National Centre for Population Health and Wellbeing Research

Y Ganolfan Genedlaethol ar gyfer Ymchwil ar Iechyd a Llesiant y Boblogaeth

Prof./Athro Ronan Lyons
(Director/Cyfarwyddwr)
NCPHWR Mission

1. Make a significant impact upon the health and wellbeing of the population of Wales through applied research

2. Make Wales a world leader in population health science by:
   • Improving the scale, speed, cost effectiveness and uptake of cutting-edge research
   • Creating an evidence base for policies, services and interventions
   • Implementing findings on a scale with population level impact
   • Expanding links to leading international research groups
Introducing activity and speakers

Evaluation of impact of policies and interventions using data linkage

Brief case studies

**Richard Fry**: Linking individual, household and environmental data

**James White**: Improving mental health through the regeneration of deprived neighbourhoods

**Sarah Rodgers**: improving social housing

**Amy Mizen**: obesogenic environments on the way to school

Discussion followed by group work

**what other policies and interventions could be evaluated through these methodologies?**
GIS models the world at a variety of scales using spatially referenced data.

Vast majority of data has either explicit or implicit spatial references.

In GIS we can model exposures originating from the built and natural environment AND model spatial inequalities at a variety of scales.
Data Linkage Example

1.4 Million homes in Wales with geo-locations

35K Adults in 1 year in Wales with CMD in GP records

1.7 Million adults in Wales with GP records

24K Respondents per annum

Geographic Information Systems

National Survey for Wales

RALF

DATA LINKAGE

Welsh Demographic Service

GP Records

SAIL DATABASE
What data is available and how could we use it?

**Satellite Data**
- Green + blue space availability
- Vegetation types + seasonal variation
- Land use change
- Urbanisation
- Air quality

**Digital Terrain Models**
- Sunshine hours (vitamin D, cancer)
- Neighbourhood Walkability
- Flood risk
- Urbanisation
- Pollution modelling

**Accessibility models**
- Time to critical care
- Health inequalities
- Service configuration
- Exposures to unhealthy environments

**Admin Data**
- Deprivation indicators
- Housing conditions data
- Licencing data
- Link via RALF

**Noise mapping**
- CMD
- Educational attainment
Communities First

• Aim:

“to raise the capacity of disadvantaged groups and of people and organisations living or working in the most deprived communities to develop activities and projects of communal benefit and to harness mainstream funding to deliver economic and social regeneration”

• Welsh Government: 2001 – 2011;
• £300m (£200K per community; £55 per resident pa)
• Eligible communities: 100 most deprived wards in Wales in 2000 WIMD; updated in 2005 with extra 46 wards.

Data sources linked in SAIL

1. Intervention data. CCBC Communities First: example
   
   a) Education and training: ICT training
   b) Vocational training and business support: credit unions
   c) Health and wellbeing: sports equipment
   d) Housing and physical environment: traffic calming
   e) Community: community centres
   f) Crime and community safety: CCTV

2. eCATAlyST prospective cohort 2001-2008 (before and after CF): Mental Health Inventory (MHI-5; depressive and anxiety symptoms)

3. GP consultation data: Read codes on mental illness and prescriptions

4. Population migration: Welsh Demographic Service
Results

1,500 funded regeneration projects in CCBC during the seven year follow-up (2001 to 2008)

Community-based projects: 59.1%

Total cost was £82,857,180

10,892 participants, 4,197 (38.5%) in 35 intervention LSOAs and 6,695 in 75 control LSOAs.
## Results

Regression coefficient (95% CI) for change in mental health associated with residence in intervention compared to control area (n = 8,394)

<table>
<thead>
<tr>
<th>Model</th>
<th>Change in MHI-5 (95% CI)</th>
<th>Favors control</th>
<th>Favors intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propensity score matched</td>
<td>1.54 (0.50, 2.59)</td>
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<tr>
<td><strong>Sensitivity analyses</strong></td>
<td></td>
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<tr>
<td>Complete case</td>
<td>1.33 (0.27, 2.39)</td>
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<tr>
<td>Excluding migrants</td>
<td>1.33 (0.27, 2.39)</td>
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<tr>
<td>Length of residence</td>
<td></td>
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<tr>
<td>0 months (Ref)</td>
<td>(Ref)</td>
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<tr>
<td>0.2 to 41 months</td>
<td>-0.32 (-4.95, 4.31)</td>
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<tr>
<td>42 to 90 months</td>
<td>1.68 (-0.97, 4.33)</td>
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<tr>
<td>91 months (did not move in intervention area)</td>
<td>1.23 (0.10, 2.36)</td>
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</table>

p-for-trend = 0.05

-4 -3 -2 -1 0 1 2 3 4 5
The Housing Regeneration and Health Study
Sarah Rodgers, Swansea University Medical School

- Co-interventions:
  - **internal works**: kitchen units, bathroom suites, heating system upgrades, electrical system upgrades;
  - **windows and doors**: double-glazed, locks;
  - **thermal insulation**: walls and loft;
  - **gardens and estate package**: fencing, paths in good condition.
- **Meeting the Welsh Housing Quality Standard**

Research Questions

• Does improving housing benefit the physical and mental health of residents?

• Comparisons of health changes over time for people living in homes receiving intervention elements:
  • Registered tenant and ≥1 co-intervention = 8,558
  • Reference group – did not receive intervention
  • Exposure group – received intervention
  • Adjusted for people living in the rest of Carmarthenshire

Primary outcome measure

• Change in the proportion of residents aged 60+ who have emergency admissions to hospital for selected conditions combined: cardiovascular, respiratory conditions, injuries (falls & burns)
Where will we get this information?

- Secure Anonymised Information Linkage (SAIL) databank
- Carmarthenshire County Council
- **NHS Wales Informatics team** remove addresses and replace with an unidentifiable code
- Allows us to link **new regeneration data** but residence location remains unknown to researchers
- Anonymised links from houses to people and their health conditions
- **8,558 homes, 7,054 older tenants, 32,009 tenants of all ages, 183,000 person years follow up (up to a decade)**
Respiratory, cardiovascular conditions, and injuries 60+ years

Adjusted for: age, sex, deprivation, comorbidities, year, month, rurality, and the rest of Carmarthenshire rates

~30% reduction in admissions

Nearly 40% reduction

Incidence Rate Ratio
IRR < 1 means rates in the intervention groups are lower than for the reference
Acknowledgements

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Thank you for your time

Questions?
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Exposure to the retail food environment and obesity – Amy Mizen

• The relationship between exposure to unhealthy food and obesity is of increased interest to researchers

• There is serious concern for childhood obesity

• Important to capture our daily activity spaces
Suitable **proxy** for the distance that a child walks

Not for the **environment** a child is exposed to

Would more sophisticated **GIS routing** be reliable?
Modelled Routes

Health Data
Mixed Effects Linear Regression
Discussion and Group work

What other policies and interventions could be evaluated through these methodologies?