Addressing Identification Issues in Neighbourhood Effects on Wellbeing

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Workshop
"Addressing Methodological Challenges in the Neighbourhood Effects Research"

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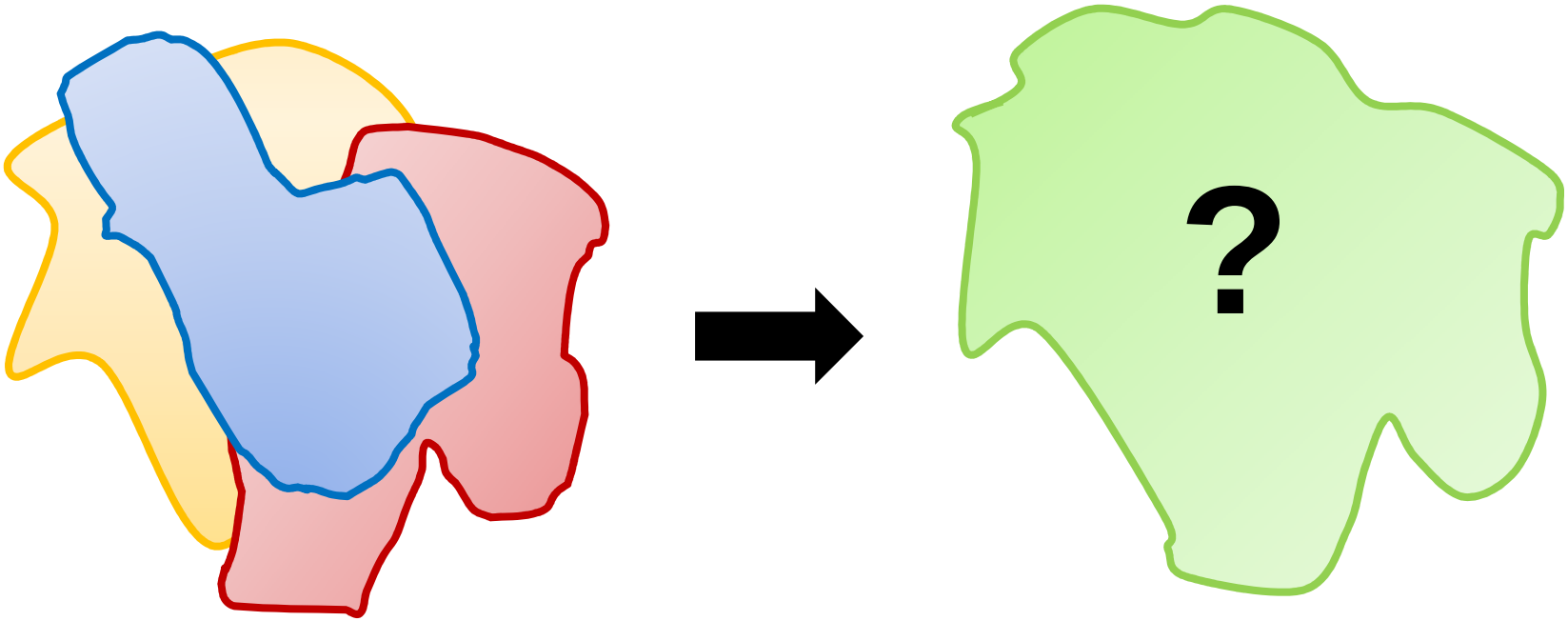
ISEG LISBON SCHOOL OF ECONOMICS & MANAGEMENT UNIVERSIDADE DE LISBOA

ISER INSTITUTE FOR SOCIAL & ECONOMIC RESEARCH

Motivation

- Inequalities in wellbeing result from differences in individual characteristics and differences in place characteristics – in this work we focus on ***how local area deprivation affects individual wellbeing***
- This is important because the efficiency of policy interventions tackling individual poverty and inequality have been impeded by
  - Challenges in identifying a causal relationship between exposure to local deprivation and socio-economic outcomes due to complex non-random residential selections mechanisms
  - The fact that the relevance of this relation may depend on the boundaries and spatial scales used (i.e., scale-dependency of effects and policies)

Which spatial scale?



multiple geographies of mechanisms

geography of policy interventions

Objectives

- Measure the effect of local area contextual deprivation, measured at different spatial scales, on individual wellbeing
  - Focus on role of spatial scale(s)
  - Focus on different subjective and objective measures of wellbeing
- Provide evidence-based recommendations to policy and practice aiming to reverse individual socio-economic inequalities through place-based policies

Research question

Is there an effect of neighbourhood deprivation on individual wellbeing?

- Does the effect vary by wellbeing outcome?
  - 4 outcomes
- Does the effect vary by neighbourhood scale?
  - 13 scales
- Is the effect causal?
  - 3 model specifications and 2 sensitivity analyses

Buck (2001): Neighbourhood Effects on Social Exclusion, Urban Studies.

New stuff!

Identification challenge in empirical modelling

$$\boldsymbol{y_{i,j,t}} = \alpha + \beta_1 \boldsymbol{X_{i,j,t}} + \beta_2 \boldsymbol{N_{j,t}} + \omega_i + \delta_j + \tau_t + \mu_{i,j,t}$$

where:

$\boldsymbol{y_{i,j,t}}$ - wellbeing outcome for individual *i* in area *j* at time *t*

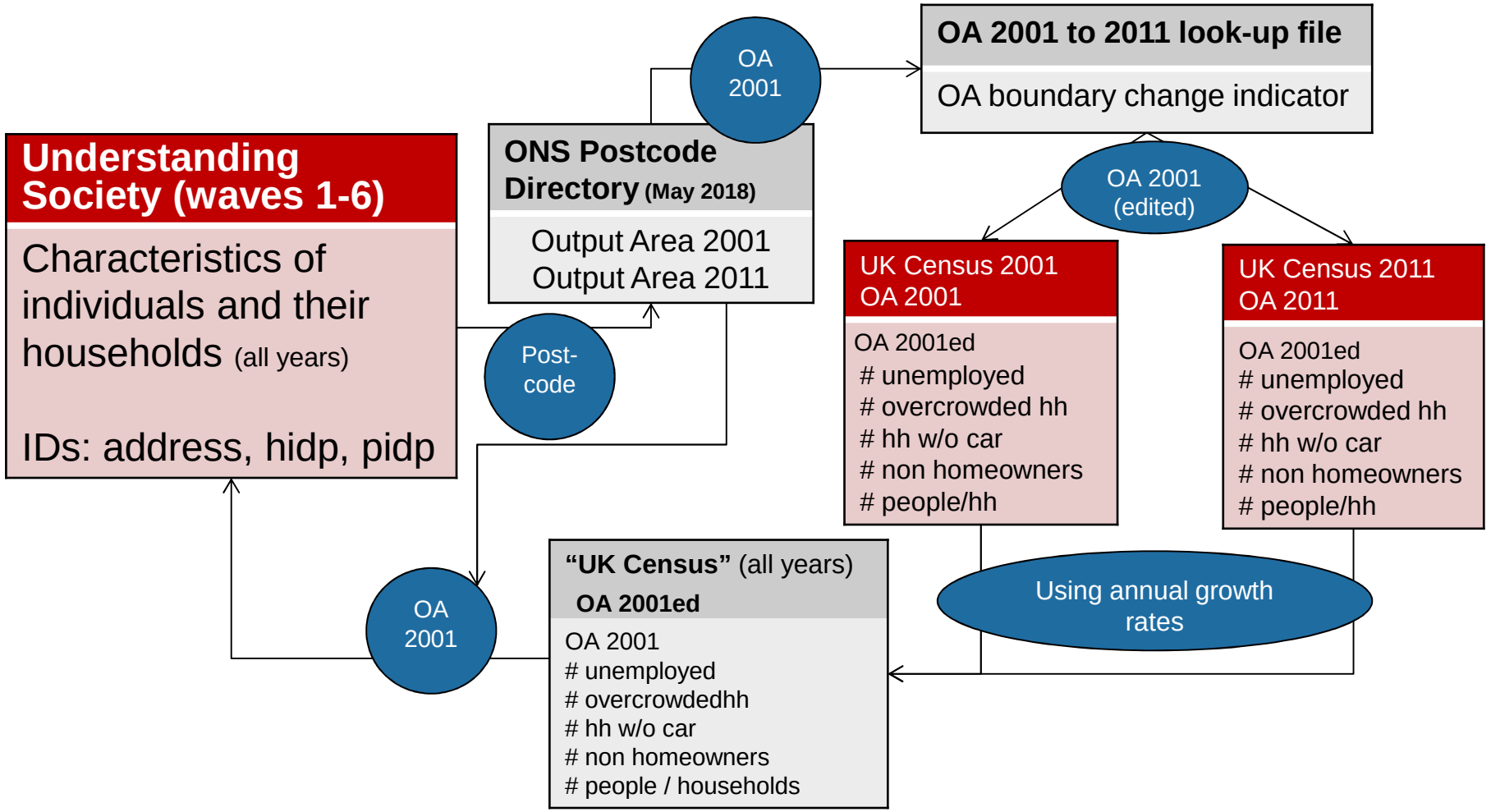
$\boldsymbol{X_{i,j,t}}$ - individual attributes including family background and initial conditions

