ Mental health condition (including depression or anxiety)
- ☐ Stroke
- ☐ Any other long-term health condition(s)
- ☐ **No long-term health condition**

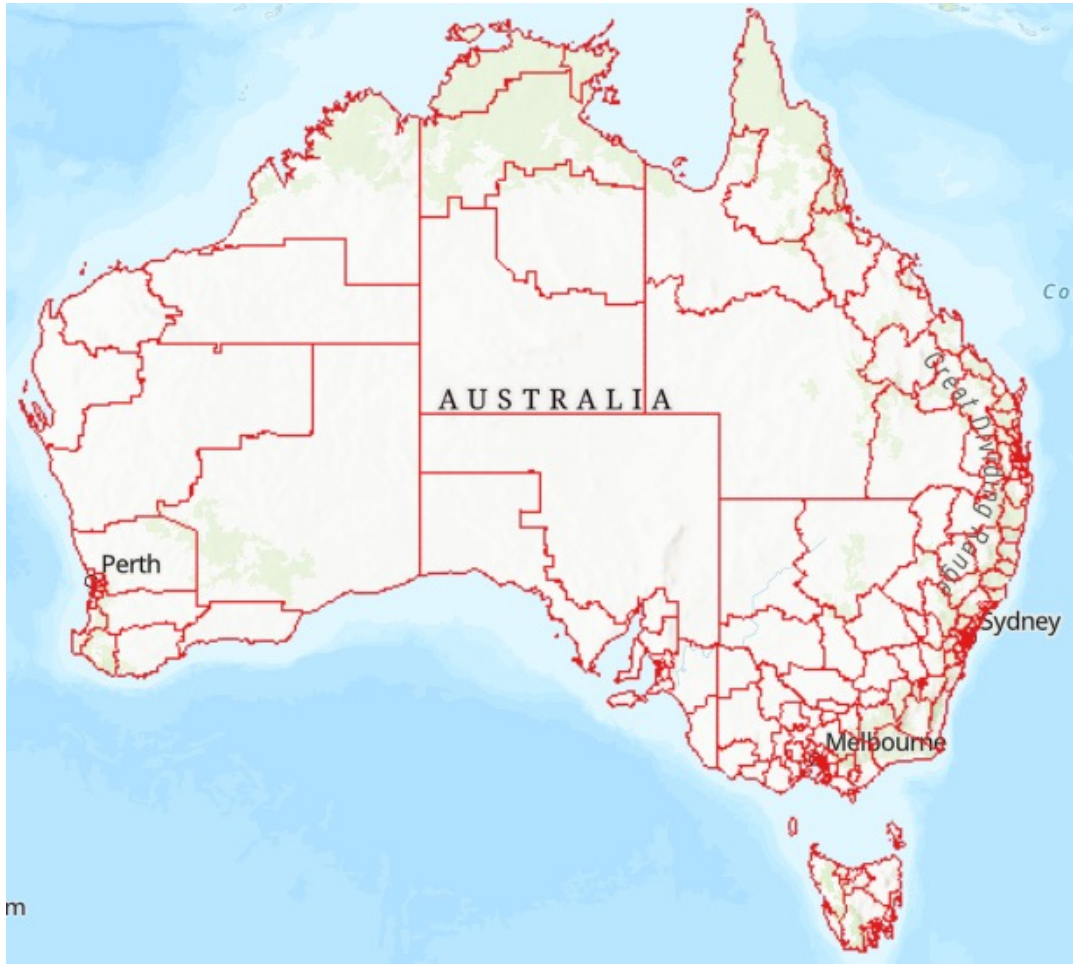
Source: ABS Census

Aims

Create 2021 estimates and projections out to 2036 of the population with long-term health conditions in Australia at the SA3 scale.

SA3 areas: populations of 30,000 to 130,000 (N = 334; median pop 2021 = 63,000)

General overview of locations of growing health service demand

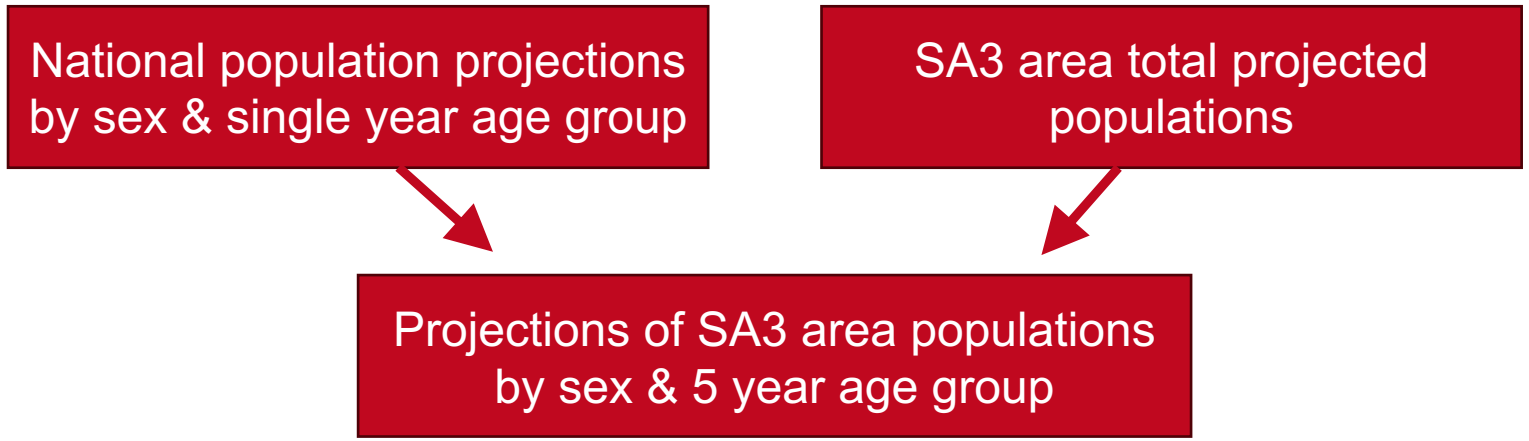


Methods

Overview

❶ Long-term health conditions prevalence estimated based on 2021 Census data

❷ Population projections



❸ Projections of people living with long-term health conditions

❶ Methods: long-term health conditions prevalence

Obtained 2021 Census data on the numbers of people reporting long-term health conditions by sex, five year age group, and SA3 area.

Prevalence rates calculated by age and sex for those with 1 long-term health condition and those with multiple health conditions:

rate = census count with health conditions / census population

Age profiles of prevalence rates smoothed to eliminate noise.

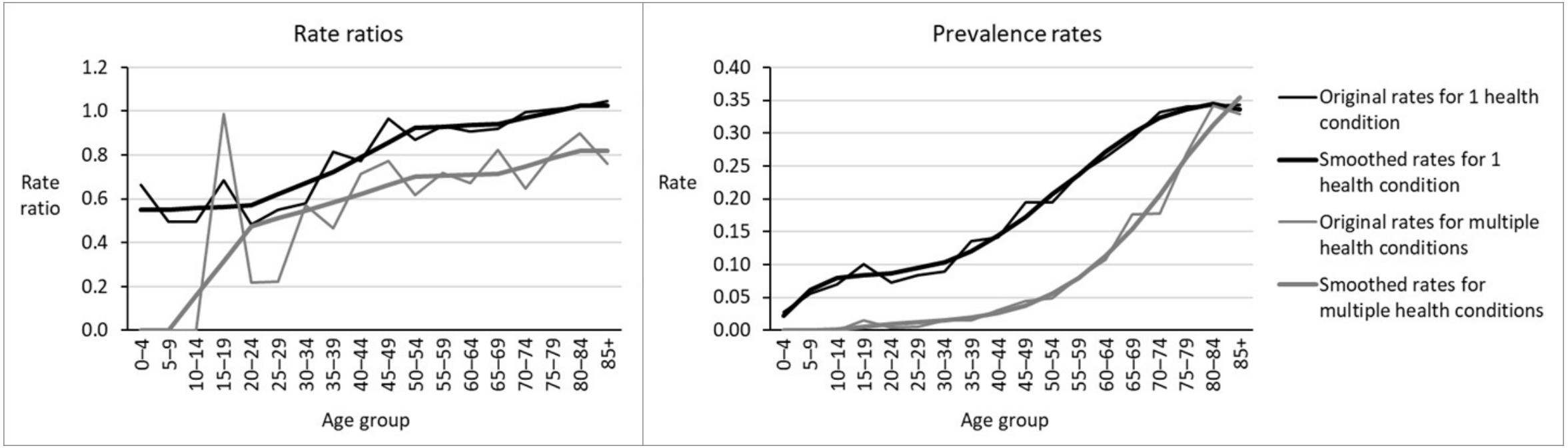
Smoothing method: TOPALS (tool for projecting age patterns using linear splines).
Easy to apply, flexible, and produces plausible and smooth rate age profiles

