Does selective internal migration drive socio-economic inequalities in mortality? A total population cohort study
Background

• Evidence for selective migration from published studies
• Less clear if migration contributes to inequalities
• First study for Wales specifically
Area-based inequalities in mortality and potential selective migration

Most deprived: 1.5 times Least deprived

Selective migration?

2006-08

'Less healthy' drift into (or are trapped in) more deprived areas

'Healthy' and advantaged move to less deprived areas

2009-11

Most deprived: 1.6 times Least deprived


Data source: Rate ratio for European age-standardised all cause mortality rate from Public Health Wales Observatory
The Wales population e-cohort

3,136,881 people record-linked within SAIL databank, registered with a GP on **01/01/2006**

Follow-up 24 quarters (6 years)

**31/12/2011**

**Stayed**

**Moved within Wales**

**Moved out/within and out/back in**

+ combinations with multiple moves

Data source: CHALICE (SAIL databank)
Model 1: moves not considered

- Individual
  - Age group
  - Sex
  - Deprivation fifth (time-varying)
  - Rural/urban class (time-varying)

Survival analysis
Cox regression model (time to death)

Risk of death in most deprived 1.57 times (hazard ratio) least deprived, adjusted for age group, sex, rural/urban class
Model 2: adjusted for moves

Individual
- Age group X moved
- Sex
- Deprivation fifth (time-varying)
- Rural/urban class (time-varying)

Survival analysis
Cox regression model (time to death)

Risk of death in
- most deprived
  1.54 times (hazard ratio)
- least deprived

, adjusted for sex, age group X moved, rural/urban class
Model 3: pretend nobody has moved (fifth)

Individual
• Age group
• Sex
• Deprivation fifth (fixed at start)
• Rural/urban class (fixed at start)

Survival analysis
Cox regression model (time to death)

Risk of death in most deprived
1.55 times (hazard ratio)
least deprived
, adjusted for age group, sex, rural/urban class
Model result comparison

Model 1: moves not considered
Risk of death in most deprived
1.57 times
least deprived

Model 2: adjusted for moves
Risk of death in most deprived
1.54 times
least deprived

Model 3: nobody moved
Risk of death in most deprived
1.55 times
least deprived

No evidence for a contribution of migration to inequalities in mortality
Differences by age group

• Relationship between migration and risk of death differs by age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Count not moved (1000s)</th>
<th>Count moved (1000s)</th>
<th>% moved</th>
<th>Hazard ratio for movers compared to non-movers</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>544</td>
<td>413</td>
<td>43.1</td>
<td>1.2</td>
</tr>
<tr>
<td>25-44</td>
<td>530</td>
<td>322</td>
<td>37.8</td>
<td>1.4</td>
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<td>45-64</td>
<td>654</td>
<td>142</td>
<td>17.9</td>
<td>1.6</td>
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<tr>
<td>65-74</td>
<td>244</td>
<td>34</td>
<td>12.2</td>
<td>2.2</td>
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<tr>
<td>75+</td>
<td>204</td>
<td>48</td>
<td>19.1</td>
<td>3.0</td>
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<tr>
<td>Total</td>
<td>2177</td>
<td>960</td>
<td>30.6</td>
<td></td>
</tr>
</tbody>
</table>
Limitations

• Focus on moves in older people before death
• Children’s moves not independent from parents’ moves
• People moving into Wales not included
• Deprivation level using same index (WIMD 2008)
• Moves within LSOA not captured
• GP lists overestimate people aged 20-39 (including students)
Conclusions

• No evidence that migration contributed to inequalities in mortality
  => Routine measures of inequality in mortality probably not biased over the short term

• Future patterns of migration may be different
  => Migration should be considered in analysis of inequalities over longer term

• Further research with other health outcomes or longer follow up could capture effects in younger people or mid-life

• Public Health Science Conference abstract accepted (Lancet)
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