

# A Synthetic Demographic Model of the UK Population: Progress and Problems

Mark Birkin, Andy Turner & Belinda Wu  
School of Geography  
University of Leeds

# Content

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- Concepts and objectives
- Methods
- Evaluation
- Results
- Conclusions

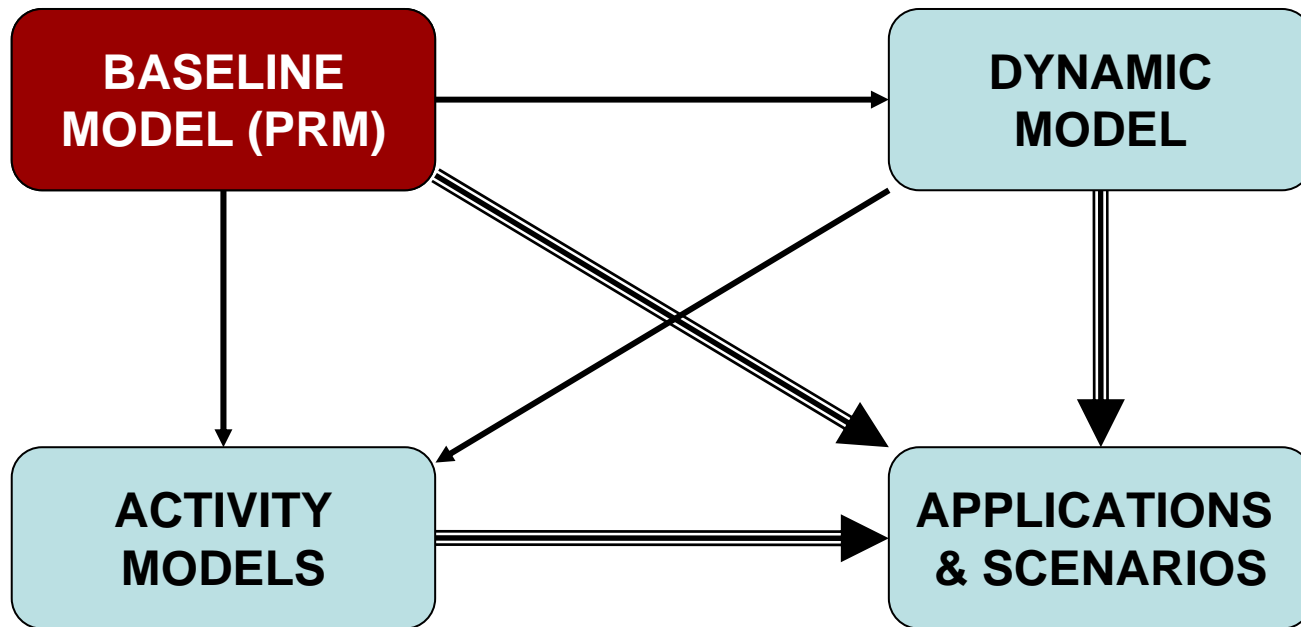
# Moses: Project Objectives

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- To develop a complete **representation** of the UK population at a very fine spatial scale
- To produce rich, detailed and robust **forecasts** of the future population of the UK
- To investigate **scenarios** which relate demographics to service provision
  - with particular emphasis on policy applications within the health and transport sectors

# Moses: Project Components

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# Methodology for the PRM

Census tables for zone  $i$

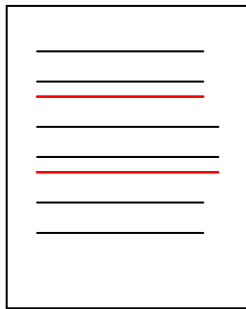


$i$

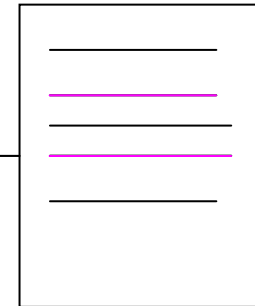
Households with L1 TI and dependent children:					
All households					
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Households with L1 TI and dependent children:					
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Households with L1 TI and dependent children:					
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Select all					
This table contains counts of Households					
Users are recommended to review <a href="#">table footnotes and comments</a> for supplementary information relating to individual tables.					
Add variables to data selection					
Select all					
Clear all					
Households					
All households					
With no adults in employment					
With dependent children					
With one or more people with a limiting long term illness					
With dependent children					
Without dependent children					
All ages					
Aged 0-4					
Select all					

