Inequalities in Healthcare Use during the COVID-19 Pandemic

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5 maart 2024

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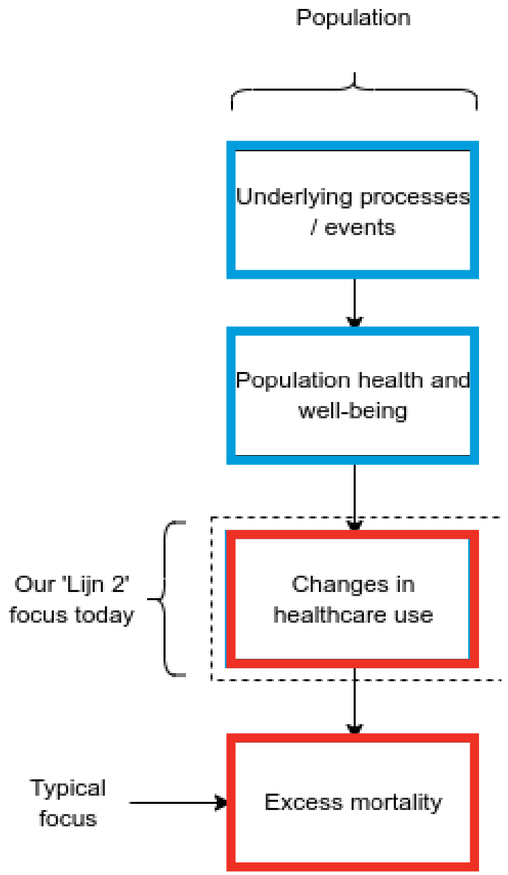
Motivation

- The COVID pandemic led to both direct and indirect shocks to health and wellbeing.
- COVID hospitalizations and deaths soared during the first two years of the pandemic.
- At the same time, considerable declines in non-COVID healthcare use have been recorded.
- In the years following the pandemic, we have started observing excess mortality beyond COVID
- Our goal is to better understand what happened and to whom during the pandemic

A complete picture necessitates looking beyond deaths and towards other indicators of well-being



Part I: Excess Health

We use the universe of healthcare activities performed within the Basic Insurance

CBS microdata (2017-2021): individual-level records on all Dutch residents for the adult poulation:

- Age
- Sex
- Income
- Migrant background
- ~ 14M individuals per year

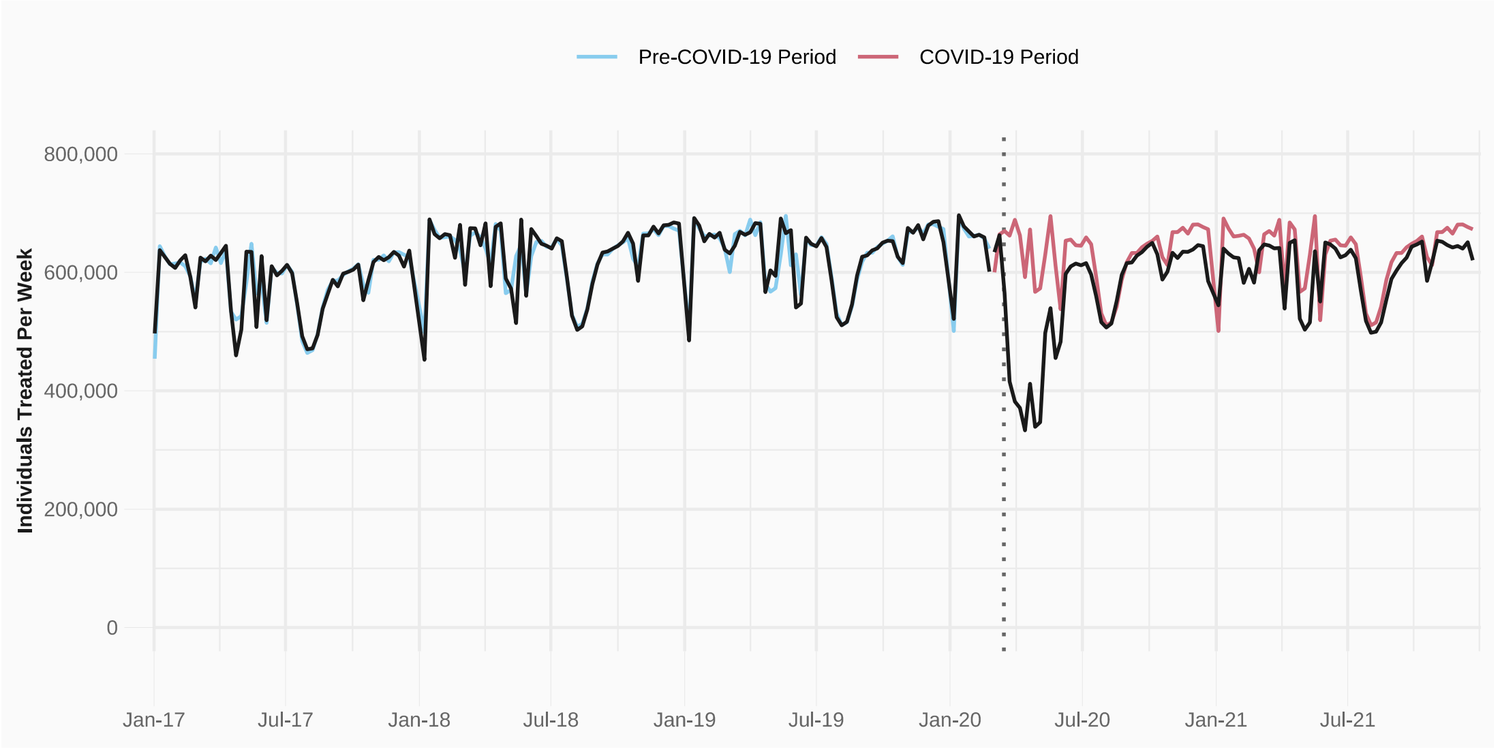
Medical claims data (2017-2021): individual-level record of health activities

- Activity type (diagnostic, operational etc.)
- Data of activity
- Urgency level (High, Medium, Low)
- Medical field (Oncology, Trauma)
- ~ 100M activities per year

We developed an ‘excess healthcare use’ methodology to study changes in healthcare use for any subgroup

For some demographic group (e.g. 80+ year olds) and some type of activity (e.g. high urgency Oncology):

- Calculate age- & sex-standardized weekly health use data
- “Train” a model on weekly timeseries from 2017 until February 2020
- “Predict” the number of patients per week in 2020 and 2021
- “Compare” expected healthcare use with observed healthcare use



