

# Overweight-related cardiovascular and cancer mortality trends 1995-2019 in Switzerland: an analysis of multiple causes of death

#Pop Health Lab

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## BACKGROUND

- Overweight and obesity are major causes of mortality, particularly due to their effect on two leading causes of death: cardiovascular diseases (CVD) and cancers (Cancer)
- In Switzerland, while mortality rates due to these diseases have declined in the past 30 years, the prevalence of overweight (including obesity) has increased in the same period

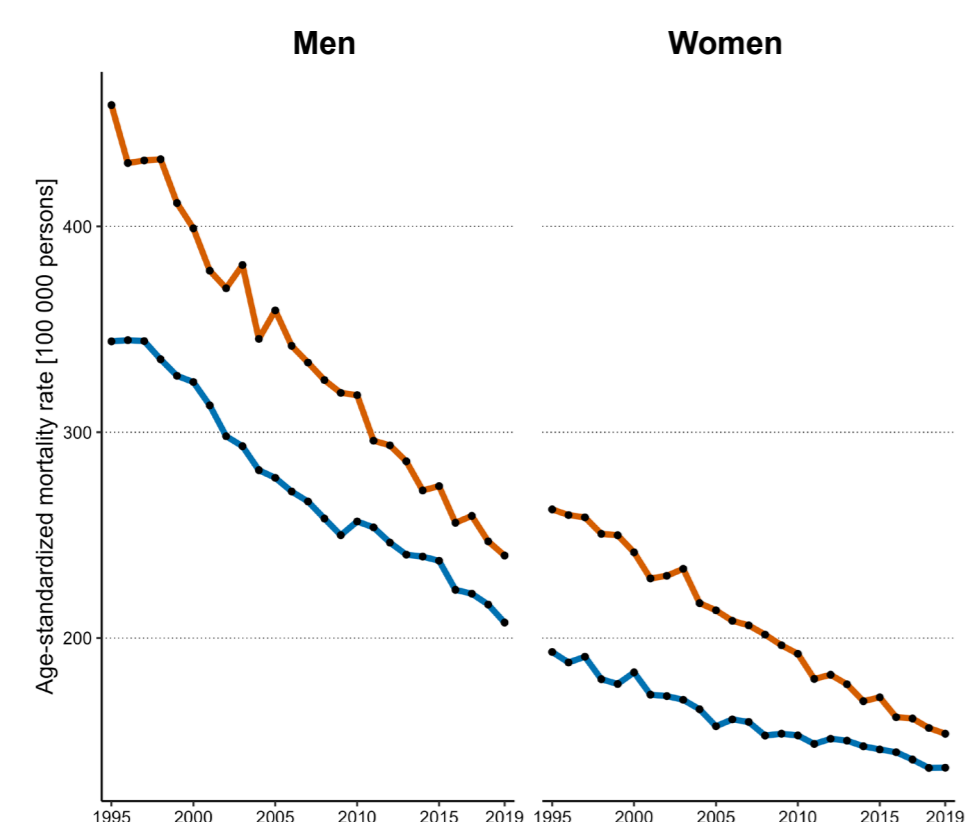


Figure 1. Decline in CVD and Cancer age-standardized mortality rates between 1995 and 2019 in Switzerland. Rates are estimated among adults (20+).

