Greening the grey and banishing the blues:

What is relationship between the physical environment and mental health?

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Definitions

• Physical environment
  • Land, air, sea, vegetation, buildings, climate
    ➢ eg. green space, air pollution, industry, UVB, temperature

• Mental health
  • Common mental disorders/ minor psychiatric morbidity
    ➢ depression, anxiety (General Health Questionnaire scores)
The problem

- Common mental disorders
  ➔ by 2020, 2nd biggest burden of disease globally

- Recent changes in physical environments
  - urbanization – more grey, less green
  - hypermobility – traveling further, faster but not actively

Hypothesis

High quality environment → Increased time spent outdoors
  ➢ eg. through active travel

→ Increased physical activity

→ Better mental health

Research questions

1. What are the associations between physical environments and mental health?

1. Is physical activity a mediator in the relationship?
The data

- **Whitehall II Study**
  - Longitudinal, prospective cohort study
  - Health screen & self-report questionnaire
    - incl detailed mental health and physical activity outcomes

10,308 M and F London-based Civil Servants

6,967 =68% of Phase 1 responders Aged 52-72yrs

'85 '89 '91 '95 '97 '01 '02 '06 '07 '11
The data

- **Multiple Environmental Deprivation Index and Classification**

  - Measures of health-related multiple physical environmental deprivation at CAS ward level
  - Calculation:

<table>
<thead>
<tr>
<th>Pathogenic</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution</td>
<td>+1 (highest quintile) or 0</td>
</tr>
<tr>
<td>Proximity to industry</td>
<td>+1 (highest quintile) or 0</td>
</tr>
<tr>
<td>Temperature</td>
<td>+1 (lowest quintile) or 0</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Salutogenic</th>
<th></th>
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<tbody>
<tr>
<td>Greenspace availability</td>
<td>-1 (highest quintile) or 0</td>
</tr>
<tr>
<td>UV level</td>
<td>-1 (highest quintile) or 0</td>
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</table>

**MEDIx score**

-2 (best) to +3 (worst)

Salutogenic UVB score
Pathogenic average temperature score
Pathogenic **air pollution** score
Salutogenic green space score
Pathogenic proximity to industry score
Mental health in Phase 7 Whitehall II by GHQ chronic score:

GOR GHQ chronic no mapped by ward

4,962

GOR GHQ chronic yes mapped by ward

1,684

= 25%
Preliminary analysis with Whitehall II Phase 7 & MEDIx

Odds of poor mental health in poor environmental quality/
odds of poor mental health in high environmental quality

= 1.19, p<0.01 (CI = 1.04-1.36)

(after controlling for sex, age, income, social deprivation, employment grade)

```
.logistic mghqcgp newmedix2 sex mage_c tinchh6_2 imdscor2e newgrade2v2
```

Logistic regression

<table>
<thead>
<tr>
<th></th>
<th>Number of obs = 5204</th>
<th>LR ch2(6) = 111.62</th>
<th>Prob &gt; ch2 = 0.0000</th>
<th>Pseudo R2 = 0.0194</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log likelihood = -2814.3582</td>
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</table>

| Variable       | Odds Ratio   | Std. Err. | z    | P>|z| | [95% Conf. Interval] |
|----------------|--------------|-----------|------|------|----------------------|
| mghqcgp        |              |           |      |      |                      |
| newmedix2      | 1.191658     | .082109   | 2.54 | 0.011| 1.041121 - 1.363962 |
| sex            | 1.356273     | .1011885  | 4.08 | 0.000| 1.171766 - 1.569832 |
| mage_c         | .9556208     | .0056093  | -7.73| 0.000| .9446897 - .9666784 |
| tinchh6_2      | .8284753     | .0602075  | -2.59| 0.010| .7184897 - .9552974 |
| imdscor2e      | 1.105164     | .0761103  | 1.45 | 0.147| .9656197 - 1.264873 |
| newgrade2v2    | 1.209525     | .1378699  | 1.67 | 0.095| .9673619 - 1.512309 |
Next steps...

• Individual components of MEDIx vs mental health in Wll 7 cohort
...and other factors with evidence for mental health-relevance
  ➢ eg. road densities

• Health Survey for England 2008
  • Nationally-representative, n=15,102 adults, health interview/exam
  • Additional self-report & accelerometry-measured physical activity in 2008
    ➢ MEDIx scores vs (1) mental health (2) physical activity
    ➢ Place Survey (perceptions of local environments) attached to HSE at Local Authority level vs (1) mental health (2) physical activity

• Direction of relationships between physical environments, physical activity and mental health
  • Longitudinal analysis
    ➢ Whitehall II cohort Phase 5 to Phase 7 = 1997 ➔ 2005