$\boldsymbol{N_{j,t}}$ - area or neighbourhood *j* characteristics

$\boldsymbol{\omega_i, \delta_j, \tau_t, \ \mu_{i,j,t}}$

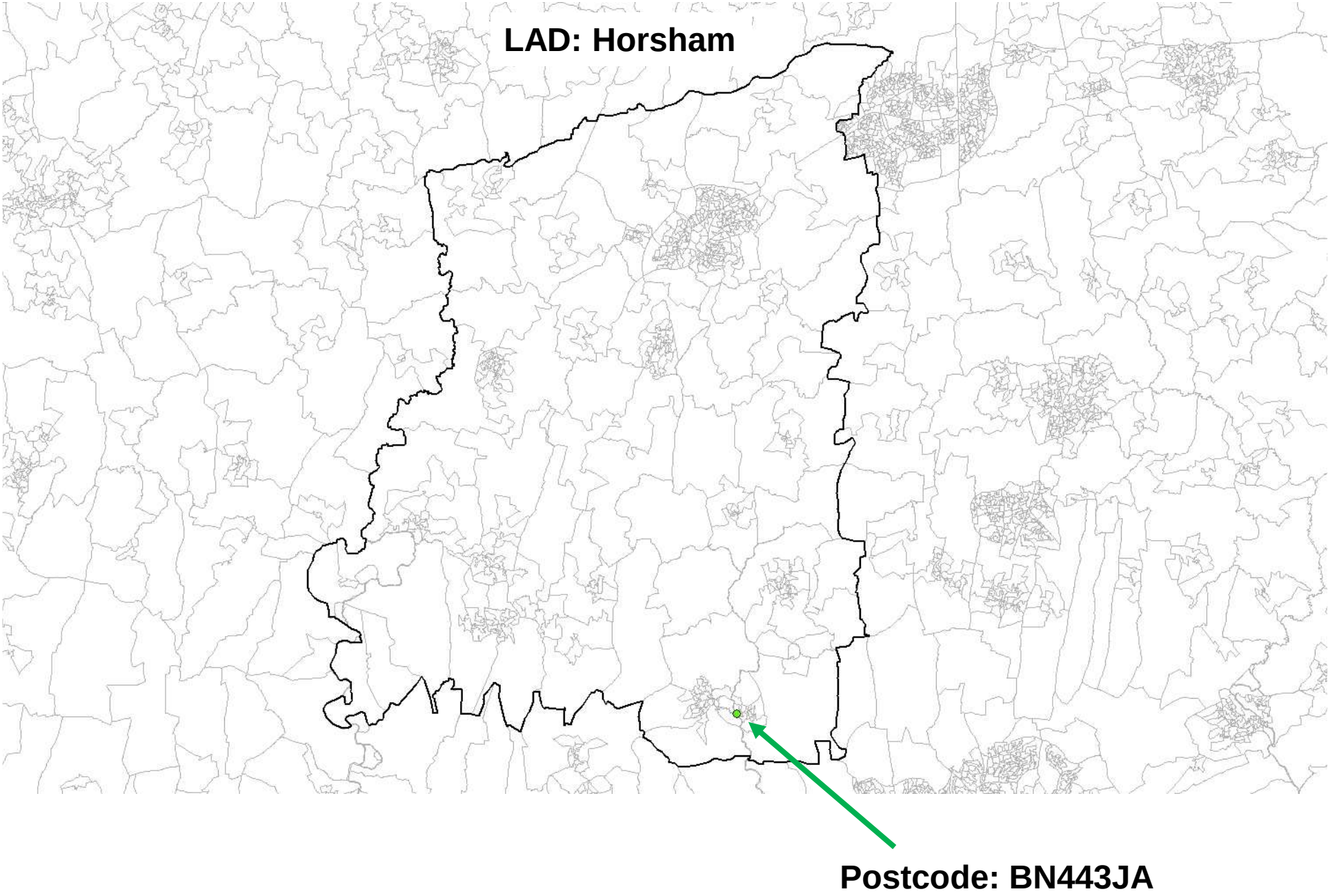
Based on: Manski, C.F. 1993. Identification of Endogenous Social Effects: The Reflection Problem. *The Review of Economic Studies*, Vol. 60 (3), 531-542. Durlauf, S.N., 2004. Neighborhood effects. In: Henderson, J.V., Thisse, J.-F. (Eds.), Handbook of Regional and Urban Economics vol. 4. Elsevier, pp. 2173–2242.

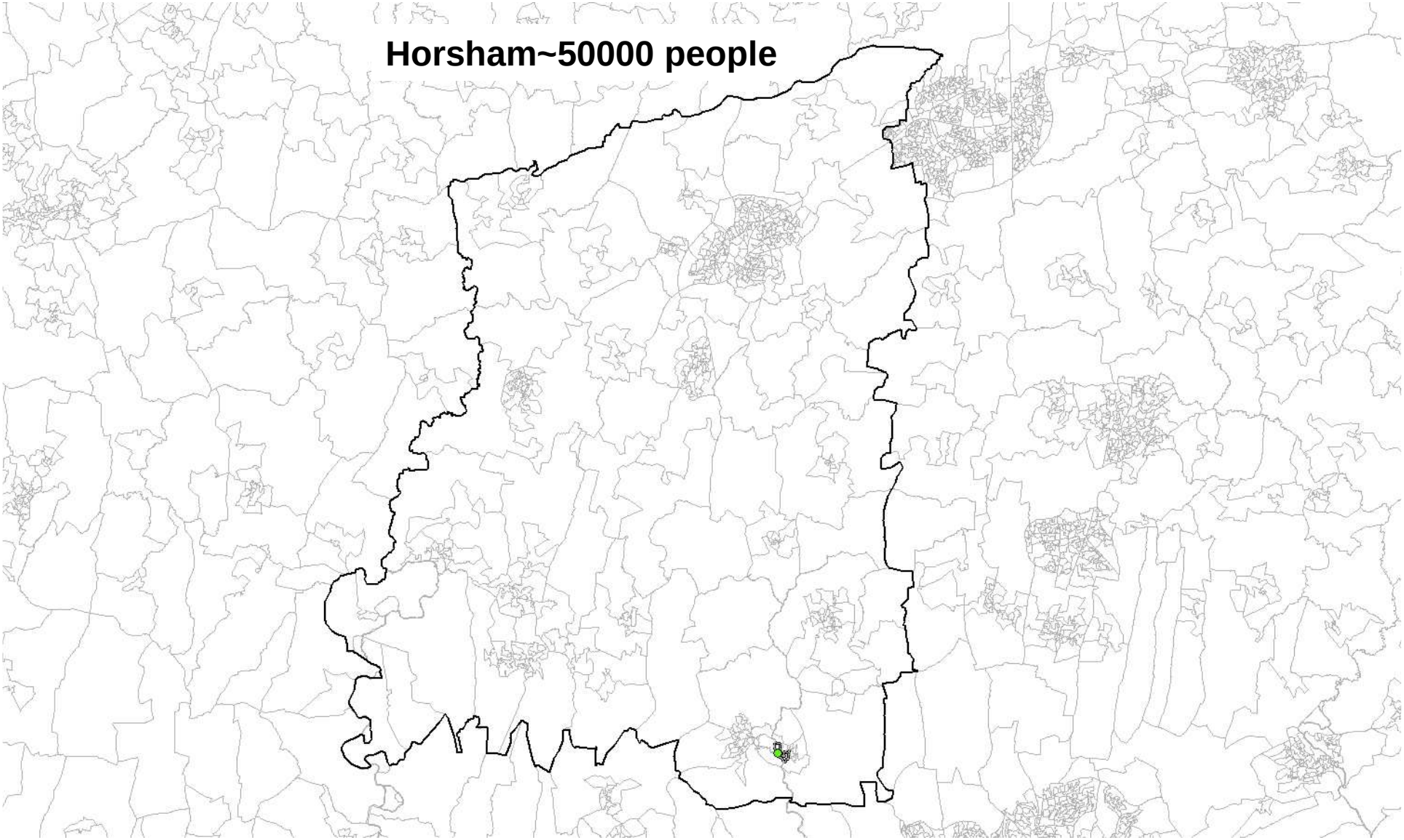
Data - panel data linked with longitudinally harmonised neighbourhood data …



