

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.

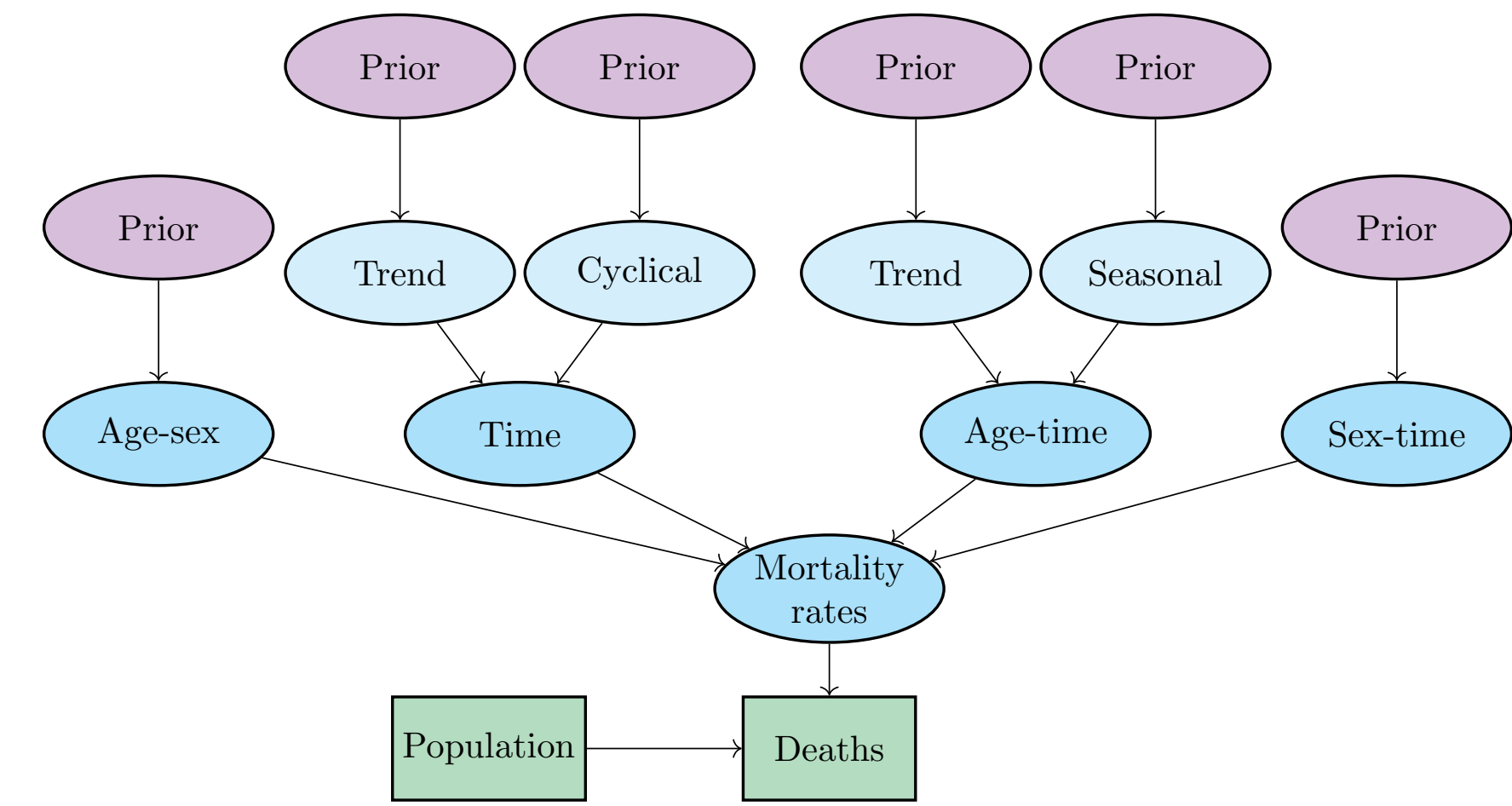
BACKGROUND

- 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

