Reviewer’s report

Title: Chronic morbidity, deprivation and primary medical care spending in England in 2015-16: a cross-sectional spatial analysis

Version: 0 Date: 25 Sep 2017

Reviewer: Michael Soljak

Reviewer's report:

This study is an incremental improvement to our understanding of the relationship between morbidity, deprivation and primary medical care spending. It could be improved with significant revisions.

p5 ll8-9, missing text: "In addition, the formula used in GMS contracts does not directly adjust for patient deprivation and the measure of morbidity is based on health data derived from the 1998-2000 Health Survey for England,[18] rather than the Since the introduction of the QOF in 2004, annually updated prevalence data..."

Introduction

The authors could have mentioned more of the primary care policy background aimed at reducing inequity e.g. abandonment of the Minimum Practice Income Guarantee and the square root transformation of QOF prevalence payments. They should also have noted the GP recruitment difficulties in deprived areas which prevent resources being delivered on the basis of need even if they are allocated.

Methods

The methods are adequate, as far as they go, in terms of the objectives. The funding totals used are appropriate. The authors have chosen to map general practice data to resident populations (LSOAs). There is no methodological problem with this, but if the objective is to describe practice funding and disease burden, a practice-based analysis, with Census data mapped to practice instead, would have been more useful to policymakers. Practice populations can be depicted in maps e.g. in Arc-GIS as colour-coded points based on postcodes of surgeries. On the other hand, they quote a recent study (Levene et al) which used practice as the level of analysis and which explained less variation, so perhaps their decision to analyse a lower level is justified. Since this is a spatial analysis the authors could have moved on for Moran’s I to use geographically-weighted regression e.g. using GWR software, rather than classical or ordinary
least squares regression, which might have improved model fit, which could have been tested using the Akaike Information Criterion or Hosmer Lemeshow tests. This is a limitation of their analysis, but it would require a major review and should not prevent publication. They could also have included GP resourcing in their models to explore the importance of their distribution (see above), and analysed PMS and GMS practices separately (they note that PMS contracts are not visibly adjusted to account for health need). As acknowledged in the Discussion, they did not take into account unmet need i.e. undiagnosed disease; estimates of expected disease prevalence are available on the Public Health England website: https://fingertips.phe.org.uk/profile/prevalence. These are significant and important but not major additional revisions.

Results: in general these are presented well. Figure 2 and 3 should be supplemented with another map showing the CMI/funding ratio. Figure 5 loses a great deal of information from the local Moran’s I, which could have been shown as a map of z-scores at LSOA level, with four categories: high value next to high value etc. There would also be a benefit to show CCG- (or LA-) level autocorrelation. These are significant and important but not major additional revisions.

Discussion: good discussion of strengths and limitations. There is insufficient discussion of the policy implications. For example, the authors could have recommended specific changes to the funding formula.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
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