

# ESTIMATES OF COVID-19 EXCESS DEATHS IN NEW ZEALAND THAT PROPERLY ACCOUNT FOR DEMOGRAPHIC TRENDS

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## OBJECTIVES

Obtain new estimates for excess deaths in Aotearoa New Zealand during the COVID-19 pandemic that

- account for differences by age, sex, and season,
- include measures of uncertainty, and
- are easy to replicate.

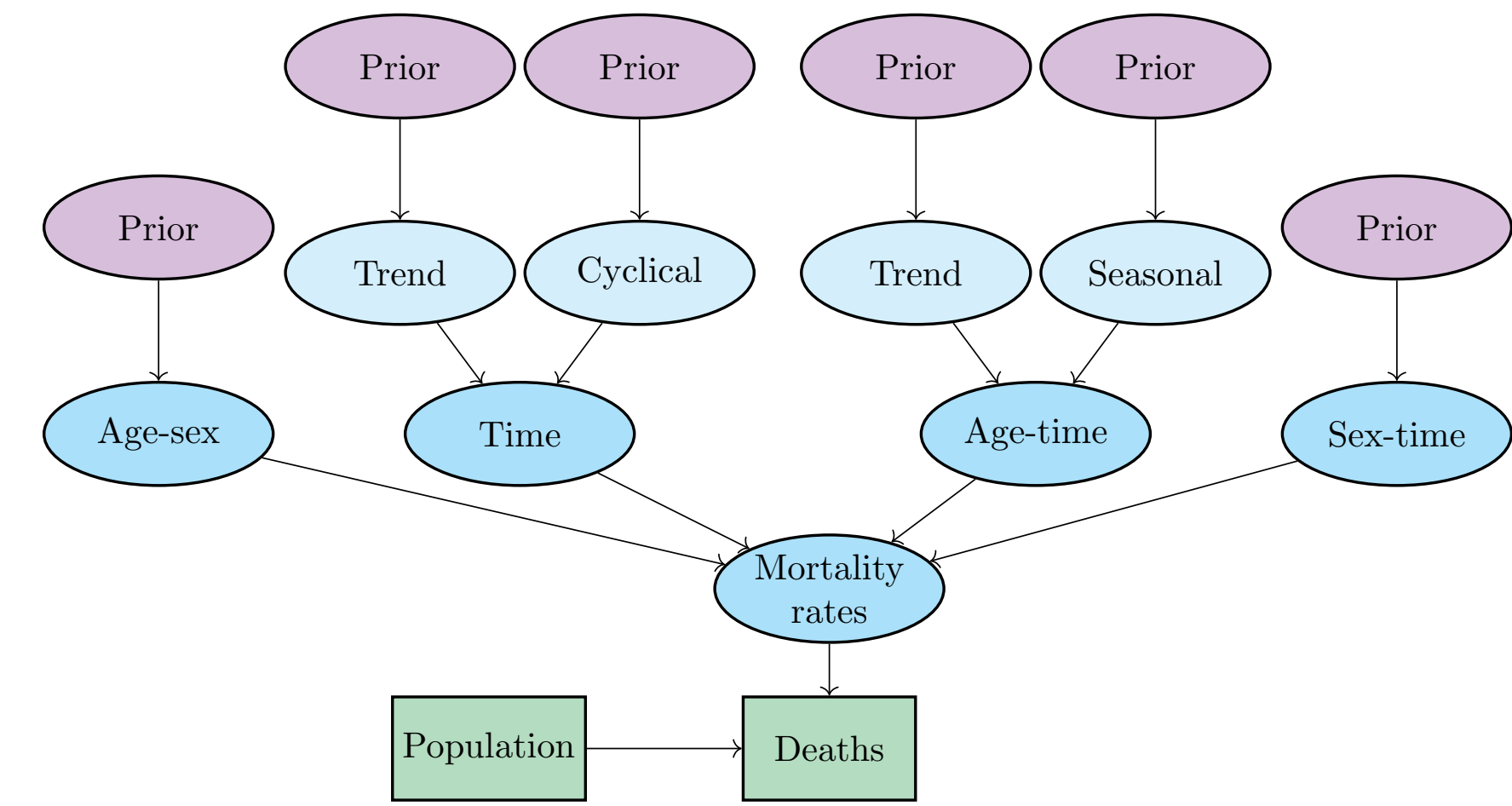
## BACKGROUND

- New Zealand closed its borders and imposed strict lockdowns during COVID-19
- Debate over number of excess deaths
- Existing estimates do not properly account for demographic trends, e.g. age-sex differentials, pre-existing trends, seasonal effects, population change

