Disparities in Coronavirus Disease 2019 Mortality by Country of Birth in Stockholm, Sweden: A Total-Population–Based Cohort Study

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**Web Figure 1.** Distribution of COVID-19 Deaths by Day Between the First Recorded Death in Stockholm County (March 14) and May 4 by Nativity Status.

Footnotes:

a. Single dates with less than 5 deaths are set to 4 to meet the requirements of our data provider.
b. Nativity status defined as being born in Sweden vs. being born in any other country.
c. *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
Web Figure 2. Distribution of COVID-19 Deaths by Age Between the First Recorded Death in Stockholm County (March 14) and May 4 by Nativity Status.

Footnotes:

a. Single dates with less than 5 deaths are set to 4 to meet the requirements of our data provider.
b. Nativity status defined as being born in Sweden vs. being born in any other country.
c. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
Web Figure 3. Proportion of COVID-19 Deaths by Birth Country in Each Age Group in Stockholm County

Footnotes:

a. *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
| Birth Country       | Model 1 RR | Model 2 RR | Excess Risk Explained by Model 2 | Model 3 RR | Excess Risk Explained by Model 3 | Total Excess Risks Explained Across Models |
|---------------------|------------|------------|-------------------------------|------------|-------------------------------|-------------------------------------------|
| **Grouped**         |            |            |                               |            |                               |                                           |
| Other Nordic        | 1.46       | 1.29       | 36%                           | 1.25       | 8%                            | 45%                                       |
| Europe              | 1.03       | 0.94       | 100%                          | 0.91       | -                             | 100%                                      |
| Middle East         | 3.15       | 2.37       | 36%                           | 1.96       | 19%                           | 56%                                       |
| Africa              | 3.04       | 2.40       | 32%                           | 1.70       | 34%                           | 66%                                       |
| Rest of World       | 1.17       | 1.02       | 91%                           | 0.84       | 9%                            | 100%                                      |
| **Detailed**        |            |            |                               |            |                               |                                           |
| Baltic States       | 1.33       | 1.29       | 11%                           | 1.38       | -28%                          | -16%                                      |
| Chile               | 1.68       | 1.40       | 41%                           | 0.97       | 59%                           | 100%                                      |
| Finland             | 1.56       | 1.37       | 34%                           | 1.33       | 6%                            | 40%                                       |
| DACH                | 0.84       | 0.80       | -24%                          | 0.89       | 53%                           | 30%                                       |
| Greece              | 1.58       | 1.26       | 56%                           | 0.88       | 44%                           | 100%                                      |
| Iran                | 2.55       | 2.14       | 26%                           | 1.47       | 43%                           | 70%                                       |
| Iraq                | 2.43       | 1.86       | 40%                           | 1.66       | 13%                           | 54%                                       |
| Lebanon             | 5.92       | 4.48       | 29%                           | 4.03       | 9%                            | 38%                                       |
| Norway              | 1.09       | 1.03       | 69%                           | 0.97       | 31%                           | 100%                                      |
| Poland              | 1.11       | 1.02       | 84%                           | 0.92       | 16%                           | 100%                                      |
| Somalia             | 8.88       | 6.74       | 27%                           | 4.35       | 30%                           | 57%                                       |
| Syria               | 4.70       | 3.49       | 33%                           | 2.94       | 15%                           | 48%                                       |
| Turkey              | 3.05       | 2.35       | 34%                           | 1.99       | 17%                           | 52%                                       |

Footnotes:

Abbreviations: DeSO – Demographic Statistical Areas; RR – relative risk.

a. DACH includes Germany, Austria, and Switzerland; Baltic States include Estonia, Latvia, and Lithuania; Greece also includes Cyprus.
b. Model 1 adjusts for age, sex, and birth country.
c. Model 2 additionally adjusts for education level, being employed, and disposable income.
d. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.
e. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
Web Table 2. Multilevel Poisson Regression Models of COVID-19 Deaths in Stockholm, Sweden, January 31–May 4, 2020, Adjusting for Each Predictor Separately With Corresponding % Change in Relative Risk by Birth Country

