



Ymchwil Iechyd
a Gofal Cymru

Health and Care
Research Wales



Swansea University
Prifysgol Abertawe



PRIFYSGOL
BANGOR
UNIVERSITY



Children in Wales
Plant yng Nghymru



GIG
CYMRU
NHS
WALES | Iechyd Cyhoeddus
Cymru
Public Health
Wales

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)



Llywodraeth Cymru
Welsh Government

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

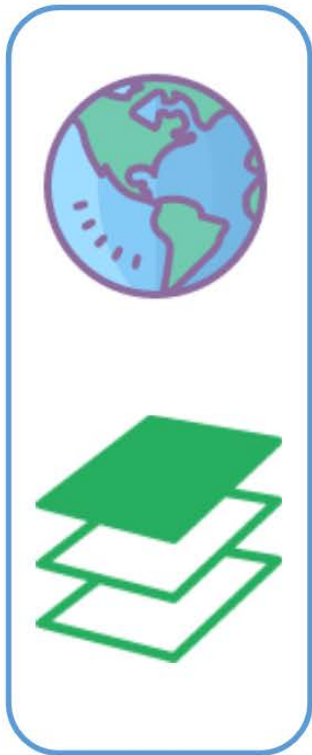
Sarah Rodgers: improving social housing

Amy Mizen: obesogenic environments on the way to school

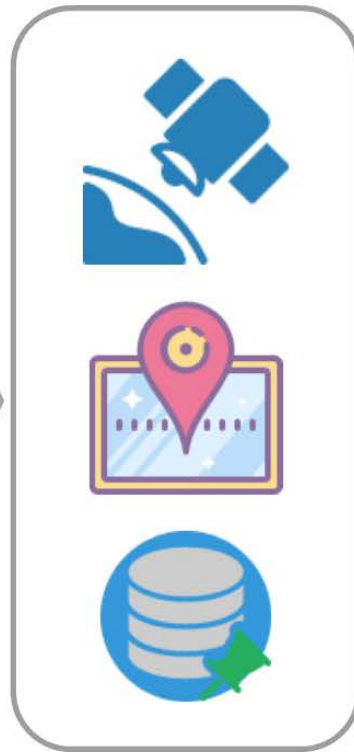
Discussion followed by group work

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

Geographic Information Systems



GIS models the world at a variety of scales using spatially referenced data



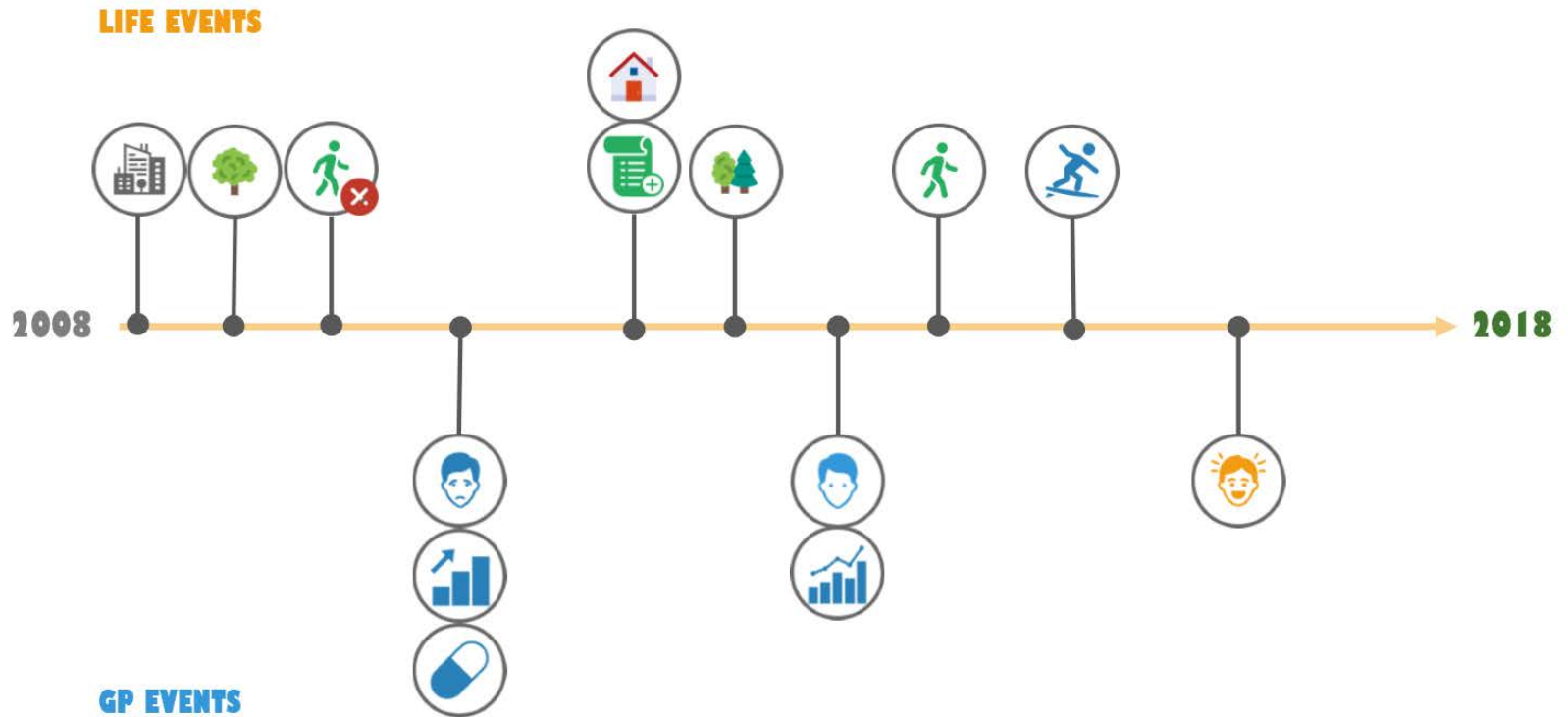
Vast majority of data has either explicit or implicit spatial references