## DATA

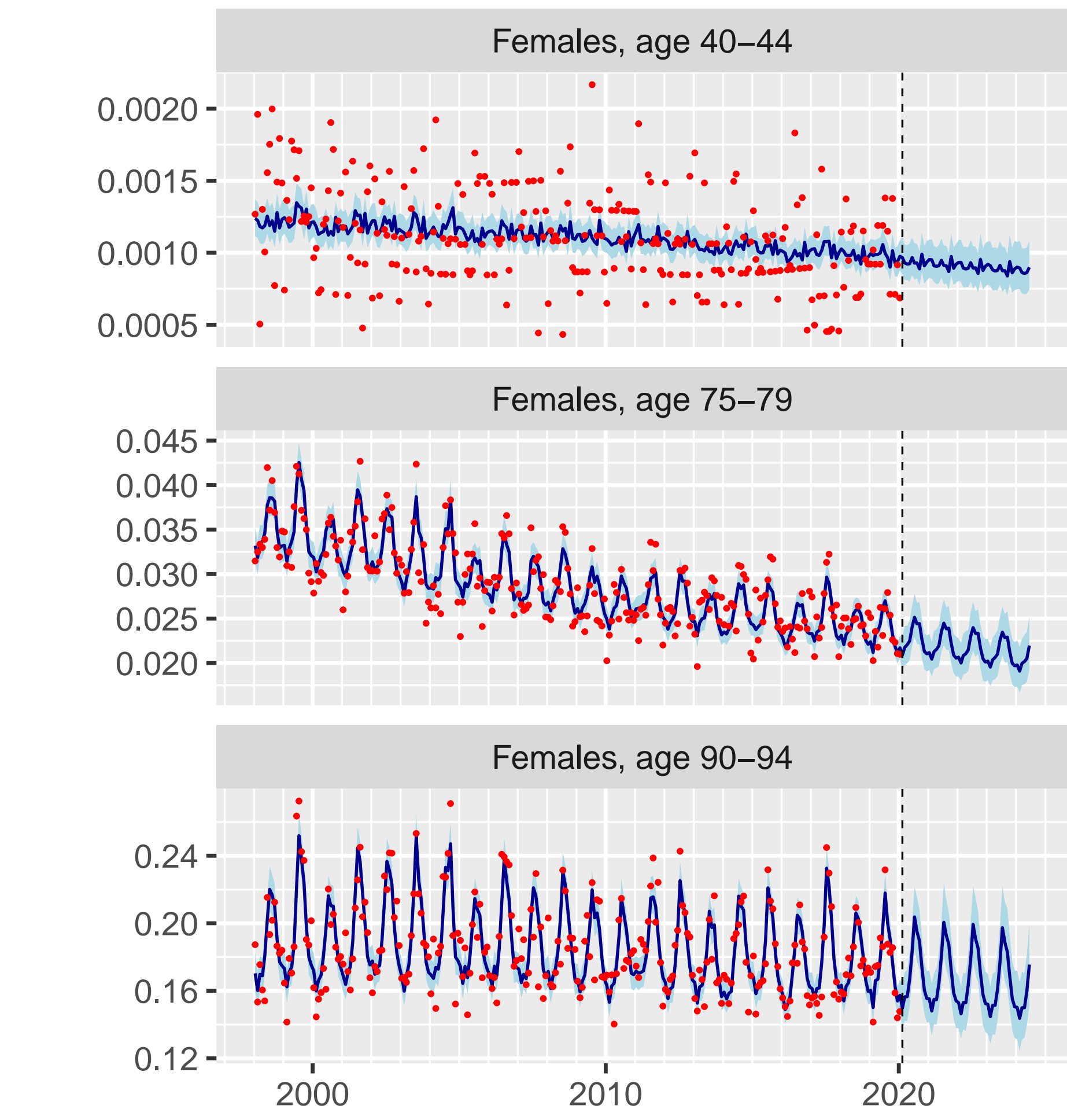
- Population by 5-year age group, sex, month, 1998–2023, from Statistics New Zealand
- Deaths by 5-year age group, sex, month, 1998–2023, from Statistics New Zealand

