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Assessing local chlamydia screening performance by combining survey and administrative data to account for differences in local population characteristics

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Introduction

- **Health** inequalities are associated with **social** inequalities, which are strongly linked to geographic **location**.
- UK Marmot Review recommended that health interventions must be **universal** but with a scale and intensity **proportionate** to the level of disadvantage in an area.
- Understand health inequalities at the **local level** but most observational data not (directly) relevant for public health questions at **both** national level and sub-populations.
- Simply compare local areas with the **average** of all local areas to see which ones are above/below average, and by how much?
  - Effectively assumes that the composition of each local area's population is the **same**, when populations can be **very different**.

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Data

Individual-level testing outcome and social and demographic factors

- Third British National Survey of Sexual Attitudes and Lifestyles (Natsal-3)
  - Nationally-representative probability sample survey of 15,162 people
  - Chlamydia testing in previous year

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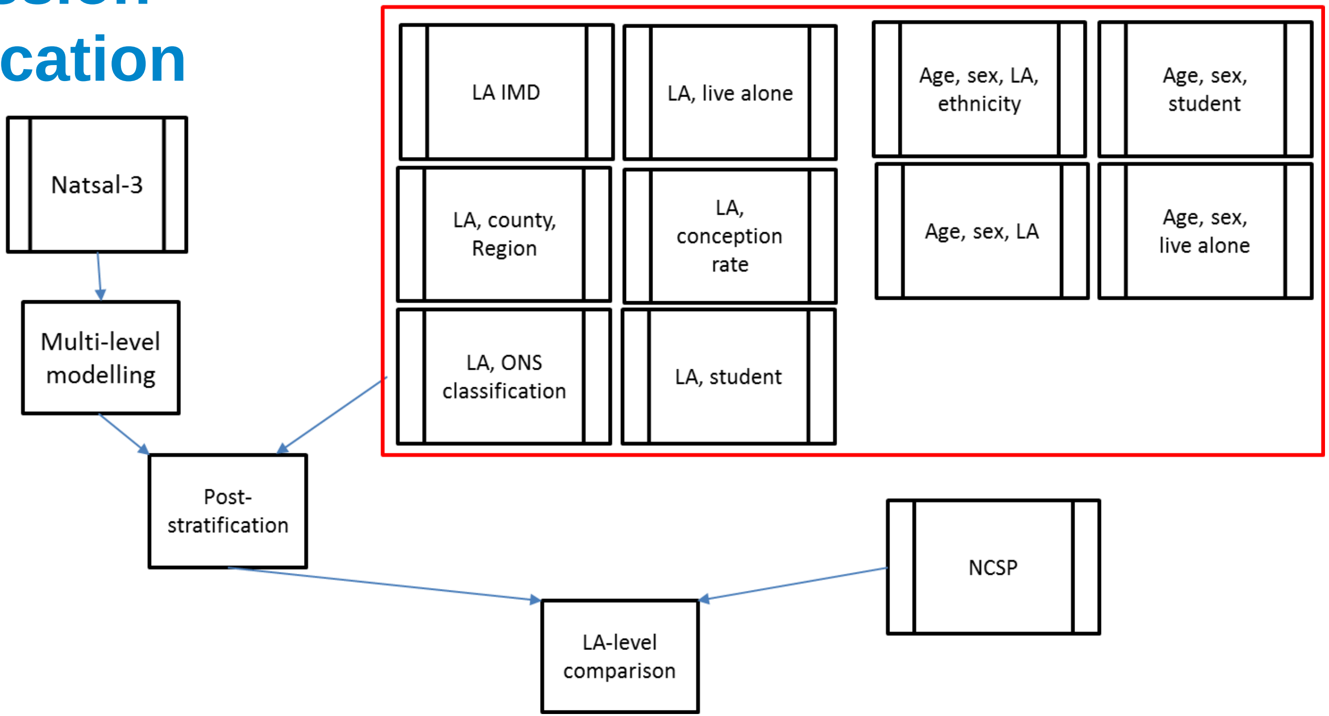
Multilevel regression and post-stratification (MRP)



Model formulae

- Individual-level data multilevel model

$$Pr(y_i = 1) = \text{logit}^{-1}\left(\beta^0 + \alpha^{age}_{j[i]} + \alpha^{male}_i male_i + \alpha^{ethnicity}_{k[i]} + \alpha^{student}_i student_i + \alpha^{livealone}_i livealone_i + \alpha^{la}_{m[i]} + \phi^{la}_{m[i]}\right),$$

$$\alpha^{la}_m \sim N\left(\alpha^{IMD}_m IMD_m + \alpha^{ONSclass}_{j[m]} + \alpha^{county}_{l[m]} + \alpha^{conception}_{p[m]}, \sigma^2_{la}\right), \quad m = 1, \dots, 326 \text{ local authorities},$$

$$\alpha^{county}_l \sim N\left(\alpha^{gors}_{q[l]}, \sigma^2_{county}\right), \quad l = 1, \dots, 83 \text{ counties},$$

- LA-level estimates by post-stratification

$$p_{la} = \frac{\sum_{j \in S} N_j p_j}{\sum_{j \in S} N_j}$$

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Results