Author’s response to reviews

Title: Availability and structure of primary medical care services and population health and health care indicators in England

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PDF covering letter
Access to primary medical care services and population health in England

Replies to reviewer’s comments:

1. Choice of dependent variables

Rather than omit the three non-mortality indicators we have preferred to retain these, because they demonstrate patterns of association which contrast with those of mortality outcomes.

We have altered the title of the paper and reworded the text in order to accommodate the reviewer’s concern.

We have also included this additional text:

‘Hospital admission rates provide measures of health care utilisation but may also be viewed as measures of the effective delivery of primary care when hospital admissions are considered, as here, to be either preventable or amenable to effective care in primary settings. The conception rate in women less than 18 years is considered in the English Department of Health’s dataset to be an indicator of ‘health improvement’; that is, an indicator which may be influenced by multi-sectoral activities aimed at improving health’. Bottom page 5 – top page 6.

2. Use of independent variables

In order to address this comment, we have included the new Table 4, which gives results from multiple regression analyses. The variables selected for inclusion in this model are described and justified in the text:

‘In the next stage of the analysis, we included all explanatory variables which were consistently associated with outcomes. This model included adjustment for Townsend score, social class, ethnic group, proportion of rural patients, proportion of patients >75 years, the supply of GPs, the partnership size and the proportion of single handed practices. This approach was preferred to a stepwise elimination from all candidate variables because the latter led to different models for each outcome, and because confounders may be important even when they do not yield statistically significant associations’. (Page 6-7)

‘In the next stage of analysis, we evaluated the independent associations of the variables included in Table 3. Since the types of services were generally not associated with outcome measures, these were excluded. The proportions of GPs aged ≥61 years and the proportion of female GPs were also excluded because they were not associated with mortality indicators. This final model therefore included the Townsend score, proportion in social class IV/V, proportion of ethnic minorities, proportions of rural patients and patients aged ≥75 years, the GP supply, mean partnership size and proportion of single-handed practices. Coefficients obtained for each outcome measure from these models are shown in Table 4’. (Page 8-9)

R-squared values have been given as requested.
3. **Impact of secondary care**

We have acknowledged this point by including the following text in the Discussion.

‘Fourthly, as we have acknowledged in the Introduction, the problem of residual confounding may exist. This may be a particular problem in respect of the relationship between primary and secondary care. Better GP supply may be associated with better supply of hospital services. This possibility deserves further investigation as it is not clear what aspect of hospital supply might be important. For example, distinctions should be made between the availability of acute and elective care, and access to public and privately provided care.’ (page 11)

4. **Endogeneity**

We have acknowledged this point by including the following text in the Discussion.

‘A related problem is that reverse causality may be present, health may influence the distribution of primary care in addition to a potential effect of primary care on health. This problem can potentially be addressed through techniques such as instrumental variables regression which require a two stage model. ‘Primary care’ would be specified in the first stage and then used as a predictor in the second stage. However, this approach was considered to be beyond the scope of this analysis.’ (page 11)

5. **Underlying model**

This point has been discussed in the last paragraph:

‘This model requires that the concept of ‘access’ is extended to include the relevance and effectiveness of services[27]. Indicators of primary care access which are based only on the supply and utilisation of services will be inadequate. Information about the coverage of the population at risk by effective interventions is also required. Some studies suggest that larger practices provide better quality care[28] and that this may be associated with reduced hospital utilisation[29] and better health outcomes. This might explain why the partnership size and proportion of single-handed practices were associated with health outcomes. However, other studies have suggested that single-handed practices provide satisfactory standards of care[30]. In order to answer the questions raised by this and other studies, future analyses should link data for the supply and utilisation of primary care services to individual-level data describing levels of risk and delivery of intervention through effective treatments’.