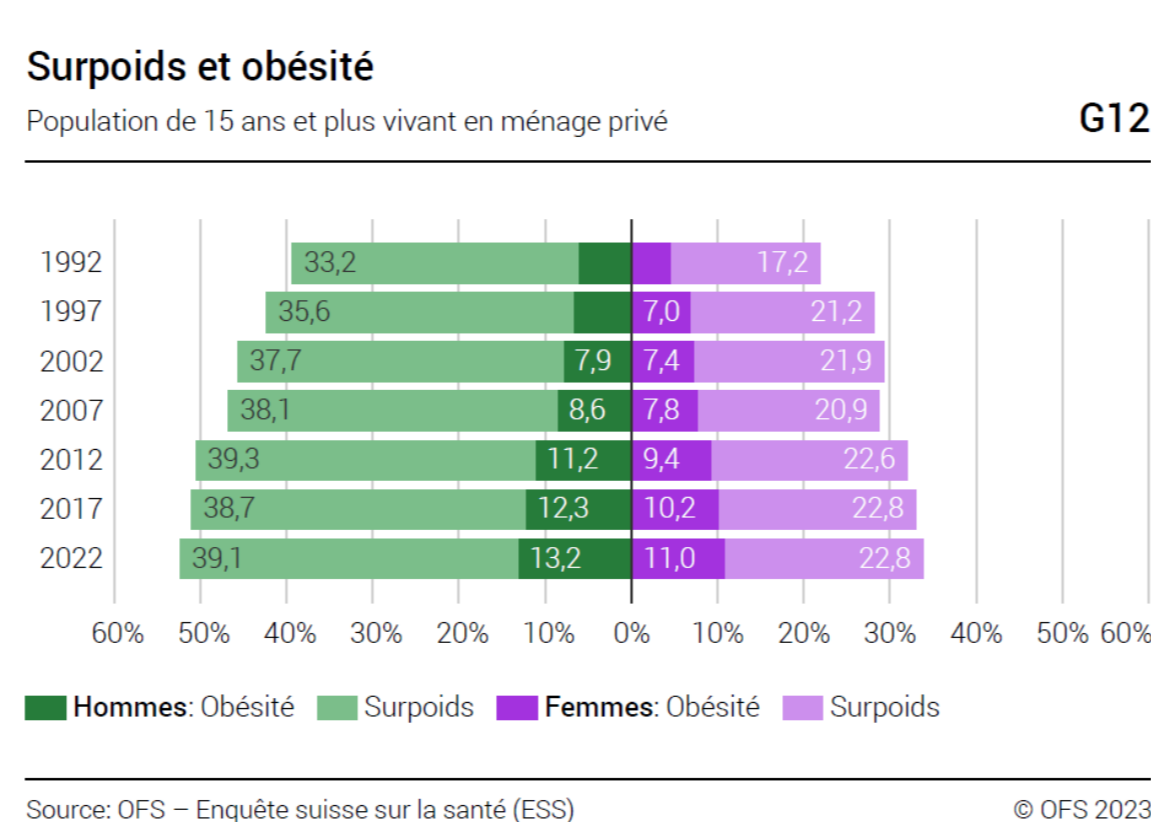


Figure 2. Increase of overweight (light colors) and obesity (dark colors) between 1992 and 2022 in Switzerland. Estimates are from self-reported BMI collected as part of the Swiss Health Survey among 15+ individuals. Prevalences for men are in green while for women are in violet. OFS is the Swiss Federal Statistical Office.

