Socioeconomic deprivation and benzodiazepine / Z-drug prescribing: a cross-sectional study of practice-level data in England

Stephanie Soyombo
Medical Student
Warwick Medical School

s.soyombo@warwick.ac.uk

Background

- ~ 300,000 in the UK on long-term benzodiazepines, despite the recommendation for short-term use
  - Z-drugs have fewer side-effects but may still result in dependence
- Benzodiazepine dependence has been cited as a national priority
  - Clinical priority: linked with e.g. falls in the elderly, cognitive/driving impairment
- Both drug classes are more commonly prescribed for the elderly and for females
  - Diazepam for anxiety; zopiclone for insomnia
- Prescription rates may be higher in more socio-economically disadvantaged regions[1]

[1] Tsimtsiou *et al*. BJGP 2009;59:e191-e198

Aim

To identify whether there is an association between practice-level benzodiazepine & Z-drug prescribing and practice-level socioeconomic deprivation

Methods – Data Sources

- NHS Digital
  - Monthly primary care practice prescribing data (2017)
  - Practice list sizes – total, and by sex and age
- BNF
  - BNF codes for all relevant drugs
- Public Health England
  - Index of Multiple Deprivation (IMD 2015) scores, by practice

Methods – Data Processing

- Monthly prescribing data aggregated across 2017 to give:
  1. Total number of items
  2. Total quantity prescribed

     … under each BNF code per practice over the year.
- Only oral formulations (tablet and solution) included
- Only commonly prescribed drugs were included*
- All drug doses converted into milligram-equivalent of diazepam.
  - E.g. 5mg Nitrazepam = 5mg Diazepam; 10mg Clobazam = 5mg Diazepam

- Final dataset included linked information, by practice, on:
  - CCG code
  - Practice and CCG IMD score
  - List size
  - Proportion of males
  - Proportion of >65s

* Included	Excluded
Chlordiazepoxide	Bromazepam (<0.01% of items)
Clobazam	Zaleplon (<0.01% of items)
Clonazepam	
Diazepam	
Lorazepam	
Nitrazepam	
Oxazepam	
Temazepam	
Zopiclone	

Methods – Analysis

- Primary outcome: total quantity prescribed in mg-equivalent diazepam per 1000 patients
- Association between practice-level IMD score and prescribing tested using multiple linear regression
  - Adjusting for: % males, % over-65s
- Results presented as:
  - Beta coefficients – the extra amount of mg-equivalent diazepam prescribed per 1000 patients for each one-point increase in practice IMD score
  - Adjusted R^2 values – proportion of the variability in prescribing that is explained by the factors studied in the regression model
  - *p* values – $p < 0.05$ considered statistically significant
- Software: 

Methods – Visualisation

- CCG maps, aggregating prescribing / IMD by CCG
  - Bivariate choropleth map – shows two variables (IMD, prescribing rate)

