Small area deprivation dispersion: does its scale inform healthy life expectancy gaps?

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Rational

- Public health commissioning role devolved to local authorities
  - Improve health for all
  - Reduce health inequalities
  - Protect health

- Public health outcome framework (PHOF) outcomes:

  Outcome 1: Increased healthy life expectancy
  Taking account of the health quality as well as the length of life
  (Note: This measure uses a self-reported health assessment, applied to life expectancy.)

  Outcome 2: Reduced differences in life expectancy and healthy life expectancy between communities
  Through greater improvements in more disadvantaged communities

  (Note: These two measures would work as a package covering both morbidity and mortality, addressing within-area differences and between area differences)
Objectives

1) Produce estimates of healthy life expectancy (HLE) at birth by all small areas in England

2) Inform the gap in HLE at birth among those living in most and least deprived small areas within the range of local authorities
Data & Methods (1)

- **Small areas**
  - 6,791 small areas (MSOAs) in England, with populations between 5000-15,000

- **Chiang II method**
  - For period life expectancies at birth (0-4, 5-9, ..., 85+)
  - Mortality and mid-year population estimates aggregated over 5 year period (2009 to 2013), in order to mitigate a risk of implausible life expectancies at small areas.

- **Sullivan method**
  - Age specific self-reported general health data gathered from Census 2011.

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13: How is your health in general?

Very good  | Good  | Fair  | Bad  | Very bad
---|---|---|---|---
[ ] | [ ] | [ ] | [ ] | [ ]
### Data & Methods (2)

#### Small Area Deprivation Measure – English IMD 2015 (7 Domains)

<table>
<thead>
<tr>
<th>DOMAINS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>(22.5%)</td>
</tr>
<tr>
<td>Employment</td>
<td>(22.5%)</td>
</tr>
<tr>
<td>Education, skills and training</td>
<td>(13.5%)</td>
</tr>
<tr>
<td>Health and disability</td>
<td>(13.5%)</td>
</tr>
<tr>
<td>Barriers to housing and services</td>
<td>(9.3%)</td>
</tr>
<tr>
<td>Crime</td>
<td>(9.3%)</td>
</tr>
<tr>
<td>Living environment</td>
<td>(9.3%)</td>
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</tbody>
</table>

#### Measuring gap in healthy life expectancy - Slope index of inequality (SII)

- Weighted for the population size
- Consider the order of areas by their relative deprivation
- Estimate gradient across whole sub-group of population – weighted linear regression
Results

Objective 1
Healthy life expectancy at birth for small areas in England
Implausible life expectancies
Male LE and HLE at birth by their MSOAs deprivation ranking, most deprived to least deprived, 2009 to 2013, England
Results

Objective 2
Measuring the inequalities in HLE at birth
National Picture

Slope index of inequality (SII) in female HLE at birth based on MSOAs in England, 2009 to 2013

HLE (Years)

Relative rank score*100

Where relative rank score=0: HLE is 56.1 years
Where relative rank score=100: HLE is 72.8 years
Expected HLE= 56.1 + 16.8*(Rank score/100)
SII in HLE at birth across local authorities in England, 2009 to 2013

Males
English SII = 16.7 years
Highest SII observed = 24.6 years
Lowest SII observed = 3.8 years

Females
English SII = 16.8 years
Highest SII observed = 22.1 years
Lowest SII observed = 2.8 years

Male area count | Slope index of inequality (years)¹,²,³,⁴ | Female area count
--- | --- | ---
(4) | High | 20.0 or over | (4)
(38) | 15.0 to 19.9 | (34)
(74) | 10.0 to 14.9 | (74)
(31) | 5.0 to 9.9 | (35)
(2) | Low | 4.9 or under | (2)
(3) | No data available | (3)
Deprivation dispersion matrix

Healthy life expectancy at birth and IMD 2015 scores for MSOAs from the selected local authorities

MSOAs' HLE (Years)

<table>
<thead>
<tr>
<th>IMD 2015 Scores</th>
<th>Healthy life expectancy at birth and IMD 2015 scores for MSOAs from the selected local authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sll at birth (Years)</td>
<td>6.4\5.8</td>
</tr>
</tbody>
</table>

- ▲ IMD 2015 Scores
- ◆ HLE Males
- ○ HLE Females

Most deprived 10%

Least deprived 10%
Policy of proportionate universalism

Males' SII (Years)

Healthy Life Expectancy (Years)

UTLA males
Median SII
Median HLE
Limitations

For females, the highest gap in HLE at birth was observed in Bradford = 22.1 years

For females, the lowest gap in HLE at birth was observed in Shropshire = 2.8 years
Conclusions

• Ecological deprivation exposure is an important explanatory factor in discriminating healthy life expectancy at the granular level of small areas.

• It has policy relevance in distinguishing areas across the dimensions of inequality and health outcome.
  
  • *Proportionate universalism is a policy accepted by Department of Health*
  
  • *Different actions and their intensity are needed where HLE is low and inequality is either low or high and where HLE is high and inequality is either low or high*

• Further work is being carried out to understand the relative importance of each domain of deprivation and the interactions between them.

• This work has also been used in determining the fairness of changes to the state pension age in the UK.