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Unequal socioeconomic distribution of the primary care workforce: whole-population small area longitudinal study

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Abstract

Objective To measure changes in socioeconomic inequality in the distribution of family physicians ("General Practitioners") relative to need in England from 2004/5 to 2013/14

Design Whole-population small area longitudinal data linkage study

Setting England from 2004/5 to 2013/14

Participants 32,482 lower layer super output areas (neighbourhoods of 1,500 people on average)

Main outcome measures Slope index of inequality in annual full time equivalent General Practitioners (FTE GPs) per 100,000 population, excluding registrars and retainers and need-adjusted using the Carr-Hill workload adjustment, based on the Index of Multiple Deprivation 2010

Results From 2006/7 to 2011/12, the slope index of inequality representing the absolute gap in FTE GP supply between the most and least deprived small areas fell by 7.3 (95% CI: 4.9 to 9.7) GPs per 100,000 need-adjusted population. During this period, the number of FTE GPs serving the most deprived fifth of small areas rose from 6,082 to 6,543, while falling from 6,154 to 6,083 in the least deprived fifth. The increase in GP supply in the most deprived fifth of neighbourhoods was larger in areas that received targeted investment for establishing new practices under the "Equitable Access to Primary Medical Care" programme from 2008-11.

Conclusions There was a substantial reduction in socioeconomic inequality in family physician supply from 2006/7 to 2011/12 associated with national policy. This may not have completely eliminated socioeconomic inequality since existing need adjustment formulae do not fully capture the additional burden of multimorbidity in deprived neighbourhoods. The small area approach introduced in this study can be used routinely to monitor socioeconomic inequality of access to primary care and to indicate workforce shortages in particular neighbourhoods.

Strengths and limitations of this study

- Our study introduces a new small area level method for measuring inequality in GP supply that focuses specifically on socioeconomic inequality and captures inequality within NHS administrative areas as well as between them.
- The main limitation of this study is the lack of a generally accepted and up-to-date measure of relative need for primary care in deprived small areas. Currently, the best available measure is the workload adjustment recommended in the 2007 review of the Carr-Hill formula for allocating primary care funding. However, concerns have been raised that the Carr-Hill formula may not fully reflect the additional needs for primary care in deprived populations.

WHAT THIS PAPER ADDS

What is already known on this subject

- There is long-standing international policy concern about unequal distribution of the primary care workforce, which can harm population health and exacerbate health inequalities.
- Previous studies have found substantial inequalities in family physician supply between large sub-national areas, even in high income countries with universal health coverage
- In England, large area inequalities in family physician supply were largely impervious to policies designed to reduce them from 1974 to 2006

What this study adds

- From 2006/7 to 2011/12, there was a substantial reduction in small area socioeconomic inequality in family physician supply relative to need in England, associated with a targeted investment policy (the "Equitable Access to Primary Medical Care" programme).
- This study introduces a small area approach to monitoring inequality in the distribution of the primary care workforce, which can pinpoint socioeconomic inequality and workforce shortages more precisely than previous comparisons between large and socioeconomically diverse areas.

Competing interest declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare that MA, RC, RF and SA have nothing to declare.

Details of contributors: MA accessed, extracted and assembled the data, conducted the main data analysis, contributed to study design, and drafted and revised the paper. RC initiated the collaborative project, had the original idea for the study, supervised the data assembly and analysis, and drafted and revised the paper. MA and RC are joint guarantors. RF helped interpret the data from a primary care perspective, and drafted and revised the paper. SA contributed to study design and conducted some preliminary data analysis. All authors, external and internal, had full access to all of the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. MA and RC affirm that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

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Data sharing statement: An extensive technical appendix with additional analysis is available at [will be submitted alongside the paper] with open access and can also be requested from the corresponding author.

Statistical package: R version 3.1.2 was used to conduct the statistical analysis in the paper.

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1. Introduction

There is long-standing international policy concern about unequal socioeconomic distribution of the primary care workforce, which can harm population health and contribute to wider socioeconomic inequalities in health.[1-3] As the UK (United Kingdom) Chair of the Royal College of General Practitioners recently wrote, "… the general practice workforce is unevenly spread across the country, with the fewest doctors in the most deprived areas, exacerbating health inequalities".[4] This problem may grow in future, as substantial future primary care workforce shortages are projected over the next two decades in the UK, US (United States) and elsewhere.[4-6] Demand for primary care is increasing due to increasing numbers of people with multiple chronic conditions ("multimorbidity"), especially in deprived populations, [7-9] and attempts by policy makers to shift care from secondary to primary care settings.[10] Workload is also increasing due to the increasing complexity of care and associated administrative burdens.[11] In England, for example, the Royal College of General Practitioners estimates that 8,000 more full time equivalent primary care physicians ("General Practitioners") will be needed by 2020,[12] while worryingly recent trends indicate a fall in applications for medical training in primary care.[13]

Previous studies have found substantial geographical inequalities in family physician supply between large sub-national areas, even in high income countries with universal health coverage.[14-21] However, because these studies have focused on large areas they have not been able to accurately describe socioeconomic inequality in primary care supply by pinpointing primary care shortages in specific disadvantaged neighbourhoods. Studies in England using data from 1974 to 2006 have found substantial and persistent geographical inequality in GP supply relative to need between NHS administrative areas – Family Practitioner Committees until 1990, then Family Health Service Authorities until 2000, then Primary Care Trusts.[22-26] Historically, these inequalities have been largely impervious to NHS policy initiatives designed to reduce them, such as the deprivation-weighted capitation payments introduced in 1990. There is also evidence that some policies may have increased large area inequality, such as the abolition of entry controls in "over-doctored" areas in England in 2002.[22]

In the late 2000s following the 2006 White Paper "Our Health, Our Care, Our Say", a renewed effort was made to increase GP supply in deprived areas as part of wider attempts to meet government targets for reducing health inequality.[24 27-29] Most notably, the "Equitable Access to Primary Medical Care" programme invested £250 million towards establishing new general practices in the 38 most "under-doctored" Primary Care Trust (PCT) areas.[28] This programme was announced by a Labour government in the 2006 White Paper, funded from 2008,[28] and wound down from 2011, a year or so after the new Coalition government came to power.[30] Our study aims to measure socioeconomic inequality in GP supply from 2004/5 to 2013/14, and to examine whether the Equitable Access to Medical Primary Care programme was associated with any beneficial impact on reducing socioeconomic

inequality. Our study introduces a new way of measuring inequality in GP supply, based on small area variations, which focuses specifically on socioeconomic inequality. Studies based on large area variations may mask important changing patterns of socioeconomic inequality within administrative areas. Our study examines variation between small area populations of approximately 1,500 people, allowing us to capture changing patterns of socioeconomic inequality in much more fine-grained detail than previous studies.

2. Data and Methods

We constructed whole-population national data sets at both small area level and practice level. Using the NHS Attribution Data Set of GP-registered populations, we linked practice level data on primary care supply for the ten years 2004/05 through 2013/14 with corresponding small area level data on population and deprivation. We use data from all 9,092 general practices in the English NHS that were open for at least one year of the study period. Our data on primary care supply were obtained from the annual National Health Service General and Personal Medical Services workforce census, taken at 30 September each year, midway through the financial year.

In line with previous research studies and official reports, the primary indicator of GP supply reported in this study is the full time equivalent (FTE) number of GP principals and salaried GPs, who make up the vast majority of the GP workforce.[4 22 23 27 31] We also conducted robustness checks using other GP supply variables, including (1) headcount of GP principals and salaried GPs, (2) GP registrars (trainee doctors on short term placements having "supernumerary" contracts, designed primarily for training rather than delivering patient care),[32] and (3) GP retainers (sessional GPs who only work a maximum of four sessions of approximately half a day each week, and only make up a small fraction of the workforce).[33 34] We also conducted robustness checks using the limited available data on practice nurse supply, available at practice level for 2013/14 but only at PCT level before that. Our data do not include locum GPs or supply of emergency primary care services outside normal office hours.

The small area unit of analysis was the 2001 lower super output area (LSOA) - a geographical unit defined by the 2001 census. There are 32,482 of these small areas in England each with a mean population of approximately 1,500 people. Data on the LSOA of residence of each practice registered patient for each year was used to attribute GP supply from practice level to LSOA level, using population weighted averages. LSOAs were ranked by deprivation according to their Index of Multiple Deprivation 2010 ranks, and split into deprivation quintile and decile groups with equal numbers of LSOAs in each group. ONS mid-year population estimates at LSOA level were used to derive the population of each deprivation group. We used ONS population estimates because GP practice list data is less thoroughly cleaned and validated and tends to over-estimate population size, for example due to people leaving the area without notifying their GP. LSOA populations were adjusted for their relative needs for primary care using the workload adjustment aspect of the most recently updated version of the Carr-Hill formula

for primary care resource allocation.[35] This version of the formula was recommended in 2007 by the Formula Review Group established by NHS Employers and the BMA, and though never implemented in practice it remains the most authoritative and up-to-date analysis of the determinants of primary care workload in England. This adjustment takes into consideration the age and sex structure and IMD health deprivation score of each LSOA to upscale populations that are expected to require more primary care and downscale populations expected to require less. We report both adjusted and unadjusted results, and also conduct robustness checks using an alternative need formula: the 2013/14 Nuffield index of general and acute hospital need.[36] As a further robustness check, the analysis was repeated at practice level by reverse attributing LSOA population and deprivation variables to GP practices and aggregating GP supply numbers by population weighted practices into five approximately equally sized deprivation based groups. To provide insight into the components of change in GP supply, we also produced descriptive statistics by deprivation group and year on the numbers of practices opening and closing, the average size of GP practices, and the average number of small areas served by each practice as an indication of whether increases in GP supply can be attributed to patients travelling further.

The primary measures of inequality were the slope index of inequality (SII) and relative index of inequality (RII), both based on linear regression analysis at the level of IMD decile group. This involves modelling GP supply as a linear function of deprivation decile, entered as a continuous variable scaled from 0 to 1. The SSI is the coefficient in this regression; the RII is that coefficient divided by the mean GP supply. The SSI can be interpreted as the absolute gap in GP supply between the most and least deprived small area; the RII can be interpreted as the proportionate gap relative to the average. Regression models using pooled data for multiple years were used to test whether observed changes in inequality between years were statistically significant, based on interaction terms between year and deprivation.

To examine associations between change in GP supply inequality and the Equitable Access to Primary Medical Care programme, we identified the 38 Primary Care Trusts (PCTs) that were considered to be "under-doctored" and hence eligible to receive funding from this programme from a Department of Health press release on the policy.[37] We then compared changes in GP supply by deprivation group of LSOAs within these "under-doctored" PCTs with changes in GP supply in deprivation groups of LSOAs within the remaining PCTs, focusing on change between the year the policy was announced, in 2006, and the year the policy was wound down, in 2011.

Results

Total numbers of GPs in England by year are reported in Table 1, in terms of both headcount and full time equivalent (FTE), along with total population figures. Although the total headcount of GPs continued to increase throughout the period, FTE numbers have been approximately flat since 2009/10 while the population has continued to grow. In England as a whole, GP supply increased from 55.1 to

60.2 FTE GPs per 100,000 population from 2004/5 to 2006/7, but remained approximately stable thereafter, rising to 60.7 in 2009/10 then falling to 59.4 by 2013/14. Crude trends in total numbers of FTE GPs split by small area level deprivation are shown in Figure 1, without allowing for population change. Total numbers of FTE GPs have grown much faster in the most deprived fifth of English small areas than elsewhere, with GP supply in the most affluent fifth growing at the slowest pace over the last ten years. This pattern is also reflected in the raw headcount of GPs (see web appendix figure A4.3).

[Table 1 and Figure 1 approximately here]

Figure 2 shows these trends adjusted for population size and need. In England as a whole, GP supply increased relative to population need from 2004/5 to 2006/7 but remained approximately stable thereafter. In 2004/5 there was "pro-rich" inequality in GP supply relative to need, with a slope index gap of 4.2 (95% CI 3.1 to 5.3) full time equivalent GPs per 100,000 need adjusted population between the most and least deprived English small areas. However, from 2006/7 to 2011/12 inequality in GP supply relative to need decreased substantially, with a fall in the slope index gap from 5.2 (95% CI 4.7 to 5.8) to -2.1 (95% CI -4.4 to 0.2). During this five year period, people living in the most deprived fifth of English small areas experienced a steady increase in GP supply relative to need, which was particularly rapid from 2008/9 to 2010/11, while people living in the least deprived three fifths experienced a decline. By 2010/11, the "pro-rich" inequality in GP supply relative to need appeared to have disappeared, with the slope index indicating slight though non-significant "pro-poor" inequality. Nationally, the increase in GP supply relative to need in deprived small areas from 2006/7 to 2011/12 was offset by a corresponding reduction in other areas – resulting in a slight overall decline in national GP supply relative to need from 60.2 to 59.2. These inequality trends were driven largely by change in the most and least deprived quintile groups: GP supply in the middle three quintile groups changed little, and remained lower than in the most affluent quintile group. By 2013/14, the trend in GP supply per need weighted population appeared to have reversed with GP supply in the most affluent areas growing faster than in the most deprived areas.

[Figure 2 approximately here]

Cross-sectional results for 2006/07 and 2011/12, before and after the EAPMC programme, are presented in Figure 3. This highlights the reversal of the gradient in GP supply from favouring the least deprived areas in 2006/07 to favouring the most deprived areas in 2011/12.

[Figure 3 approximately here]

Figure 4 shows changes in GP supply between these years, comparing LSOAs in "under-doctored" PCTs that received funding under the EAMPC programme with those in the other PCTs that did not receive this funding. PCTs classified as "under-doctored" experienced larger increases in GP supply than PCTs not

classified as "under-doctored". Furthermore, these larger increases were concentrated in the poorest fifth of LSOAs in England.

[Figure 4 approximately here]

Our main finding of a reduction in socioeconomic inequality in GP supply from 2006/7 to 2011/12 was robust to extensive sensitivity analyses using different definitions of primary care supply (headcount and FTE, with and without adjustment for population size and need, with and without GP registrars and retainers, with and without practice nurses at PCT level), different units of analysis (small area, practice, PCT and CCG) and different measures of inequality (absolute and relative). This finding was also robust to using a different need adjustment formula: the Nuffield general and acute hospital need index for 2013/14 (see appendix figure A17.3).[36]

The increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. In 2009/10, 2010/11 and 2011/12 there were substantial net increases in GP supply in deprived areas of around 28, 167 and 26 FTE GPs respectively resulting from the opening and closing of practices – (see appendix table 1.7). However, this was followed by substantial net falls in both subsequent years of around 55 and 65 FTE GPs respectively, as more practices closed than opened. Meanwhile, average practice size grew at similar rates in all deprivation groups (see appendix figure 8.6). There does not appear to be any evidence of patients living in deprived areas travelling further to increase their access to GPs, on the contrary average numbers of LSOAs per practice remained stable throughout the ten year period of the study (see appendix figure 8.5). Full details of these results as well as further breakdowns of the results presented in the paper can be found in the accompanying web appendix.

3. Discussion

Statement of principal findings

We found a substantial reduction in socioeconomic inequality in GP supply in England from 2006/7 to 2011/12. This can partly be attributed to national policy in the form of the Equitable Access to Primary Medical Care programme, which provided additional funding for new GP practices in "under-doctored" areas of the country. The increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. Socioeconomic inequality in GP supply subsequently increased slightly in 2012/13 and 2013/14, as the NHS funding situation tightened and practices started closing more rapidly in deprived areas.

Strengths and weaknesses of the study

Our study introduces a new small area level method for measuring inequality in GP supply that focuses specifically on socioeconomic inequality and captures inequality within NHS administrative areas as well as between them. Previous large area level methods can only tell policymakers which Clinical Commissioning Groups (CCGs) are the most "under-doctored". As well as this, our new method also allows policymakers to take a close-up look at the situation within CCGs and identify which individual neighbourhoods and GP practices are the most deprived and under-doctored. This ability could potentially be used to re-direct funding for new practices and new GPs more accurately towards the neighbourhoods that need them most.

The main limitation of this study is the lack of a generally accepted and up-to-date measure of relative need for primary care in deprived small areas. Currently, the best available measure is the workload adjustment recommended in the 2007 review of the Carr-Hill formula for allocating primary care funding.[35] This adjustment is based on regression analysis of the determinants of consultation rates in a sample of 454 practices serving 3.8m patients from April 2003 to April 2004.[38] However, concerns have been raised that the Carr-Hill formula may not fully reflect the additional needs for primary care in deprived populations.[39] In our implementation of this formula, the average individual living in the most deprived fifth of English small areas was estimated to have 3.8% more need than the average individual living in the least deprived fifth in 2013/14 (see web appendix table A2.7). This implied additional needs weight for deprived areas may be an under-estimate, for three reasons. First, due to data constraints we were unable to implement one element of the recommended adjustment: temporary resident status in each age-sex category. Second, the health deprivation domain of the IMD 2010 does not fully capture the burden of multimorbidity, which tends to be greater in deprived populations.[9] Third, the adjustment is based on workload patterns in the early 2000s. If there were substantial unmet needs for primary care in deprived populations in the early 2000s, the adjustment may under-estimate the appropriate level of workload in those populations. This limitation means that we cannot draw firm conclusions about levels of need, and in particular we cannot conclude that socioeconomic inequality in GP supply has now been eliminated. However, we can still conclude that there was a reduction in socioeconomic inequality in GP supply relative to need from 2006/7 to 2011/12. To challenge that conclusion, one would have to hypothesise an offsetting increase in relative need for primary care in the most deprived fifth of small areas relative to other areas. This is implausible, for two reasons. First, according to the Carr-Hill formula, relative need for primary care in the most deprived fifth of small areas actually decreased relative to need in the most affluent fifth over the ten year period of the study, due to gradual changes in age-sex composition between deprivation groups (see web appendix figure 17.1). Furthermore, it is not plausible that there was a sudden and substantial increase in relative needs in the most deprived fifth of areas between 2006/7 to 2011/12 relative to the second most deprived fifth of areas. A second limitation is that the official statistics on GP supply do not include data on the supply of

locums.[40 41] However, growth in the use of GP locums in areas struggling to recruit is unlikely to explain our findings since historically recruitment appears to be more difficult in deprived areas.[42 43]

Comparison with previous studies

Two previous studies have examined changing patterns of inequality in GP supply relative to need in England using national data. Gravelle and Sutton examined overall inequality in GP supply between Family Practitioner Committee areas from 1974 to 1990 and between Family Health Service Authority areas from 1990 to 1995.[22] They found substantial and persistent overall inequality, with strong within-area correlation between 1975 and 1995 – most of the administrative areas that were "under-doctored" in 1974 were still "under-doctored" in 1995. Goddard and colleagues extended this time series by adding the years 1996 to 2006, during which period Primary Care Trust areas were introduced.[23] They found that overall variation between administrative areas increased between 1995 and 2006. Both studies concluded that NHS policy had little impact on overall inequality in GP supply, though the second concluded that the abolition of entry controls on "over-doctored" administrative areas in 2002 may have increased overall inequality. Our finding of a reduction in GP supply inequality associated with NHS policy in the late 2000s may seem surprising in the light of these previous findings that inequality in GP supply has not changed much since the 1970s. However, these previous studies are not directly comparable to ours since they examined overall inequality in GP supply between large administrative areas, rather than socioeconomic inequality between small areas. Furthermore, they examined earlier time periods subject to different policy initiatives. For example, the deprivation-weighted capitation payment system introduced in 1990 resulted in complex marginal incentive structures that may have merely shifted GPs from one deprived area to another.[22] By contrast, the EAPMC programme was specifically targeted at opening new GP practices in deprived areas, involved substantial financial expenditure, and was implemented at a time of vigorous centralised NHS target setting and performance monitoring. Viewed in that light, it is less surprising that this programme succeeded in helping to increase GP supply in deprived areas. Equally, it is perhaps not surprising that socioeconomic inequality started to rise again after the programme was wound down in 2011/12, as money ran out and practices started to close.

Meaning of the study: possible explanations and implications for clinicians and policymakers

The reduction in socioeconomic inequality in GP supply was associated with national policy to recruit more GPs in deprived areas of England, as announced in the 2006 White Paper and followed by the Equitable Access to Primary Medical Care (EAPMC) programme from 2008 to 2011. GP supply relative to need increased from 2006/7 to 2011/12 in the group of 38 Primary Care Trusts that received funding from the EAPMC programme, especially in the most deprived fifth of small areas within those PCTs, while decreasing in other PCTs. The increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. While

inequality has increased again since the end of the EAPMC funding it has not yet reached the levels observed in the early 2000s. However, the ongoing NHS funding squeeze and difficulties in GP recruitment and retention particularly in deprived areas suggest that there is a risk of inequality in GP supply continuing to rise in future years. For example, vacancies in GP training posts are especially high in the North of England, where 29% of training posts were unfilled in August 2014.[44] Retention of GPs is also a significant problem, with one study suggesting that nearly a third of GPs intend to leave direct patient care within five years.[31]

Unanswered questions and future research

It is not known how much more need for primary care there is in deprived areas relative to affluent areas. Our estimates of this are based on the best available measure of need for primary care: the workload adjustment from the 2007 revision of the Carr-Hill formula for allocating primary care resources. Our figures show that in 2013/14, the most recent year available, the most deprived fifth of areas received slightly more GP supply relative to need than other areas. However, we cannot conclude from this that "pro-rich" inequality in GP supply has disappeared since, as explained above, there are good reasons for thinking that the Carr-Hill formula may under-estimate need in deprived areas.[39]

References

1. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. The Milbank quarterly 2005;**83**(3):457-502 doi: 10.1111/j.1468-0009.2005.00409.x[published Online First: Epub Date]|.
2. Newhouse J, Williams A, Bennett B, et al. Does the geographical distribution of physicians reflect market failure? Bell J Econ 1982;**13**(2):493 - 505
3. Marmot M, Friel S, Bell R, et al. Closing the gap in a generation: health equity through action on the social determinants of health. Lancet 2008;**372**(9650):1661 - 69
4. Baker M, Ware J, Morgan K. Time to put patients first by investing in general practice. Br J Gen Pract 2014;**64**(623):268-9 doi: 10.3399/bjgp14X679921[published Online First: Epub Date]|.
5. Iacobucci G. *Increase general practice funding or risk "death of the family doctor," GP leader warns*, 2015.
6. Bodenheimer TS, Smith MD. Primary Care: Proposed Solutions To The Physician Shortage Without Training More Physicians. Health Affairs 2013;**32**(11):1881-86 doi: 10.1377/hlthaff.2013.0234[published Online First: Epub Date]|.
7. Barnett K, Mercer SW, Norbury M, et al. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. Lancet 2012;**380**(9836):37-43 doi: 10.1016/S0140-6736(12)60240-2[published Online First: Epub Date]|.
8. Department of Health. Long Term Conditions Compendium of Information. 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216528/dh_134486.pdf (accessed 05 11 14).
9. Charlton J, Rudisill C, Bhattarai N, et al. Impact of deprivation on occurrence, outcomes and health care costs of people with multiple morbidity. Journal of health services research & policy 2013;**18**(4):215-23 doi: 10.1177/1355819613493772[published Online First: Epub Date]|.
10. Baker M. Strategic Review of Health Inequalities in England Post 2010 (Marmot Review). 2009. http://www.rcgp.org.uk/Policy/RCGP-policy-areas/~/media/Files/Policy/A-Z-policy/RCGP-Marmot-Review-Paper-September-2008.ashx (accessed 03 11 14).
11. Department of Health. Equity and excellence: Liberating the NHS. In: Department of Health, ed.: The Stationary Office, 2010.
12. Royal College of General Practitioners. Over 500 surgeries at risk of closure as GP workforce crisis deepens. 2014. http://www.rcgp.org.uk/news/2014/october/over-500-surgeries-at-risk-of-closure-as-gp-workforce-crisis-deepens.aspx (accessed 06 11 14).
13. Kaffash J. Revealed: 15% drop in GP training applications set to exacerbate recruitment crisis. PULSE 2014. http://www.pulsetoday.co.uk/your-practice/practice-topics/education/revealed-15-drop-in-gp-training-applications-set-to-exacerbate-recruitment-crisis/20005739.article#.VIXTUdJybcs (accessed 05/02/2014).
14. Yardim M, Uner S. Geographical Disparities in the Distribution of Physicians in Turkey. TAF Prev Med Bull 2013;**12**(5):487 - 94
15. Matsumoto M, Inoue K, Farmer J, et al. Geographic distribution of primary care physicians in Japan and Britain. Health Place 2010;**16**:164 - 66
16. Petterson SM, Phillips Jr RL, Bazemore AW, et al. Unequal distribution of the US primary care workforce. American family physician 2013;**87**(11):Online-Online
17. Hann M, Gravelle H. The maldistribution of general practitioners in England and Wales: 1974-2003. Br Gen Pract 2004;**54**:894 - 98
18. Isabel C, Paula V. Geographic distribution of physicians in Portugal. Eur J Health Econ 2010;**11**(4):383 - 93
19. Fulop G, Kopetsch T, Hofstatter G, et al. Regional distribution effects of 'needs planning' for office-based physicians in Germany and Austria-methods and empirical findings. J Public Health 2008;**16**:447 - 55

20. Brown M. Using Gini-style indices to evaluate the spatial patterns of health practitioners: Theoretical considerations and an application based on Alberta data. Soc Sci Med 1994;**38**(9):1243 - 56
21. Stapleton G, Schröder-Bäck P, Brand H, et al. Health inequalities and regional specific scarcity in primary care physicians: ethical issues and criteria. International Journal of Public Health 2014;**59**(3):449-55 doi: 10.1007/s00038-013-0497-7[published Online First: Epub Date]|.
22. Gravelle H, Sutton M. Inequality in the geographical distribution of general practitioners in England and Wales 1974-1995. Journal of health services research & policy 2001;**6**(1):6-13
23. Goddard M, Gravelle H, Hole A, et al. Where did all the GPs go? Increasing supply and geographical equity in England and Scotland. Journal of health services research & policy 2010;**15**(1):28-35 doi: 10.1258/jhsrp.2009.009003[published Online First: Epub Date]|.
24. Centre for Workforce Intelligence. GP in-depth review; Preliminary Findings. 2013. http://www.cfwi.org.uk/publications/gp-in-depth-review-preliminary-findings/@@publication-detail (accessed 05 11 14).
25. Sibbald B. Putting general practitioners where they are needed: an overview of strategies to correct maldistribution. Secondary Putting general practitioners where they are needed: an overview of strategies to correct maldistribution 2005. http://www.population-health.manchester.ac.uk/primarycare/npcrdc-archive/archive/PublicationDetail.cfm/ID/139.htm.
26. Hutt P, Gilmour S. Tackling inequalities in general practice. 2010 07/09/2010. http://www.kingsfund.org.uk/sites/files/kf/field/field_document/health-inequalities-general-practice-gp-inquiry-research-paper-mar11.pdf (accessed 05/03/2015).
27. Department of Health. Our Health, Our Care, Our Say. 2006. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/272238/6737.pdf (accessed 06 11 14).
28. Department of Health. Equitable Access to Primary Medical Care services. 2007. http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Aboutus/Procurementandproposals/Procurement/ProcurementatPCTs/index.htm (accessed 08/12/2014).
29. Goldhill F, Alexander B. GP training practices £100m capital programme guidance. Secondary GP training practices £100m capital programme guidance 2009. http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Dearcolleagueletters/DH_098860.
30. Hakin B. Equitable Access Programme: Primary Medical Care Services (letter). 2011 03/02/2011; (02/02/2015). https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215793/dh_123926.pdf (accessed 02/02/2015).
31. The GP Taskforce. Securing the Future GP Workforce: Delivering the Mandate on GP Expansion. 2014 18/07/2014. http://hee.nhs.uk/wp-content/uploads/sites/321/2014/07/GP-Taskforce-report.pdf (accessed 18/12/2014).
32. McNeil F. Making the most of a part time GP registrar post. BMJ Careers 2007 18 Aug 2007 335. http://careerfocus.bmj.com/cgi/content/full/335/7615/gp63-a (accessed 18/12/2014).
33. The Information Centre for Health and Social Care. General and Personal Medical Services England 2002-2012. Leeds, 2013.
34. British Medical Association. Model GP retainer scheme contract. 2005. http://bma.org.uk/practical-support-at-work/contracts/sessional-gps (accessed 02/02/2015).
35. Formula Review Group. Review of the General Medical Services global sum formula. London: NHS Employers and BMA, 2007.
36. NHS England Strategic Finance. Technical Guide to the formulae for 2014-15 and 2015-16 revenue allocations to Clinical Commissioning Groups and Area Teams. 2014 25 March 2014. http://www.england.nhs.uk/2014/03/27/allocations-tech-guide/ (accessed 11/02/2015).

37. WIRED GOV LTD. New practices for under-doctored areas. 2007 23/11/2007. http://www.wired-gov.net/wg/wg-news-1.nsf/0/4EEF1F44D83DBD5D8025739C003E7DE8?OpenDocument (accessed 02/02/2015).
38. Hippisley-Cox J, Coupland C, Pringle M, et al. GMS Formula Review Analysis of the QRESEARCH database. Final Report to the GMS Review Group. 10 02 2006 ed. Nottingham: NHS Employers, 2006.
39. Roberts N. GMS Funding Changes [letter]. 2014 12/08/2014. http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCEQFjAA&url=http%3A%2F%2Fbma.org.uk%2F-%2Fmedia%2Ffiles%2Fpdfs%2Fworking%2520for%2520change%2Fnegotiating%2520for%2520the%2520profession%2Fgeneral%2520practitioners%2Fgms%2520changes%2520lmc%2520letter%252012-8.pdf&ei=K97YVKr8NY7datOPgOgL&usg=AFQjCNEca2rjaBdxpuLdEr9cVHnf416rTA (accessed 09/02/2014).
40. Dilonot A. Statistics on general practitioners [letter]. London, 2014:Annex A, footnote 3. .
41. Poulter. D. Response to parlimentary question from Luciana Berger; To ask the Secretary of State for Health how many general practitioners (a) excluding retainers and registrars, (b) including retainers but excluding registrars there were in (i) 2009-10 and (ii) 2013-14. . In: Health. Do, ed. London: House of Commons., 2014.
42. anon. GP workforce crisis hits record level. PULSE. 19/10/2003 ed. London: Cogora Ltd, 2003.
43. Hutt P GS. Tackling inequalities in general practice. 2010 07/09/2010. Tackling inequalities in general practice (accessed 05/03/2015).
44. Kaffash J. Almost 40% of GP training places are unfilled in some areas of the UK. PULSE 2014. http://www.pulsetoday.co.uk/your-practice/practice-topics/education/almost-40-of-gp-training-places-unfilled-in-some-areas-of-uk/20006989.article#.VJLRtNJybcs

TABLES AND FIGURES

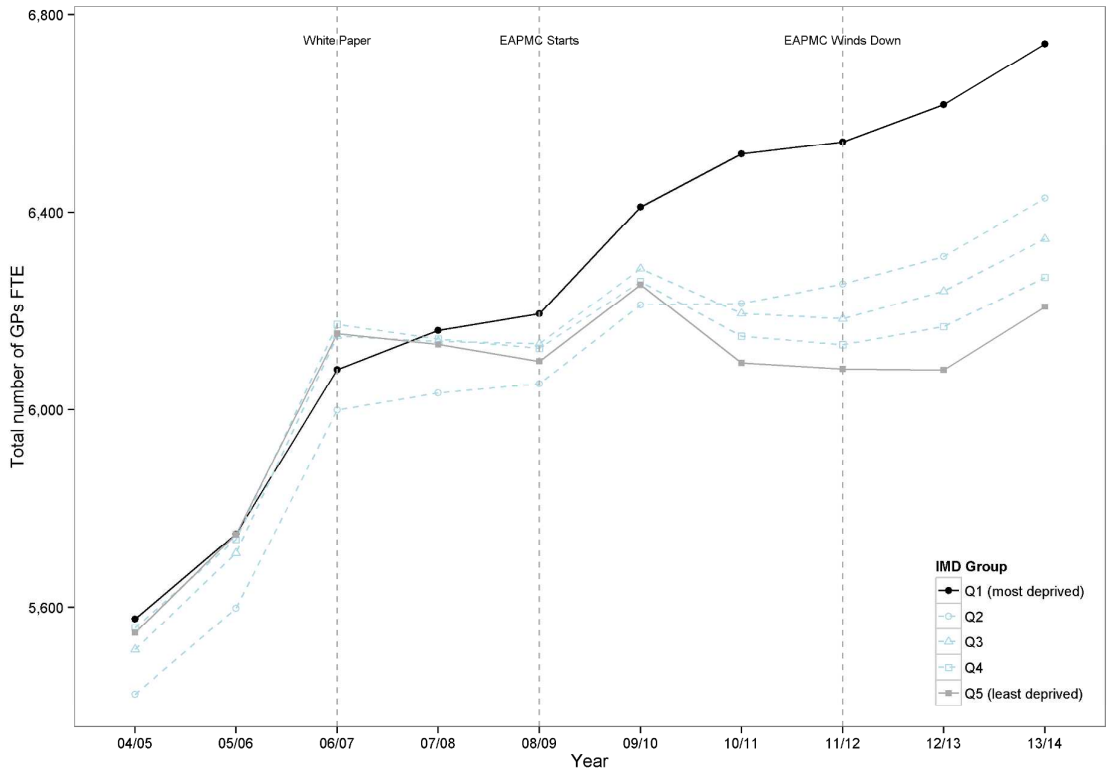
Table 1: Total GP Workforce in England from 2004/5 to 2013/14[1]

		GP Headcount		GP Full Time Equivalent	
Year	**Total Population**	Total	Per 100,000 Pop.	Total	Per 100,000 Pop.
2004/05	50,109,707	30,751	61.37	27,621	55.12
2005/06	50,466,162	31,924	63.26	28,540	56.55
2006/07	50,763,893	32,646	64.31	30,557	60.19
2007/08	51,106,181	32,995	64.56	30,609	59.89
2008/09	51,464,646	33,911	65.89	30,603	59.46
2009/10	51,807,127	35,072	67.70	31,422	60.65
2010/11	52,234,045	36,073	69.06	31,173	59.68
2011/12	52,690,703	36,628	69.52	31,197	59.21
2012/13	53,488,001	36,771	68.75	31,418	58.74
2013/14	53,859,917	36,849	68.42	31,993	59.40

Note to Table 1

1. Excluding GP registrars, retainers and locums.

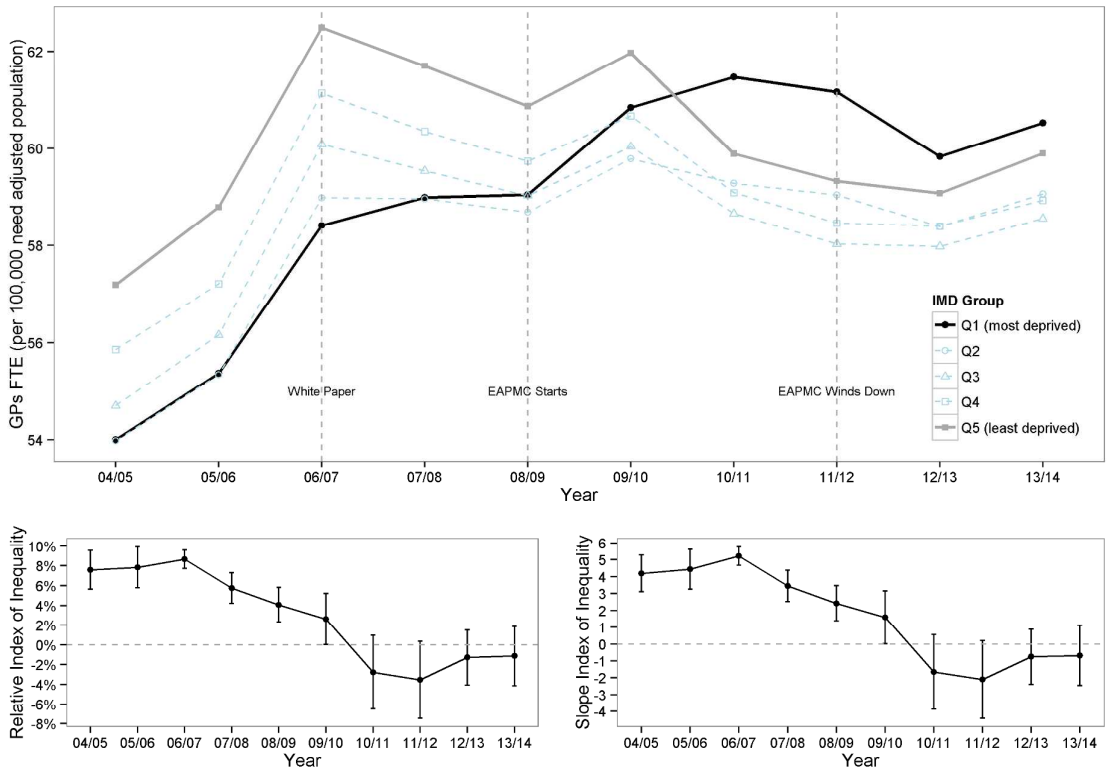
Figure 1: Total GP Workforce[1] by Deprivation Quintile Group, from 2004/5 to 2013/14



Note to Figure 1:

1. Number of full time equivalent GPs, excluding registrars and retainers

Figure 2: Socioeconomic Inequality in GP Supply in England 2003/4 to 2013/14[1,2]



Notes to Figure 2:

1. The upper panel shows full time equivalent GPs per 100,000 need adjusted population by deprivation quintile group of small areas by year; the two lower panels show inequality indices by year, with 95% confidence intervals.
2. The Slope Index of Inequality can be interpreted as the absolute gap in FTE GPs per 100,000 need adjusted population between the most and least deprived small area, and the Relative Index of Inequality as the percentage gap relative to the average area. In each case, a positive index indicates "pro-rich" inequality favouring less deprived areas.

Figure 3: Socioeconomic Gradient in GP Supply in 2006/7 and 2011/12, Before and After the Equitable Access to Primary Medical Care Programme

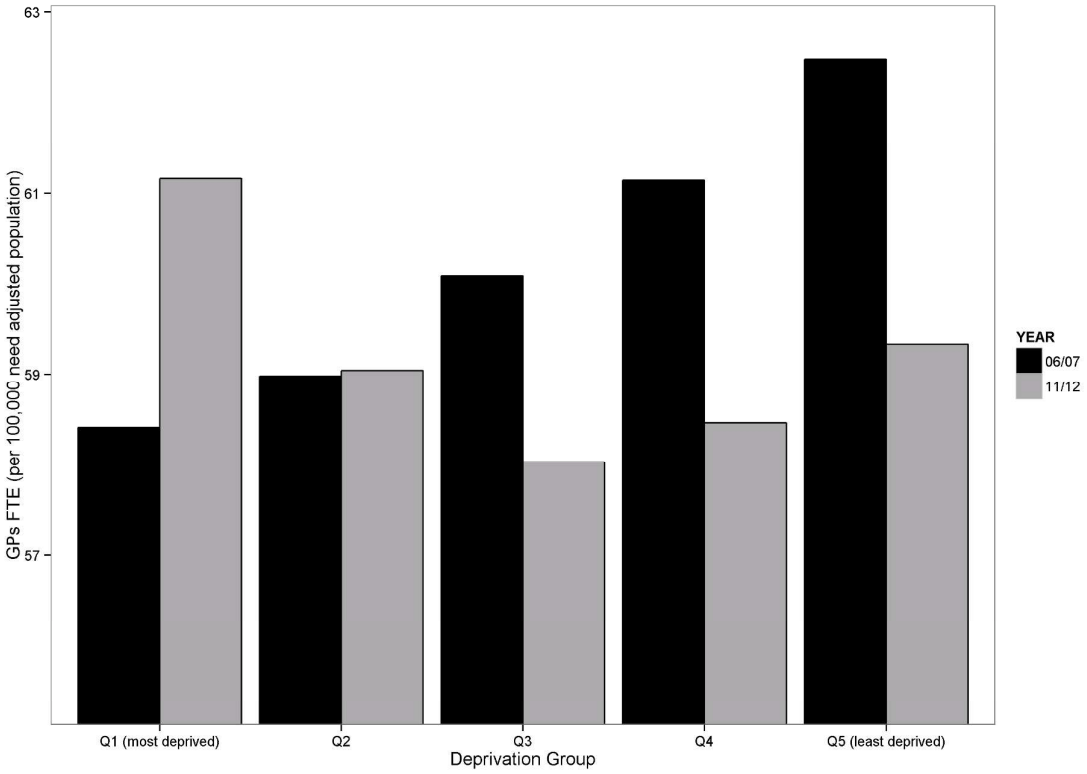
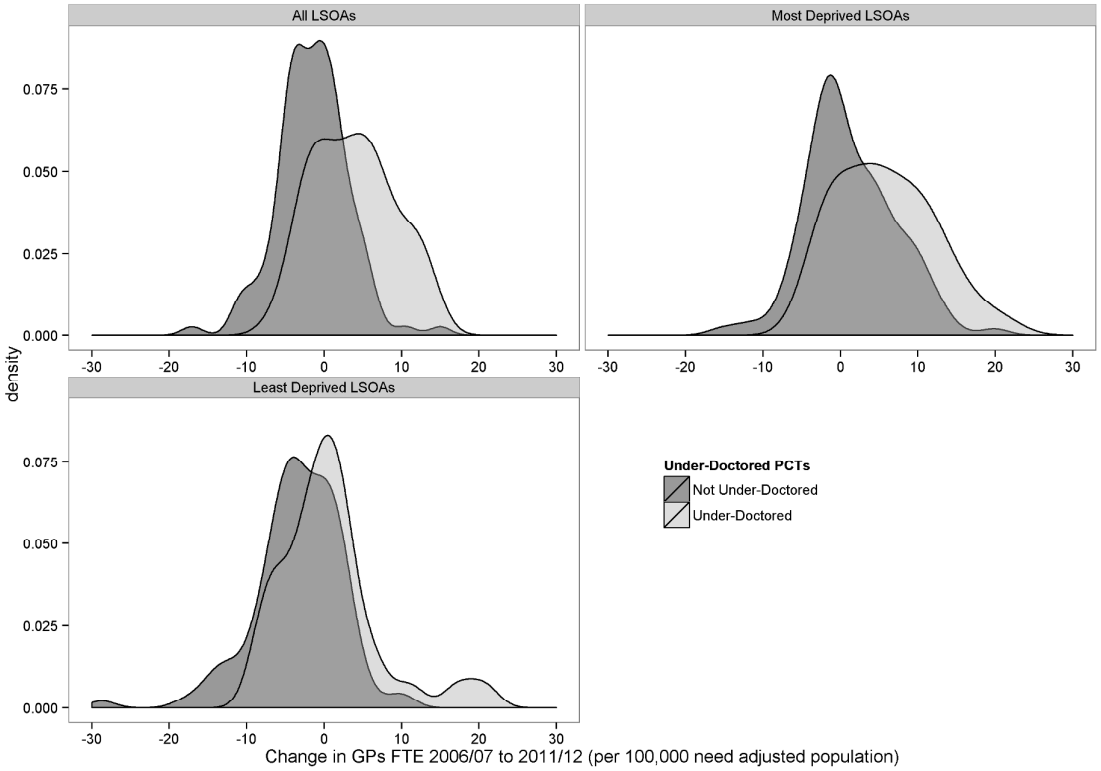


Figure 4: Change in GP Supply Between 2006/7 and 2011/12 By Deprivation Quintile Group, Comparing "Under-Doctored" PCTs and Other PCTs (Kernel Density Plots)



Appendix to paper:

Unequal socioeconomic distribution of the primary care workforce: whole-population small area longitudinal study

This appendix consists of seventeen sections providing further details on and breakdowns of the results in the paper as well as results of various sensitivity analyses.

Section 1 GP supply by IMD quintile

This section presents data tables showing numbers of GPs both in terms of head count and in terms of full time equivalents broken down by IMD deprivation quintiles for years 2004/05 to 2013/14. These results are presented for total numbers of GPs as well as broken down into the three subgroups GPs excluding registrars and retainers, GP registrars only and GP retainers only. For these results GP numbers are attributed to LSOAs and then LSOAs are aggregated according to IMD scores calculated at LSOA level. This worksheet also contains results where IMD deprivation scores are attributed to GP practices and these are then used to aggregate GP numbers into population weighted fifths by deprivation. Several additional sets of data underpinning the plots in various sensitivity analyses are also given in these tables.

Section 2 Inequality Indices

This section presents the numbers of GP FTE in the richest and poorest fifths of LSOAs as well as the absolute gap, relative gap, slope index of inequality and relative index of inequality for years 2004/05 to 2013/14. Results are broken down into the

Section 3 GP supply by PCT in 2006 and 2011

This section looks at GP supply by PCT in 2006/07 and 2011/12 the two years that we compare to evaluate whether the investment in underdoctored areas had any effect. PCTs are marked by underdoctored status as identified in the policy documents that defined where this investment would be targeted. Numbers are presented for all LSOAs as well as for only the most deprived fifth of LSOAs and least deprived fifth of LSOAs in each PCT. PCTs that do not include any LSOAs in the most or least deprived fifths have NAs in place of numbers in the relevant fields. There is also a second table in this worksheet showing similar results for GPs excluding registrars and retainers.