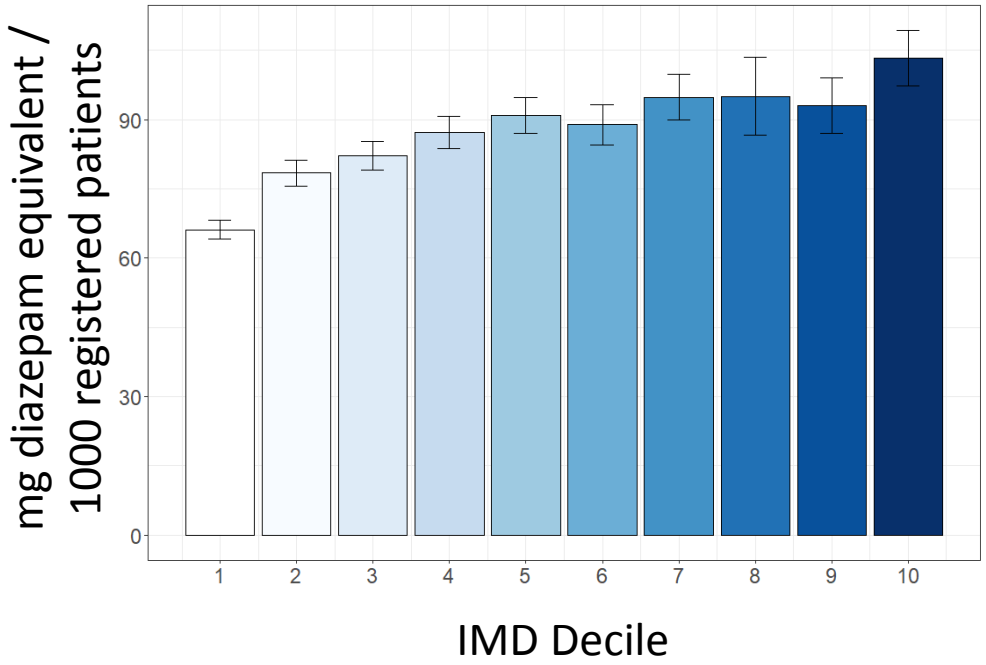
Summary of linear regression analyses

… of the association between practice IMD score and benzodiazepine / Z-drug prescribing levels per 1000 registered patients.

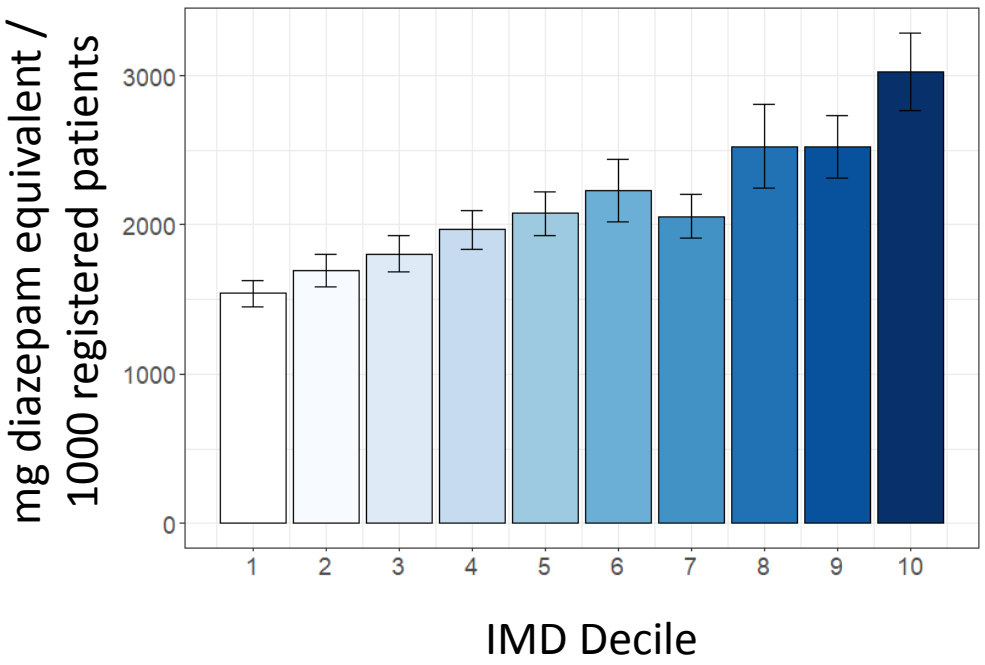
Drug		Univariate	Multivariable
Total benzo/Z-drug prescriptions	Beta *p value* multiple R^2	164 < 0.001 0.7%	628 < 0.001 18%
Chlordiazepoxide	Beta *p value* multiple R^2	22 < 0.001 6.2%	20 < 0.001 13%
Clobazam	Beta *p value* multiple R^2	121 < 0.001 8.0%	162 < 0.001 12%
Clonazepam	Beta *p value* multiple R^2	79 < 0.001 1.2%	146 < 0.001 6%
Diazepam	Beta *p value* multiple R^2	73 < 0.001 1.1%	164 < 0.001 7%
Lorazepam	Beta *p value* multiple R^2	50 < 0.001 1.2%	114 < 0.001 11%
Nitrazepam	Beta *p value* multiple R^2	36 < 0.001 6%	45 < 0.001 13%
Temazepam	Beta *p value* multiple R^2	37 < 0.001 2%	55 < 0.001 8%
Zopiclone	Beta *p value* multiple R^2	4 0.47 <0.1%	83 < 0.001 13%

