The Lived Experience of COVID-19 Mortality

Quantifying the Relationship between Excess Mortality and Family Bereavement

Mallika Snyder (UCB), Diego Alburez-Gutierrez (MPIDR), Iván Williams (UBA), and Emilio Zagheni (MPIDR)

Presented at the Wittgenstein Centre Conference
November 30, 2020

Background

- In many countries, COVID-19 has been associated with increases in mortality above expected levels
- Most of these excess deaths are concentrated at older ages
- Excess mortality will lead to more individuals experiencing the loss of a relative
  - Verdery et al. (2020) find in the US that every death directly attributable to COVID-19 is associated with nine close kin experiencing bereavement
  - Losing kin is associated with potentially significant impacts on mental and physical health, some long-term (e.g. Raker et al, 2020), as well as on other measures of well-being

The Lived Experience of Mortality

- Our question: how is the experience of these excess deaths distributed from the perspective of those who survive the period, but may experience the loss of relatives?
- Which age groups/sex are most likely to be affected?
- How does this vary by country?
- Understanding the survivor's perspective is vital for better understanding the long-term consequences of the pandemic on individuals and their kin networks

Two Quantities of Interest

1. Probability of losing a relative for those who have one at the start of the period
   - Useful for thinking about the distribution of bereavement
2. The number of relatives lost during a period
   - Useful for thinking about the magnitude of bereavement

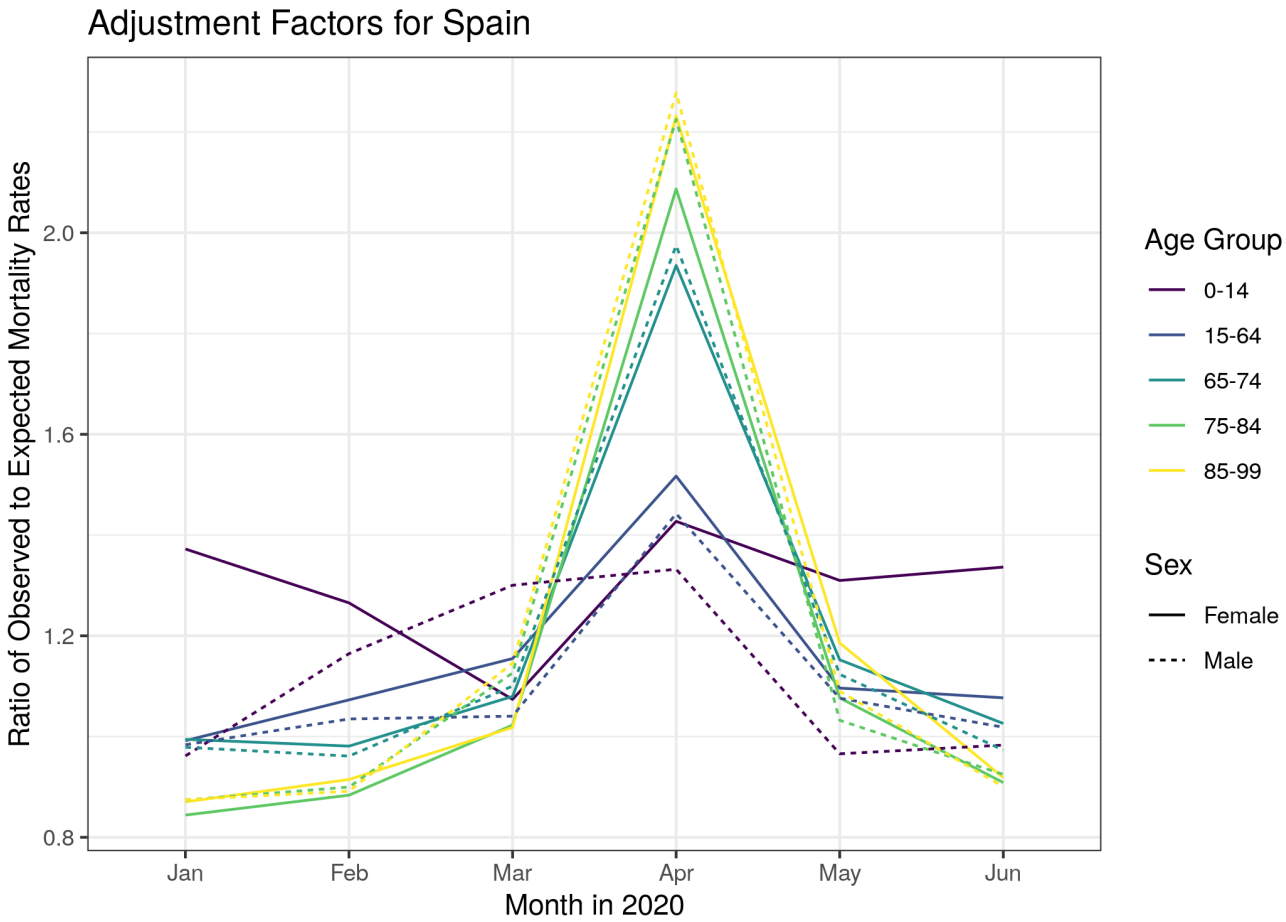
- Both measured compared to a counterfactual scenario without COVID-19 excess mortality
- Measured for the average person who survives the period (referred to as ego)