| Predictor                          | Model 1: Country of birth only | Model 5: Housing type |
|-----------------------------------|--------------------------------|-----------------------|
| Model 1: Country of birth only    |                                |                       |
| Sweden                            | 1                              | Sweden                |
| Other Nordic                      | 1                              | Other Nordic          |
| Europe                            | 1                              | Europe                |
| Middle East                       | 1                              | Middle East           |
| Africa                            | 1                              | Africa                |
| Rest of World                     | 1                              | Rest of World         |
| Model 2: Disposable income        |                                |                       |
| Sweden                            | 1                              | Other inc. care       |
| Other Nordic                      | 1                              | Missing               |
| Europe                            | 1                              |                      |
| Middle East                       | 1                              | Middle East           |
| Africa                            | 1                              | Africa                |
| Rest of World                     | 1                              | Rest of World         |
| Most                              | 1                              |                      |
| More                              | 1                              |                      |
| Less                              | 1                              |                      |
| Least                             | 1                              |                      |
| Missing                           | 1                              |                      |
| Model 3: Education level          |                                |                       |
| Sweden                            | 1                              | Sweden                |
| Other Nordic                      | 1                              | Other Nordic          |
| Europe                            | 1                              | Europe                |
| Middle East                       | 1                              | Middle East           |
| Africa                            | 1                              | Africa                |
| Rest of World                     | 1                              | Rest of World         |
| Tertiary                          | 1                              |                      |
| Secondary                         | 1                              | Least                 |
| Primary                           | 1                              | Less                  |
| Missing                           | 1                              | Middle               |
| Model 4: Employed                 |                                |                       |
| Sweden                            | 1                              | More                  |
| Other Nordic                      | 1                              | Most                  |
| Europe                            | 1                              |                      |
| Middle East                       | 1                              |                      |
| Africa                            | 1                              |                      |
| Rest of World                     | 1                              |                      |
| Yes                               | 1                              |                      |
| No                                | 1                              |                      |

Footnotes:

Abbreviations: HH – household; RR – relative risk.
RRs significant to $P < 0.01 (***)$, $P < 0.05 (**)$, and $P < 0.10 (*)$.

a. Age and sex are adjusted in all models.

b. *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
### Web Table 3. Multilevel Poisson Regression Models for COVID-19 Deaths in Stockholm, Sweden, January 31–May 4, 2020

| Predictor                      | Model 1 |            |           | Model 2 |            |           | Model 3 |            |           |
|-------------------------------|---------|------------|-----------|---------|------------|-----------|---------|------------|-----------|
|                               | RR      | 95% CI     | P         | RR      | 95% CI     | P         | RR      | 95% CI     | P         |
| **Sex**                       |         |            |           |         |            |           |         |            |           |
| Female                        | 1       |            | 1         | 1       |            | 1         | 1       |            | 1         |
| Male                          | 1.69    | 1.53 ,     | 1.88 ***  | 1.82    | 1.64 ,     | 2.02 ***  | 2.10    | 1.88 ,     | 2.35 ***  |
| Age                           |         |            |           |         |            |           |         |            |           |
| 21-39                         | 1       |            | 1         | 1       |            | 1         | 1       |            | 1         |
| 40-49                         | 3.09    | 1.10 ,     | 8.68 **   | 3.43    | 1.22 ,     | 9.64 **   | 2.94    | 0.99 ,     | 8.77 **   |
| 50-59                         | 16.46   | 7.00 ,     | 38.72 *** | 16.78   | 7.12 ,     | 39.55 *** | 16.51   | 6.99 ,     | 38.98 *** |
| 60-64                         | 40.93   | 17.35 ,    | 96.57 *** | 35.06   | 14.82 ,    | 82.91 *** | 37.26   | 15.75 ,    | 88.15 *** |
| 65-69                         | 89.59   | 38.96 ,    | 206.04 ***| 56.39   | 24.35 ,    | 130.58 ***| 83.56   | 35.84 ,    | 194.83 ***|
| 70-74                         | 167.09  | 73.63 ,    | 379.15 ***| 85.85   | 37.47 ,    | 196.70 ***| 144.16  | 62.37 ,    | 333.21 ***|
| 75-79                         | 452.55  | 201.04 ,   | 1 018.73 ***| 211.80 | 93.06 ,    | 482.03 ***| 358.51 | 155.84 ,   | 824.65 ***|
| 80-84                         | 960.58  | 427.51 ,   | 2 158.33 ***| 414.84 | 182.37 ,   | 943.64 ***| 655.24 | 284.83 ,   | 1 507.39 ***|
| 85+                           | 2 430.04| 1 085.83 , | 5 438.35 ***| 993.07 | 437.84 ,   | 2 252.41 ***| 1 197.74 | 521.72 , | 2 749.72 ***|
| **Country of birth**          |         |            |           |         |            |           |         |            |           |
| Sweden                        | 1       |            | 1         | 1       |            | 1         | 1       |            | 1         |
| Other Nordic                  | 1.46    | 1.21 ,     | 1.75 ***  | 1.29    | 1.07 ,     | 1.55 ***  | 1.25    | 1.03 ,     | 1.52 **   |
| Europe                        | 1.03    | 0.85 ,     | 1.26     | 0.94    | 0.76 ,     | 1.15     | 0.91    | 0.74 ,     | 1.12      |
| Middle East                   | 3.15    | 2.63 ,     | 3.77 ***  | 2.37    | 1.92 ,     | 2.93 ***  | 1.96    | 1.56 ,     | 2.46 ***   |
| Africa                        | 3.04    | 2.17 ,     | 4.28 ***  | 2.40    | 1.68 ,     | 3.41 ***  | 1.70    | 1.17 ,     | 2.47 ***   |
| Rest of the World             | 1.17    | 0.83 ,     | 1.66     | 1.02    | 0.71 ,     | 1.45     | 0.84    | 0.58 ,     | 1.22      |
| **Education level**           |         |            |           |         |            |           |         |            |           |
| Post-secondary                |         |            |           |         |            |           |         |            |           |
| Secondary                     | 1.29    | 1.12 ,     | 1.48 ***  | 1.26    | 1.09 ,     | 1.46 ***  |
| Primary                       | 1.32    | 1.14 ,     | 1.53 ***  | 1.24    | 1.06 ,     | 1.45 ***  |
| Missing                       | 1.39    | 1.06 ,     | 1.82 **   | 1.21    | 0.91 ,     | 1.61      |
| **Disposable Income**         |         |            |           |         |            |           |         |            |           |
| Q4, Most                      | 1       |            | 1         | 1       |            | 1         | 1       |            | 1         |
| Q3, More                      | 0.83    | 0.63 ,     | 1.09     | 1.03    | 0.77 ,     | 1.37      |
| Q2, Less                      | 1.21    | 0.97 ,     | 1.50 *    | 1.35    | 1.07 ,     | 1.71 ***  |
| Q1, Least                     | 1.33    | 1.06 ,     | 1.66 ***  | 1.49    | 1.18 ,     | 1.90 ***  |
| Missing                       | 0.32    | 0.04 ,     | 2.34     | 0.42    | 0.06 ,     | 3.21      |
### Employed