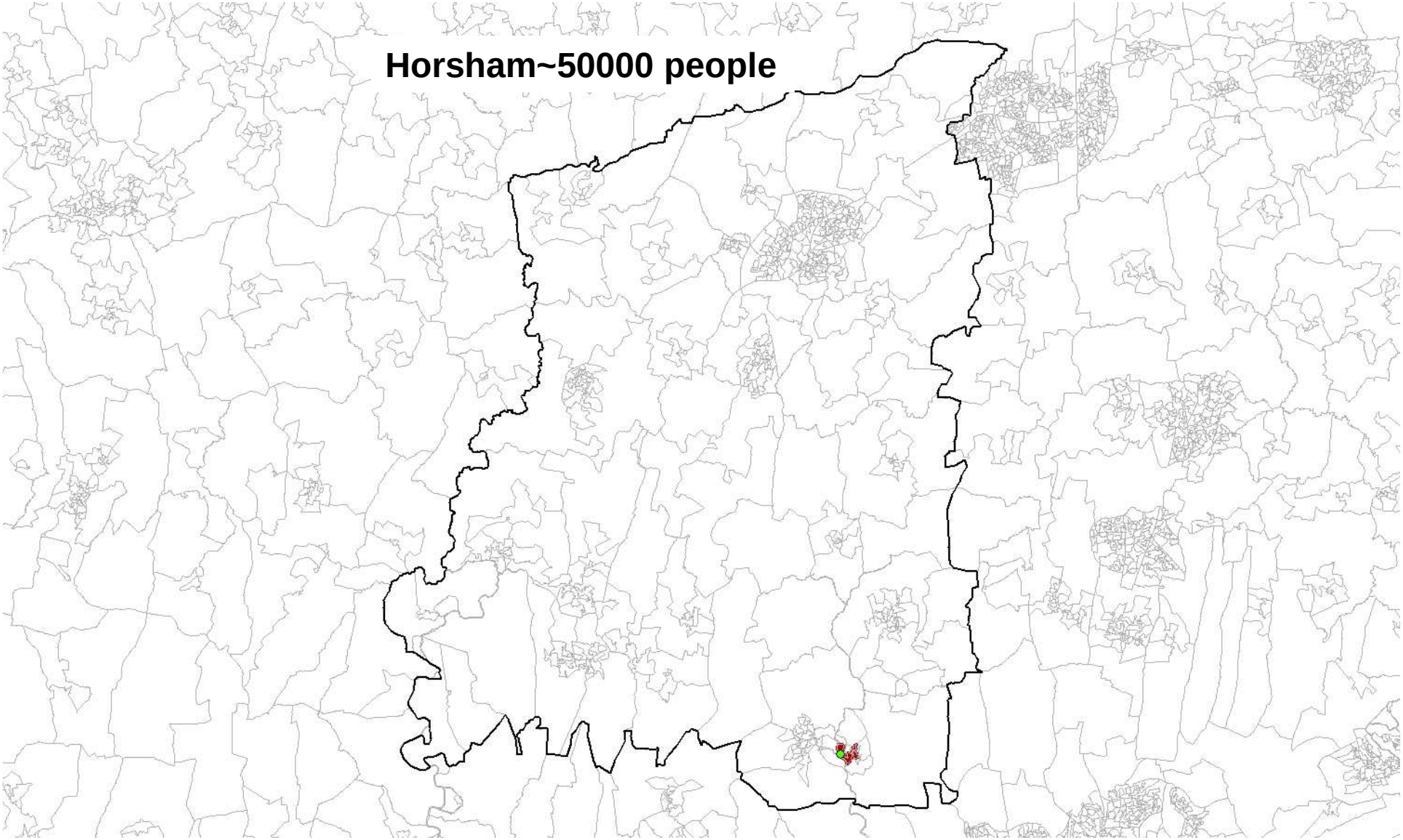
… at bespoke scales

LAD: Horsham (~55k)
West Sussex, England

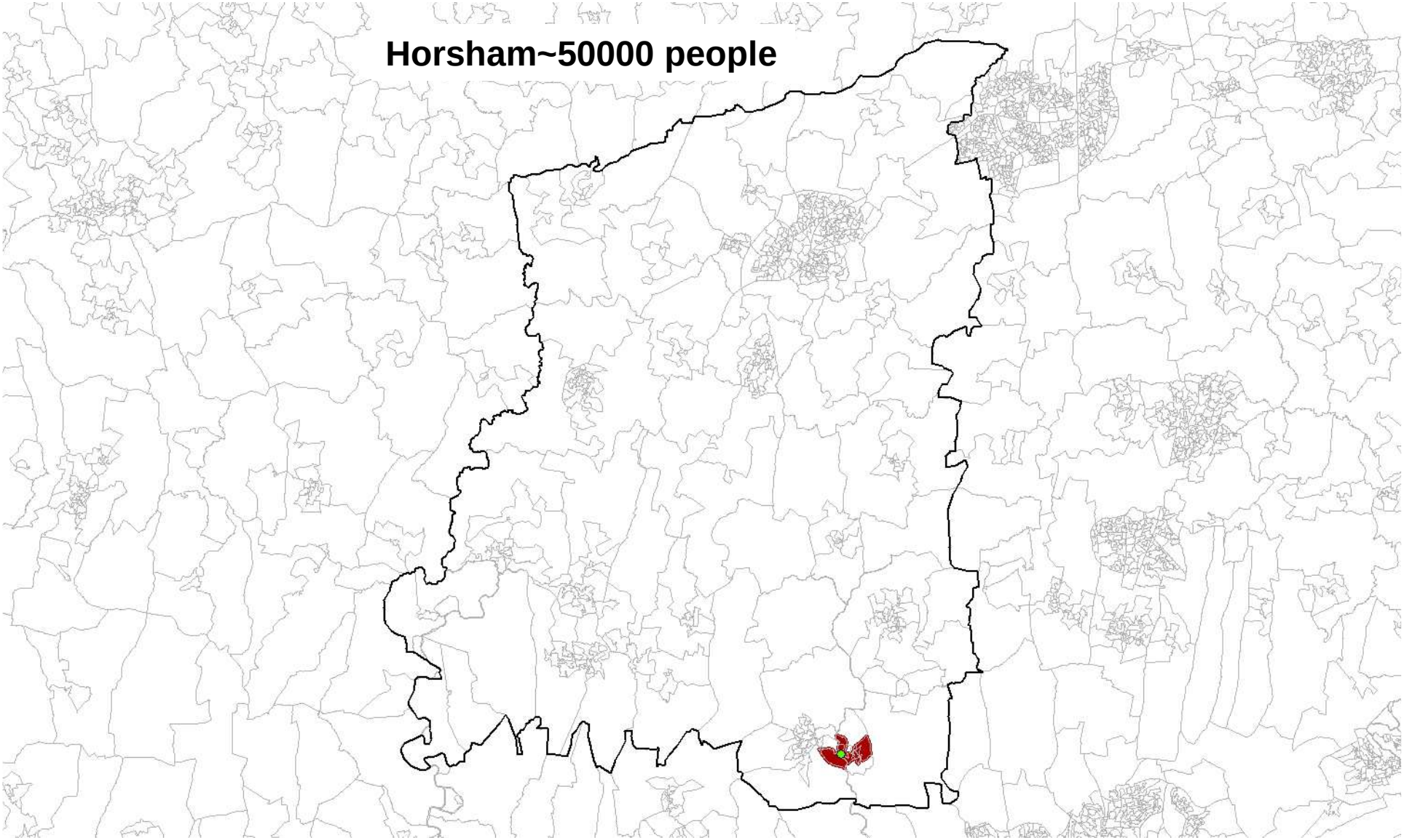

LAD: Horsham
Postcode: BN443JA



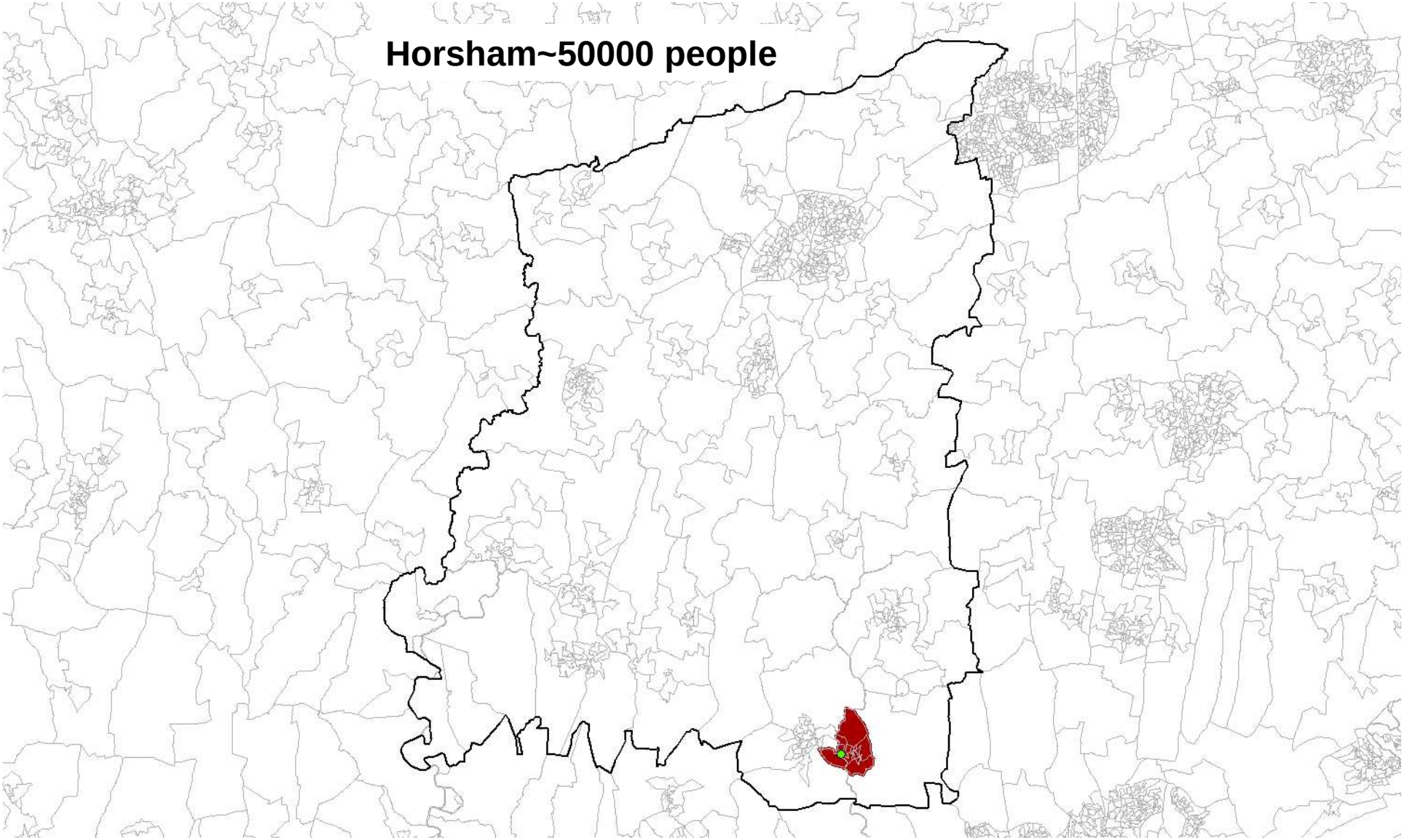
bNN, k=500 people



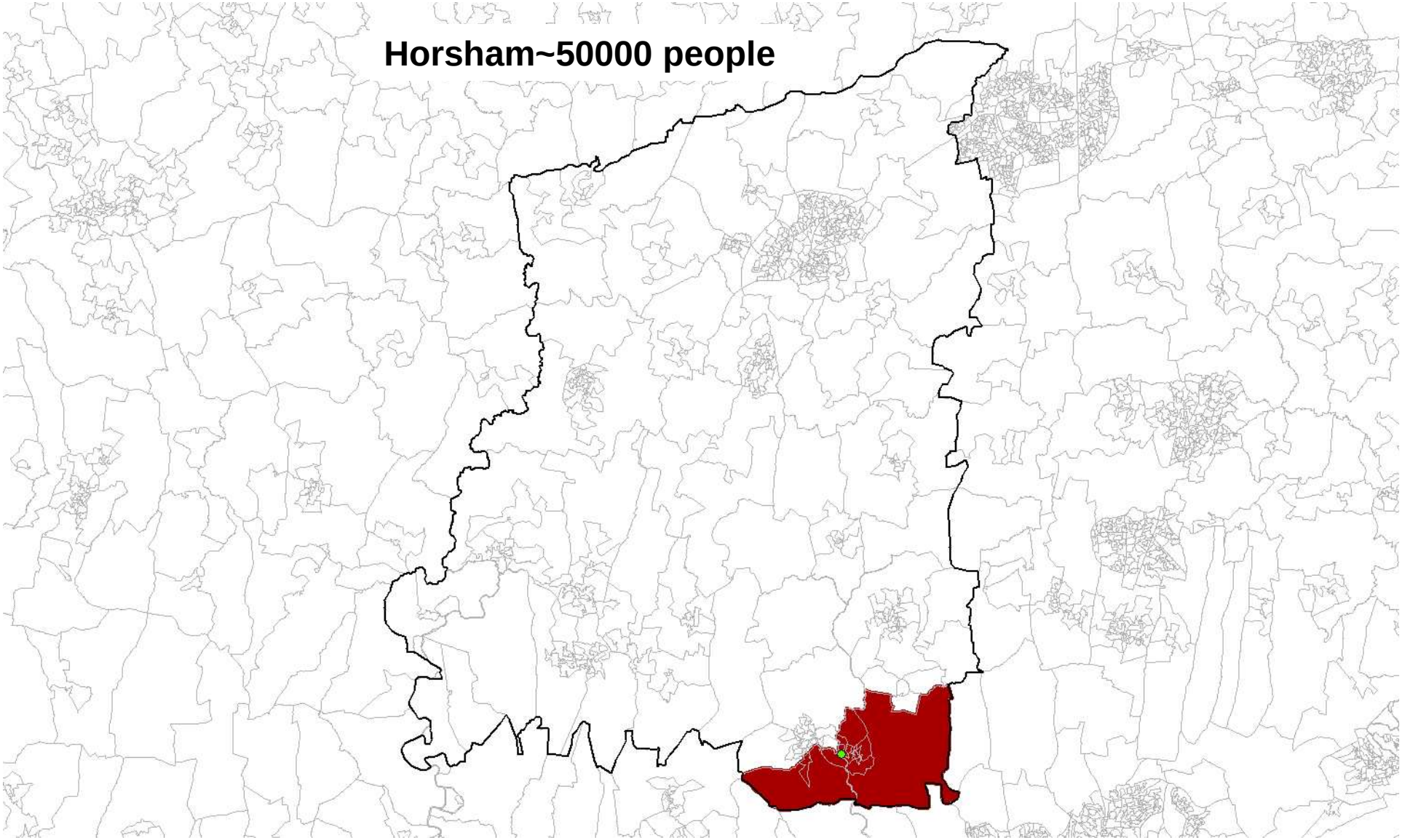
bNN, k=1000 people



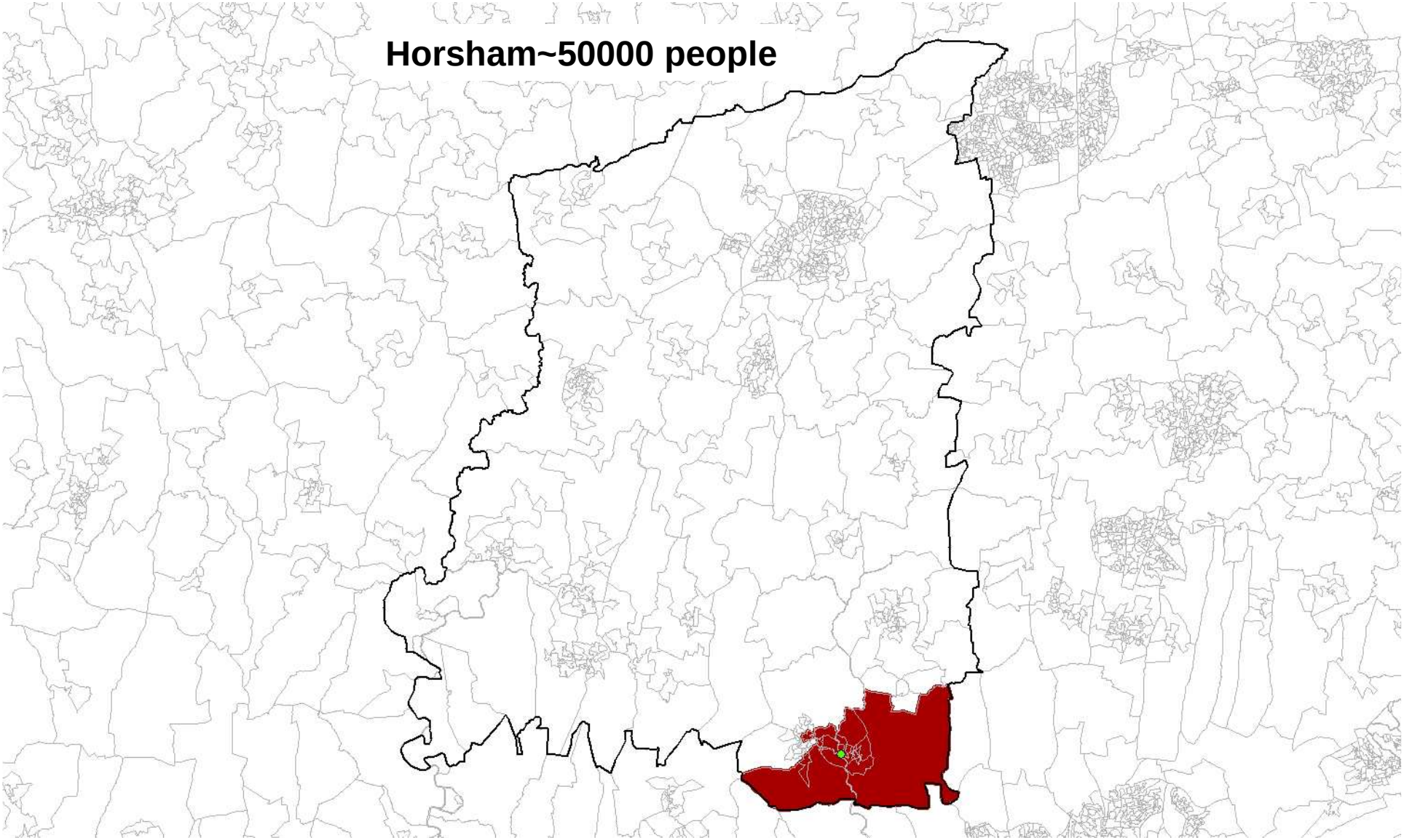
bNN, k=2000 people



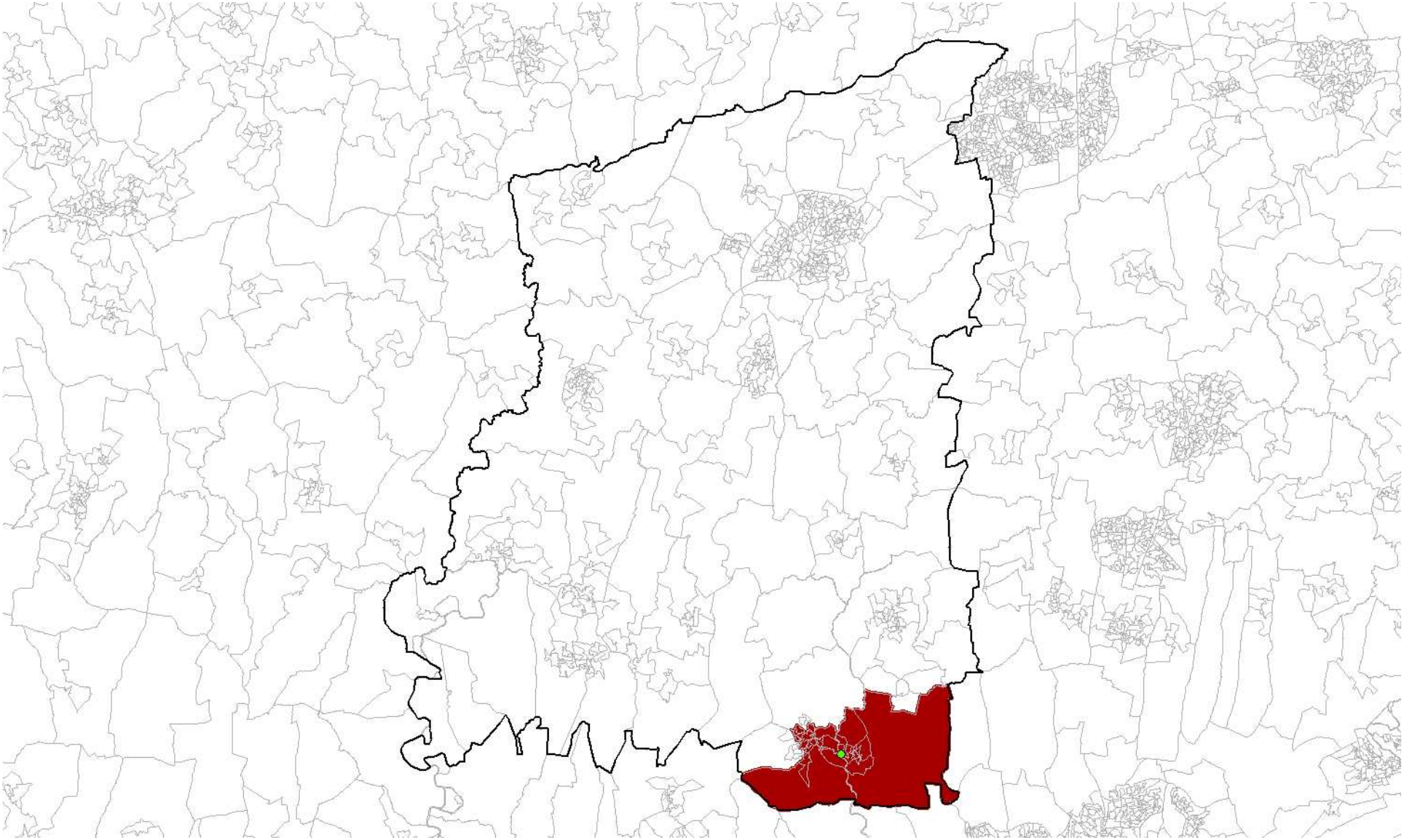
bNN, k=4000 people



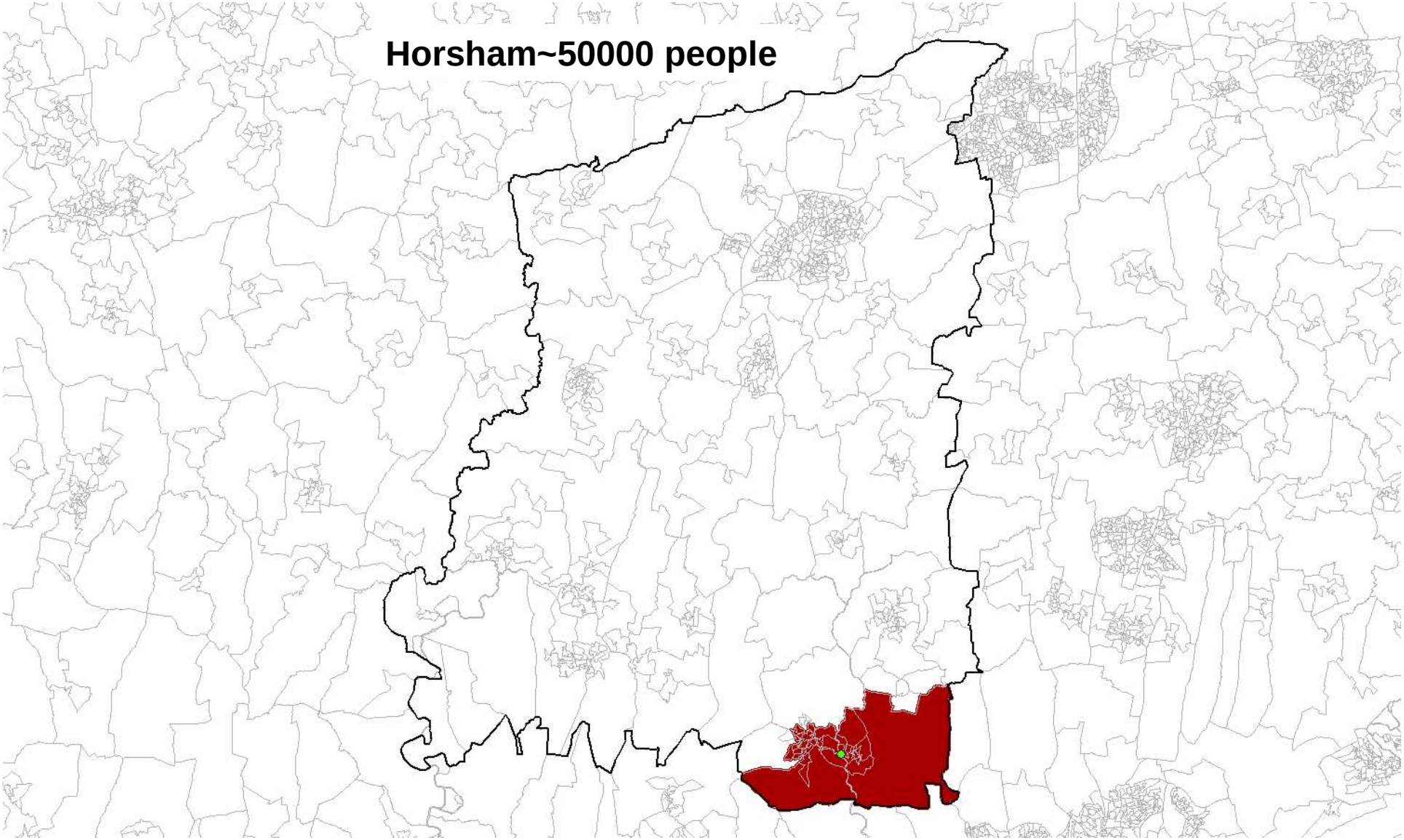
bNN, k=5000 people



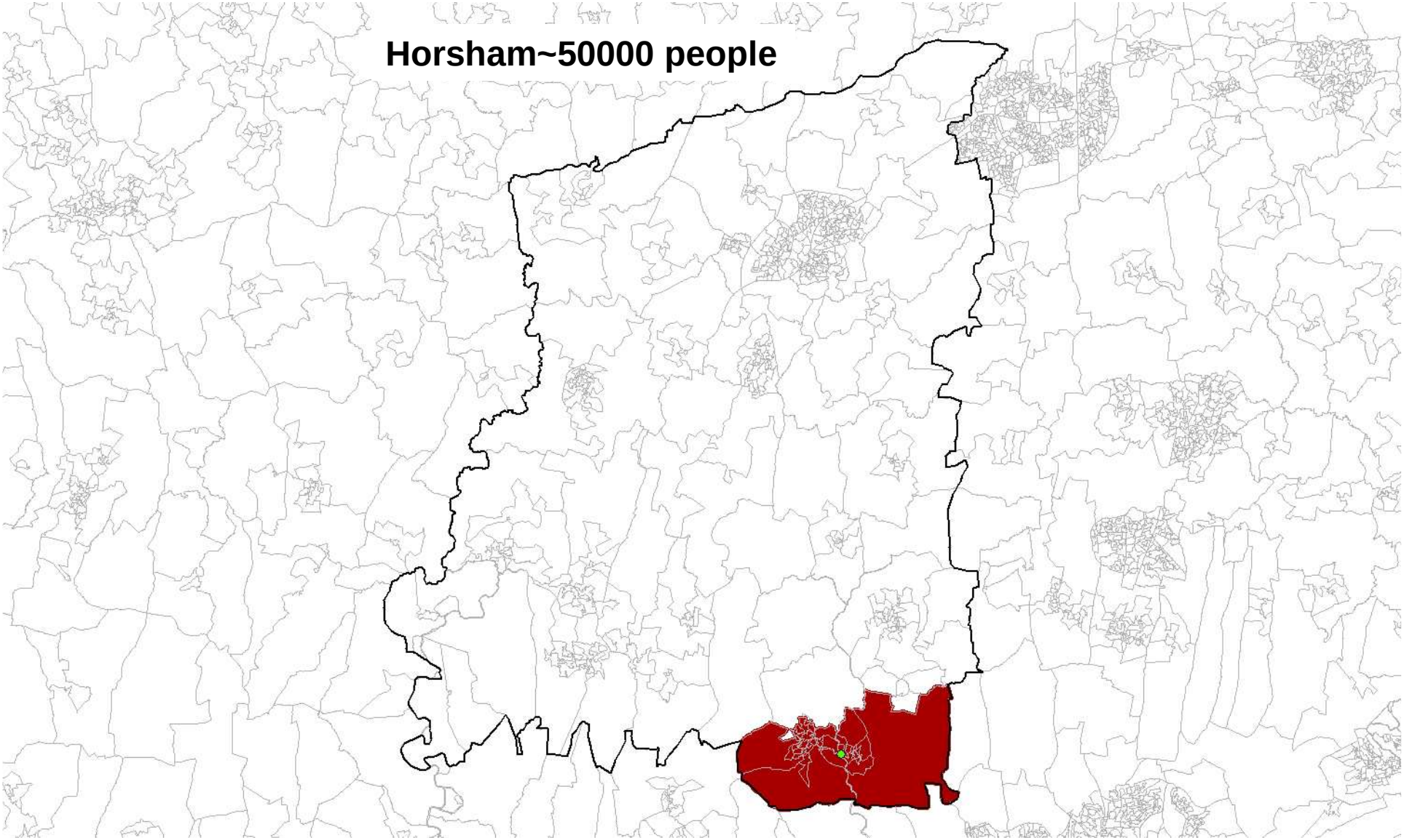
bNN, k=6000 people



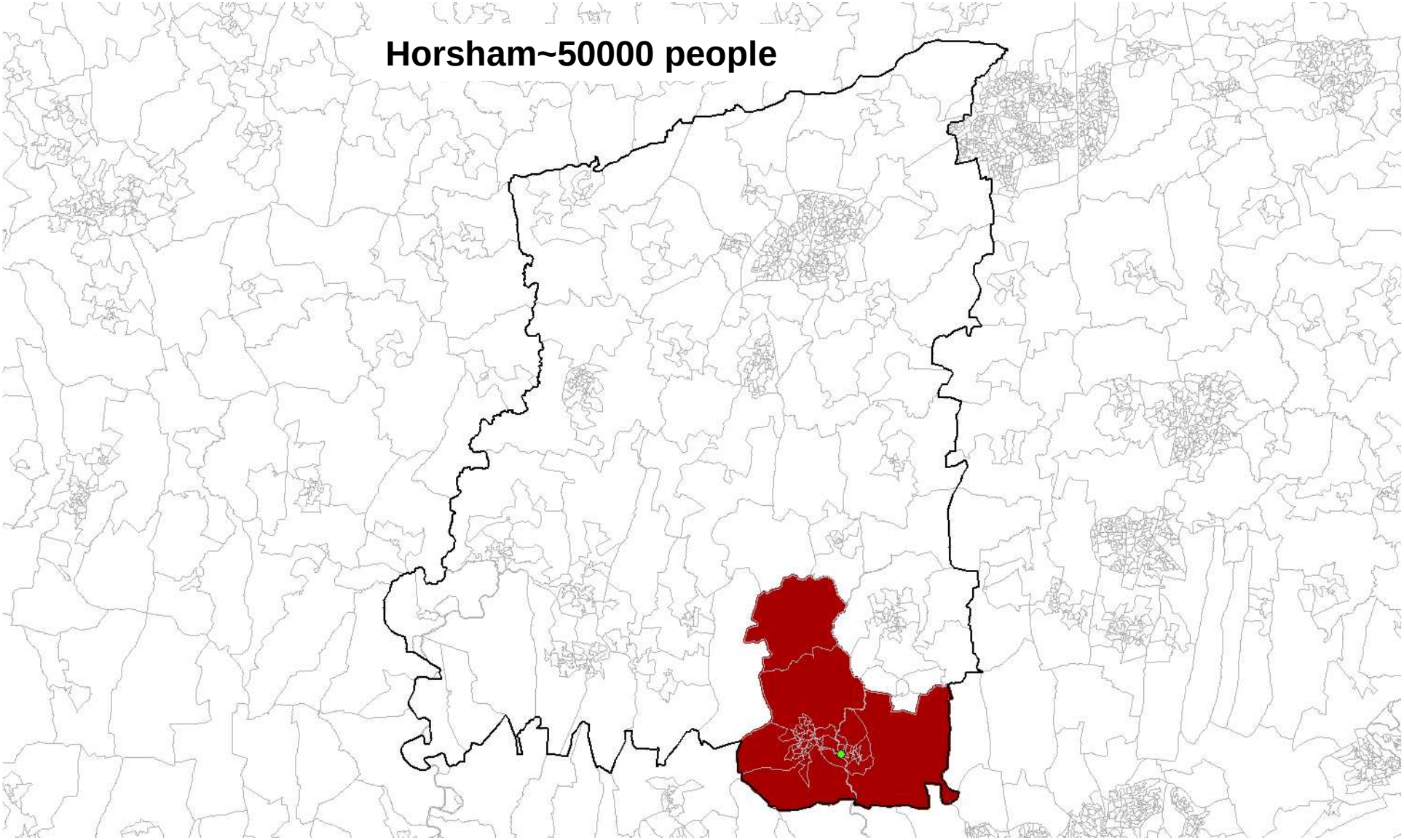