❶ Methods: long-term health conditions prevalence

TOPALS smoothing:

1. Calculate rate ratios of prevalence rates: SA3 age-sex rate / national age-sex rate
2. Rate ratios smoothed over age using linear splines.
3. Smoothed prevalence rates = national prevalence rates × smoothed rate ratios

Example for males in the SA3 area of Darwin City, 2021

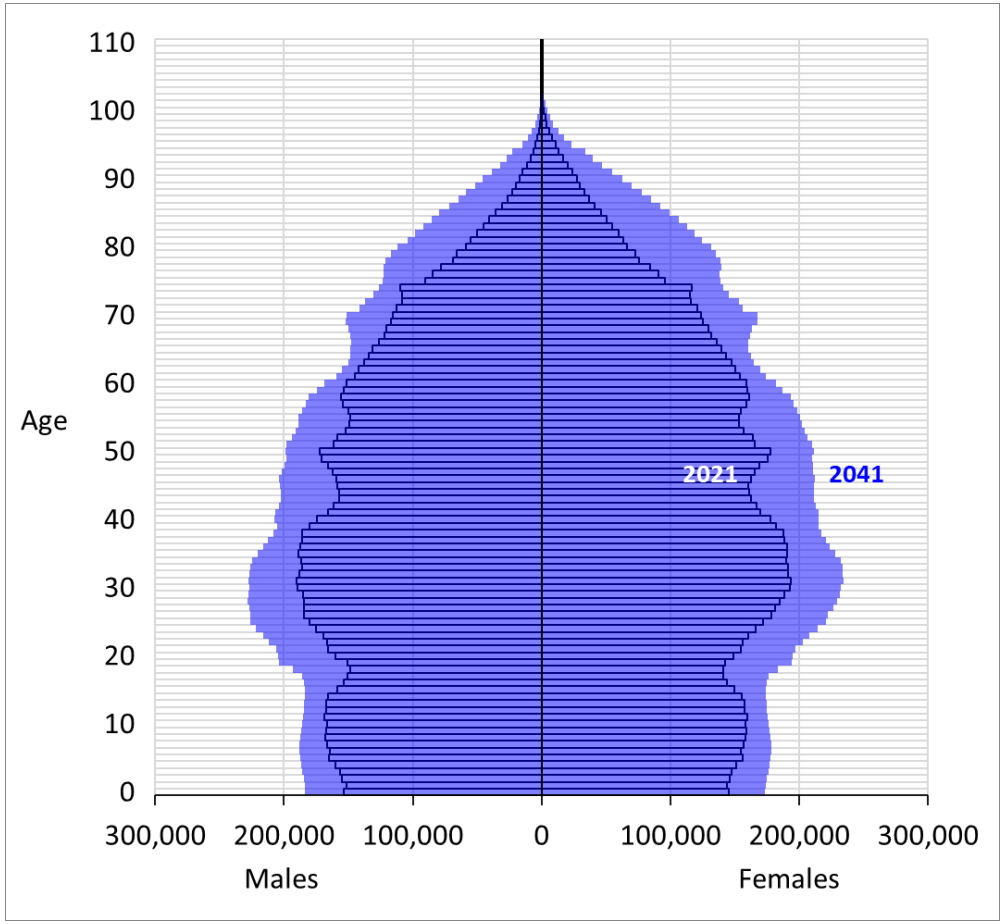


❷(i) Methods: national population projections

Standard cohort-component population projection model.

accounts for births, deaths and migration

Produces population projections by sex & single years of age for Australia in single year time intervals from mid-year 2021



❷(ii) Methods: SA3 area total population projections

Initial SA3 population totals created by a composite extrapolative model which involved taking the mean projection from four models:

- Linear/Exponential model;
- Constant Share of Population model;
- Variable Share of Growth model;
- Modified Exponential model.

For SA3 areas outside capital cities: composite extrapolative model projections used

For SA3 areas within capitals: projections adjusted to match geographical distribution of latest State/Territory Government population projections to take into account anticipated dwelling growth

❷(iii) **Methods: SA3 projections by age and sex**

Cohort-component model SYMPOPP (synthetic migration population projection program)

- A version of the cohort-component population projection model for local areas which has low input data requirements
- Outputs populations by sex and 5 year age group in 5 year time intervals
- Proven to produce good quality subnational population projections by age and sex in several applications to date

The heart of the model is a bi-regional accounting equation. For any cohort:

$$\text{Population}(t+5) = \text{Population}(t) - \text{Deaths} - \text{Outward migration} + \text{Inward migration}$$

Births calculated by multiplying age-specific fertility rates by female populations

❸ Methods: projections of long-term health conditions

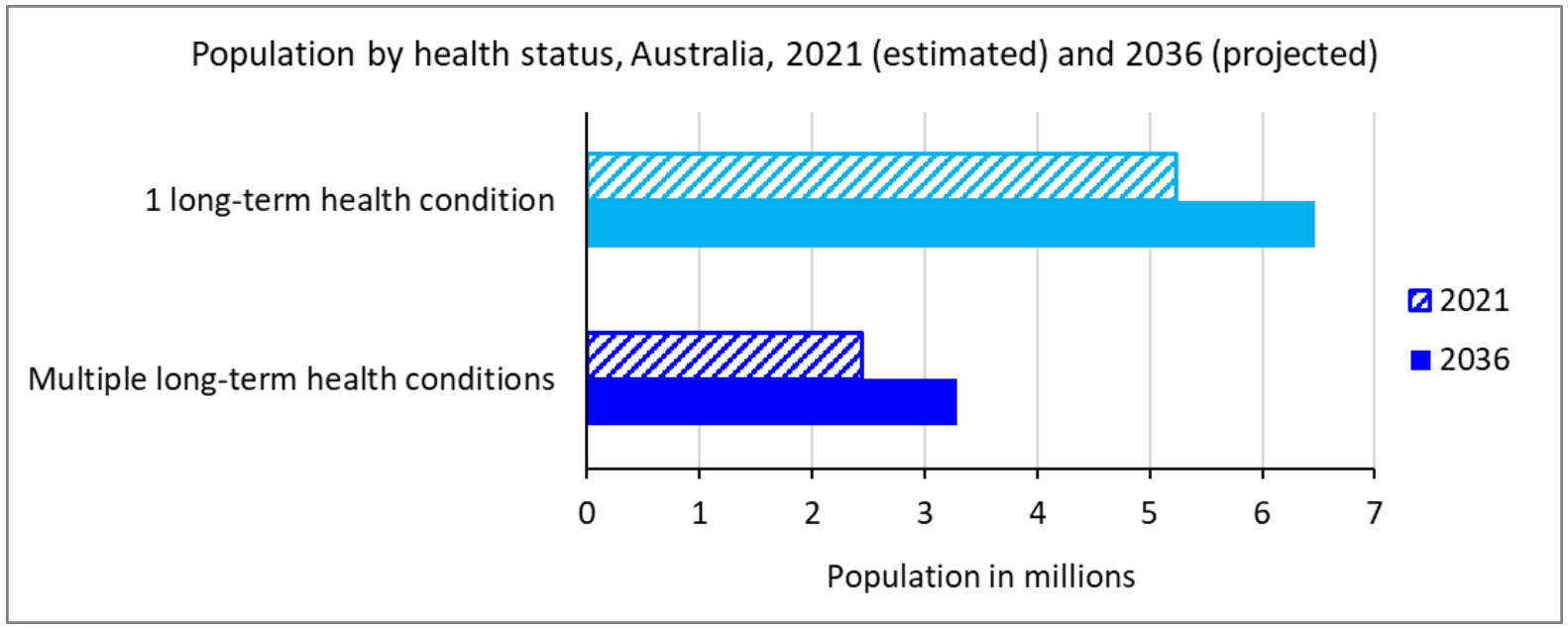
Prevalence rates applied to projected populations. Assumption of constant prevalence rates into the future.