Methods

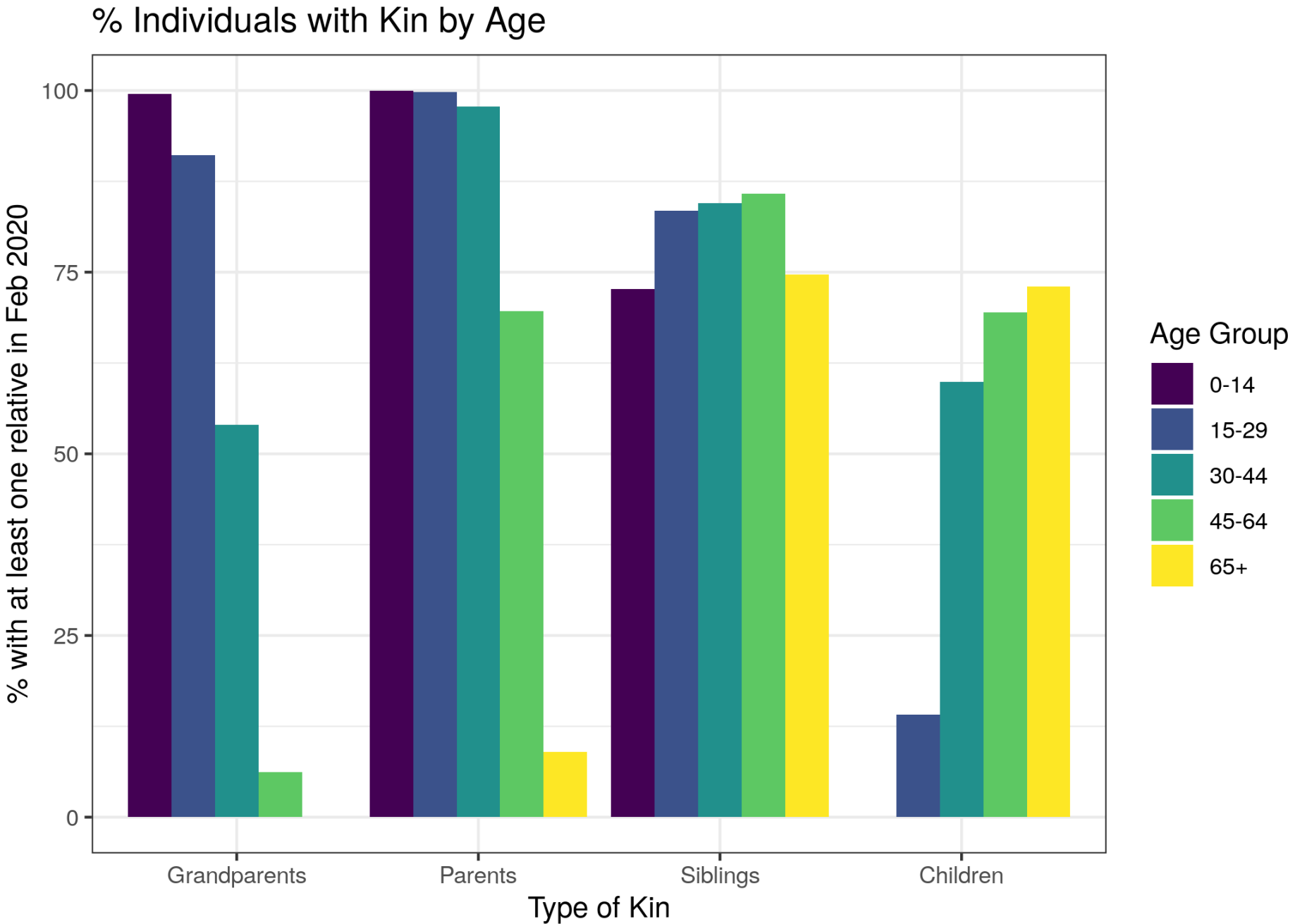
- We use SOCSIM to generate population genealogies for a COVID-19 scenario and a counterfactual scenario
- We run 100 simulations per country and scenario to account for the stochastic nature of these simulation results
- Today I will be reporting results for 16 European countries and the United States
- SOCSIM requires blocks of monthly vital rates:
  - Fertility rates and non-COVID-19 mortality from 5-year UN World Population Prospects 2019 lifetable (medium variants)
  - COVID-19 scenario: adjusted UNWPP rates for March-June 2020 (first wave mortality only)