bNN, k=7000 people



bNN, k=8000 people



bNN, k=9000 people



bNN, k=10000 people

Outcome variables and sample description

- Subjective outcomes:
  - Life satisfaction
  - SF12 Mental health
  - SF12 Physical health
- Objective outcome:
  - Hourly wage

	All	Waged
# of obs	166,632	77,790
# of individuals	47,414	25,275
$\bar{x}$ time in panel	3.5	3.1

	$\bar{x}$	$\bar{x}$ change	Min	Max
Life satisfaction	5.1	0	1	7
Mental health	49.7	-0.3	0	78.1
Physical health	49.6	-0.3	4.5	76.3
Hourly wage	13.2	0.8	3.1	72.3

Source: UKHLS W1-6, 2018. Linked with UK Census data

Key independent variable
Townsend Index

Scale	$\bar{x}$	$\bar{x}$ change	Min	Max	# of units
Output Area	-0.09	0.003	-6.8	11.0	29,676
Lower Super Output Area	-0.01	-0.001	-6.9	11.5	17,517
Population threshold …*500*	-0.05	-0.001	-7.7	11.3	28,708
1k	-0.02	-0.002	-7.1	11.4	25,120
2k	0.00	0.000	-7.4	11.7	25,267
3k	0.02	0.000	-7.1	11.8	20,586
4k	0.03	0.002	-7.2	11.9	20,790
5k	0.04	0.003	-6.9	12.2	18,492
6k	0.05	0.002	-6.9	11.9	15,798
7k	0.05	0.004	-7.0	12.0	16,439
8k	0.06	0.004	-7.2	12.0	19,482
9k	0.07	0.005	-7.4	12.0	19,275
10k	0.08	0.005	-7.5	11.8	19,543

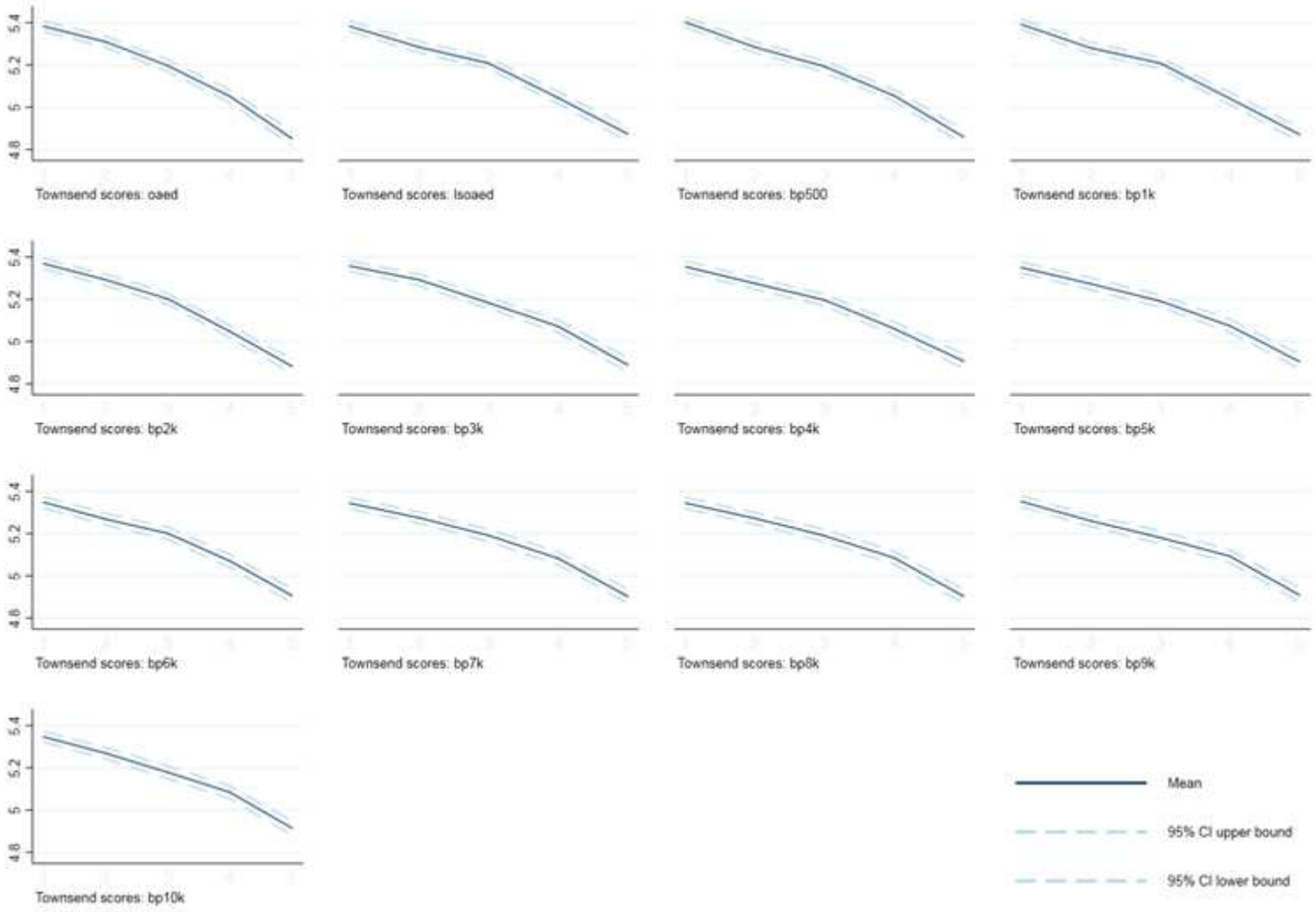
Positive values signify relatively deprived areas