Section 4 Basecase results - LSOA level deprivation - excluding GP Registrars and GP retainers

This section presents a full set of results expanding on those presented in the paper. The results are for GPs excluding registrars and retainers, these are attributed to LSOAs and then aggregated by LSOA level IMD scores into deprivation quintiles. The results show:

(1) the trend over time by deprivation quintile in need adjusted full time equivalent GP supply per 100,000 of population
(2) cross- sectional results for 2006/07 and 20011/12 in need adjusted full time equivalent GP supply per 100,000 of population
(3) the trends in total numbers of GP both in terms of head count and in terms of full time equivalent GPs split by deprivation quintile
(4) unadjusted and adjusted time trends in numbers of GPs in terms of head count and full time equivalents split by derpivation quintile
(5) regression results to test whether there has been a siginificant change in the slope index of inequality between 2006/07 and 2011/12
(6) distributions of changes in GP supply between 2006/07 and 2011/12 at PCT level split by under-doctored status looking at all LSOAs, the most deprived fifth of LSOAs and the least deprived fifth of LSOAs
(7) distributions of FTE practice nurses in 2013/14
(8) scatter plot of GP FTE in each LSOA plotted against deprivation in 2006/07 and 2011/12
(9) scatter plot of changes in GP FTE in each LSOA against deprivation between 2006/07 and 2011/12
(10) the trend over time in GP FTE by deprivation decile

Section 5 Sensitivity analysis including GP registrars and GP retainers

This section shows the same six sets of results as those in section 4 but looking at GP supply including GP registrars and

Section 6 Sensitivity analysis looking only at GP registrars

This section shows the first five sets of results as those in section 4 but looking only at the supply of GP registrars

Section 7 Sensitivity analysis looking only at GP retainers

This section shows the first five sets of results as those in section 4 but looking only at the supply of GP registrars

Section 8 Sensitivity analysis looking at practice level deprivation quintiles rather than LSOA level deprivation quintiles excluding GP registrars and GP retainers

This section shows the first five sets of results as those in section 4 but with attibution of IMD score to GP practice and aggregation into deprivation quintiles at practice level rather than attribution of the GP supply to LSOA level and aggregation at LSOA level as done in the base case. Inaddition to this there are also plots of:
(6) trends in numbers of LSOA that practices draw their patients from over time by deprivation quintile
(7) trends in mean numbers of GPs per practice over time by deprivation quintile

Section 9 Sensitivity analysis looking at practice level deprivation quintiles including registrars and retainers

This section is the same as section 8 except it shows results for GP numbers including registrars and retainers rather than all

Section 10 Sensitivity analysis London NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the London NHS CR

Section 11 Sensitivity analysis North of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the North of England NHS CR

Section 12 Sensitivity analysis Midlands and East of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the Midland and East of

Section 13 Sensitivity analysis South of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the South of England NHS CR

Section 14 Sensitivity analysis PCT level looking at trends in Nurse and GP FTE excluding registrars and retainers

This section shows trends in Nurse FTE and GP FTE with deprivation quintiles derived from population weighted PCTs. Historical data for nurse FTE was only available to us at PCT level

Section 15 Sensitivity analysis looking at CCG level deprivation quintiles excluding registrars and retainers

This section is the same as section 4 except it shows results aggregated into deprivation quintiles based on population

Section 16 Trends in GP practices opening and closing and their impact on GP FTE

This section shows the numbers of GP practices opening and closing over time by deprivation group and the impact this has had in terms of gains and losses of GP FTE excluding registrars and retainers in these groups

Section 17 Need adjustment details and sensitivity analysis

This section explains the Carr-Hill Workload need adjustment formula used, explores its impacts on the results over time and explores the sensitivity of the results to using an alternative Nuffield person based resource allocation formula on the results

Appendix Section 1

Table A1.1: GP Supply by IMD Quintile Including Registrars and Retainers

				All GPs (Including Registrars and Retainers)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6656	66.89	64.46	6045	60.74	58.54
2004	2	9,922,657	10,048,907	6562	66.14	65.31	5895	59.41	58.66
2004	3	10,032,274	10,082,658	6811	67.89	67.55	6040	60.21	59.91
2004	4	10,062,460	9,949,765	6962	69.19	69.97	6139	61.00	61.69
2004	5 (least deprived)	10,140,651	9,701,318	7067	69.69	72.84	6194	61.08	63.85
2005	1 (most deprived)	10,017,043	10,380,909	6826	68.14	65.75	6190	61.79	59.63
2005	2	9,998,176	10,114,567	6774	67.75	66.97	6062	60.63	59.94
2005	3	10,115,862	10,165,383	7047	69.66	69.32	6232	61.61	61.31
2005	4	10,133,726	10,028,822	7179	70.85	71.59	6320	62.37	63.02
2005	5 (least deprived)	10,201,355	9,776,480	7265	71.21	74.31	6360	62.35	65.06
2006	1 (most deprived)	10,061,435	10,411,858	6969	69.27	66.93	6505	64.65	62.47
2006	2	10,062,639	10,172,317	6869	68.26	67.52	6429	63.89	63.20
2006	3	10,182,896	10,234,380	7133	70.05	69.70	6631	65.12	64.80
2006	4	10,194,108	10,096,472	7251	71.13	71.82	6707	65.79	66.43
2006	5 (least deprived)	10,262,815	9,848,867	7319	71.31	74.31	6718	65.46	68.21
2007	1 (most deprived)	10,107,634	10,443,538	7036	69.61	67.37	6513	64.43	62.36
2007	2	10,132,298	10,233,624	6862	67.72	67.05	6394	63.11	62.48
2007	3	10,257,247	10,310,359	7009	68.33	67.98	6508	63.45	63.12
2007	4	10,268,083	10,180,175	7091	69.06	69.65	6556	63.85	64.40
2007	5 (least deprived)	10,340,919	9,938,486	7147	69.11	71.91	6546	63.30	65.86
2008	1 (most deprived)	10,172,305	10,490,011	7499	73.72	71.49	6757	66.43	64.41
2008	2	10,222,041	10,313,147	7301	71.42	70.79	6633	64.89	64.32
2008	3	10,336,944	10,392,001	7479	72.35	71.97	6767	65.47	65.12
2008	4	10,326,760	10,251,648	7553	73.14	73.68	6820	66.05	66.53
2008	5 (least deprived)	10,406,596	10,017,839	7603	73.06	75.90	6809	65.43	67.97
2009	1 (most deprived)	10,242,974	10,537,912	7907	77.19	75.03	7056	68.89	66.96
2009	2	10,312,215	10,390,335	7651	74.19	73.64	6896	66.87	66.37
2009	3	10,412,543	10,470,074	7805	74.96	74.55	7026	67.48	67.11
2009	4	10,376,595	10,317,632	7854	75.69	76.13	7064	68.08	68.46
2009	5 (least deprived)	10,461,735	10,091,174	7974	76.22	79.02	7127	68.12	70.62
2010	1 (most deprived)	10,336,179	10,604,558	8353	80.81	78.77	7190	69.56	67.80
2010	2	10,418,358	10,484,925	7946	76.27	75.78	6918	66.40	65.98
2010	3	10,500,292	10,561,037	8019	76.37	75.93	6961	66.29	65.91
2010	4	10,452,346	10,406,831	8040	76.92	77.25	6971	66.70	66.99
2010	5 (least deprived)	10,526,870	10,176,694	8087	76.82	79.47	6978	66.29	68.57
2011	1 (most deprived)	10,456,433	10,697,690	8485	81.14	79.31	7186	68.72	67.17
2011	2	10,543,934	10,594,848	8102	76.84	76.47	6955	65.96	65.64
2011	3	10,591,723	10,656,814	8156	77.00	76.53	6977	65.87	65.47
2011	4	10,519,160	10,489,422	8147	77.45	77.67	6975	66.31	66.50
2011	5 (least deprived)	10,579,453	10,251,929	8193	77.45	79.92	7006	66.23	68.34
2012	1 (most deprived)	10,893,479	11,062,381	8605	78.99	77.78	7342	67.40	66.37
2012	2	10,782,713	10,807,827	8227	76.29	76.12	7102	65.87	65.71
2012	3	10,694,991	10,762,883	8235	77.00	76.51	7089	66.29	65.87
2012	4	10,552,487	10,562,156	8207	77.77	77.70	7052	66.83	66.77
2012	5 (least deprived)	10,564,331	10,292,754	8165	77.29	79.33	6981	66.08	67.83
2013	1 (most deprived)	10,994,820	11,137,074	8460	76.94	75.96	7334	66.70	65.85
2013	2	10,873,567	10,885,678	8103	74.52	74.43	7077	65.08	65.01
2013	3	10,765,378	10,837,339	8062	74.89	74.39	7011	65.13	64.70
2013	4	10,610,984	10,635,953	7995	75.34	75.17	6942	65.42	65.27
2013	5 (least deprived)	10,615,169	10,363,872	7967	75.05	76.87	6888	64.88	66.46

Table A1.2: GP Supply by IMD Quintile Excluding Registrars and Retainers

				Excluding Registrars and Retainers					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6118	61.48	59.24	5576	56.03	54.00
2004	2	9,922,657	10,048,907	6002	60.49	59.73	5424	54.66	53.98
2004	3	10,032,274	10,082,658	6164	61.44	61.14	5515	54.97	54.70
2004	4	10,062,460	9,949,765	6233	61.95	62.65	5558	55.24	55.86
2004	5 (least deprived)	10,140,651	9,701,318	6233	61.47	64.25	5548	54.71	57.19
2005	1 (most deprived)	10,017,043	10,380,909	6318	63.07	60.86	5748	57.38	55.37
2005	2	9,998,176	10,114,567	6221	62.22	61.51	5598	55.99	55.34
2005	3	10,115,862	10,165,383	6418	63.45	63.14	5709	56.44	56.16
2005	4	10,133,726	10,028,822	6470	63.84	64.51	5738	56.62	57.21
2005	5 (least deprived)	10,201,355	9,776,480	6497	63.69	66.46	5747	56.34	58.79
2006	1 (most deprived)	10,061,435	10,411,858	6484	64.44	62.28	6082	60.45	58.41
2006	2	10,062,639	10,172,317	6371	63.31	62.63	5999	59.62	58.98
2006	3	10,182,896	10,234,380	6563	64.45	64.13	6149	60.39	60.09
2006	4	10,194,108	10,096,472	6607	64.81	65.44	6173	60.55	61.14
2006	5 (least deprived)	10,262,815	9,848,867	6621	64.52	67.23	6154	59.96	62.49
2007	1 (most deprived)	10,107,634	10,443,538	6642	65.71	63.59	6161	60.95	58.99
2007	2	10,132,298	10,233,624	6460	63.76	63.13	6034	59.55	58.96
2007	3	10,257,247	10,310,359	6597	64.31	63.98	6139	59.85	59.54
2007	4	10,268,083	10,180,175	6627	64.54	65.10	6143	59.83	60.35
2007	5 (least deprived)	10,340,919	9,938,486	6670	64.50	67.11	6132	59.30	61.70
2008	1 (most deprived)	10,172,305	10,490,011	6883	67.67	65.62	6194	60.89	59.05
2008	2	10,222,041	10,313,147	6663	65.18	64.61	6053	59.21	58.69
2008	3	10,336,944	10,392,001	6785	65.64	65.29	6134	59.34	59.03
2008	4	10,326,760	10,251,648	6783	65.69	66.17	6124	59.31	59.74
2008	5 (least deprived)	10,406,596	10,017,839	6796	65.31	67.84	6098	58.60	60.87
2009	1 (most deprived)	10,242,974	10,537,912	7202	70.32	68.35	6411	62.59	60.84
2009	2	10,312,215	10,390,335	6907	66.98	66.47	6212	60.24	59.79
2009	3	10,412,543	10,470,074	6994	67.17	66.80	6286	60.37	60.04
2009	4	10,376,595	10,317,632	6967	67.14	67.52	6260	60.32	60.67
2009	5 (least deprived)	10,461,735	10,091,174	7002	66.93	69.39	6253	59.77	61.97
2010	1 (most deprived)	10,336,179	10,604,558	7609	73.61	71.75	6518	63.06	61.47
2010	2	10,418,358	10,484,925	7157	68.69	68.26	6216	59.66	59.28
2010	3	10,500,292	10,561,037	7152	68.11	67.72	6195	59.00	58.66
2010	4	10,452,346	10,406,831	7096	67.89	68.19	6149	58.83	59.09
2010	5 (least deprived)	10,526,870	10,176,694	7060	67.07	69.37	6095	57.90	59.89
2011	1 (most deprived)	10,456,433	10,697,690	7754	74.15	72.48	6543	62.57	61.16
2011	2	10,543,934	10,594,848	7309	69.32	68.99	6255	59.32	59.04
2011	3	10,591,723	10,656,814	7257	68.51	68.09	6185	58.39	58.03
2011	4	10,519,160	10,489,422	7181	68.26	68.46	6132	58.29	58.46
2011	5 (least deprived)	10,579,453	10,251,929	7128	67.37	69.53	6083	57.50	59.33
2012	1 (most deprived)	10,893,479	11,062,381	7802	71.62	70.52	6618	60.75	59.83
2012	2	10,782,713	10,807,827	7346	68.13	67.97	6310	58.52	58.39
2012	3	10,694,991	10,762,883	7283	68.09	67.67	6240	58.35	57.98
2012	4	10,552,487	10,562,156	7206	68.29	68.22	6168	58.45	58.40
2012	5 (least deprived)	10,564,331	10,292,754	7135	67.54	69.32	6081	57.56	59.08
2013	1 (most deprived)	10,994,820	11,137,074	7796	70.91	70.00	6741	61.31	60.53
2013	2	10,873,567	10,885,678	7371	67.79	67.72	6429	59.12	59.06
2013	3	10,765,378	10,837,339	7301	67.82	67.37	6346	58.95	58.56
2013	4	10,610,984	10,635,953	7213	67.97	67.81	6268	59.07	58.93
2013	5 (least deprived)	10,615,169	10,363,872	7168	67.53	69.16	6208	58.49	59.90

Table A1.3: GP Supply by IMD Quintile Registrars Only

				Registrars Only					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	456	4.58	4.41	440	4.43	4.26
2004	2	9,922,657	10,048,907	447	4.51	4.45	433	4.36	4.30
2004	3	10,032,274	10,082,658	496	4.94	4.92	474	4.73	4.71
2004	4	10,062,460	9,949,765	543	5.39	5.45	519	5.16	5.21
2004	5 (least deprived)	10,140,651	9,701,318	598	5.90	6.17	567	5.60	5.85
2005	1 (most deprived)	10,017,043	10,380,909	437	4.36	4.21	419	4.18	4.04
2005	2	9,998,176	10,114,567	452	4.52	4.47	432	4.32	4.27
2005	3	10,115,862	10,165,383	506	5.00	4.98	481	4.75	4.73
2005	4	10,133,726	10,028,822	562	5.55	5.60	533	5.26	5.31
2005	5 (least deprived)	10,201,355	9,776,480	585	5.73	5.98	550	5.39	5.62
2006	1 (most deprived)	10,061,435	10,411,858	411	4.09	3.95	395	3.93	3.80
2006	2	10,062,639	10,172,317	409	4.07	4.02	394	3.91	3.87
2006	3	10,182,896	10,234,380	450	4.42	4.40	432	4.24	4.22
2006	4	10,194,108	10,096,472	490	4.80	4.85	469	4.61	4.65
2006	5 (least deprived)	10,262,815	9,848,867	498	4.86	5.06	480	4.68	4.88
2007	1 (most deprived)	10,107,634	10,443,538	324	3.20	3.10	308	3.05	2.95
2007	2	10,132,298	10,233,624	317	3.13	3.10	304	3.00	2.97
2007	3	10,257,247	10,310,359	309	3.02	3.00	298	2.91	2.89
2007	4	10,268,083	10,180,175	333	3.25	3.27	321	3.13	3.15
2007	5 (least deprived)	10,340,919	9,938,486	303	2.93	3.05	294	2.84	2.95
2008	1 (most deprived)	10,172,305	10,490,011	558	5.49	5.32	528	5.19	5.03
2008	2	10,222,041	10,313,147	567	5.54	5.49	536	5.24	5.19
2008	3	10,336,944	10,392,001	604	5.84	5.81	577	5.58	5.55
2008	4	10,326,760	10,251,648	651	6.30	6.35	622	6.02	6.07
2008	5 (least deprived)	10,406,596	10,017,839	638	6.13	6.37	608	5.84	6.07
2009	1 (most deprived)	10,242,974	10,537,912	651	6.35	6.18	612	5.97	5.81
2009	2	10,312,215	10,390,335	679	6.59	6.54	640	6.21	6.16
2009	3	10,412,543	10,470,074	726	6.97	6.93	682	6.55	6.51
2009	4	10,376,595	10,317,632	778	7.49	7.54	730	7.04	7.08
2009	5 (least deprived)	10,461,735	10,091,174	819	7.83	8.11	769	7.35	7.62
2010	1 (most deprived)	10,336,179	10,604,558	698	6.76	6.59	654	6.33	6.17
2010	2	10,418,358	10,484,925	728	6.99	6.94	678	6.51	6.46
2010	3	10,500,292	10,561,037	786	7.48	7.44	733	6.98	6.94
2010	4	10,452,346	10,406,831	842	8.05	8.09	782	7.48	7.51
2010	5 (least deprived)	10,526,870	10,176,694	896	8.51	8.80	829	7.88	8.15
2011	1 (most deprived)	10,456,433	10,697,690	687	6.57	6.42	626	5.99	5.85
2011	2	10,543,934	10,594,848	738	7.00	6.96	679	6.44	6.40
2011	3	10,591,723	10,656,814	828	7.82	7.77	764	7.22	7.17
2011	4	10,519,160	10,489,422	879	8.35	8.38	809	7.69	7.72
2011	5 (least deprived)	10,579,453	10,251,929	955	9.03	9.32	881	8.33	8.59
2012	1 (most deprived)	10,893,479	11,062,381	765	7.03	6.92	706	6.48	6.38
2012	2	10,782,713	10,807,827	832	7.72	7.70	769	7.13	7.11
2012	3	10,694,991	10,762,883	890	8.32	8.27	820	7.66	7.62
2012	4	10,552,487	10,562,156	922	8.74	8.73	846	8.02	8.01
2012	5 (least deprived)	10,564,331	10,292,754	934	8.84	9.07	854	8.09	8.30
2013	1 (most deprived)	10,994,820	11,137,074	626	5.70	5.62	576	5.24	5.17
2013	2	10,873,567	10,885,678	685	6.30	6.29	628	5.77	5.77
2013	3	10,765,378	10,837,339	708	6.58	6.54	642	5.96	5.92
2013	4	10,610,984	10,635,953	716	6.74	6.73	645	6.08	6.06
2013	5 (least deprived)	10,615,169	10,363,872	717	6.76	6.92	643	6.06	6.21

Table A1.4: GP Supply by IMD Quintile Retainers Only

				Retainers Only					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	83	0.83	0.80	28	0.29	0.28
2004	2	9,922,657	10,048,907	113	1.14	1.12	38	0.39	0.38
2004	3	10,032,274	10,082,658	151	1.51	1.50	51	0.51	0.51
2004	4	10,062,460	9,949,765	186	1.85	1.87	61	0.61	0.62
2004	5 (least deprived)	10,140,651	9,701,318	235	2.32	2.42	78	0.77	0.81
2005	1 (most deprived)	10,017,043	10,380,909	71	0.71	0.68	23	0.23	0.22
2005	2	9,998,176	10,114,567	101	1.01	1.00	33	0.33	0.33
2005	3	10,115,862	10,165,383	123	1.21	1.21	42	0.41	0.41
2005	4	10,133,726	10,028,822	148	1.46	1.47	50	0.49	0.49
2005	5 (least deprived)	10,201,355	9,776,480	183	1.79	1.87	63	0.62	0.65
2006	1 (most deprived)	10,061,435	10,411,858	74	0.74	0.71	28	0.27	0.26
2006	2	10,062,639	10,172,317	89	0.88	0.87	36	0.36	0.35
2006	3	10,182,896	10,234,380	121	1.18	1.18	50	0.49	0.49
2006	4	10,194,108	10,096,472	154	1.51	1.53	65	0.63	0.64
2006	5 (least deprived)	10,262,815	9,848,867	199	1.94	2.02	84	0.82	0.85
2007	1 (most deprived)	10,107,634	10,443,538	70	0.70	0.67	44	0.43	0.42
2007	2	10,132,298	10,233,624	84	0.83	0.82	56	0.55	0.55
2007	3	10,257,247	10,310,359	103	1.00	1.00	72	0.70	0.69
2007	4	10,268,083	10,180,175	131	1.27	1.28	91	0.89	0.90
2007	5 (least deprived)	10,340,919	9,938,486	174	1.68	1.75	120	1.16	1.21
2008	1 (most deprived)	10,172,305	10,490,011	57	0.56	0.55	35	0.34	0.33
2008	2	10,222,041	10,313,147	71	0.70	0.69	45	0.44	0.44
2008	3	10,336,944	10,392,001	90	0.87	0.87	56	0.55	0.54
2008	4	10,326,760	10,251,648	119	1.15	1.16	74	0.72	0.72
2008	5 (least deprived)	10,406,596	10,017,839	169	1.63	1.69	102	0.98	1.02
2009	1 (most deprived)	10,242,974	10,537,912	54	0.52	0.51	33	0.33	0.32
2009	2	10,312,215	10,390,335	65	0.63	0.63	43	0.42	0.42
2009	3	10,412,543	10,470,074	86	0.83	0.82	58	0.56	0.56
2009	4	10,376,595	10,317,632	110	1.06	1.07	74	0.71	0.72
2009	5 (least deprived)	10,461,735	10,091,174	153	1.47	1.52	104	1.00	1.03
2010	1 (most deprived)	10,336,179	10,604,558	46	0.45	0.43	18	0.17	0.17
2010	2	10,418,358	10,484,925	62	0.59	0.59	24	0.23	0.23
2010	3	10,500,292	10,561,037	82	0.78	0.78	33	0.31	0.31
2010	4	10,452,346	10,406,831	102	0.98	0.98	41	0.39	0.39
2010	5 (least deprived)	10,526,870	10,176,694	131	1.25	1.29	53	0.51	0.52
2011	1 (most deprived)	10,456,433	10,697,690	44	0.43	0.42	17	0.16	0.16
2011	2	10,543,934	10,594,848	55	0.52	0.52	21	0.20	0.20
2011	3	10,591,723	10,656,814	71	0.67	0.67	28	0.26	0.26
2011	4	10,519,160	10,489,422	88	0.84	0.84	34	0.32	0.32
2011	5 (least deprived)	10,579,453	10,251,929	110	1.04	1.08	43	0.40	0.42
2012	1 (most deprived)	10,893,479	11,062,381	38	0.35	0.34	19	0.17	0.17
2012	2	10,782,713	10,807,827	49	0.45	0.45	23	0.21	0.21
2012	3	10,694,991	10,762,883	62	0.58	0.58	30	0.28	0.27
2012	4	10,552,487	10,562,156	79	0.75	0.75	38	0.36	0.36
2012	5 (least deprived)	10,564,331	10,292,754	97	0.91	0.94	46	0.43	0.45
2013	1 (most deprived)	10,994,820	11,137,074	37	0.34	0.34	17	0.15	0.15
2013	2	10,873,567	10,885,678	46	0.42	0.42	20	0.19	0.19
2013	3	10,765,378	10,837,339	53	0.49	0.49	23	0.22	0.22
2013	4	10,610,984	10,635,953	66	0.63	0.62	29	0.28	0.28
2013	5 (least deprived)	10,615,169	10,363,872	82	0.77	0.79	36	0.34	0.35

Table A1.5: GP Supply by IMD Quintile Including Registrars and Retainers Practice Level Aggregation

				ALL GPs (Practice Level Aggregation)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6509	64.93	63.53	5943	59.29	58.01
2004	2	9,922,657	10,048,907	6574	65.57	64.70	5931	59.16	58.37
2004	3	10,032,274	10,082,658	6662	66.50	66.13	5950	59.39	59.06
2004	4	10,062,460	9,949,765	7117	71.01	71.52	6209	61.95	62.39
2004	5 (least deprived)	10,140,651	9,701,318	7197	71.84	74.35	6280	62.69	64.88
2005	1 (most deprived)	10,017,043	10,380,909	6681	66.15	64.78	6085	60.25	59.00
2005	2	9,998,176	10,114,567	6782	67.21	66.34	6107	60.52	59.74
2005	3	10,115,862	10,165,383	6868	68.07	67.66	6112	60.57	60.21
2005	4	10,133,726	10,028,822	7362	72.93	73.45	6414	63.54	63.99
2005	5 (least deprived)	10,201,355	9,776,480	7398	73.31	75.83	6447	63.89	66.08
2006	1 (most deprived)	10,061,435	10,411,858	6813	67.08	65.76	6371	62.73	61.49
2006	2	10,062,639	10,172,317	6863	67.57	66.70	6411	63.12	62.30
2006	3	10,182,896	10,234,380	7029	69.25	68.85	6574	64.76	64.39
2006	4	10,194,108	10,096,472	7412	72.99	73.44	6883	67.77	68.19
2006	5 (least deprived)	10,262,815	9,848,867	7424	73.17	75.67	6752	66.55	68.82
2007	1 (most deprived)	10,107,634	10,443,538	6956	68.04	66.77	6437	62.97	61.79
2007	2	10,132,298	10,233,624	6912	67.61	66.77	6427	62.87	62.08
2007	3	10,257,247	10,310,359	6894	67.47	67.07	6436	62.99	62.61
2007	4	10,268,083	10,180,175	7159	69.99	70.36	6665	65.16	65.51
2007	5 (least deprived)	10,340,919	9,938,486	7223	70.72	73.09	6551	64.14	66.29
2008	1 (most deprived)	10,172,305	10,490,011	7375	71.64	70.40	6636	64.46	63.35
2008	2	10,222,041	10,313,147	7411	71.95	71.06	6742	65.46	64.65
2008	3	10,336,944	10,392,001	7330	71.23	70.81	6667	64.80	64.41
2008	4	10,326,760	10,251,648	7613	73.97	74.32	6894	66.99	67.30
2008	5 (least deprived)	10,406,596	10,017,839	7707	74.92	77.34	6846	66.55	68.70
2009	1 (most deprived)	10,242,974	10,537,912	7856	75.75	74.56	6985	67.35	66.29
2009	2	10,312,215	10,390,335	7627	73.64	72.79	6902	66.64	65.87
2009	3	10,412,543	10,470,074	7650	73.83	73.40	6907	66.66	66.28
2009	4	10,376,595	10,317,632	7952	76.77	77.05	7179	69.31	69.55
2009	5 (least deprived)	10,461,735	10,091,174	8107	78.26	80.67	7196	69.47	71.61
2010	1 (most deprived)	10,336,179	10,604,558	8327	79.69	78.60	7134	68.28	67.34
2010	2	10,418,358	10,484,925	7947	76.07	75.22	6959	66.61	65.86
2010	3	10,500,292	10,561,037	7780	74.48	74.06	6789	64.99	64.63
2010	4	10,452,346	10,406,831	8200	78.48	78.69	7106	68.01	68.19
2010	5 (least deprived)	10,526,870	10,176,694	8191	78.43	80.70	7030	67.31	69.26
2011	1 (most deprived)	10,456,433	10,697,690	8469	80.33	79.42	7121	67.55	66.78
2011	2	10,543,934	10,594,848	8037	76.21	75.43	6970	66.09	65.41
2011	3	10,591,723	10,656,814	7918	75.19	74.74	6792	64.49	64.11
2011	4	10,519,160	10,489,422	8277	78.57	78.69	7068	67.10	67.20
2011	5 (least deprived)	10,579,453	10,251,929	8382	79.55	81.69	7148	67.84	69.66
2012	1 (most deprived)	10,893,479	11,062,381	8414	78.61	78.14	7132	66.63	66.23
2012	2	10,782,713	10,807,827	8119	75.85	75.18	7062	65.98	65.39
2012	3	10,694,991	10,762,883	8087	75.66	75.18	7001	65.50	65.08
2012	4	10,552,487	10,562,156	8413	78.61	78.55	7223	67.49	67.43
2012	5 (least deprived)	10,564,331	10,292,754	8405	78.64	80.40	7150	66.89	68.39
2013	1 (most deprived)	10,994,820	11,137,074	8281	76.83	76.49	7144	66.29	66.00
2013	2	10,873,567	10,885,678	7964	73.93	73.33	7016	65.13	64.60
2013	3	10,765,378	10,837,339	7910	73.41	72.98	6907	64.10	63.73
2013	4	10,610,984	10,635,953	8184	76.02	75.87	7095	65.91	65.78
2013	5 (least deprived)	10,615,169	10,363,872	8247	76.58	78.18	7089	65.83	67.21

Table A1.6: GP Supply by IMD Quintile Excluding Registrars and Retainers Practice Level Aggregation

				Excluding Registrars and Retainers (Practice Level Aggregation)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6040	60.25	58.95	5526	55.13	53.94
2004	2	9,922,657	10,048,907	5990	59.75	58.96	5433	54.20	53.48
2004	3	10,032,274	10,082,658	6095	60.84	60.50	5473	54.63	54.32
2004	4	10,062,460	9,949,765	6350	63.36	63.82	5607	55.94	56.35
2004	5 (least deprived)	10,140,651	9,701,318	6276	62.64	64.84	5582	55.72	57.67
2005	1 (most deprived)	10,017,043	10,380,909	6240	61.78	60.50	5698	56.42	55.25
2005	2	9,998,176	10,114,567	6195	61.39	60.60	5606	55.56	54.84
2005	3	10,115,862	10,165,383	6313	62.57	62.19	5639	55.88	55.55
2005	4	10,133,726	10,028,822	6618	65.56	66.03	5809	57.54	57.96
2005	5 (least deprived)	10,201,355	9,776,480	6558	64.99	67.22	5788	57.36	59.33
2006	1 (most deprived)	10,061,435	10,411,858	6379	62.81	61.57	5989	58.97	57.81
2006	2	10,062,639	10,172,317	6369	62.71	61.89	5982	58.90	58.14
2006	3	10,182,896	10,234,380	6493	63.97	63.60	6110	60.19	59.85
2006	4	10,194,108	10,096,472	6723	66.20	66.61	6311	62.15	62.53
2006	5 (least deprived)	10,262,815	9,848,867	6682	65.86	68.10	6164	60.76	62.83
2007	1 (most deprived)	10,107,634	10,443,538	6608	64.64	63.43	6130	59.96	58.84
2007	2	10,132,298	10,233,624	6474	63.33	62.54	6035	59.03	58.29
2007	3	10,257,247	10,310,359	6497	63.58	63.21	6069	59.39	59.04
2007	4	10,268,083	10,180,175	6700	65.50	65.85	6259	61.18	61.51
2007	5 (least deprived)	10,340,919	9,938,486	6716	65.76	67.96	6117	59.90	61.90
2008	1 (most deprived)	10,172,305	10,490,011	6847	66.51	65.36	6152	59.76	58.72
2008	2	10,222,041	10,313,147	6706	65.10	64.30	6103	59.25	58.52
2008	3	10,336,944	10,392,001	6679	64.91	64.52	6065	58.94	58.59
2008	4	10,326,760	10,251,648	6850	66.55	66.87	6201	60.24	60.53
2008	5 (least deprived)	10,406,596	10,017,839	6829	66.38	68.53	6083	59.13	61.04
2009	1 (most deprived)	10,242,974	10,537,912	7234	69.76	68.65	6412	61.83	60.85
2009	2	10,312,215	10,390,335	6849	66.12	65.37	6189	59.75	59.06
2009	3	10,412,543	10,470,074	6890	66.50	66.11	6208	59.91	59.56
2009	4	10,376,595	10,317,632	7048	68.04	68.29	6362	61.42	61.64
2009	5 (least deprived)	10,461,735	10,091,174	7051	68.07	70.16	6253	60.36	62.22
2010	1 (most deprived)	10,336,179	10,604,558	7695	73.65	72.64	6556	62.74	61.89
2010	2	10,418,358	10,484,925	7093	67.89	67.14	6203	59.38	58.72
2010	3	10,500,292	10,561,037	6974	66.76	66.39	6065	58.06	57.73
2010	4	10,452,346	10,406,831	7235	69.24	69.43	6266	59.97	60.13
2010	5 (least deprived)	10,526,870	10,176,694	7076	67.75	69.71	6083	58.24	59.93
2011	1 (most deprived)	10,456,433	10,697,690	7867	74.62	73.78	6589	62.50	61.79
2011	2	10,543,934	10,594,848	7196	68.23	67.53	6226	59.03	58.43
2011	3	10,591,723	10,656,814	7064	67.08	66.68	6042	57.37	57.03
2011	4	10,519,160	10,489,422	7286	69.17	69.27	6201	58.87	58.96
2011	5 (least deprived)	10,579,453	10,251,929	7215	68.47	70.32	6139	58.26	59.84
2012	1 (most deprived)	10,893,479	11,062,381	7714	72.07	71.64	6498	60.71	60.35
2012	2	10,782,713	10,807,827	7246	67.69	67.10	6278	58.65	58.13
2012	3	10,694,991	10,762,883	7151	66.90	66.48	6153	57.57	57.20
2012	4	10,552,487	10,562,156	7361	68.78	68.72	6295	58.82	58.77
2012	5 (least deprived)	10,564,331	10,292,754	7299	68.29	69.82	6193	57.95	59.25
2013	1 (most deprived)	10,994,820	11,137,074	7678	71.24	70.92	6603	61.26	60.99
2013	2	10,873,567	10,885,678	7254	67.34	66.79	6381	59.24	58.75
2013	3	10,765,378	10,837,339	7185	66.68	66.29	6270	58.19	57.85
2013	4	10,610,984	10,635,953	7357	68.34	68.21	6379	59.25	59.14
2013	5 (least deprived)	10,615,169	10,363,872	7375	68.48	69.92	6359	59.05	60.28

Table A1.7: GP Supply by IMD Quintile Related to Opening and Closing of Practices

				Opening and Closing of GP Practices					
				GP Practices Opening		GP Practices Closing		Net Change in GP Practices	
Year	IMD Quintile	Population	Need adjusted population	Number of Practices	Number of GP FTE	Number of Practices	Number of GP FTE	Number of Practices	Number of GP FTE
2004	1 (most deprived)	9,951,665	10,327,060	-	-	-	-	-	-
2004	2	9,922,657	10,048,907	-	-	-	-	-	-
2004	3	10,032,274	10,082,658	-	-	-	-	-	-
2004	4	10,062,460	9,949,765	-	-	-	-	-	-
2004	5 (least deprived)	10,140,651	9,701,318	-	-	-	-	-	-
2005	1 (most deprived)	10,017,043	10,380,909	38	25.00	59	20.00	-21	5.00
2005	2	9,998,176	10,114,567	21	19.60	36	11.60	-15	8.00
2005	3	10,115,862	10,165,383	12	25.60	31	15.20	-19	10.40
2005	4	10,133,726	10,028,822	8	9.20	31	6.60	-23	2.60
2005	5 (least deprived)	10,201,355	9,776,480	10	9.40	32	15.60	-22	-6.20
2006	1 (most deprived)	10,061,435	10,411,858	16	25.30	56	13.80	-40	11.50
2006	2	10,062,639	10,172,317	9	26.60	35	9.80	-26	16.80
2006	3	10,182,896	10,234,380	8	15.39	17	5.00	-9	10.39
2006	4	10,194,108	10,096,472	6	6.00	14	12.20	-8	-6.20
2006	5 (least deprived)	10,262,815	9,848,867	4	6.00	15	2.00	-11	4.00
2007	1 (most deprived)	10,107,634	10,443,538	18	10.04	48	13.00	-30	-2.96
2007	2	10,132,298	10,233,624	4	9.17	36	8.92	-32	0.25
2007	3	10,257,247	10,310,359	6	19.67	34	27.08	-28	-7.41
2007	4	10,268,083	10,180,175	5	8.19	24	9.91	-19	-1.72
2007	5 (least deprived)	10,340,919	9,938,486	6	3.00	26	9.06	-20	-6.06
2008	1 (most deprived)	10,172,305	10,490,011	11	8.20	42	16.00	-31	-7.80
2008	2	10,222,041	10,313,147	4	5.05	18	8.25	-14	-3.20
2008	3	10,336,944	10,392,001	3	1.00	18	7.00	-15	-6.00
2008	4	10,326,760	10,251,648	2	4.66	6	5.00	-4	-0.34
2008	5 (least deprived)	10,406,596	10,017,839	1	6.86	6	7.68	-5	-0.82
2009	1 (most deprived)	10,242,974	10,537,912	80	51.59	39	24.01	41	27.58
2009	2	10,312,215	10,390,335	56	28.87	22	27.31	34	1.56
2009	3	10,412,543	10,470,074	49	11.44	22	11.02	27	0.42
2009	4	10,376,595	10,317,632	18	1.60	13	7.75	5	-6.15
2009	5 (least deprived)	10,461,735	10,091,174	17	4.11	5	6.00	12	-1.89
2010	1 (most deprived)	10,336,179	10,604,558	99	191.98	30	24.49	69	167.49
2010	2	10,418,358	10,484,925	38	89.25	19	7.96	19	81.29
2010	3	10,500,292	10,561,037	17	32.11	10	5.88	7	26.23
2010	4	10,452,346	10,406,831	14	35.53	17	13.22	-3	22.31
2010	5 (least deprived)	10,526,870	10,176,694	7	16.95	14	7.71	-7	9.24
2011	1 (most deprived)	10,456,433	10,697,690	18	46.11	37	20.59	-19	25.52
2011	2	10,543,934	10,594,848	7	22.26	27	20.52	-20	1.74
2011	3	10,591,723	10,656,814	2	2.59	23	10.82	-21	-8.23
2011	4	10,519,160	10,489,422	4	4.28	19	12.88	-15	-8.60
2011	5 (least deprived)	10,579,453	10,251,929	1	3.00	13	9.18	-12	-6.18
2012	1 (most deprived)	10,893,479	11,062,381	10	19.26	61	74.45	-51	-55.19
2012	2	10,782,713	10,807,827	1	4.00	31	30.77	-30	-26.77
2012	3	10,694,991	10,762,883	0	0.00	23	28.52	-23	-28.52
2012	4	10,552,487	10,562,156	1	3.96	21	25.40	-20	-21.45
2012	5 (least deprived)	10,564,331	10,292,754	0	0.00	11	10.32	-11	-10.32
2013	1 (most deprived)	10,994,820	11,137,074	5	3.89	130	69.20	-125	-65.31
2013	2	10,873,567	10,885,678	3	6.97	76	23.75	-73	-16.78
2013	3	10,765,378	10,837,339	5	9.56	93	39.10	-88	-29.54
2013	4	10,610,984	10,635,953	4	13.81	61	40.30	-57	-26.50
2013	5 (least deprived)	10,615,169	10,363,872	2	5.84	46	32.35	-44	-26.51

Table A1.8: GP Supply by IMD Quintile Other Sensitivity Analyses

				Other Sensitivity Analyses			
Year	IMD Quintile	Population	Need adjusted population	Mean GP FTE per Practice	Mean LSOAs per Practice	Nurse FTE (PCT level Data)	Nurse FTE per 100k need adjusted (PCT level Data)
2004	1 (most deprived)	9,951,665	10,327,060	2.47	116	2,750.12	27.05
2004	2	9,922,657	10,048,907	3.10	97	2,877.33	26.73
2004	3	10,032,274	10,082,658	3.46	77	2,698.58	25.95
2004	4	10,062,460	9,949,765	3.79	63	2,801.97	26.87
2004	5 (least deprived)	10,140,651	9,701,318	4.03	53	619.36	5.90
2005	1 (most deprived)	10,017,043	10,380,909	2.56	114	2,827.48	25.30
2005	2	9,998,176	10,114,567	3.24	96	3,084.49	28.97
2005	3	10,115,862	10,165,383	3.58	77	2,444.92	25.17
2005	4	10,133,726	10,028,822	3.92	63	2,766.40	25.65
2005	5 (least deprived)	10,201,355	9,776,480	4.22	53	2,870.08	26.48
2006	1 (most deprived)	10,061,435	10,411,858	2.75	112	2,379.12	24.72
2006	2	10,062,639	10,172,317	3.50	95	627.92	6.02
2006	3	10,182,896	10,234,380	3.90	76	1,784.83	16.89
2006	4	10,194,108	10,096,472	4.29	63	2,970.37	26.93
2006	5 (least deprived)	10,262,815	9,848,867	4.54	53	2,709.54	25.80
2007	1 (most deprived)	10,107,634	10,443,538	2.81	113	2,743.65	26.81
2007	2	10,132,298	10,233,624	3.61	95	3,069.98	27.66
2007	3	10,257,247	10,310,359	3.89	76	2,998.94	27.82
2007	4	10,268,083	10,180,175	4.27	63	1,853.89	17.63
2007	5 (least deprived)	10,340,919	9,938,486	4.52	53	1,290.83	13.01
2008	1 (most deprived)	10,172,305	10,490,011	2.87	112	1,305.49	13.06
2008	2	10,222,041	10,313,147	3.65	94	3,304.54	31.27
2008	3	10,336,944	10,392,001	3.89	77	2,913.88	27.46
2008	4	10,326,760	10,251,648	4.24	63	2,837.45	28.24
2008	5 (least deprived)	10,406,596	10,017,839	4.51	53	2,795.96	27.67
2009	1 (most deprived)	10,242,974	10,537,912	2.97	111	3,102.89	29.14
2009	2	10,312,215	10,390,335	3.74	97	2,953.78	27.61
2009	3	10,412,543	10,470,074	3.98	77	2,579.57	25.49
2009	4	10,376,595	10,317,632	4.37	63	2,278.37	23.01
2009	5 (least deprived)	10,461,735	10,091,174	4.66	53	559.31	5.73
2010	1 (most deprived)	10,336,179	10,604,558	2.91	110	570.55	5.80
2010	2	10,418,358	10,484,925	3.67	97	2,767.23	27.92
2010	3	10,500,292	10,561,037	3.90	77	2,249.80	22.48
2010	4	10,452,346	10,406,831	4.28	63	2,990.75	27.35
2010	5 (least deprived)	10,526,870	10,176,694	4.53	53	2,393.42	23.66
2011	1 (most deprived)	10,456,433	10,697,690	2.93	112	3,151.84	28.72
2011	2	10,543,934	10,594,848	3.71	98	2,672.13	26.18
2011	3	10,591,723	10,656,814	3.91	78	2,942.80	27.44
2011	4	10,519,160	10,489,422	4.28	64	2,274.21	23.18
2011	5 (least deprived)	10,579,453	10,251,929	4.56	54	2,843.30	25.95
2012	1 (most deprived)	10,893,479	11,062,381	3.06	114	2,575.48	25.02
2012	2	10,782,713	10,807,827	3.85	100	189.61	1.99
2012	3	10,694,991	10,762,883	4.01	80	2,646.99	25.74
2012	4	10,552,487	10,562,156	4.35	65	2,787.59	27.90
2012	5 (least deprived)	10,564,331	10,292,754	4.62	55	2,716.02	26.99
2013	1 (most deprived)	10,994,820	11,137,074	3.18	119	2,558.39	25.07
2013	2	10,873,567	10,885,678	3.99	102	2,751.39	26.68
2013	3	10,765,378	10,837,339	4.11	83	2,691.70	24.76
2013	4	10,610,984	10,635,953	4.48	67	183.18	1.93
2013	5 (least deprived)	10,615,169	10,363,872	4.80	57	2,610.09	24.05

Appendix Section 2

Table A2.1: Inequality Indices GPs FTE Including Registrars and Retainers

	All GPs (Including Registrars and Retainers)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	58.54	63.85	5.31	8%	6.90	11.39%
2005	59.63	65.06	5.43	8%	7.08	11.46%
2006	62.47	68.21	5.74	8%	7.40	11.38%
2007	62.36	65.86	3.50	5%	4.50	7.06%
2008	64.41	67.97	3.56	5%	4.72	7.19%
2009	66.96	70.62	3.66	5%	4.75	7.00%
2010	67.80	68.57	0.77	1%	1.32	1.98%
2011	67.17	68.34	1.17	2%	1.66	2.49%
2012	66.37	67.83	1.46	2%	1.99	3.00%
2013	65.85	66.46	0.61	1%	0.77	1.18%

Table A2.2: Inequality Indices GPs FTE Excluding Registrars and Retainers

	Excluding Registrars and Retainers					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII (95% CI)	RII (95% CI)
2004	54.00	57.19	3.19	6%	4.19 (3.10 to 5.28)	7.60% (5.63 to 9.57)
2005	55.37	58.79	3.42	6%	4.44 (3.26 to 5.62)	7.85% (5.77 to 9.94)
2006	58.41	62.49	4.08	7%	5.22 (4.66 to 5.77)	8.66% (7.74 to 9.58)
2007	58.99	61.70	2.71	4%	3.45 (2.53 to 4.36)	5.75% (4.22 to 7.28)
2008	59.05	60.87	1.82	3%	2.42 (1.38 to 3.46)	4.07% (2.32 to 5.82)
2009	60.84	61.97	1.13	2%	1.59 (0.02 to 3.16)	2.62% (0.03 to 5.21)
2010	61.47	59.89	-1.58	-3%	-1.65 (-3.87 to 0.57)	-2.77% (-6.49 to 0.95)
2011	61.16	59.33	-1.83	-3%	-2.10 (-4.41 to 0.21)	-3.55% (-7.45 to 0.35)
2012	59.83	59.08	-0.75	-1%	-0.75 (-2.38 to 0.88)	-1.28% (-4.06 to 1.50)
2013	60.53	59.90	-0.63	-1%	-0.68 (-2.46 to 1.11)	-1.14% (-4.15 to 1.87)

