Differences in outcome: The role of structural factors in COVID-19 mortality in care homes in Germany

Webinar:
Taking stock of COVID-19 and the long-term care sector in Germany
Mon, 5 Jul 2021

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SOCIUM
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Outline

I. Covid-19 in Germany: An overview
II. Excess Mortality in Germany
III. Covid-19-related mortality among nursing homes
IV. Explaining differences in mortality between nursing homes
I. Overview: Covid-19 in Germany

New Cases and deaths per day
- 7 days average -

Source: RKI, daily reports
I. Overview: Covid-19 in Germany

New cases per week according to age bands

Source: RKI 2021
I. Overview: Covid-19 in Germany

New cases per week according to age bands

Source: RKI 2021
II. Excess mortality

Source: EuroMomo
II. Excess mortality: Z-Score

Source: EuroMomo
III.1 Excess mortality among German nursing homes: 1st wave

Mortality among nursing home residents and in the whole population in 2020 in comparison to the median value of the years 2016-2019

Source: WIdO 2021, own translation
III.1 Excess mortality among German nursing homes: 1st wave

Mortality among nursing home residents and in the whole population in 2020 in comparison to the median value of the years 2016-2019

Source: WIdO 2021, own translation
III.2 NH residents as % of all Covid-19 related deaths

• 1\textsuperscript{st} wave:
  – According to an online Survey of LTC providers of home care (n=824) from 28th April until 12th March, about half of all deaths with Covid-19 have been nursing home residents.
  – Robert-Koch-Institute (RKI) data suffer from a high number of unclassified cases. Among those classified more than half of all deaths with Covid-19 have been nursing home residents.

• 2\textsuperscript{nd} wave:
  – According to RKI data the 2\textsuperscript{nd} wave

• 3\textsuperscript{rd} wave:
  – RKI data underestimate the share of nursing home residents.
  – As the share of those aged 80+ among newly infected is low, the share of home residents among deaths with Covid-19 can also expected to be comparatively low.
III.2 NH residents as % of all Covid-19 related deaths

Share of nursing home residents of all deaths related to Covid-19

Source: RKI, daily reports

Anm.: Ab dem 16.11.2020 ist die Berechnung von Schätzwert und Obergrenze nicht möglich, da der Anteil der fehlenden Angaben unbekannt ist. Zuletzt (15.11.2020) lag diese Quote der unklassierten Daten bei 58 %.
IV. Explaining differences in outcomes

- During the first wave the majority of nursing homes had no case of Sars-CoV-2 at all.
- The exposition to the virus was the major determinant of outcomes (deaths, cases) of the respective nursing home.
IV. Explaining differences in outcomes

Figure 1: Correlation between spread of the virus in the population and the probability of an outbreak

Source: unpublished own calculations, based on data from online survey (Rothgang et al. 2020)
IV. Explaining differences in outcomes

Figure 1: correlation between spread of the virus in the population and the intensity of an outbreak

Source: unpublished own calculations, based on data from online survey (Rothgang et al. 2020)
IV. Explaining differences in outcomes

• During the first wave the majority of nursing homes had no case of Sars-CoV-2 at all.

• The exposition to the virus was the major determinant of outcomes (deaths, cases) of the respective nursing home.

• Apart from this
  – the number of beds and
  – the staff ratio (nurses per 100 residents)

have an influence. Alas, the explanatory power of these factors is not very high
### IV. Explaining differences in outcomes

**Table 1: Binomial logistic regression models**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 (characteristics only)</th>
<th>Model 2 (control spread)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>p</td>
</tr>
<tr>
<td><strong>Outbreak among residents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ownership (non-profit)</td>
<td>2.076</td>
<td>.012</td>
</tr>
<tr>
<td>Number of beds</td>
<td>1.009</td>
<td>.001</td>
</tr>
<tr>
<td>Nurses per 100 resident ratio</td>
<td>1.019</td>
<td>.007</td>
</tr>
<tr>
<td>Spread of the virus</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Short term care offer</td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Outbreak among staff</strong></td>
<td></td>
<td></td>
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<tr>
<td>Ownership (non-profit)</td>
<td>1.814</td>
<td>.012</td>
</tr>
<tr>
<td>Number of beds</td>
<td>1.007</td>
<td>.002</td>
</tr>
<tr>
<td>Nurses per resident ratio</td>
<td>1.020</td>
<td>.001</td>
</tr>
<tr>
<td>Spread of the virus</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: unpublished own calculations, based on data from online survey (Rothgang et al. 2020)
### Table 1: Multiple linear regression models

<table>
<thead>
<tr>
<th>dependent variable</th>
<th>independent variable</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>r²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
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<tr>
<td>share of infected residents (model 1)</td>
<td>number of beds</td>
<td>-1.03</td>
<td>.039</td>
<td>-.255</td>
<td>-2.612</td>
<td>.011</td>
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<td></td>
<td>Nurses per 100 resident ratio</td>
<td>.504</td>
<td>.123</td>
<td>.401</td>
<td>4.110</td>
<td>.000</td>
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<tr>
<td>share of infected residents (model 2)</td>
<td>number of beds</td>
<td>-1.07</td>
<td>.039</td>
<td>-.265</td>
<td>-2.709</td>
<td>.008</td>
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<tr>
<td></td>
<td>Nurses per 100 resident ratio</td>
<td>.461</td>
<td>.127</td>
<td>.365</td>
<td>3.641</td>
<td>.000</td>
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<tr>
<td>share of resident deaths (model 1)</td>
<td>number of beds</td>
<td>-.080</td>
<td>.037</td>
<td>-.294</td>
<td>-2.168</td>
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<td></td>
<td>Nurses per 100 resident ratio</td>
<td>.249</td>
<td>.099</td>
<td>.343</td>
<td>2.530</td>
<td>.015</td>
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<tr>
<td>share of infected staff (model 1)</td>
<td>number of beds</td>
<td>-.036</td>
<td>.018</td>
<td>-.178</td>
<td>-1.982</td>
<td>.050</td>
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<tr>
<td></td>
<td>Nurses per 100 residents</td>
<td>.101</td>
<td>.050</td>
<td>.182</td>
<td>2.024</td>
<td>.045</td>
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<tr>
<td>share of infected staff (model 2)</td>
<td>number of beds</td>
<td>-.035</td>
<td>.018</td>
<td>-.172</td>
<td>-1.918</td>
<td>.058</td>
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<td></td>
<td>Nurses per 100 resident ratio</td>
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<td>.051</td>
<td>.162</td>
<td>1.779</td>
<td>.078</td>
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<td>spread of virus</td>
<td>3.331</td>
<td>2.022</td>
<td>.148</td>
<td>1.647</td>
<td>.102</td>
</tr>
</tbody>
</table>

Source: unpublished own calculations, based on data from online survey (Rothgang et al. 2020)
In the first wave excess mortality was low in Germany. However, about half of all deceased related to Covid-19 were nursing home residents.

For the second wave data excess mortality is much higher, while data concerning nursing homes is scarce. At least for the end of 2020 the share of nursing home residents among those who have died with Covid-19 is still very high.

The third wave shows little excess mortality, particularly among the elderly due to ongoing vaccination. Nursing homes therefore are no longer a major hotspot of fatalities.

While the spread of infection is the major determinant for nursing home outcomes, the size of the facility and the staffing ratio have a significant additional influence on outcomes.
References


Thank you for your attention!