Synthetic list for zone  $i$

Household SAR



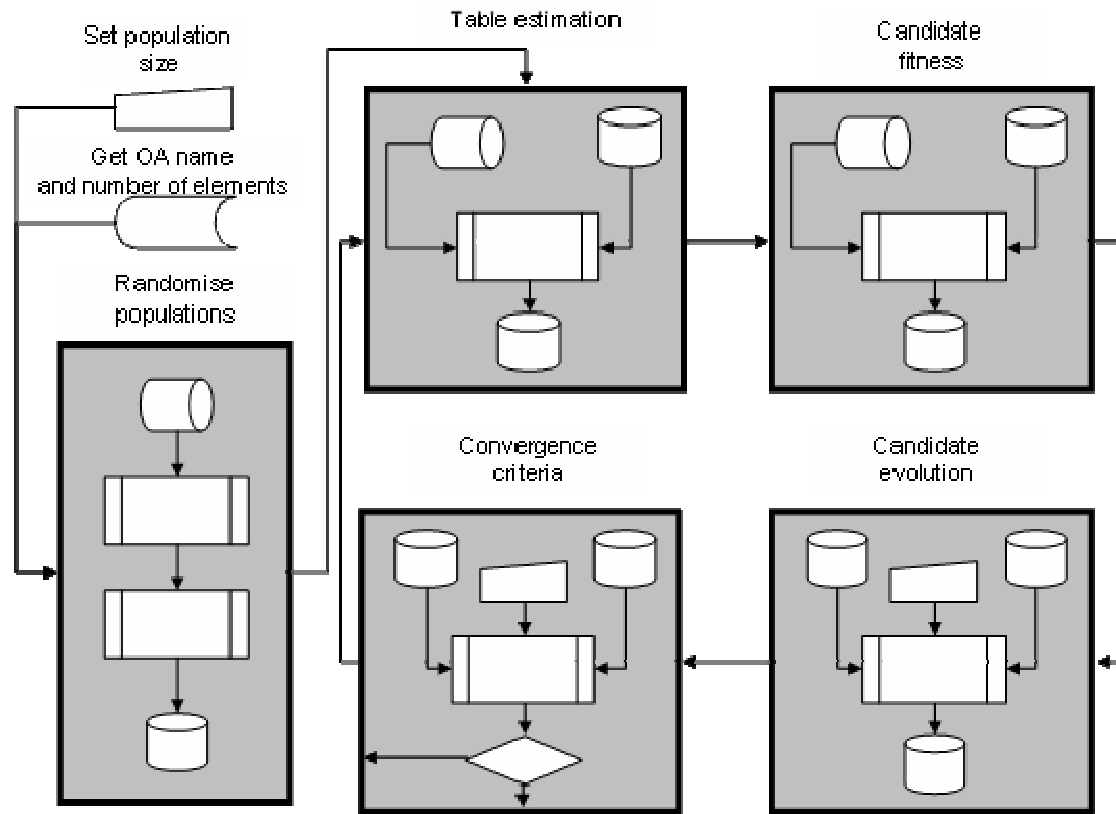
BHPS



Repeat this process for 52 million individuals

<http://www.ncess.ac.uk/nodes/moses/>

**Figure 1. Architecture of the Population Reconstruction Model**



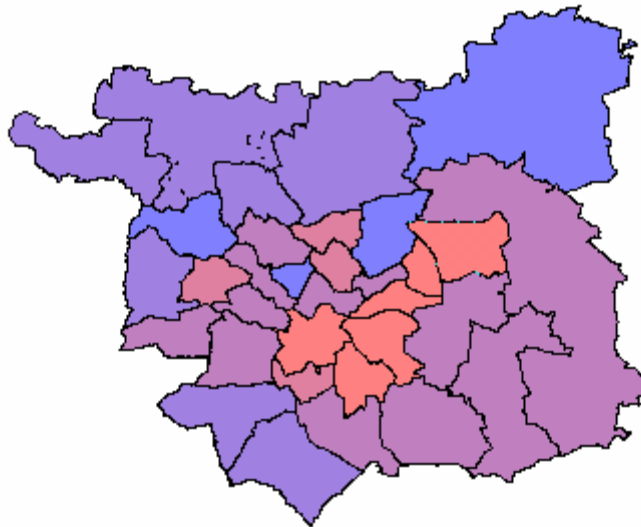
**Table I Results from the PRM (Version 1)**

Attribute	IoD	Type	Attribute	IoD	Type	Attribute	IoD	Type
White	0.04 V		Semi-Detached	0.11 O		Unemployed	0.20 V	
Males	0.04 V		Public Transport	0.11 V		Widowed	0.21 O	
Full time	0.06 V		Married	0.11 V		Single	0.21 V	
25-44	0.06 C		Married	0.11 V		16-24	0.22 C	
part time	0.08 V		Own Vehicle	0.12 V		Retiree	0.28 O	
65+	0.07 C		No Quals	0.13 V		Detached	0.29 O	
Long-term I	0.07 O		Overqualified	0.14 O		Mixed	0.29 V	
15-64	0.07 C		Professional	0.14 V		Leasehold	0.30 V	
Co-habiting	0.07 V		Widow	0.16 V		Other	0.11 V	
Life medical	0.08 V		Age 65+ dependent	0.17 V		Asian	0.46 V	
Lease 2	0.09 V		Terminated	0.17 O		Black/Asian	0.48 V	
Lease 1	0.09 V					Black	0.52 V	
Under 16s	0.09 C							

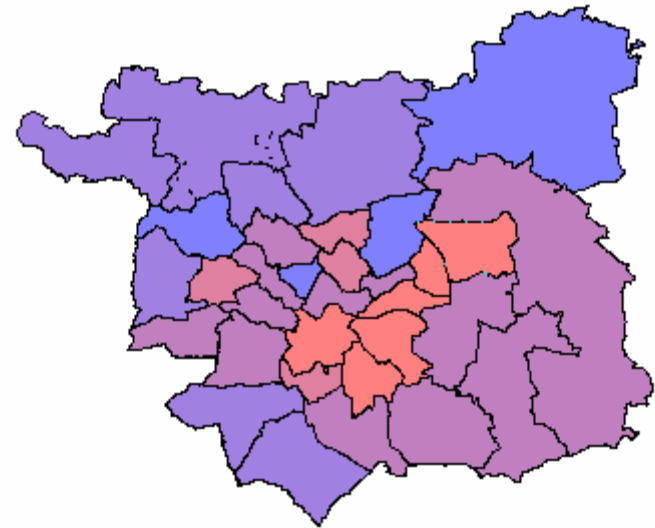
Note:  
 IoDs of 0.05 imply (row) 5:1 IoDs between 0 (perfect correspondence) and 1 (no correspondence).  
 Attribute types are constrained (C), optimized (O) and coding (V). For discussion, see text.