For each age-sex group :

Population with 1 health condition = Projected population × Prevalence rate for 1 condition

Population with multiple conditions = Projected population × Prevalence rate for multiple conditions

Results: national scale

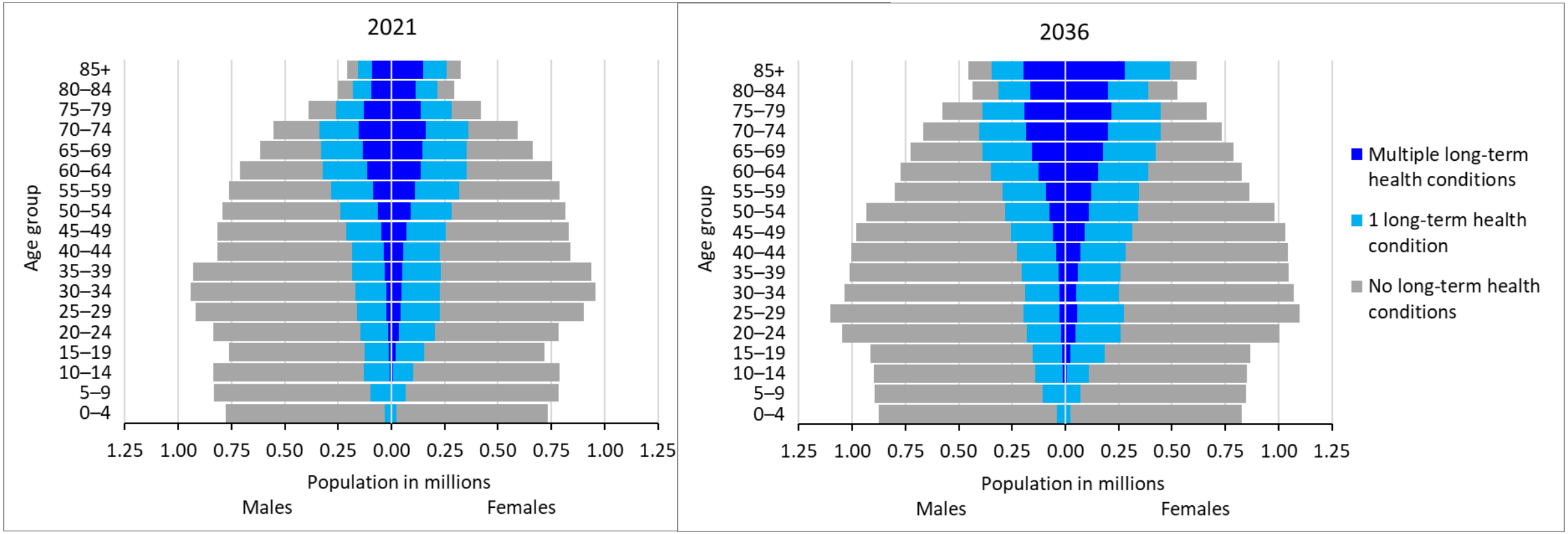


Increase in population with 1 health condition, 2021-36: +1.24 m or 23.6%
multiple health conditions: +0.84 m or 34.4%

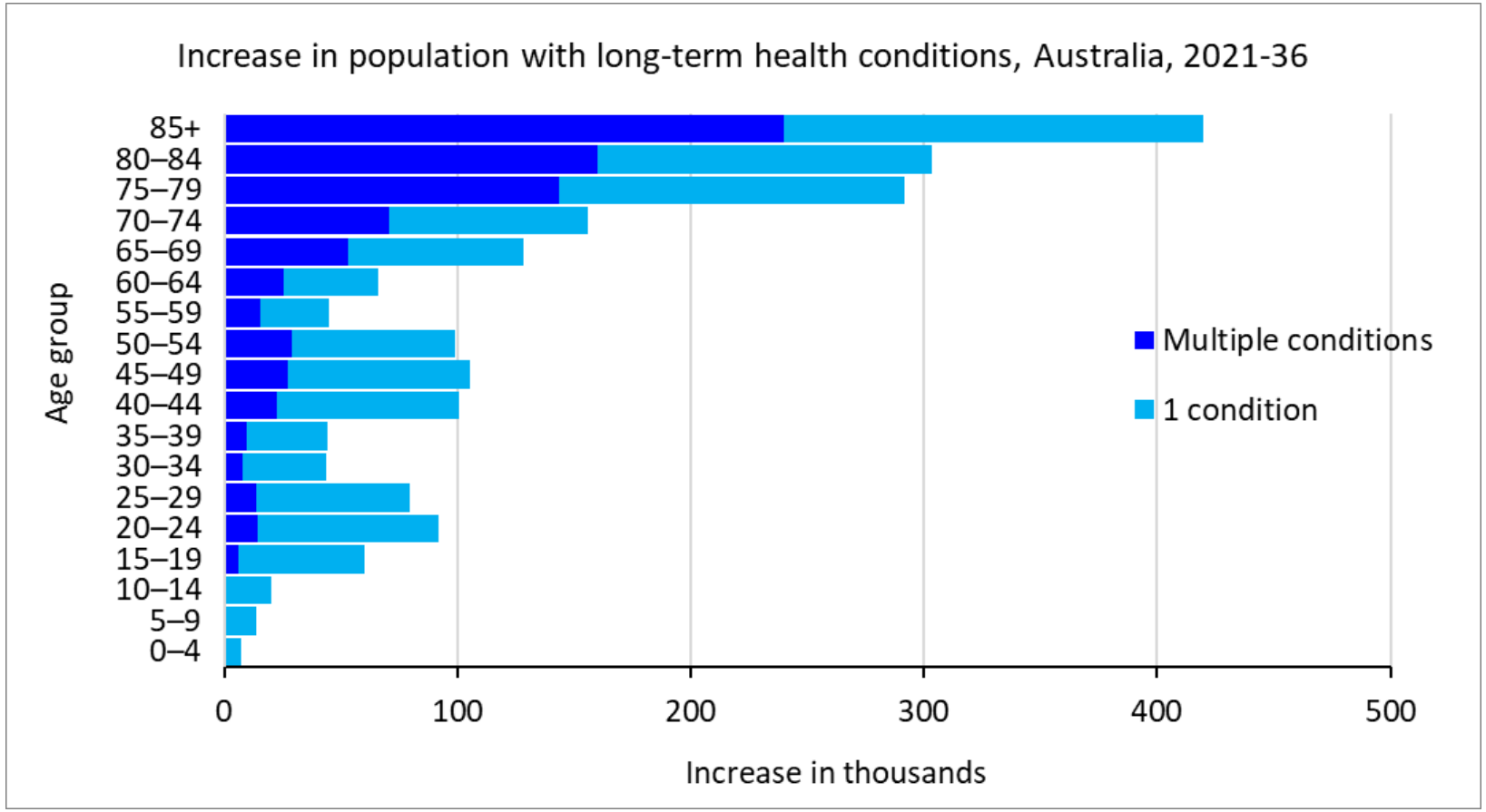
Share of population with 1 health condition, 2021-36: 20.4% → 21.0%
multiple health conditions: 9.5% → 10.7%