Table A2.3: Inequality Indices GPs FTE Registrars Only

	Registrars Only					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	4.26	5.85	1.59	27%	2.05	42.08%
2005	4.04	5.62	1.58	28%	2.12	44.10%
2006	3.80	4.88	1.08	22%	1.46	34.14%
2007	2.95	2.95	0.00	0%	0.09	2.94%
2008	5.03	6.07	1.04	17%	1.46	26.20%
2009	5.81	7.62	1.81	24%	2.30	34.60%
2010	6.17	8.15	1.98	24%	2.54	36.03%
2011	5.85	8.59	2.74	32%	3.43	47.97%
2012	6.38	8.30	1.92	23%	2.40	32.04%
2013	5.17	6.21	1.04	17%	1.21	20.73%

Table A2.4: Inequality Indices GPs FTE Retainers Only

	Retainers Only					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	0.28	0.81	0.53	65%	0.66	127.43%
2005	0.22	0.65	0.43	66%	0.51	122.80%
2006	0.26	0.85	0.59	69%	0.73	140.95%
2007	0.42	1.21	0.79	65%	0.96	127.32%
2008	0.33	1.02	0.69	68%	0.83	136.07%
2009	0.32	1.03	0.71	69%	0.87	142.08%
2010	0.17	0.52	0.35	67%	0.44	134.83%
2011	0.16	0.42	0.26	62%	0.32	117.20%
2012	0.17	0.45	0.28	62%	0.35	120.38%
2013	0.15	0.35	0.20	57%	0.24	102.56%

Table A2.5: Inequality Indices GPs FTE Including Registrars and Retainers Practice Level Aggregation

	ALL GPs (Practice Level Aggregation)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	58.01	64.88	6.87	11%	8.63	14.26%
2005	59.00	66.08	7.08	11%	9.15	14.81%
2006	61.49	68.82	7.33	11%	10.06	15.46%
2007	61.79	66.29	4.50	7%	6.00	9.42%
2008	63.35	68.70	5.35	8%	6.48	9.86%
2009	66.29	71.61	5.32	7%	7.06	10.39%
2010	67.34	69.26	1.92	3%	2.69	4.02%
2011	66.78	69.66	2.88	4%	3.48	5.23%
2012	66.23	68.39	2.16	3%	2.82	4.24%
2013	66.00	67.21	1.21	2%	1.51	2.31%

Table A2.6: Inequality Indices GPs FTE Eccluding Registrars and Retainers Practice Level Aggregation

	Excluding Registrars and Retainers (Practice Level Aggregation)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	53.94	57.67	3.73	6%	4.97	9.02%
2005	55.25	59.33	4.08	7%	5.58	9.86%
2006	57.81	62.83	5.02	8%	7.05	11.71%
2007	58.84	61.90	3.06	5%	4.53	7.56%
2008	58.72	61.04	2.32	4%	3.25	5.46%
2009	60.85	62.22	1.37	2%	2.56	4.21%
2010	61.89	59.93	-1.96	-3%	-1.57	-2.62%
2011	61.79	59.84	-1.95	-3%	-1.96	-3.30%
2012	60.35	59.25	-1.10	-2%	-1.09	-1.86%
2013	60.99	60.28	-0.71	-1%	-0.73	-1.23%

Table A2.7: Carr-Hill Adjustment Relative Need Gap Compared to Most Affluent Fifth

	Relative Need Gap Compared to Q5			
YEAR	Q1	Q2	Q3	Q4
2004	8.47%	5.86%	5.05%	3.36%
2005	8.14%	5.56%	4.86%	3.27%
2006	7.83%	5.34%	4.73%	3.20%
2007	7.51%	5.09%	4.59%	3.16%
2008	7.13%	4.81%	4.43%	3.13%
2009	6.66%	4.46%	4.24%	3.07%
2010	6.13%	4.10%	4.04%	2.99%
2011	5.58%	3.69%	3.83%	2.90%
2012	4.23%	2.88%	3.29%	2.73%
2013	3.75%	2.54%	3.11%	2.67%

Appendix Section 3

Table A3.1: GP supply by PCT 2006 and 2011 excluding registrars and retainers

		Full Time Equivalent GPs Excluding Registrars and Retainers (per 100,000 need adjusted population)								
		All LSOAs			Most Deprived Fifth of LSOAs			Least Deprived Fifth of LSOAs		
PCT	Under-Doctored PCT	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006
Ashton, Leigh and Wigan	1	54.52	54.04	-0.48	53.01	55.05	2.04	62.08	55.76	-6.32
Barking and Dagenham	1	41.72	47.99	6.27	40.58	48.78	8.20	NA	NA	NA
Barnet	0	66.07	55.37	-10.70	63.80	51.39	-12.41	68.14	55.31	-12.83
Barnsley	1	54.57	65.97	11.40	52.12	69.98	17.86	74.95	76.78	1.83
Bassetlaw	0	53.19	54.69	1.50	51.21	58.25	7.04	60.31	61.43	1.12
Bath and North East Somerset	0	61.45	59.86	-1.59	60.95	56.33	-4.62	60.35	58.82	-1.53
Bedfordshire	0	62.89	60.38	-2.51	58.52	67.38	8.86	64.71	59.20	-5.51
Berkshire East	0	56.59	57.73	1.14	53.92	60.99	7.07	60.08	59.75	-0.33
Berkshire West	0	61.35	58.24	-3.11	54.97	53.93	-1.04	62.86	58.81	-4.05
Bexley	0	44.50	48.86	4.36	44.88	50.15	5.27	45.39	50.00	4.61
Birmingham East and North	1	54.98	55.30	0.32	55.53	56.99	1.46	54.45	54.05	-0.40
Blackburn with Darwen Teaching	1	47.14	59.48	12.34	46.47	58.52	12.05	48.69	65.93	17.24
Blackpool	1	51.62	60.01	8.39	53.82	65.90	12.08	NA	NA	NA
Bolton Teaching	1	54.00	58.88	4.88	54.16	60.23	6.07	58.18	61.66	3.48
Bournemouth and Poole Teaching	0	65.05	58.21	-6.84	68.33	63.73	-4.60	65.04	57.31	-7.73
Bradford and Airedale Teaching	0	64.45	64.29	-0.16	64.11	64.87	0.76	62.53	62.43	-0.10
Brent Teaching	0	69.34	70.45	1.11	73.02	70.83	-2.19	NA	NA	NA
Brighton and Hove City	0	62.60	56.20	-6.40	60.56	58.90	-1.66	68.46	56.71	-11.75
Bristol	0	62.75	59.64	-3.11	64.96	63.77	-1.19	66.35	57.20	-9.15
Bromley	0	55.83	54.52	-1.31	50.54	53.38	2.84	58.41	55.75	-2.66
Buckinghamshire	0	66.22	62.92	-3.30	NA	NA	NA	67.47	63.39	-4.08
Bury	0	60.91	57.50	-3.41	55.61	59.66	4.05	67.98	59.07	-8.91
Calderdale	1	51.24	49.28	-1.96	50.30	46.14	-4.16	51.55	53.32	1.77
Cambridgeshire	0	69.26	61.34	-7.92	59.14	57.94	-1.20	70.01	61.38	-8.63
Camden	0	72.35	76.71	4.36	68.98	79.29	10.31	79.27	81.99	2.72
Central and Eastern Cheshire	0	59.42	54.14	-5.28	58.07	53.56	-4.51	60.23	53.91	-6.32
Central Lancashire	0	54.39	50.69	-3.70	53.04	51.02	-2.02	56.89	52.79	-4.10
City and Hackney Teaching	0	72.61	71.61	-1.00	74.43	72.63	-1.80	38.94	37.84	-1.10
Cornwall and Isles of Scilly	0	70.47	59.92	-10.55	70.65	63.96	-6.69	79.89	51.14	-28.75
County Durham	0	62.62	62.12	-0.50	59.30	62.99	3.69	72.35	64.64	-7.71
Coventry Teaching	0	58.81	60.95	2.14	62.35	65.95	3.60	50.87	57.05	6.18
Croydon	0	66.99	66.70	-0.29	68.77	66.31	-2.46	69.20	64.72	-4.48
Cumbria Teaching	0	63.22	64.60	1.38	59.44	62.00	2.56	63.48	64.23	0.75
Darlington	0	67.44	69.31	1.87	66.26	69.88	3.62	67.24	67.29	0.05
Derby City	0	56.09	52.19	-3.90	56.85	56.71	-0.14	57.79	52.39	-5.40
Derbyshire County	0	60.21	55.51	-4.70	56.90	56.08	-0.82	62.15	56.40	-5.75
Devon	0	80.32	79.07	-1.25	83.49	84.89	1.40	76.50	75.07	-1.43
Doncaster	0	55.31	60.27	4.96	55.25	64.11	8.86	63.13	63.78	0.65
Dorset	0	68.43	57.28	-11.15	70.55	67.62	-2.93	65.63	54.86	-10.77
Dudley	1	55.76	57.39	1.63	57.96	62.94	4.98	55.34	55.46	0.12
Ealing	0	56.10	61.98	5.88	53.10	62.48	9.38	59.66	64.07	4.41
East Lancashire Teaching	0	50.93	55.67	4.74	48.94	57.44	8.50	51.12	54.46	3.34
East Riding of Yorkshire	0	61.55	52.53	-9.02	55.21	54.40	-0.81	65.75	51.83	-13.92
East Sussex Downs and Weald	0	59.38	60.48	1.10	56.76	68.12	11.36	61.58	61.39	-0.19
Eastern and Coastal Kent	0	55.35	54.37	-0.98	54.32	53.18	-1.14	59.46	57.18	-2.28
Enfield	0	58.18	59.16	0.98	54.60	59.21	4.61	57.13	53.07	-4.06
Gateshead	0	58.88	63.80	4.92	62.30	64.89	2.59	53.85	64.24	10.39
Gloucestershire	0	62.86	59.13	-3.73	60.89	64.65	3.76	65.16	59.24	-5.92
Great Yarmouth and Waveney	0	55.05	58.30	3.25	52.27	61.58	9.31	55.14	57.43	2.29
Greenwich Teaching	1	48.44	61.68	13.24	49.85	64.73	14.88	NA	NA	NA
Halton and St Helens	1	51.90	54.45	2.55	52.39	53.08	0.69	52.63	55.77	3.14
Hammersmith and Fulham	1	60.47	72.94	12.47	59.66	72.70	13.04	NA	NA	NA
Hampshire	0	58.50	57.62	-0.88	61.21	57.23	-3.98	58.94	58.28	-0.66
Haringey Teaching	0	61.40	71.93	10.53	59.47	71.60	12.13	NA	NA	NA
Harrow	0	63.86	64.33	0.47	61.57	57.58	-3.99	62.01	65.12	3.11
Hartlepool	1	50.56	58.29	7.73	50.57	57.24	6.67	53.39	60.37	6.98
Hastings and Rother	0	55.17	59.11	3.94	55.11	64.38	9.27	59.20	58.79	-0.41
Havering	1	49.75	47.10	-2.65	50.06	47.70	-2.36	51.99	45.84	-6.15

Heart of Birmingham Teaching	1	60.39	63.59	3.20	62.87	67.78	4.91	NA	NA	NA
Herefordshire	0	64.95	59.60	-5.35	60.03	57.64	-2.39	65.82	58.39	-7.43
Hertfordshire	0	63.07	58.05	-5.02	56.54	54.75	-1.79	65.72	59.78	-5.94
Heywood, Middleton and Rochdale	1	56.55	53.68	-2.87	57.16	55.77	-1.39	53.84	45.51	-8.33
Hillingdon	0	58.55	58.29	-0.26	59.65	60.11	0.46	57.69	59.07	1.38
Hounslow	1	50.83	59.94	9.11	48.83	69.99	21.16	51.56	62.67	11.11
Hull Teaching	1	54.05	52.88	-1.17	54.59	53.08	-1.51	55.12	56.52	1.40
Isle of Wight National Health Service	0	52.33	52.81	0.48	57.66	52.89	-4.77	48.88	49.23	0.35
Islington	0	75.96	79.83	3.87	76.58	82.33	5.75	NA	NA	NA
Kensington and Chelsea	0	61.81	56.55	-5.26	56.57	60.73	4.16	85.05	66.99	-18.06
Kingston	0	70.41	71.81	1.40	68.80	75.22	6.42	74.26	71.85	-2.41
Kirklees	0	56.67	55.14	-1.53	57.05	54.23	-2.82	61.51	58.04	-3.47
Knowsley	1	47.63	60.33	12.70	48.40	63.87	15.47	NA	NA	NA
Lambeth	0	77.15	75.82	-1.33	76.17	76.64	0.47	NA	NA	NA
Leeds	0	57.60	54.92	-2.68	58.88	57.12	-1.76	60.27	56.11	-4.16
Leicester City	1	49.23	60.00	10.77	50.58	60.76	10.18	47.47	68.17	20.70
Leicestershire County and Rutland	0	58.79	61.58	2.79	62.00	76.25	14.25	60.61	61.79	1.18
Lewisham	0	68.23	65.68	-2.55	69.23	66.98	-2.25	NA	NA	NA
Lincolnshire Teaching	0	50.27	51.58	1.31	48.40	53.74	5.34	53.07	53.27	0.20
Liverpool	1	61.49	62.82	1.33	60.80	63.59	2.79	70.89	67.12	-3.77
Luton	1	55.39	58.15	2.76	59.62	64.56	4.94	52.20	51.58	-0.62
Manchester Teaching	1	56.60	55.70	-0.90	56.49	55.75	-0.74	64.20	55.88	-8.32
Medway	1	49.84	54.67	4.83	46.91	56.67	9.76	49.22	50.93	1.71
Mid Essex	0	59.08	58.55	-0.53	53.06	59.09	6.03	59.49	60.38	0.89
Middlesbrough	0	56.57	61.90	5.33	57.84	66.51	8.67	57.12	58.26	1.14
Milton Keynes	0	66.86	62.28	-4.58	65.13	65.12	-0.01	68.12	61.80	-6.32
Newcastle	1	56.46	56.90	0.44	56.16	59.51	3.35	58.36	56.86	-1.50
Newham	0	72.22	72.89	0.67	71.97	72.89	0.92	NA	NA	NA
Norfolk	0	66.77	63.02	-3.75	67.27	66.26	-1.01	72.48	65.40	-7.08
North East Essex	0	53.84	50.83	-3.01	38.84	39.80	0.96	63.36	59.32	-4.04
North East Lincolnshire	0	57.26	59.43	2.17	57.58	61.87	4.29	60.09	59.09	-1.00
North Lancashire Teaching	1	56.09	52.87	-3.22	54.68	52.51	-2.17	54.72	51.49	-3.23
North Lincolnshire	0	58.80	54.34	-4.46	61.60	59.09	-2.51	59.42	55.75	-3.67
North Somerset	0	52.76	56.18	3.42	51.72	60.08	8.36	59.37	58.38	-0.99
North Staffordshire	0	54.49	56.90	2.41	52.59	58.50	5.91	56.66	59.97	3.31
North Tyneside	0	56.00	61.81	5.81	56.45	63.18	6.73	56.17	59.08	2.91
North Yorkshire and York	0	65.09	61.15	-3.94	65.64	66.15	0.51	65.18	60.60	-4.58
Northamptonshire Teaching	0	56.28	52.24	-4.04	55.73	53.22	-2.51	59.46	54.18	-5.28
Northumberland	0	83.05	65.97	-17.08	79.31	63.96	-15.35	84.62	69.63	-14.99
Nottingham City	1	51.65	49.09	-2.56	51.76	49.68	-2.08	51.18	51.75	0.57
Nottinghamshire County Teaching	0	54.52	54.23	-0.29	51.94	55.67	3.73	58.78	56.67	-2.11
Oldham	1	46.89	52.47	5.58	44.94	56.31	11.37	53.08	50.15	-2.93
Oxfordshire	0	63.34	63.18	-0.16	58.10	70.88	12.78	63.74	60.55	-3.19
Peterborough	0	60.38	61.92	1.54	59.48	62.55	3.07	56.87	59.24	2.37
Plymouth Teaching	0	71.72	68.30	-3.42	72.52	70.01	-2.51	67.51	63.17	-4.34
Portsmouth City Teaching	0	51.75	50.07	-1.68	52.24	49.93	-2.31	55.46	56.92	1.46
Redbridge	0	51.42	47.27	-4.15	51.27	50.91	-0.36	65.13	49.72	-15.41
Redcar and Cleveland	1	56.85	63.35	6.50	57.85	66.23	8.38	61.93	63.65	1.72
Richmond and Twickenham	0	70.38	62.98	-7.40	NA	NA	NA	72.97	65.45	-7.52
Rotherham	0	56.14	58.69	2.55	55.43	60.31	4.88	58.65	56.99	-1.66
Salford	1	48.72	54.20	5.48	46.76	53.19	6.43	53.06	56.49	3.43
Sandwell	1	52.23	49.78	-2.45	52.35	51.04	-1.31	NA	NA	NA
Sefton	1	54.60	48.72	-5.88	53.86	51.54	-2.32	54.88	48.91	-5.97
Sheffield	0	68.64	68.76	0.12	69.46	74.14	4.68	72.72	68.71	-4.01
Shropshire County	0	60.87	55.96	-4.91	60.66	60.93	0.27	59.70	52.87	-6.83
Solihull	0	62.64	56.85	-5.79	63.05	55.01	-8.04	67.08	60.88	-6.20
Somerset	0	70.67	60.05	-10.62	69.99	63.53	-6.46	73.55	60.49	-13.06
South Birmingham	0	60.36	58.85	-1.51	58.80	58.72	-0.08	71.35	63.84	-7.51
South East Essex	0	54.20	53.49	-0.71	52.01	45.99	-6.02	55.10	56.77	1.67
South Gloucestershire	0	64.57	61.71	-2.86	45.55	55.51	9.96	64.34	60.06	-4.28
South Staffordshire	0	57.15	57.66	0.51	58.88	56.10	-2.78	59.08	60.22	1.14
South Tyneside	1	58.94	61.39	2.45	56.87	61.01	4.14	65.20	62.24	-2.96
South West Essex	0	50.10	49.50	-0.60	49.31	43.98	-5.33	52.29	53.85	1.56
Southampton City	0	58.95	54.83	-4.12	59.22	57.86	-1.36	64.89	58.85	-6.04
Southwark	0	72.20	70.87	-1.33	70.72	72.51	1.79	51.03	38.59	-12.44
Stockport	0	54.15	50.59	-3.56	54.79	55.46	0.67	54.89	49.27	-5.62

Stockton-on-Tees Teaching	0	59.59	54.98	-4.61	64.07	59.23	-4.84	59.41	54.64	-4.77
Stoke on Trent	1	46.99	54.56	7.57	44.37	55.87	11.50	52.42	50.85	-1.57
Suffolk	0	60.84	56.81	-4.03	59.81	49.20	-10.61	61.03	57.85	-3.18
Sunderland Teaching	1	56.90	60.35	3.45	57.10	59.02	1.92	57.43	63.14	5.71
Surrey	0	63.26	64.31	1.05	65.76	64.42	-1.34	64.47	65.26	0.79
Sutton and Merton	0	66.45	67.50	1.05	60.60	63.97	3.37	71.72	71.72	0.00
Swindon	0	65.56	63.55	-2.01	62.68	66.10	3.42	67.69	58.87	-8.82
Tameside and Glossop	1	53.20	51.57	-1.63	51.59	54.65	3.06	56.80	49.83	-6.97
Telford and Wrekin	0	56.30	53.68	-2.62	56.52	55.03	-1.49	56.86	52.38	-4.48
Torbay	0	67.19	61.49	-5.70	68.30	67.15	-1.15	65.26	61.35	-3.91
Tower Hamlets	0	66.79	81.77	14.98	66.58	86.46	19.88	61.91	64.14	2.23
Trafford	0	54.28	57.39	3.11	56.84	57.47	0.63	54.74	57.29	2.55
Wakefield District	0	57.30	55.04	-2.26	55.57	55.42	-0.15	59.72	56.77	-2.95
Walsall Teaching	1	50.50	56.98	6.48	50.04	59.27	9.23	53.25	52.07	-1.18
Waltham Forest	0	64.28	60.14	-4.14	62.79	58.91	-3.88	NA	NA	NA
Wandsworth	0	74.48	81.43	6.95	81.55	92.06	10.51	73.22	82.76	9.54
Warrington	0	59.86	55.90	-3.96	63.19	57.34	-5.85	58.44	57.57	-0.87
Warwickshire	0	60.84	60.13	-0.71	51.03	62.70	11.67	63.43	60.99	-2.44
West Essex	0	59.39	59.62	0.23	52.50	58.94	6.44	64.90	63.25	-1.65
West Kent	0	55.95	55.20	-0.75	49.21	51.07	1.86	57.47	55.59	-1.88
West Sussex	0	63.52	55.74	-7.78	56.09	56.69	0.60	65.80	55.89	-9.91
Western Cheshire	0	65.25	61.10	-4.15	67.40	63.42	-3.98	63.48	60.76	-2.72
Westminster	0	63.06	54.21	-8.85	67.87	65.58	-2.29	NA	NA	NA
Wiltshire	0	69.53	64.29	-5.24	71.23	67.58	-3.65	68.96	63.11	-5.85
Wirral	0	64.33	58.40	-5.93	69.03	62.08	-6.95	59.14	54.25	-4.89
Wolverhampton City	1	47.47	52.81	5.34	46.98	55.17	8.19	47.85	48.16	0.31
Worcestershire	0	61.92	63.55	1.63	64.13	63.11	-1.02	62.44	64.99	2.55

Table A3.2: GP supply by PCT 2006 and 2011 including registrars and retainers

		Full Time Equivalent GPs Including Registrars and Retainers (per 100,000 need adjusted population)								
		All LSOAs			Most Deprived Fifth of LSOAs			Least Deprived Fifth of LSOAs		
PCT	Under-Doctored PCT	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006
Ashton, Leigh and Wigan	1	56.77	54.04	-2.73	55.52	55.05	-0.47	64.58	55.76	-8.82
Barking and Dagenham	1	44.04	53.25	9.21	43.05	54.45	11.40	NA	NA	NA
Barnet	0	70.62	61.66	-8.96	67.15	56.60	-10.55	73.76	63.48	-10.28
Barnsley	1	54.66	71.92	17.26	52.17	74.84	22.67	74.95	87.39	12.44
Bassetlaw	0	59.69	64.75	5.06	56.38	65.29	8.91	70.35	76.55	6.20
Bath and North East Somerset	0	63.64	71.32	7.68	62.85	69.43	6.58	62.73	68.88	6.15
Bedfordshire	0	65.68	68.21	2.53	60.82	74.21	13.39	67.91	68.64	0.73
Berkshire East	0	62.86	65.88	3.02	60.94	69.36	8.42	66.65	67.48	0.83
Berkshire West	0	64.68	63.59	-1.09	56.93	56.72	-0.21	66.23	64.30	-1.93
Bexley	0	46.75	55.02	8.27	46.43	51.64	5.21	48.04	58.51	10.47
Birmingham East and North	1	58.86	64.95	6.09	58.68	65.94	7.26	61.89	68.19	6.30
Blackburn with Darwen Teaching	1	47.26	59.48	12.22	46.48	58.52	12.04	49.60	65.93	16.33
Blackpool	1	54.17	60.01	5.84	56.25	65.90	9.65	NA	NA	NA
Bolton Teaching	1	59.88	59.03	-0.85	58.76	60.44	1.68	64.12	61.71	-2.41
Bournemouth and Poole Teaching	0	74.68	70.14	-4.54	78.27	74.34	-3.93	73.95	73.67	-0.28
Bradford and Airedale Teaching	0	71.53	74.14	2.61	68.76	73.60	4.84	72.34	70.88	-1.46
Brent Teaching	0	77.18	79.94	2.76	83.03	81.34	-1.69	NA	NA	NA
Brighton and Hove City	0	65.67	60.90	-4.77	62.59	62.28	-0.31	71.69	60.73	-10.96
Bristol	0	63.85	66.58	2.73	66.29	72.93	6.64	67.52	59.53	-7.99
Bromley	0	59.40	59.84	0.44	52.77	55.77	3.00	62.37	61.59	-0.78
Buckinghamshire	0	73.22	74.16	0.94	NA	NA	NA	75.06	75.90	0.84
Bury	0	66.81	57.51	-9.30	58.55	59.66	1.11	78.45	59.08	-19.37
Calderdale	1	54.85	55.36	0.51	51.12	48.21	-2.91	59.14	66.43	7.29
Cambridgeshire	0	72.60	71.57	-1.03	61.43	60.67	-0.76	72.93	72.50	-0.43
Camden	0	84.42	88.87	4.45	78.66	92.50	13.84	92.73	90.51	-2.22
Central and Eastern Cheshire	0	66.36	62.76	-3.60	61.55	60.20	-1.35	68.38	63.28	-5.10
Central Lancashire	0	57.57	50.72	-6.85	56.39	51.02	-5.37	60.08	52.79	-7.29
City and Hackney Teaching	0	76.14	82.80	6.66	78.12	84.19	6.07	38.99	46.59	7.60
Cornwall and Isles of Scilly	0	74.02	67.19	-6.83	73.18	71.53	-1.65	86.01	62.95	-23.06
County Durham	0	69.09	70.58	1.49	63.94	68.17	4.23	83.44	79.68	-3.76
Coventry Teaching	0	63.23	69.99	6.76	65.24	74.60	9.36	55.60	64.79	9.19
Croydon	0	72.85	76.10	3.25	72.09	71.59	-0.50	76.56	78.88	2.32
Cumbria Teaching	0	66.32	72.05	5.73	62.30	68.16	5.86	66.60	71.57	4.97
Darlington	0	68.57	73.18	4.61	67.31	74.05	6.74	68.14	70.80	2.66
Derby City	0	59.27	58.01	-1.26	61.22	63.08	1.86	59.73	57.30	-2.43
Derbyshire County	0	65.01	65.72	0.71	60.90	65.68	4.78	66.11	65.88	-0.23
Devon	0	86.02	87.85	1.83	91.29	95.00	3.71	82.47	86.16	3.69
Doncaster	0	60.49	68.47	7.98	60.11	71.89	11.78	76.01	81.14	5.13
Dorset	0	73.82	64.12	-9.70	74.18	71.17	-3.01	72.45	63.61	-8.84
Dudley	1	63.70	64.51	0.81	65.34	69.76	4.42	65.59	65.08	-0.51
Ealing	0	59.18	69.16	9.98	55.73	67.99	12.26	62.67	74.45	11.78
East Lancashire Teaching	0	52.74	56.58	3.84	49.57	57.66	8.09	51.92	54.58	2.66
East Riding of Yorkshire	0	65.07	58.83	-6.24	57.41	58.26	0.85	69.72	57.58	-12.14
East Sussex Downs and Weald	0	63.84	67.99	4.15	59.54	76.10	16.56	66.17	67.94	1.77
Eastern and Coastal Kent	0	59.03	60.16	1.13	56.54	58.18	1.64	64.24	64.96	0.72
Enfield	0	60.87	63.11	2.24	55.34	61.26	5.92	62.80	59.29	-3.51
Gateshead	0	66.67	73.29	6.62	70.48	76.40	5.92	59.06	68.56	9.50
Gloucestershire	0	68.54	67.35	-1.19	64.94	69.54	4.60	72.14	68.62	-3.52
Great Yarmouth and Waveney	0	56.55	66.98	10.43	53.53	69.26	15.73	55.35	64.16	8.81
Greenwich Teaching	1	53.21	69.50	16.29	53.80	72.41	18.61	NA	NA	NA
Halton and St Helens	1	56.03	54.48	-1.55	57.17	53.09	-4.08	55.00	55.77	0.77
Hammersmith and Fulham	1	65.55	79.02	13.47	63.83	78.38	14.55	NA	NA	NA
Hampshire	0	64.86	66.32	1.46	65.58	64.69	-0.89	65.93	67.86	1.93
Haringey Teaching	0	67.61	77.80	10.19	63.77	74.87	11.10	NA	NA	NA
Harrow	0	73.31	73.97	0.66	69.31	67.27	-2.04	74.63	75.33	0.70
Hartlepool	1	55.81	60.40	4.59	55.64	59.27	3.63	59.20	62.82	3.62
Hastings and Rother	0	58.78	64.05	5.27	57.16	68.99	11.83	67.26	65.38	-1.88
Havering	1	55.56	53.95	-1.61	56.51	56.49	-0.02	59.88	51.48	-8.40
Heart of Birmingham Teaching	1	65.52	74.77	9.25	68.33	78.72	10.39	NA	NA	NA
Herefordshire	0	71.41	66.68	-4.73	67.88	65.14	-2.74	71.76	66.57	-5.19

Hertfordshire	0	67.81	66.50	-1.31	58.24	58.57	0.33	71.89	70.00	-1.89
Heywood, Middleton and Rochdale	1	58.18	53.68	-4.50	58.56	55.77	-2.79	55.21	45.51	-9.70
Hillingdon	0	64.62	64.26	-0.36	60.77	61.26	0.49	68.81	72.59	3.78
Hounslow	1	51.12	64.01	12.89	48.98	76.88	27.90	51.86	65.16	13.30
Hull Teaching	1	54.05	56.33	2.28	54.59	55.78	1.19	55.15	59.93	4.78
Isle of Wight National Health Service	0	54.68	58.08	3.40	60.10	58.21	-1.89	53.39	53.99	0.60
Islington	0	80.35	86.18	5.83	80.88	88.65	7.77	NA	NA	NA
Kensington and Chelsea	0	70.83	73.70	2.87	58.75	69.29	10.54	108.97	102.92	-6.05
Kingston	0	78.33	79.56	1.23	73.19	84.10	10.91	83.29	81.23	-2.06
Kirklees	0	60.02	62.44	2.42	59.66	59.18	-0.48	65.48	68.12	2.64
Knowsley	1	48.54	61.08	12.54	48.89	64.29	15.40	NA	NA	NA
Lambeth	0	80.65	77.10	-3.55	79.74	77.43	-2.31	NA	NA	NA
Leeds	0	62.92	62.54	-0.38	63.65	64.32	0.67	66.46	64.59	-1.87
Leicester City	1	51.69	66.80	15.11	52.84	67.82	14.98	51.03	74.49	23.46
Leicestershire County and Rutland	0	68.35	73.29	4.94	77.97	87.97	10.00	68.96	73.44	4.48
Lewisham	0	74.24	66.16	-8.08	77.55	67.44	-10.11	NA	NA	NA
Lincolnshire Teaching	0	50.65	57.23	6.58	48.44	58.88	10.44	53.95	60.87	6.92
Liverpool	1	67.46	67.31	-0.15	66.20	67.78	1.58	75.58	71.23	-4.35
Luton	1	59.33	76.73	17.40	64.30	86.93	22.63	55.16	68.26	13.10
Manchester Teaching	1	61.44	55.91	-5.53	61.44	55.91	-5.53	68.03	55.89	-12.14
Medway	1	52.74	62.01	9.27	48.17	60.47	12.30	51.97	57.72	5.75
Mid Essex	0	62.70	66.28	3.58	56.29	70.21	13.92	64.35	69.60	5.25
Middlesbrough	0	59.24	66.71	7.47	60.34	71.64	11.30	60.37	62.89	2.52
Milton Keynes	0	69.56	67.48	-2.08	65.35	66.54	1.19	71.60	68.76	-2.84
Newcastle	1	63.01	67.32	4.31	62.83	68.25	5.42	65.91	71.41	5.50
Newham	0	73.55	82.22	8.67	73.31	81.98	8.67	NA	NA	NA
Norfolk	0	70.02	68.79	-1.23	70.22	72.24	2.02	74.91	70.68	-4.23
North East Essex	0	53.96	57.17	3.21	38.85	41.64	2.79	63.56	65.14	1.58
North East Lincolnshire	0	60.25	64.21	3.96	60.50	66.37	5.87	63.28	63.84	0.56
North Lancashire Teaching	1	63.31	53.47	-9.84	61.58	52.92	-8.66	60.80	52.07	-8.73
North Lincolnshire	0	61.29	61.99	0.70	62.98	65.10	2.12	63.64	68.62	4.98
North Somerset	0	53.50	64.71	11.21	51.72	68.18	16.46	60.59	68.36	7.77
North Staffordshire	0	57.53	67.07	9.54	54.87	63.52	8.65	59.93	72.94	13.01
North Tyneside	0	62.40	71.33	8.93	62.58	73.44	10.86	62.44	68.24	5.80
North Yorkshire and York	0	73.71	68.94	-4.77	73.44	73.60	0.16	73.95	68.40	-5.55
Northamptonshire Teaching	0	60.01	64.91	4.90	59.44	68.98	9.54	62.95	66.23	3.28
Northumberland	0	99.46	76.95	-22.51	91.70	69.52	-22.18	104.30	82.90	-21.40
Nottingham City	1	54.92	53.90	-1.02	55.35	54.79	-0.56	53.42	55.61	2.19
Nottinghamshire County Teaching	0	58.96	71.22	12.26	55.54	74.57	19.03	65.27	77.55	12.28
Oldham	1	48.61	52.47	3.86	47.38	56.31	8.93	53.66	50.15	-3.51
Oxfordshire	0	67.80	72.36	4.56	63.94	80.27	16.33	67.02	69.67	2.65
Peterborough	0	60.54	68.12	7.58	59.48	67.08	7.60	57.87	67.01	9.14
Plymouth Teaching	0	72.88	72.38	-0.50	73.38	72.96	-0.42	69.44	68.50	-0.94
Portsmouth City Teaching	0	57.62	56.99	-0.63	58.09	54.74	-3.35	62.48	63.37	0.89
Redbridge	0	56.36	56.29	-0.07	56.12	60.73	4.61	73.37	58.26	-15.11
Redcar and Cleveland	1	60.06	68.46	8.40	59.51	70.28	10.77	67.39	73.64	6.25
Richmond and Twickenham	0	79.46	76.66	-2.80	NA	NA	NA	81.94	79.99	-1.95
Rotherham	0	61.06	69.35	8.29	60.39	70.72	10.33	63.14	65.92	2.78
Salford	1	52.60	54.20	1.60	50.92	53.19	2.27	59.20	56.49	-2.71
Sandwell	1	58.36	56.15	-2.21	58.52	57.81	-0.71	NA	NA	NA
Sefton	1	59.01	49.76	-9.25	57.91	51.79	-6.12	58.80	49.71	-9.09
Sheffield	0	78.38	80.95	2.57	83.23	89.92	6.69	78.11	74.99	-3.12
Shropshire County	0	66.04	62.38	-3.66	64.45	64.63	0.18	69.37	62.12	-7.25
Solihull	0	69.54	64.48	-5.06	65.40	60.07	-5.33	79.42	71.31	-8.11
Somerset	0	72.98	69.37	-3.61	73.19	75.09	1.90	75.92	70.79	-5.13
South Birmingham	0	71.07	69.67	-1.40	69.10	69.80	0.70	82.56	71.77	-10.79
South East Essex	0	56.91	60.97	4.06	53.56	48.73	-4.83	59.04	69.96	10.92
South Gloucestershire	0	65.56	66.06	0.50	45.55	58.97	13.42	65.45	65.23	-0.22
South Staffordshire	0	61.36	64.94	3.58	62.68	63.54	0.86	64.34	69.50	5.16
South Tyneside	1	64.01	67.83	3.82	62.04	67.52	5.48	71.16	69.57	-1.59
South West Essex	0	52.39	54.40	2.01	51.24	47.14	-4.10	54.23	60.71	6.48
Southampton City	0	62.73	61.49	-1.24	62.77	63.47	0.70	68.31	64.10	-4.21
Southwark	0	74.23	71.00	-3.23	72.44	72.53	0.09	51.09	38.63	-12.46
Stockport	0	59.74	51.76	-7.98	60.24	56.02	-4.22	61.49	50.51	-10.98
Stockton-on-Tees Teaching	0	62.99	61.77	-1.22	67.74	66.32	-1.42	62.68	61.15	-1.53
Stoke on Trent	1	49.26	58.16	8.90	46.36	59.19	12.83	54.34	53.21	-1.13

Suffolk	0	65.31	64.08	-1.23	65.77	58.43	-7.34	64.97	64.68	-0.29
Sunderland Teaching	1	61.61	65.57	3.96	61.05	63.55	2.50	62.36	67.72	5.36
Surrey	0	71.89	74.96	3.07	77.20	72.15	-5.05	72.98	75.54	2.56
Sutton and Merton	0	73.99	75.20	1.21	65.96	70.18	4.22	79.39	79.85	0.46
Swindon	0	66.35	70.13	3.78	64.13	75.88	11.75	67.93	65.41	-2.52
Tameside and Glossop	1	57.17	51.85	-5.32	55.13	54.98	-0.15	63.71	49.86	-13.85
Telford and Wrekin	0	62.47	57.04	-5.43	65.33	58.86	-6.47	61.01	54.89	-6.12
Torbay	0	69.88	66.37	-3.51	70.64	70.77	0.13	70.30	69.80	-0.50
Tower Hamlets	0	73.25	94.10	20.85	73.93	99.25	25.32	65.84	77.06	11.22
Trafford	0	55.85	57.63	1.78	57.77	57.66	-0.11	56.05	57.49	1.44
Wakefield District	0	65.10	67.54	2.44	63.18	66.90	3.72	68.10	69.62	1.52
Walsall Teaching	1	54.82	64.88	10.06	52.94	65.50	12.56	59.31	64.25	4.94
Waltham Forest	0	69.98	69.35	-0.63	66.91	66.36	-0.55	NA	NA	NA
Wandsworth	0	80.97	92.01	11.04	89.84	105.91	16.07	83.39	96.74	13.35
Warrington	0	59.87	61.99	2.12	63.19	62.34	-0.85	58.45	64.93	6.48
Warwickshire	0	67.67	71.19	3.52	54.26	69.08	14.82	71.62	74.49	2.87
West Essex	0	68.60	73.07	4.47	57.79	72.17	14.38	75.90	77.21	1.31
West Kent	0	62.93	63.88	0.95	53.37	58.26	4.89	65.85	65.44	-0.41
West Sussex	0	67.22	67.68	0.46	57.66	62.90	5.24	70.39	69.00	-1.39
Western Cheshire	0	75.75	68.31	-7.44	78.16	72.46	-5.70	72.77	67.79	-4.98
Westminster	0	64.98	60.82	-4.16	68.82	71.47	2.65	NA	NA	NA
Wiltshire	0	70.63	73.22	2.59	72.52	78.04	5.52	69.94	72.26	2.32
Wirral	0	67.01	59.71	-7.30	69.94	62.72	-7.22	65.07	56.55	-8.52
Wolverhampton City	1	52.79	62.02	9.23	52.02	64.88	12.86	51.73	53.48	1.75
Worcestershire	0	68.97	71.68	2.71	71.17	71.57	0.40	69.47	72.62	3.15

Appendix Section 4

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - these are the basecase results used in the paper**

Figure A4.1: Trend in FTE GP supply over time excluding registrars and retainers

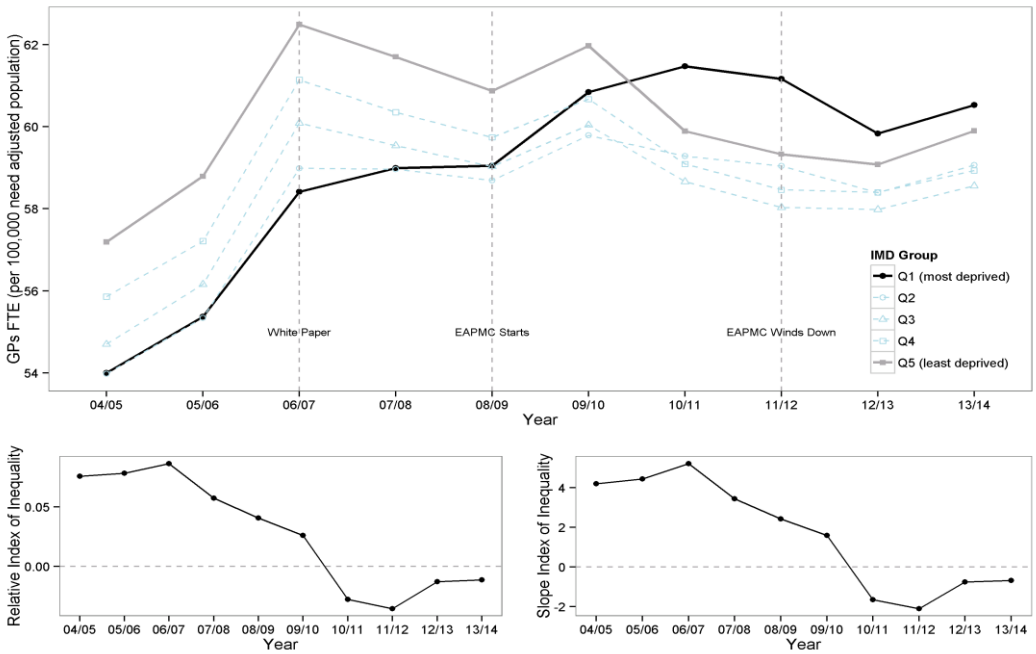


Figure A4.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

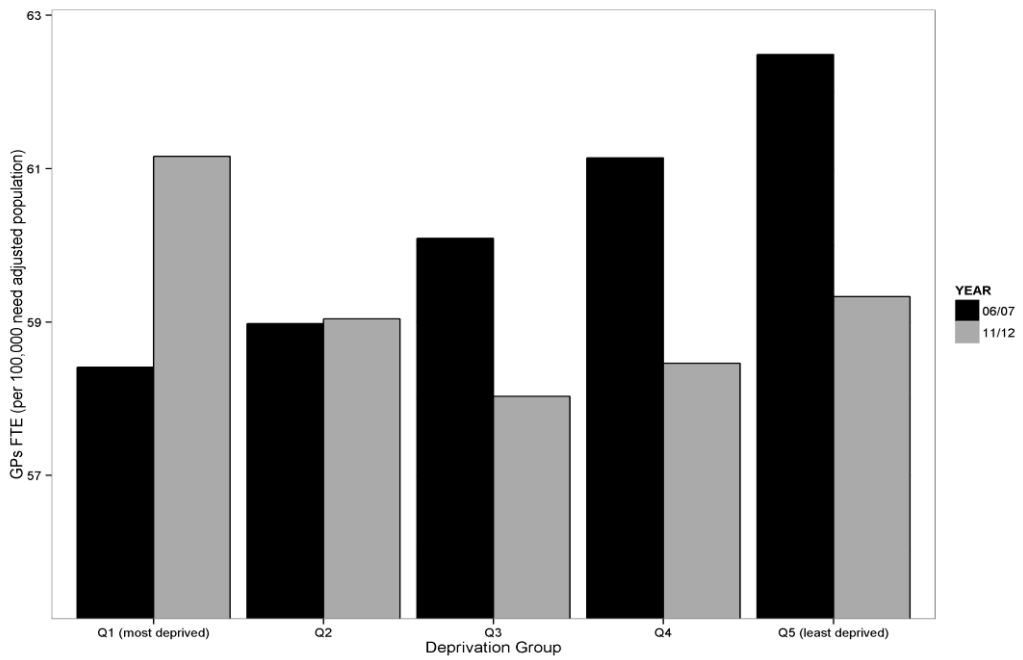


Figure A4.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

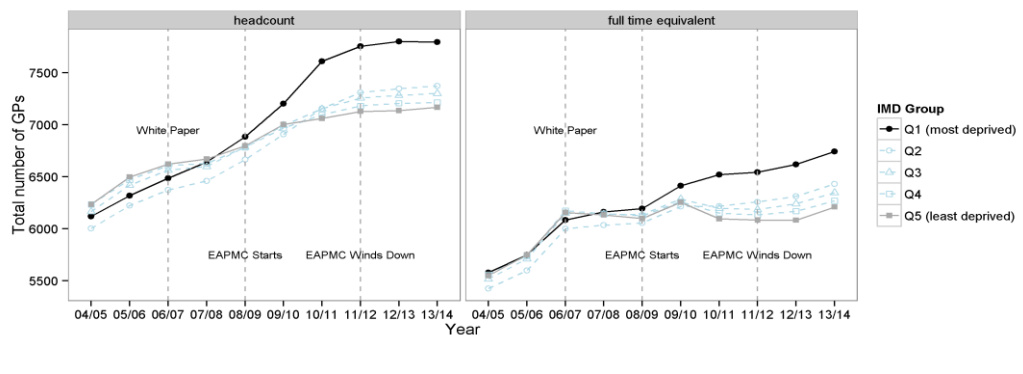
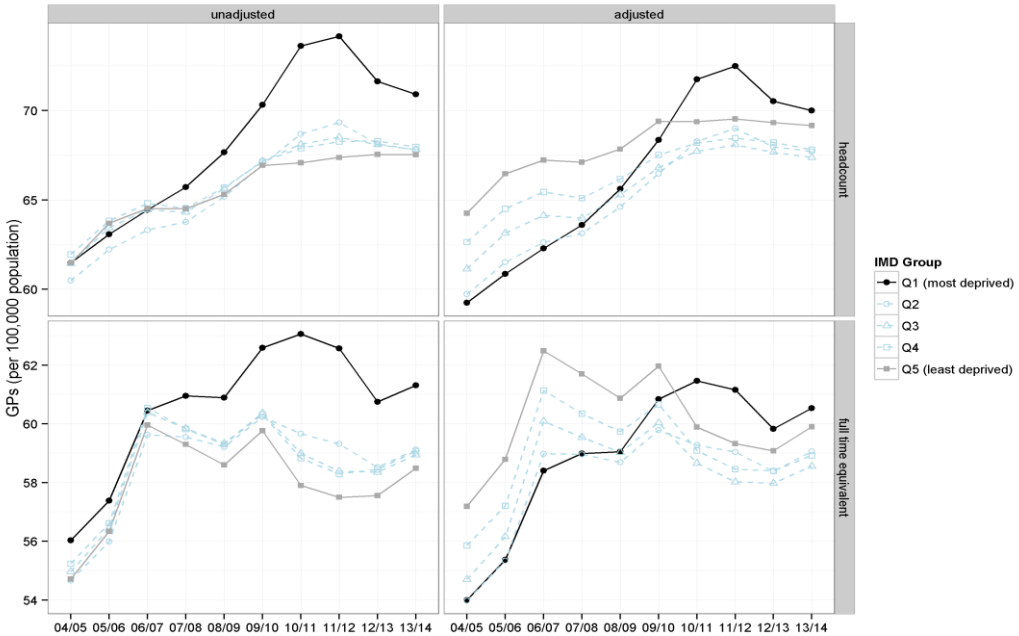