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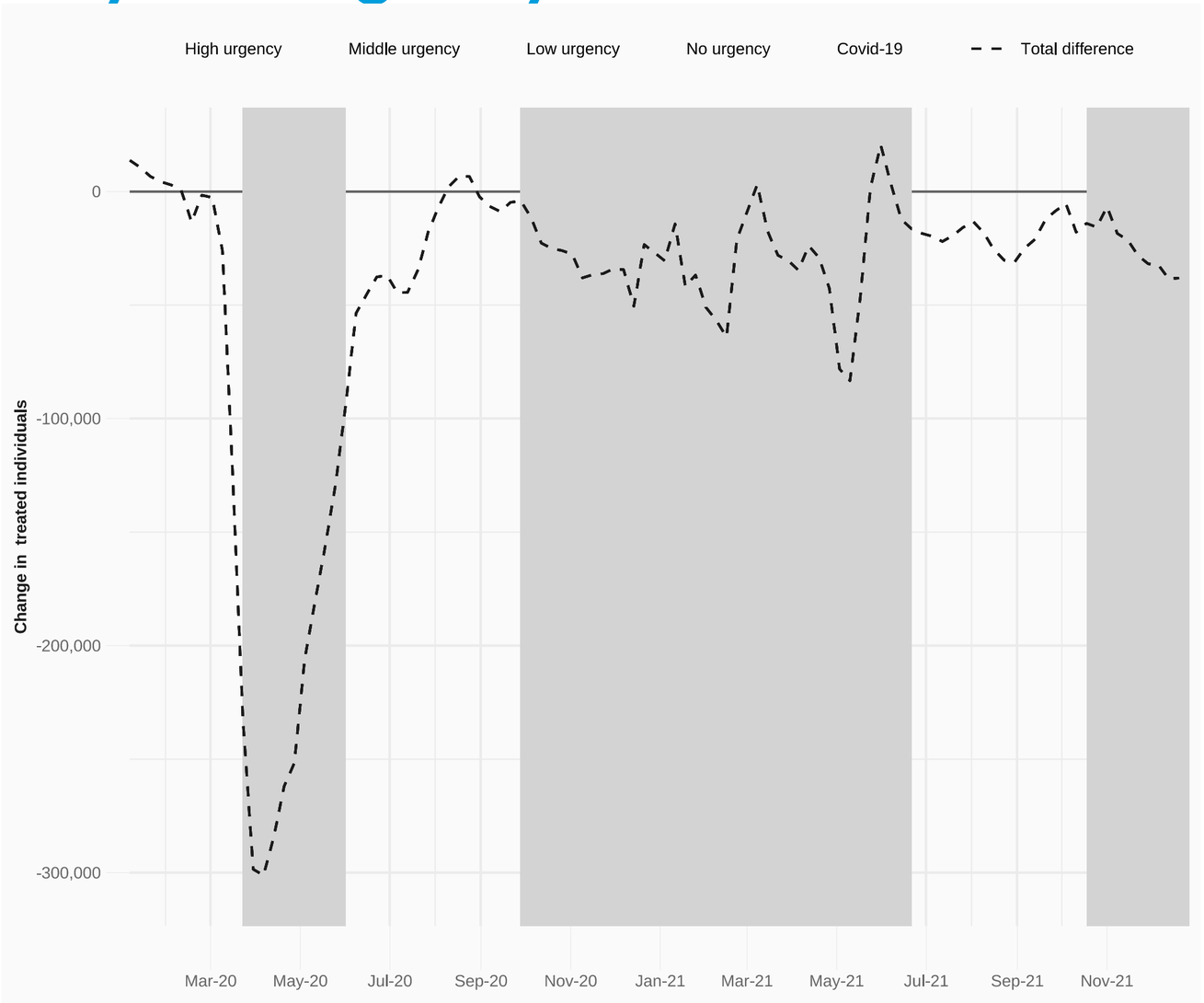
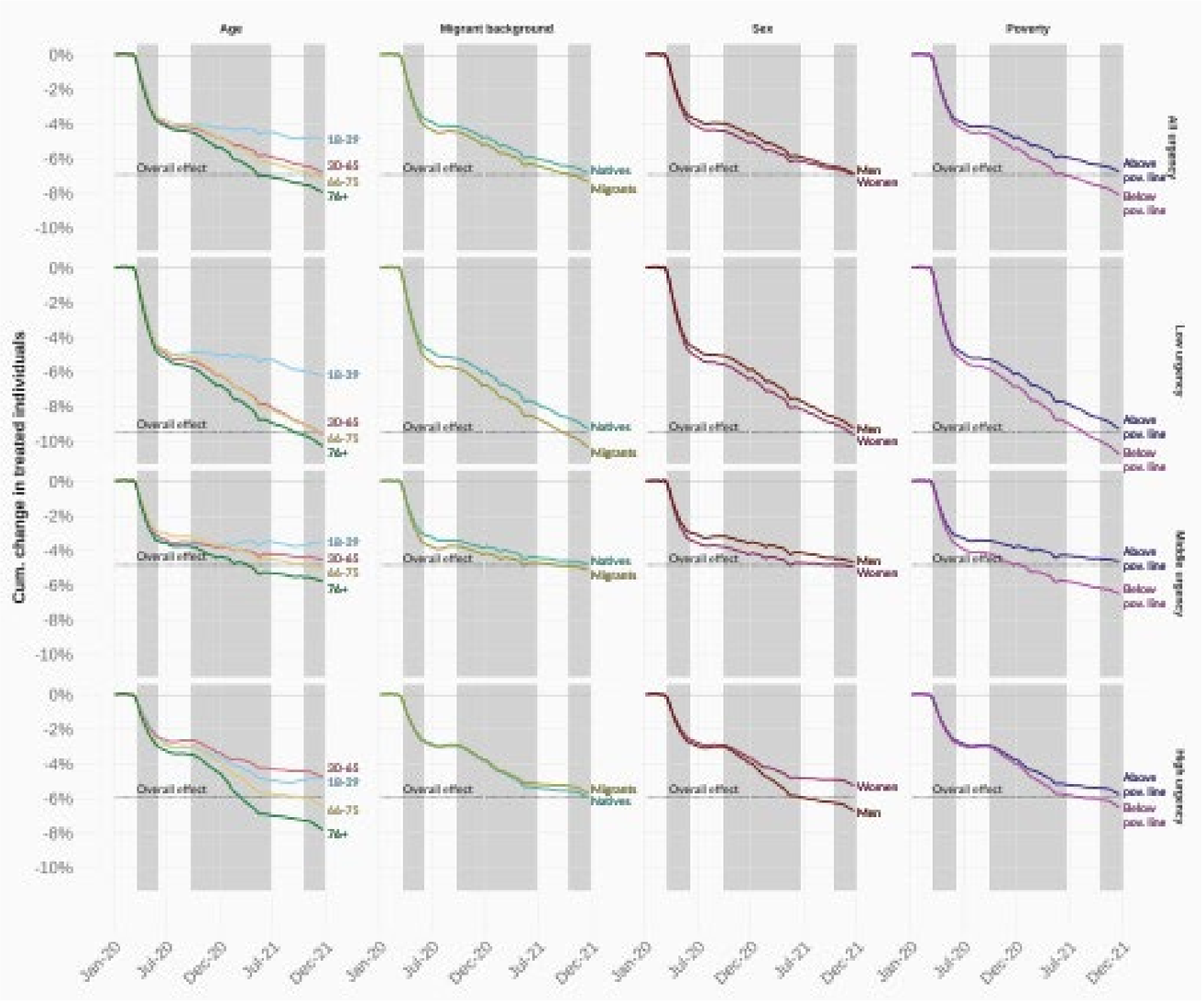
At the population level we observe a staggering decline in healthcare use, particularly low urgency care