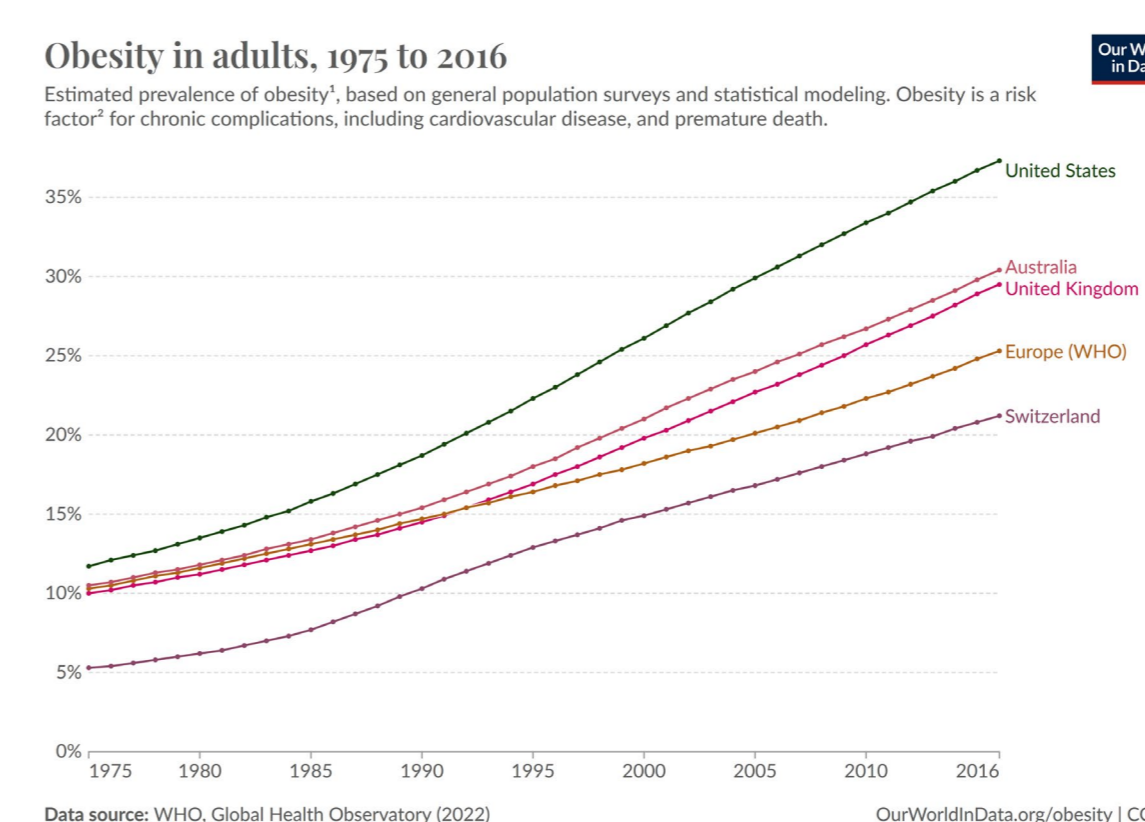


Figure 3. Increase of obesity in adults between 1975 and 2016 in Switzerland and some other high-income countries. Data are from WHO. Switzerland has a lower prevalence of obesity compared to other EU countries and the US.



## OBJECTIVE

To assess the contribution of overweight (including obesity) to trends of CVD and Cancer mortality rates among adults (20+) between 1995 and 2019 in Switzerland

## METHODS

- We conducted a population-based analysis of all adult deaths recorded in Switzerland between 1995 and 2019 (mortality database of the Swiss Federal Statistical Office)
- We identified overweight-related CVD / Cancer deaths by implementing a multiple causes of death approach (Adair and Lopez, 2020).
  - Identify deaths with CVD / Cancer reported as either underlying or contributing cause of death. CVD / Cancer were identified via ICD-10 codes of chapters in the GBD study.
  - Attribute deaths identified at point i as overweight-related if one of these conditions was reported as well in the death certificate: diabetes, chronic kidney disease, obesity, lipidemia, hypertensive heart disease (identified via ICD-10 codes)
  - Attribute deaths identified at point i as overweight-unrelated if none of the conditions listed at point ii were reported in the death certificate
- We estimated mortality rates by assigning each CVD / Cancer death a weight dependent on whether CVD / Cancer was identified as the underlying or contributing cause of death (Breger et al., 2020). Specifically, we assigned the underlying cause of death twice the weight of a contributing cause.
- We age-standardized mortality rates with the European standard population 2013
- We examined period- and cohort-based variations in the mortality trends by implementing an age-period-cohort (APC) model via the intrinsic estimator (Masters and Powers, 2020). We expect that the observed increase in overweight prevalence between 1995 and 2019 is reflected by a similar pattern in period-based variation of mortality rates