Figure A4.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A4.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.27994 -0.31105  0.01673  0.26021  1.44945

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         57.3527     0.5315 107.910  < 2e-16 ***
YEAR2011             3.0080     0.7516   4.002  0.00103 **
IMD_DECILE           5.2152     0.8566   6.088 1.57e-05 ***
YEAR2011:IMD_DECILE -7.3164     1.2114  -6.040 1.72e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.778 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.719
F-statistic:  17.2 on 3 and 16 DF,  p-value: 2.917e-05
```

Figure A4.5: Distribution of change in FTE GP supply in PCTs between 2006/07 and 2011/12 by underdoctored status excluding registrars and retainers

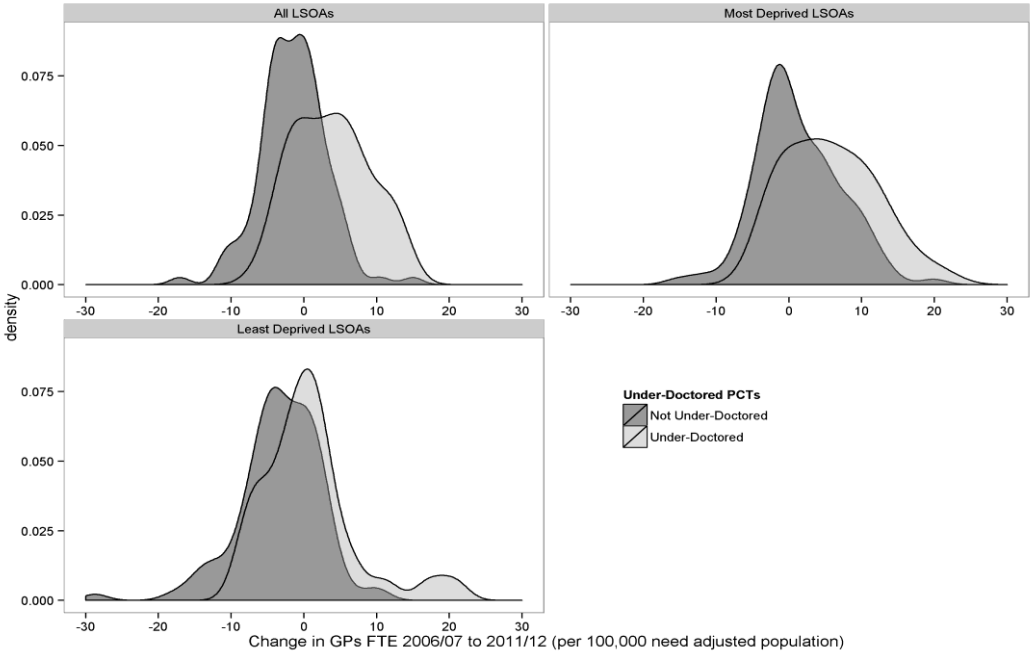


Figure A4.6: Distribution of GP Supply and Practices Nurses in 2013/14

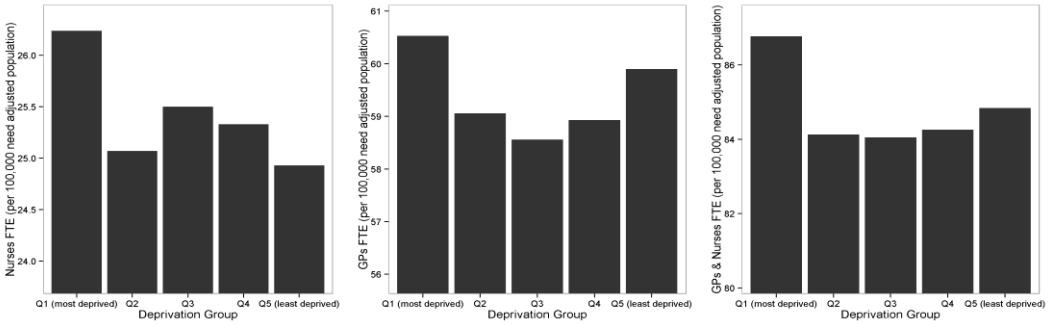


Figure A4.7: Distribution of GP Supply and Practices Nurses in 2013/14 (zeroed scale)

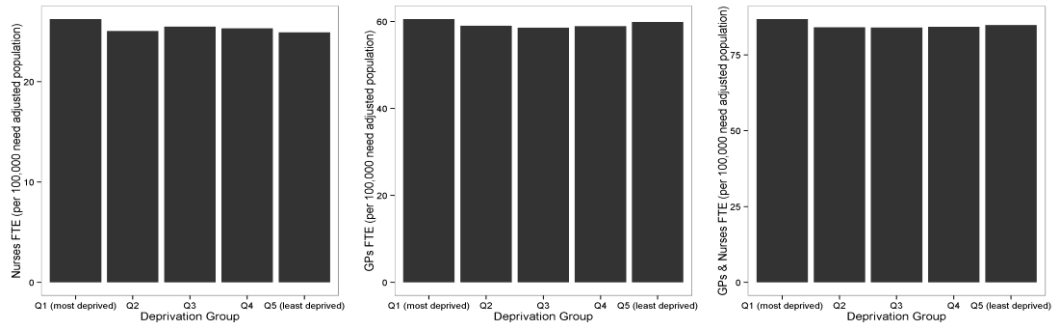


Figure A4.8: GP FTE per 100,000 at LSOA level in 2006/07 and 2011/12

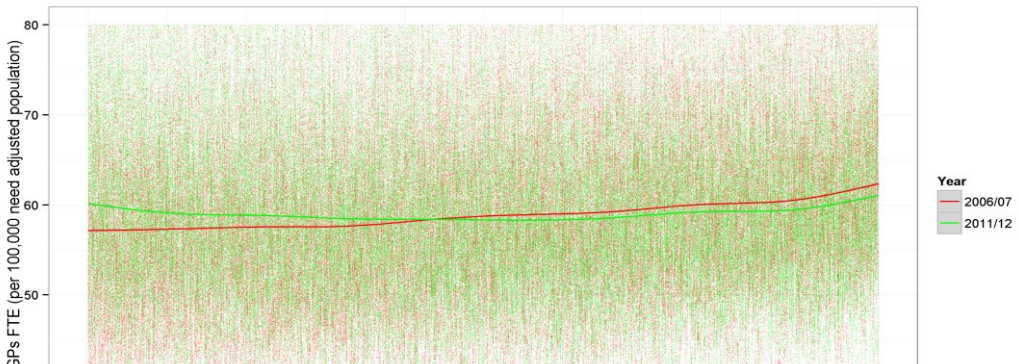


Figure A4.9: Change in GP FTE per 100,000 at LSOA level between 2006/07 and 2011/12

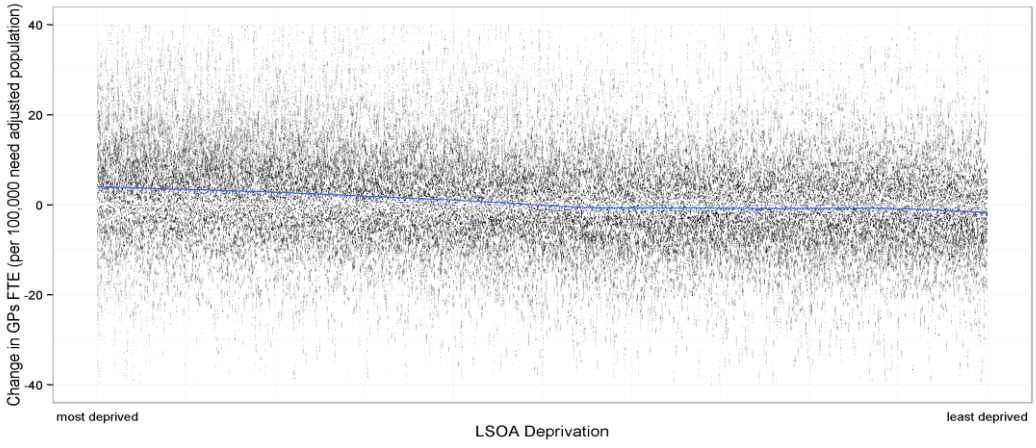
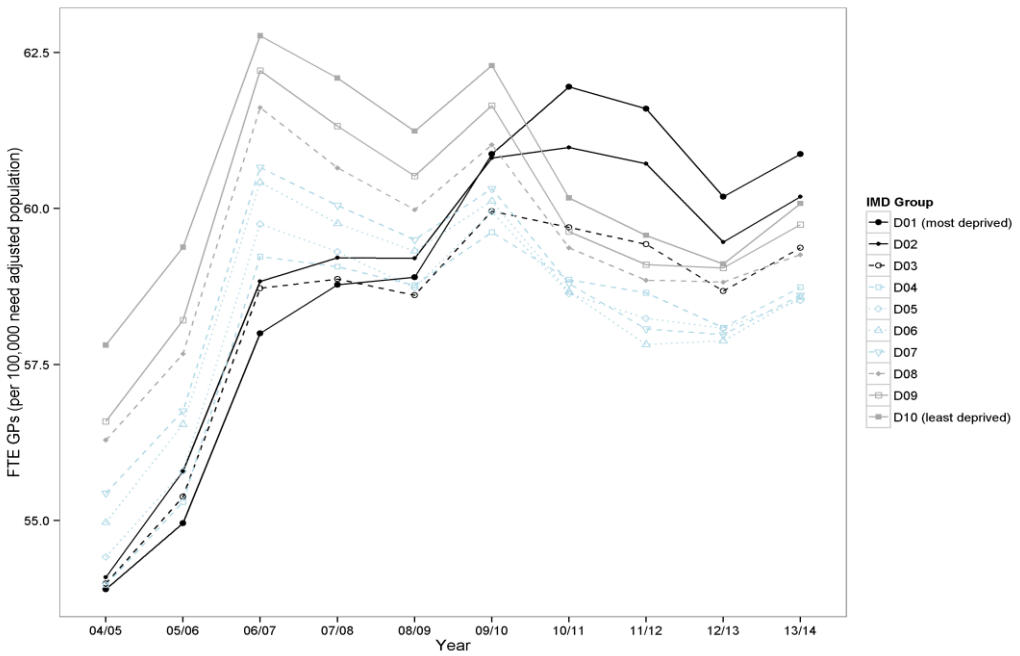


Figure A4.10: GP FTE by IMD Decile



Appendix Section 5

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **all GPs including registrars and retainers** used in the calculations

Figure A5.1: Trend in FTE GP supply over time including registrars and retainers

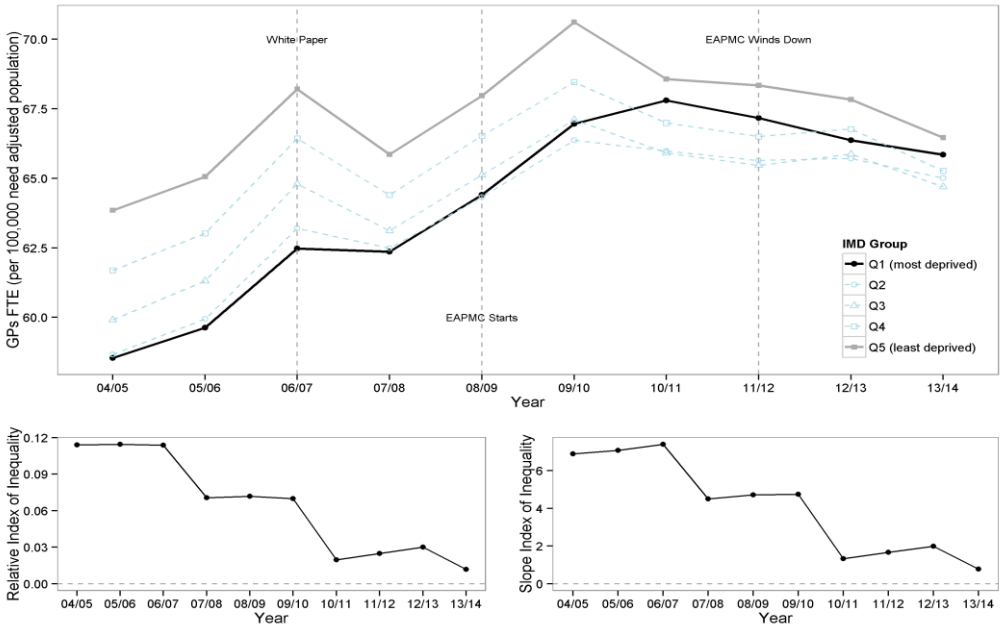


Figure A5.2: FTE GP supply in 2006/07 and 2011/12 including registrars and retainers

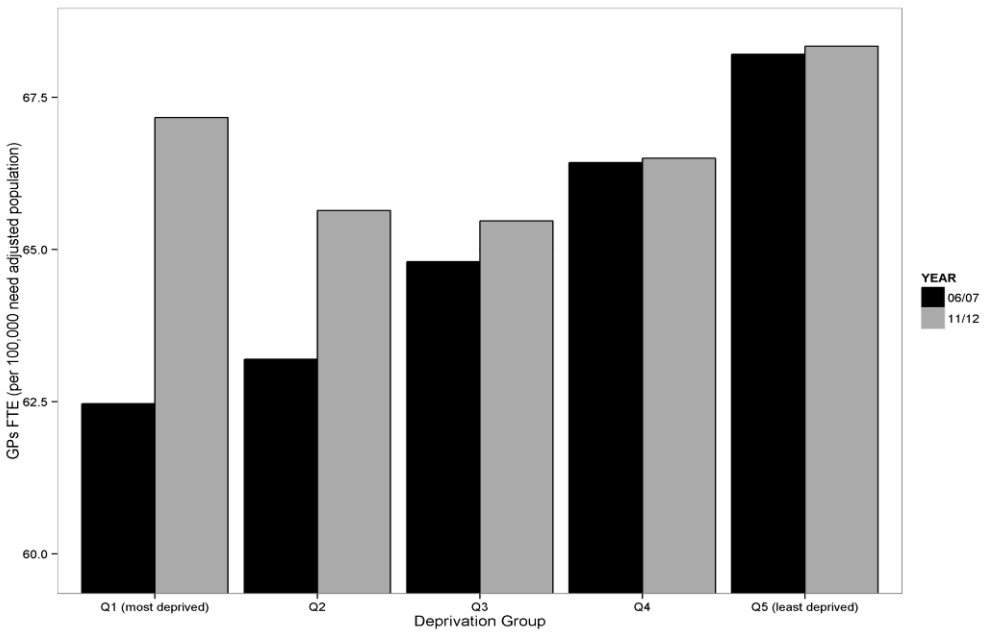


Figure A5.3: Trend in total headcount and FTE GP supply over time including registrars and retainers

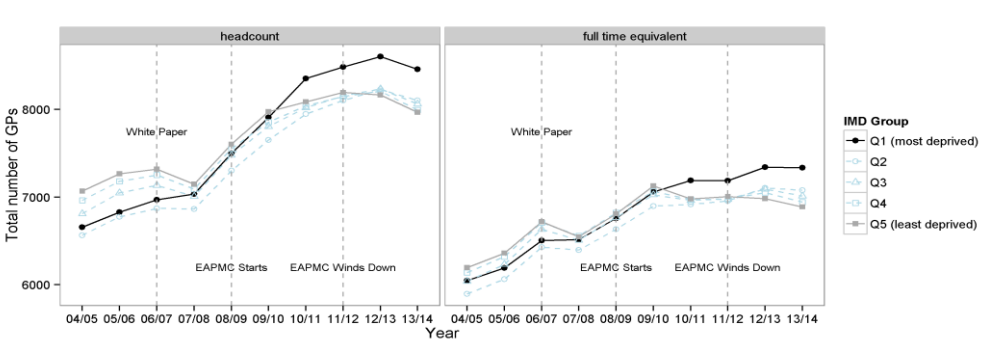
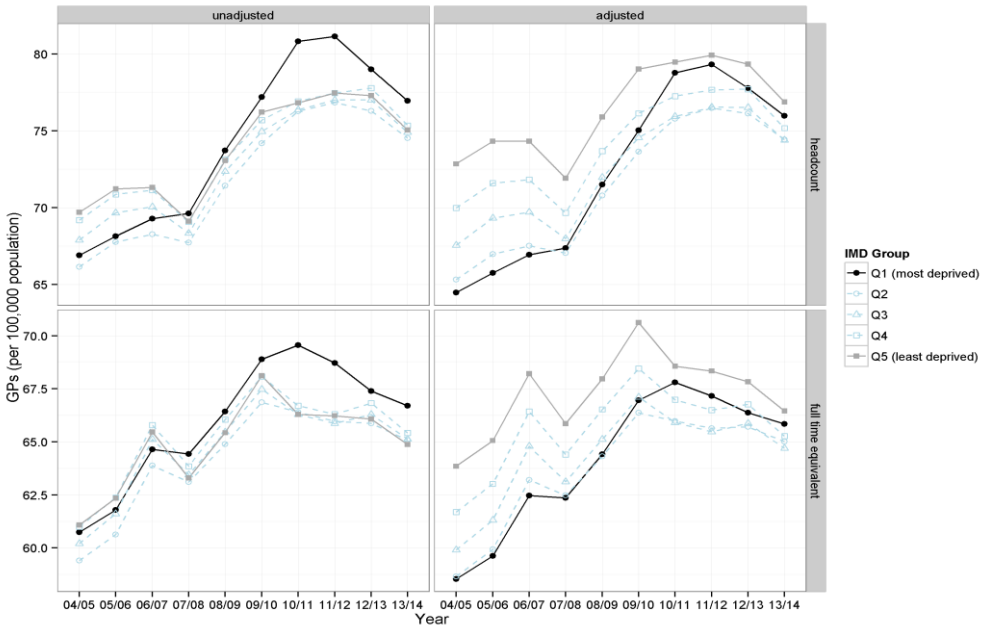


Figure A5.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time including registrars and retainers



Regression A5.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

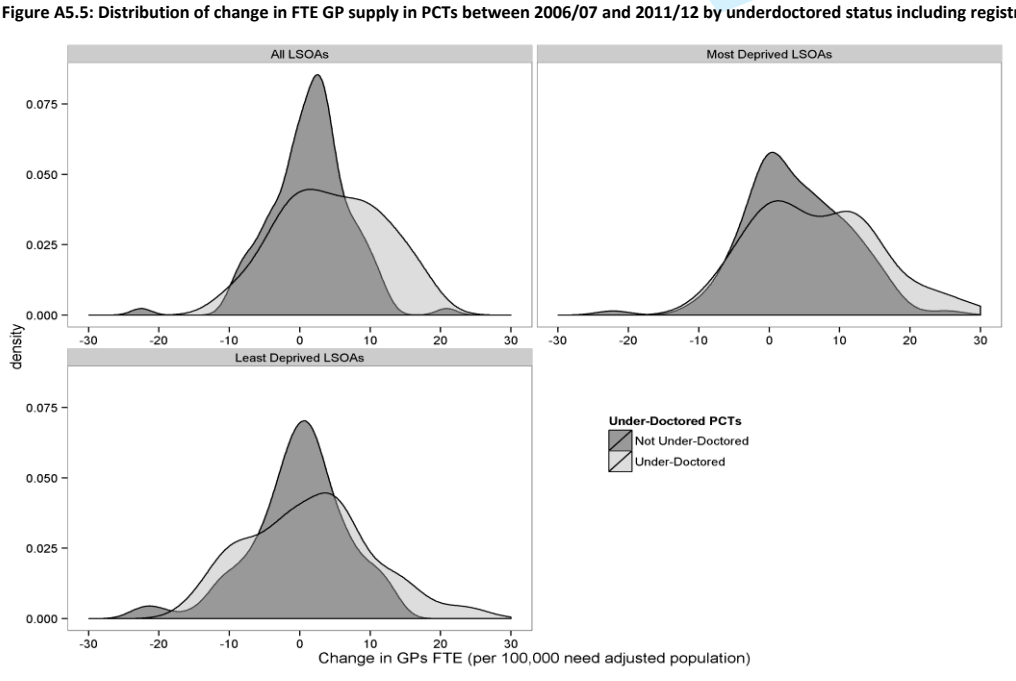
```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.16200 -0.40845 -0.07703  0.42570  1.49800

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         60.9533     0.5718 106.607  < 2e-16 ***
YEAR2011             4.7587     0.8086   5.885 2.30e-05 ***
IMD_DECILE           7.4012     0.9215   8.032 5.27e-07 ***
YEAR2011:IMD_DECILE -5.7412     1.3031  -4.406 0.000442 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.837 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.8138
F-statistic: 28.68 on 3 and 16 DF,  p-value: 1.131e-06
```

Figure A5.5: Distribution of change in FTE GP supply in PCTs between 2006/07 and 2011/12 by underdoctored status including registrars and retainers



Appendix Section 6

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **only looking at GP registrars**

Figure A6.1: Trend in FTE GP supply over time registrars only

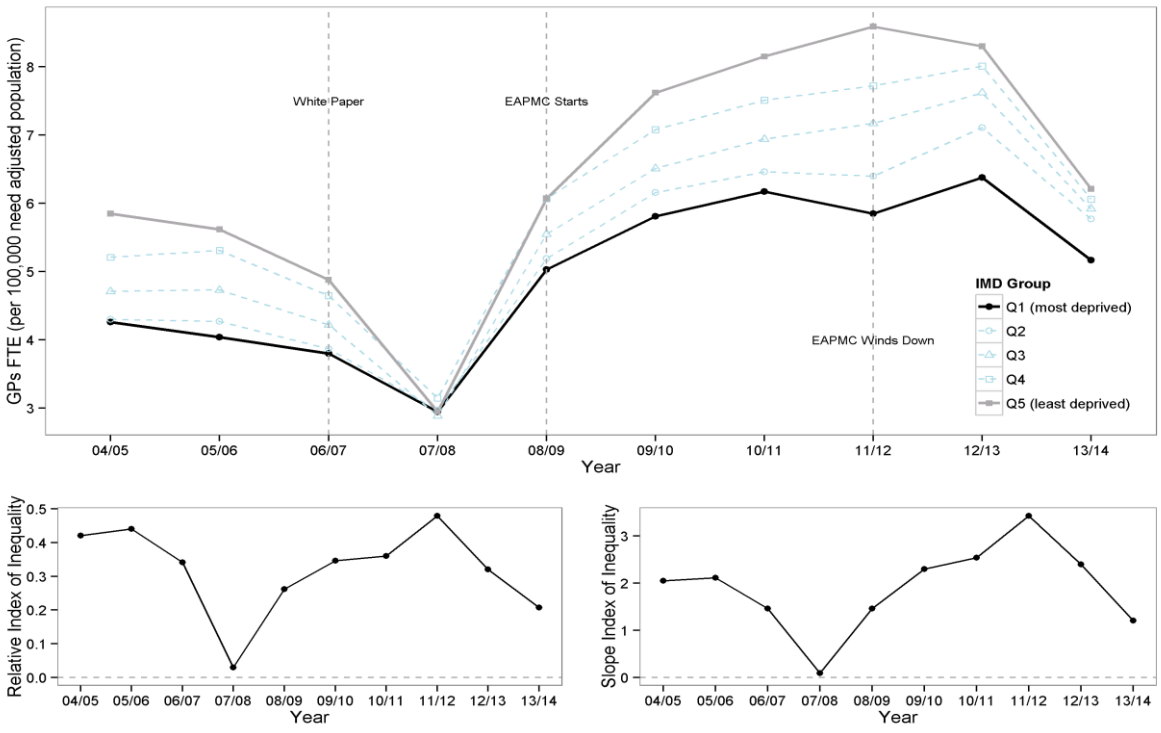


Figure A6.2: FTE GP supply in 2006/07 and 2011/12 registrars only

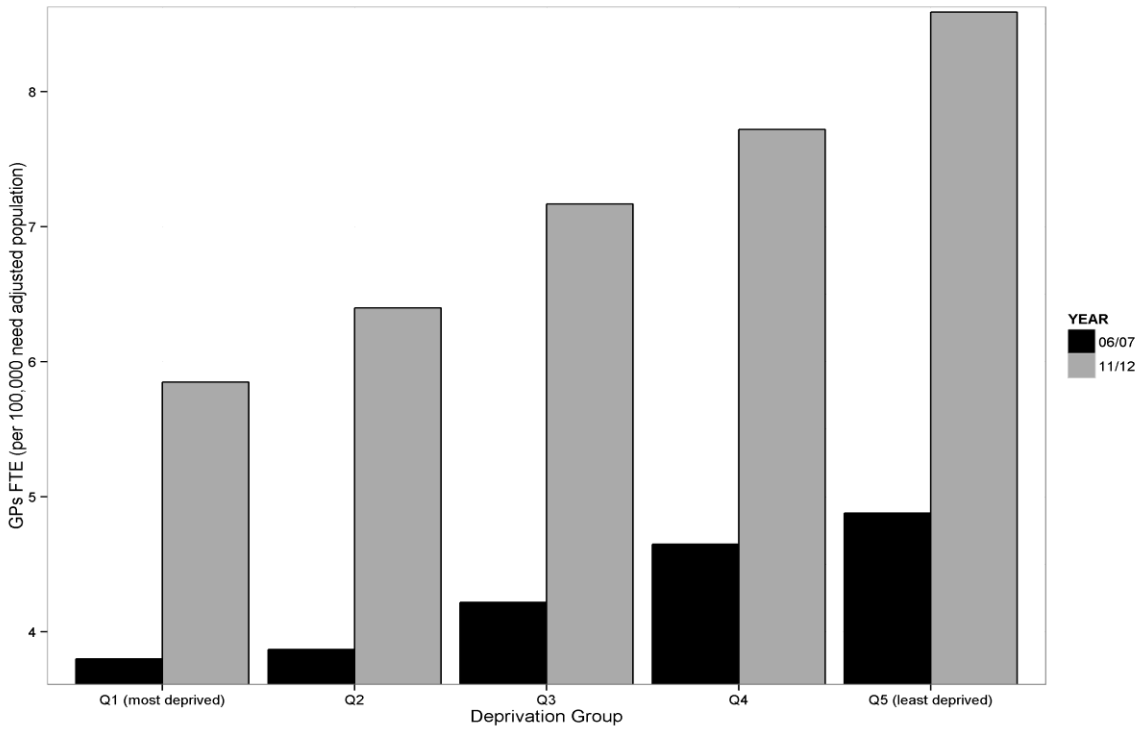


Figure A6.3: Trend in total headcount and FTE GP supply over time registrars only

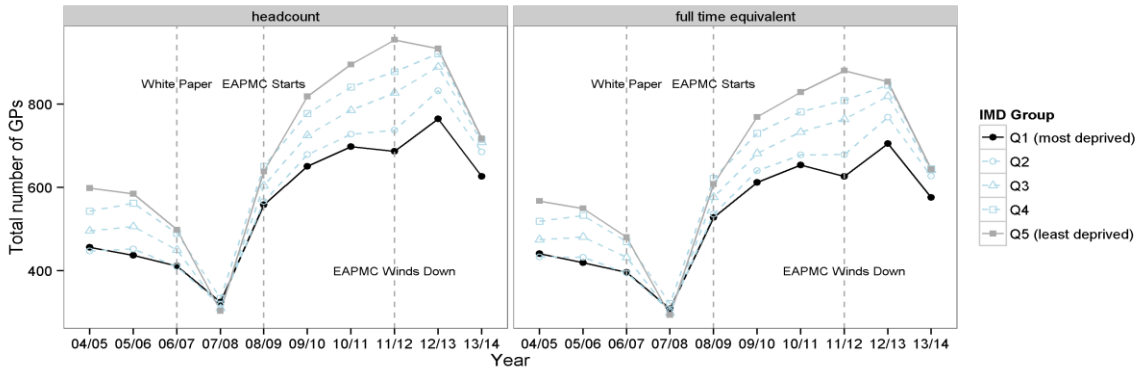
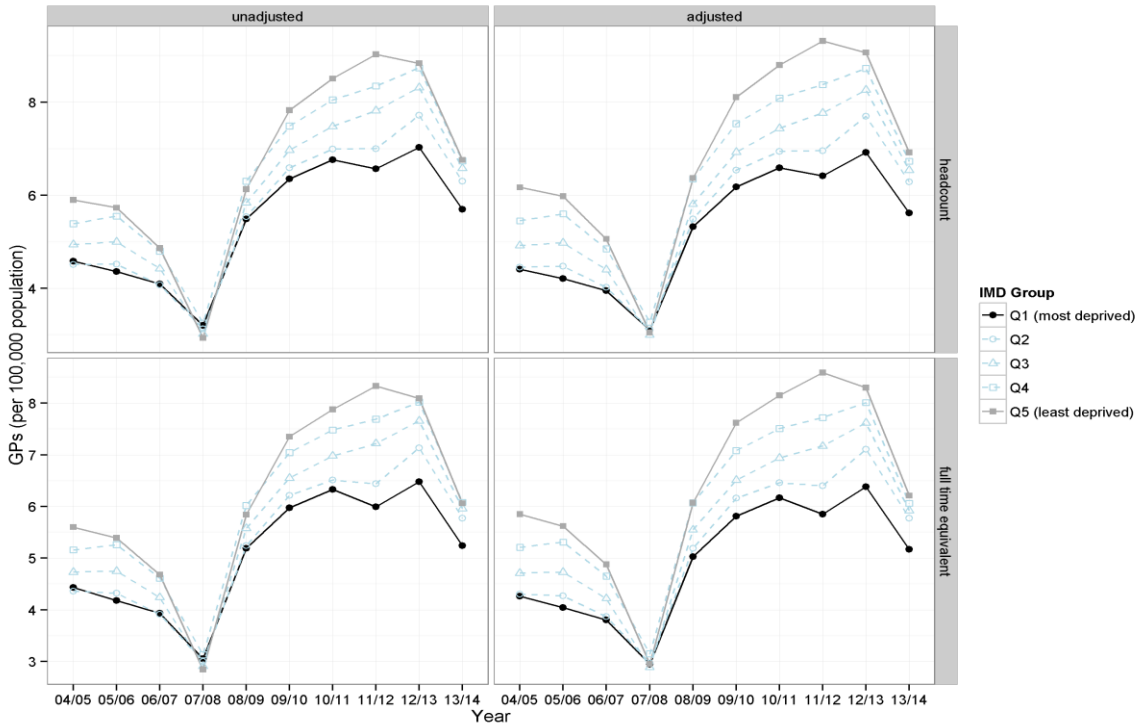


Figure A6.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time registrars only



Regression A6.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-0.21273 -0.06820 -0.01009  0.07977  0.16139

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)          3.47800    0.07755   44.85  < 2e-16 ***
YEAR2011             1.78467    0.10967   16.27 2.24e-11 ***
IMD_DECILE           1.46182    0.12498   11.70 2.98e-09 ***
YEAR2011:IMD_DECILE  1.96788    0.17674   11.13 6.04e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1135 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.9954
F-statistic:  1360 on 3 and 16 DF,  p-value: < 2.2e-16
```

Appendix Section 7

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **only looking at GP retainers**

Figure A7.1: Trend in FTE GP supply over time retainers only

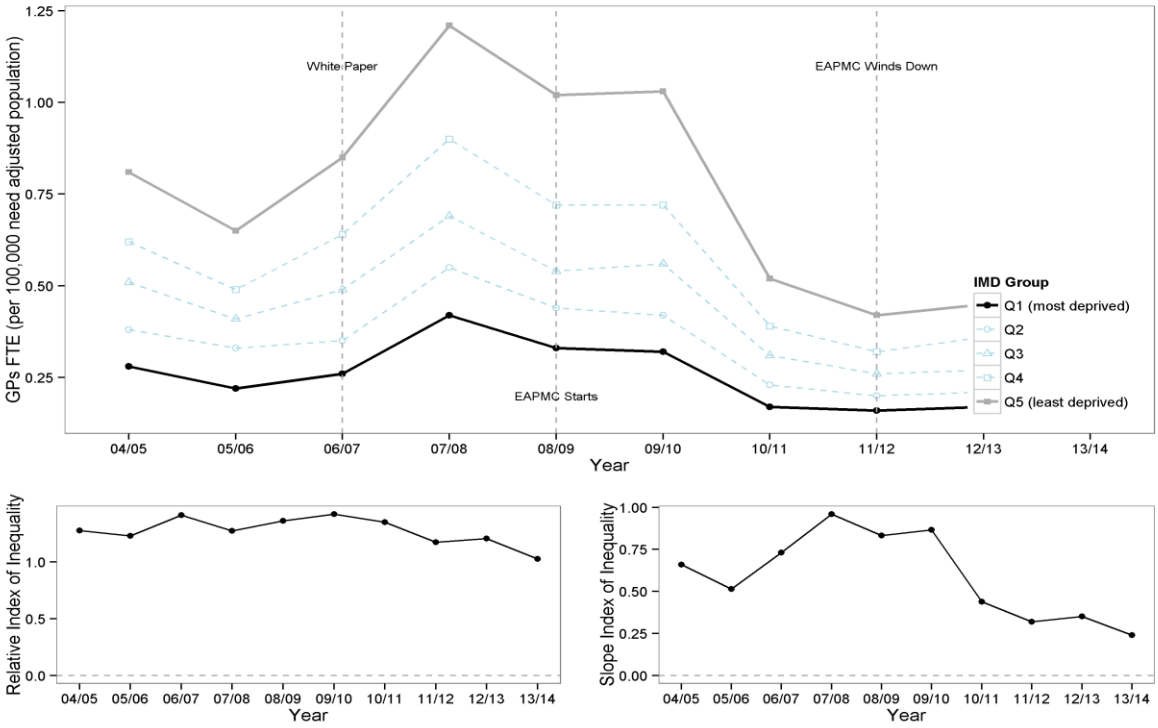


Figure A7.2: FTE GP supply in 2006/07 and 2011/12 retainers only

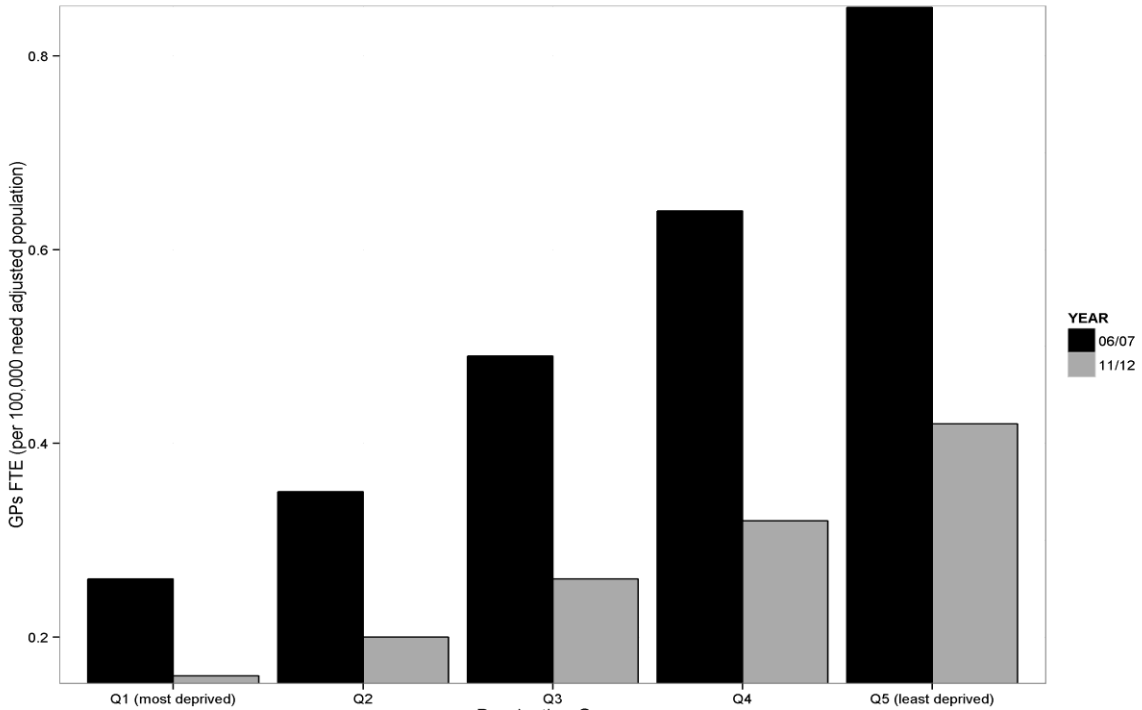


Figure A7.3: Trend in total headcount and FTE GP supply over time retainers only

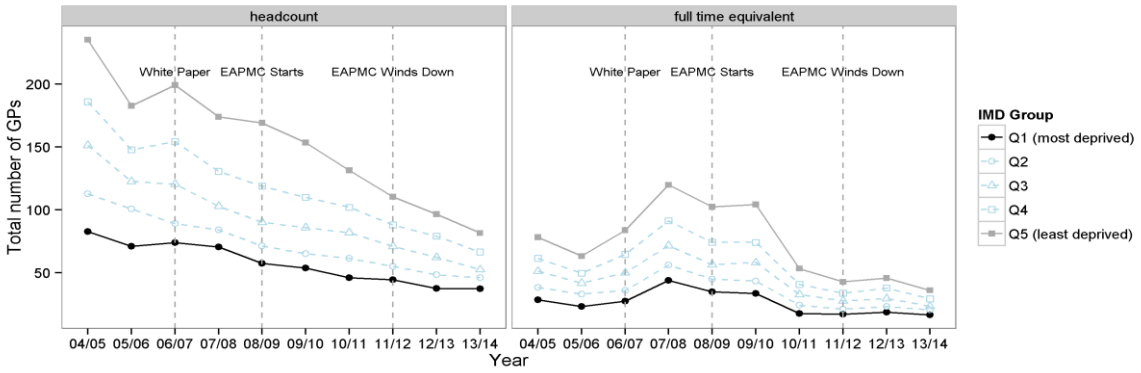
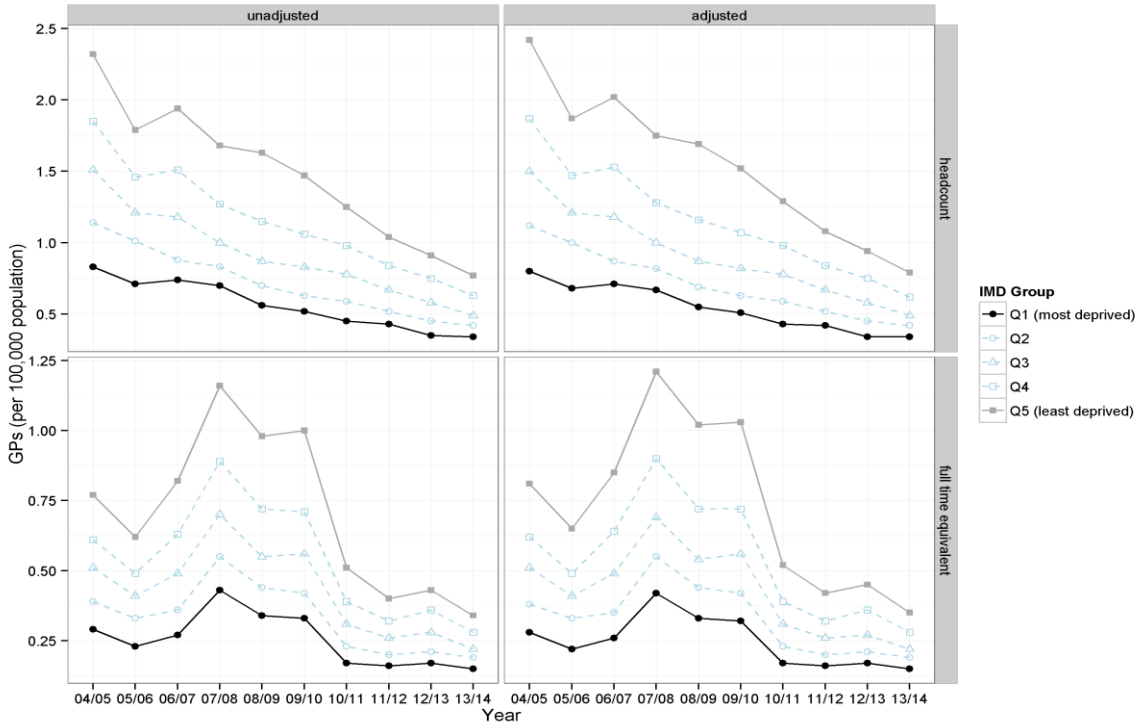


Figure A7.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time retainers only



Regression A7.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
      Min        1Q    Median        3Q       Max
-0.049273 -0.022864 -0.010758  0.008636  0.121818