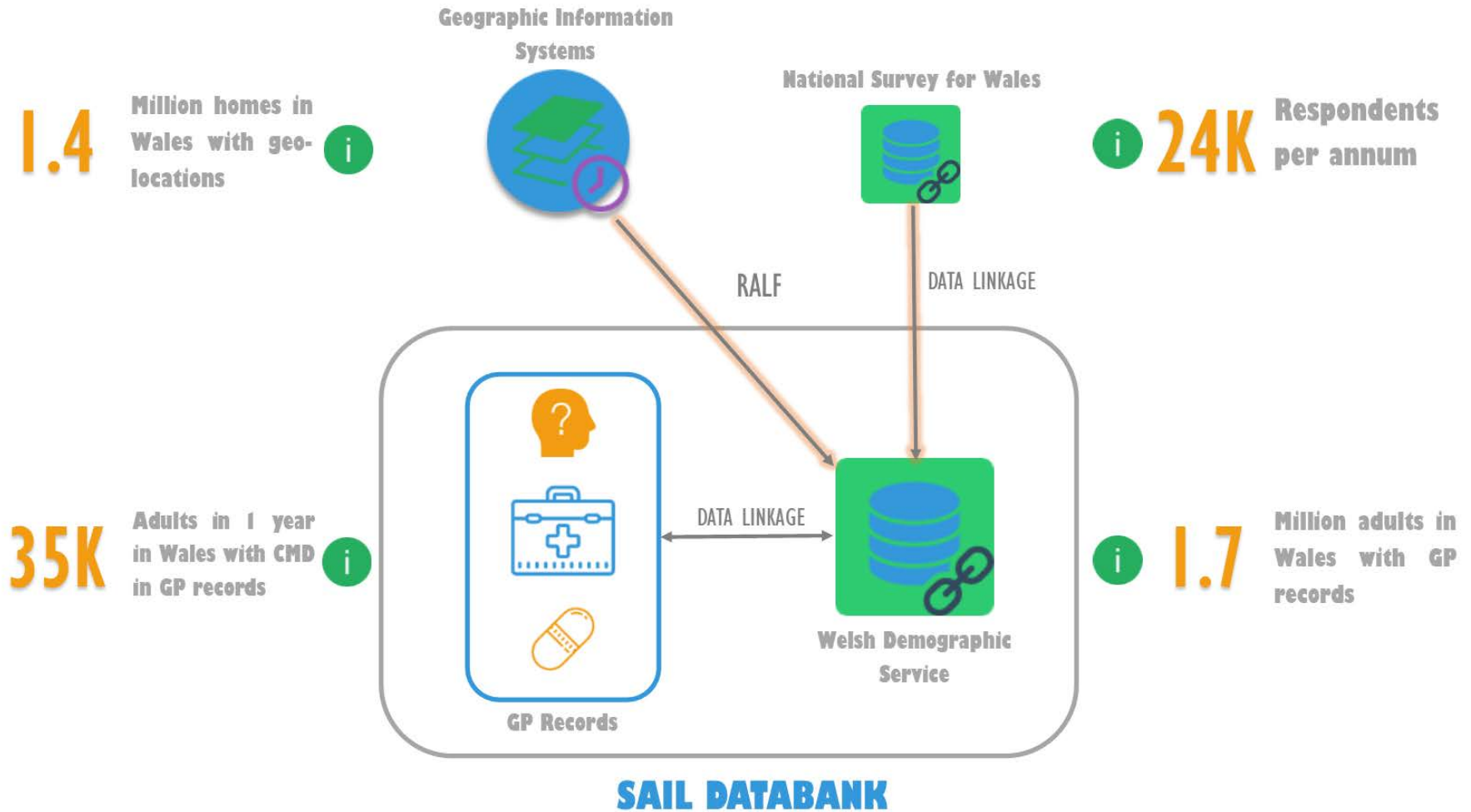
In GIS we can model exposures originating from the built and natural environment AND model spatial inequalities at a variety of scales