- At its peak, 300,000 fewer patients entered the healthcare system (~40% decline)
- Most declines occurred in low urgency activities
- The first hospitalization wave was characterized by a much stronger decline than latter waves
- Overall, the decline in non-COVID care far outpaced the influx of COVID patients



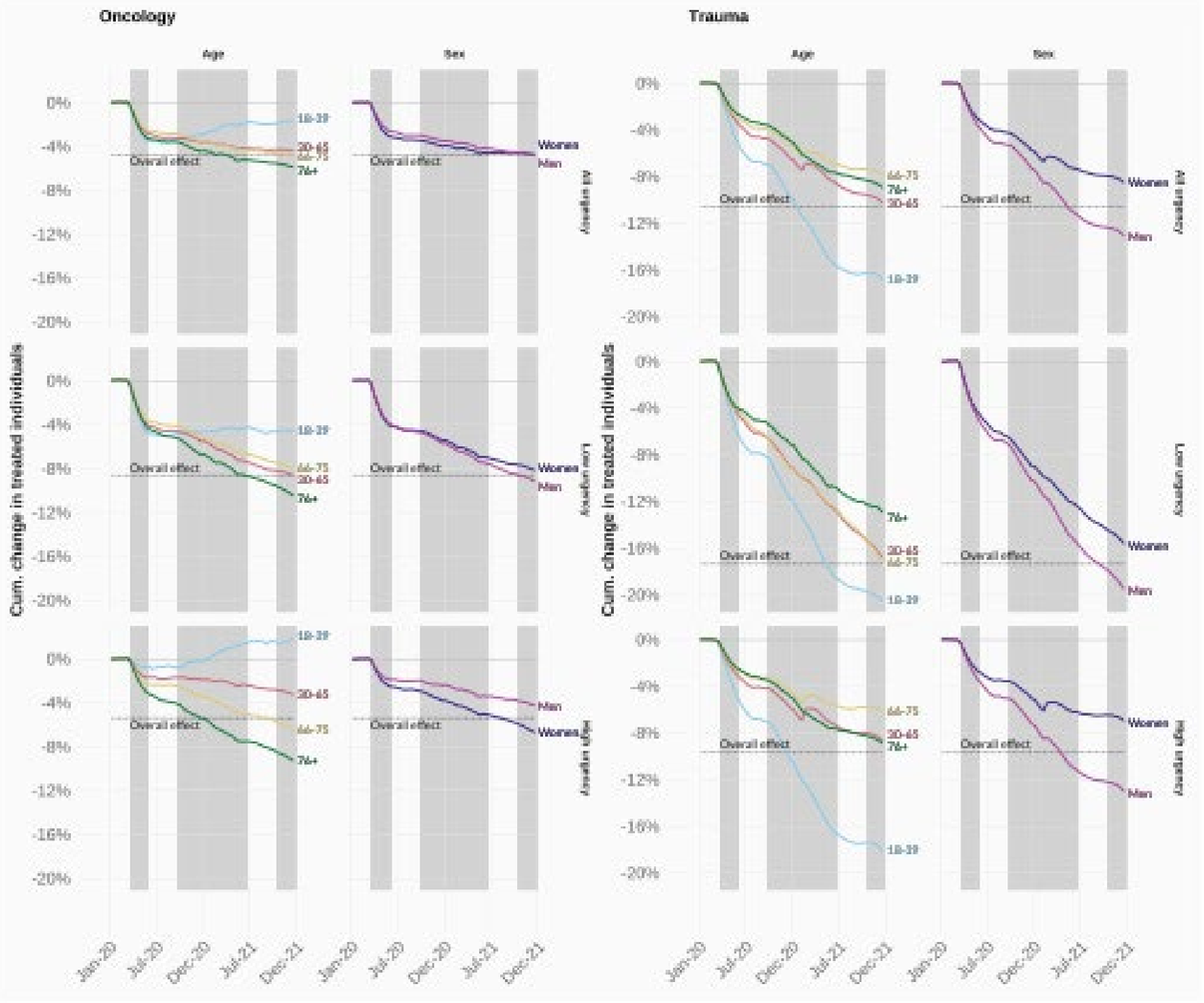
We also observe striking diparities along demographics

- Here, we plot cumulative losses across the entire pandemic period
- Low income and those with a migrant background recorded much stronger losses
- Younger age groups were least affected
- There were stronger declines for women than men in less urgent healthcare



Assessing medical subsets sheds further light on aggregate declines

- Declines in oncological activities were considerably less steep than Trauma-related activities
- However, we observe marked differences in Oncological declines by sex that could be a result of halted population screenings
- Amon trauma-related activities, we see a strong age gradient – this illustrates the impact of behavioral measures like lockdowns



Part II: Group-level excess mortality

The standard approach to studying excess mortality relies on an overall prognosis of deaths