# Health Status (Optimised)

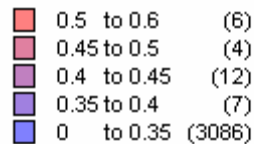
Actual



Model

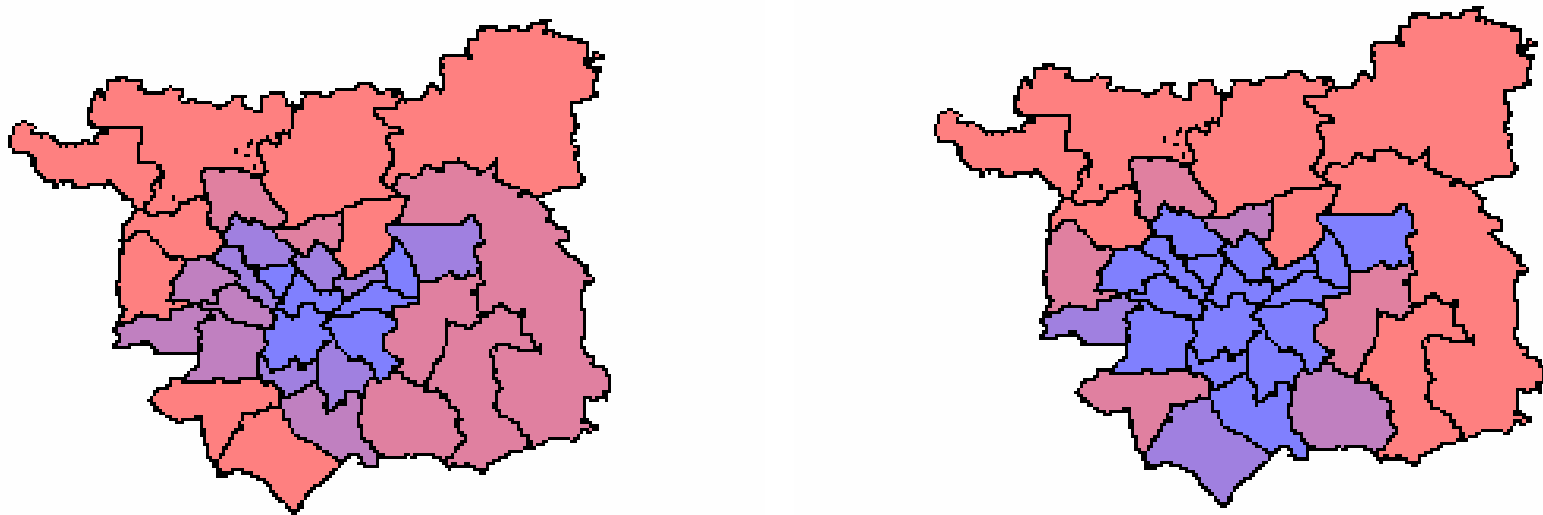


leeds\_wards by health

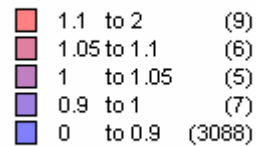


# Car ownership (Co-varying)

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leeds\_wards by carmod