Prescribing levels by practice IMD Deciles

Diazepam



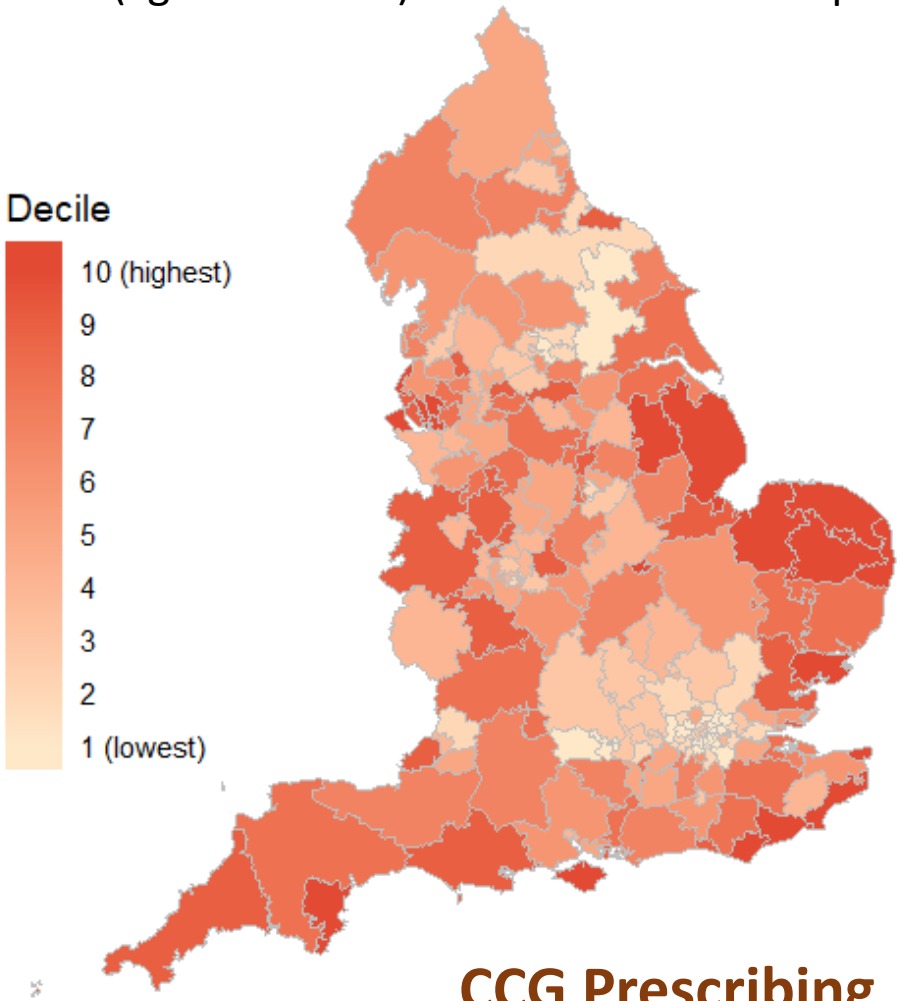
Nitrazepam



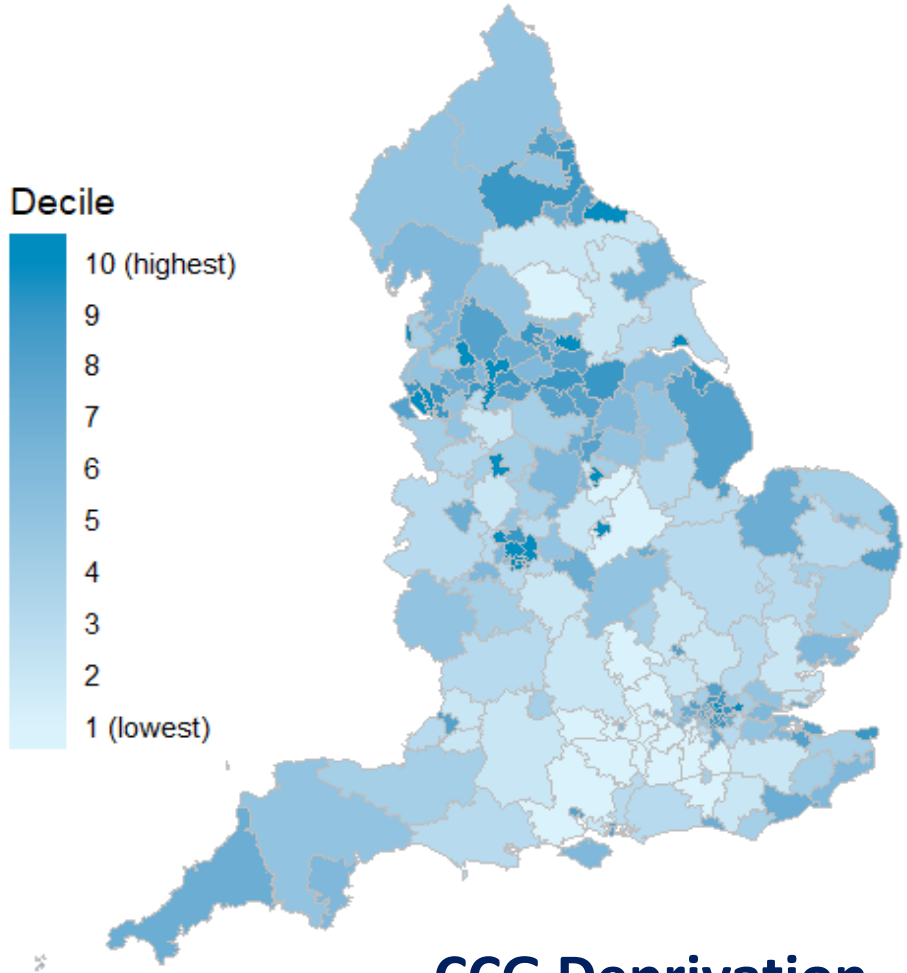
Prescribing by CCG

Geographical choropleth map of England, categorising CCG regions according to deciles of benzodiazepine / Z-drug prescribing (orange) or IMD score (blue).