Results: national scale

Population with long-term health conditions, Australia



Results: national scale



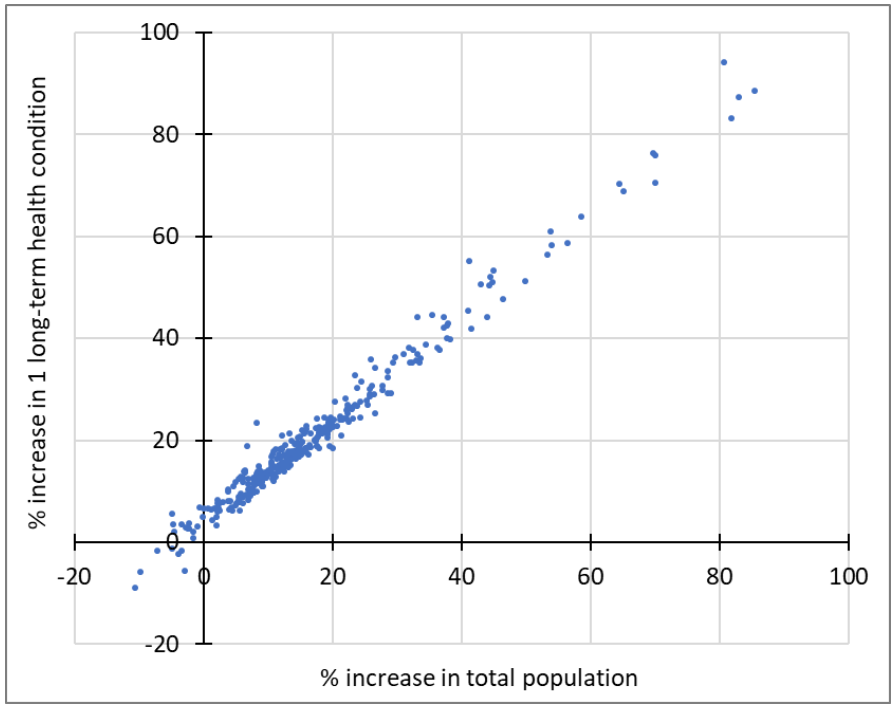
80% of the 2021-36 increase in people with multiple health conditions at ages 65+

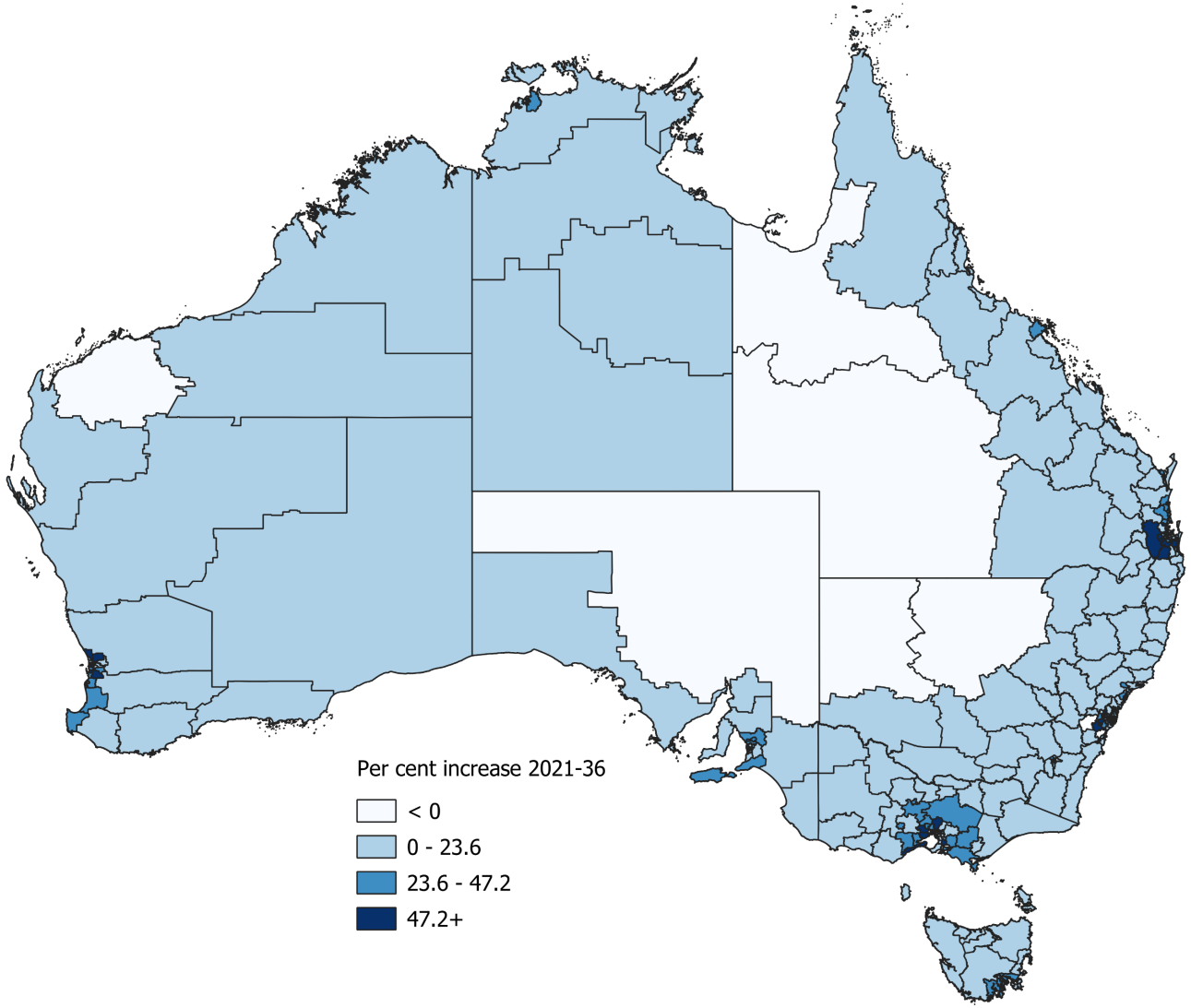
Results: SA3 areas

Projected increase in the population with 1 long-term health condition by SA3 area, 2021-36

Almost all SA3 areas expected to increase no. of people living with a health condition