Step1

Calculate average weekly deaths in some reference window

Step 2

Calculate a 7 week moving average for each week

Step 3

Scale the averages in such a way that the total aligns with some prognosis

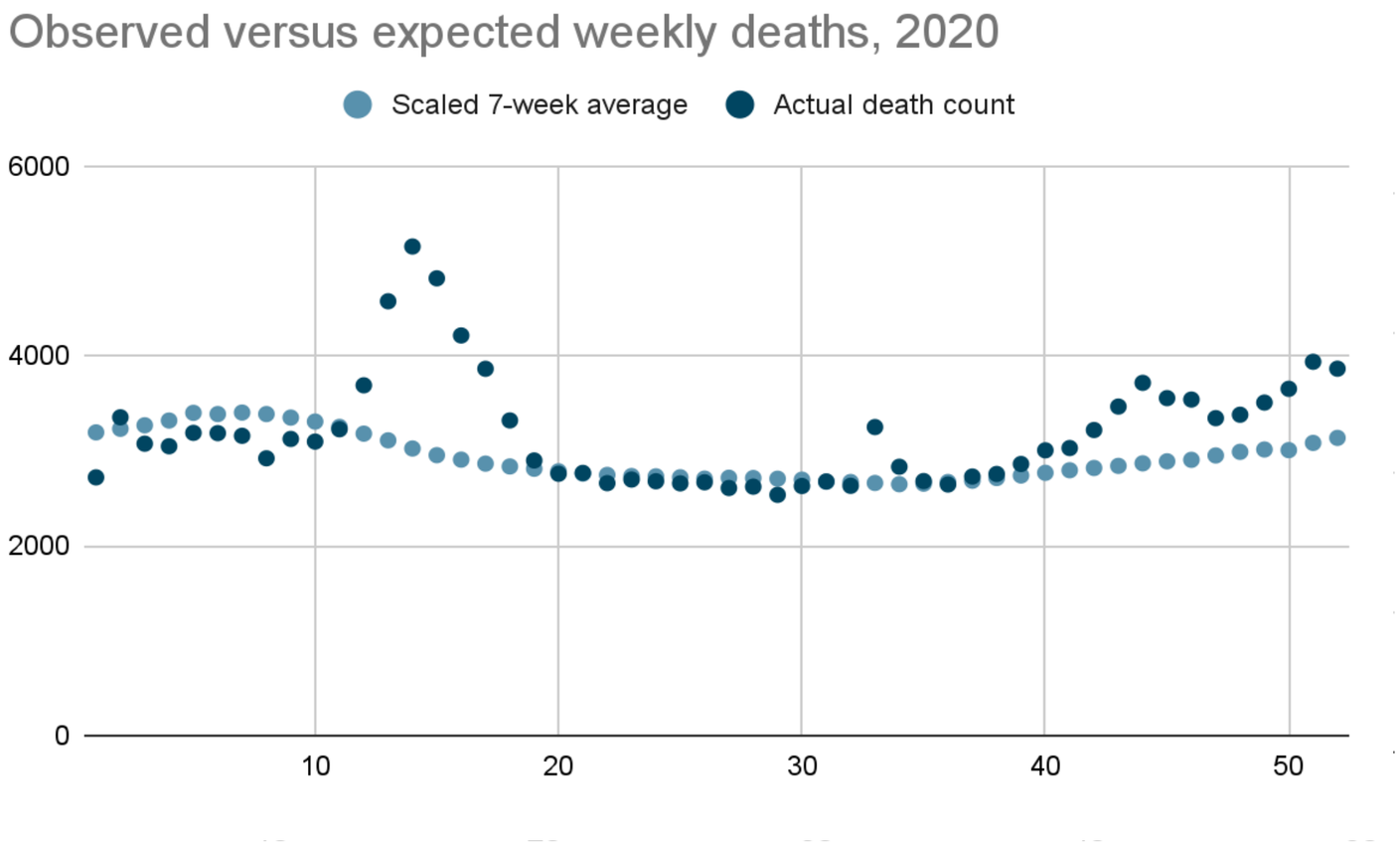
Step 4

Compare estimated deaths with realized deaths

CBS uses the kernprognose to determine scaling of week averages

CBS' excess mortality in a nutshell

- Average
- Smooth
- Scale
- Compare



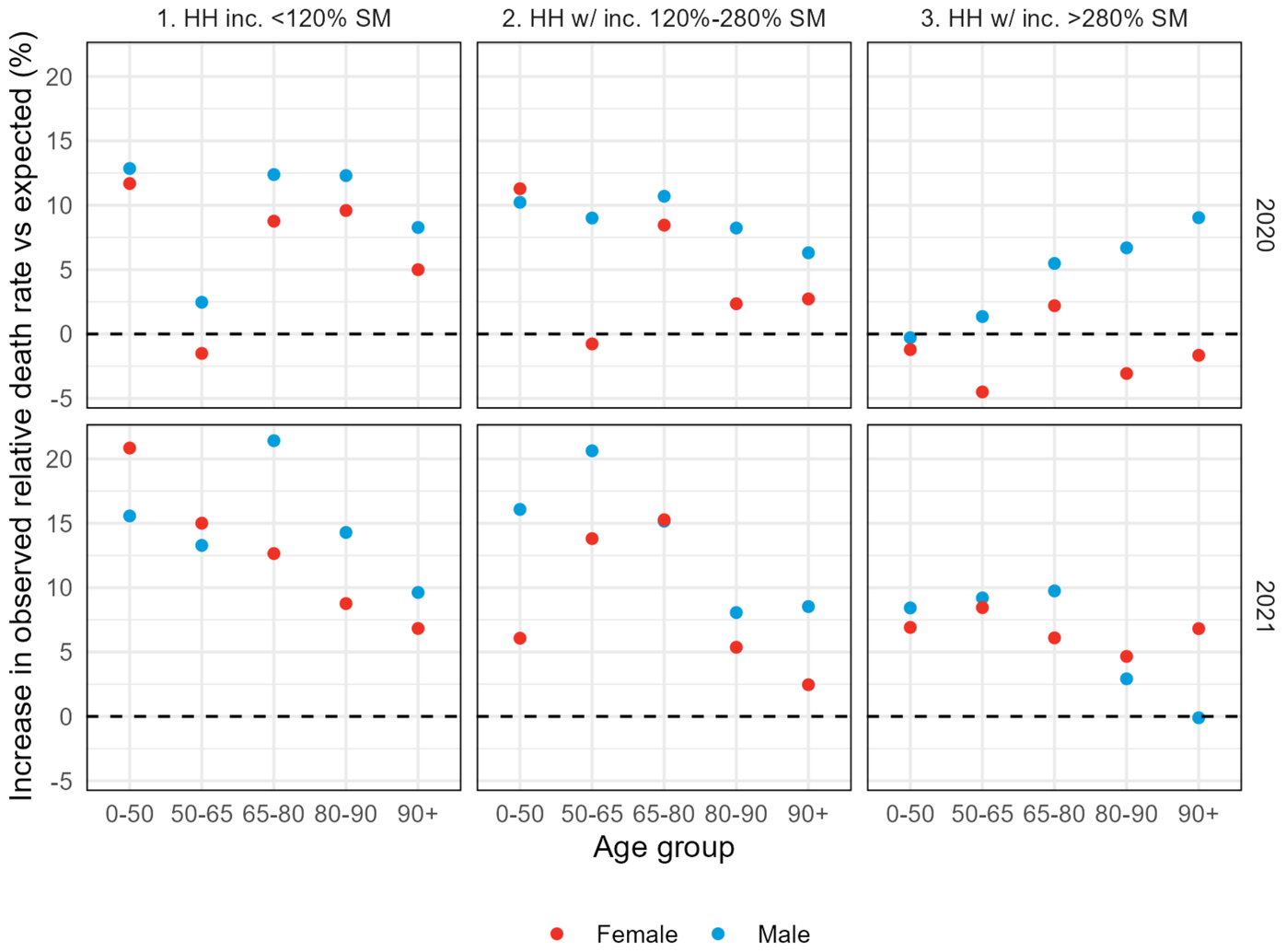
Source: own reproduction of excess mortality

Some reflections on ‘excess mortality’ calculations

1. Absolute excess mortality is completely determined by the difference between observed deaths and the external source used to scale historic deaths
2. Week-by-week excess mortality is dependent on the confidence intervals of the weekly estimates - these scale the number of years used to estimate them (not the number of deaths)
3. The approach relies on an external source to scale historic deaths with, complicating the calculation of excess mortality for subgroups without expected deaths

We find suggestive evidence of an income gradient among the working population and people up to age 80-90 year old

Observed vs expected mortality rates
By age, sex and income



When looking at age, gender and income:

- Income differences with respect to the highest income group, up to (and incl.) age group 80-90
- When compared to expected death rates, realized death rates tend to increase less for females

All results are based on calculations by Ahti, using non-public microdata from Statistics Netherlands (CBS).

Part III: Find out for yourself!

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