| Yes | | 1 | 2.67 | 2.15 | 3.32 ** | 2.27 | 1.81 | 2.84 *** |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| No  | | 2.67 | 2.15 | 3.32 ** | 2.27 | 1.81 | 2.84 *** |

### Housing type

| House or apartment | 1 | |   |   |   |   |
| Special housing incl. care | 5.93 | 5.07 | 6.94 *** |
| Missing | 0.86 | 0.71 | 1.03 |

### No. working age in HH

| 0 | | 1 | |   |   |   |
| 1-2 | | 1.61 | 1.36 | 1.90 *** |
| 3+ | | 2.32 | 1.72 | 3.12 *** |

### Population density (DeSO)

| Q1, Least | 1 | | | | | |
| Q2, Less | 1.10 | 0.87 | 1.38 |
| Q3, Middle | 1.28 | 1.02 | 1.61 ** |
| Q4, More | 1.67 | 1.31 | 2.11 *** |
| Q5, Most | 1.59 | 1.24 | 2.04 *** |

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**Footnotes:**

Abbreviations: CI – confidence interval; DeSO – Demographic Statistical Areas; HH – household; incl. – including; no. – number; RR – relative risk.

RRs significant to $P < 0.01$ (***) , $P < 0.05$ (**), and $P < 0.10$ (*).

- **a.** The relative risks reported in this table are displayed in manuscript Figure 1.
- **b.** Model 1 adjusts for age, sex, and birth country.
- **c.** Model 2 additionally adjusts for education level, being employed, and disposable income.
- **d.** Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.

- **e.** *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
## Web Table 4. Multilevel Poisson Regression Models for Deaths From All Other Causes in Stockholm, Sweden, January 31–May 4, 2020