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)          0.11667    0.03033   3.847  0.00143 **
YEAR2011            -0.02000    0.04289  -0.466  0.64730
IMD_DECILE           0.73152    0.04888  14.965 7.91e-11 ***
YEAR2011:IMD_DECILE -0.41273    0.06913  -5.970 1.96e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0444 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.9565
F-statistic: 140.4 on 3 and 16 DF,  p-value: 1.056e-11
```

Appendix Section 8

Results calculated by **attributing IMD scores to practices excluding registrars and retainers** and aggregating based on fifths of population weighted practices ranked by IMD score

Figure A8.1: Trend in FTE GP supply over time excluding registrars and retainers practice level aggregation

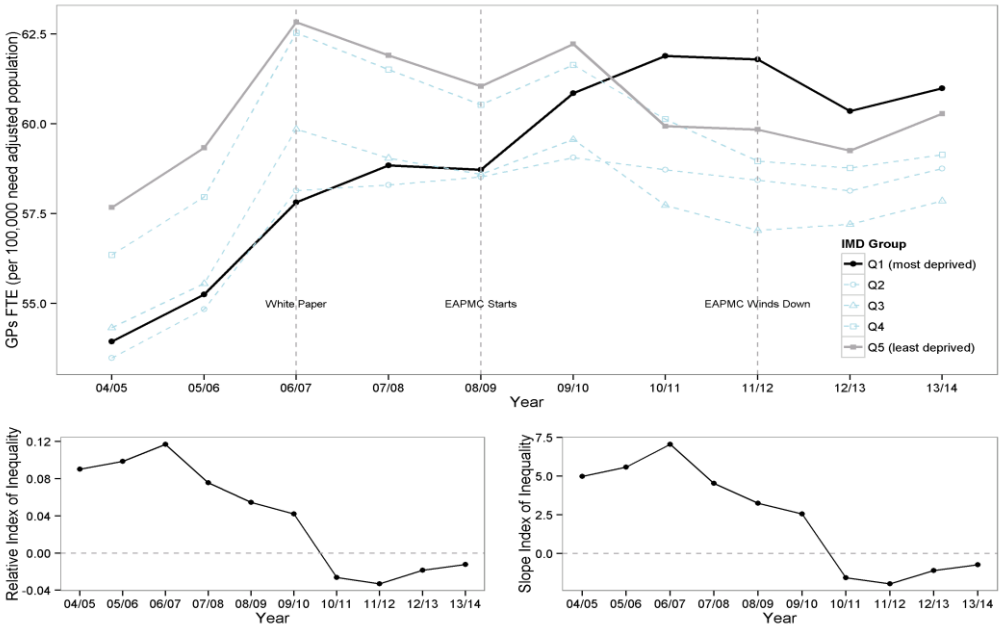


Figure A8.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers practice level aggregation

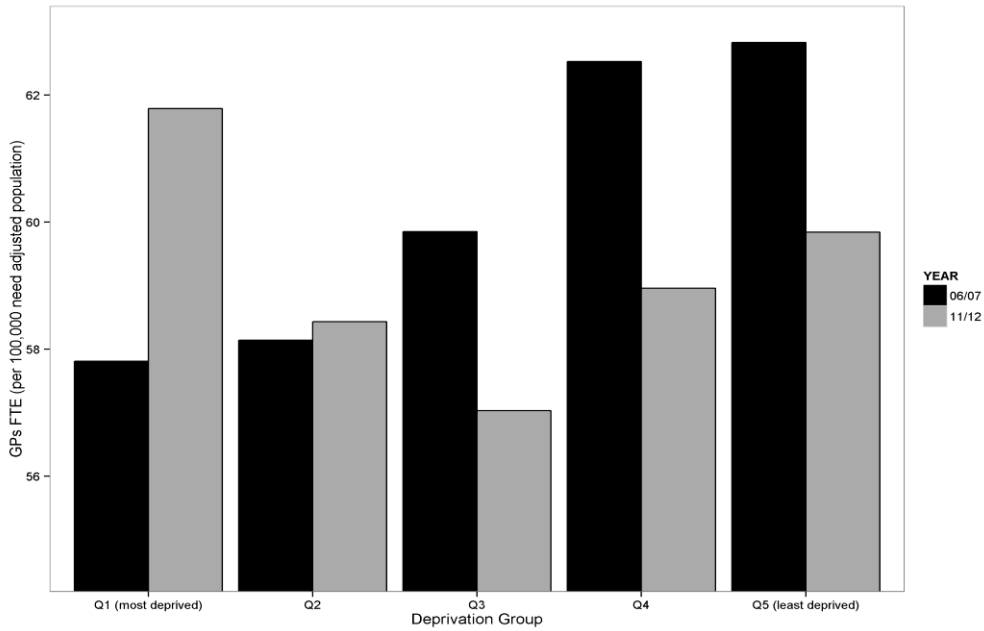


Figure A8.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers practice level aggregation

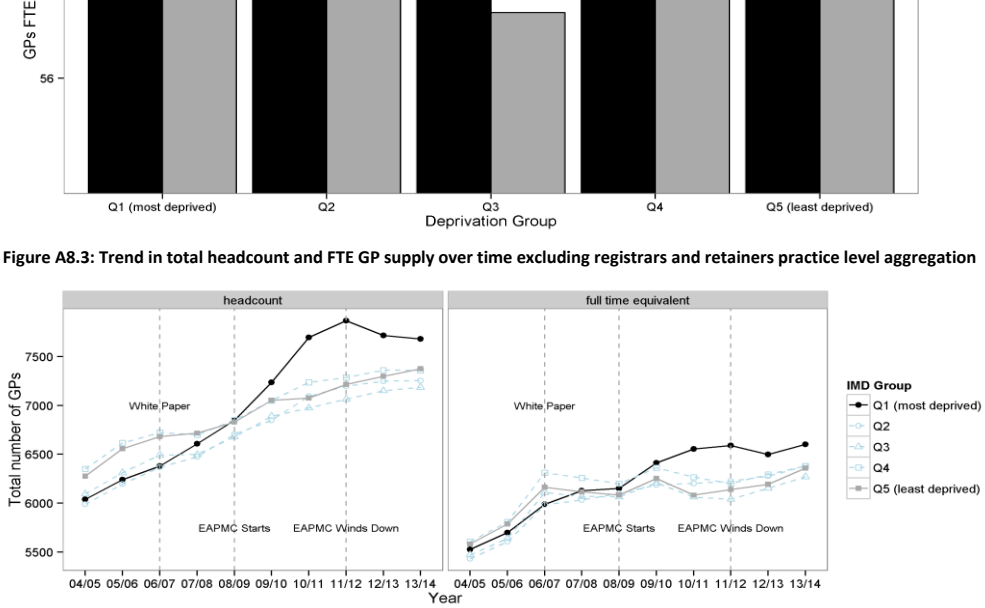
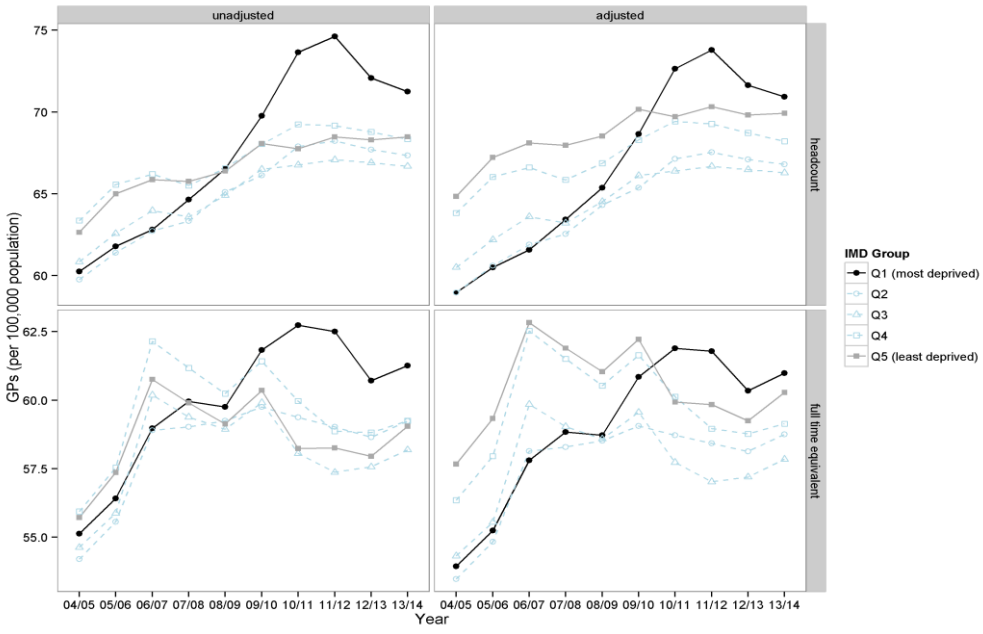


Figure A8.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers practice level aggregation



Regression A8.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.6158 -0.6283 -0.2555  0.8089  3.3422

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          56.349      0.992  56.803  < 2e-16 ***
YEAR2011              3.934      1.403   2.804 0.012732 *
IMD_DECILE            7.054      1.599   4.412 0.000436 ***
YEAR2011:IMD_DECILE  -9.009      2.261  -3.985 0.001066 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.452 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.5182
F-statistic: 7.811 on 3 and 16 DF,  p-value: 0.00196
```

Figure A8.5 Numbers of LSOA per GP Practice over Time

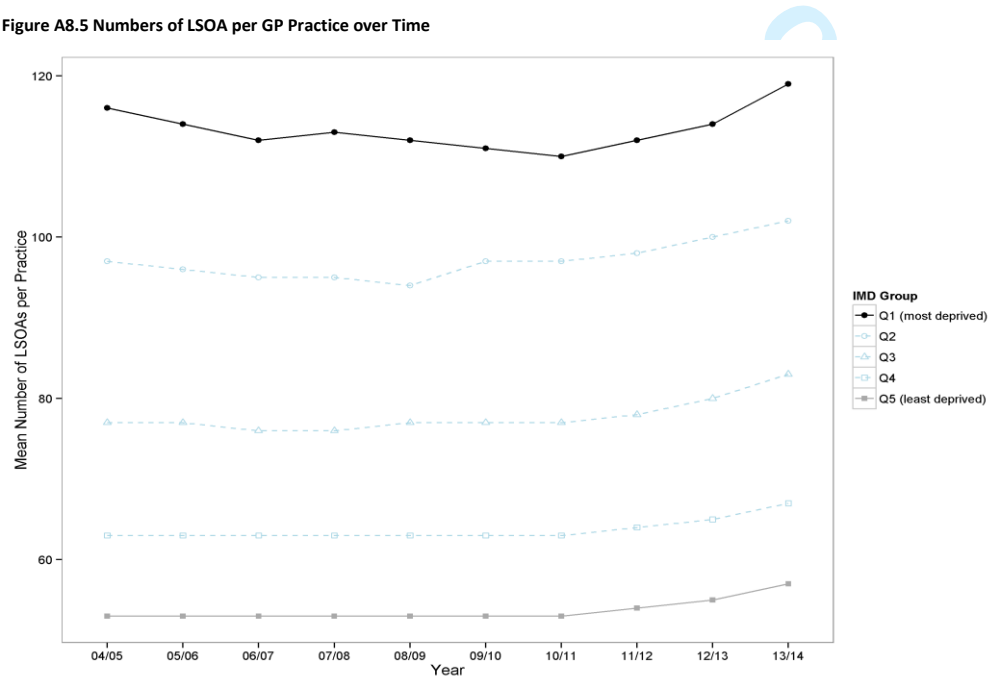
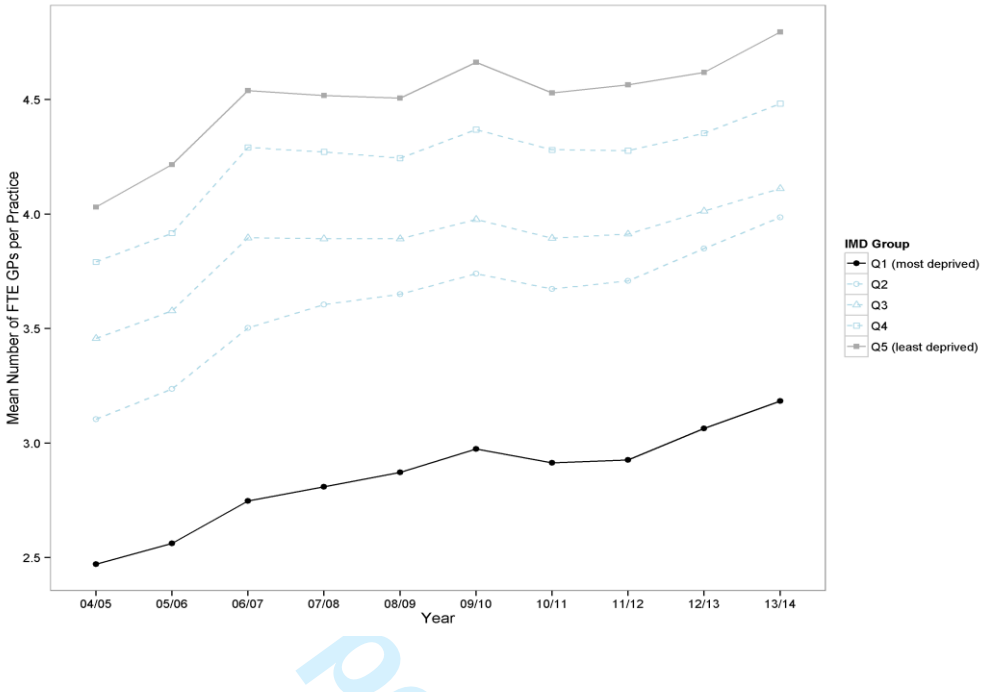


Figure A8.6 Numbers of FTE GPs per Practice over Time



Appendix Section 9

Results calculated by **attributing IMD scores to practices** and aggregating based on fifths of population weighted practices ranked by IMD score - all GPs including registrars and retainers included in the calculation

Figure A9.1: Trend in FTE GP supply over time including registrars and retainers practice level aggregation

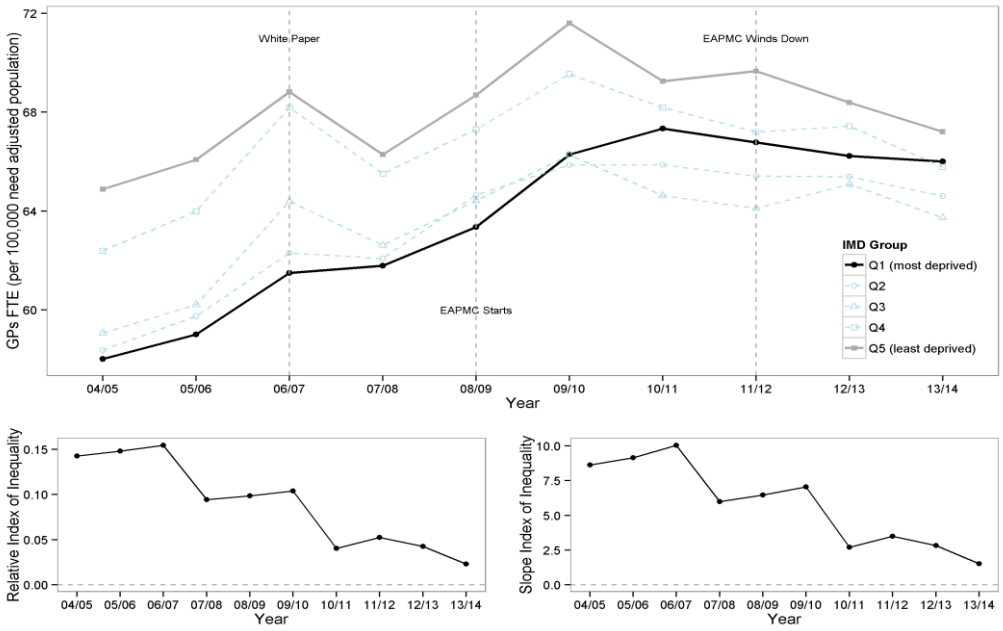


Figure A9.2: FTE GP supply in 2006/07 and 2011/12 including registrars and retainers practice level aggregation

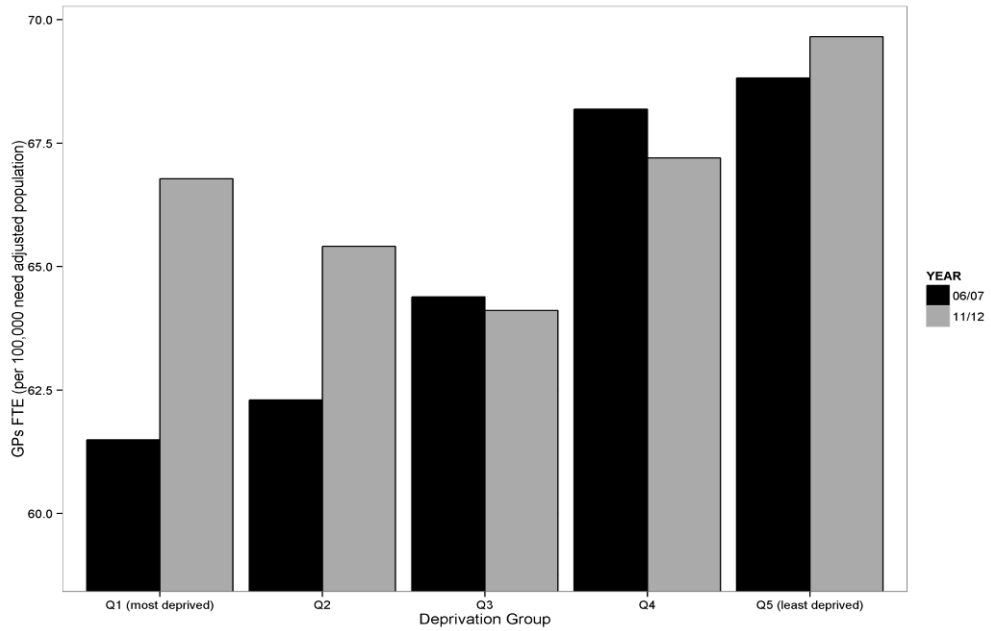


Figure A9.3: Trend in total headcount and FTE GP supply over time including registrars and retainers practice level aggregation

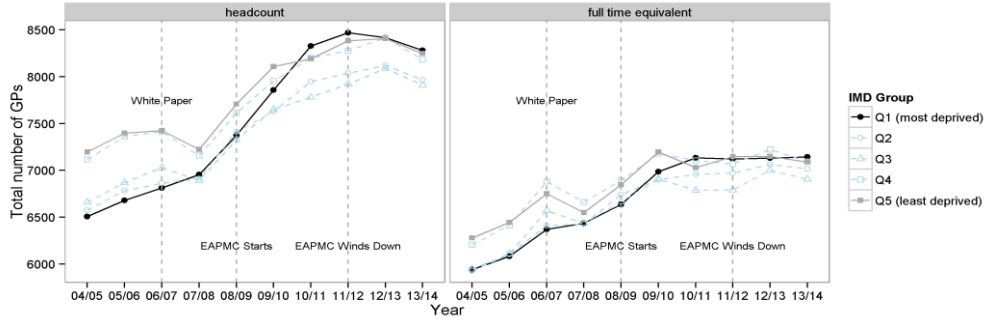
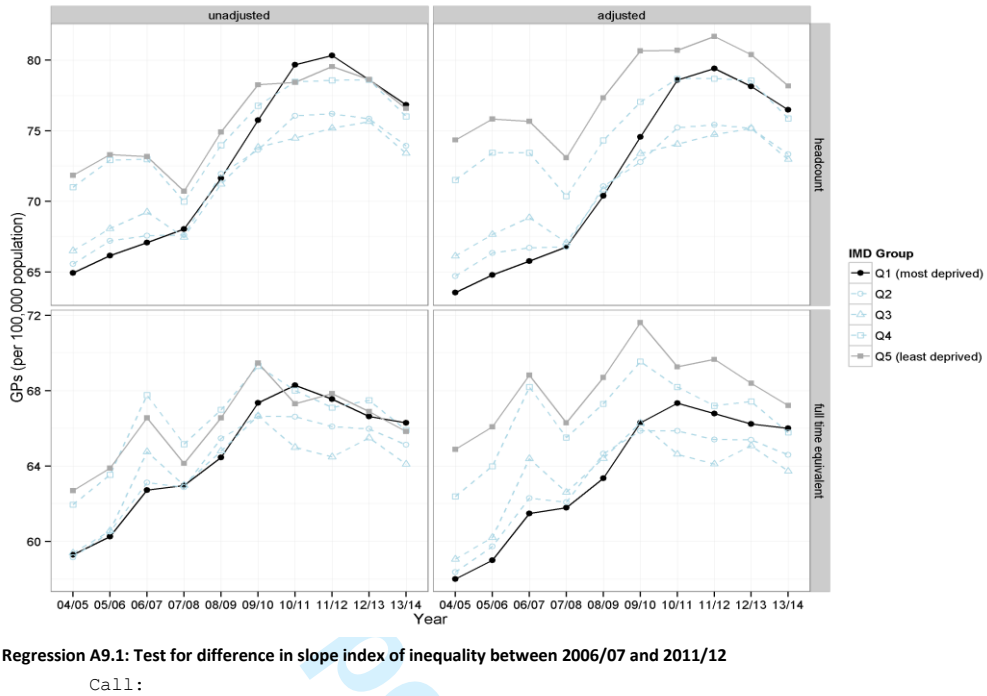


Figure A9.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time including registrars and retainers practice level aggregation



Regression A9.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.9198 -0.8870 -0.2299  1.1036  3.7836

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          59.508      1.127  52.782  < 2e-16 ***
YEAR2011              5.210      1.594   3.268  0.00484 **
IMD_DECILE           10.056      1.817   5.535 4.53e-05 ***
YEAR2011:IMD_DECILE  -6.573      2.570  -2.558  0.02107 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.65 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.6544
F-statistic: 12.99 on 3 and 16 DF,  p-value: 0.0001479
```

Appendix Section 10

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - results for London**

Figure A10.1: Trend in FTE GP supply over time excluding registrars and retainers

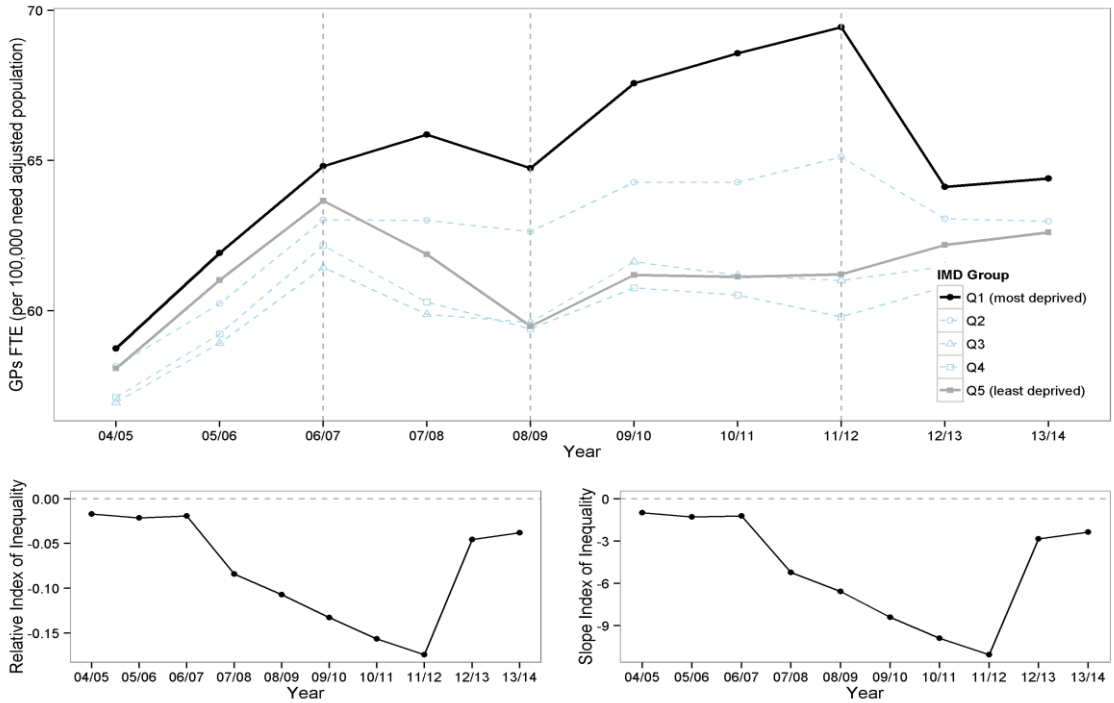


Figure A10.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

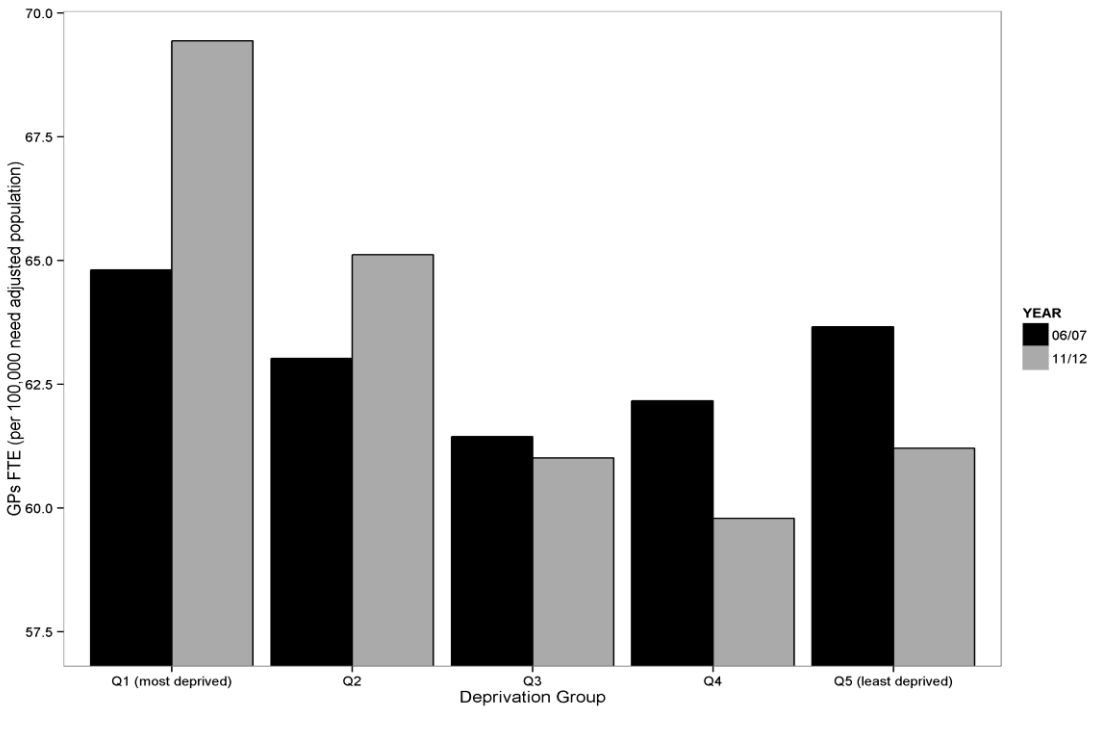


Figure A10.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

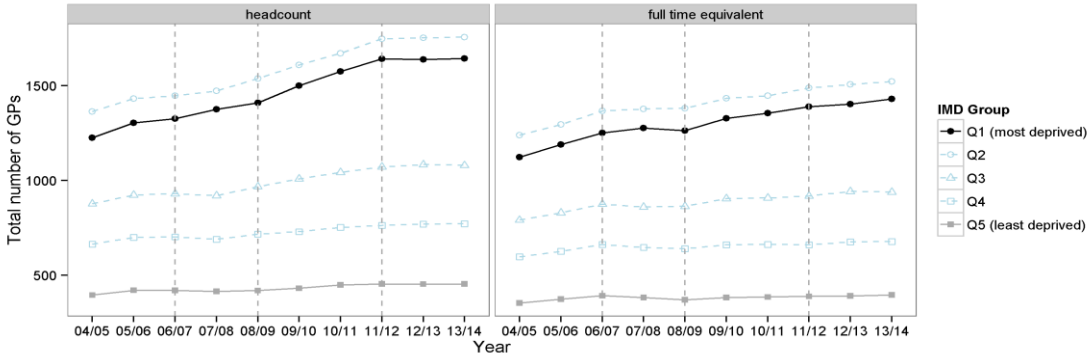
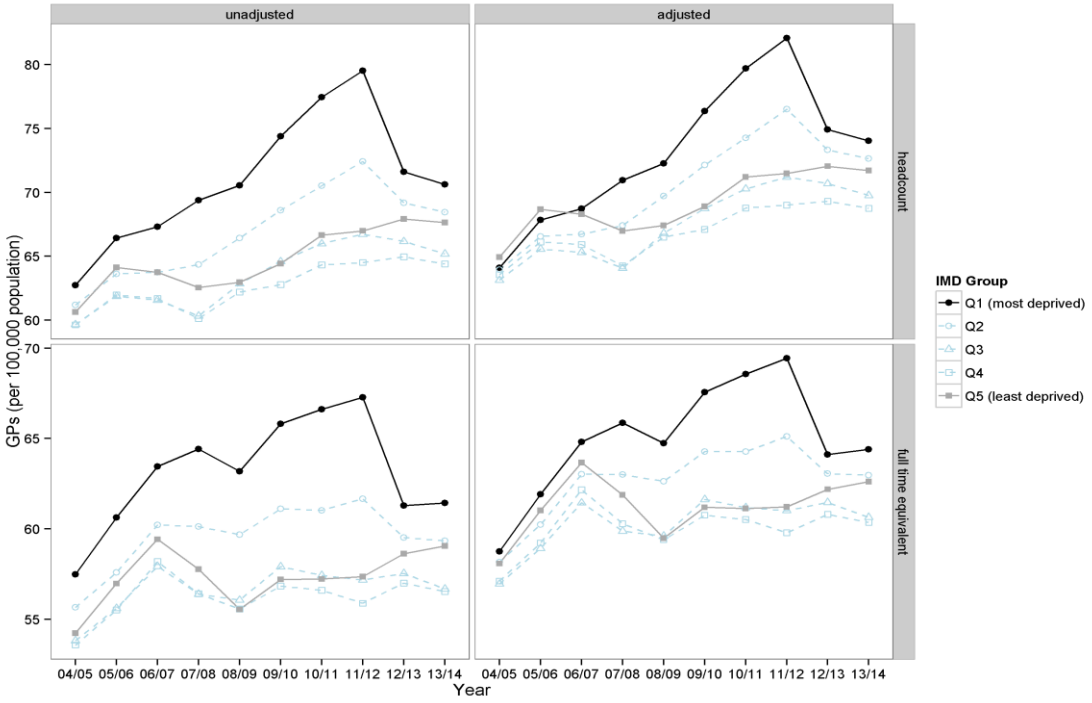


Figure A10.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A10.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.4398 -1.1211 -0.2092  1.3358  3.4882

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          63.687      1.257  50.664  < 2e-16 ***
YEAR2011              5.789      1.778   3.257  0.00495 **
IMD_DECILE           -1.215      2.026  -0.600  0.55704
YEAR2011:IMD_DECILE  -9.830      2.865  -3.431  0.00343 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.84 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.5896
F-statistic:  10.1 on 3 and 16 DF,  p-value: 0.0005652
```

Appendix Section 11

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation** - **results for North of England**

Figure A11.1: Trend in FTE GP supply over time excluding registrars and retainers

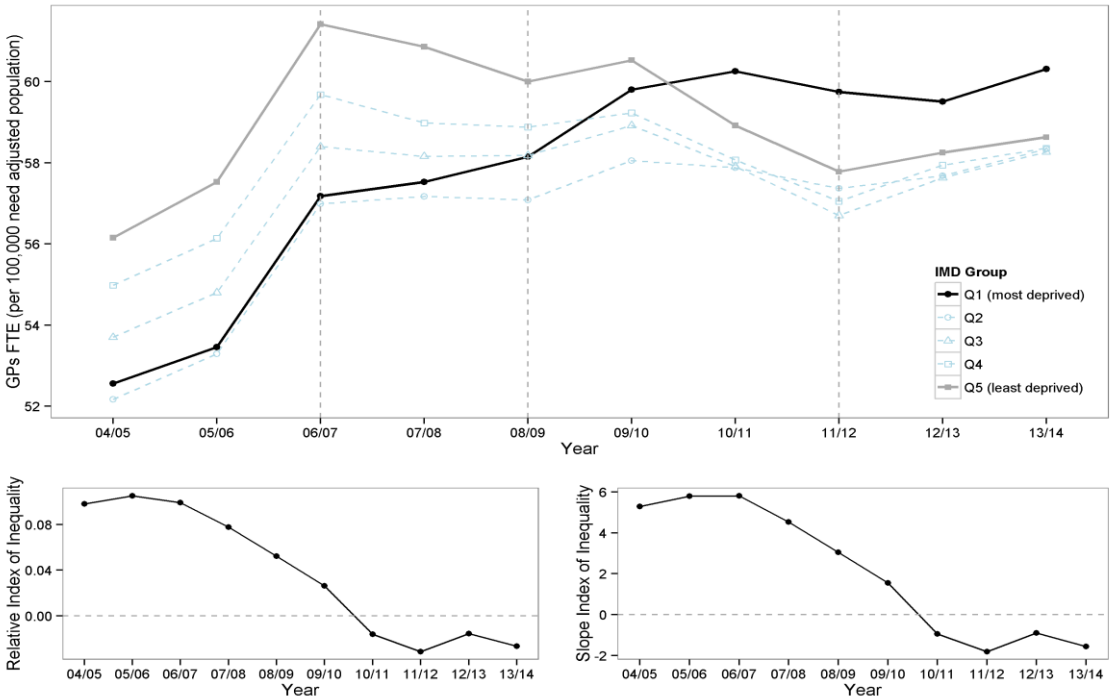


Figure A11.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

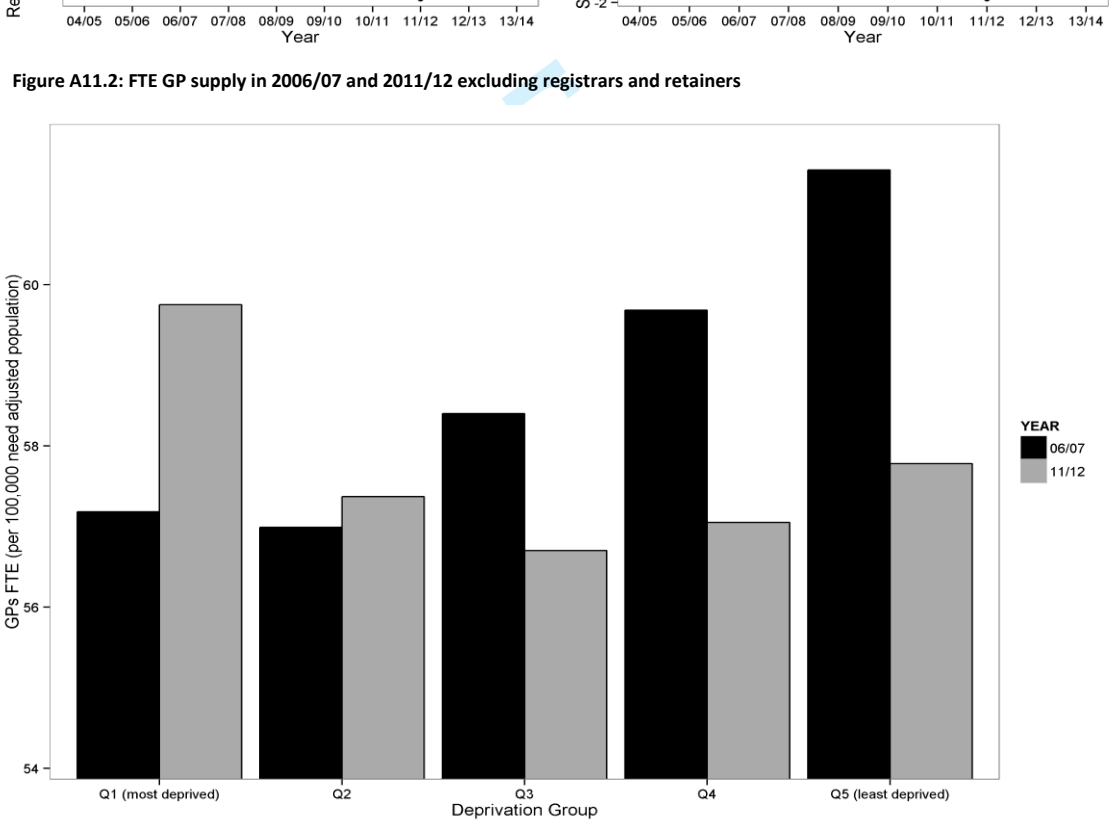


Figure A11.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

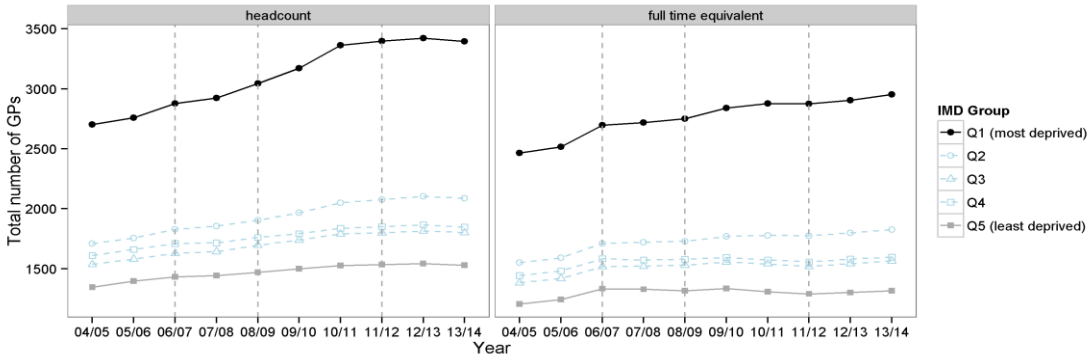
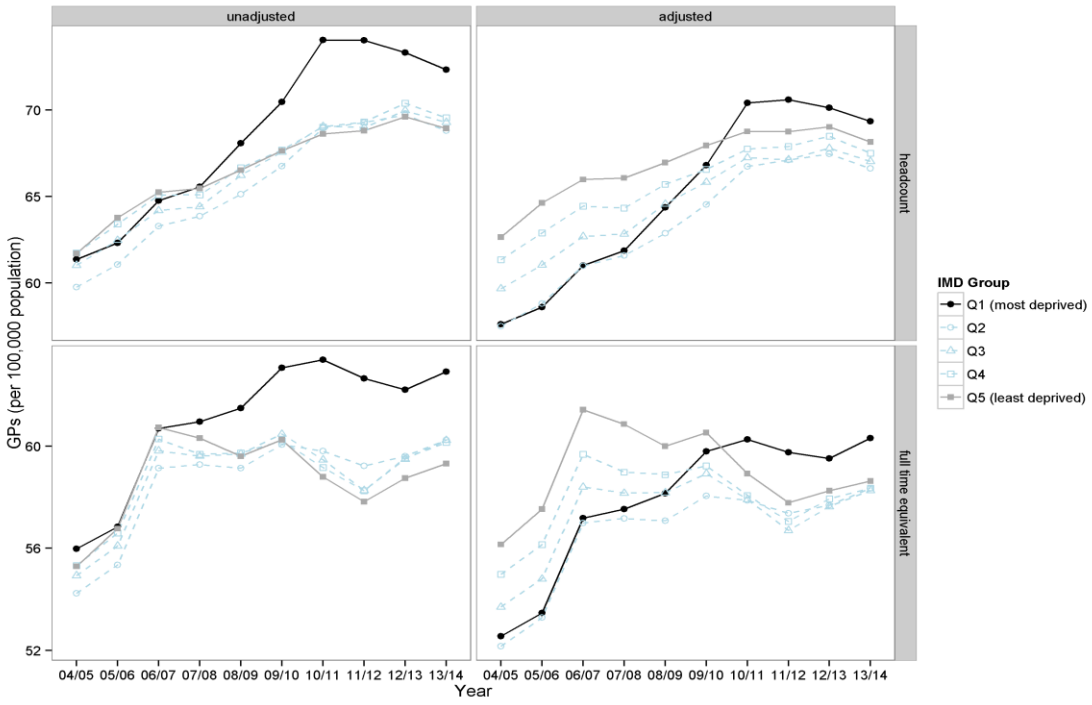


Figure A11.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A11.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.38648 -0.67520 -0.01955  0.44667  2.18964

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         55.5367     0.6595  84.211  < 2e-16 ***
YEAR2011             3.1447     0.9327   3.372 0.003885 **
IMD_DECILE           5.8152     1.0629   5.471 5.13e-05 ***
YEAR2011:IMD_DECILE -7.6248     1.5031  -5.073 0.000113 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9654 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.6529
F-statistic: 12.91 on 3 and 16 DF,  p-value: 0.0001531
```

Appendix Section 12

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - results for Midlands and East of England**

Figure A12.1: Trend in FTE GP supply over time excluding registrars and retainers

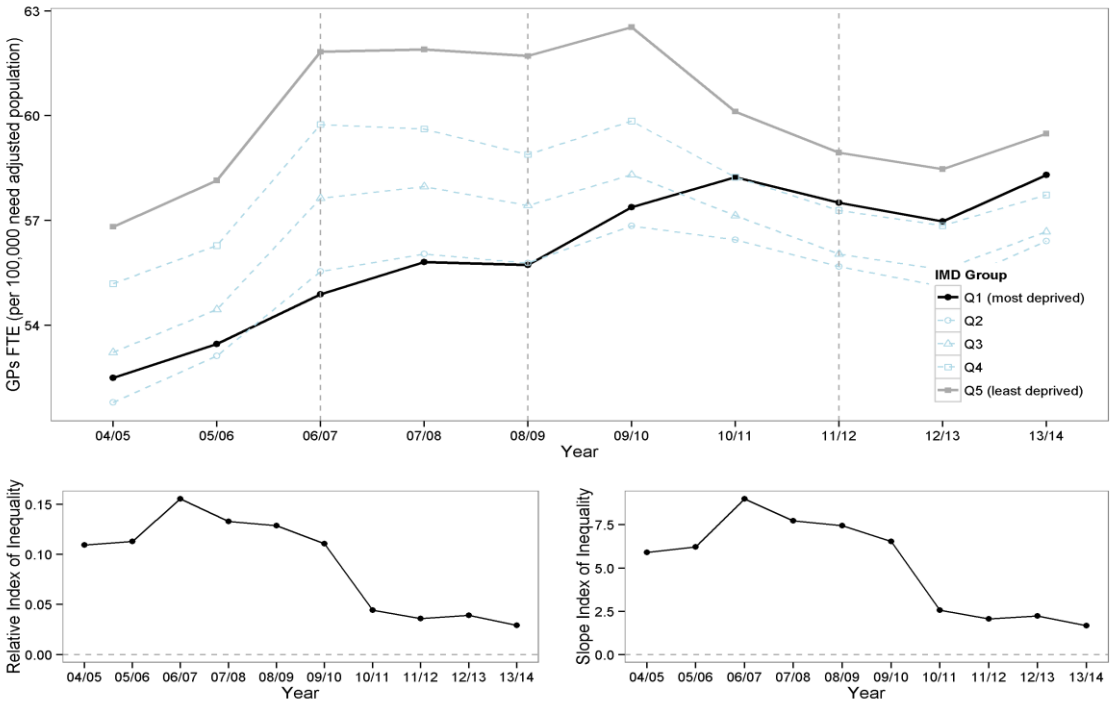


Figure A12.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

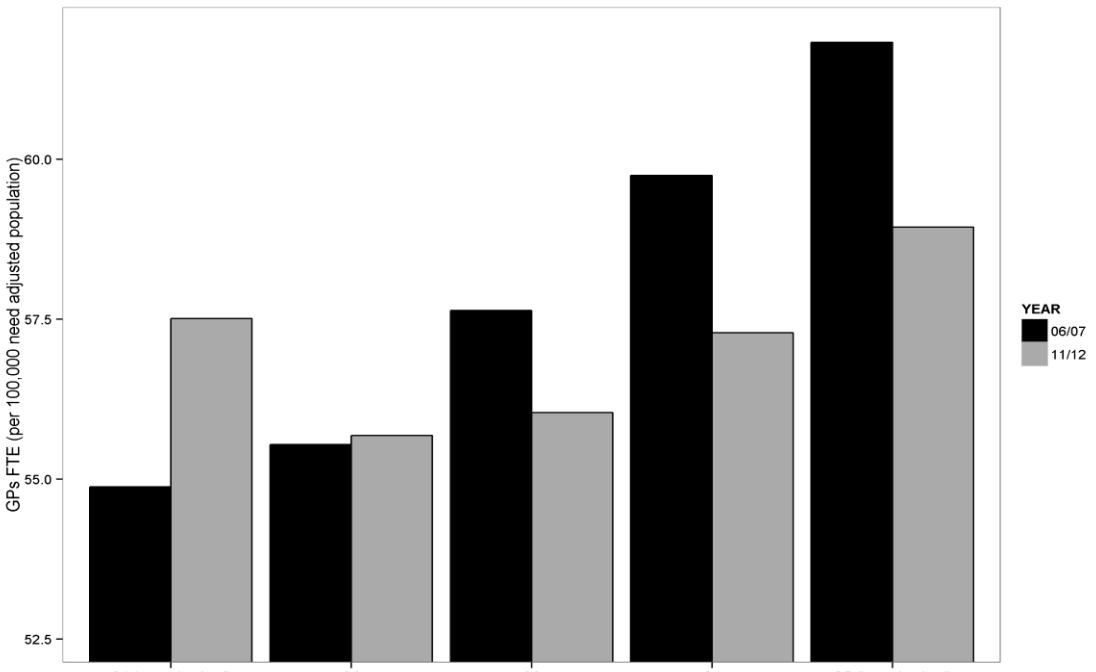


Figure A12.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

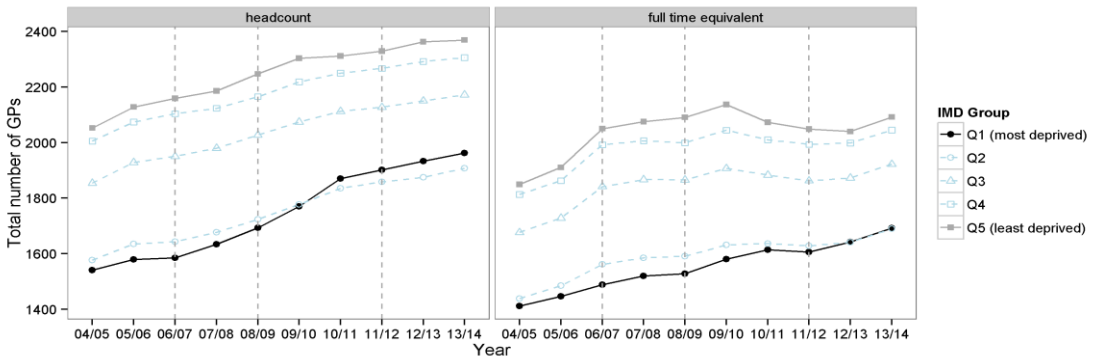
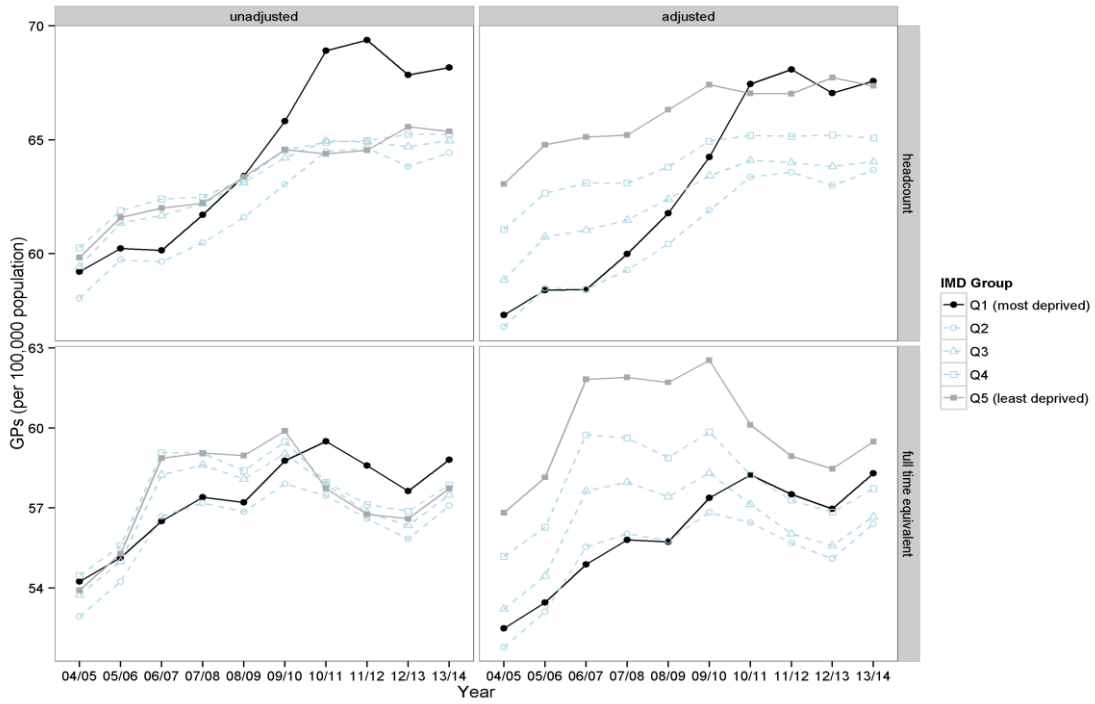


Figure A12.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A12.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-1.2693 -0.5681 -0.2970  0.3750  2.8982

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         52.9693     0.7386  71.718  < 2e-16 ***
YEAR2011             2.9867     1.0445   2.859 0.011358 *
IMD_DECILE           9.0067     1.1903   7.567 1.13e-06 ***
YEAR2011:IMD_DECILE -6.9485     1.6834  -4.128 0.000789 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.081 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.7602
F-statistic: 21.07 on 3 and 16 DF,  p-value: 8.368e-06
```