## STATISTICAL MODEL



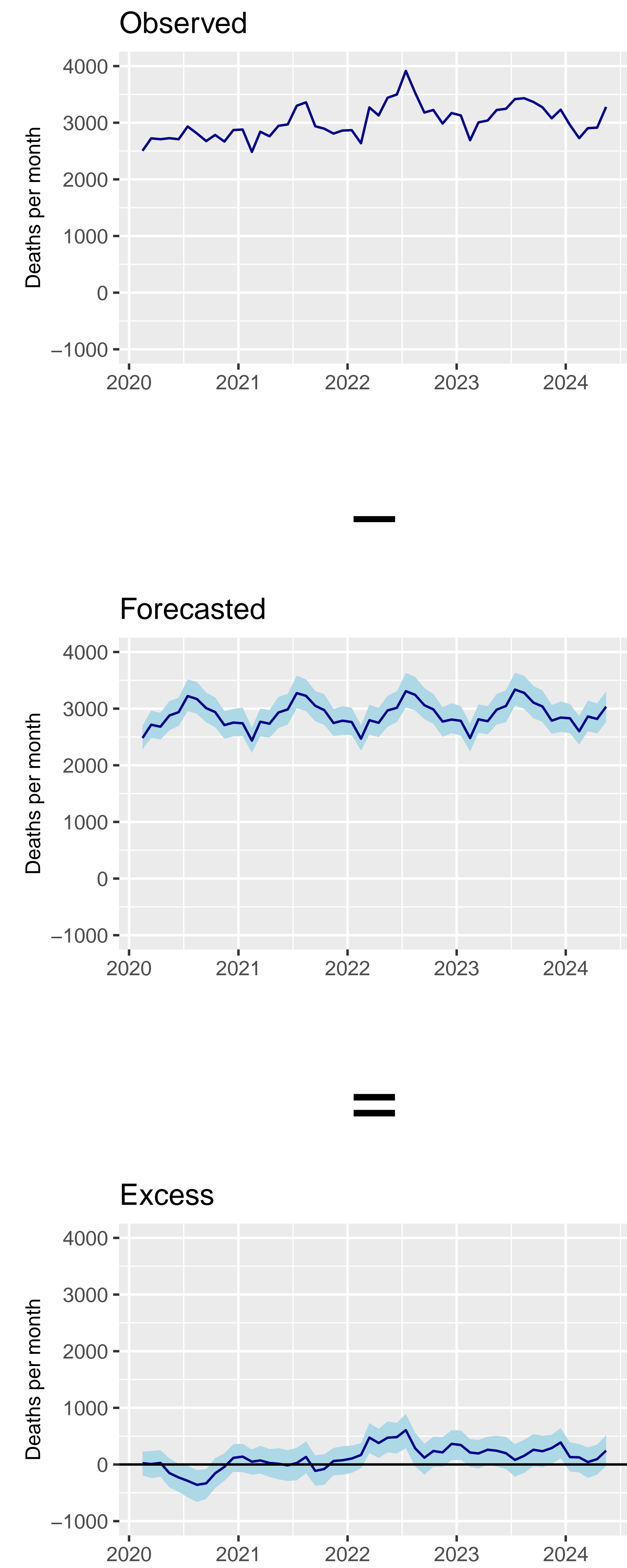
Bayesian hierarchical model used for estimation and forecasting