| Predictor                  | Model 1 | Model 2 | Model 3 |
|----------------------------|---------|---------|---------|
|                            | RR  | 95% CI | P      | RR  | 95% CI | P      | RR  | 95% CI | P      |
| **Sex**                    |      |        |       |      |        |       |      |        |       |
| Female                     | 1   |        |       | 1   |        |       | 1   |        |       |
| Male                       | 1.40| 1.32   | 1.49***| 1.50| 1.41   | 1.59***| 1.62| 1.52   | 1.73***|
| **Age**                    |      |        |       |      |        |       |      |        |       |
| 21-39                      | 1   |        |       | 1   |        |       | 1   |        |       |
| 40-49                      | 1.70| 1.26   | 2.29***| 1.95| 1.44   | 2.64***| 1.96| 1.43   | 2.68***|
| 50-59                      | 5.13| 4.02   | 6.53***| 5.46| 4.27   | 6.96***| 5.83| 4.54   | 7.48***|
| 60-64                      | 11.43| 8.92| 14.64***| 10.42| 8.12   | 13.38***| 10.87| 8.42   | 14.04***|
| 65-69                      | 18.77| 14.85| 23.73***| 13.02| 10.23  | 16.57***| 15.38| 11.90  | 19.87***|
| 70-74                      | 32.62| 26.15| 40.69***| 18.68| 14.83  | 23.54***| 23.03| 17.91  | 29.62***|
| 75-79                      | 55.27| 44.42| 68.77***| 28.94| 22.99  | 36.43***| 35.02| 27.19  | 45.11***|
| 80-84                      | 110.97| 89.39| 137.77***| 53.81| 42.78  | 67.70***| 63.87| 48.35  | 80.22***|
| 85+                        | 331.60| 269.33| 408.26***| 151.28| 121.04| 189.09***| 143.36| 111.88| 183.70***|
| **Country of birth**       |      |        |       |      |        |       |      |        |       |
| Sweden                     | 1   |        |       | 1   |        |       | 1   |        |       |
| Other Nordic               | 1.14| 1.02   | 1.28** | 1.00| 0.89   | 1.12   | 0.96| 0.85   | 1.08   |
| Europe                     | 0.89| 0.79   | 1.00** | 0.79| 0.70   | 0.89***| 0.80| 0.70   | 0.90***|
| Middle East                | 0.92| 0.78   | 1.09   | 0.66| 0.55   | 0.78***| 0.66| 0.55   | 0.79***|
| Africa                     | 0.92| 0.68   | 1.24   | 0.69| 0.51   | 0.93***| 0.65| 0.48   | 0.89***|
| Rest of the World          | 0.71| 0.57   | 0.89***| 0.59| 0.47   | 0.74***| 0.60| 0.48   | 0.76***|
| **Education level**        |      |        |       |      |        |       |      |        |       |
| Post-secondary             |      |        |       |      |        |       |      |        |       |
| Secondary                  | 1.23| 1.13   | 1.33***| 1.18| 1.09   | 1.28***|
| Primary                    | 1.45| 1.33   | 1.59***| 1.35| 1.24   | 1.48***|
| Missing                    | 1.41| 1.16   | 1.71***| 1.34| 1.10   | 1.63***|
| **Disposable Income**      |      |        |       |      |        |       |      |        |       |
| Q4, Most                   |      |        |       |      |        |       |      |        |       |
| Q3, More                   | 1.26| 1.09   | 1.45***| 1.37| 1.18   | 1.58***|
| Q2, Less                   | 1.40| 1.23   | 1.58***| 1.49| 1.31   | 1.70***|
| Q1, Least                  | 1.66| 1.46   | 1.88***| 1.76| 1.54   | 2.01***|
| Missing                    | 0.19| 0.05   | 0.76** | 0.24| 0.06   | 0.91** |
| Employed | Yes | 1 | 1.96 | 2.45 *** | 1.73 | 2.18 *** |
|----------|-----|---|------|---------|------|---------|
| No       | 2.19 | 1.96 | 2.45 *** | 1.94 | 1.73 | 2.18 *** |

| Housing type | | | | | | |
|--------------|---|---|---|---|---|---|
| House or apartment | 1 | | | | | |
| Special housing incl. care | 3.75 | 3.42 | 4.11 *** | | | |
| Missing | 0.86 | 0.78 | 0.94 *** | | | |

| No. working age in HH | | | | | | |
|----------------------|---|---|---|---|---|---|
| 0                    | 1 | | | | | |
| 1-2                  | 1.17 | 1.05 | 1.31 *** | | | |
| 3+                   | 1.09 | 0.90 | 1.32 | | | |

| Population density (DeSO) | | | | | | |
|---------------------------|---|---|---|---|---|---|
| Q1, Least                 | 1 | | | | | |
| Q2, Less                  | 1.01 | 0.91 | 1.12 | | | |
| Q3, Middle                | 1.05 | 0.94 | 1.17 | | | |
| Q4, More                  | 1.09 | 0.97 | 1.22 | | | |
| Q5, Most                  | 1.03 | 0.91 | 1.17 | | | |

Footnotes:

Abbreviations: CI – confidence interval; DeSO – Demographic Statistical Areas; HH – household; incl. – including; no. – number; RR – relative risk.