Pattern closely correlated with overall population growth

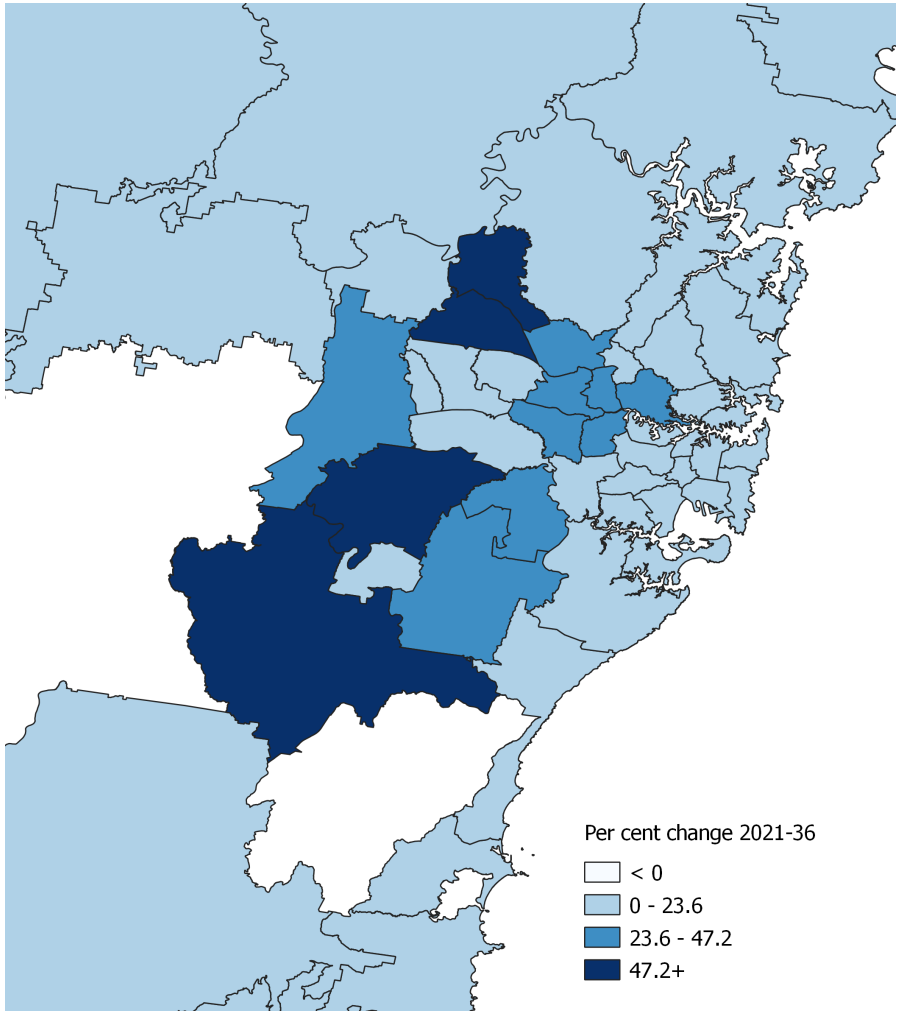




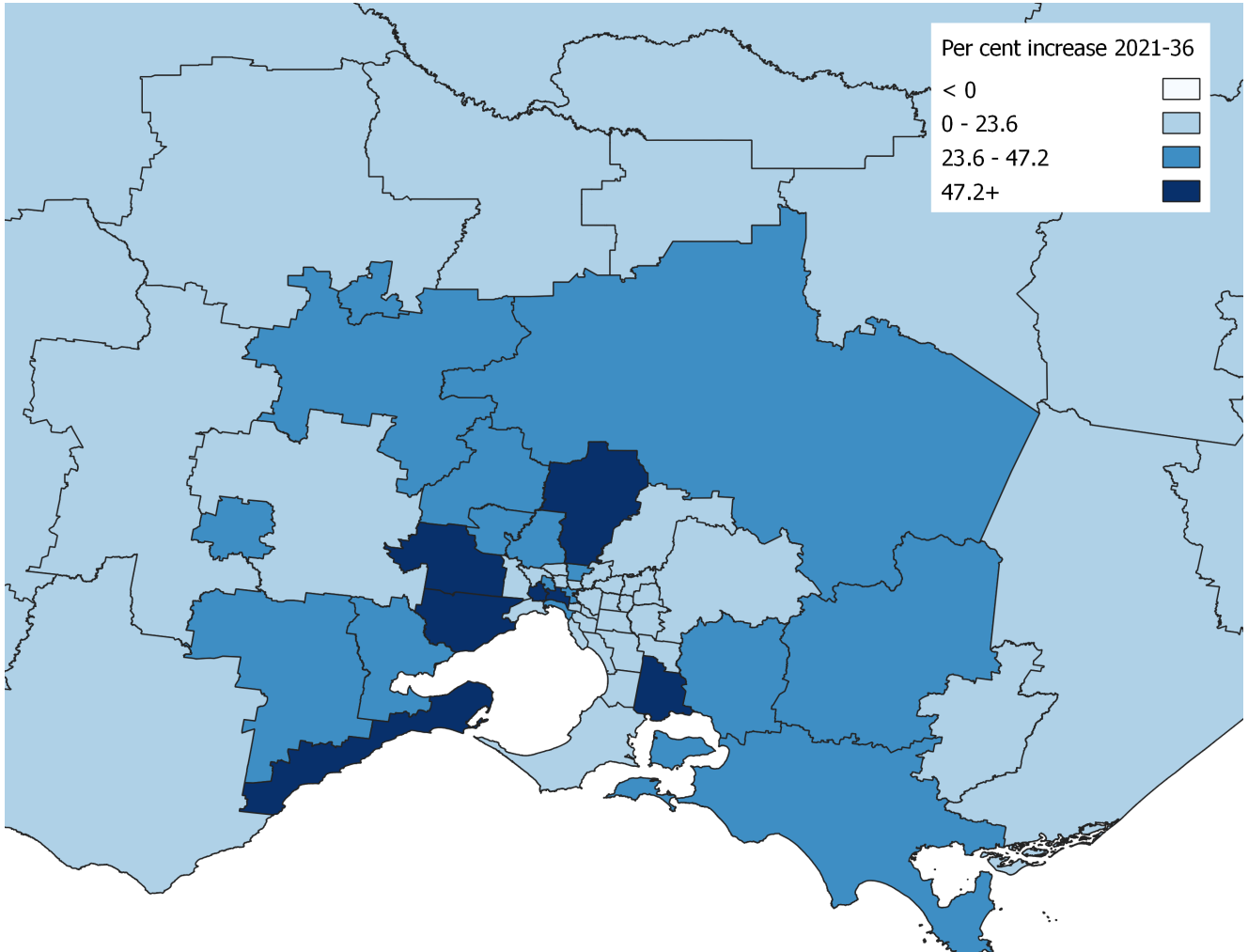
Results: SA3 areas

Projected increase in the population with 1 long-term health condition by SA3 area, 2021-36

Sydney



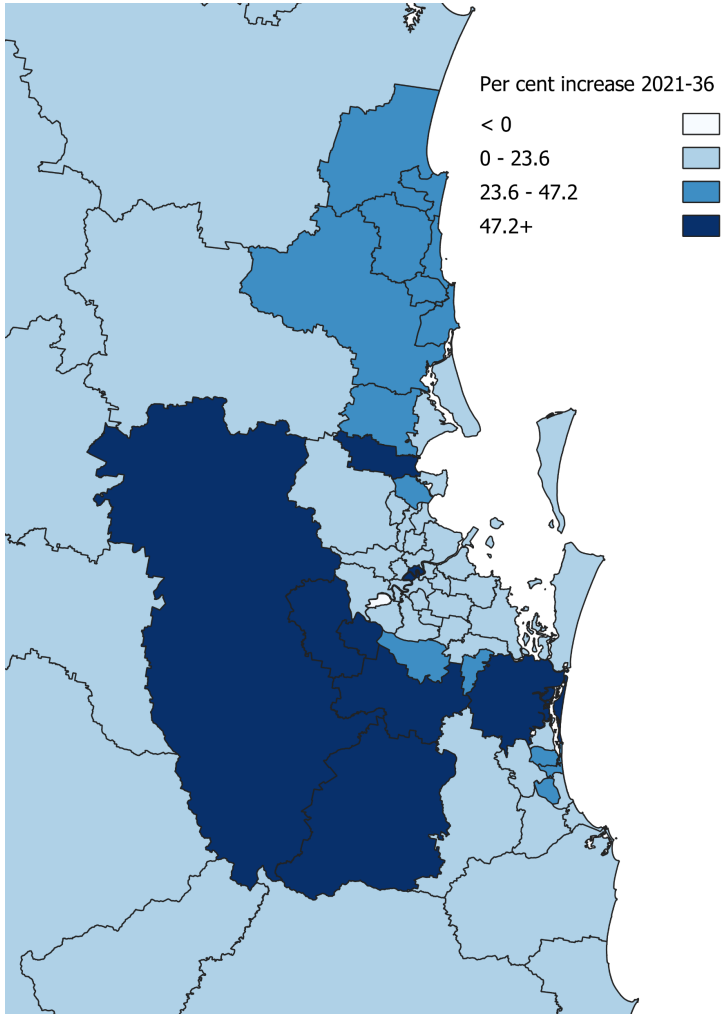
Melbourne



Results: SA3 areas

Projected increase in the population with 1 long-term health condition by SA3 area, 2021-36