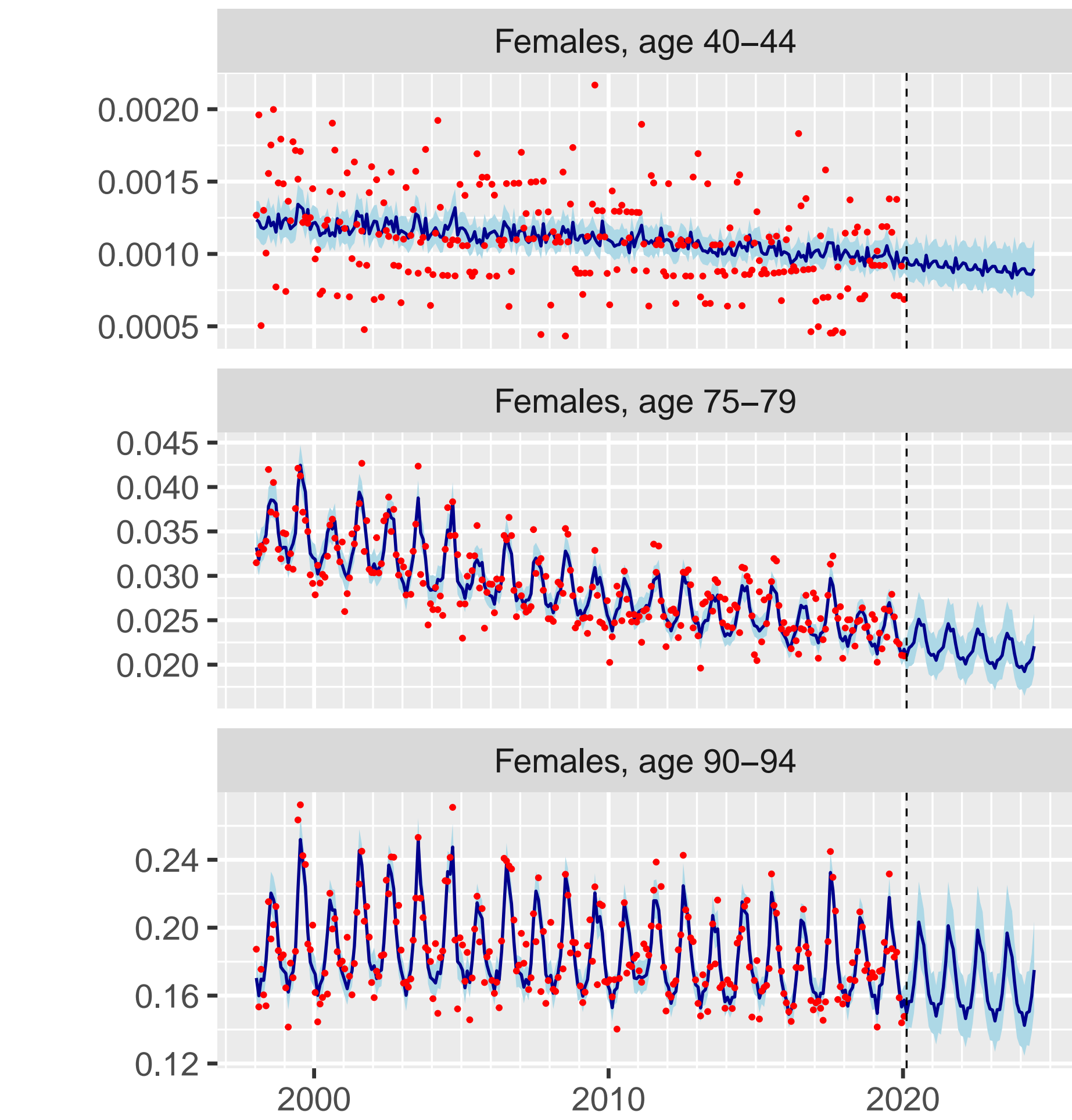
- Population by 5-year age group, sex, month, 1998–2023, from Statistics New Zealand
- Deaths by 5-year age group, sex, month, 1998–2023, from Statistics New Zealand