RRs significant to $P < 0.01$ (***) , $P < 0.05$ (**), and $P < 0.10$ (*).

a. The relative risks reported in this table are displayed in manuscript Figure 1.
b. Model 1 adjusts for age, sex, and birth country.
c. Model 2 additionally adjusts for education level, being employed, and disposable income.
d. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.
e. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
### Web Table 5. Number of Deaths From COVID-19 and All Other Causes, Population Sizes, and Time-at-Risk for Detailed Birth Country in Stockholm, Sweden, January 31–May 4, 2020

| Birth Country | COVID-19 Deaths | All-Cause Deaths Minus COVID-19 |
|---------------|-----------------|---------------------------------|
|               | Deaths          | Population | Years at Risk | Deaths | Population | Years at Risk |
| Baltic States | 14              | 12 540     | 3 189         | 22     | 12 540     | 3 189         |
| Chile         | 12              | 13 842     | 3 521         | 23     | 13 842     | 3 521         |
| Finland       | 111             | 47 079     | 11 945        | 278    | 47 079     | 11 945        |
| DACH          | 23              | 14 565     | 3 697         | 76     | 14 565     | 3 697         |
| Greece        | 11              | 8 737      | 2 222         | 14     | 8 737      | 2 222         |
| Iraq          | 29              | 41 054     | 10 446        | 44     | 41 054     | 10 446        |
| Lebanon       | 13              | 6 289      | 1 600         | 7      | 6 289      | 1 600         |
| Norway        | 11              | 6 251      | 1 588         | 28     | 6 251      | 1 588         |
| Poland        | 12              | 32 436     | 8 253         | 38     | 32 436     | 8 253         |
| Somalia       | 19              | 10 522     | 2 676         | 12     | 10 522     | 2 676         |
| Sweden        | 1 016           | 1 232 511  | 313 336       | 3 313  | 1 232 511  | 313 336       |
| Syria         | 34              | 24 349     | 6 194         | 32     | 24 349     | 6 194         |
| Turkey        | 31              | 22 915     | 5 828         | 33     | 22 915     | 5 828         |

**Footnotes:**

a. We only show the countries of origin that recorded at least 10 covid-19 deaths between 31 Jan and 4 May 2020.

b. DACH includes Germany, Austria, and Switzerland; Baltic States include Estonia, Latvia, and Lithuania; Greece also includes Cyprus.

c. *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
### Web Table 6. Multilevel Poisson Regression Models for COVID-19 Deaths in Stockholm, Sweden, January 31–May 4, 2020, According to Detailed Birth Country

| Birth Country | Model 1 |  | Model 2 |  | Model 3 |  |
|---------------|---------|---|---------|---|---------|---|
|               | RR      | 95% CI | P     | RR      | 95% CI | P     | RR      | 95% CI | P     |
| Sweden        | 1.33    | 0.78, 2.26 | 1.29 | 0.76, 2.19 | 1.38 | 0.80, 2.39 |
| Baltic States | 1.68    | 0.95, 2.97 | *   | 1.40 | 0.79, 2.48 | 0.97 | 0.50, 1.86 |
| Finland       | 1.56    | 1.28, 1.89 | *** | 1.37 | 1.12, 1.67 | *** | 1.33 | 1.08, 1.65 |
| DACH          | 0.84    | 0.56, 1.27 | 0.80 | 0.53, 1.22 | 0.89 | 0.57, 1.38 |
| Greece        | 1.58    | 0.87, 2.87 | 1.26 | 0.69, 2.29 | 0.88 | 0.46, 1.72 |
| Iran          | 2.55    | 1.74, 3.74 | *** | 2.14 | 1.45, 3.17 | *** | 1.47 | 0.92, 2.34 |
| Iraq          | 2.43    | 1.68, 3.52 | *** | 1.86 | 1.25, 2.77 | *** | 1.66 | 1.09, 2.54 |
| Lebanon       | 5.92    | 3.42, 10.24 | *** | 4.48 | 2.58, 7.80 | *** | 4.03 | 2.24, 7.25 |
| Norway        | 1.09    | 0.60, 1.97 | 1.03 | 0.57, 1.86 | 0.97 | 0.50, 1.85 |
| Poland        | 1.11    | 0.63, 1.96 | 1.02 | 0.57, 1.80 | 0.92 | 0.51, 1.68 |
| Somalia       | 8.88    | 5.63, 13.99 | *** | 6.74 | 4.14, 10.94 | *** | 4.35 | 2.51, 7.52 |
| Syria         | 4.70    | 3.34, 6.62 | *** | 3.49 | 2.42, 5.03 | *** | 2.94 | 1.97, 4.39 |
| Turkey        | 3.05    | 2.14, 4.37 | *** | 2.35 | 1.62, 3.40 | *** | 1.99 | 1.33, 2.98 |