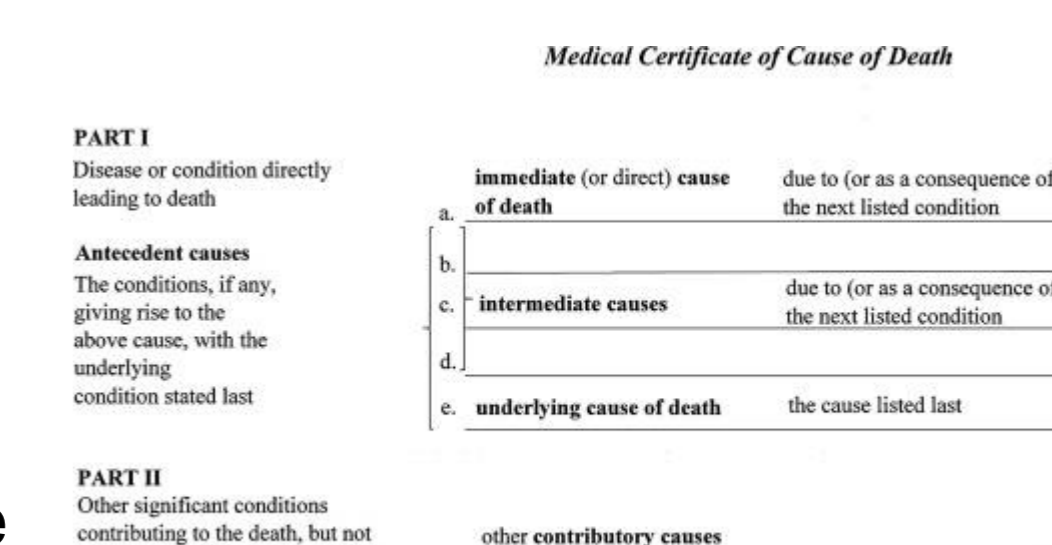


Figure 4. A maximum of three causes of death were available as the Swiss death certificate reports one underlying cause of death (Part I) and up to two contributing causes (Part II).

## RESULTS

- There were 1 581 135 deaths from all causes between 1995 and 2019 (51.5% women). Among these, 626 393 deaths were associated to CVD (as underlying or contributing cause) and 459 666 deaths were associated to Cancer
- Overweight-related CVD deaths were 210 815 (33.7% of identified CVD deaths); overweight-related Cancer deaths were 83 914 (18.3% of identified Cancer deaths)
- Age-standardized CVD / Cancer mortality rates:** overweight-unrelated rates declined steadily between 1995 and 2019, while overweight-related rates increased until 2005 and declined at a tiny pace afterwards
- APC variations:** overweight-related CVD / Cancer mortality rates were associated with a steadily increasing period-based variation. This trend was not observed for overweight-unrelated rates. Mortality rates declined across birth cohorts, particularly for those after 1930