STATISTICAL MODEL



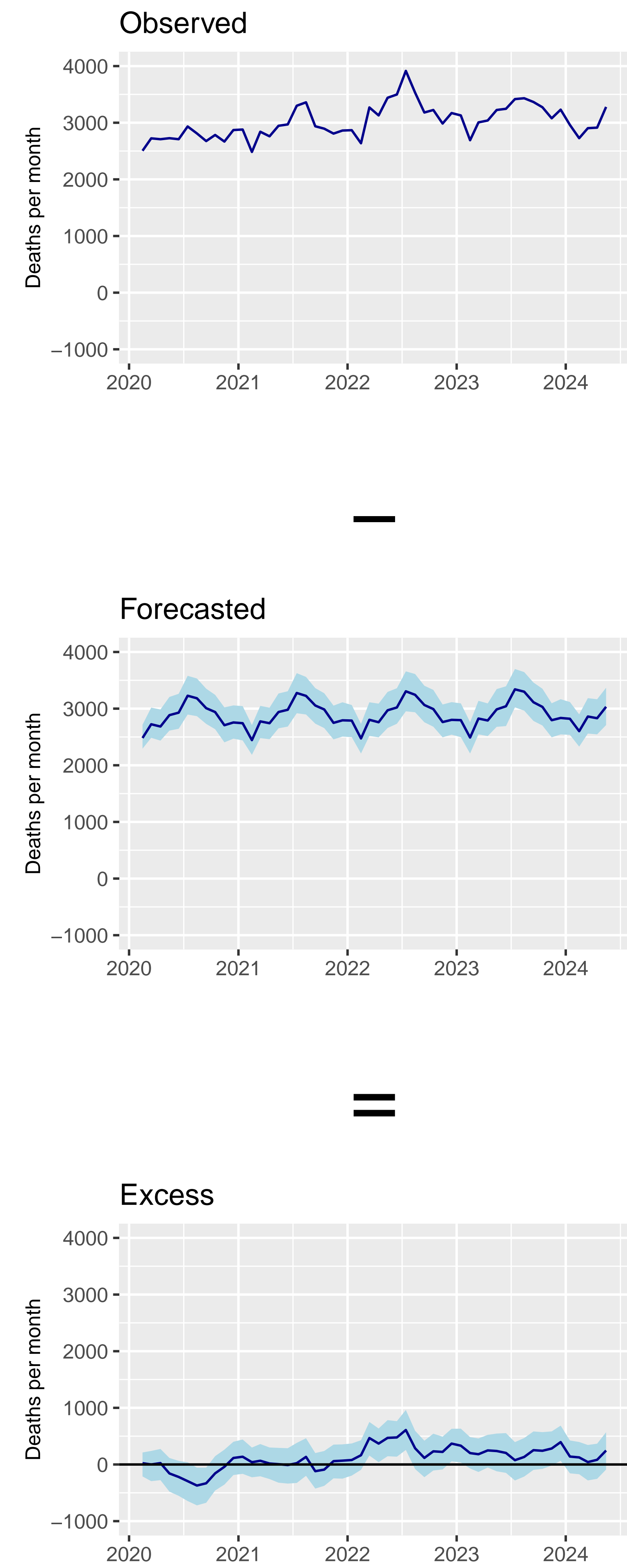
Bayesian hierarchical model used for estimation and forecasting