South East Queensland



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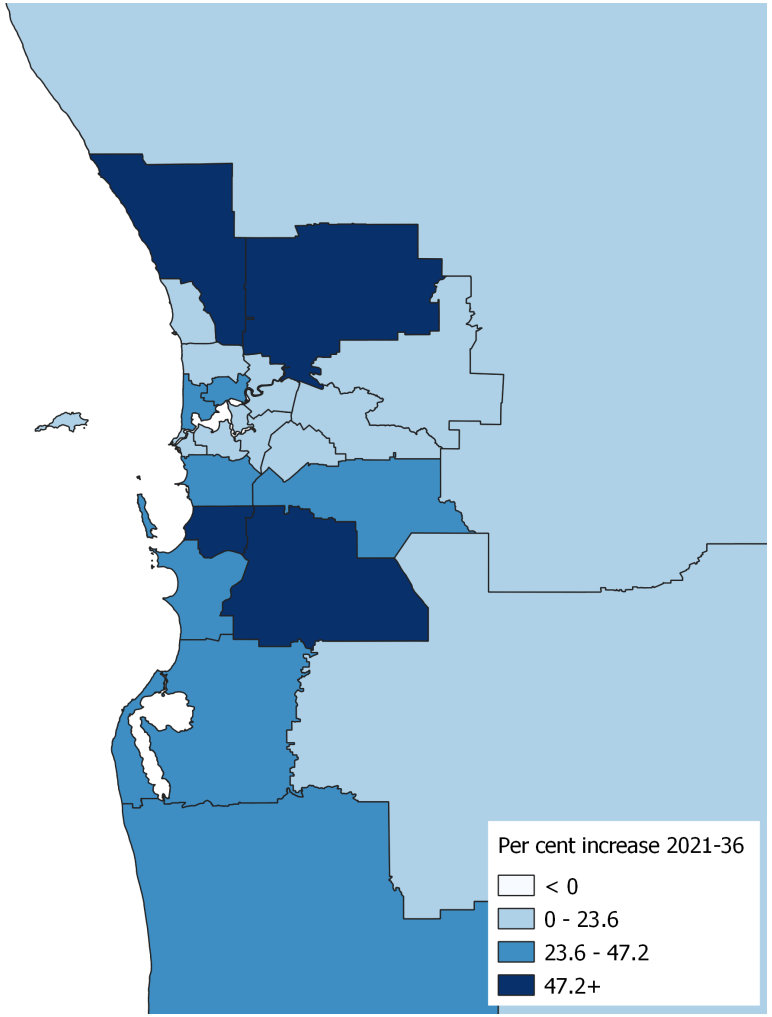
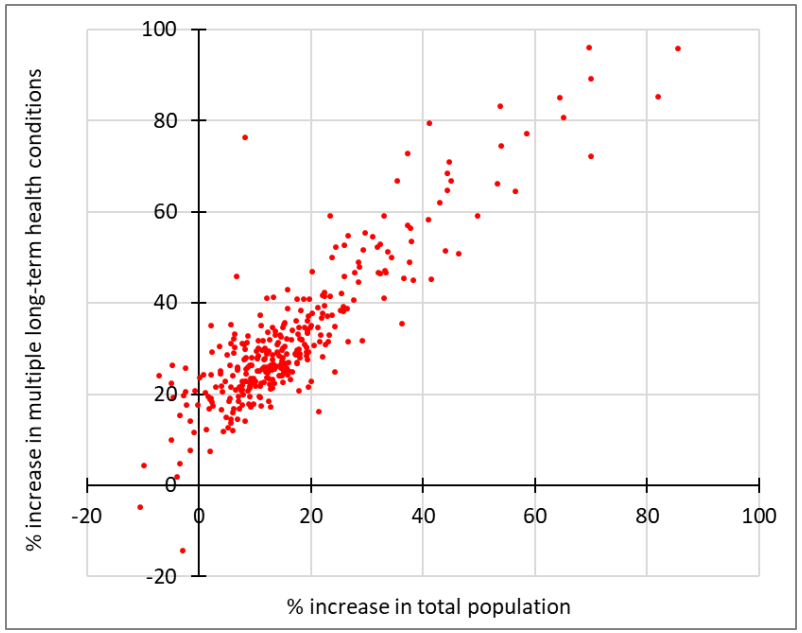
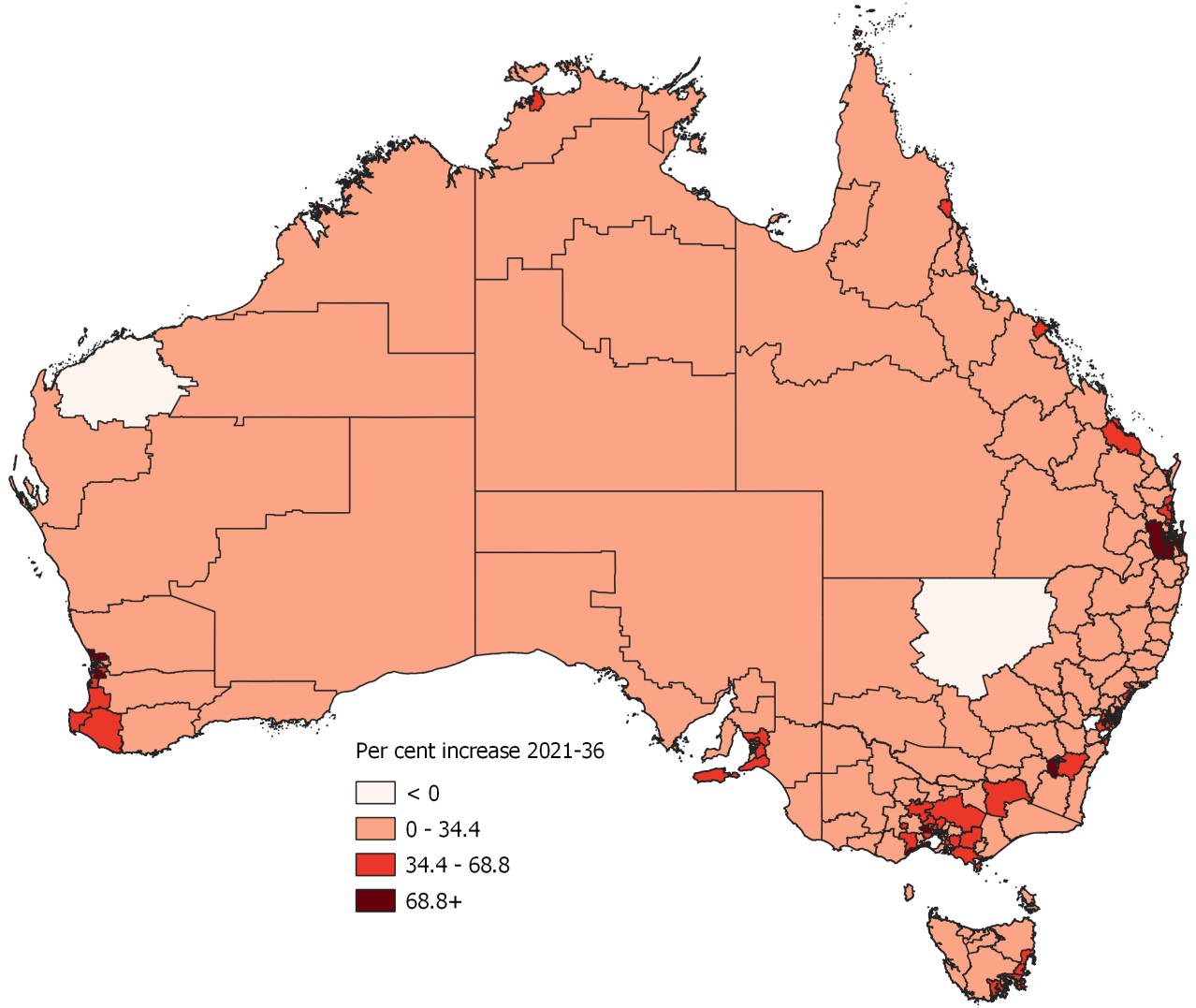


Results: SA3 areas

Projected increase in the population with multiple health conditions by SA3 area, 2021-36