Excess Mortality

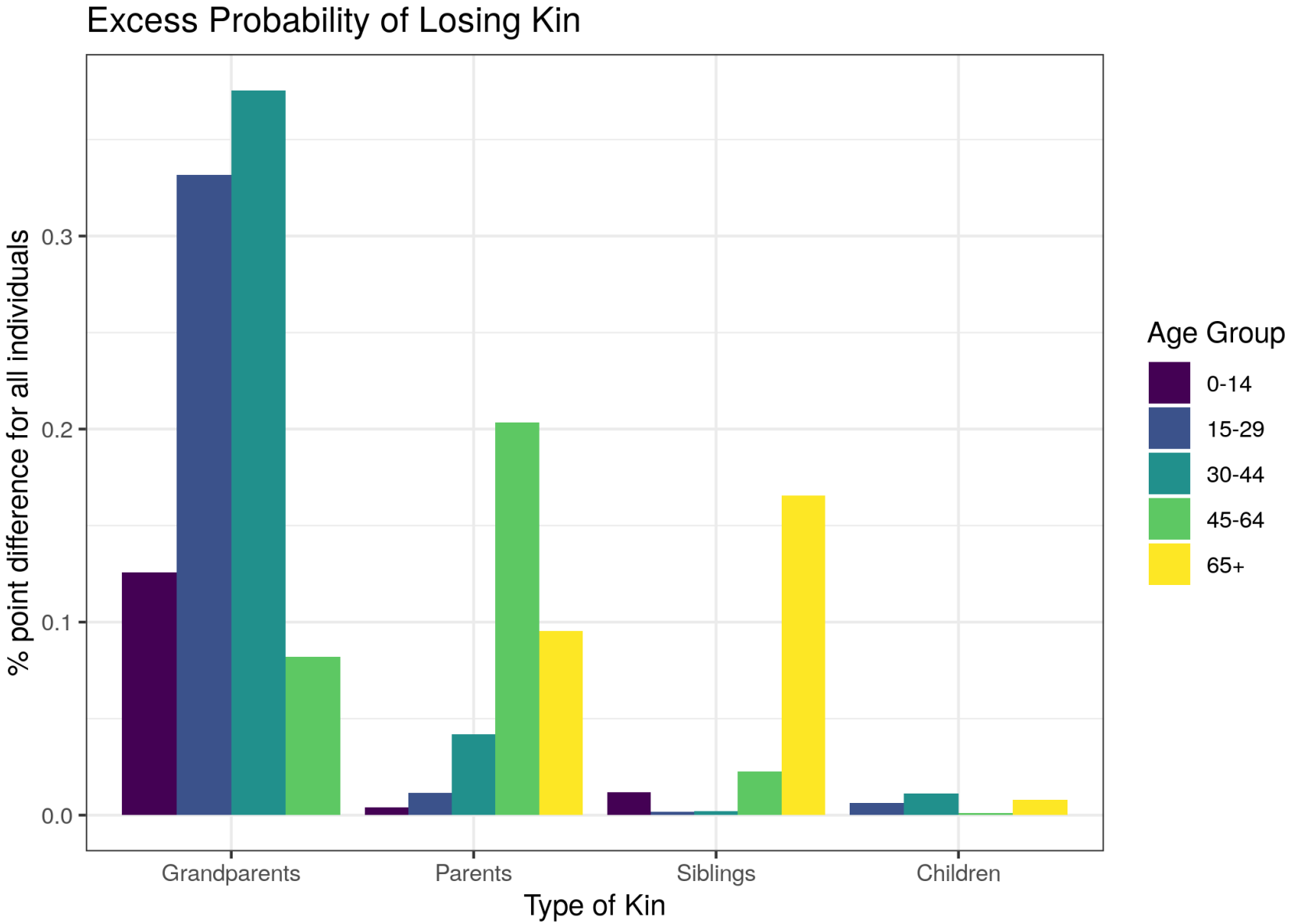
- Adjustment factor: ratios of observed to expected mortality rates calculated from the Human Mortality Database's Short-Term Mortality Fluctuations Dataset
- Currently using a four year average for expected mortality