**Footnotes:**

Abbreviations: CI – confidence interval; RR – relative risk.
RRs significant to $P < 0.01 (***)$, $P < 0.05 (**)$, and $P < 0.10 (*)$.

a. The relative risks reported in this table are displayed in manuscript Figure 2.
b. We only show the countries of origin that recorded at least 10 covid-19 deaths between 31 Jan and 4 May 2020.
c. DACH includes Germany, Austria, and Switzerland; Baltic States include Estonia, Latvia, and Lithuania; Greece also includes Cyprus.
d. Model 1 adjusts for age, sex, and birth country.
e. Model 2 additionally adjusts for education level, being employed, and disposable income.
f. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeS0 level.
g. We do not show the specific RRs for the other predictors in this table because the values are similar to those shown in the online Web Table 1.
h. *Source:* Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
### Web Table 7. Multilevel Poisson Regression Models for Deaths From all Other Causes (Minus COVID-19) in Stockholm, Sweden, January 31–May 4, 2020, According to Detailed Birth Country

| Birth Country   | Model 1 RR | 95% CI  | P | Model 2 RR | 95% CI  | P | Model 3 RR | 95% CI  | P |
|-----------------|------------|---------|---|------------|---------|---|------------|---------|---|
| Sweden          | 1          |         |   | 1          |         |   | 1          |         |   |
| Baltic States   | 0.68       | 0.45    , 1.04 *| 0.65 | 0.43    , 0.99 **| 0.69 | 0.45    , 1.06 *|
| Chile           | 0.88       | 0.58    , 1.32 | 0.69 | 0.46    , 1.04 *| 0.67 | 0.44    , 1.02 *|
| Finland         | 1.21       | 1.07    , 1.37 ***| 1.04 | 0.92    , 1.18 | 1.00 | 0.88    , 1.14 |
| Germanic States | 0.93       | 0.74    , 1.17 | 0.90 | 0.72    , 1.13 | 0.96 | 0.76    , 1.22 |
| Greece & Cyprus | 0.62       | 0.37    , 1.05 *| 0.46 | 0.27    , 0.77 ***| 0.48 | 0.28    , 0.81 ***|
| Iran            | 0.79       | 0.56    , 1.13 | 0.64 | 0.45    , 0.90 ***| 0.61 | 0.42    , 0.88 ***|
| Iraq            | 0.96       | 0.71    , 1.30 | 0.67 | 0.49    , 0.91 ***| 0.67 | 0.48    , 0.92 ***|
| Lebanon         | 0.84       | 0.40    , 1.77 | 0.58 | 0.27    , 1.22 | 0.61 | 0.29    , 1.30 |
| Norway          | 0.89       | 0.61    , 1.29 | 0.84 | 0.58    , 1.21 | 0.81 | 0.55    , 1.20 |
| Poland          | 0.91       | 0.66    , 1.26 | 0.80 | 0.58    , 1.10 | 0.77 | 0.55    , 1.08 |
| Somalia         | 1.39       | 0.79    , 2.45 | 0.93 | 0.52    , 1.65 | 0.99 | 0.55    , 1.77 |
| Syria           | 1.17       | 0.83    , 1.66 | 0.77 | 0.54    , 1.10 | 0.77 | 0.53    , 1.10 |
| Turkey          | 0.90       | 0.64    , 1.27 | 0.62 | 0.44    , 0.87 ***| 0.65 | 0.45    , 0.92 **|

**Footnotes:**

- Abbreviations: CI – confidence interval; RR – relative risk.
- RRs significant to \( P < 0.01 (***)\), \( P < 0.05 (**\), and \( P < 0.10 (*)\).

a. The relative risks reported in this table are displayed in manuscript Figure 2.

b. We only show the countries of origin that recorded at least 10 covid-19 deaths between 31 Jan and 4 May 2020.

c. DACH includes Germany, Austria, and Switzerland; Baltic States include Estonia, Latvia, and Lithuania; Greece also includes Cyprus.

d. Model 1 adjusts for age, sex, and birth country.