ESTIMATES AND FORECASTS OF RATES



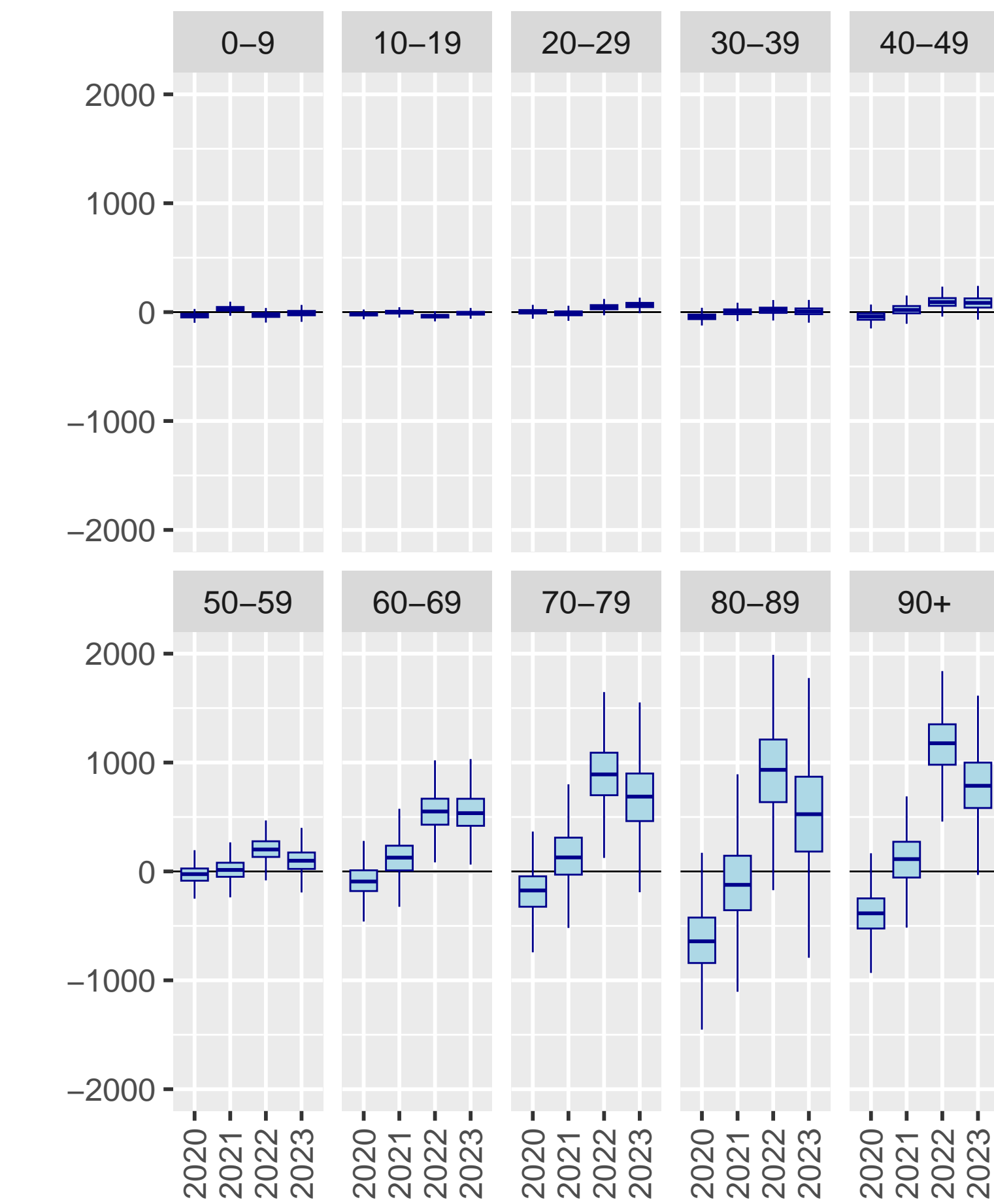
Estimates and forecasts of mortality rates for selected groups. Blue lines and bands are point estimates and 95% credible intervals from model. Red dots are direct estimates.

