Quantifying excess mortality by cause of death against a pre-pandemic and socio-economic factor-dependent baseline

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RCLR Research Centre for Longevity Risk

Outline

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Quantifying excess mortality

Vaccination hesitancy

Quantifying excess mortality by cause of death

A high-level summary of our approach

Overall aim: Quantifying excess mortality in the Dutch population by cause of death (21x) against a pre-pandemic, socio-economic factor-dependent baseline

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- Phase 2a: Analyze mortality during 2020-2021 by cause of death against a pre-pandemic baseline to identify which causes of death were affected most during the pandemic

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Models are calibrated to individual survival observations using Poisson GAMs

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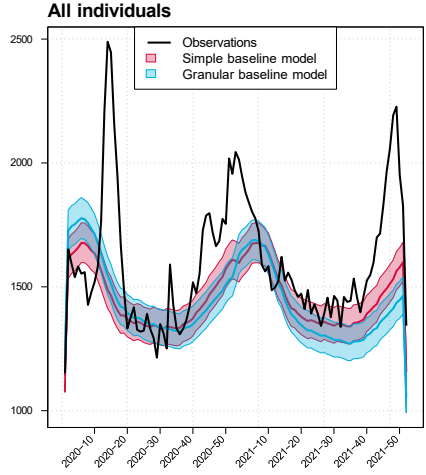
The importance of having an appropriate baseline

An illustration using all-cause mortality by subgroups



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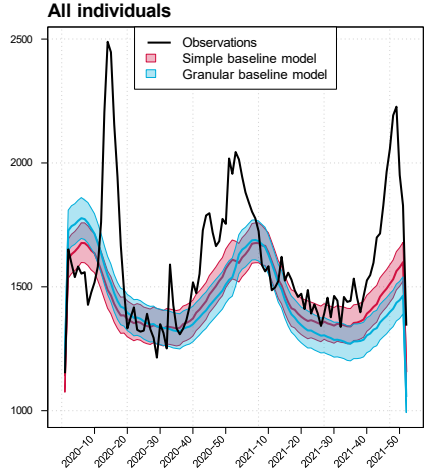

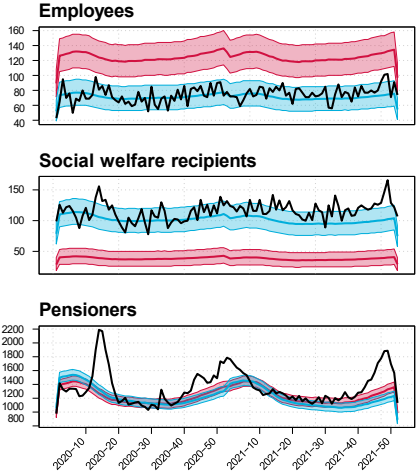

Current status and plans for the coming period

Current status

- Baseline models have been calibrated
- Examples of factors included in the baseline: personal & household income, migration background, source of income, medical expenses, homeownership, ...
- Identified causes with substantial excess mortality

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Outlook

- Refine use of medical expenses in baseline mortality
- Refine approach for using baseline mortality throughout the year to avoid unexpected ‘jumps’ in mortality
- Explain excess mortality using socio-economic risk factors and COVID-19 testing and vaccination information

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Vaccination hesitancy

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Vaccination hesitancy

- Studying the association between COVID-19 vaccination rates and various demographic and socio-economic factors (Labuschagne et al. 2023; Pijpers et al. 2023).
- The COVID-19 vaccination campaign in the Netherlands started on 6 January 2021. We consider individuals living in the Netherlands in 2021 (January, 1st - December, 31st) aged between 18 and 100 years old.
- We combine data on COVID-19 infections and vaccinations to determine if an individual is "fully vaccinated", meaning having received either one or two doses depending on the vaccine type, or having received one dose along with a positive COVID-19 test within the past six months (RIVM).