## ESTIMATES AND FORECASTS OF RATES



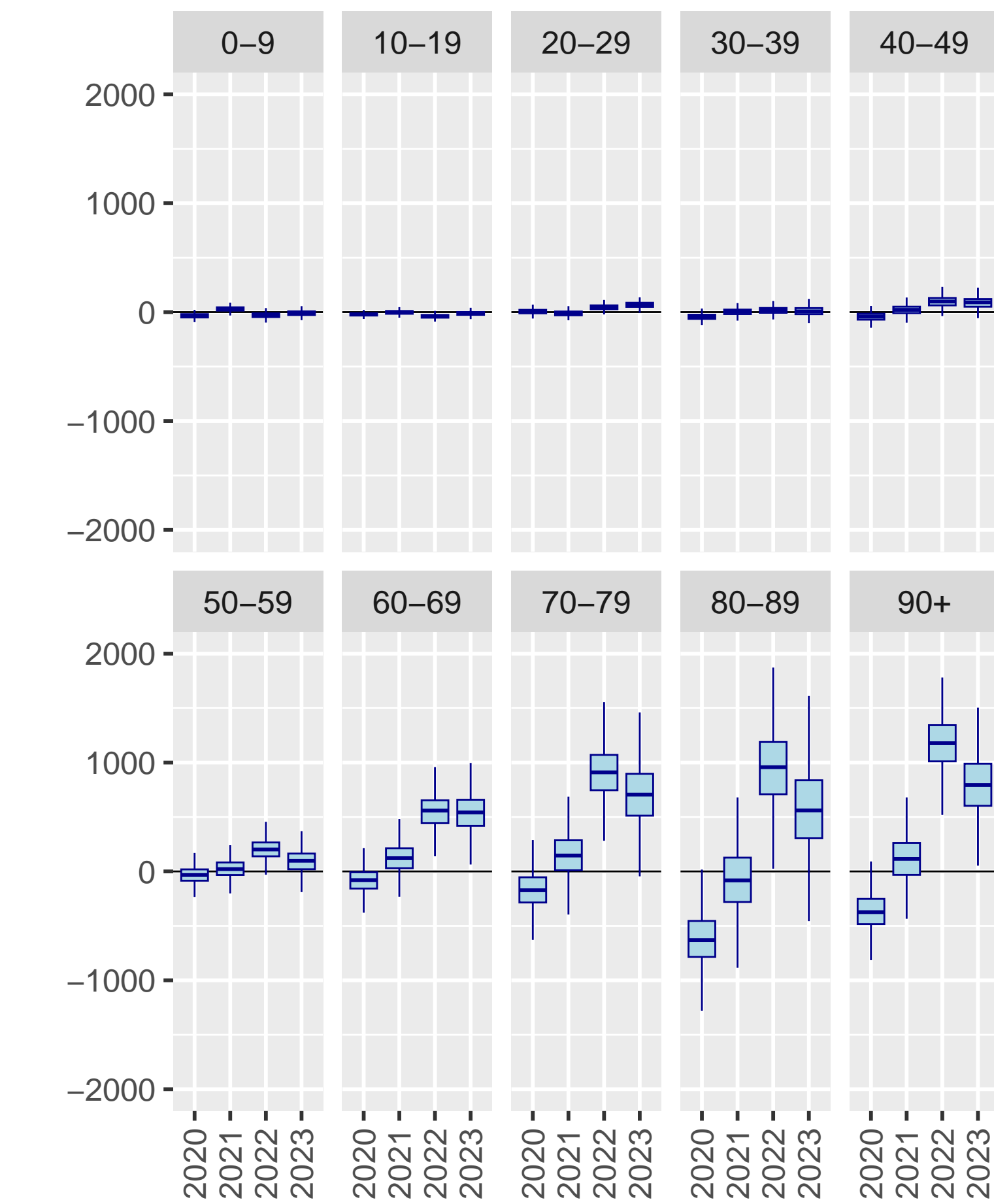
Estimates and forecasts of mortality rates for selected groups. Blue lines and bands are point estimates and 95% credible intervals from model. Red dots are direct estimates.