Variables and sample description
Other control variables

- Baseline models:
  - Age (age_dv), Gender (sex_dv), Ethnicity (racel_dv), Whether born in the UK (ukborn_dv), Marital status (mastat_dv), Highest educational qualifcation (hiqual_dv), NS-SEC of current job (jbsoc00 ➔ NS-SEC5), Economic activity (empstat), Household income (fihhmnnet1_dv), Housing tenure (tenure_dv)
  - From NOMIS: Annual national unemployment rate, Annual unemployment rate in local authority
  - From ONSPD: Country, Whether respondent lives in London, Urban-rural classification.
- Full models:
  - NS-SEC of own first job (j1soc00 ➔ NS-SEC5), NS-SEC of father's job when respondent aged 14 (pasoc00 ➔ NS-SEC5), NS-SEC of mother's job when respondent aged 14 (masoc00 ➔ NS-SEC5)

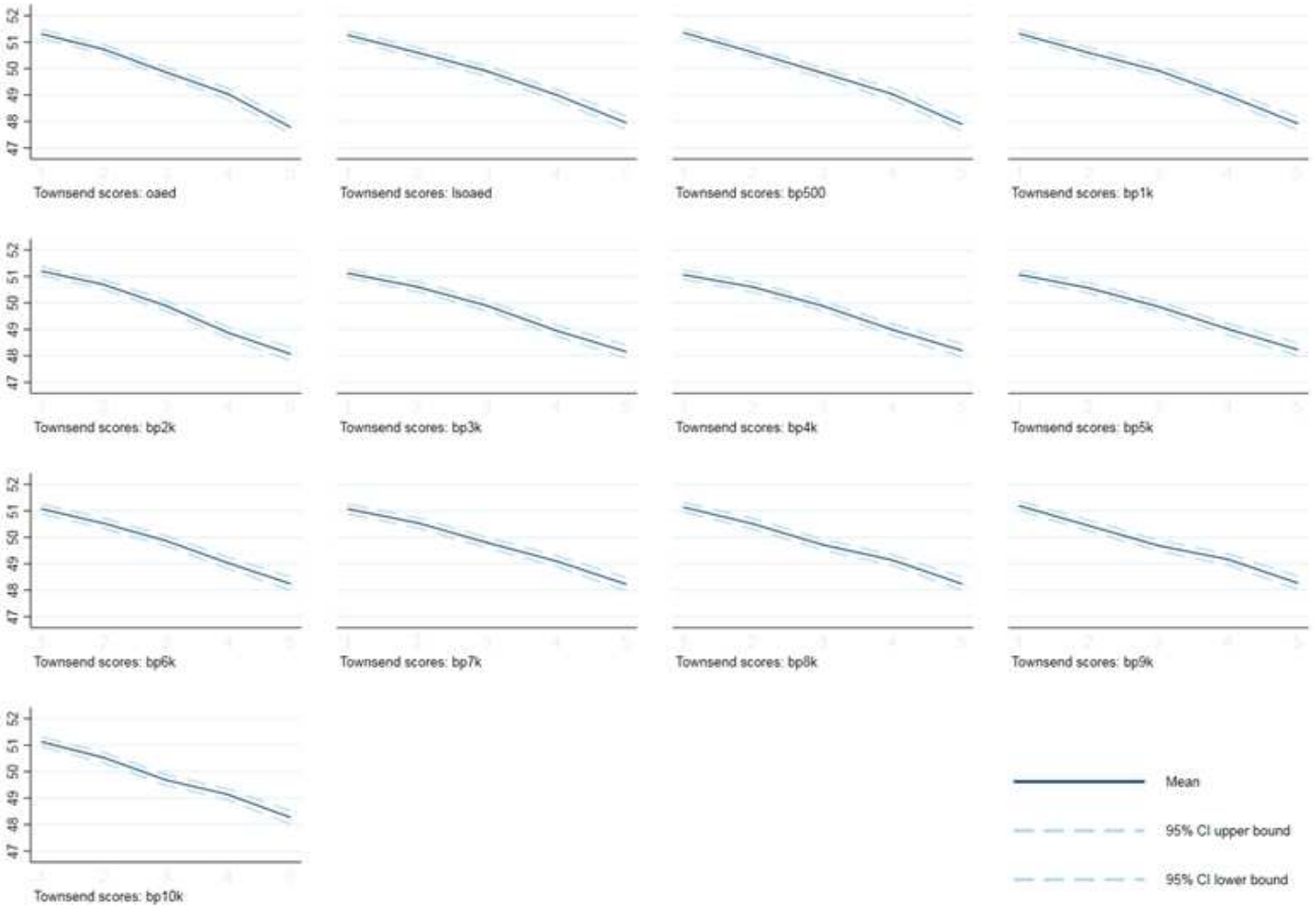
Life satisfaction by neighbourhood deprivation at various scales

(Population estimates for England & Wales 2009-2016)



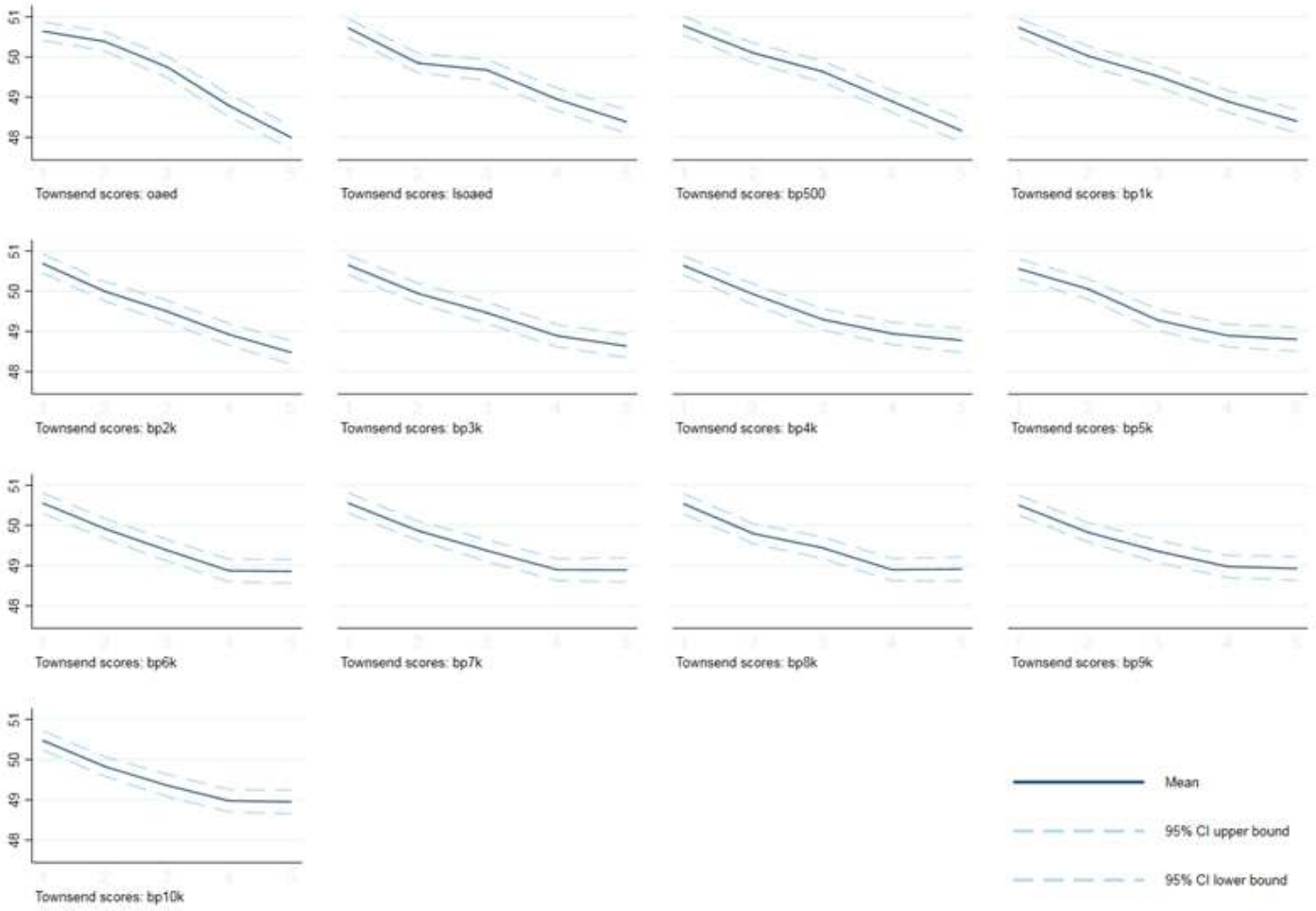
Mental health by neighbourhood deprivation at various scales

(Population estimates for England & Wales 2009-2016)