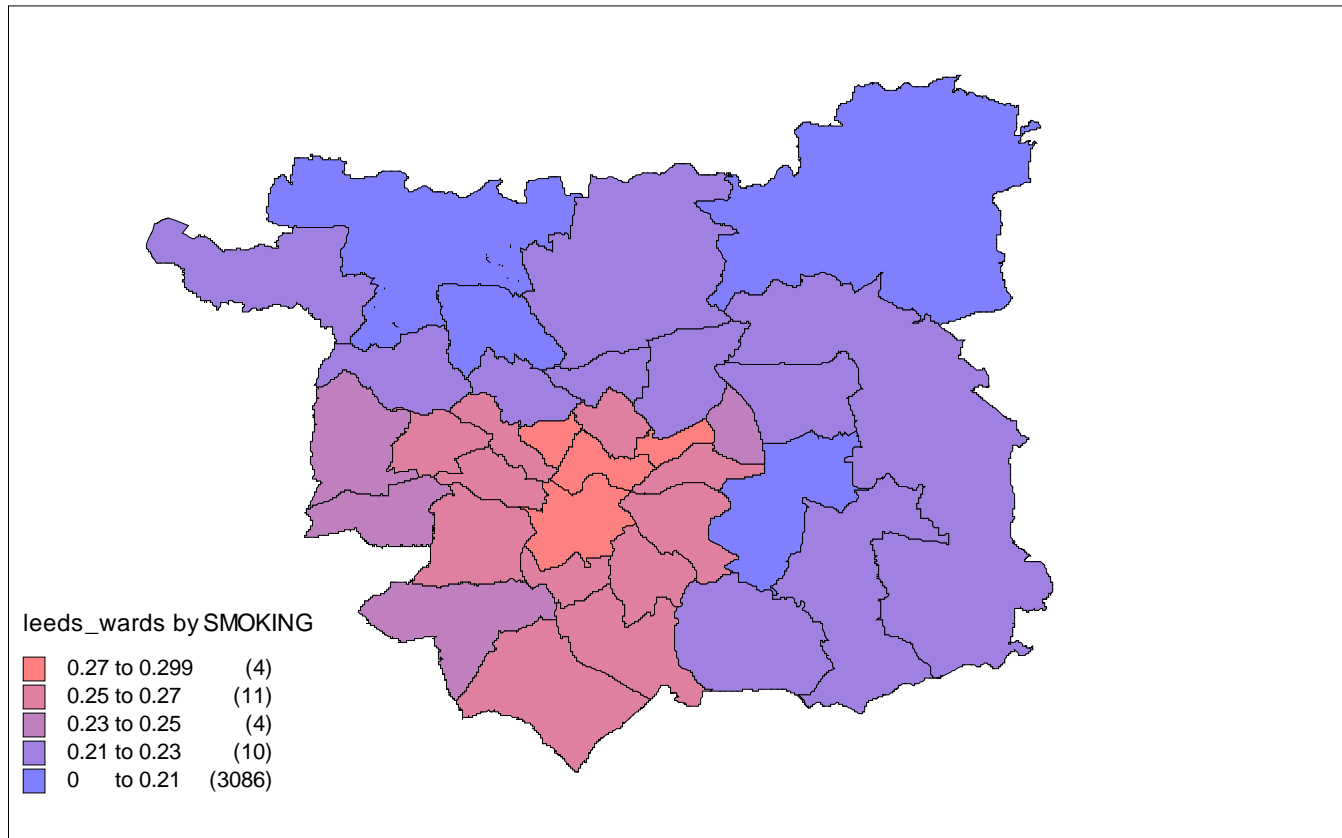


# Issues with Version 1

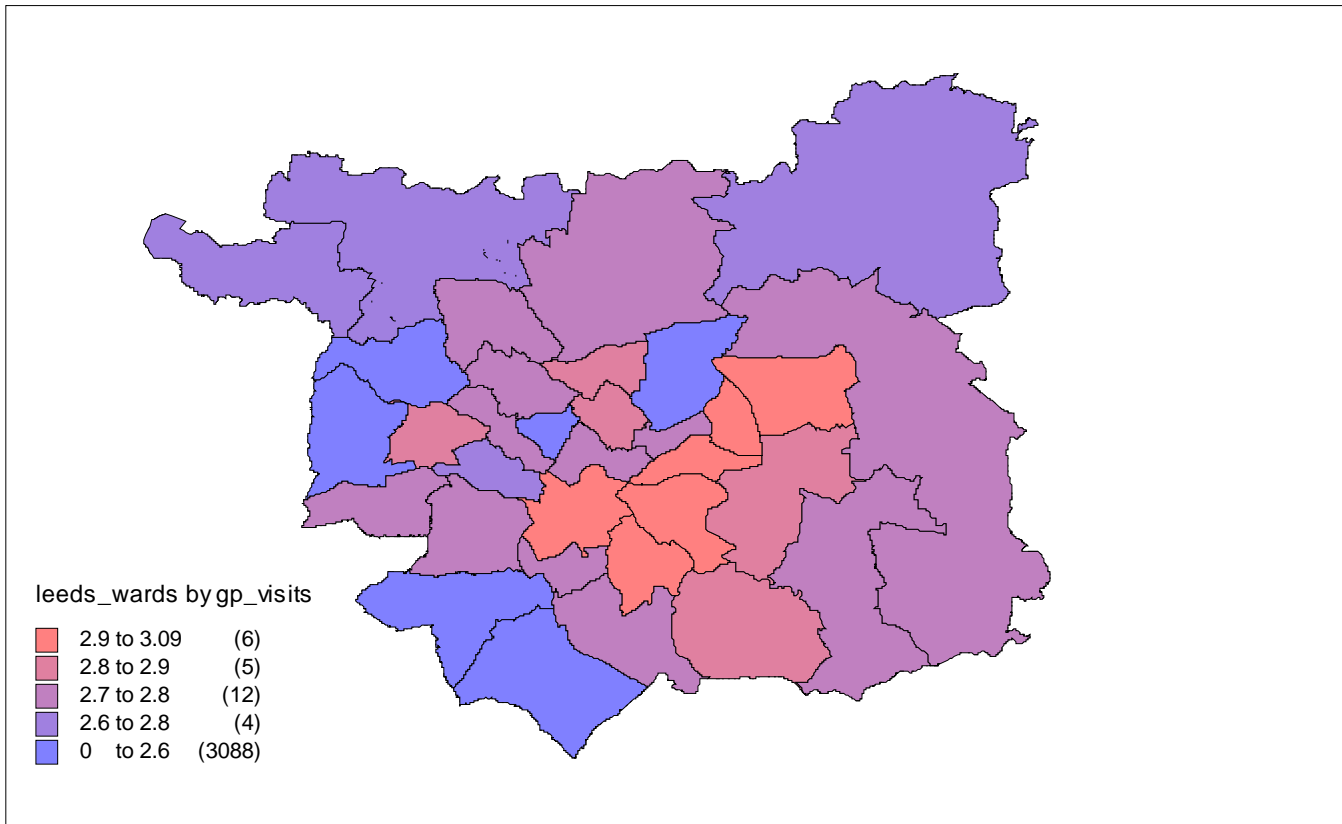
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- Scope (households versus communal establishments)
- Constraints
- Data sources (HSAR vs ISAR)
- Geography (SCAM)
- Household dynamics
- Algorithm/ methodology