e. Model 2 additionally adjusts for education level, being employed, and disposable income.

f. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.

g. We do not show the specific RRs for the other predictors in this table because the values are similar to those shown in the online Web Table 2.

h. **Source:** Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
## Web Table 8. Multilevel Poisson Regression Models for COVID-19 Deaths in all of Sweden, January 31–May 4, 2020, Including a Region of Residence by Birth Country Interaction Term

| Region of Residence by Birth Country | Model 1  | P  | Model 2  | P  | Model 3  | P  |
|-------------------------------------|---------|----|----------|----|----------|----|
|                                     | RR      | 95% CI | RR      | 95% CI | RR      | 95% CI |
| Stockholm                           |         |       |          |      |          |    |
| Sweden                              | 1       |       | 1        |       | 1        |    |
| Other Nordic                        | 1.46    | 1.21 | 1.75 *** | 1.29 | 1.08     | 1.55 *** | 1.27 | 1.05 | 1.54 *** |
| Europe                              | 1.04    | 0.85 | 1.26     | 0.96 | 0.78     | 1.17 | 0.96 | 0.78 | 1.18 |
| Middle East                         | 3.13    | 2.61 | 3.75 *** | 2.35 | 1.93     | 2.88 *** | 2.10 | 1.71 | 2.59 *** |
| Africa                              | 3.00    | 2.14 | 4.21 *** | 2.41 | 1.70     | 3.41 *** | 1.96 | 1.37 | 2.80 *** |
| Rest of the World                   | 1.16    | 0.82 | 1.64     | 1.06 | 0.75     | 1.50 | 0.91 | 0.63 | 1.31 |
| Rest of Sweden                      |         |       |          |      |          |    |
| Sweden                              | 1       |       | 1        |       | 1        |    |
| Other Nordic                        | 1.29    | 1.02 | 1.63 **  | 1.19 | 0.94     | 1.51 | 1.10 | 0.86 | 1.42 |
| Europe                              | 1.20    | 0.93 | 1.54     | 1.12 | 0.87     | 1.44 | 1.07 | 0.82 | 1.39 |
| Middle East                         | 3.75    | 2.79 | 5.02 *** | 2.85 | 2.10     | 3.87 *** | 2.58 | 1.89 | 3.53 *** |
| Africa                              | 8.46    | 5.63 | 12.70 *** | 6.72 | 4.44     | 10.18 *** | 5.58 | 3.64 | 8.56 *** |
| Rest of the World                   | 1.52    | 0.90 | 2.58     | 1.43 | 0.84     | 2.43 | 1.31 | 0.75 | 2.27 |

**Footnotes:**

Abbreviations: CI – confidence interval; RR – relative risk.
RRs significant to $P < 0.01 (***)$, $P < 0.05 (**)$, and $P < 0.10 (*)$.

- a. Model 1 adjusts for age, sex, and birth country.
- b. Model 2 additionally adjusts for education level, being employed, and disposable income.
- c. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.
- d. We do not show the specific RRs for the other predictors in this table because they are similar to those shown in Web Table 1.
- e. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
**Web Table 9.** Multilevel Poisson Regression Models for COVID-19 Deaths in Stockholm, Sweden, January 31–May 4, 2020, Including a sex by Birth Country Interaction Term

| Sex by Birth Country | Model 1 | Model 2 | Model 3 |
|---------------------|---------|---------|---------|
|                      | RR      | 95% CI  | P       | RR      | 95% CI  | P       | RR      | 95% CI  | P       |
| Women               |         |         |         |         |         |         |         |         |         |
| Sweden              | 1       |         |         | 1       |         |         | 1       |         |         |
| Other Nordic        | 1.37    | 1.08 ,  | 1.75 ***| 1.26    | 0.99 ,  | 1.61 *  | 1.28    | 0.99 ,  | 1.65 *  |
| Europe              | 0.85    | 0.62 ,  | 1.16    | 0.80    | 0.58 ,  | 1.10    | 0.79    | 0.57 ,  | 1.10    |
| Middle East         | 2.71    | 2.04 ,  | 3.61 ***| 2.04    | 1.49 ,  | 2.79 ***| 1.75    | 1.24 ,  | 2.47 ***|
| Africa              | 2.10    | 1.09 ,  | 4.07 ** | 1.64    | 0.83 ,  | 3.22    | 1.39    | 0.69 ,  | 2.78    |
| Rest of the World   | 0.91    | 0.51 ,  | 1.61    | 0.83    | 0.47 ,  | 1.49    | 0.66    | 0.35 ,  | 1.25    |
| Men                 |         |         |         |         |         |         |         |         |         |
| Sweden              | 1       |         |         | 1       |         |         | 1       |         |         |
| Other Nordic        | 1.55    | 1.17 ,  | 2.04 ***| 1.32    | 1.00 ,  | 1.74 *  | 1.20    | 0.89 ,  | 1.61    |
| Europe              | 1.21    | 0.93 ,  | 1.57    | 1.09    | 0.84 ,  | 1.42    | 1.00    | 0.77 ,  | 1.31    |
| Middle East         | 3.53    | 2.79 ,  | 4.45 ***| 2.63    | 2.03 ,  | 3.40 ***| 2.08    | 1.59 ,  | 2.72 ***|
| Africa              | 3.66    | 2.46 ,  | 5.45 ***| 2.95    | 1.97 ,  | 4.42 ***| 1.91    | 1.25 ,  | 2.91 ***|
| Rest of the World   | 1.41    | 0.91 ,  | 2.18    | 1.25    | 0.80 ,  | 1.94    | 0.98    | 0.63 ,  | 1.54    |