GIS UKSeRP

Conceptual Model



Data Linkage Example



What data is available and how could we use it?



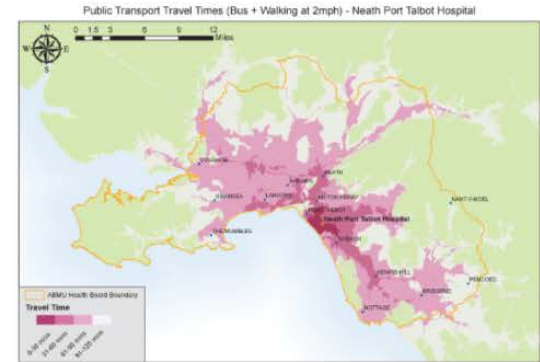
Satellite Data

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



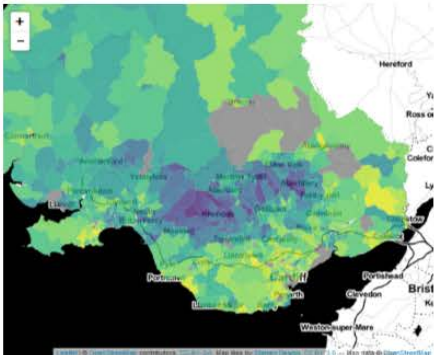
Digital Terrain Models

- 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

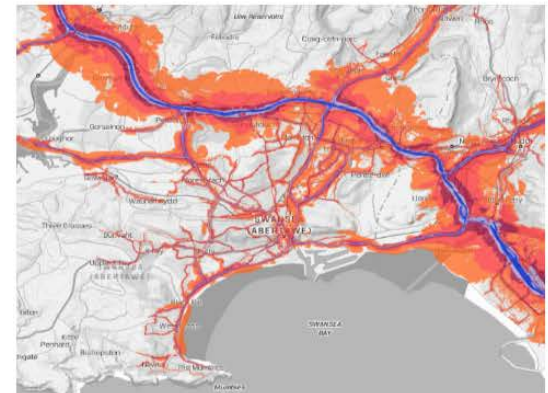


Admin Data

- 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

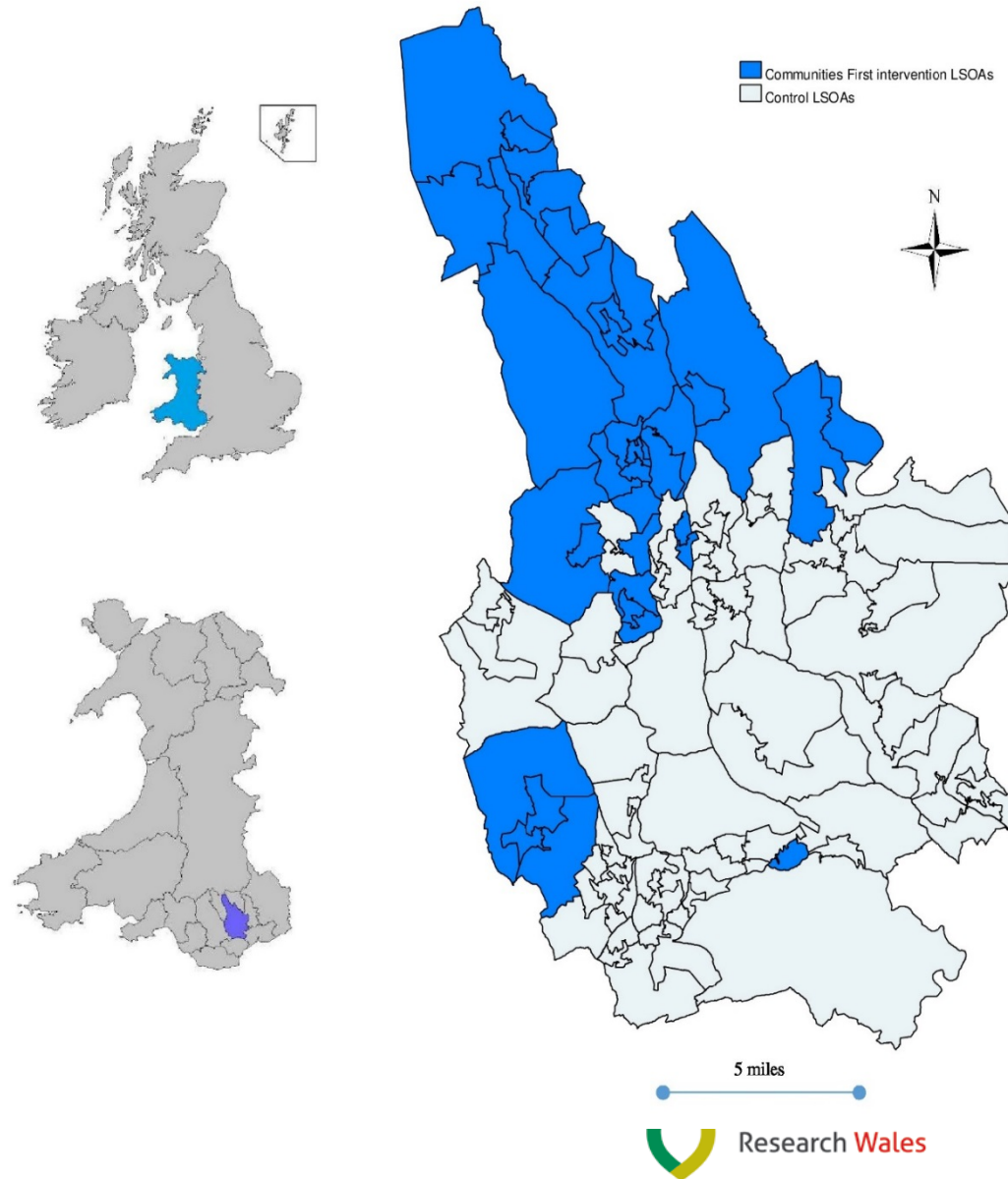
Results

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)

Model	Change in MHI-5 (95% CI)	Favors control	Favors intervention
Propensity score matched	1.54 (0.50, 2.59)		
<i>Sensitivity analyses</i>			
Complete case	1.33 (0.27, 2.39)		
Excluding migrants	1.33 (0.27, 2.39)		
Length of residence			
0 months	(Ref)		
0.2 to 41 months	-0.32 (-4.95, 4.31)		
42 to 90 months	1.68 (-0.97, 4.33)		
91 months (did not move in intervention area)	1.23 (0.10, 2.36)		
		<i>p-for-trend = 0.05</i>	
		-4 -3 -2 -1 0 1 2 3 4 5	

The Housing Regeneration and Health Study

Sarah Rodgers, Swansea University Medical School

- Investment of £138 million in Carmarthenshire council housing improvements; 8,558 homes (2007 – 2015).
- 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

Different exposure and reference groups for each of 8 co-interventions

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)**



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Respiratory, cardiovascular conditions, and injuries 60+ years

~30%
reduction in
admissions

Nearly 40%
reduction

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

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

Acknowledgements

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Questions?

