Patterns and trends in oral health inequalities in high income countries

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What characterises the oral health of high income countries?

• Risks are variable between countries...but plenty dietary risk

• Relatively sophisticated health messages and behaviours may off-set risks (personal hygiene, technologies etc)

• Well developed services though coverage a major issue

• History of much higher caries rates in the recent past
Patterns

Which disease?

Caries – Abundant in high income countries
   All ages

Periodontal disease – Abundant in high income countries
   Mostly middle age and later
   Strong genetic and systemic contributors

And does it have to be a disease?
   Tooth count?
   Quality of life?
England, Wales, NI, CDHS (2013)
Percentage of children with a high caries burden, by IMD
A very different dataset
Periodontal data from 50,000 patients

Percentage of patients with a code 3 or above sextant, at OHA and OHR, by IMD group

- % of patients with a code 3 or above at OHA
- % of patients with a code 3 or above at OHR also

Cohort sizes
- IMD group 1: 6,813
- IMD group 2: 6,749
- IMD group 3: 14,410
- IMD group 4: 6,312
- IMD group 5: 6,538
- IMD group 6: 5,152
- IMD group 7: 5,587
- IMD group 8: 4,611
- IMD group 9: 4,355
Understanding “pattern” gets tricky in high income countries

• Disease is cumulative and damage combined
• Inequalities may be about both risk AND treatment

So

• Relationship with age
• Measures may be disease and/or treatment
• Getting the combination of age and measure is critical

Relationship between disease and “impact” may also be tenuous
Trends
## Pattern of inequalities

### Income and tooth loss in the young and old

Marginal effects (number of teeth) fully adjusted for demographics, education, IMD, SC

<table>
<thead>
<tr>
<th></th>
<th>21-34 years</th>
<th>65+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richest</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Second richest</td>
<td>0.05</td>
<td>-2.43</td>
</tr>
<tr>
<td>Intermediate</td>
<td>-0.21</td>
<td>-1.91</td>
</tr>
<tr>
<td>Second poorest</td>
<td>-0.60</td>
<td>-3.70</td>
</tr>
<tr>
<td>Poorest</td>
<td>-0.20</td>
<td>-4.51</td>
</tr>
</tbody>
</table>

Pattern of inequalities

Income and tooth loss in the young and old

What does this tell us?

• Number of teeth captures the accumulation of everything

• In late life there is a major gradient

• In early life NOW it may be of little value in HI countries

• That may be generational!
### Pattern of inequalities

**Income and caries prevalence in the young and old**

Marginal effects (probability change) fully adjusted for demographics, education, IMD, SC

<table>
<thead>
<tr>
<th>Income Level</th>
<th>21-34 years</th>
<th>65+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richest</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Second richest</td>
<td>0.16</td>
<td>0.02</td>
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<tr>
<td>Intermediate</td>
<td>0.18</td>
<td>0.07</td>
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<tr>
<td>Second poorest</td>
<td>0.10</td>
<td>0.03</td>
</tr>
<tr>
<td>Poorest</td>
<td>0.17</td>
<td>0.04</td>
</tr>
</tbody>
</table>

The interplay between Socioeconomic Inequalities and Clinical Oral Health. J Dent Res. 2015;94:19-26
Pattern of inequalities

Income and caries prevalence in the young and old

What does this tell us?

• The presence of a lesion in the young is socially determined

• But it is not a gradient!

• Inequalities in risk and treatment effects may both play a part

• In older people there is little gradient but there are reasons
## Pattern of Inequalities

### Visible Anterior Spaces and Different Social Measures

Marginal effects (number of teeth) fully adjusted for demographics, education, IMD, SC

<table>
<thead>
<tr>
<th></th>
<th>Income</th>
<th>Area based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least Deprived/wealthiest</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Most deprived/poorest</td>
<td>0.02</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Pattern of inequalities

Prevalence of anterior spaces

What does this tell us?

• Clearly it is not always just about income

• Oral health manifests in many ways and social patterning may be quite nuanced
### Pattern of inequalities

**What if we forget disease......**

**Quality of life in the young and old**

Marginal effects (OHIP “FOVO” prevalence) fully adjusted for demographics, education, SC

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<td>0.05</td>
<td>0.03</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Second poorest</td>
<td>0.08</td>
<td>0.05</td>
</tr>
<tr>
<td>Poorest</td>
<td>0.12</td>
<td>0.04</td>
</tr>
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Pattern of inequalities

Prevalence of QoL Impact and Income

What does this tell us?

• Despite a big gradient in the number of teeth in older people, there is no gradient in impact

• Despite no gradient in number of teeth in younger people, there is a strong gradient in impact

This could be age or generation or both
What will it mean to be in the right hand quintile in 2003 compared to 1993?
Patterns and Trends in High Income Countries

What does all of this tell us?

1. Clearly there is variation, but where caries declines, the meaning of such inequalities may change.

2. Choosing the way we describe inequalities is important.

3. To allow meaningful comparisons and better understanding of how inequalities relate to national conditions we might consider some standard and age related measures.

4. Restricting our assessments to diseases is a very limited way of viewing this.
Thank you