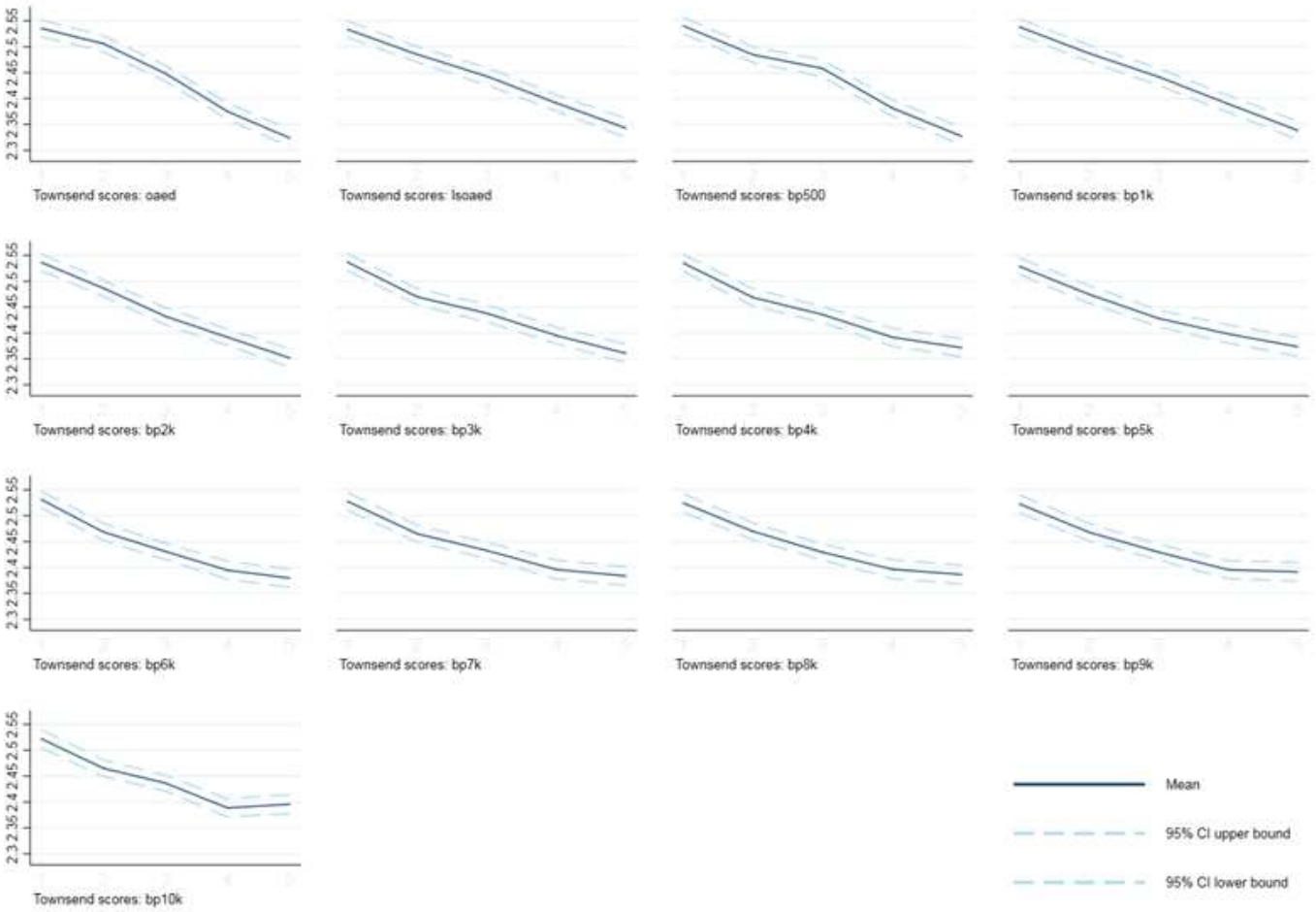
Physical health by neighbourhood deprivation at various scales

(Population estimates for England & Wales 2009-2016)



Hourly wage by neighbourhood deprivation at various scales

(Population estimates for England & Wales 2009-2016)



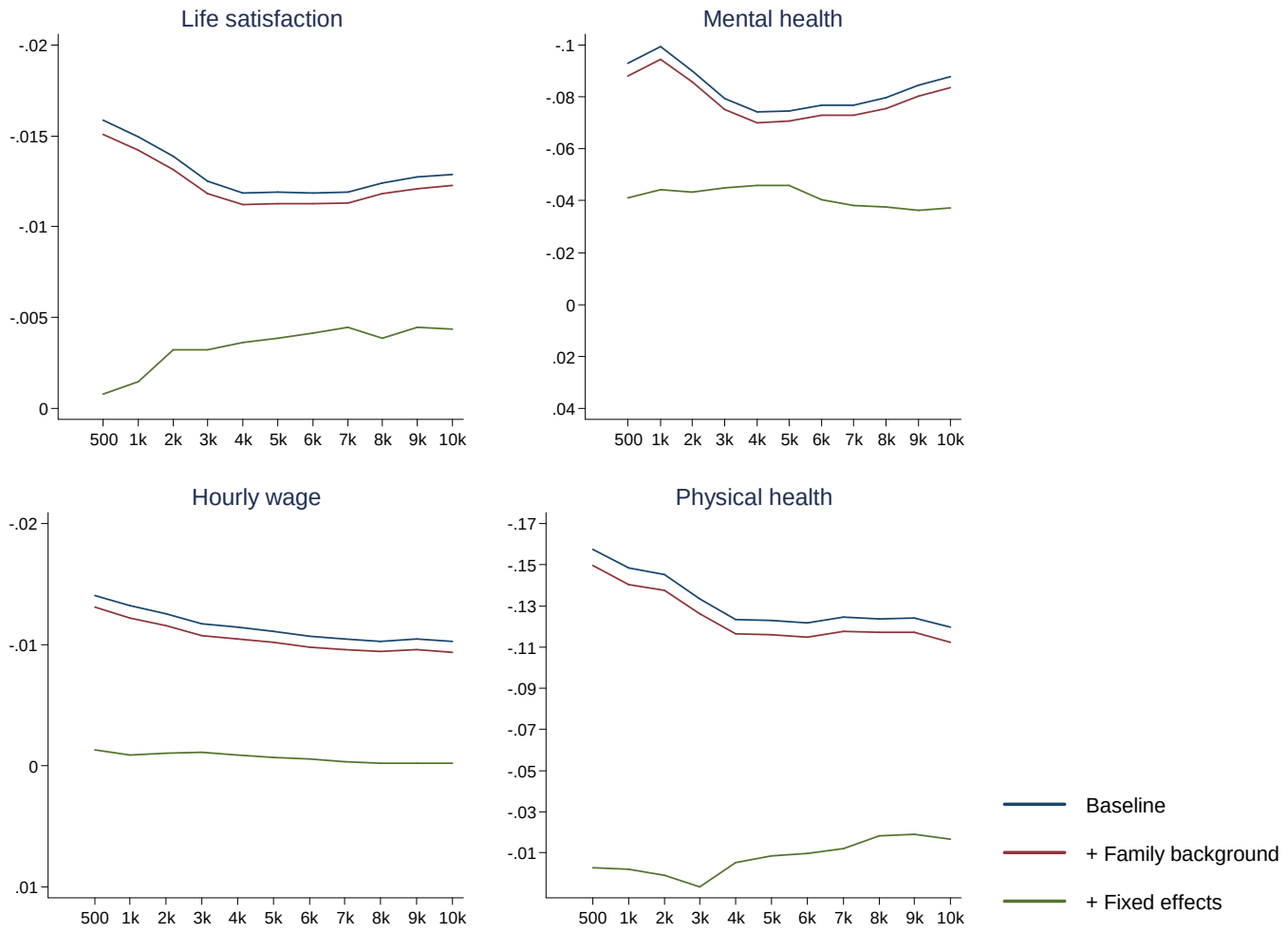
Empirical modelling approach

- Model specifications:
  - **Pooled OLS** with basic set of controls
  - + family background controls
  - + individual fixed effects (**Correlated Random Effects**)
- Restrict sample to those who
  - would like to move house (prmv)
  - are social renters (shs)

  + individual fixed effects (**Correlated Random Effects**)

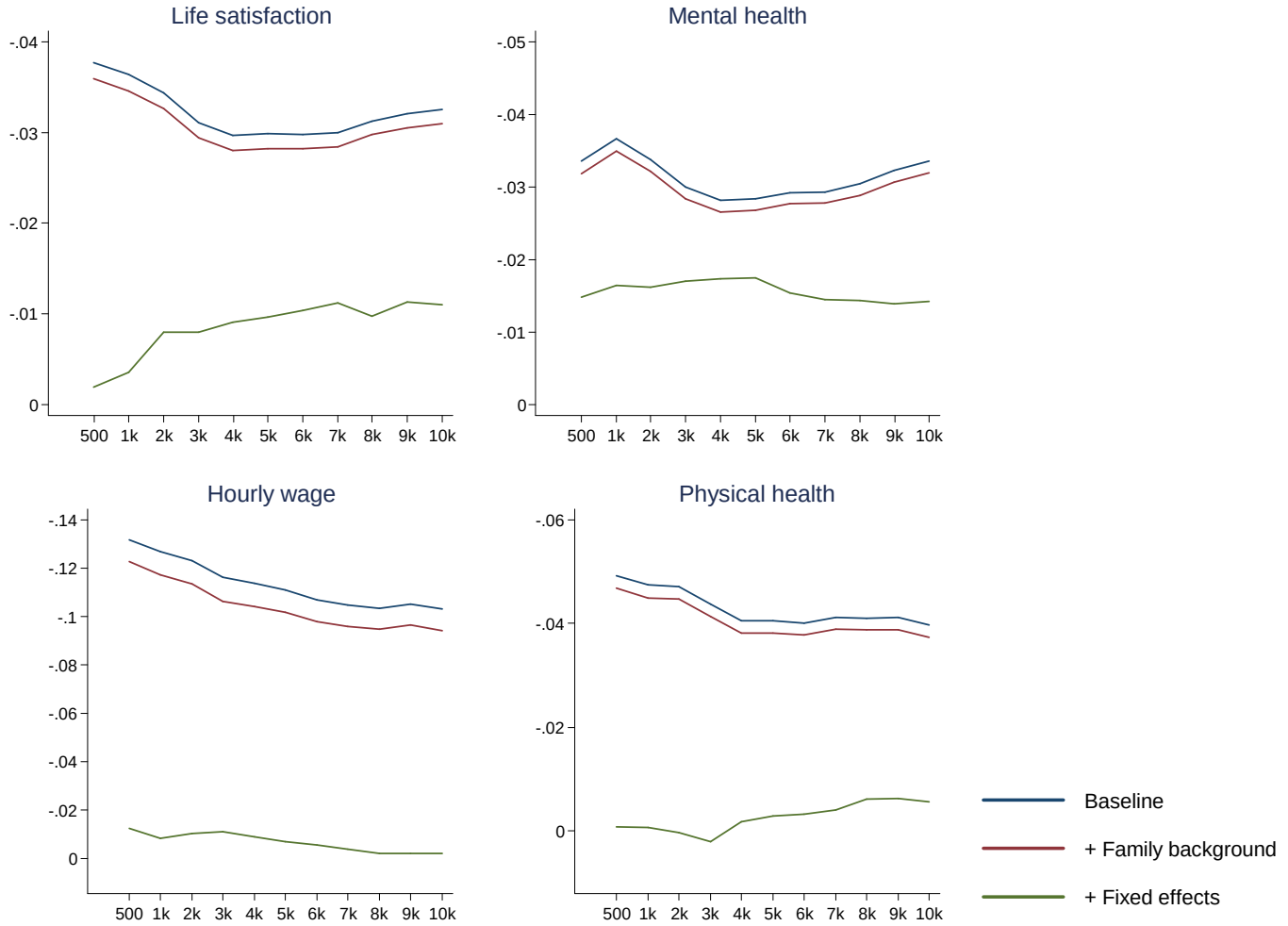
Neighbourhood Deprivation effects on wellbeing: Adding more controls

(raw coefficients from linear regressions)