Appendix Section 13

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation** - **results for South of England**

Figure A13.1: Trend in FTE GP supply over time excluding registrars and retainers

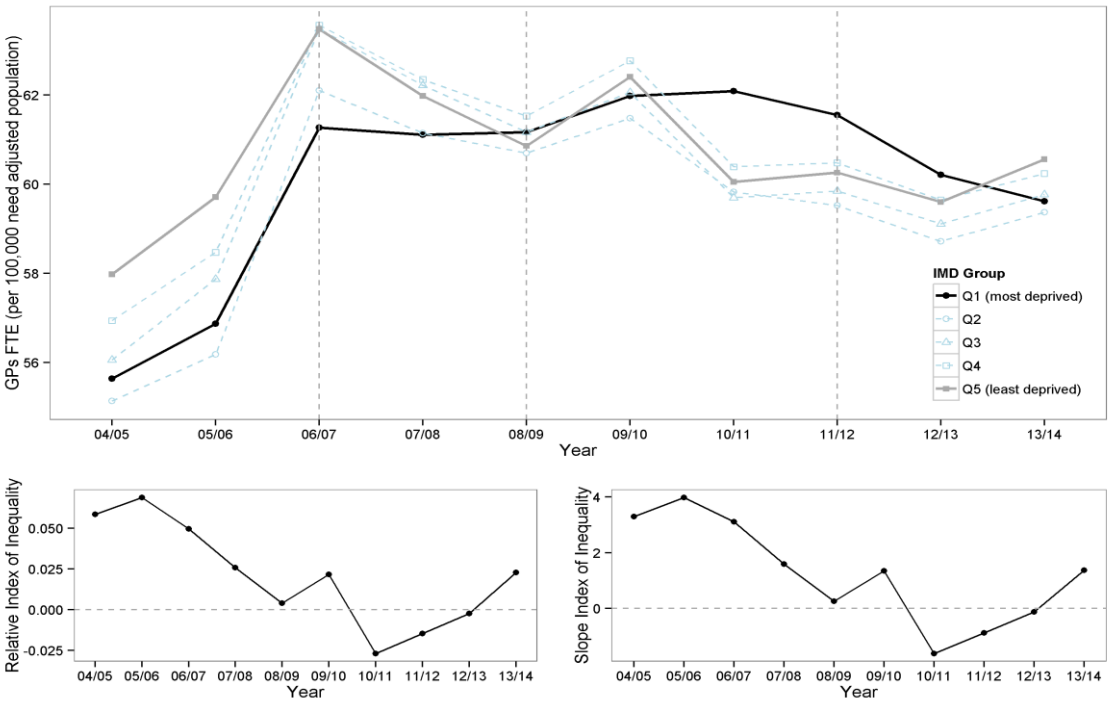


Figure A13.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

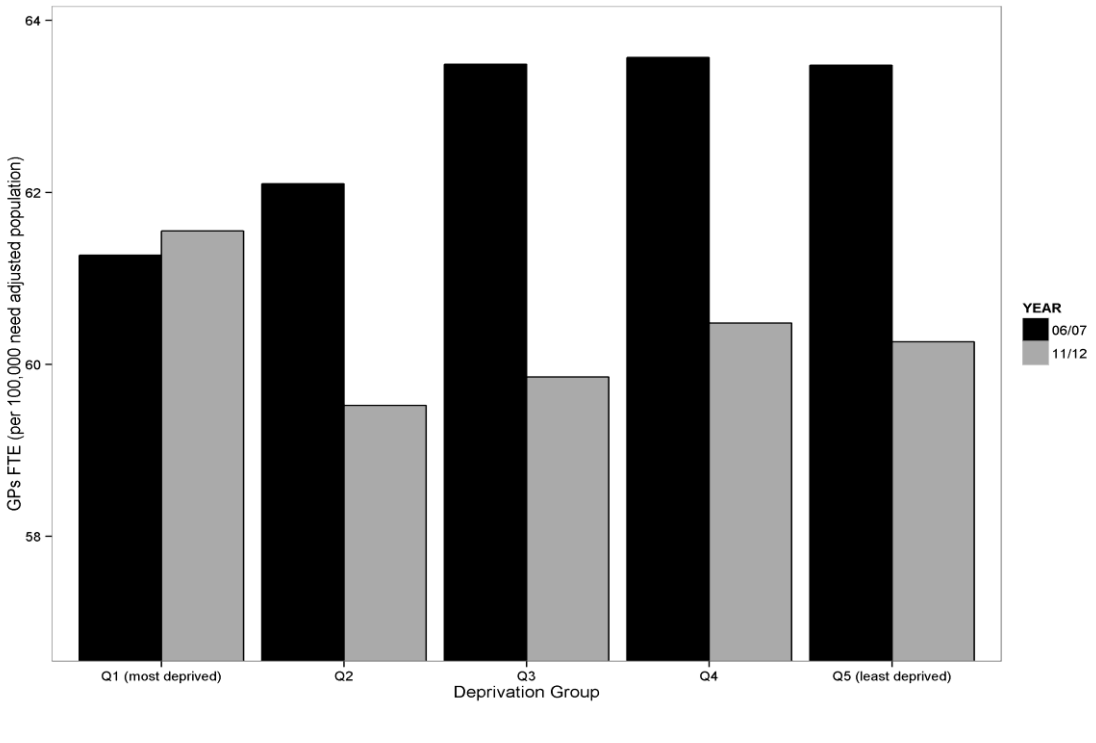


Figure A13.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

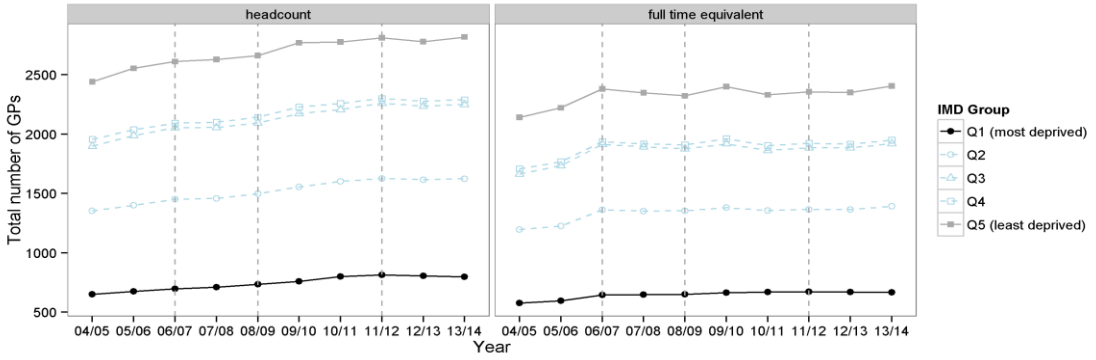
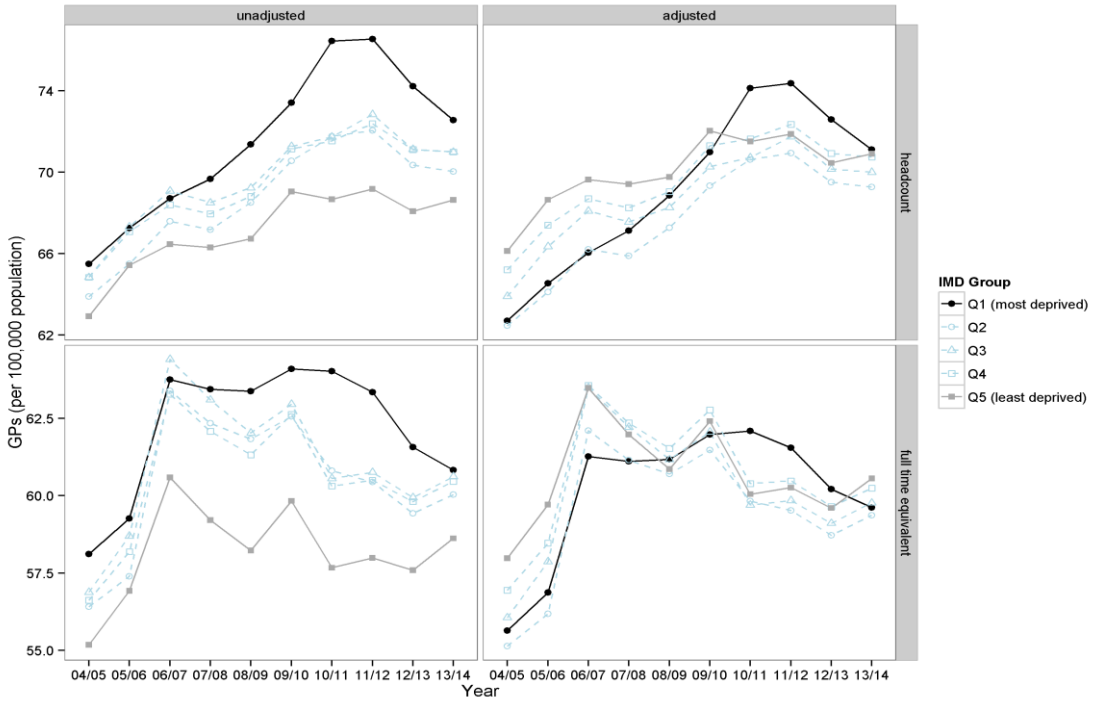


Figure A13.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A13.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.38576 -0.55121  0.08591  0.48395  1.16764

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)          61.0387     0.5336 114.399  < 2e-16 ***
YEAR2011             -0.2180     0.7546  -0.289  0.77636
IMD_DECILE            3.1170     0.8599   3.625  0.00228 **
YEAR2011:IMD_DECILE  -4.0000     1.2161  -3.289  0.00462 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7811 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.7568
F-statistic:  20.7 on 3 and 16 DF,  p-value: 9.354e-06
```

Appendix Section 14

Results calculated by attributing GP supply to **PCTs** and aggregating based on population weighted fifths of PCTs ranked by IMD score - **GP registrars and retainers excluded from the calculation**

Figure A14.1: Trend in FTE GP supply over time excluding registrars and retainers

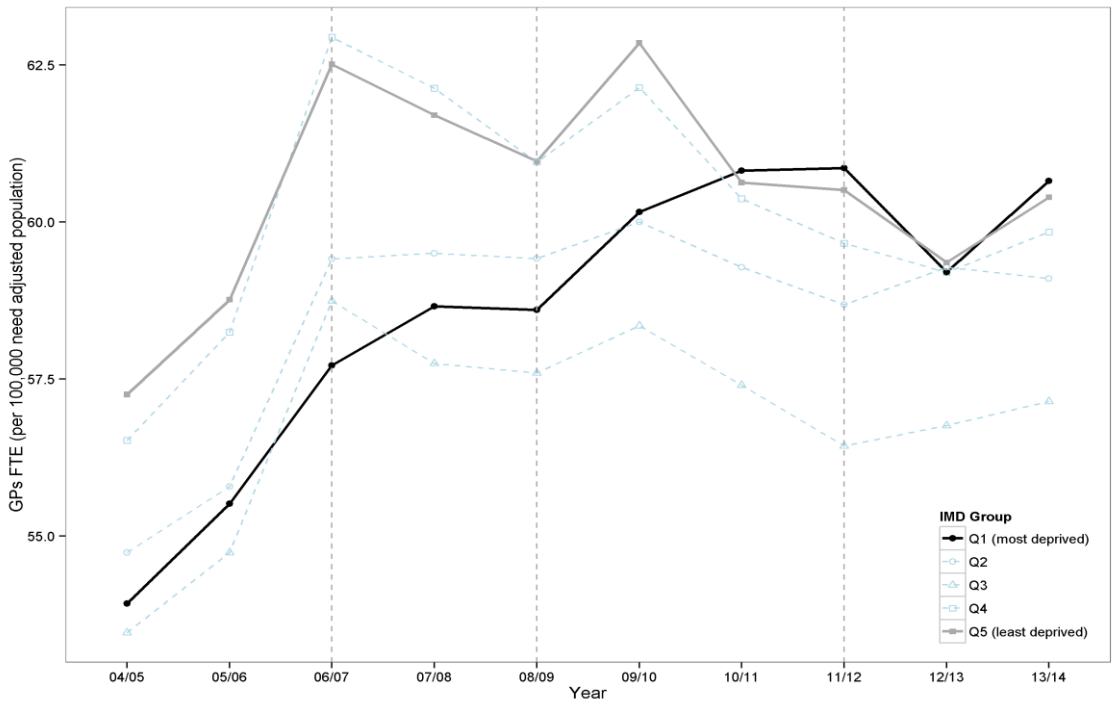


Figure A14.2: Trend in FTE nurse supply over time

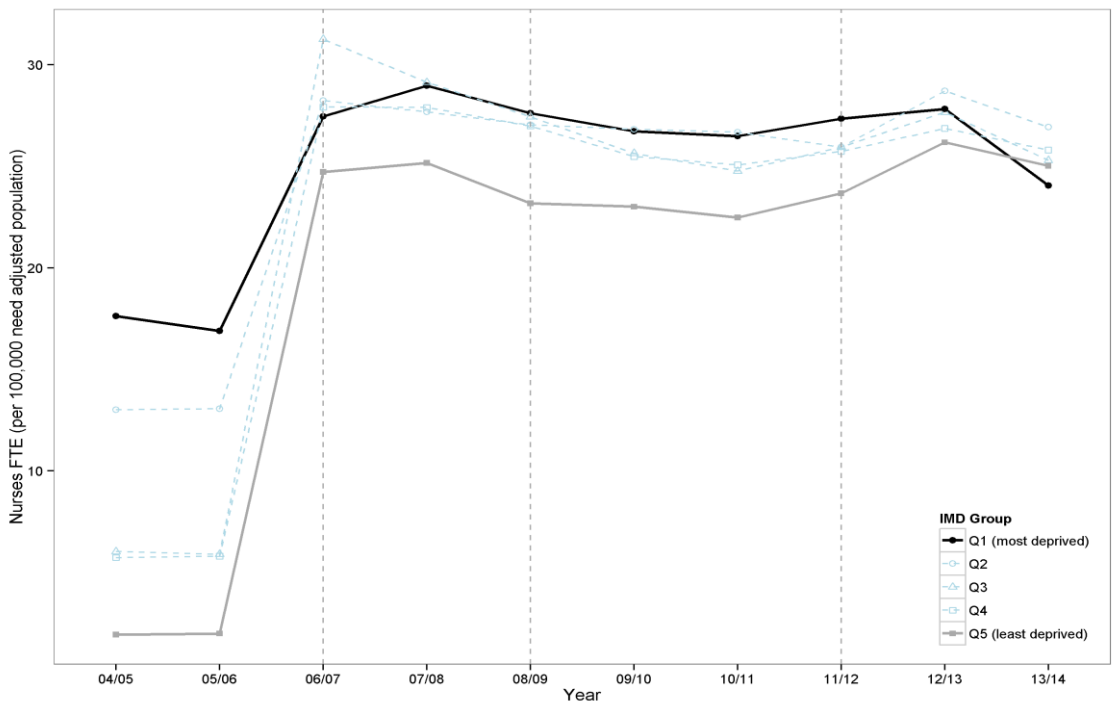
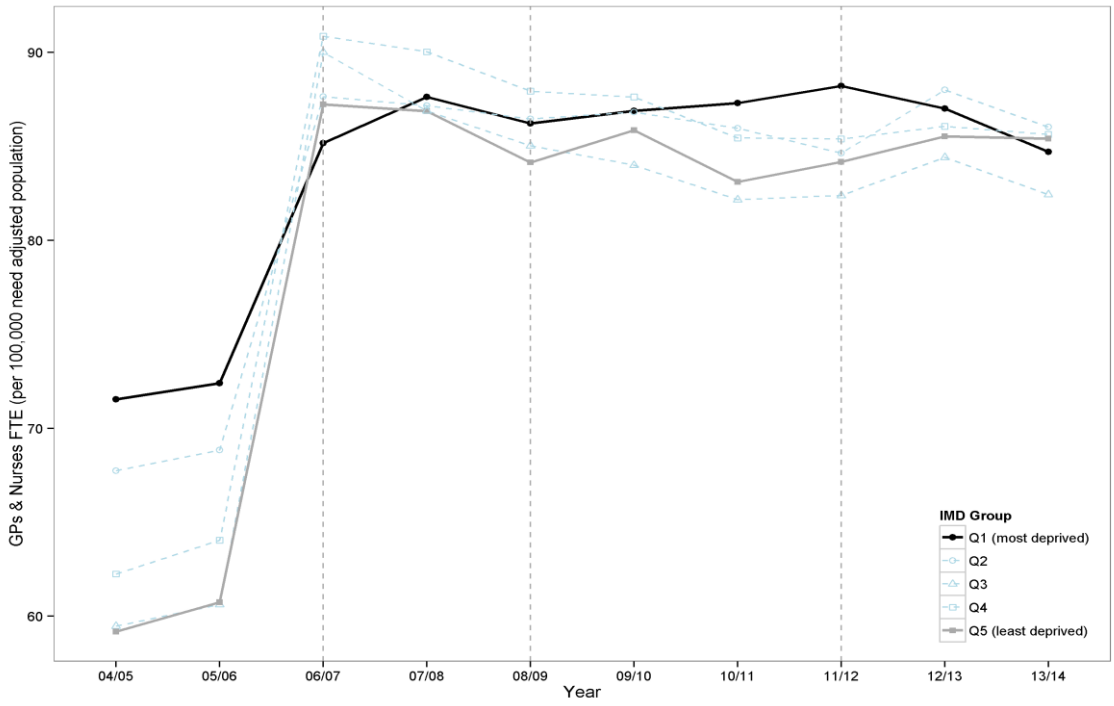


Figure A14.3: Combined trend in FTE GP and nurse supply over time



Appendix Section 15

Results calculated by attributing GP supply to **CCG**s and aggregating based on population weighted fifths of CCGs ranked by IMD score - **GP registrars and retainers excluded from the calculation**

Figure A15.1: Trend in FTE GP supply over time excluding registrars and retainers

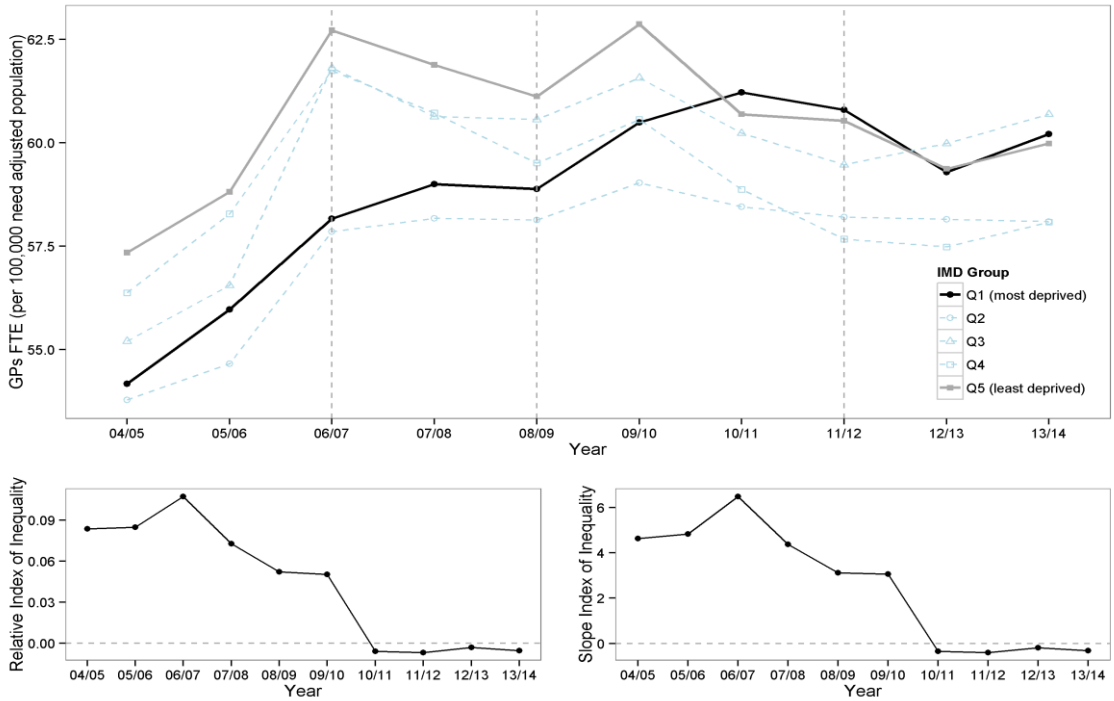


Figure A15.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

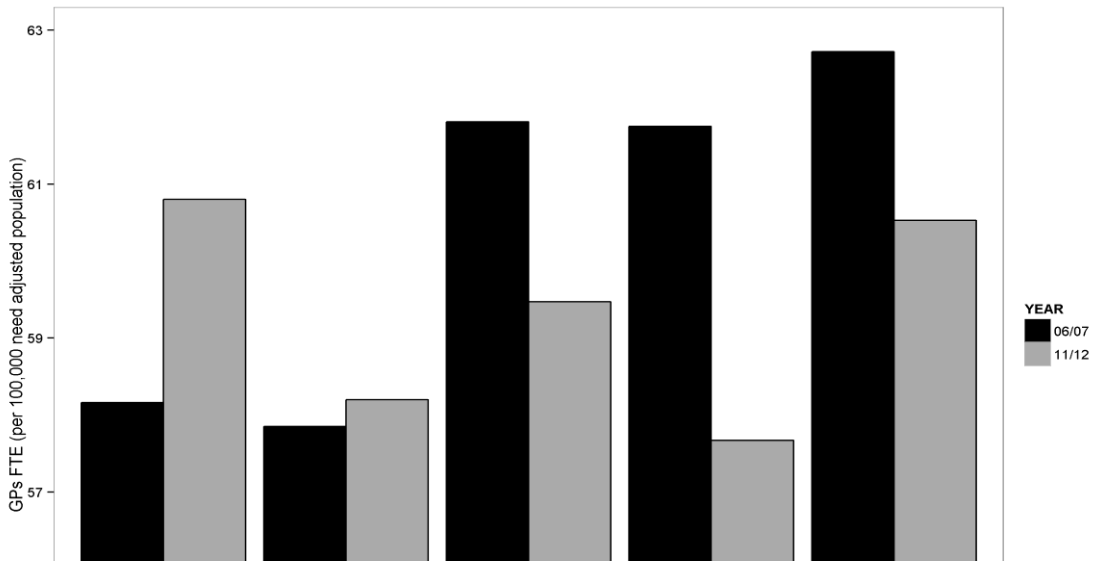


Figure A15.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

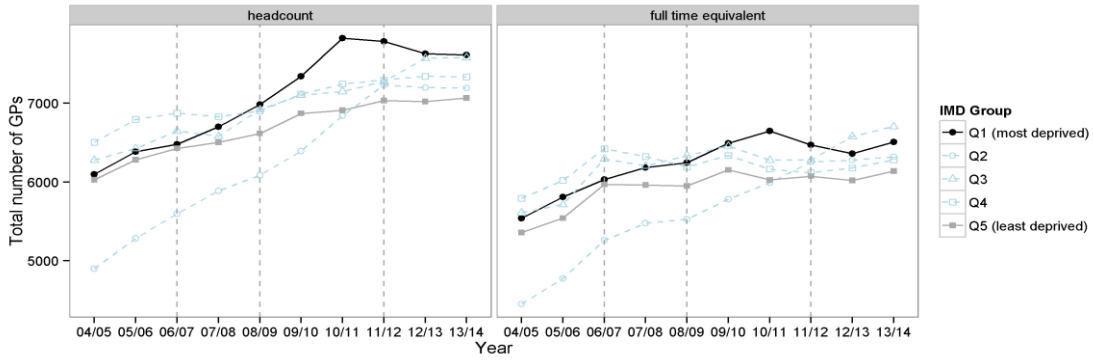
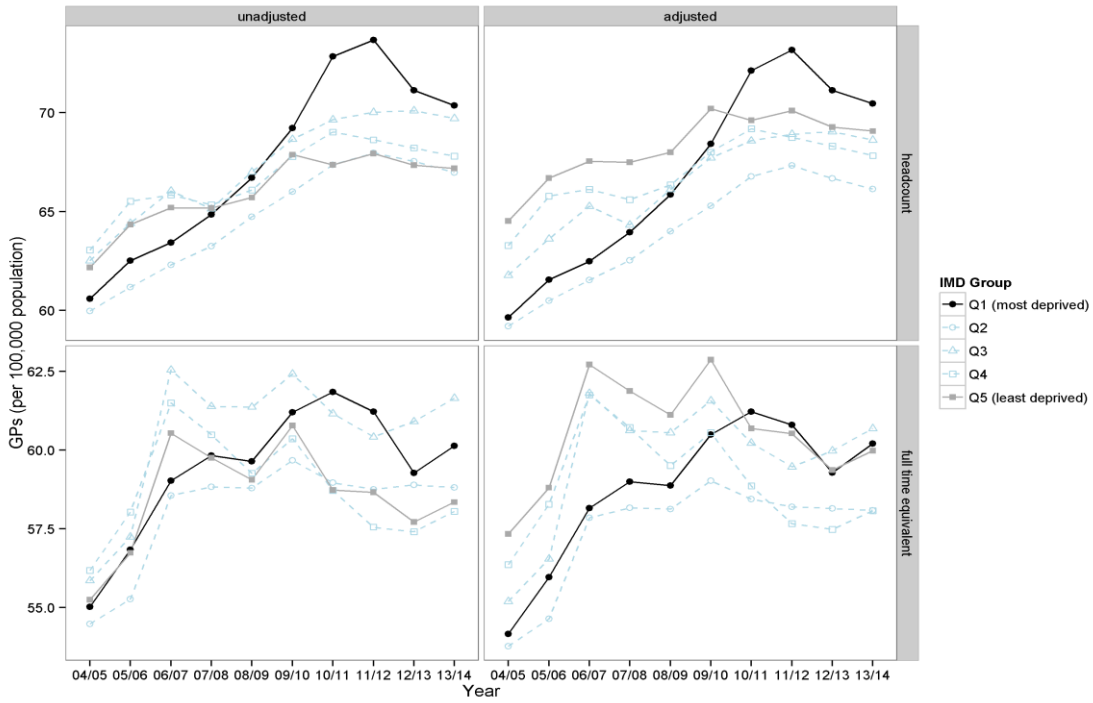


Figure A15.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A15.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-3.9218 -0.9508  0.3906  1.1253  2.2385

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          56.880      1.158  49.140  < 2e-16 ***
YEAR2011              2.683      1.637   1.639  0.12076
IMD_DECILE            6.487      1.865   3.478  0.00311 **
YEAR2011:IMD_DECILE  -6.888      2.638  -2.611  0.01891 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.694 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.3723
F-statistic: 4.757 on 3 and 16 DF,  p-value: 0.0148
```

Appendix Section 16

Results calculated looking at opening and closing GP practices and their impact on GP FTE numbersby IMD score - **GP registrars and retainers excluded from the calculation**

Figure A16.1: Trend in GP practices opening

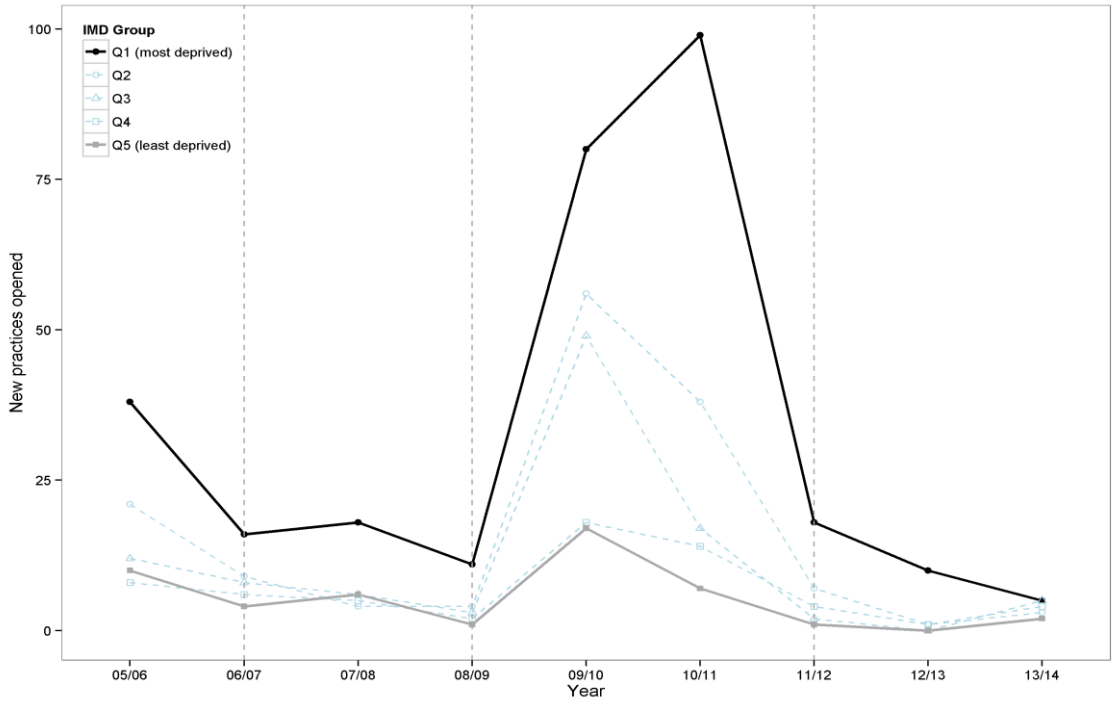


Figure A16.2: Trend in GP FTE due to GP practices opening

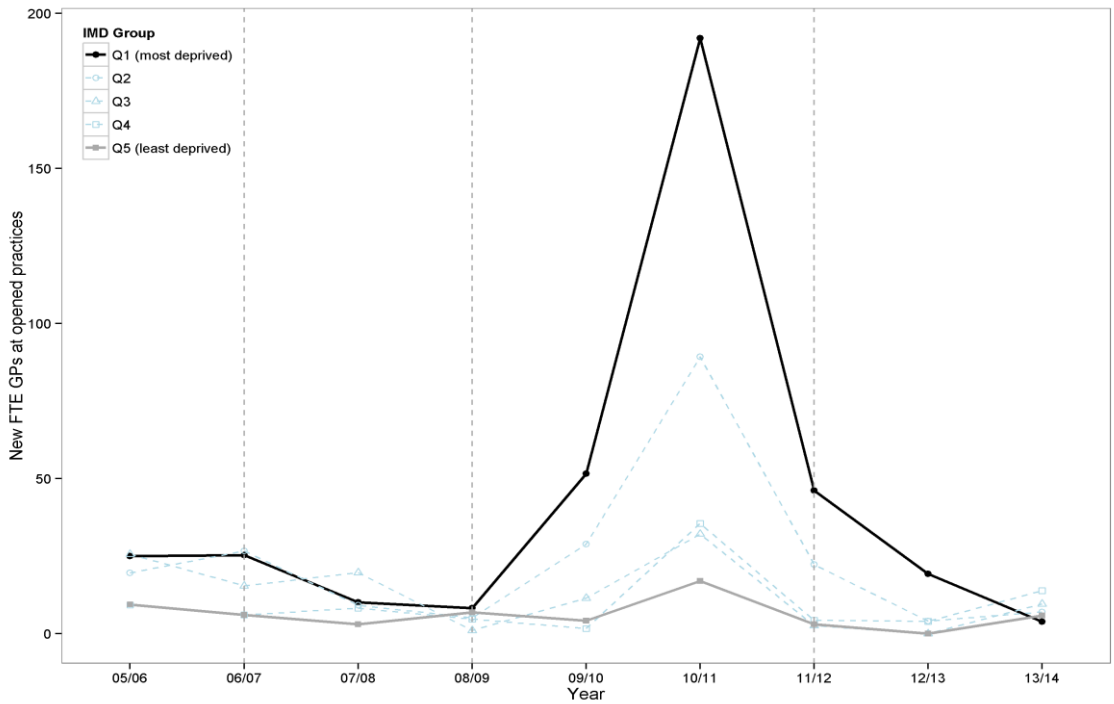


Figure A16.3: Trend in GP practices closing

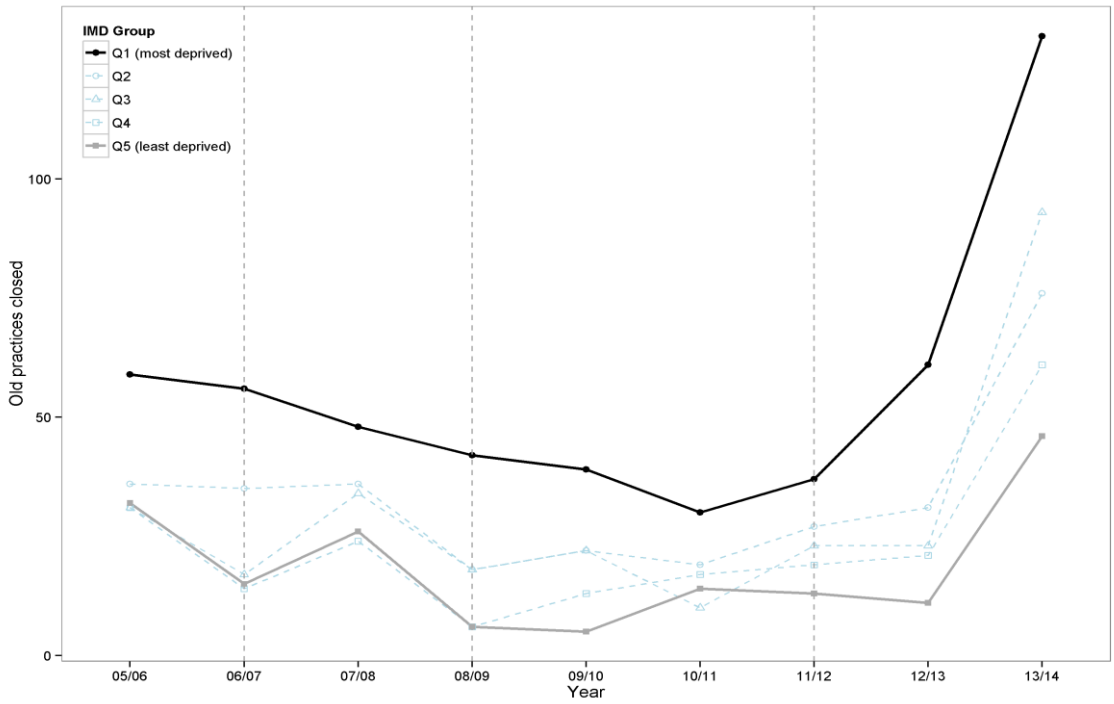


Figure A16.4: Trend in GP FTE due to GP practices closing

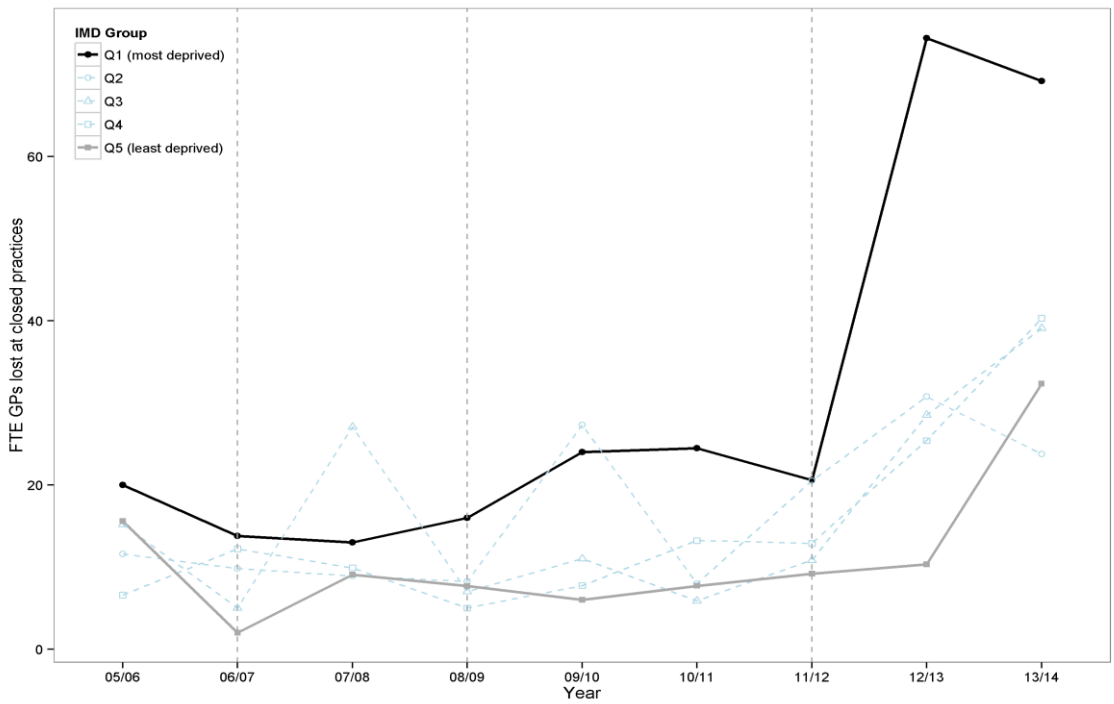


Figure A16.5: Trend in net change in GP practices

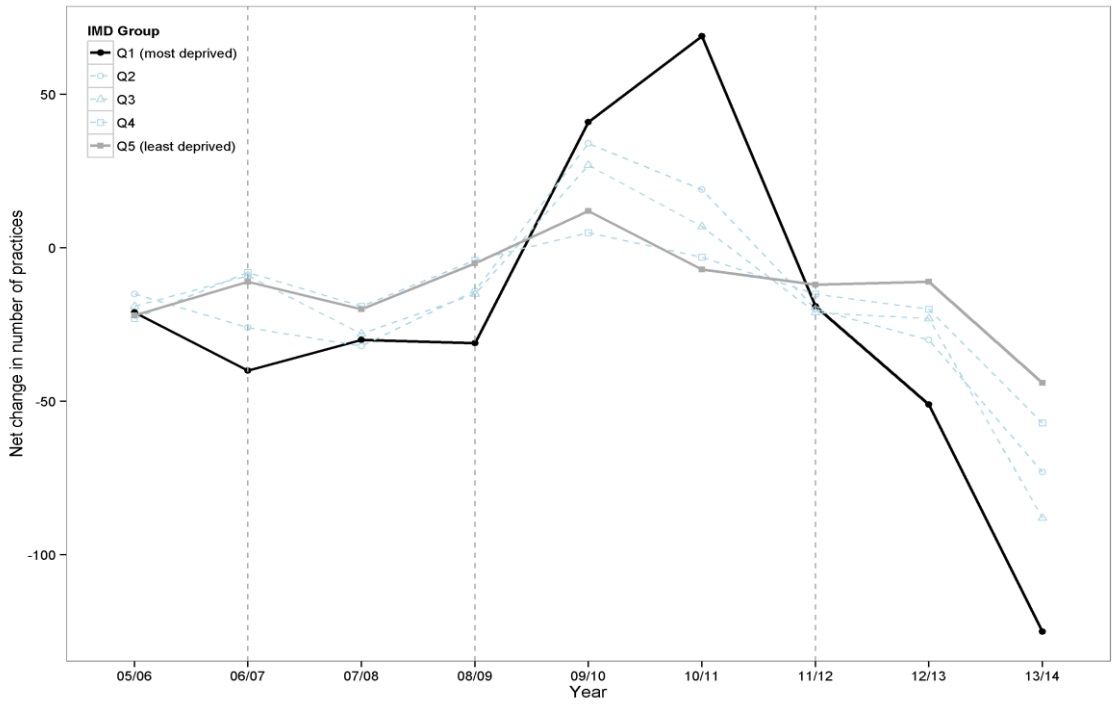
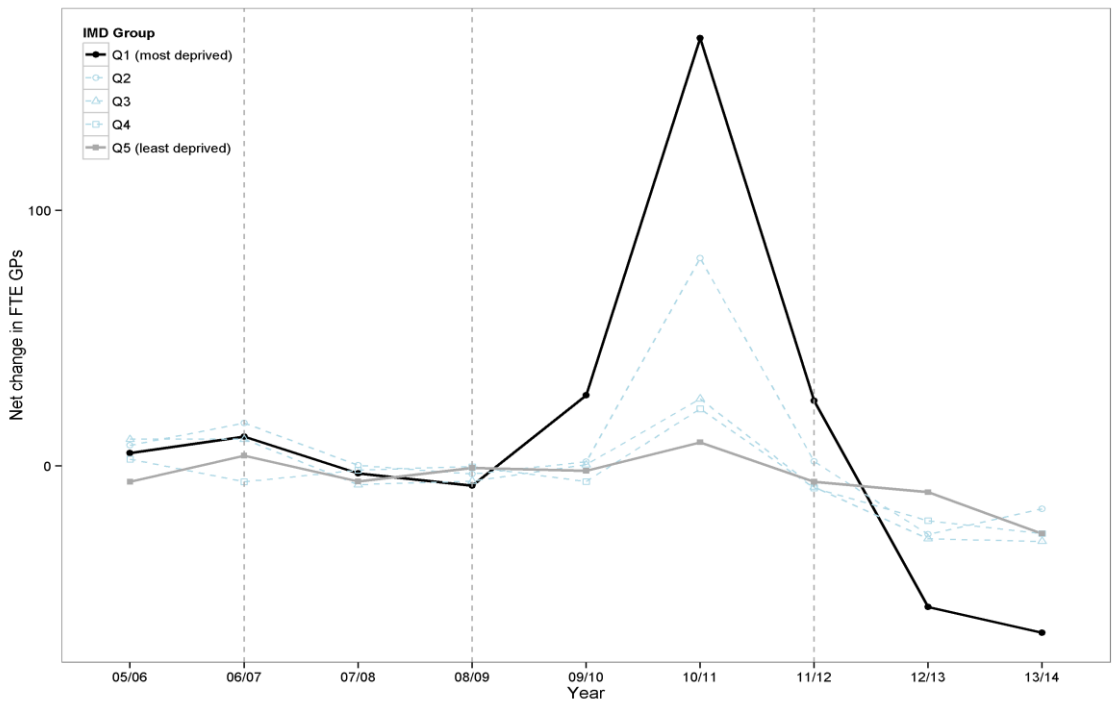


Figure A16.6: Trend in net change in GP FTE due to net change in practices



Appendix Section 17

Exploring the impact of need adjustment over time for the deprivation quintiles

Table A17.1: Carr-Hill Need Adjustment Workload Weights

Age-Sex weight		Registration status weight		IMD Health Domain score weight
Band	Weight	Band	Weight	Weight
Male 0-4 years	2.354	Registered with practice for 12 months+	1.000	The weight is calculated as:
Male 5-14 years	1.000			
Male 15-44 years	0.913			1.054 to the power of the IMD Health Domain score associated with the patient's postcode)
Male 45-64 years	1.373			
Male 65-74 years	2.531	Registered with practice in last 12 months	1.689	
Male 75-84 years	3.254			
Male 85+ years	3.193			
Female 0-4 years	2.241			
Female 5-14 years	1.030			
Female 15-44 years	1.885			
Female 45-64 years	2.115			
Female 65-74 years	2.820			
Female 75-84 years	3.301			
Female 85+ years	3.090			

Source: Review of the Generla Medical Services global sum formula (2007) - Table 1 - http://www.nhsemployers.org/~/media/Employers/Documents/Primary%20care%20contracts/GMS/GMS%20Finance/Global%20Sum/frg_report_final_cd_090207.pdf

We were unable to get data on duration of registration with practice so this part of the calculation is ommited from our results

The formula was applied at LSOA level populations and adjusted populations were re-normalised to sum to the pre-adjusted total

The IMD Health Domain score ranges from -3.10 to 3.79 corresponding to pre-normalisation deprivation adustment weights of 0.85 and 1.22.