Decile 1 (lightest shade) is the lowest level of prescribing / least deprived



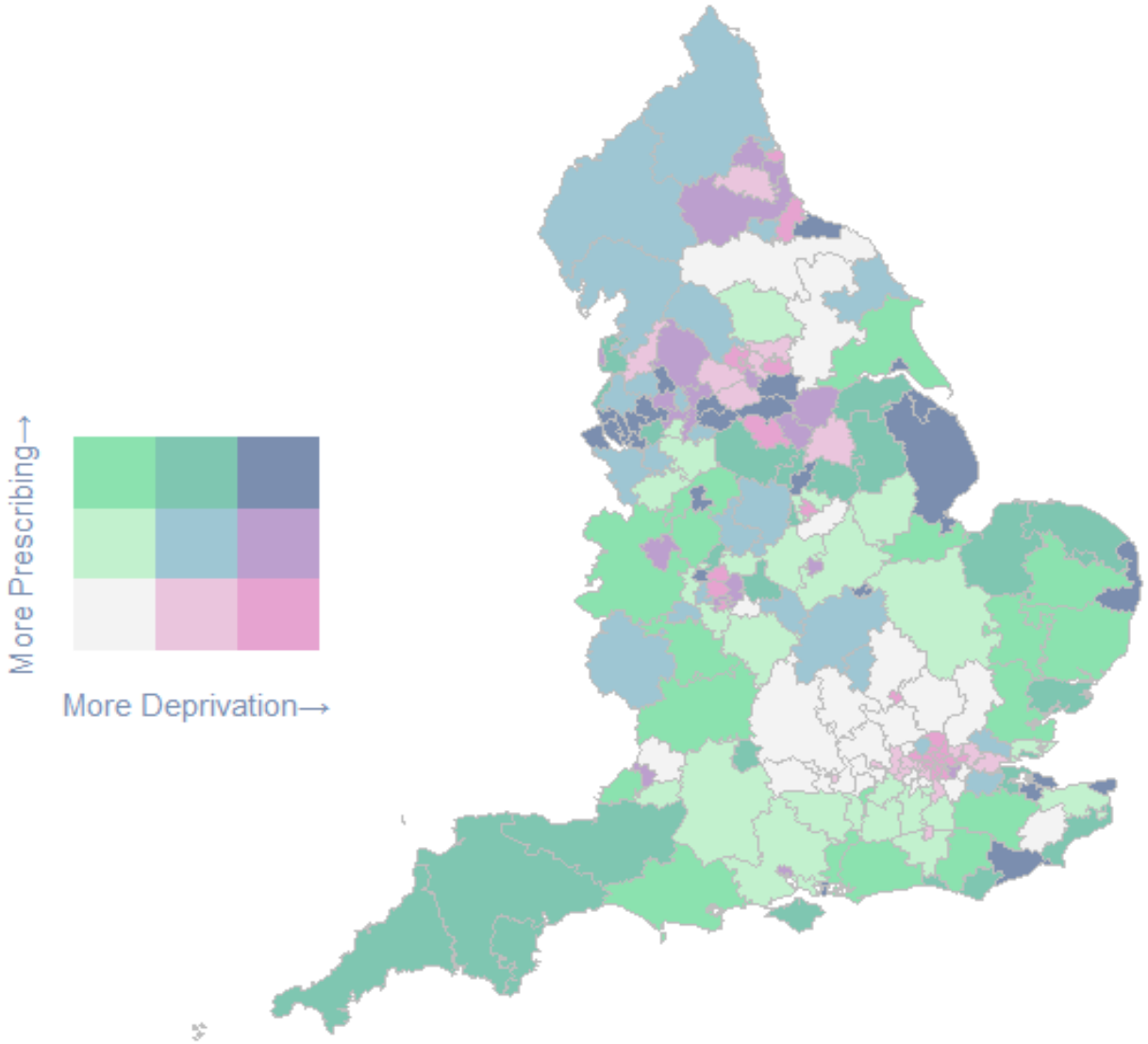
CCG Prescribing



CCG Deprivation

Prescribing and deprivation by CCG

Bivariate choropleth map of England combining information on the level of benzodiazepine prescribing and the level of deprivation (by tertiles).



Key Findings

- IMD score is independently positively associated with prescribing
- This association is seen more strongly in some drugs than others
- IMD + age + sex still only explains a small proportion of the variation in prescribing
- Other unidentified factors contribute to the variation in prescribing

Limitations

- Analysis was restricted to 2017; no time trends were studied
- Only primary care prescriptions were included
- Data was analysed only at practice level
- The indications for prescribing are unknown

Conclusion and Further Work

- **Significant association between primary care practice-level deprivation and practice-level prescribing of benzodiazepines and Z-drugs found in England**

- Combination of IMD score, age and sex **only explained a small proportion of the variation** in prescribing

- Further work required on individual-level primary care datasets
  - Which patient-level and practice-level factors are driving the prescriptions?
  - Need to identify where interventions to reduce prescribing should be targeted

Socioeconomic deprivation and benzodiazepine / Z-drug prescribing: a cross-sectional study of practice-level data in England

Stephanie Soyombo[1], Harpal Aujla[1], Rhian Stanbrook[2], David Capewell[3], Mary Shantikumar[4], Daniel Todkill[5], Saran Shantikumar[1,5]

[1] Warwick Medical School, University of Warwick
[2] Medwyn Surgery, Surrey
[3] Outwood Park Medical Centre, Wakefield
[4] Central Surgery, Rugby
[5] Field Services, Public Health England, West Midlands

s.soyombo@warwick.ac.uk

saran.shantikumar@warwick.ac.uk

*Contact for datasets used and R script if conducting similar studies

plot_prescribing.html