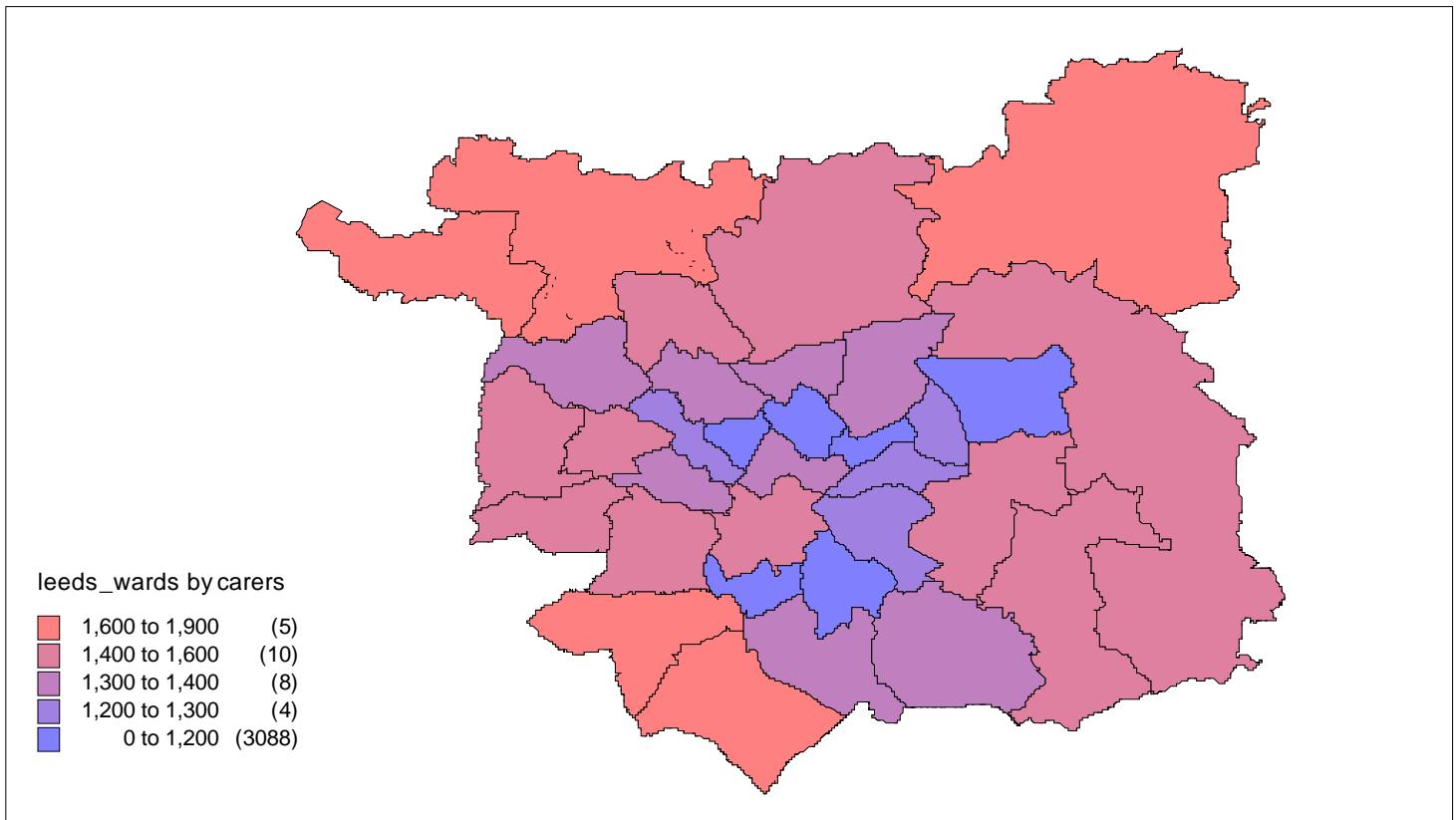
# Smoking



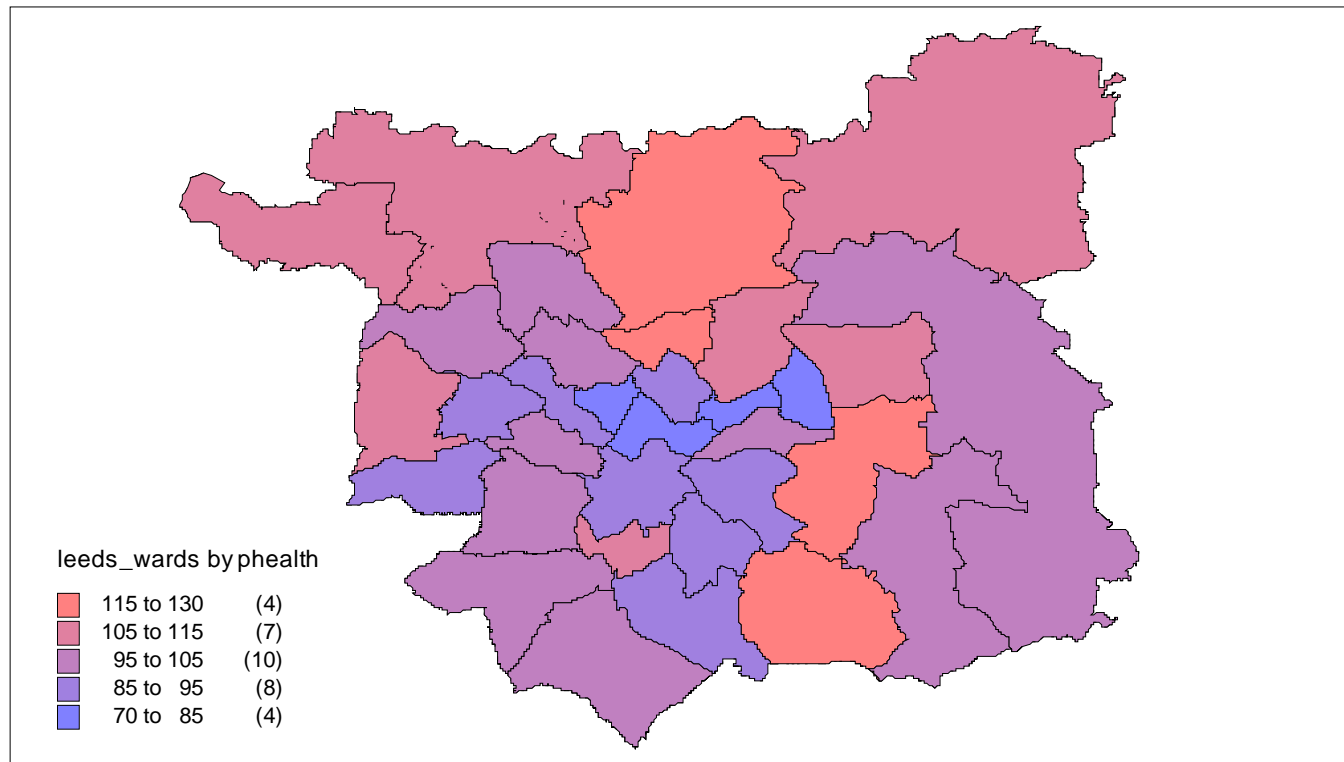
# Visits to GP



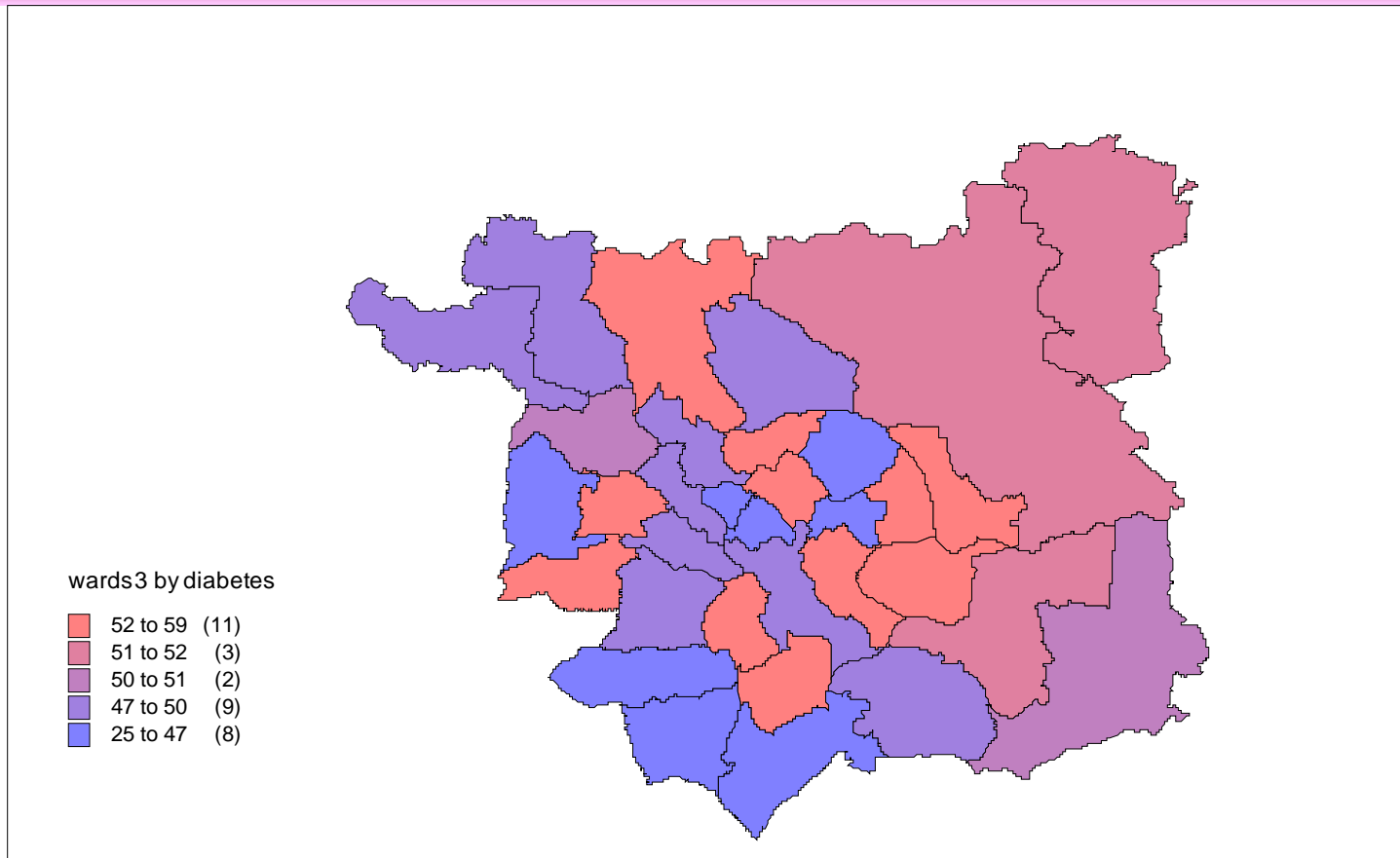
# Carers



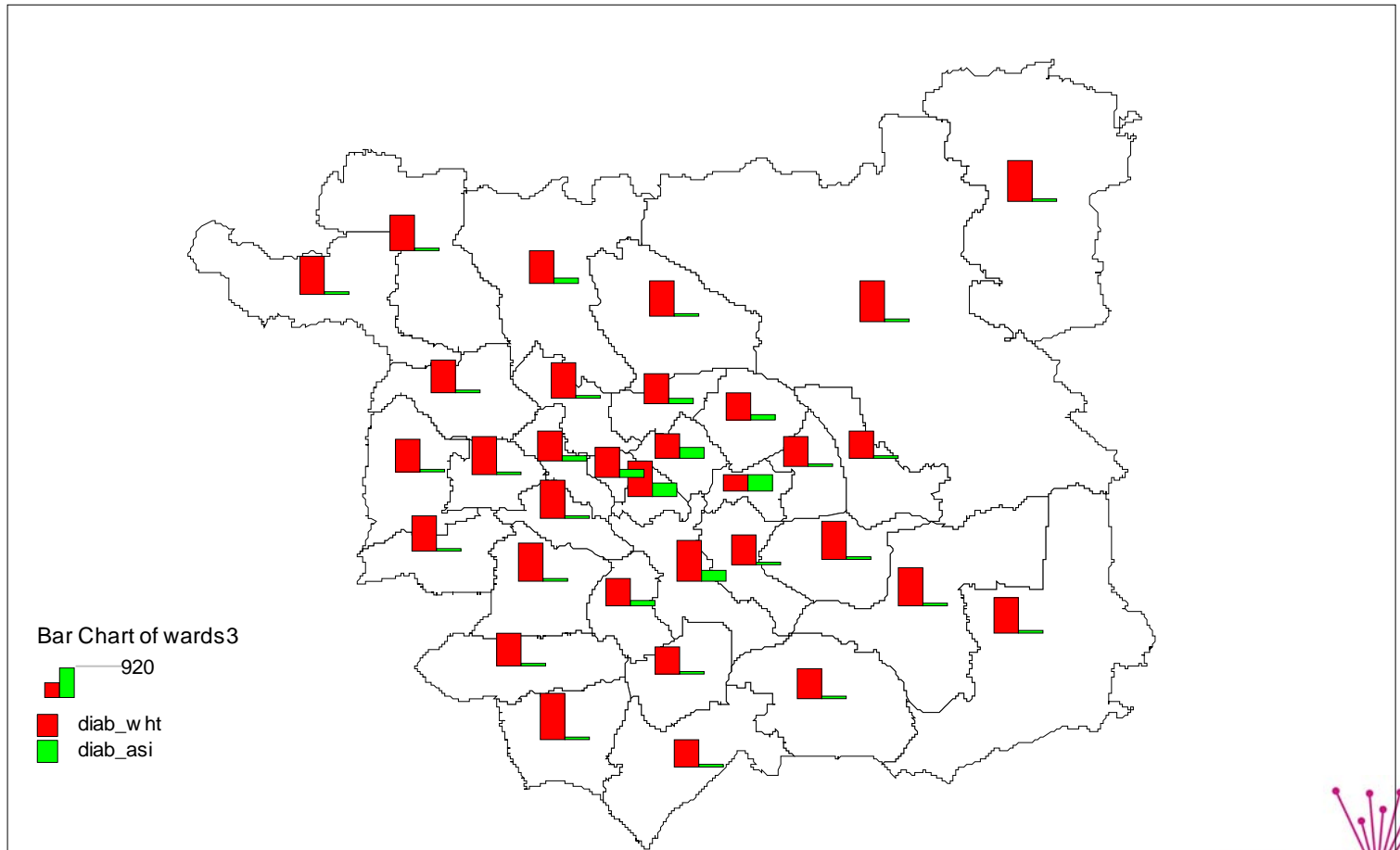
# Private Health Care



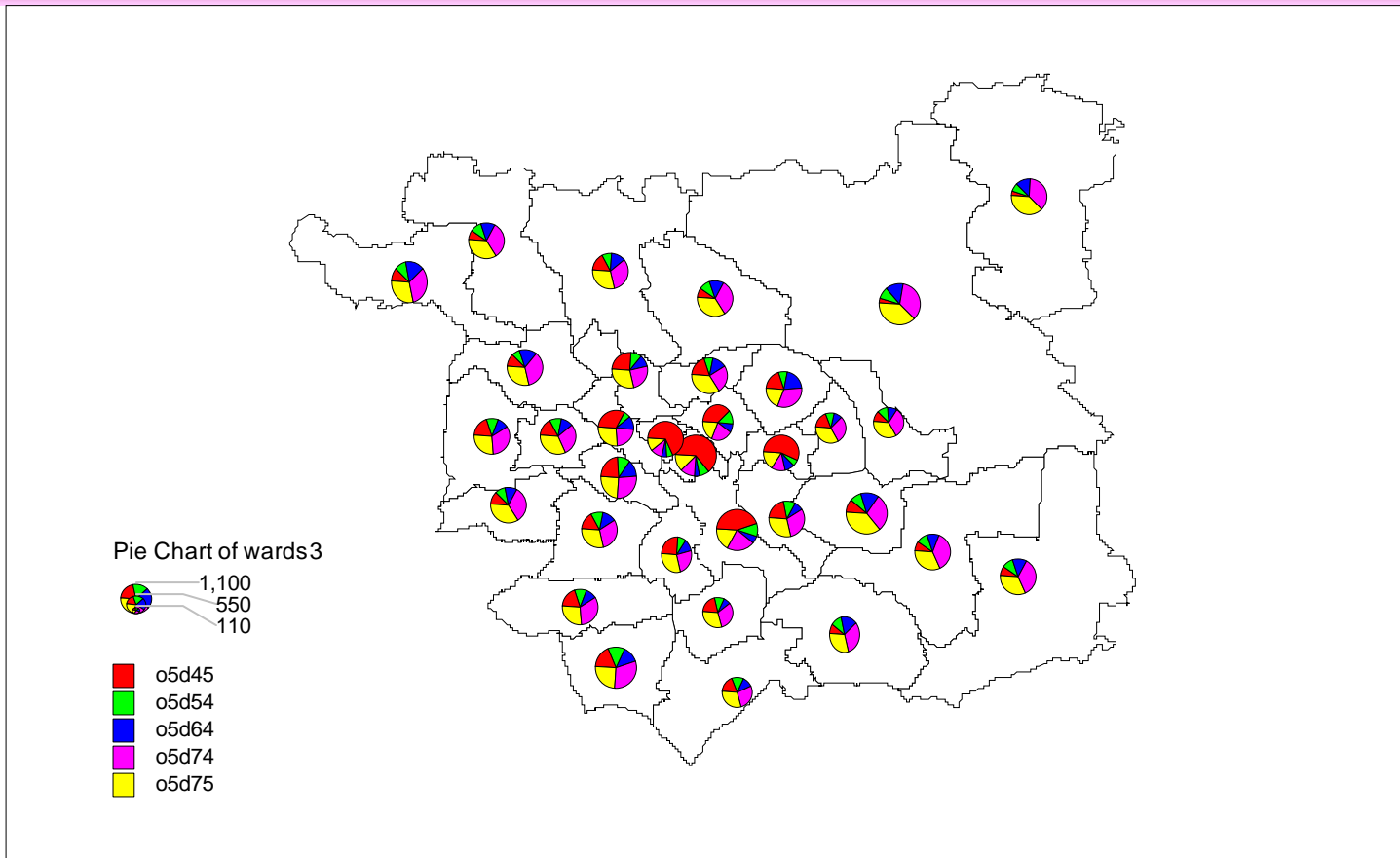
# Diabetes



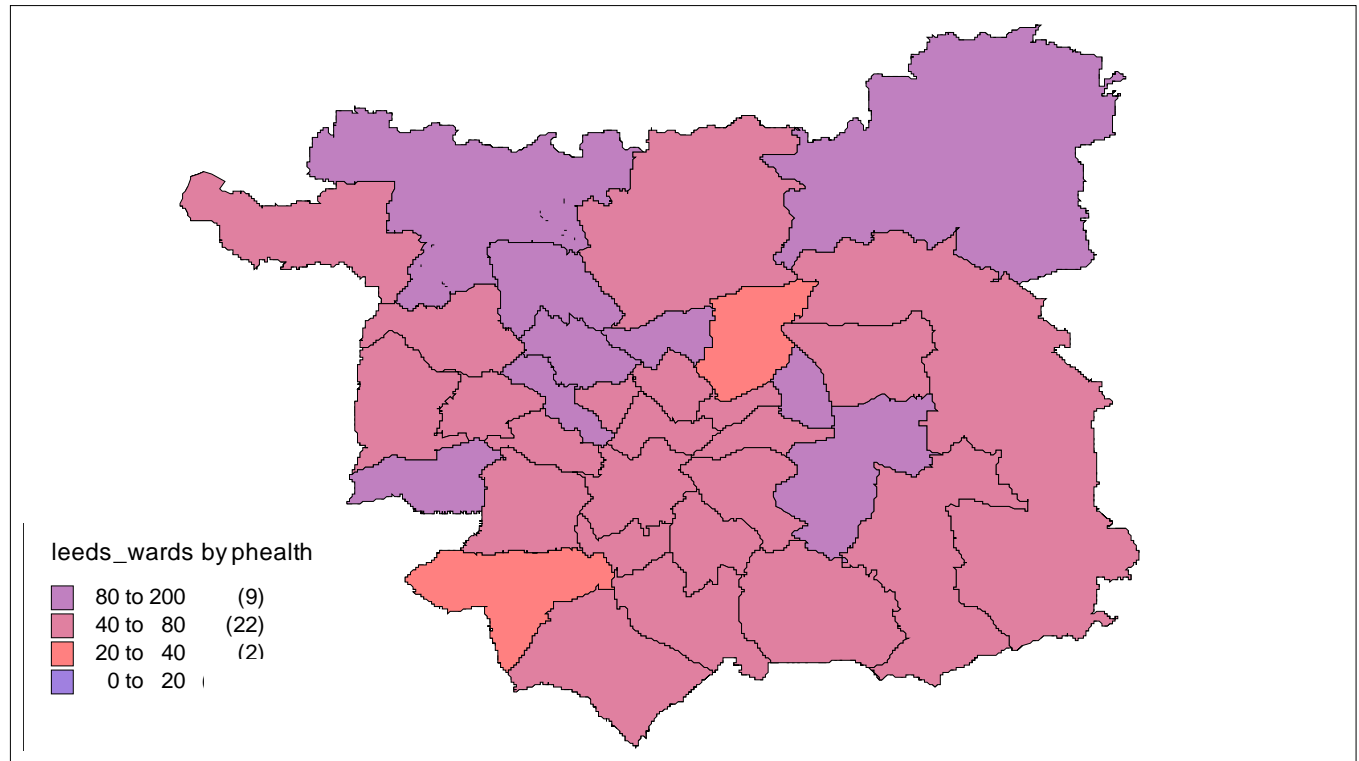
# Diabetes



# Diabetes 2005



# Diabetes 2030



# Moses: Application to Policy Issues

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- The future balance between primary, community and hospital services
  - The 'prevention agenda'