The biggest increase in LSOA population due to adjustment over the period of analysis was 165% and the smallest increase was 8%
After normalisation these changes reduced to an increase of 50% and a decrease of 38% respectively

Figure A17.1: Trend in Carr-Hill Relative Need Index Over Time - LSOA level IMD Quintile Aggregation

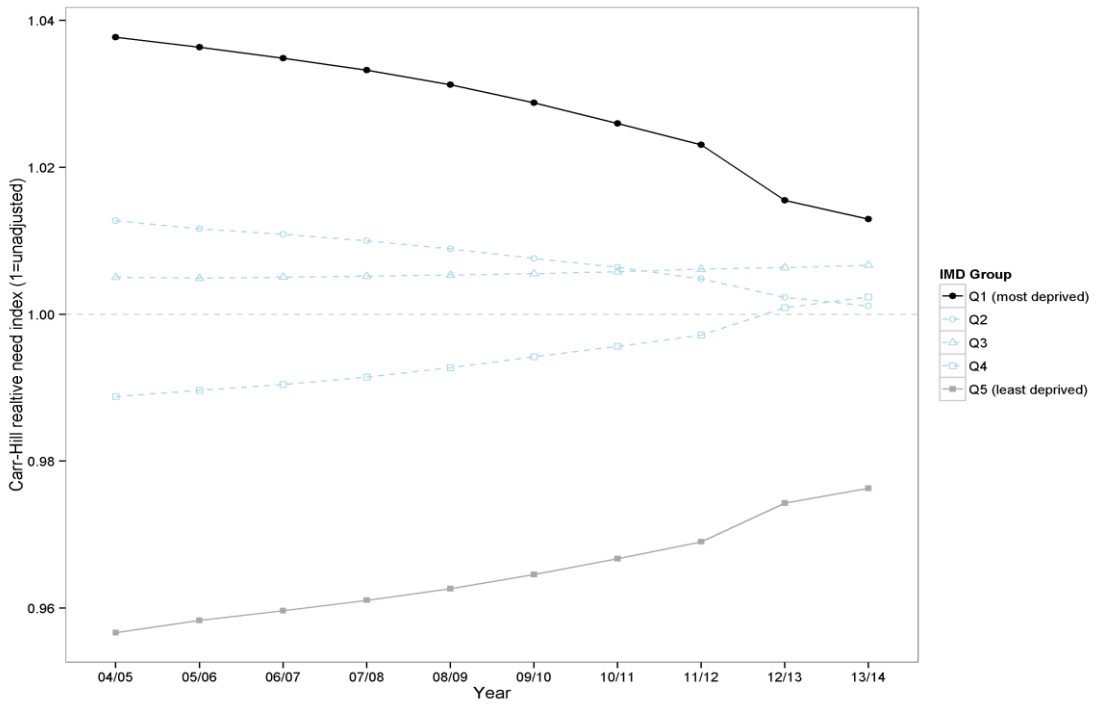
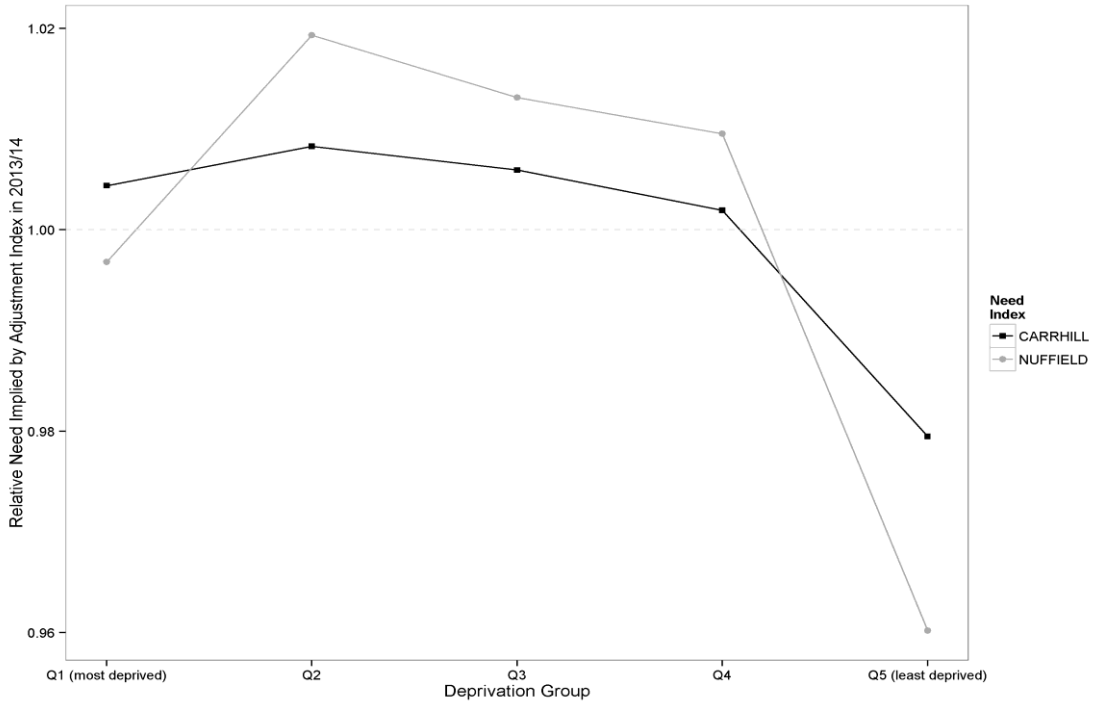
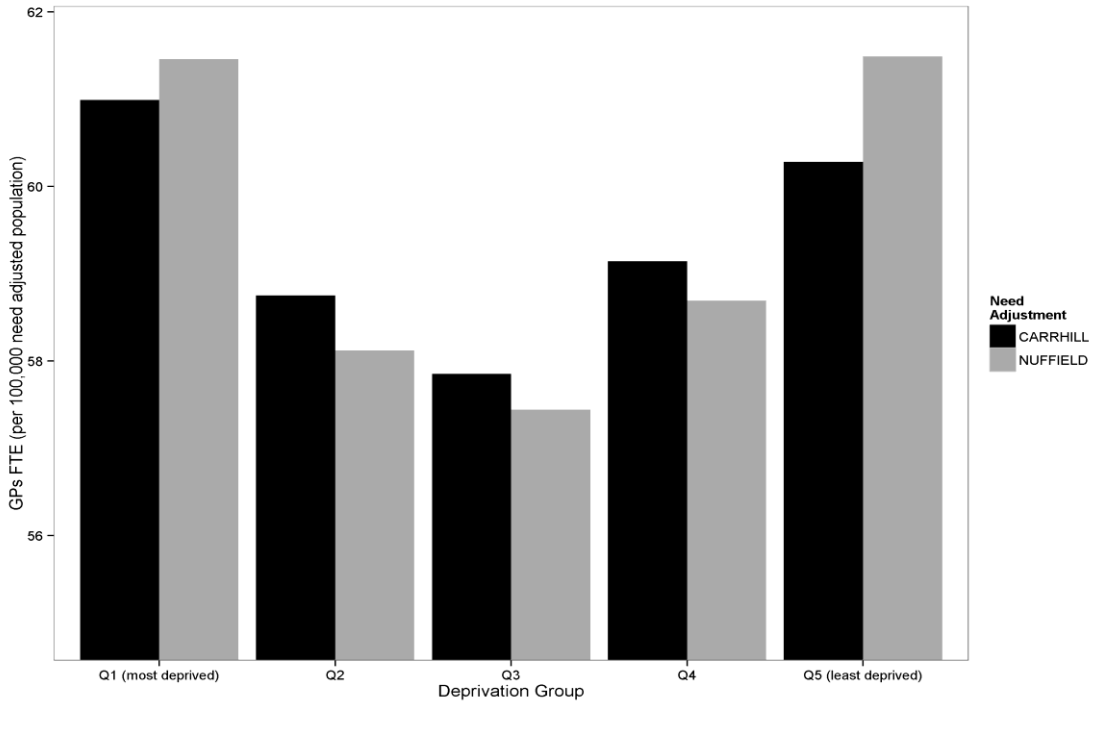


Figure A17.2: Comparing Carr-Hill and Nuffield PBRA Relative Need Index 2013/14 - Practice Level IMD Quintile Aggregation



Source: Nuffield Person Based Resource Allocation - Technical Guide to Clinical Commissioning Group and Area Team allocations 2014-15 and 2015-16: http://www.england.nhs.uk/2014/03/27/allocations-tech-guide/ speadsheet: http://www.england.nhs.uk/wp-content/uploads/2014/03/c-nph-gen-acute.xlsx

Figure A17.3: Impact of Carr-Hill and Nuffield PBRA Need Adjustment on GP FTE Excluding Registrars and Retianers 2013/14



STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract **[Within the title page 1 and design section of the abstract page 2]**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found **[within the results section of the abstract page 2]**
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported **[page 5]**
Objectives	3	State specific objectives, including any prespecified hypotheses **[page 5 and 6]**
Methods		
Study design	4	Present key elements of study design early in the paper **[methods page 6 and 7]**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection **[methods page 6]**
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up **[methods page 6]** *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls **[N/A]** *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants **[N/A]**
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed **[N/A]** *Case-control study*—For matched studies, give matching criteria and the number of controls per case **[N/A]**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable **[methods page 6 and 7]**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group **[methods page 6 and 7]**
Bias	9	Describe any efforts to address potential sources of bias **[methods page 6 and 7]**
Study size	10	Explain how the study size was arrived at **[methods page 6]**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why **[methods page 6 and 7]**
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding **[methods page 6 and 7]**

(*b*) Describe any methods used to examine subgroups and interactions

[N/A]

(*c*) Explain how missing data were addressed

[N/A]

(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed

[N/A]

Case-control study—If applicable, explain how matching of cases and controls was addressed

[N/A]

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

[N/A]

(*e*) Describe any sensitivity analyses

[methods page 7]

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed **[results table 1]**
		(b) Give reasons for non-participation at each stage **[N/A]**
		(c) Consider use of a flow diagram **[N/A]**
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest **[N/A]**
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount) **[N/A]**
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time **[results figures 1 and 2]**
		Case-control study—Report numbers in each exposure category, or summary measures of exposure **[N/A]**
		Cross-sectional study—Report numbers of outcome events or summary measures **[N/A]**
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included **[results page 8]**
		(*b*) Report category boundaries when continuous variables were categorized **[N/A]**
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period **[results figure 2]**
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses **[results page 9]**
Discussion		
Key results	18	Summarise key results with reference to study objectives **[discussion page 9]**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias **[discussion page 10]**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence **[discussion page 11 and 12]**
Generalisability	21	Discuss the generalisability (external validity) of the study results **[discussion page 12]**
Other information		

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based **[page 4]**

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Unequal socioeconomic distribution of the primary care workforce: whole-population small area longitudinal study

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Keywords:	PRIMARY CARE, Health economics < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Human resource management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health Workforce, Health Inequality

Unequal socioeconomic distribution of the primary care workforce: whole-population small area longitudinal study

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Abstract

Objective: To measure changes in socioeconomic inequality in the distribution of family physicians ("General Practitioners") relative to need in England from 2004/5 to 2013/14

Design: Whole-population small area longitudinal data linkage study

Setting: England from 2004/5 to 2013/14

Participants: 32,482 lower layer super output areas (neighbourhoods of 1,500 people on average)

Main outcome measures: Slope index of inequality (SII) between the most and least deprived small areas in annual full time equivalent General Practitioners (FTE GPs) per 100,000 need adjusted population .

Results: In 2004/5 inequality in primary care supply as measured by the SII in FTE GPs was 4.2 (95% CI: 3.1 to 5.3) GPs per 100,000. By 2013/14 this SII had fallen to -0.7 (95% CI: -2.5 to 1.1) GPs per 100,000. The number of FTE GPs per 100,000 serving the most deprived fifth of small areas increased over this period from 54.0 to 60.5, while increasing from 57.2 to 59.9 in the least deprived fifth so that by the end of the study period there were more GPs per 100,000 need adjusted population in the most deprived areas than in the least deprived. The increase in GP supply in the most deprived fifth of neighbourhoods was larger in areas that received targeted investment for establishing new practices under the "Equitable Access to Primary Medical Care".

Conclusions: There was a substantial reduction in socioeconomic inequality in family physician supply associated with national policy. This policy may not have completely eliminated socioeconomic inequality in family physician supply since existing need adjustment formulae do not fully capture the additional burden of multimorbidity in deprived neighbourhoods. The small area approach introduced in this study can be used routinely to monitor socioeconomic inequality of access to primary care and to indicate workforce shortages in particular neighbourhoods.

Strengths and limitations of this study

- Our study introduces a new small area level method for measuring inequality in GP supply that focuses specifically on socioeconomic inequality and captures inequality within NHS administrative areas as well as between them.
- The main limitation of this study is the lack of a generally accepted and up-to-date measure of relative need for primary care in deprived small areas. Currently, the best available measure is the workload adjustment recommended in the 2007 review of the Carr-Hill formula for allocating primary care funding. However, concerns have been raised that the Carr-Hill formula may not fully reflect the additional needs for primary care in deprived populations.

WHAT THIS PAPER ADDS

What is already known on this subject

- There is long-standing international policy concern about unequal distribution of the primary care workforce, which can harm population health and exacerbate health inequalities.
- Previous studies have found substantial inequalities in family physician supply between large sub-national areas, even in high income countries with universal health coverage
- In England, large area inequalities in family physician supply were largely impervious to policies designed to reduce them from 1974 to 2006

What this study adds

- From 2006/7 to 2011/12, there was a substantial reduction in small area socioeconomic inequality in family physician supply relative to need in England, associated with a targeted investment policy (the "Equitable Access to Primary Medical Care" programme).
- This study introduces a small area approach to monitoring inequality in the distribution of the primary care workforce, which can pinpoint socioeconomic inequality and workforce shortages more precisely than previous comparisons between large and socioeconomically diverse areas.

Competing interest declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare that MA, RC, RF and SA have nothing to declare.

Details of contributors: MA accessed, extracted and assembled the data, conducted the main data analysis, contributed to study design, and drafted and revised the paper. RC initiated the collaborative project, had the original idea for the study, supervised the data assembly and analysis, and drafted and revised the paper. MA and RC are joint guarantors. RF helped interpret the data from a primary care perspective, and drafted and revised the paper. SA contributed to study design and conducted some preliminary data analysis. All authors, external and internal, had full access to all of the data (including statistical reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. MA and RC affirm that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Funding declaration: This study is independent research supported by the National Institute for Health Research (HS&DR Project: 11/2004/39 - Developing indicators of change in NHS equity performance). The funding body did not play any role in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health.

Data sharing statement: No additional data available.

Statistical package: R version 3.1.2 was used to conduct the statistical analysis in the paper.

Acknowledgements: For helpful comments, we would like to thank our research project team and advisory group – in particular, Brian Ferguson, Maria Goddard, Peter Goldblatt, Mauro Laudicella, Rosalind Raine, Mark Dusheiko, Tim Doran, Anne Griffin, Iona Health, Jennie Popay and Peter Smith – and also Hugh Gravelle, Matthew Chisambi, Amanda Howe, Andrew Jackson and Robert Shaw. NHS Attribution Data Set data on GP-registered populations was obtained under license from the Department of Health, and GMS statistics data on GP supply was obtained under license from the Health and Social Care Information Centre.

1. Introduction

There is long-standing international policy concern about unequal socioeconomic distribution of the primary care workforce, which can harm population health and contribute to wider socioeconomic inequalities in health.[1-3] As the UK (United Kingdom) Chair of the Royal College of General Practitioners recently wrote, "… the general practice workforce is unevenly spread across the country, with the fewest doctors in the most deprived areas, exacerbating health inequalities".[4] This problem may grow in future, as substantial future primary care workforce shortages are projected over the next two decades in the UK, US (United States) and elsewhere.[4-6] Demand for primary care is increasing due to increasing numbers of people with multiple chronic conditions ("multimorbidity"), especially in deprived populations, [7-9] and attempts by policy makers to shift care from secondary to primary care settings.[10] Workload is also increasing due to the increasing complexity of care and associated administrative burdens.[11] In England, for example, the Royal College of General Practitioners estimates that 8,000 more full time equivalent primary care physicians ("General Practitioners") will be needed by 2020,[12] while worryingly recent trends indicate a fall in applications for medical training in primary care.[13]

Previous studies have found substantial geographical inequalities in family physician supply between large sub-national areas, even in high income countries with universal health coverage.[14-21] However, because these studies have focused on large areas they have not been able to accurately describe socioeconomic inequality in primary care supply by pinpointing primary care shortages in specific disadvantaged neighbourhoods. Studies in England using data from 1974 to 2006 have found substantial and persistent geographical inequality in GP supply relative to need between NHS administrative areas – Family Practitioner Committees until 1990, then Family Health Service Authorities until 2000, then Primary Care Trusts.[22-26] Historically, these inequalities have been largely impervious to NHS policy initiatives designed to reduce them, such as the deprivation-weighted capitation payments introduced in 1990. There is also evidence that some policies may have increased large area inequality, such as the abolition of entry controls in "over-doctored" areas in England in 2002.[22]

In the late 2000s following the 2006 White Paper "Our Health, Our Care, Our Say", a renewed effort was made to increase GP supply in deprived areas as part of wider attempts to meet government targets for reducing health inequality.[24 27-29] Most notably, the "Equitable Access to Primary Medical Care" programme that invested £250 million towards establishing new general practices and GP led heath centres as well as extending opening hours and expanding services in the 38 most "under-doctored" Primary Care Trust (PCT) areas[28]. This programme was announced by a Labour government in the 2006 White Paper, funded from 2008,[28] and wound down from 2011, a year or so after the new Coalition government came to power.[30] Our study aims to measure socioeconomic inequality in GP supply from 2004/5 to 2013/14, and to examine whether the Equitable Access to Medical Primary Care

programme was associated with any beneficial impact on reducing socioeconomic inequality. Our study introduces a new way of measuring inequality in GP supply, based on small area variations, which focuses specifically on socioeconomic inequality. Studies based on large area variations may mask important changing patterns of socioeconomic inequality within administrative areas. Our study examines variation between small area populations of approximately 1,500 people, allowing us to capture changing patterns of socioeconomic inequality in much more fine-grained detail than previous studies.

2. Data and Methods

We constructed whole-population national data sets at both small area level and practice level. Using the NHS Attribution Data Set of GP-registered populations, we linked practice level data on primary care supply for the ten years 2004/05 through 2013/14 with corresponding small area level data on population and deprivation. We use data from all 9,092 general practices in the English NHS that were open for at least one year of the study period. Our data on primary care supply were obtained from the annual National Health Service General and Personal Medical Services workforce census, taken at 30 September each year, midway through the financial year.

In line with previous research studies and official reports, the primary indicator of GP supply reported in this study is the full time equivalent (FTE) number of GP principals and salaried GPs, who make up the vast majority of the GP workforce.[4 22 23 27 31] We also conducted robustness checks using other GP supply variables, including (1) headcount of GP principals and salaried GPs, (2) GP registrars (trainee doctors on short term placements having "supernumerary" contracts, designed primarily for training rather than delivering patient care),[32] and (3) GP retainers (sessional GPs who only work a maximum of four sessions of approximately half a day each week, and only make up a small fraction of the workforce).[33 34] We also conducted robustness checks using the limited available data on practice nurse supply, available at practice level for 2013/14 but only at PCT level before that. Our data do not include locum GPs or supply of emergency primary care services outside normal office hours.

The small area unit of analysis was the 2001 lower super output area (LSOA) - a geographical unit defined by the 2001 census. There are 32,482 of these small areas in England each with a mean population of approximately 1,500 people. Data on the LSOA of residence of each practice registered patient for each year was used to attribute GP supply from practice level to LSOA level, using population weighted averages. LSOAs were ranked by deprivation according to their Index of Multiple Deprivation 2010 ranks, and split into deprivation quintile and decile groups with equal numbers of LSOAs in each group. ONS mid-year population estimates at LSOA level were used to derive the population of each deprivation group. We used ONS population estimates because GP practice list data is less thoroughly cleaned and validated and tends to over-estimate population size, for example due to people leaving the area without notifying their GP. LSOA populations were adjusted for their relative needs for primary care using the workload adjustment aspect of the most recently updated version of the Carr-Hill formula

for primary care resource allocation.[35] This version of the formula was recommended in 2007 by the Formula Review Group established by NHS Employers and the BMA, and though never implemented in practice it remains the most authoritative and up-to-date analysis of the determinants of primary care workload in England. This adjustment takes into consideration the age and sex structure and IMD health deprivation score of each LSOA to upscale populations that are expected to require more primary care and downscale populations expected to require less. We report both adjusted and unadjusted results, and also conduct robustness checks using an alternative need formula: the 2013/14 Nuffield index of general and acute hospital need.[36] As a further robustness check, the analysis was repeated at practice level by reverse attributing LSOA population and deprivation variables to GP practices and aggregating GP supply numbers by population weighted practices into five approximately equally sized deprivation based groups. To provide insight into the components of change in GP supply, we also produced descriptive statistics by deprivation group and year on the numbers of practices opening and closing, the average size of GP practices, and the average number of small areas served by each practice as an indication of whether increases in GP supply can be attributed to patients travelling further.

The primary measures of inequality were the slope index of inequality (SII) and relative index of inequality (RII), both based on linear regression analysis at the level of IMD decile group. This involves modelling GP supply as a linear function of deprivation decile, entered as a continuous variable scaled from 0 to 1. The SII is the coefficient in this regression; the RII is that coefficient divided by the mean GP supply. The SII can be interpreted as the modelled difference in the number of FTE GPs per 100,000 population between the most and least deprived small areas (the absolute gap); while the RII can be interpreted as this difference as a proportion of the national average (the proportionate gap). Regression models using pooled data for multiple years were used to test whether observed changes in inequality between years were statistically significant, based on interaction terms between year and deprivation.

To examine associations between change in GP supply inequality and the Equitable Access to Primary Medical Care programme, we identified the 38 Primary Care Trusts (PCTs) that were considered to be "under-doctored" and hence eligible to receive funding from this programme from a Department of Health press release on the policy.[37] We then compared changes in GP supply by deprivation group of LSOAs within these "under-doctored" PCTs (which cover a population of approximately 10 million people) with changes in GP supply in deprivation groups of LSOAs within the remaining PCTs (which cover a population of approximately 43 million people), focusing on change between the year the policy was announced, in 2006, and the year the policy was wound down, in 2011.

Results

Total numbers of GPs in England by year are reported in Table 1, in terms of both headcount and full time equivalent (FTE), along with total population figures. Although the total headcount of GPs continued to increase throughout the period, FTE numbers have been approximately flat since 2009/10

while the patient population has continued to grow. In England as a whole, GP supply increased from 55.1 to 60.2 FTE GPs per 100,000 population from 2004/5 to 2006/7, but remained approximately stable thereafter, rising to 60.7 in 2009/10 then falling to 59.4 by 2013/14. Crude trends in total numbers of FTE GPs split by small area level deprivation are shown in Figure 1 (these are not adjusted for population change). Total numbers of FTE GPs have grown much faster in the most deprived fifth of English small areas than elsewhere, with GP supply in the most affluent fifth growing at the slowest pace over the last ten years. This pattern is also reflected in the raw headcount of GPs (see web appendix figure A4.3).

[Table 1 and Figure 1 approximately here]

Figure 2 shows these trends adjusted for population size and need. In England as a whole, GP supply increased relative to population need from 2004/5 to 2006/7 but remained approximately stable thereafter. The geographical distribution of this GP supply in relation to the deprivation of the areas served by GPs however, changed substantially over the study period. In 2004/5 there was "pro-rich" inequality in GP supply relative to need, with 54.0 FTE GPs per 100,000 of need adjusted population in the most deprived fifth of small areas and 57.2 FTE GPs per 100,000 of need adjusted population in the least deprived fifth of areas resulting in an SII of 4.2 (95% CI 3.1 to 5.3). By the end of the study period this inequality had reversed with 60.5 and 59.9 FTE GPs per 100,000 need adjusted population in the most deprived and least deprived fifths of small areas respectively and an SII of -0.7 (95% CI: -2.5 to 1.1).

This decrease in socioeconomic inequality in GP supply relative to need occurred between 2006/7 and 2011/12 a period over which the SII fell from 5.2 (95% CI 4.7 to 5.8) to -2.1 (95% CI -4.4 to 0.2). During this five year period, people living in the most deprived fifth of English small areas experienced a steady increase in GP supply relative to need, which was particularly rapid from 2008/9 to 2010/11, while people living in the least deprived three fifths experienced a decline. By 2010/11, the "pro-rich" inequality in GP supply relative to need appeared to have disappeared. Nationally, the increase in GP supply relative to need in deprived small areas from 2006/7 to 2011/12 was offset by a corresponding reduction in other areas – resulting in a slight overall decline in national GP supply relative to need from 60.2 to 59.2 FTE GPs per 100,000. These inequality trends were driven largely by change in the most and least deprived quintile groups: GP supply in the middle three quintile groups changed little, and remained lower than in the most affluent quintile group.

By 2013/14, the trend in GP supply per need weighted population appeared to have reversed with GP supply in the most affluent areas growing faster than in the most deprived areas.

[Figure 2 approximately here]

Cross-sectional results for 2006/7 and 2011/12, before and after the EAPMC programme, are presented in Figure 3. This highlights the reversal of the gradient in GP supply from favouring the least deprived areas in 2006/7 to favouring the most deprived areas in 2011/12.

[Figure 3 approximately here]

Figure 4 shows changes in GP supply between these years, comparing LSOAs in "under-doctored" PCTs that received funding under the EAMPC programme with those in the other PCTs that did not receive this funding. PCTs classified as "under-doctored" experienced larger increases in GP supply than PCTs not classified as "under-doctored". Furthermore, these larger increases were concentrated in the poorest fifth of LSOAs in England.

[Figure 4 approximately here]

The reduction in the SII between 2006/7 and 2011/12 when measured at LSOA level (average population 1,500) was 7.3 (95% CI: 4.9 to 9.7). The same reduction in SII when measured at the much larger CCG level (average population 250,000) was 6.9 (95% CI: 1.7 to 12.1). The greater value of the change in SII found when using the finer grained geography demonstrates that by conducting our analysis at the small area level we are able to identify both changes in within CCG inequality as well as changes in between CCG inequality, the first of which would have been overlooked had the analysis been conducted at the larger unit of analysis.

Our main finding of a reduction in socioeconomic inequality in GP supply from 2006/7 to 2011/12 was robust to extensive sensitivity analyses using different definitions of primary care supply (headcount and FTE, with and without adjustment for population size (see appendix figure A4.3) and need (see appendix figure A4.4), with and without GP registrars and retainers (see appendix figures A4.1 and A5.1), with and without practice nurses at PCT level (see appendix figures A14.1 and A14.3), different units of analysis small area (see appendix figure A4.1), practice (see appendix figure A8.1), PCT (see appendix figure A14.1) and CCG (see appendix figure A15.1) and different measures of inequality (absolute and relative). This finding was also robust to using a different need adjustment formula: the Nuffield general and acute hospital need index for 2013/14 (see appendix figure A17.3).[36]

The greater increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. In 2009/10, 2010/11 and 2011/12 there were substantial net increases in GP supply in deprived areas of around 28, 167 and 26 FTE GPs respectively resulting from the opening and closing of practices – (see appendix table 1.7). However, this was followed by substantial net falls in both subsequent years of around 55 and 65 FTE GPs respectively, as more practices closed than opened. Meanwhile, average practice size grew at similar rates in all deprivation groups (see appendix figure 8.6). There does not appear to be any

evidence of patients living in deprived areas travelling further to increase their access to GPs, on the contrary average numbers of LSOAs per practice remained stable throughout the ten year period of the study (see appendix figure 8.5). Full details of these results as well as further breakdowns of the results presented in the paper can be found in the accompanying web appendix.

3. Discussion

Statement of principal findings

We found a substantial reduction in socioeconomic inequality in GP supply in England from 2006/7 to 2011/12. This can partly be attributed to national policy in the form of the Equitable Access to Primary Medical Care programme, which provided additional funding for new GP practices in "under-doctored" areas of the country. The greater increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. Socioeconomic inequality in GP supply subsequently increased slightly in 2012/13 and 2013/14, as the NHS funding situation tightened and practices started closing more rapidly in deprived areas.

Strengths and weaknesses of the study

Our study introduces a new small area level method for measuring inequality in GP supply that focuses specifically on socioeconomic inequality and captures inequality within NHS administrative areas as well as between them. Previous large area level methods can only tell policymakers which Clinical Commissioning Groups (CCGs) are the most "under-doctored". As well as this, our new method also allows policymakers to take a close-up look at the situation within CCGs and identify which individual neighbourhoods and GP practices are the most deprived and under-doctored. This ability could potentially be used to re-direct funding for new practices and new GPs more accurately towards the neighbourhoods that need them most.

The main limitation of this study is the lack of a generally accepted and up-to-date measure of relative need for primary care in deprived small areas. Currently, the best available measure is the workload adjustment recommended in the 2007 review of the Carr-Hill formula for allocating primary care funding.[35] This adjustment is based on regression analysis of the determinants of consultation rates in a sample of 454 practices serving 3.8m patients from April 2003 to April 2004.[38] However, concerns have been raised that the Carr-Hill formula may not fully reflect the additional needs for primary care in deprived populations.[39] In our implementation of this formula, the average individual living in the most deprived fifth of English small areas was estimated to have 3.8% more need than the average individual living in the least deprived fifth in 2013/14 (see web appendix table A2.7). This implied additional needs weight for deprived areas may be an under-estimate, for three reasons. First, due to data constraints we were unable to implement one element of the recommended adjustment: temporary

resident status in each age-sex category. Second, the health deprivation domain of the IMD 2010 does not fully capture the burden of multimorbidity, which tends to be greater in deprived populations.[9] Third, the adjustment is based on workload patterns in the early 2000s. If there were substantial unmet needs for primary care in deprived populations in the early 2000s, the adjustment may under-estimate the appropriate level of workload in those populations. This limitation means that we cannot draw firm conclusions about levels of need, and in particular we cannot conclude that socioeconomic inequality in GP supply has now been eliminated. However, we can still conclude that there was a reduction in socioeconomic inequality in GP supply relative to need from 2006/7 to 2011/12. To challenge that conclusion, one would have to hypothesise an offsetting increase in relative need for primary care in the most deprived fifth of small areas relative to other areas. This is implausible, for two reasons. First, according to the Carr-Hill formula, relative need for primary care in the most deprived fifth of small areas actually decreased relative to need in the most affluent fifth over the ten year period of the study, due to gradual changes in age-sex composition between deprivation groups (see web appendix figure 17.1). Furthermore, it is not plausible that there was a sudden and substantial increase in relative needs in the most deprived fifth of areas between 2006/7 to 2011/12 relative to the second most deprived fifth of areas. A second limitation is that the official statistics on GP supply do not include data on the supply of locums.[40 41] However, growth in the use of GP locums in areas struggling to recruit is unlikely to explain our findings since historically recruitment appears to be more difficult in deprived areas.[42 43]

Comparison with previous studies

Two previous studies have examined changing patterns of inequality in GP supply relative to need in England using national data. Gravelle and Sutton examined overall inequality in GP supply between Family Practitioner Committee areas from 1974 to 1990 and between Family Health Service Authority areas from 1990 to 1995.[22] They found substantial and persistent overall inequality, with strong within-area correlation between 1975 and 1995 – most of the administrative areas that were "under-doctored" in 1974 were still "under-doctored" in 1995. Goddard and colleagues extended this time series by adding the years 1996 to 2006, during which period Primary Care Trust areas were introduced.[23] They found that overall variation between administrative areas increased between 1995 and 2006. Both studies concluded that NHS policy had little impact on overall inequality in GP supply, though the second concluded that the abolition of entry controls on "over-doctored" administrative areas in 2002 may have increased overall inequality. Our finding of a reduction in GP supply inequality associated with NHS policy in the late 2000s may seem surprising in the light of these previous findings that inequality in GP supply has not changed much since the 1970s. However, these previous studies are not directly comparable to ours since they examined overall inequality in GP supply between large administrative areas, rather than socioeconomic inequality between small areas. Furthermore, they examined earlier time periods subject to different policy initiatives. For example, the deprivation-weighted capitation payment system introduced in 1990 resulted in complex marginal incentive structures that may have

merely shifted GPs from one deprived area to another.[22] By contrast, the EAPMC programme was specifically targeted at opening new GP practices in deprived areas, involved substantial financial expenditure, and was implemented at a time of vigorous centralised NHS target setting and performance monitoring. Viewed in that light, it is less surprising that this programme succeeded in helping to increase GP supply in deprived areas. Equally, it is perhaps not surprising that socioeconomic inequality started to rise again after the programme was wound down in 2011/12, as money ran out and practices started to close.

Meaning of the study: possible explanations and implications for clinicians and policymakers

The reduction in socioeconomic inequality in GP supply was associated with national policy to recruit more GPs in deprived areas of England, as announced in the 2006 White Paper and followed by the Equitable Access to Primary Medical Care (EAPMC) programme from 2008 to 2011. GP supply relative to need increased from 2006/7 to 2011/12 in the group of 38 Primary Care Trusts that received funding from the EAPMC programme, especially in the most deprived fifth of small areas within those PCTs, while decreasing in other PCTs. The increase in GP supply in deprived small areas appears primarily to have been driven by the opening of new practices, rather than recruitment into existing practices. While inequality has increased again since the end of the EAPMC funding it has not yet reached the levels observed in the early 2000s. However, the ongoing NHS funding squeeze and difficulties in GP recruitment and retention particularly in deprived areas suggest that there is a risk of inequality in GP supply continuing to rise in future years. For example, vacancies in GP training posts are especially high in the North of England, where 29% of training posts were unfilled in August 2014.[44] Retention of GPs is also a significant problem, with one study suggesting that nearly a third of GPs intend to leave direct patient care within five years.[31]

Unanswered questions and future research

It is not known how much more need for primary care there is in deprived areas relative to affluent areas. Our estimates of this are based on the best available measure of need for primary care: the workload adjustment from the 2007 revision of the Carr-Hill formula for allocating primary care resources. Our figures show that in 2013/14, the most recent year available, the most deprived fifth of areas received slightly more GP supply relative to need than other areas. However, we cannot conclude from this that "pro-rich" inequality in GP supply has disappeared since, as explained above, there are good reasons for thinking that the Carr-Hill formula may under-estimate need in deprived areas.[39]

References

1. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. The Milbank quarterly 2005;**83**(3):457-502 doi: 10.1111/j.1468-0009.2005.00409.x[published Online First: Epub Date]|.
2. Newhouse J, Williams A, Bennett B, et al. Does the geographical distribution of physicians reflect market failure? Bell J Econ 1982;**13**(2):493 - 505
3. Marmot M, Friel S, Bell R, et al. Closing the gap in a generation: health equity through action on the social determinants of health. Lancet 2008;**372**(9650):1661 - 69
4. Baker M, Ware J, Morgan K. Time to put patients first by investing in general practice. Br J Gen Pract 2014;**64**(623):268-9 doi: 10.3399/bjgp14X679921[published Online First: Epub Date]|.
5. Iacobucci G. *Increase general practice funding or risk "death of the family doctor," GP leader warns*, 2015.
6. Bodenheimer TS, Smith MD. Primary Care: Proposed Solutions To The Physician Shortage Without Training More Physicians. Health Affairs 2013;**32**(11):1881-86 doi: 10.1377/hlthaff.2013.0234[published Online First: Epub Date]|.
7. Barnett K, Mercer SW, Norbury M, et al. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. Lancet 2012;**380**(9836):37-43 doi: 10.1016/S0140-6736(12)60240-2[published Online First: Epub Date]|.
8. Department of Health. Long Term Conditions Compendium of Information. 2012. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216528/dh_134486.pdf (accessed 05 11 14).
9. Charlton J, Rudisill C, Bhattarai N, et al. Impact of deprivation on occurrence, outcomes and health care costs of people with multiple morbidity. Journal of health services research & policy 2013;**18**(4):215-23 doi: 10.1177/1355819613493772[published Online First: Epub Date]|.
10. Baker M. Strategic Review of Health Inequalities in England Post 2010 (Marmot Review). 2009. http://www.rcgp.org.uk/Policy/RCGP-policy-areas/~/media/Files/Policy/A-Z-policy/RCGP-Marmot-Review-Paper-September-2008.ashx (accessed 03 11 14).
11. Department of Health. Equity and excellence: Liberating the NHS. In: Department of Health, ed.: The Stationary Office, 2010.
12. Royal College of General Practitioners. Over 500 surgeries at risk of closure as GP workforce crisis deepens. 2014. http://www.rcgp.org.uk/news/2014/october/over-500-surgeries-at-risk-of-closure-as-gp-workforce-crisis-deepens.aspx (accessed 06 11 14).
13. Kaffash J. Revealed: 15% drop in GP training applications set to exacerbate recruitment crisis. PULSE 2014. http://www.pulsetoday.co.uk/your-practice/practice-topics/education/revealed-15-drop-in-gp-training-applications-set-to-exacerbate-recruitment-crisis/20005739.article#.VIXTUdJybcs (accessed 05/02/2014).
14. Yardim M, Uner S. Geographical Disparities in the Distribution of Physicians in Turkey. TAF Prev Med Bull 2013;**12**(5):487 - 94
15. Matsumoto M, Inoue K, Farmer J, et al. Geographic distribution of primary care physicians in Japan and Britain. Health Place 2010;**16**:164 - 66
16. Petterson SM, Phillips Jr RL, Bazemore AW, et al. Unequal distribution of the US primary care workforce. American family physician 2013;**87**(11):Online-Online
17. Hann M, Gravelle H. The maldistribution of general practitioners in England and Wales: 1974-2003. Br Gen Pract 2004;**54**:894 - 98
18. Isabel C, Paula V. Geographic distribution of physicians in Portugal. Eur J Health Econ 2010;**11**(4):383 - 93

19. Fulop G, Kopetsch T, Hofstatter G, et al. Regional distribution effects of 'needs planning' for office-based physicians in Germany and Austria-methods and empirical findings. J Public Health 2008;**16**:447 - 55
20. Brown M. Using Gini-style indices to evaluate the spatial patterns of health practitioners: Theoretical considerations and an application based on Alberta data. Soc Sci Med 1994;**38**(9):1243 - 56
21. Stapleton G, Schröder-Bäck P, Brand H, et al. Health inequalities and regional specific scarcity in primary care physicians: ethical issues and criteria. International Journal of Public Health 2014;**59**(3):449-55 doi: 10.1007/s00038-013-0497-7[published Online First: Epub Date]|.
22. Gravelle H, Sutton M. Inequality in the geographical distribution of general practitioners in England and Wales 1974-1995. Journal of health services research & policy 2001;**6**(1):6-13
23. Goddard M, Gravelle H, Hole A, et al. Where did all the GPs go? Increasing supply and geographical equity in England and Scotland. Journal of health services research & policy 2010;**15**(1):28-35 doi: 10.1258/jhsrp.2009.009003[published Online First: Epub Date]|.
24. Centre for Workforce Intelligence. GP in-depth review; Preliminary Findings. 2013. http://www.cfwi.org.uk/publications/gp-in-depth-review-preliminary-findings/@@publication-detail (accessed 05 11 14).
25. Sibbald B. Putting general practitioners where they are needed: an overview of strategies to correct maldistribution. Secondary Putting general practitioners where they are needed: an overview of strategies to correct maldistribution 2005. http://www.population-health.manchester.ac.uk/primarycare/npcrdc-archive/archive/PublicationDetail.cfm/ID/139.htm.
26. Hutt P, Gilmour S. Tackling inequalities in general practice. 2010 07/09/2010. http://www.kingsfund.org.uk/sites/files/kf/field/field_document/health-inequalities-general-practice-gp-inquiry-research-paper-mar11.pdf (accessed 05/03/2015).
27. Department of Health. Our Health, Our Care, Our Say. 2006. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/272238/6737.pdf (accessed 06 11 14).
28. Department of Health. Equitable Access to Primary Medical Care services. 2007. http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Aboutus/Procurementandproposals/Procurement/ProcurementatPCTs/index.htm (accessed 08/12/2014).
29. Goldhill F, Alexander B. GP training practices £100m capital programme guidance. Secondary GP training practices £100m capital programme guidance 2009. http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Dearcolleagueletters/DH_098860.
30. Hakin B. Equitable Access Programme: Primary Medical Care Services (letter). 2011 03/02/2011; (02/02/2015). https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215793/dh_123926.pdf (accessed 02/02/2015).
31. The GP Taskforce. Securing the Future GP Workforce: Delivering the Mandate on GP Expansion. 2014 18/07/2014. http://hee.nhs.uk/wp-content/uploads/sites/321/2014/07/GP-Taskforce-report.pdf (accessed 18/12/2014).
32. McNeil F. Making the most of a part time GP registrar post. BMJ Careers 2007 18 Aug 2007 335. http://careerfocus.bmj.com/cgi/content/full/335/7615/gp63-a (accessed 18/12/2014).
33. The Information Centre for Health and Social Care. General and Personal Medical Services England 2002-2012. Leeds, 2013.
34. British Medical Association. Model GP retainer scheme contract. 2005. http://bma.org.uk/practical-support-at-work/contracts/sessional-gps (accessed 02/02/2015).
35. Formula Review Group. Review of the General Medical Services global sum formula. London: NHS Employers and BMA, 2007.

36. NHS England Strategic Finance. Technical Guide to the formulae for 2014-15 and 2015-16 revenue allocations to Clinical Commissioning Groups and Area Teams. 2014 25 March 2014. http://www.england.nhs.uk/2014/03/27/allocations-tech-guide/ (accessed 11/02/2015).
37. WIRED GOV LTD. New practices for under-doctored areas. 2007 23/11/2007. http://www.wired-gov.net/wg/wg-news-1.nsf/0/4EEF1F44D83DBD5D8025739C003E7DE8?OpenDocument (accessed 02/02/2015).
38. Hippisley-Cox J, Coupland C, Pringle M, et al. GMS Formula Review Analysis of the QRESEARCH database. Final Report to the GMS Review Group. 10 02 2006 ed. Nottingham: NHS Employers, 2006.
39. Roberts N. GMS Funding Changes [letter]. 2014 12/08/2014. http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCEQFjAA&url=http%3A%2F%2Fbma.org.uk%2F-%2Fmedia%2Ffiles%2Fpdfs%2Fworking%2520for%2520change%2Fnegotiating%2520for%2520the%2520profession%2Fgeneral%2520practitioners%2Fgms%2520changes%2520lmc%2520letter%252012-8.pdf&ei=K97YVKr8NY7datOPgOgL&usg=AFQjCNEca2rjaBdxpuLdEr9cVHnf416rTA (accessed 09/02/2014).
40. Dilonot A. Statistics on general practitioners [letter]. London, 2014:Annex A, footnote 3. .
41. Poulter. D. Response to parlimentary question from Luciana Berger; To ask the Secretary of State for Health how many general practitioners (a) excluding retainers and registrars, (b) including retainers but excluding registrars there were in (i) 2009-10 and (ii) 2013-14. . In: Health. Do, ed. London: House of Commons., 2014.
42. anon. GP workforce crisis hits record level. PULSE. 19/10/2003 ed. London: Cogora Ltd, 2003.
43. Hutt P GS. Tackling inequalities in general practice. 2010 07/09/2010. Tackling inequalities in general practice (accessed 05/03/2015).
44. Kaffash J. Almost 40% of GP training places are unfilled in some areas of the UK. PULSE 2014. http://www.pulsetoday.co.uk/your-practice/practice-topics/education/almost-40-of-gp-training-places-unfilled-in-some-areas-of-uk/20006989.article#.VJLRtNJybcs

TABLES

Table 1: Total GP Workforce in England from 2004/5 to 2013/14[1]

		GP Headcount		GP Full Time Equivalent	
Year	**Total Population**	Total	Per 100,000 Pop.	Total	Per 100,000 Pop.
2004/05	50,109,707	30,751	61.37	27,621	55.12
2005/06	50,466,162	31,924	63.26	28,540	56.55
2006/07	50,763,893	32,646	64.31	30,557	60.19
2007/08	51,106,181	32,995	64.56	30,609	59.89
2008/09	51,464,646	33,911	65.89	30,603	59.46
2009/10	51,807,127	35,072	67.70	31,422	60.65
2010/11	52,234,045	36,073	69.06	31,173	59.68
2011/12	52,690,703	36,628	69.52	31,197	59.21
2012/13	53,488,001	36,771	68.75	31,418	58.74
2013/14	53,859,917	36,849	68.42	31,993	59.40

Note to Table 1

1. Excluding GP registrars, retainers and locums.

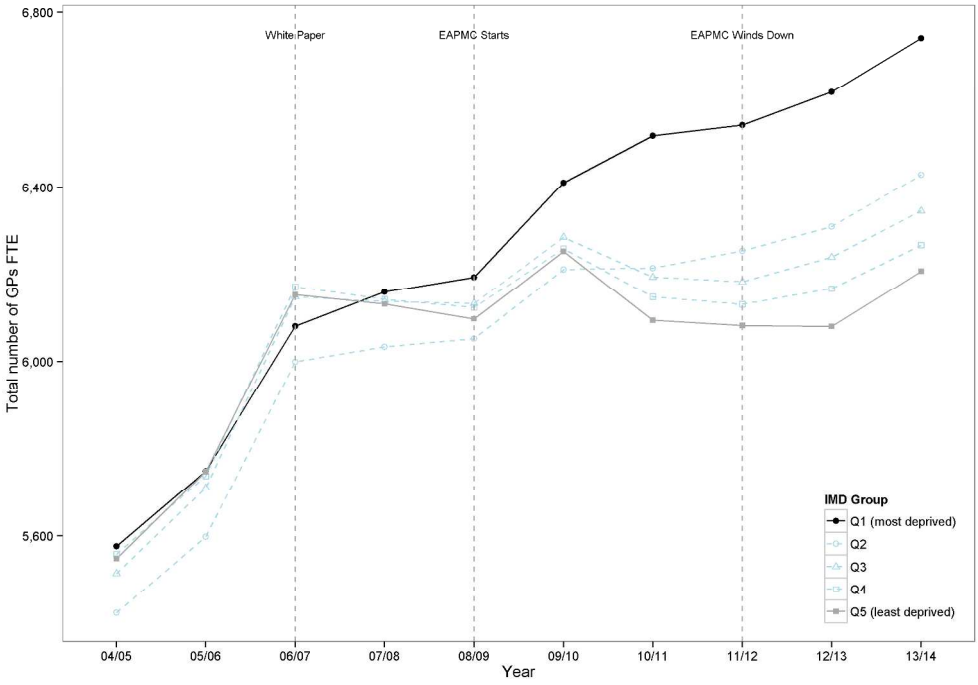


Figure 1: Total GP Workforce1 by Deprivation Quintile Group, from 2004/5 to 2013/14

Note to Figure 1:
1. Number of full time equivalent GPs, excluding registrars and retainers

269x189mm (300 x 300 DPI)

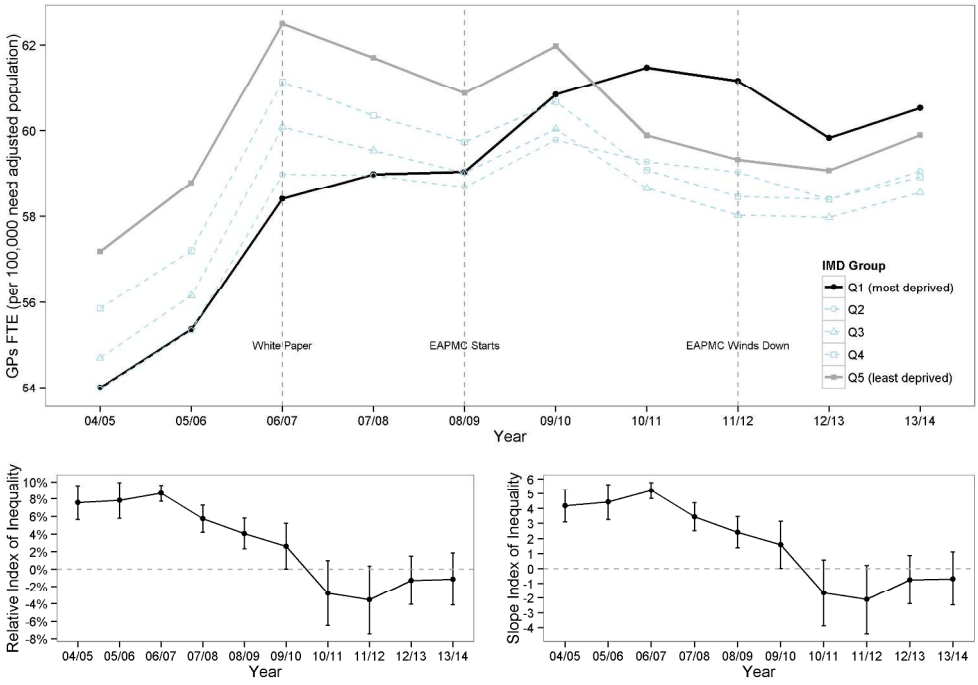


Figure 2: Socioeconomic Inequality in GP Supply in England 2003/4 to 2013/141,2

Notes to Figure 2:
1. The upper panel shows full time equivalent GPs per 100,000 need adjusted population by deprivation quintile group of small areas by year; the two lower panels show inequality indices by year, with 95% confidence intervals.
2. The Slope Index of Inequality can be interpreted as the absolute gap in FTE GPs per 100,000 need adjusted population between the most and least deprived small area, and the Relative Index of Inequality as the percentage gap relative to the average area. In each case, a positive index indicates "pro-rich" inequality favouring less deprived areas.