## CALCULATING EXCESS DEATHS



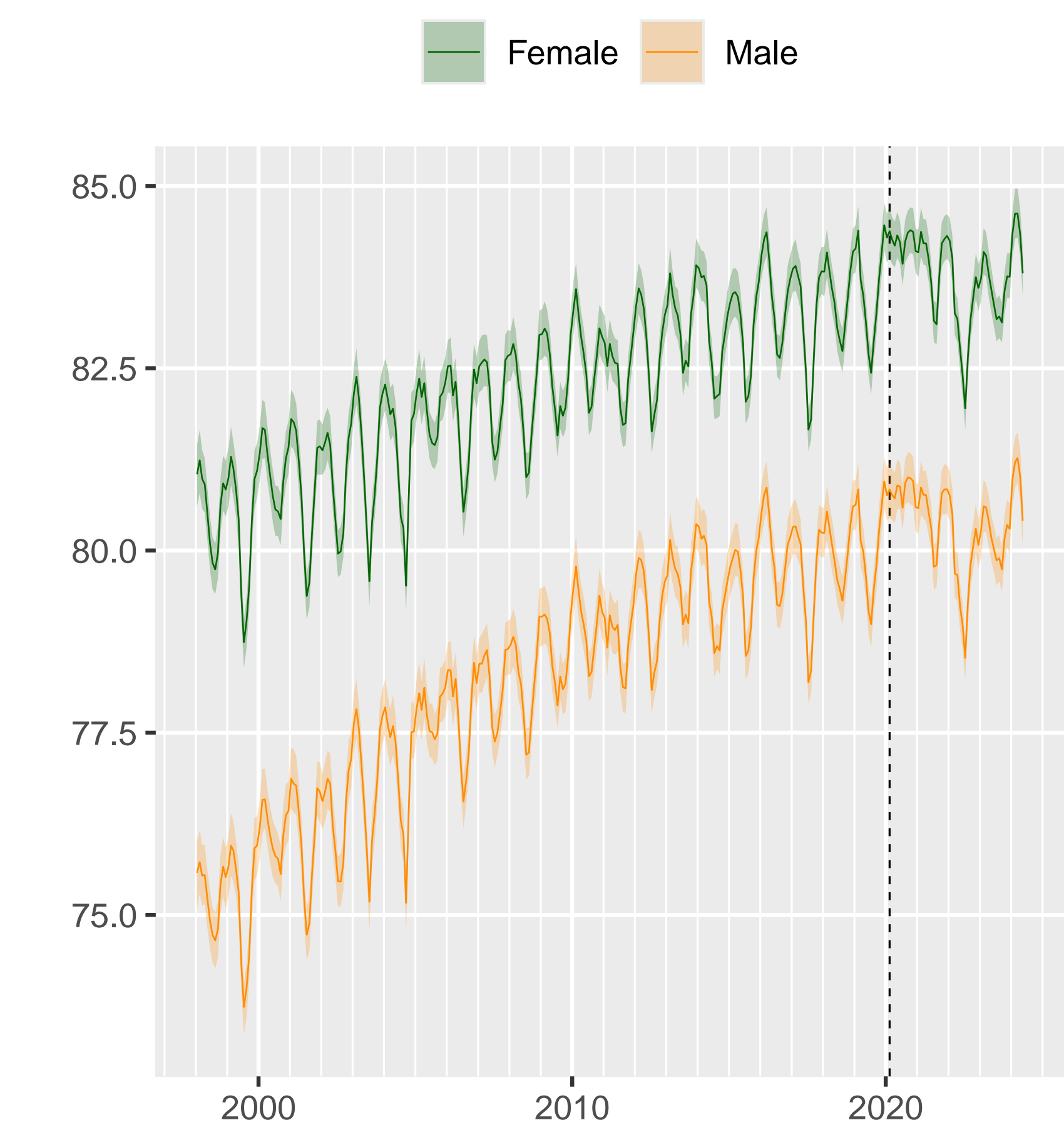
Calculation of monthly excess deaths: forecasted deaths are subtracted from actual deaths

## EXCESS DEATHS BY AGE



Excess deaths, by age group, by year

## LIFE EXPECTANCY



Estimates of life expectancy at birth, from model fitted to data for 1998–2024

## CONCLUSION

- Monthly excess deaths between -500 and 1000
- Annual excess deaths in 2022–2023 higher than 2020–2021
- Excess deaths concentrated among older people

## NOTES

- Work in progress, and results are provisional
- Statistical models implemented using R package **bage**

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