  - Location of services
  - Current and future gaps in services, eg for older people
- Impact of changes in demand for services, eg diabetes, stroke
- Exploration of relationships between formal and informal support networks

# Moses – Next Steps & Conclusions

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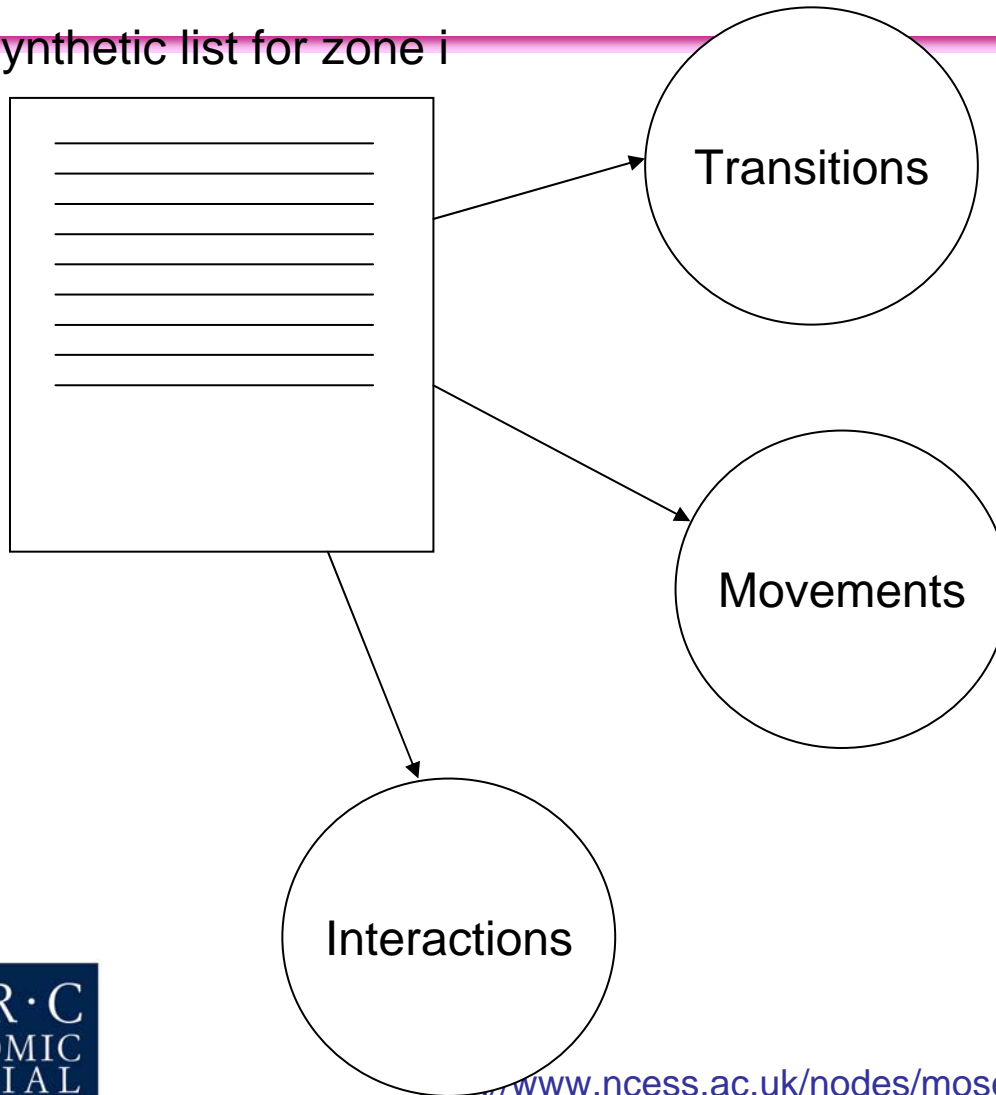
- Moses creates a sophisticated representation of the current and future population of the UK and its behaviour
- UK baseline now available (except Scotland!)
- Dynamic model ('toy' version) (September)
- Grid demonstrator – SC06 (November)
- We are actively seeking engagement with policy communities which recognise the potential value of our approach

# Results from Version 1

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- The relationship between controls, optimising and co-varying attributes is as expected, with closest adherence for constraints and the loosest for co-variation;
- Even the control attributes are not distributed perfectly, which could be a facet of some of the data issues described earlier;
- Co-variation does not appear to be very effectively represented within the algorithm at present. For example, ethnic status is not as strongly spatially clustered within the model as in reality. This probably reflects the fact that none of the controls or optimising attributes currently selected is closely related to ethnic status. An interesting question is what controls and optimising attributes might be selected in order to give the best overall profile of a city and its constituent neighbourhoods.

Synthetic list for zone i



**Dynamic  
modelling**

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# Activity modelling

Synthetic list for zone i