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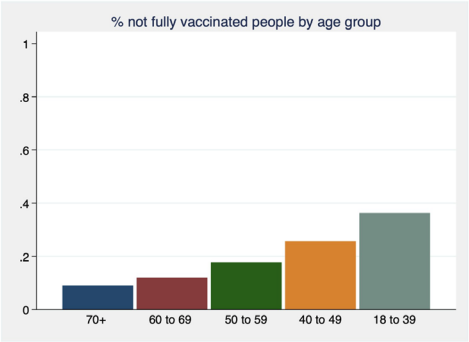
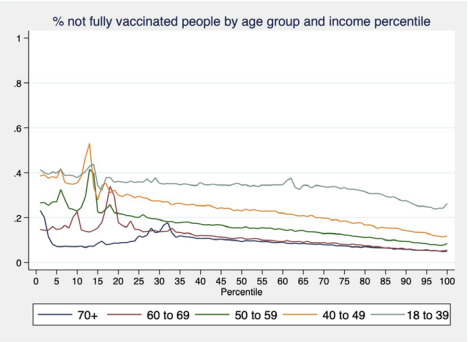
Vaccination hesitancy

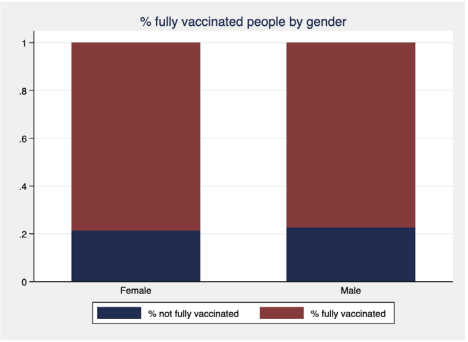
Age groups and Personal Income Percentiles

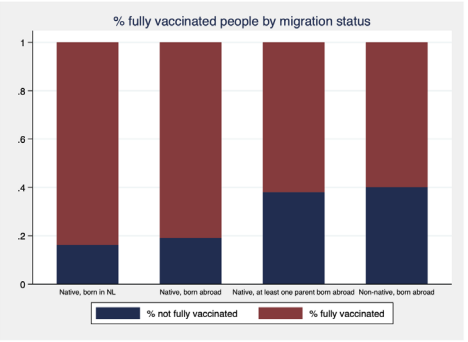




Vaccination hesitancy

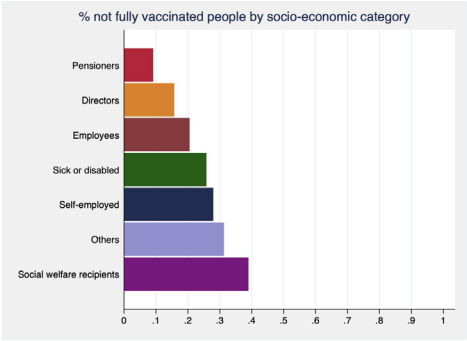
Gender and Migration Status

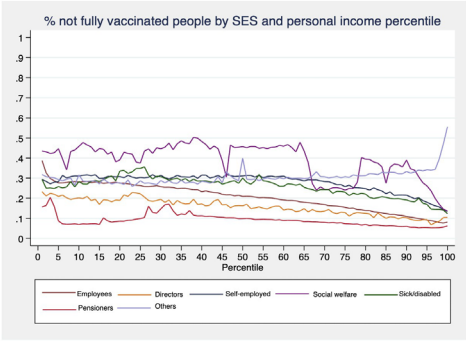




Vaccination hesitancy

Socio-economic category (SES) and Personal Income Percentiles





Plans for the coming period

- Improve the analysis on vaccination hesitancy by using binomial regression models with demographic and socio-economic factors as well as the interaction among them.
- Improve the analysis on vaccination hesitancy by considering an extended time frame, thus booster vaccinations.
- The obtained results will contribute to explain differences in excess mortality.

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References

- Labuschagne LJE, Smorenburg N, van de Kassteele J, Bom B, de Weerdt AC, de Melker HE, Hahné SJM. "Neighbourhood sociodemographic factors and COVID-19 vaccine uptake in the Netherlands: an ecological analysis." *BMC Public Health*. 2023;

- Pijpers J, van Roon A, van Roekel C, Labuschagne L, Smagge B, Ferreira JA, de Melker H, Hahné S. "Determinants of COVID-19 Vaccine Uptake in The Netherlands: A Nationwide Registry-Based Study". *Vaccines*. 2023;

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