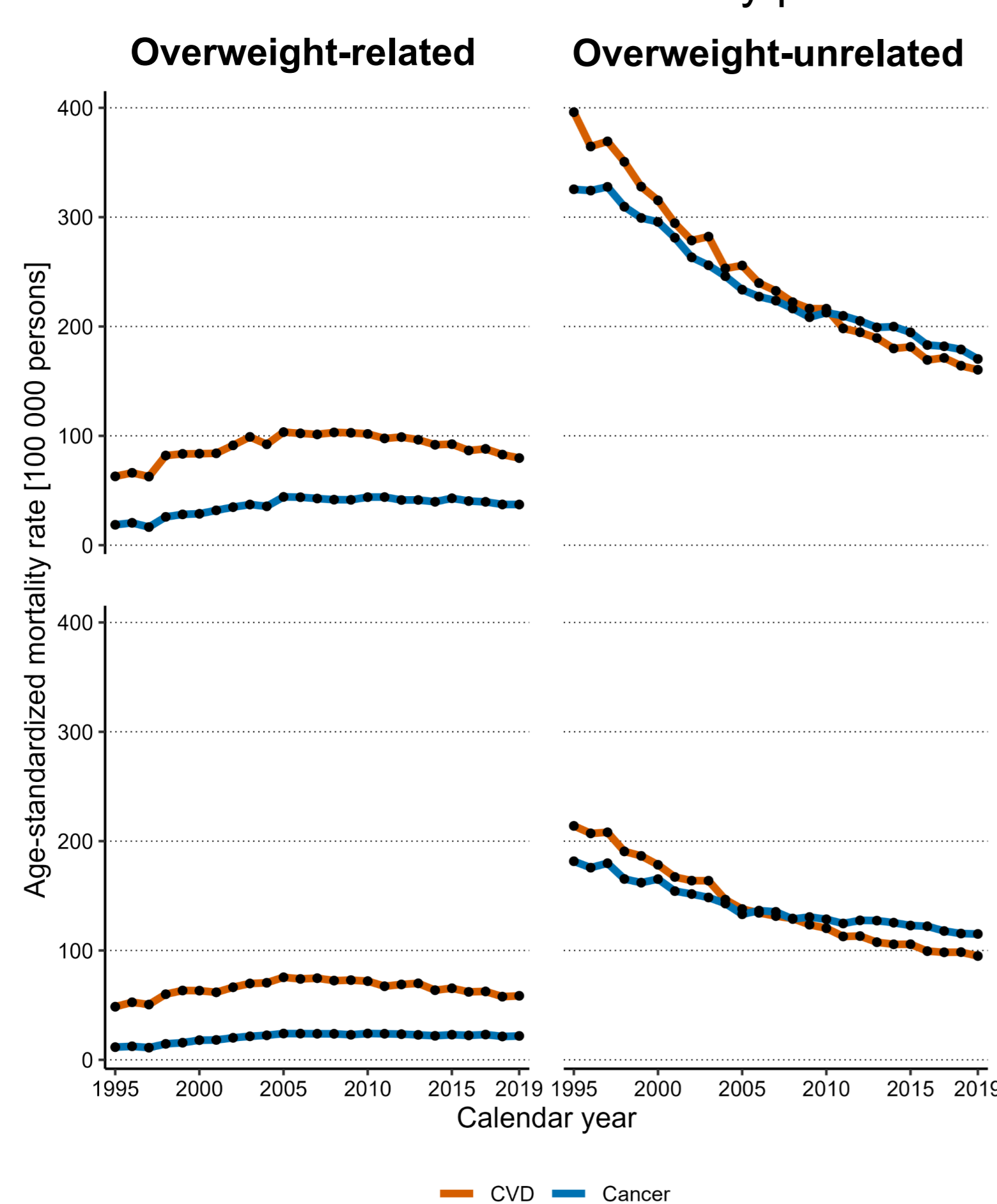


Figure 5. Trends of age-standardized mortality rates for overweight-related (left column) and overweight-unrelated (right column) deaths. Rates are estimated by weighing the deaths according to their position in the death certificate (see Methods).