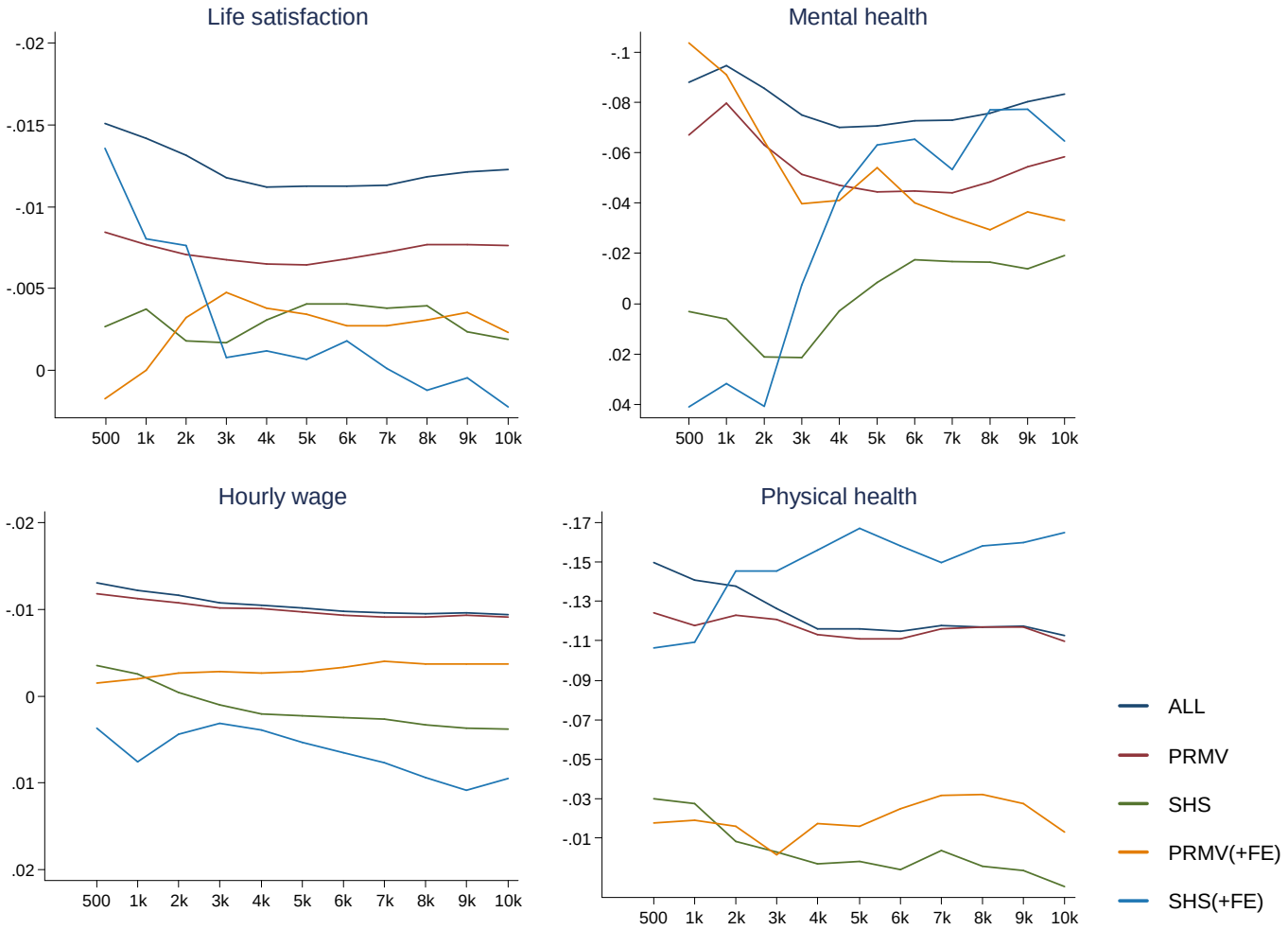
Neighbourhood Deprivation effects on wellbeing: Adding more controls

(b-coefficients from linear regressions)



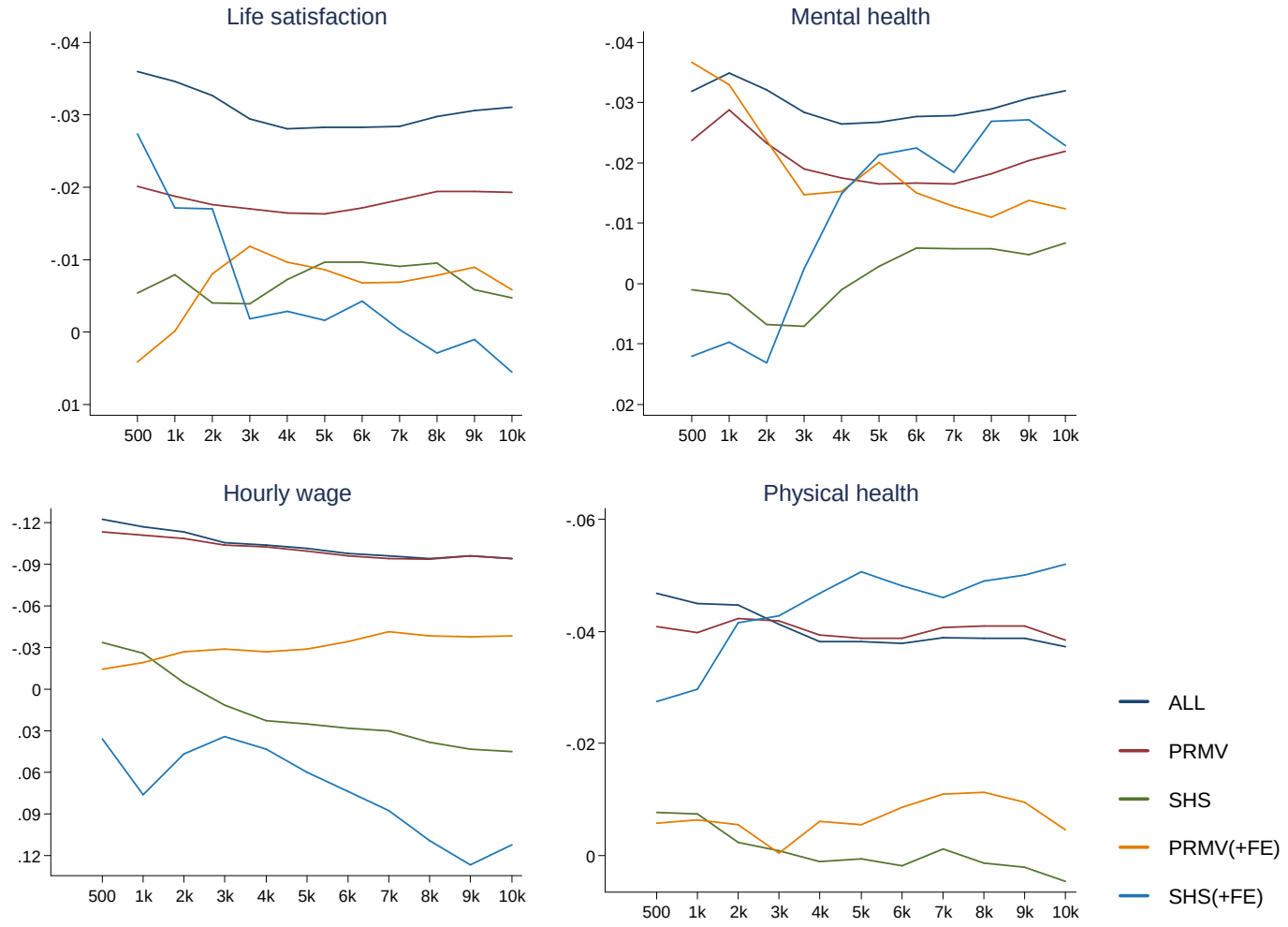
Neighbourhood Deprivation effects on wellbeing: Sample restrictions

(raw coefficients from linear regressions)



Neighbourhood Deprivation effects on wellbeing: Sample restrictions

(b-coefficients from linear regressions)

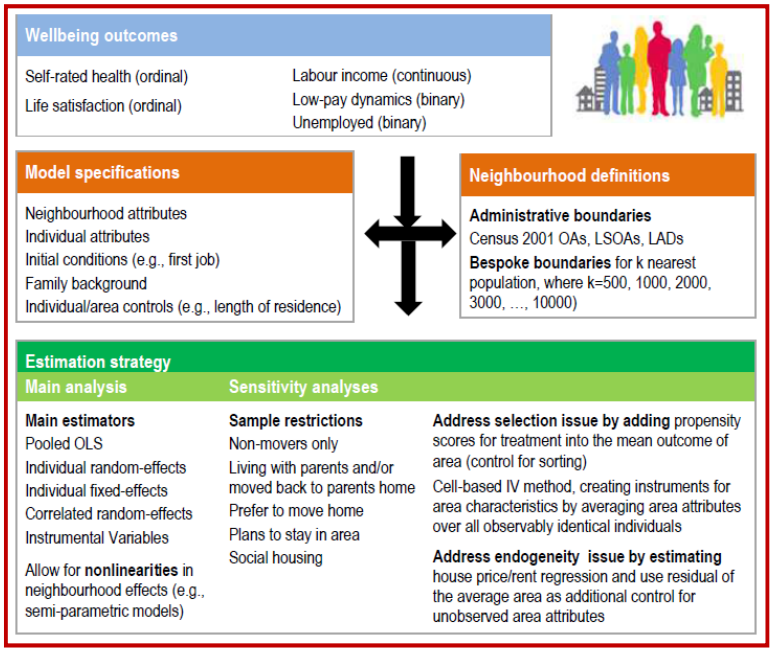


Summary of main findings

- Strong support for negative impact of deprivation on subjective and objective wellbeing in pooled models …
  - Robust to inclusion of family background controls and to restricting sample who may not have chosen neighbourhood
- But once we consider individual unobserved factors, effects are mostly wiped out. This suggests:
  - Effects are due to sorting on unobservable individual characteristics
- Where effects are robust, this is even stronger evidence that area deprivation matters

Next steps

- Implement additional estimators and models
  - non-linear models
  - additional sample restrictions
  - neighbourhood fixed effects
- Address selection issue in alternative modelling framework
  - Propensity score matching
  - Cell-based IV
  - House price/rent regression



- Still looking for alternative time-varying neighbourhood context measures at OA01 scale! Ideas?

Further info on key variables

- SF12 Physical and Mental Health Composite Scores (PCS & MCS):
  - range from lowest to highest level of health (0-100)
  - combine 12 items in such a way that they compare to a national norm with a mean score of 50 and a standard deviation of 10
  - Domains: Physical functioning, Role-physical, Bodily pain, General health, Vitality, Social functioning, Role-emotional, Mental health

Townsend score

- The measure incorporates four variables:
  - Unemployment (i.e., % aged 16 + who are economically active)
  - Household overcrowding (>1 persons per room)
  - Non-car ownership (as a percentage of all households)
  - Non-home ownership (as a percentage of all households)
- Takes log of unemployment and overcrowding percentages (+1), then standardizes all variables using a Z-score (subtract the mean value and divide by the standard deviation). Then sums the Z-scores.
- Positive values: areas with high material deprivation, negative values: relative affluence. 0 represents an area with overall mean values. See http://www.restore.ac.uk/geo-refer/36229dtuks00y19810000.php