Correlation with growth of total population





Results: SA3 areas

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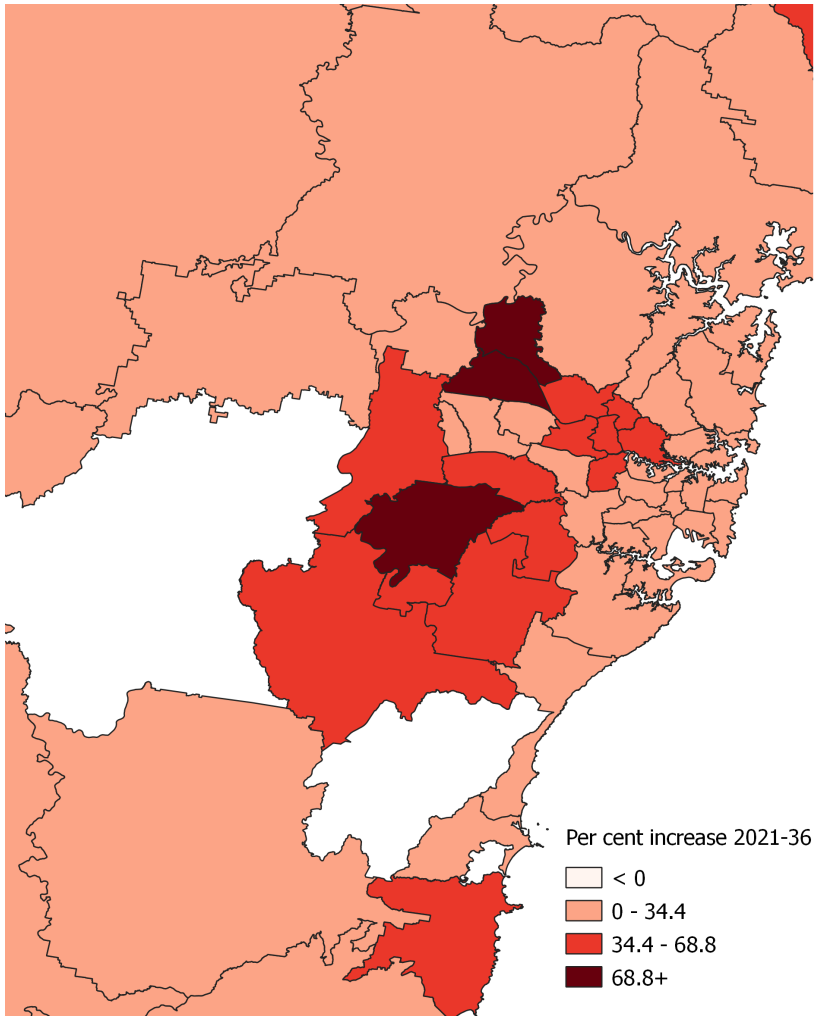

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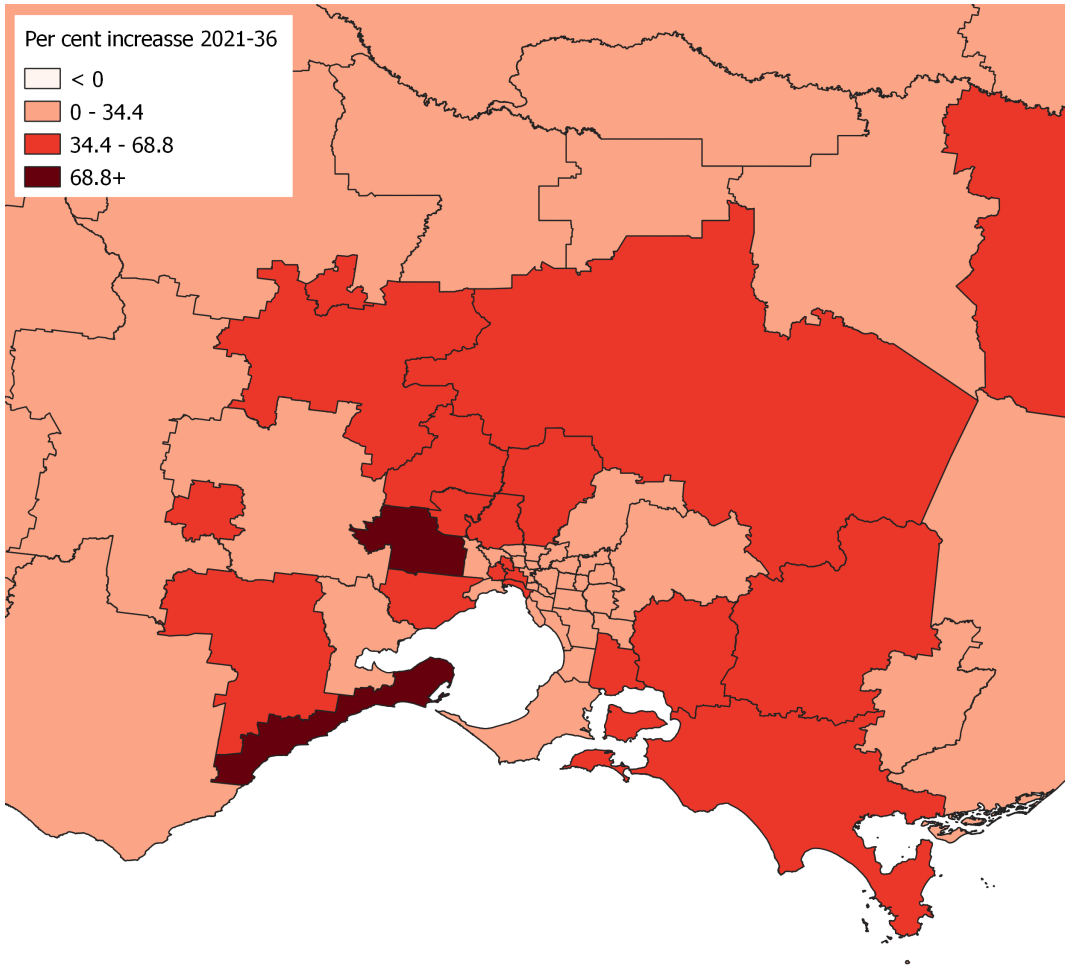

Results: SA3 areas

Projected increase in the population with multiple health conditions by SA3 area, 2021-36

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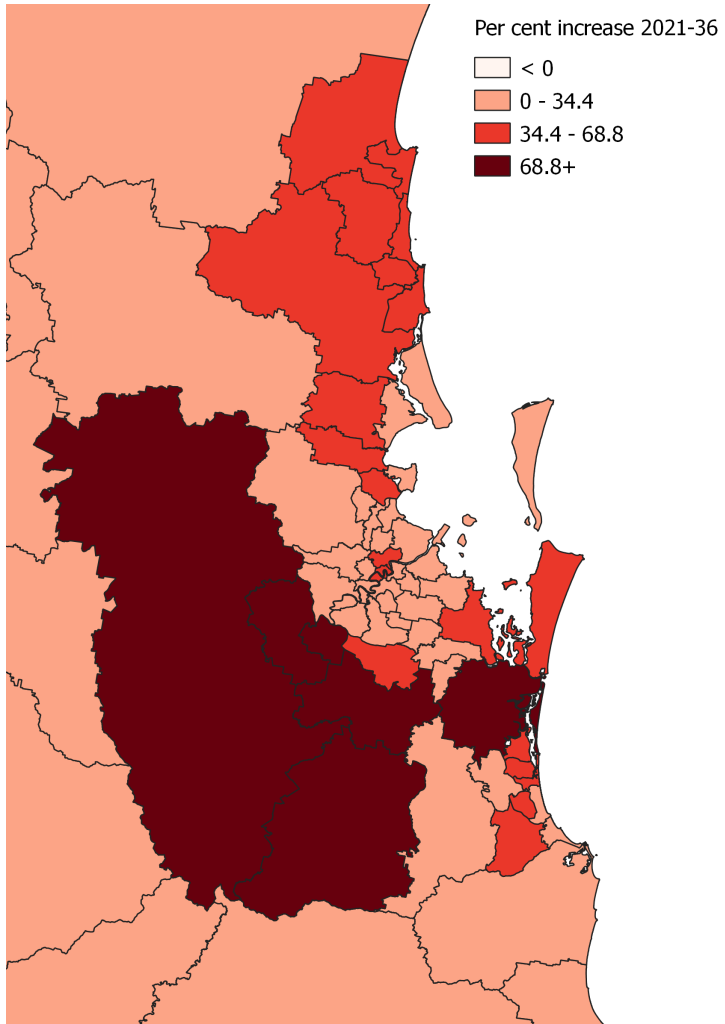