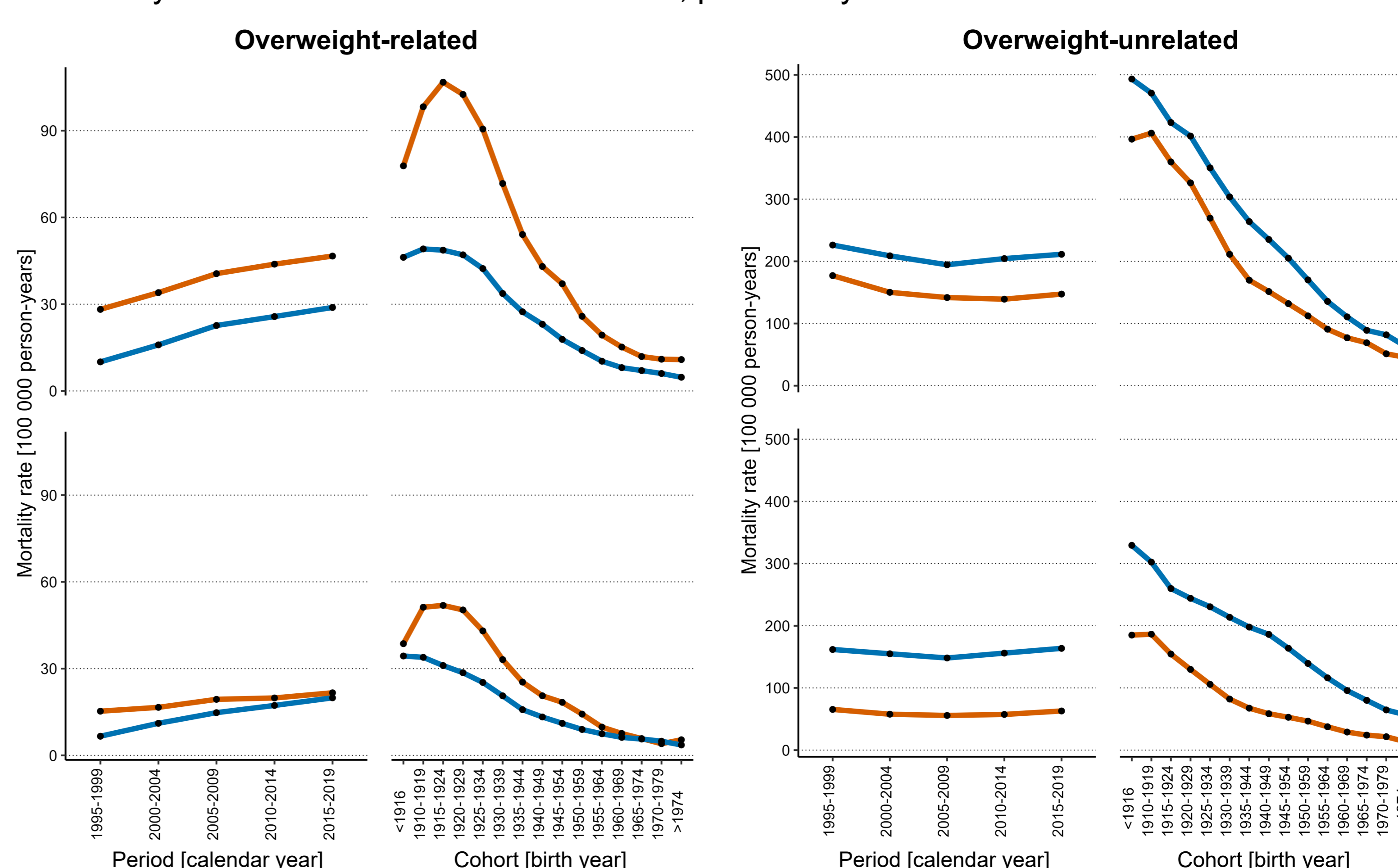


Figure 6. Period-based and cohort-based variations in CVD / Cancer (red/blue) mortality rates for overweight-related (left panel) and overweight-unrelated (right panel) deaths. Age-based variations (not shown) displayed an exponential increase with age, particularly after age 40. Age-period-cohort variations were estimated with the intrinsic estimator in STATA, according to the algorithm described in Masters and Powers, 2020.

## KEY MESSAGES

- Contrary to overweight-unrelated CVD / Cancer mortality rates, overweight-related CVD / Cancer mortality rates have not declined between 1995 and 2019 in Switzerland
- This trend is associated to a steady period-based overweight-related increase of mortality rates for both CVD and Cancer
- Multiple causes of death data are a valuable source of data to track relevant mortality trends

## References

Adair T, Lopez AD. The role of overweight and obesity in adverse cardiovascular disease mortality trends: an analysis of multiple cause of death data from Australia and the USA. *BMC Med.* 2020;18(1):199.

Breger TL, Edwards JK, Cole SR, et al. Estimating a set of mortality risk functions with multiple contributing causes of death. *Epidemiology.* 2020;31(5):704-712.

Masters R, Powers D. Clarifying assumptions in age-period-cohort analyses and validating results. *PLoS One.* 2020;15(10):e0238871.

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