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We would like to acknowledge the local authorities and health organisations for providing the data making this research possible.

Exposure to the retail food environment and obesity – Amy Mizen

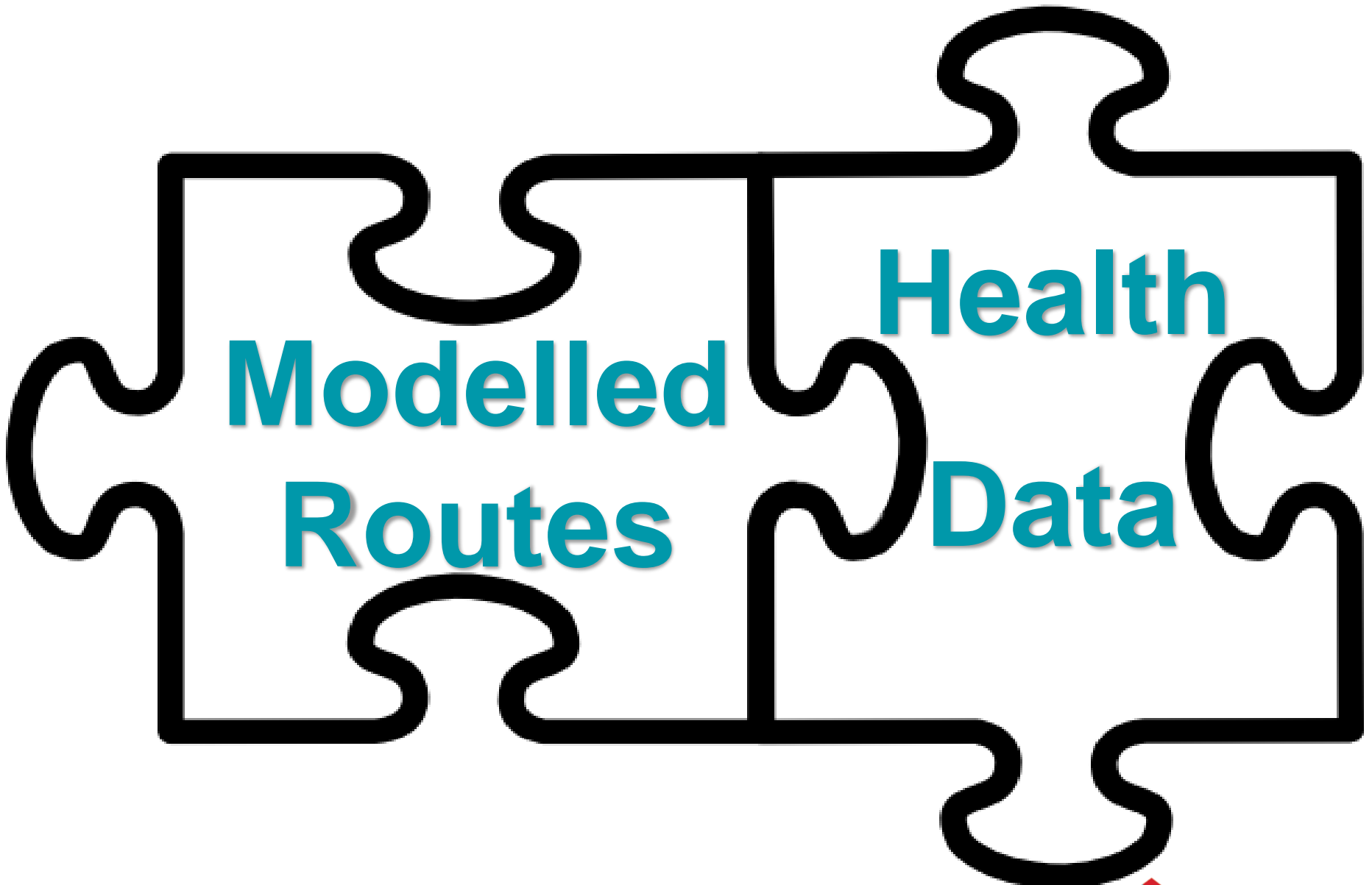
- The relationship between exposure to **unhealthy food** and **obesity** is of increased interest to researchers
- There is serious concern for **childhood** obesity
- Important to capture our **daily activity spaces**



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?