The Distribution of Kin by Age

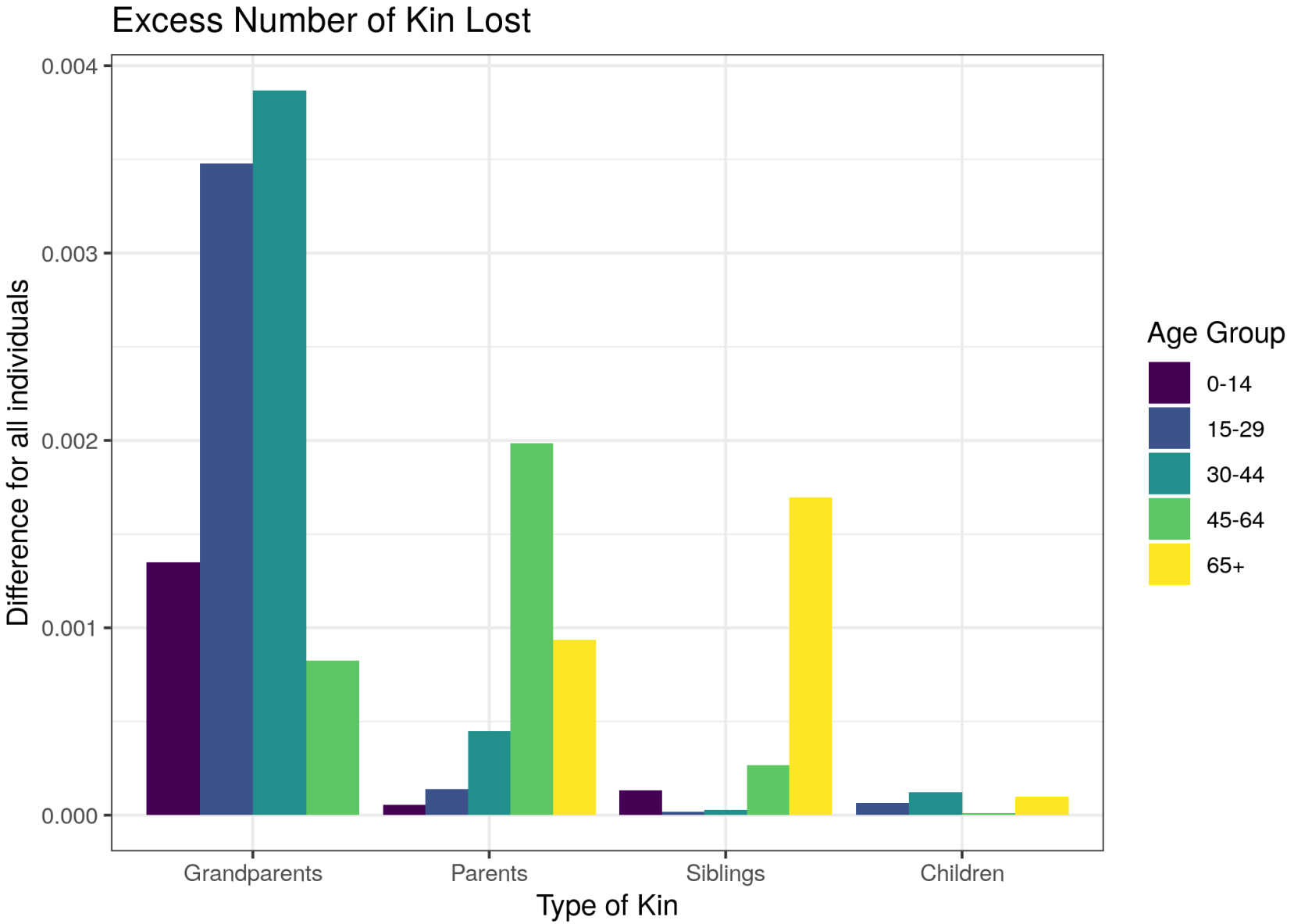


Excess Probability of Loss in the COVID-19 Scenario



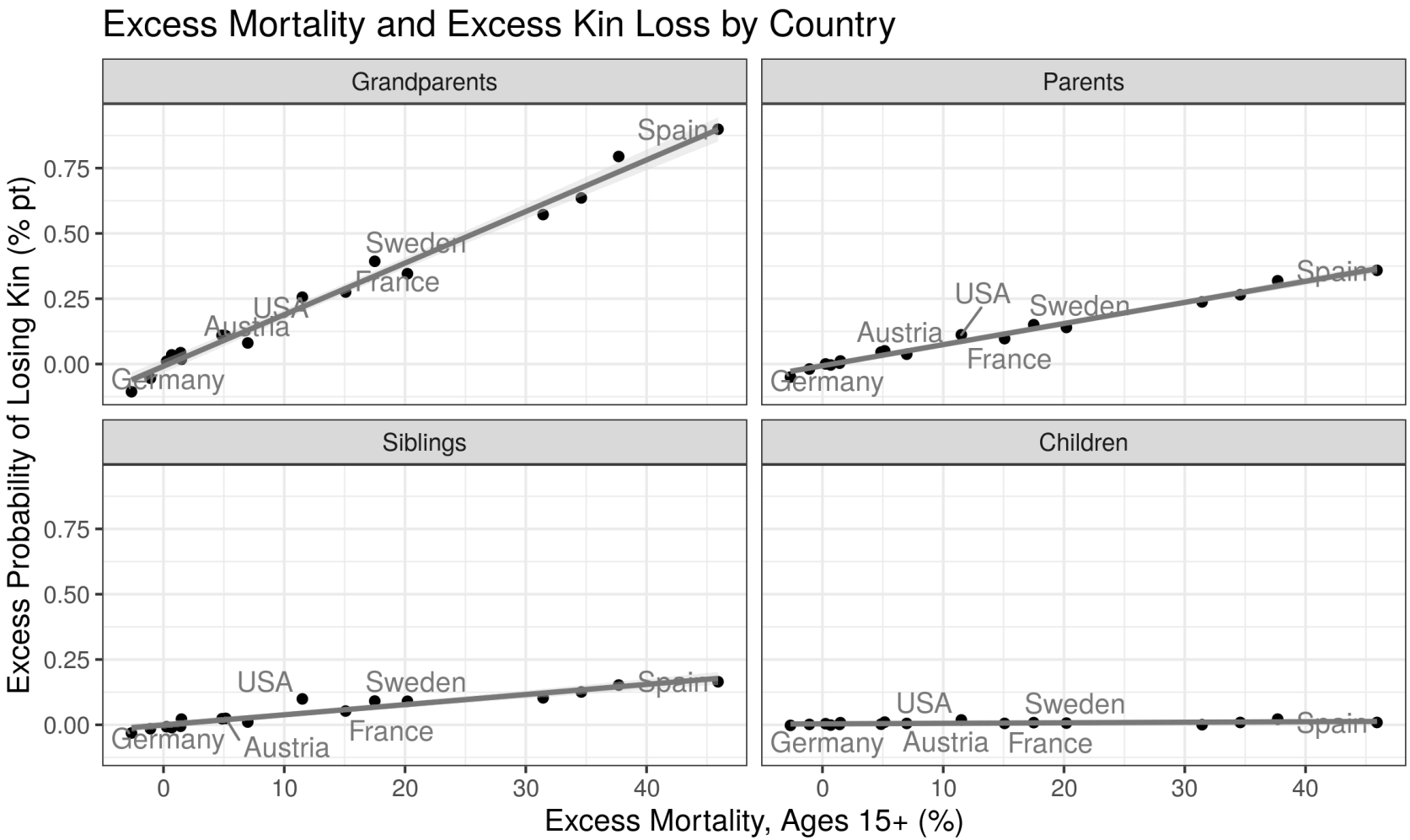
$$\text{Excess Probability of Loss} = (\text{P(Loss)}_{COVID} - \text{P(Loss)}_{Counterfactual}) \times (\%\ \text{with Kin})$$

Excess Number of Kin Lost in the COVID-19 Scenario



$$\text{Excess Kin Loss} = (\text{KinLost}_{COVID} - \text{KinLost}_{Counterfactual}) \times (\% \text{ with Kin})$$

Excess Mortality and Bereavement by Country



$$\text{Excess Mortality} = \frac{\text{Observed Deaths} - \text{Expected Deaths}}{\text{Expected Deaths}}$$

Limitations and Future Work

- Small sample of countries
- Even though COVID-19 cases are often clustered, we assume a uniform distribution of excess mortality across the population
- These results are for survivors, and excess mortality may alter the distribution of who survives
- Going forward, we intend to work on
  - Expanding the list of countries/months/types of kin covered
  - Disentangling the effects of mortality and age structure on bereavement through decomposition modeling
  - Robustness checks using Caswell's matrix approach to the Goodman-Keyfitz-Pullum kinship equations to calculate expected kin under various mortality scenarios, using a different data source (HMD and HFD)

Conclusions

- These results give us a sense of the relationship between excess mortality and the experience of bereavement
- They also provide information on the distribution of such loss
- They also point to the importance of both age structure and excess mortality level in shaping this relationship
- Understanding these effects may help us also consider how excess mortality may affect the experience of bereavement in other countries and contexts, and predict some of the long-term consequences of the pandemic
- Questions/comments/feedback appreciated:
  - Email: mallikasnyder{at}berkeley.edu
  - Twitter: mallika_snyder