Footnotes:

Abbreviations: CI – confidence interval; RR – relative risk. RRs significant to $P < 0.01$ (**), $P < 0.05$ (**), and $P < 0.10$ (*).

a. Model 1 adjusts for age, sex, and birth country.
b. Model 2 additionally adjusts for education level, being employed, and disposable income.
c. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.
d. We do not show the specific RRs for the other predictors because the values are similar to those shown in Web Table 1.
e. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.
Web Table 10. Multilevel Poisson Regression Models for COVID-19 Deaths in Stockholm, Sweden, January 31–May 4, 2020, Stratified by Ages 65 and Under and 66 and Over

| Age by Birth Country | Model 1 | Model 2 | Model 3 |
|----------------------|---------|---------|---------|
|                      |  RR     | 95% CI  |  P      |  RR     | 95% CI  |  P      |  RR     | 95% CI  |  P      |
| 65 and under         |         |         |         |         |         |         |         |         |         |
| Sweden               | 1       |         |         | 1       |         |         | 1       |         |         |
| Other Nordic         | 2.43    | 1.03    | 5.72 ** | 1.77    | 0.75    | 4.17    | 2.07    | 0.87    | 4.92    |
| Europe               | 1.55    | 0.73    | 3.30    | 0.88    | 0.40    | 1.95    | 0.99    | 0.44    | 2.23    |
| Middle East          | 3.37    | 1.97    | 5.76 *** | 1.86    | 1.06    | 3.28 ** | 1.91    | 1.06    | 3.46 ** |
| Africa               | 5.43    | 2.87    | 10.29 *** | 3.05    | 1.58    | 5.89 *** | 2.71    | 1.33    | 5.53 *** |
| Rest of the World    | 1.85    | 0.84    | 4.12    | 1.20    | 0.53    | 2.72    | 1.23    | 0.53    | 2.85    |
| 66 and over          |         |         |         |         |         |         |         |         |         |
| Sweden               | 1       |         |         | 1       |         |         | 1       |         |         |
| Other Nordic         | 1.42    | 1.18    | 1.71 *** | 1.28    | 1.06    | 1.54 *** | 1.22    | 1.00    | 1.49 ** |
| Europe               | 1.01    | 0.82    | 1.24    | 0.94    | 0.76    | 1.16    | 0.91    | 0.73    | 1.12    |
| Middle East          | 3.16    | 2.60    | 3.83 *** | 2.53    | 2.02    | 3.18 *** | 2.01    | 1.57    | 2.58 *** |
| Africa               | 2.55    | 1.68    | 3.85 *** | 2.13    | 1.39    | 3.27 *** | 1.54    | 0.99    | 2.40 *  |
| Rest of the World    | 1.09    | 0.74    | 1.61    | 0.98    | 0.66    | 1.46    | 0.79    | 0.52    | 1.20    |

Footnotes:

Abbreviations: CI – confidence interval; DeSO – Demographic Statistical Areas; RR – relative risk. RRs significant to $P < 0.01$ (**), $P < 0.05$ (**), and $P < 0.10$ (*).

a. Model 1 adjusts for age, sex, and birth country.
b. Model 2 additionally adjusts for education level, being employed, and disposable income.
c. Model 3 further adjusts for housing type, number of working age individuals in household, and population density at the DeSO level.
d. Source: Authors’ calculations were based upon Swedish registers from the “Ageing Well” project.