CALCULATING EXCESS DEATHS



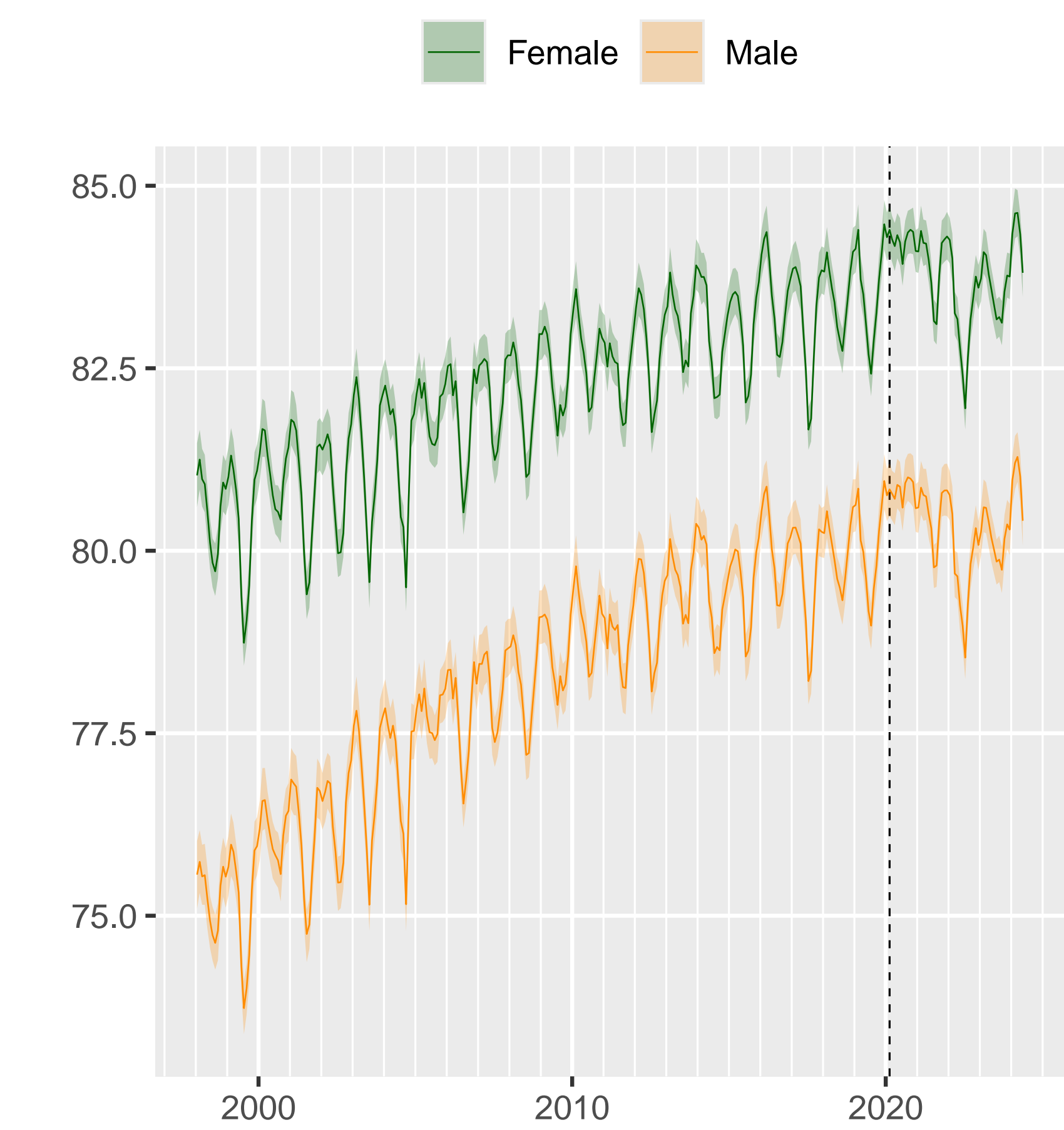
Calculation of monthly excess deaths: forecasted deaths are subtracted from actual deaths

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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