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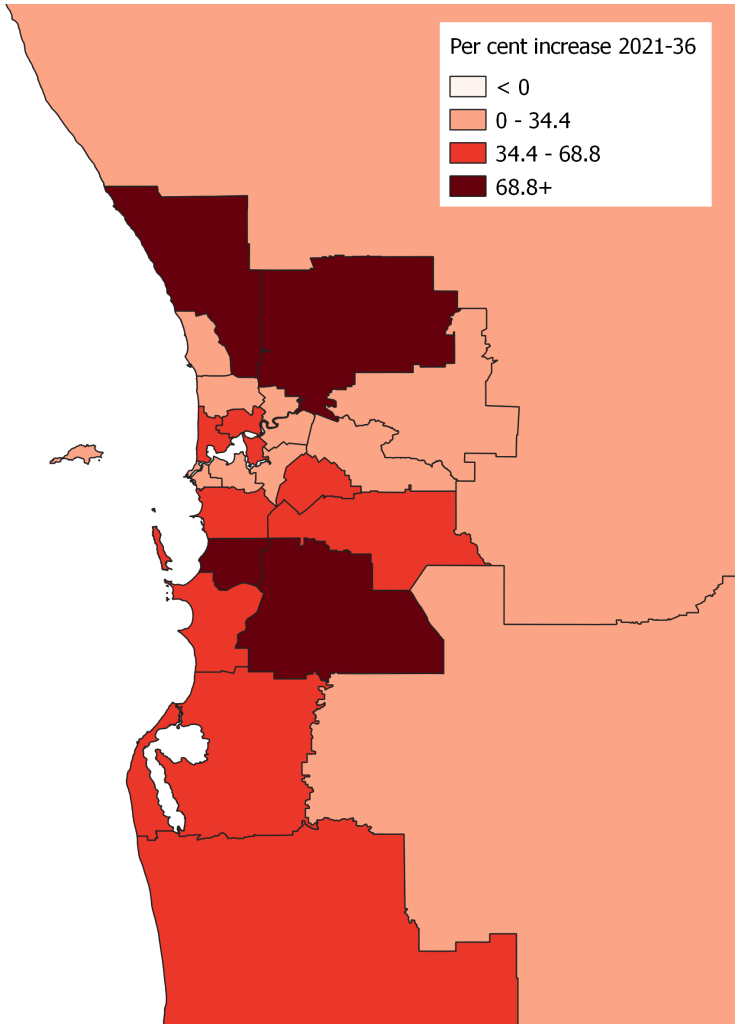


Discussion

- Greater relative projected increase for those with multiple health conditions (MHC) (compared to those with just 1 health condition)
    - 80% of the population with MHC aged 65+
    - Continuation of provision of complex-care of those with co-morbidities primarily in later life, but with a significant increase in demand upon health care services in the near future.
    - Significant implications for aged care financing, aged care and health care workforce etc that has been heavily documented in other studies.

- Strong growth projected for population with long-term health conditions, closely correlated with geographical pattern of population growth
    - Correlation particularly strong within capital cities and major urban centres
    - However, many areas experience low or moderate population growth alongside high growth in MHC. Highlights targeting and financing of healthcare in regional Australia.

Discussion

- We have investigated growth in MHC through one temporal lens. i.e., spatial

- However, one strength of the projections we have developed is the ability to focus on the intersection of spatial and timing components of MHC growth and population ageing more generally.

- Some regions, particularly in regional areas are experiences strong numerical ageing (driven by ageing in place) and structural ageing (reinforced by outmigration of the young).

- The differential drivers of population ageing will lead to earlier onset demand for services for people with MHC among many SA3 areas, relative to urban centres and capital cities.

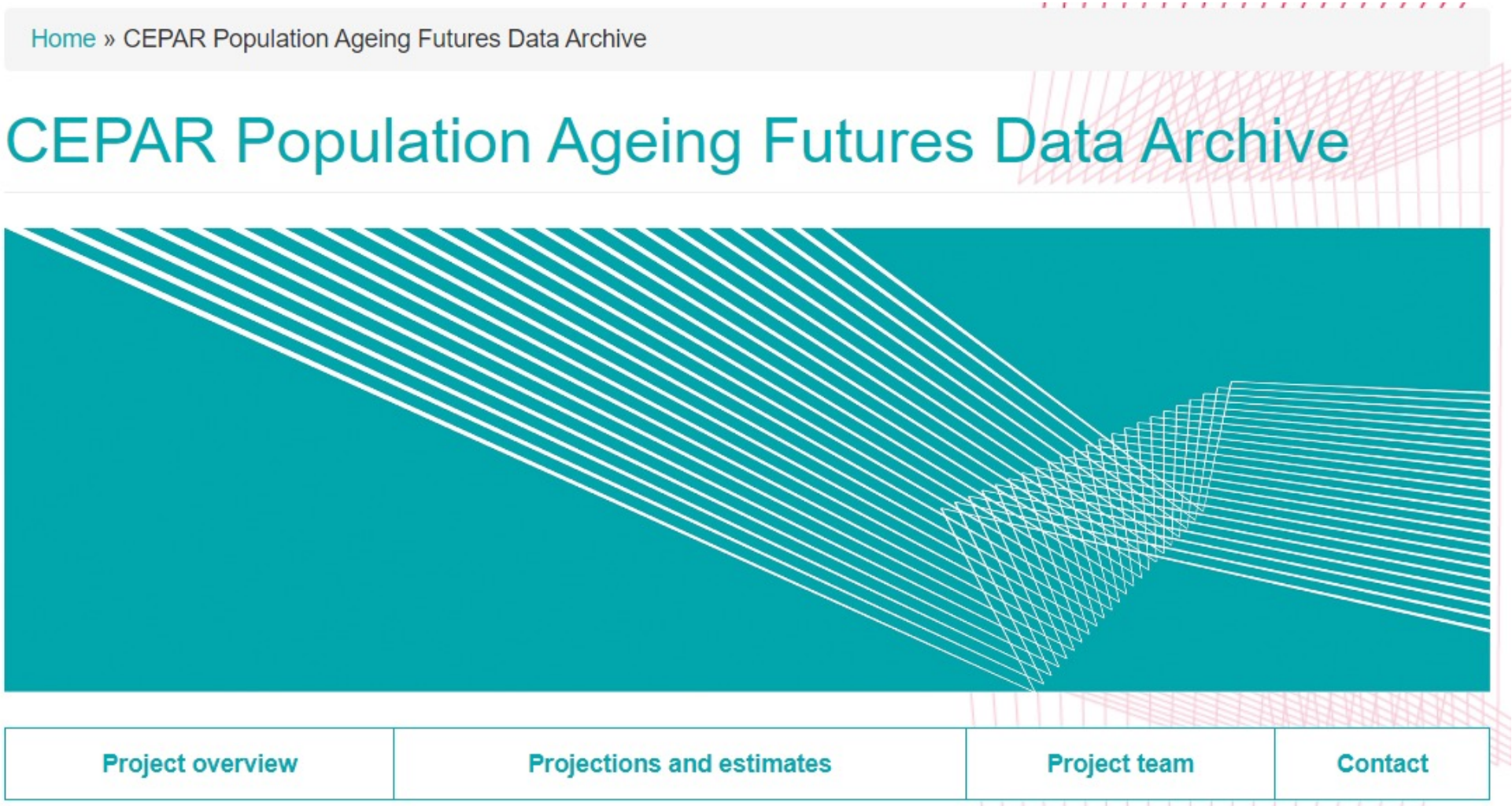
- Currently investigating these aspects.

Key points

- New local area population projections for Australia, including projections of people with long-term health conditions
- Strong population growth projected 2021-36, esp. among older population
- Strong growth projected for population with long-term health conditions, closely correlated with geographical pattern of population growth
- Greater relative projected increase for those with multiple health conditions (compared to those with just 1 health condition)

Projections data

Coming soon at https://www.cepar.edu.au/cepar-population-ageing-projections



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