269x189mm (300 x 300 DPI)

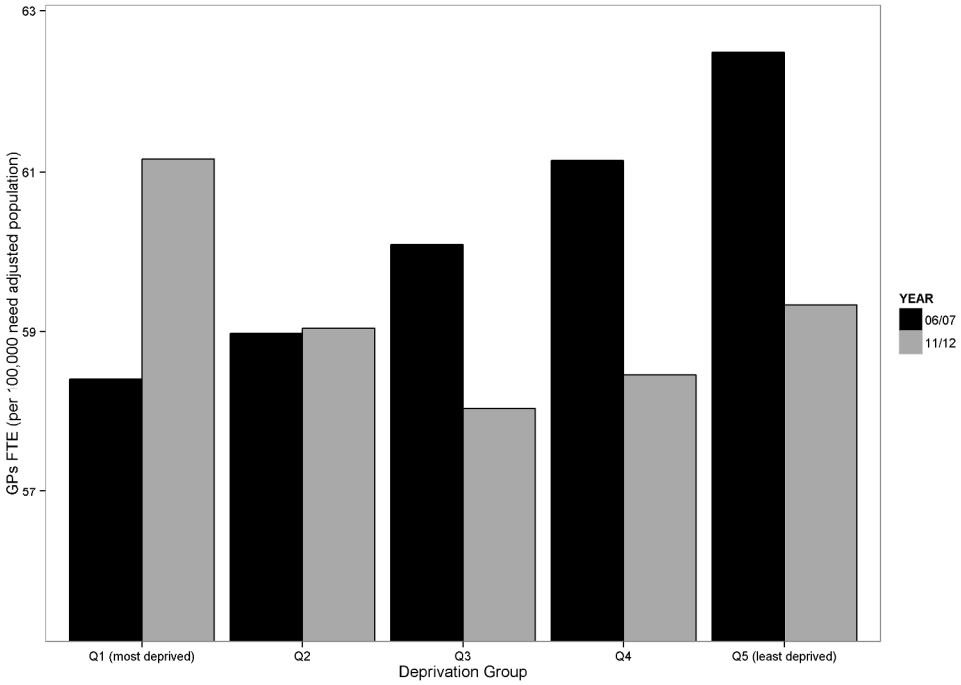


Figure 3: Socioeconomic Gradient in GP Supply in 2006/7 and 2011/12, Before and After the Equitable Access to Primary Medical Care Programme
269x189mm (300 x 300 DPI)

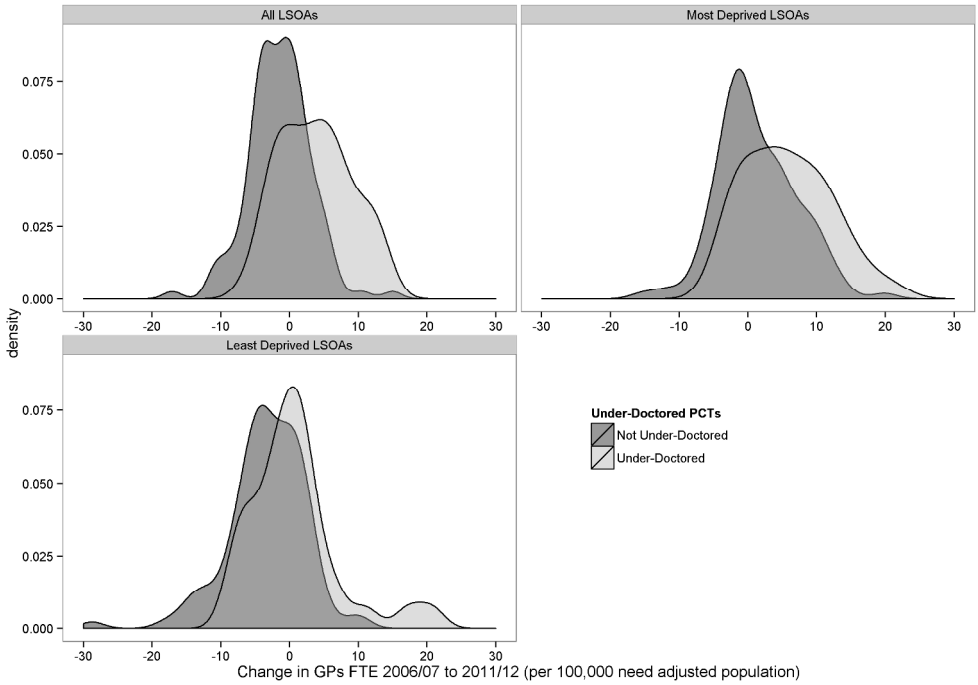


Figure 4: Change in GP Supply Between 2006/7 and 2011/12 By Deprivation Quintile Group, Comparing "Under-Doctored" PCTs and Other PCTs (Kernel Density Plots)
269x189mm (300 x 300 DPI)

Appendix to paper:

Unequal socioeconomic distribution of the primary care workforce: whole-population small area longitudinal study

This appendix consists of seventeen sections providing further details on and breakdowns of the results in the paper as well as results of various sensitivity analyses.

Section 1 GP supply by IMD quintile

This section presents data tables showing numbers of GPs both in terms of head count and in terms of full time equivalents broken down by IMD deprivation quintiles for years 2004/05 to 2013/14. These results are presented for total numbers of GPs as well as broken down into the three subgroups GPs excluding registrars and retainers, GP registrars only and GP retainers only. For these results GP numbers are attributed to LSOAs and then LSOAs are aggregated according to IMD scores calculated at LSOA level. This worksheet also contains results where IMD deprivation scores are attributed to GP practices and these are then used to aggregate GP numbers into population weighted fifths by deprivation. Several additional sets of data underpinning the plots in various sensitivity analyses are also given in these tables.

Section 2 Inequality Indices

This section presents the numbers of GP FTE in the richest and poorest fifths of LSOAs as well as the absolute gap, relative gap, slope index of inequality and relative index of inequality for years 2004/05 to 2013/14. Results are broken down into the same subgroups and sensitivities as in section 1.

Section 3 GP supply by PCT in 2006 and 2011

This section looks at GP supply by PCT in 2006/07 and 2011/12 the two years that we compare to evaluate whether the investment in underdoctored areas had any effect. PCTs are marked by underdoctored status as identified in the policy documents that defined where this investment would be targeted. Numbers are presented for all LSOAs as well as for only the most deprived fifth of LSOAs and least deprived fifth of LSOAs in each PCT. PCTs that do not include any LSOAs in the most or least deprived fifths have NAs in place of numbers in the relevant fields. There is also a second table in this worksheet showing similar results for GPs excluding registrars and retainers.

Section 4 Basecase results - LSOA level deprivation - excluding GP registrars and GP retainers

This section presents a full set of results expanding on those presented in the paper. The results are for GPs excluding registrars and retainers, these are attributed to LSOAs and then aggregated by LSOA level IMD scores into deprivation quintiles. The results show:

(1) the trend over time by deprivation quintile in need adjusted full time equivalent GP supply per 100,000 of population

(2) cross- sectional results for 2006/07 and 20011/12 in need adjusted full time equivalent GP supply per 100,000 of population

(3) the trends in total numbers of GP both in terms of head count and in terms of full time equivalent GPs split by deprivation quintile

(4) unadjusted and adjusted time trends in numbers of GPs in terms of head count and full time equivalents split by derpivation quintile

(5) regression results to test whether there has been a siginificant change in the slope index of inequality between 2006/07 and 2011/12

(6) distributions of changes in GP supply between 2006/07 and 2011/12 at PCT level split by under-doctored status looking at all LSOAs, the most deprived fifth of LSOAs and the least deprived fifth of LSOAs

(7) distributions of FTE practice nurses in 2013/14

(8) scatter plot of GP FTE in each LSOA plotted against deprivation in 2006/07 and 2011/12

(9) scatter plot of changes in GP FTE in each LSOA against deprivation between 2006/07 and 2011/12

(10) the trend over time in GP FTE by deprivation decile

Section 5 Sensitivity analysis including GP registrars and GP retainers

This section shows the first six sets of results as those in section 4 but looking at GP supply including GP registrars and retainers

Section 6 Sensitivity analysis looking only at GP registrars

This section shows the first five sets of results as those in section 4 but looking only at the supply of GP registrars

Section 7 Sensitivity analysis looking only at GP retainers

This section shows the first five sets of results as those in section 4 but looking only at the supply of GP registrars

Section 8 Sensitivity analysis looking at practice level deprivation quintiles rather than LSOA level deprivation quintiles excluding GP registrars and GP retainers

This section shows the first five sets of results as those in section 4 but with attibution of IMD score to GP practice and aggregation into deprivation quintiles at practice level rather than attribution of the GP supply to LSOA level and aggregation at LSOA level as done in the base case. Inaddition to this there are also plots of:
(6) trends in numbers of LSOA that practices draw their patients from over time by deprivation quintile
(7) trends in mean numbers of GPs per practice over time by deprivation quintile

Section 9 Sensitivity analysis looking at practice level deprivation quintiles including registrars and retainers

This section is the same as section 8 except it shows results for GP numbers including registrars and retainers rather than all GPs as shown in section 8.

Section 10 Sensitivity analysis London NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the London NHS CR

Section 11 Sensitivity analysis North of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the North of England NHS CR

Section 12 Sensitivity analysis Midlands and East of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the Midland and East of England NHS CR

Section 13 Sensitivity analysis South of England NHS CR excluding registrars and retainers

This section shows the first five sets of results as those in section 4 but looking only at LSOAs in the South of England NHS CR

Section 14 Sensitivity analysis PCT level looking at trends in Nurse and GP FTE excluding registrars and retainers

This section shows trends in Nurse FTE and GP FTE with deprivation quintiles derived from population weighted PCTs. Historical data for nurse FTE was only available to us at PCT level.

Section 15 Sensitivity analysis looking at CCG level deprivation quintiles excluding registrars and retainers

This section is the same as section 4 except it shows results aggregated into deprivation quintiles based on population weighted CCGs.

Section 16 Trends in GP practices opening and closing and their impact on GP FTE

This section shows the numbers of GP practices opening and closing over time by deprivation group and the impact this has had in terms of gains and losses of GP FTE excluding registrars and retainers in these groups

Section 17 Need adjustment details and sensitivity analysis

This section explains the Carr-Hill Workload need adjustment formula used, explores its impacts on the results over time and explores the sensitivity of the results to using an alternative Nuffield person based resource allocation formula on the results.

Appendix Section 1

This section presents data tables showing numbers of GPs both in terms of head count and in terms of full time equivalents broken down by IMD deprivation quintiles for years 2004/05 to 2013/14.

These results are presented for total numbers of GPs as well as broken down into the three subgroups GPs excluding registrars and retainers, GP registrars only and GP retainers only.

For these results GP numbers are attributed to LSOAs and then LSOAs are aggregated according to IMD scores calculated at LSOA level.

This worksheet also contains results where IMD deprivation scores are attributed to GP practices and these are then used to aggregate GP numbers into population weighted fifths by deprivation.

Several additional sets of data underpinning the plots in various sensitivity analyses explored in further sections of this appendix are also given in the tables in this section. These include details of the trends in the numbers of opening and closing of GP practices over time and their impact in terms of GP FTE, trends in practice size over time and trends in practice nurse populations over time.

Table A1.1: GP Supply by IMD Quintile Including Registrars and Retainers

				All GPs (Including Registrars and Retainers)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6656	66.89	64.46	6045	60.74	58.54
2004	2	9,922,657	10,048,907	6562	66.14	65.31	5895	59.41	58.66
2004	3	10,032,274	10,082,658	6811	67.89	67.55	6040	60.21	59.91
2004	4	10,062,460	9,949,765	6962	69.19	69.97	6139	61.00	61.69
2004	5 (least deprived)	10,140,651	9,701,318	7067	69.69	72.84	6194	61.08	63.85
2005	1 (most deprived)	10,017,043	10,380,909	6826	68.14	65.75	6190	61.79	59.63
2005	2	9,998,176	10,114,567	6774	67.75	66.97	6062	60.63	59.94
2005	3	10,115,862	10,165,383	7047	69.66	69.32	6232	61.61	61.31
2005	4	10,133,726	10,028,822	7179	70.85	71.59	6320	62.37	63.02
2005	5 (least deprived)	10,201,355	9,776,480	7265	71.21	74.31	6360	62.35	65.06
2006	1 (most deprived)	10,061,435	10,411,858	6969	69.27	66.93	6505	64.65	62.47
2006	2	10,062,639	10,172,317	6869	68.26	67.52	6429	63.89	63.20
2006	3	10,182,896	10,234,380	7133	70.05	69.70	6631	65.12	64.80
2006	4	10,194,108	10,096,472	7251	71.13	71.82	6707	65.79	66.43
2006	5 (least deprived)	10,262,815	9,848,867	7319	71.31	74.31	6718	65.46	68.21
2007	1 (most deprived)	10,107,634	10,443,538	7036	69.61	67.37	6513	64.43	62.36
2007	2	10,132,298	10,233,624	6862	67.72	67.05	6394	63.11	62.48
2007	3	10,257,247	10,310,359	7009	68.33	67.98	6508	63.45	63.12
2007	4	10,268,083	10,180,175	7091	69.06	69.65	6556	63.85	64.40
2007	5 (least deprived)	10,340,919	9,938,486	7147	69.11	71.91	6546	63.30	65.86
2008	1 (most deprived)	10,172,305	10,490,011	7499	73.72	71.49	6757	66.43	64.41
2008	2	10,222,041	10,313,147	7301	71.42	70.79	6633	64.89	64.32
2008	3	10,336,944	10,392,001	7479	72.35	71.97	6767	65.47	65.12
2008	4	10,326,760	10,251,648	7553	73.14	73.68	6820	66.05	66.53
2008	5 (least deprived)	10,406,596	10,017,839	7603	73.06	75.90	6809	65.43	67.97
2009	1 (most deprived)	10,242,974	10,537,912	7907	77.19	75.03	7056	68.89	66.96
2009	2	10,312,215	10,390,335	7651	74.19	73.64	6896	66.87	66.37
2009	3	10,412,543	10,470,074	7805	74.96	74.55	7026	67.48	67.11
2009	4	10,376,595	10,317,632	7854	75.69	76.13	7064	68.08	68.46
2009	5 (least deprived)	10,461,735	10,091,174	7974	76.22	79.02	7127	68.12	70.62
2010	1 (most deprived)	10,336,179	10,604,558	8353	80.81	78.77	7190	69.56	67.80
2010	2	10,418,358	10,484,925	7946	76.27	75.78	6918	66.40	65.98
2010	3	10,500,292	10,561,037	8019	76.37	75.93	6961	66.29	65.91
2010	4	10,452,346	10,406,831	8040	76.92	77.25	6971	66.70	66.99
2010	5 (least deprived)	10,526,870	10,176,694	8087	76.82	79.47	6978	66.29	68.57
2011	1 (most deprived)	10,456,433	10,697,690	8485	81.14	79.31	7186	68.72	67.17
2011	2	10,543,934	10,594,848	8102	76.84	76.47	6955	65.96	65.64
2011	3	10,591,723	10,656,814	8156	77.00	76.53	6977	65.87	65.47
2011	4	10,519,160	10,489,422	8147	77.45	77.67	6975	66.31	66.50
2011	5 (least deprived)	10,579,453	10,251,929	8193	77.45	79.92	7006	66.23	68.34
2012	1 (most deprived)	10,893,479	11,062,381	8605	78.99	77.78	7342	67.40	66.37
2012	2	10,782,713	10,807,827	8227	76.29	76.12	7102	65.87	65.71
2012	3	10,694,991	10,762,883	8235	77.00	76.51	7089	66.29	65.87
2012	4	10,552,487	10,562,156	8207	77.77	77.70	7052	66.83	66.77
2012	5 (least deprived)	10,564,331	10,292,754	8165	77.29	79.33	6981	66.08	67.83
2013	1 (most deprived)	10,994,820	11,137,074	8460	76.94	75.96	7334	66.70	65.85
2013	2	10,873,567	10,885,678	8103	74.52	74.43	7077	65.08	65.01
2013	3	10,765,378	10,837,339	8062	74.89	74.39	7011	65.13	64.70
2013	4	10,610,984	10,635,953	7995	75.34	75.17	6942	65.42	65.27
2013	5 (least deprived)	10,615,169	10,363,872	7967	75.05	76.87	6888	64.88	66.46

Table A1.2: GP Supply by IMD Quintile Excluding Registrars and Retainers

				Excluding Registrars and Retainers					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6118	61.48	59.24	5576	56.03	54.00
2004	2	9,922,657	10,048,907	6002	60.49	59.73	5424	54.66	53.98
2004	3	10,032,274	10,082,658	6164	61.44	61.14	5515	54.97	54.70
2004	4	10,062,460	9,949,765	6233	61.95	62.65	5558	55.24	55.86
2004	5 (least deprived)	10,140,651	9,701,318	6233	61.47	64.25	5548	54.71	57.19
2005	1 (most deprived)	10,017,043	10,380,909	6318	63.07	60.86	5748	57.38	55.37
2005	2	9,998,176	10,114,567	6221	62.22	61.51	5598	55.99	55.34
2005	3	10,115,862	10,165,383	6418	63.45	63.14	5709	56.44	56.16
2005	4	10,133,726	10,028,822	6470	63.84	64.51	5738	56.62	57.21
2005	5 (least deprived)	10,201,355	9,776,480	6497	63.69	66.46	5747	56.34	58.79
2006	1 (most deprived)	10,061,435	10,411,858	6484	64.44	62.28	6082	60.45	58.41
2006	2	10,062,639	10,172,317	6371	63.31	62.63	5999	59.62	58.98
2006	3	10,182,896	10,234,380	6563	64.45	64.13	6149	60.39	60.09
2006	4	10,194,108	10,096,472	6607	64.81	65.44	6173	60.55	61.14
2006	5 (least deprived)	10,262,815	9,848,867	6621	64.52	67.23	6154	59.96	62.49
2007	1 (most deprived)	10,107,634	10,443,538	6642	65.71	63.59	6161	60.95	58.99
2007	2	10,132,298	10,233,624	6460	63.76	63.13	6034	59.55	58.96
2007	3	10,257,247	10,310,359	6597	64.31	63.98	6139	59.85	59.54
2007	4	10,268,083	10,180,175	6627	64.54	65.10	6143	59.83	60.35
2007	5 (least deprived)	10,340,919	9,938,486	6670	64.50	67.11	6132	59.30	61.70
2008	1 (most deprived)	10,172,305	10,490,011	6883	67.67	65.62	6194	60.89	59.05
2008	2	10,222,041	10,313,147	6663	65.18	64.61	6053	59.21	58.69
2008	3	10,336,944	10,392,001	6785	65.64	65.29	6134	59.34	59.03
2008	4	10,326,760	10,251,648	6783	65.69	66.17	6124	59.31	59.74
2008	5 (least deprived)	10,406,596	10,017,839	6796	65.31	67.84	6098	58.60	60.87
2009	1 (most deprived)	10,242,974	10,537,912	7202	70.32	68.35	6411	62.59	60.84
2009	2	10,312,215	10,390,335	6907	66.98	66.47	6212	60.24	59.79
2009	3	10,412,543	10,470,074	6994	67.17	66.80	6286	60.37	60.04
2009	4	10,376,595	10,317,632	6967	67.14	67.52	6260	60.32	60.67
2009	5 (least deprived)	10,461,735	10,091,174	7002	66.93	69.39	6253	59.77	61.97
2010	1 (most deprived)	10,336,179	10,604,558	7609	73.61	71.75	6518	63.06	61.47
2010	2	10,418,358	10,484,925	7157	68.69	68.26	6216	59.66	59.28
2010	3	10,500,292	10,561,037	7152	68.11	67.72	6195	59.00	58.66
2010	4	10,452,346	10,406,831	7096	67.89	68.19	6149	58.83	59.09
2010	5 (least deprived)	10,526,870	10,176,694	7060	67.07	69.37	6095	57.90	59.89
2011	1 (most deprived)	10,456,433	10,697,690	7754	74.15	72.48	6543	62.57	61.16
2011	2	10,543,934	10,594,848	7309	69.32	68.99	6255	59.32	59.04
2011	3	10,591,723	10,656,814	7257	68.51	68.09	6185	58.39	58.03
2011	4	10,519,160	10,489,422	7181	68.26	68.46	6132	58.29	58.46
2011	5 (least deprived)	10,579,453	10,251,929	7128	67.37	69.53	6083	57.50	59.33
2012	1 (most deprived)	10,893,479	11,062,381	7802	71.62	70.52	6618	60.75	59.83
2012	2	10,782,713	10,807,827	7346	68.13	67.97	6310	58.52	58.39
2012	3	10,694,991	10,762,883	7283	68.09	67.67	6240	58.35	57.98
2012	4	10,552,487	10,562,156	7206	68.29	68.22	6168	58.45	58.40
2012	5 (least deprived)	10,564,331	10,292,754	7135	67.54	69.32	6081	57.56	59.08
2013	1 (most deprived)	10,994,820	11,137,074	7796	70.91	70.00	6741	61.31	60.53
2013	2	10,873,567	10,885,678	7371	67.79	67.72	6429	59.12	59.06
2013	3	10,765,378	10,837,339	7301	67.82	67.37	6346	58.95	58.56
2013	4	10,610,984	10,635,953	7213	67.97	67.81	6268	59.07	58.93
2013	5 (least deprived)	10,615,169	10,363,872	7168	67.53	69.16	6208	58.49	59.90

Table A1.3: GP Supply by IMD Quintile Registrars Only

				Registrars Only					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	456	4.58	4.41	440	4.43	4.26
2004	2	9,922,657	10,048,907	447	4.51	4.45	433	4.36	4.30
2004	3	10,032,274	10,082,658	496	4.94	4.92	474	4.73	4.71
2004	4	10,062,460	9,949,765	543	5.39	5.45	519	5.16	5.21
2004	5 (least deprived)	10,140,651	9,701,318	598	5.90	6.17	567	5.60	5.85
2005	1 (most deprived)	10,017,043	10,380,909	437	4.36	4.21	419	4.18	4.04
2005	2	9,998,176	10,114,567	452	4.52	4.47	432	4.32	4.27
2005	3	10,115,862	10,165,383	506	5.00	4.98	481	4.75	4.73
2005	4	10,133,726	10,028,822	562	5.55	5.60	533	5.26	5.31
2005	5 (least deprived)	10,201,355	9,776,480	585	5.73	5.98	550	5.39	5.62
2006	1 (most deprived)	10,061,435	10,411,858	411	4.09	3.95	395	3.93	3.80
2006	2	10,062,639	10,172,317	409	4.07	4.02	394	3.91	3.87
2006	3	10,182,896	10,234,380	450	4.42	4.40	432	4.24	4.22
2006	4	10,194,108	10,096,472	490	4.80	4.85	469	4.61	4.65
2006	5 (least deprived)	10,262,815	9,848,867	498	4.86	5.06	480	4.68	4.88
2007	1 (most deprived)	10,107,634	10,443,538	324	3.20	3.10	308	3.05	2.95
2007	2	10,132,298	10,233,624	317	3.13	3.10	304	3.00	2.97
2007	3	10,257,247	10,310,359	309	3.02	3.00	298	2.91	2.89
2007	4	10,268,083	10,180,175	333	3.25	3.27	321	3.13	3.15
2007	5 (least deprived)	10,340,919	9,938,486	303	2.93	3.05	294	2.84	2.95
2008	1 (most deprived)	10,172,305	10,490,011	558	5.49	5.32	528	5.19	5.03
2008	2	10,222,041	10,313,147	567	5.54	5.49	536	5.24	5.19
2008	3	10,336,944	10,392,001	604	5.84	5.81	577	5.58	5.55
2008	4	10,326,760	10,251,648	651	6.30	6.35	622	6.02	6.07
2008	5 (least deprived)	10,406,596	10,017,839	638	6.13	6.37	608	5.84	6.07
2009	1 (most deprived)	10,242,974	10,537,912	651	6.35	6.18	612	5.97	5.81
2009	2	10,312,215	10,390,335	679	6.59	6.54	640	6.21	6.16
2009	3	10,412,543	10,470,074	726	6.97	6.93	682	6.55	6.51
2009	4	10,376,595	10,317,632	778	7.49	7.54	730	7.04	7.08
2009	5 (least deprived)	10,461,735	10,091,174	819	7.83	8.11	769	7.35	7.62
2010	1 (most deprived)	10,336,179	10,604,558	698	6.76	6.59	654	6.33	6.17
2010	2	10,418,358	10,484,925	728	6.99	6.94	678	6.51	6.46
2010	3	10,500,292	10,561,037	786	7.48	7.44	733	6.98	6.94
2010	4	10,452,346	10,406,831	842	8.05	8.09	782	7.48	7.51
2010	5 (least deprived)	10,526,870	10,176,694	896	8.51	8.80	829	7.88	8.15
2011	1 (most deprived)	10,456,433	10,697,690	687	6.57	6.42	626	5.99	5.85
2011	2	10,543,934	10,594,848	738	7.00	6.96	679	6.44	6.40
2011	3	10,591,723	10,656,814	828	7.82	7.77	764	7.22	7.17
2011	4	10,519,160	10,489,422	879	8.35	8.38	809	7.69	7.72
2011	5 (least deprived)	10,579,453	10,251,929	955	9.03	9.32	881	8.33	8.59
2012	1 (most deprived)	10,893,479	11,062,381	765	7.03	6.92	706	6.48	6.38
2012	2	10,782,713	10,807,827	832	7.72	7.70	769	7.13	7.11
2012	3	10,694,991	10,762,883	890	8.32	8.27	820	7.66	7.62
2012	4	10,552,487	10,562,156	922	8.74	8.73	846	8.02	8.01
2012	5 (least deprived)	10,564,331	10,292,754	934	8.84	9.07	854	8.09	8.30
2013	1 (most deprived)	10,994,820	11,137,074	626	5.70	5.62	576	5.24	5.17
2013	2	10,873,567	10,885,678	685	6.30	6.29	628	5.77	5.77
2013	3	10,765,378	10,837,339	708	6.58	6.54	642	5.96	5.92
2013	4	10,610,984	10,635,953	716	6.74	6.73	645	6.08	6.06
2013	5 (least deprived)	10,615,169	10,363,872	717	6.76	6.92	643	6.06	6.21

Table A1.4: GP Supply by IMD Quintile Retainers Only

				Retainers Only					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	83	0.83	0.80	28	0.29	0.28
2004	2	9,922,657	10,048,907	113	1.14	1.12	38	0.39	0.38
2004	3	10,032,274	10,082,658	151	1.51	1.50	51	0.51	0.51
2004	4	10,062,460	9,949,765	186	1.85	1.87	61	0.61	0.62
2004	5 (least deprived)	10,140,651	9,701,318	235	2.32	2.42	78	0.77	0.81
2005	1 (most deprived)	10,017,043	10,380,909	71	0.71	0.68	23	0.23	0.22
2005	2	9,998,176	10,114,567	101	1.01	1.00	33	0.33	0.33
2005	3	10,115,862	10,165,383	123	1.21	1.21	42	0.41	0.41
2005	4	10,133,726	10,028,822	148	1.46	1.47	50	0.49	0.49
2005	5 (least deprived)	10,201,355	9,776,480	183	1.79	1.87	63	0.62	0.65
2006	1 (most deprived)	10,061,435	10,411,858	74	0.74	0.71	28	0.27	0.26
2006	2	10,062,639	10,172,317	89	0.88	0.87	36	0.36	0.35
2006	3	10,182,896	10,234,380	121	1.18	1.18	50	0.49	0.49
2006	4	10,194,108	10,096,472	154	1.51	1.53	65	0.63	0.64
2006	5 (least deprived)	10,262,815	9,848,867	199	1.94	2.02	84	0.82	0.85
2007	1 (most deprived)	10,107,634	10,443,538	70	0.70	0.67	44	0.43	0.42
2007	2	10,132,298	10,233,624	84	0.83	0.82	56	0.55	0.55
2007	3	10,257,247	10,310,359	103	1.00	1.00	72	0.70	0.69
2007	4	10,268,083	10,180,175	131	1.27	1.28	91	0.89	0.90
2007	5 (least deprived)	10,340,919	9,938,486	174	1.68	1.75	120	1.16	1.21
2008	1 (most deprived)	10,172,305	10,490,011	57	0.56	0.55	35	0.34	0.33
2008	2	10,222,041	10,313,147	71	0.70	0.69	45	0.44	0.44
2008	3	10,336,944	10,392,001	90	0.87	0.87	56	0.55	0.54
2008	4	10,326,760	10,251,648	119	1.15	1.16	74	0.72	0.72
2008	5 (least deprived)	10,406,596	10,017,839	169	1.63	1.69	102	0.98	1.02
2009	1 (most deprived)	10,242,974	10,537,912	54	0.52	0.51	33	0.33	0.32
2009	2	10,312,215	10,390,335	65	0.63	0.63	43	0.42	0.42
2009	3	10,412,543	10,470,074	86	0.83	0.82	58	0.56	0.56
2009	4	10,376,595	10,317,632	110	1.06	1.07	74	0.71	0.72
2009	5 (least deprived)	10,461,735	10,091,174	153	1.47	1.52	104	1.00	1.03
2010	1 (most deprived)	10,336,179	10,604,558	46	0.45	0.43	18	0.17	0.17
2010	2	10,418,358	10,484,925	62	0.59	0.59	24	0.23	0.23
2010	3	10,500,292	10,561,037	82	0.78	0.78	33	0.31	0.31
2010	4	10,452,346	10,406,831	102	0.98	0.98	41	0.39	0.39
2010	5 (least deprived)	10,526,870	10,176,694	131	1.25	1.29	53	0.51	0.52
2011	1 (most deprived)	10,456,433	10,697,690	44	0.43	0.42	17	0.16	0.16
2011	2	10,543,934	10,594,848	55	0.52	0.52	21	0.20	0.20
2011	3	10,591,723	10,656,814	71	0.67	0.67	28	0.26	0.26
2011	4	10,519,160	10,489,422	88	0.84	0.84	34	0.32	0.32
2011	5 (least deprived)	10,579,453	10,251,929	110	1.04	1.08	43	0.40	0.42
2012	1 (most deprived)	10,893,479	11,062,381	38	0.35	0.34	19	0.17	0.17
2012	2	10,782,713	10,807,827	49	0.45	0.45	23	0.21	0.21
2012	3	10,694,991	10,762,883	62	0.58	0.58	30	0.28	0.27
2012	4	10,552,487	10,562,156	79	0.75	0.75	38	0.36	0.36
2012	5 (least deprived)	10,564,331	10,292,754	97	0.91	0.94	46	0.43	0.45
2013	1 (most deprived)	10,994,820	11,137,074	37	0.34	0.34	17	0.15	0.15
2013	2	10,873,567	10,885,678	46	0.42	0.42	20	0.19	0.19
2013	3	10,765,378	10,837,339	53	0.49	0.49	23	0.22	0.22
2013	4	10,610,984	10,635,953	66	0.63	0.62	29	0.28	0.28
2013	5 (least deprived)	10,615,169	10,363,872	82	0.77	0.79	36	0.34	0.35

Table A1.5: GP Supply by IMD Quintile Including Registrars and Retainers Practice Level Aggregation

				ALL GPs (Practice Level Aggregation)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6509	64.93	63.53	5943	59.29	58.01
2004	2	9,922,657	10,048,907	6574	65.57	64.70	5931	59.16	58.37
2004	3	10,032,274	10,082,658	6662	66.50	66.13	5950	59.39	59.06
2004	4	10,062,460	9,949,765	7117	71.01	71.52	6209	61.95	62.39
2004	5 (least deprived)	10,140,651	9,701,318	7197	71.84	74.35	6280	62.69	64.88
2005	1 (most deprived)	10,017,043	10,380,909	6681	66.15	64.78	6085	60.25	59.00
2005	2	9,998,176	10,114,567	6782	67.21	66.34	6107	60.52	59.74
2005	3	10,115,862	10,165,383	6868	68.07	67.66	6112	60.57	60.21
2005	4	10,133,726	10,028,822	7362	72.93	73.45	6414	63.54	63.99
2005	5 (least deprived)	10,201,355	9,776,480	7398	73.31	75.83	6447	63.89	66.08
2006	1 (most deprived)	10,061,435	10,411,858	6813	67.08	65.76	6371	62.73	61.49
2006	2	10,062,639	10,172,317	6863	67.57	66.70	6411	63.12	62.30
2006	3	10,182,896	10,234,380	7029	69.25	68.85	6574	64.76	64.39
2006	4	10,194,108	10,096,472	7412	72.99	73.44	6883	67.77	68.19
2006	5 (least deprived)	10,262,815	9,848,867	7424	73.17	75.67	6752	66.55	68.82
2007	1 (most deprived)	10,107,634	10,443,538	6956	68.04	66.77	6437	62.97	61.79
2007	2	10,132,298	10,233,624	6912	67.61	66.77	6427	62.87	62.08
2007	3	10,257,247	10,310,359	6894	67.47	67.07	6436	62.99	62.61
2007	4	10,268,083	10,180,175	7159	69.99	70.36	6665	65.16	65.51
2007	5 (least deprived)	10,340,919	9,938,486	7223	70.72	73.09	6551	64.14	66.29
2008	1 (most deprived)	10,172,305	10,490,011	7375	71.64	70.40	6636	64.46	63.35
2008	2	10,222,041	10,313,147	7411	71.95	71.06	6742	65.46	64.65
2008	3	10,336,944	10,392,001	7330	71.23	70.81	6667	64.80	64.41
2008	4	10,326,760	10,251,648	7613	73.97	74.32	6894	66.99	67.30
2008	5 (least deprived)	10,406,596	10,017,839	7707	74.92	77.34	6846	66.55	68.70
2009	1 (most deprived)	10,242,974	10,537,912	7856	75.75	74.56	6985	67.35	66.29
2009	2	10,312,215	10,390,335	7627	73.64	72.79	6902	66.64	65.87
2009	3	10,412,543	10,470,074	7650	73.83	73.40	6907	66.66	66.28
2009	4	10,376,595	10,317,632	7952	76.77	77.05	7179	69.31	69.55
2009	5 (least deprived)	10,461,735	10,091,174	8107	78.26	80.67	7196	69.47	71.61
2010	1 (most deprived)	10,336,179	10,604,558	8327	79.69	78.60	7134	68.28	67.34
2010	2	10,418,358	10,484,925	7947	76.07	75.22	6959	66.61	65.86
2010	3	10,500,292	10,561,037	7780	74.48	74.06	6789	64.99	64.63
2010	4	10,452,346	10,406,831	8200	78.48	78.69	7106	68.01	68.19
2010	5 (least deprived)	10,526,870	10,176,694	8191	78.43	80.70	7030	67.31	69.26
2011	1 (most deprived)	10,456,433	10,697,690	8469	80.33	79.42	7121	67.55	66.78
2011	2	10,543,934	10,594,848	8037	76.21	75.43	6970	66.09	65.41
2011	3	10,591,723	10,656,814	7918	75.19	74.74	6792	64.49	64.11
2011	4	10,519,160	10,489,422	8277	78.57	78.69	7068	67.10	67.20
2011	5 (least deprived)	10,579,453	10,251,929	8382	79.55	81.69	7148	67.84	69.66
2012	1 (most deprived)	10,893,479	11,062,381	8414	78.61	78.14	7132	66.63	66.23
2012	2	10,782,713	10,807,827	8119	75.85	75.18	7062	65.98	65.39
2012	3	10,694,991	10,762,883	8087	75.66	75.18	7001	65.50	65.08
2012	4	10,552,487	10,562,156	8413	78.61	78.55	7223	67.49	67.43
2012	5 (least deprived)	10,564,331	10,292,754	8405	78.64	80.40	7150	66.89	68.39
2013	1 (most deprived)	10,994,820	11,137,074	8281	76.83	76.49	7144	66.29	66.00
2013	2	10,873,567	10,885,678	7964	73.93	73.33	7016	65.13	64.60
2013	3	10,765,378	10,837,339	7910	73.41	72.98	6907	64.10	63.73
2013	4	10,610,984	10,635,953	8184	76.02	75.87	7095	65.91	65.78
2013	5 (least deprived)	10,615,169	10,363,872	8247	76.58	78.18	7089	65.83	67.21

Table A1.6: GP Supply by IMD Quintile Excluding Registrars and Retainers Practice Level Aggregation

				Excluding Registrars and Retainers (Practice Level Aggregation)					
				GP Headcount			GP Full Time Equivalent		
Year	IMD Quintile	Population	Need adjusted population	Total	Unadjusted per 100k	Need adjusted per 100k	Total	Unadjusted per 100k	Need adjusted per 100k
2004	1 (most deprived)	9,951,665	10,327,060	6040	60.25	58.95	5526	55.13	53.94
2004	2	9,922,657	10,048,907	5990	59.75	58.96	5433	54.20	53.48
2004	3	10,032,274	10,082,658	6095	60.84	60.50	5473	54.63	54.32
2004	4	10,062,460	9,949,765	6350	63.36	63.82	5607	55.94	56.35
2004	5 (least deprived)	10,140,651	9,701,318	6276	62.64	64.84	5582	55.72	57.67
2005	1 (most deprived)	10,017,043	10,380,909	6240	61.78	60.50	5698	56.42	55.25
2005	2	9,998,176	10,114,567	6195	61.39	60.60	5606	55.56	54.84
2005	3	10,115,862	10,165,383	6313	62.57	62.19	5639	55.88	55.55
2005	4	10,133,726	10,028,822	6618	65.56	66.03	5809	57.54	57.96
2005	5 (least deprived)	10,201,355	9,776,480	6558	64.99	67.22	5788	57.36	59.33
2006	1 (most deprived)	10,061,435	10,411,858	6379	62.81	61.57	5989	58.97	57.81
2006	2	10,062,639	10,172,317	6369	62.71	61.89	5982	58.90	58.14
2006	3	10,182,896	10,234,380	6493	63.97	63.60	6110	60.19	59.85
2006	4	10,194,108	10,096,472	6723	66.20	66.61	6311	62.15	62.53
2006	5 (least deprived)	10,262,815	9,848,867	6682	65.86	68.10	6164	60.76	62.83
2007	1 (most deprived)	10,107,634	10,443,538	6608	64.64	63.43	6130	59.96	58.84
2007	2	10,132,298	10,233,624	6474	63.33	62.54	6035	59.03	58.29
2007	3	10,257,247	10,310,359	6497	63.58	63.21	6069	59.39	59.04
2007	4	10,268,083	10,180,175	6700	65.50	65.85	6259	61.18	61.51
2007	5 (least deprived)	10,340,919	9,938,486	6716	65.76	67.96	6117	59.90	61.90
2008	1 (most deprived)	10,172,305	10,490,011	6847	66.51	65.36	6152	59.76	58.72
2008	2	10,222,041	10,313,147	6706	65.10	64.30	6103	59.25	58.52
2008	3	10,336,944	10,392,001	6679	64.91	64.52	6065	58.94	58.59
2008	4	10,326,760	10,251,648	6850	66.55	66.87	6201	60.24	60.53
2008	5 (least deprived)	10,406,596	10,017,839	6829	66.38	68.53	6083	59.13	61.04
2009	1 (most deprived)	10,242,974	10,537,912	7234	69.76	68.65	6412	61.83	60.85
2009	2	10,312,215	10,390,335	6849	66.12	65.37	6189	59.75	59.06
2009	3	10,412,543	10,470,074	6890	66.50	66.11	6208	59.91	59.56
2009	4	10,376,595	10,317,632	7048	68.04	68.29	6362	61.42	61.64
2009	5 (least deprived)	10,461,735	10,091,174	7051	68.07	70.16	6253	60.36	62.22
2010	1 (most deprived)	10,336,179	10,604,558	7695	73.65	72.64	6556	62.74	61.89
2010	2	10,418,358	10,484,925	7093	67.89	67.14	6203	59.38	58.72
2010	3	10,500,292	10,561,037	6974	66.76	66.39	6065	58.06	57.73
2010	4	10,452,346	10,406,831	7235	69.24	69.43	6266	59.97	60.13
2010	5 (least deprived)	10,526,870	10,176,694	7076	67.75	69.71	6083	58.24	59.93
2011	1 (most deprived)	10,456,433	10,697,690	7867	74.62	73.78	6589	62.50	61.79
2011	2	10,543,934	10,594,848	7196	68.23	67.53	6226	59.03	58.43
2011	3	10,591,723	10,656,814	7064	67.08	66.68	6042	57.37	57.03
2011	4	10,519,160	10,489,422	7286	69.17	69.27	6201	58.87	58.96
2011	5 (least deprived)	10,579,453	10,251,929	7215	68.47	70.32	6139	58.26	59.84
2012	1 (most deprived)	10,893,479	11,062,381	7714	72.07	71.64	6498	60.71	60.35
2012	2	10,782,713	10,807,827	7246	67.69	67.10	6278	58.65	58.13
2012	3	10,694,991	10,762,883	7151	66.90	66.48	6153	57.57	57.20
2012	4	10,552,487	10,562,156	7361	68.78	68.72	6295	58.82	58.77
2012	5 (least deprived)	10,564,331	10,292,754	7299	68.29	69.82	6193	57.95	59.25
2013	1 (most deprived)	10,994,820	11,137,074	7678	71.24	70.92	6603	61.26	60.99
2013	2	10,873,567	10,885,678	7254	67.34	66.79	6381	59.24	58.75
2013	3	10,765,378	10,837,339	7185	66.68	66.29	6270	58.19	57.85
2013	4	10,610,984	10,635,953	7357	68.34	68.21	6379	59.25	59.14
2013	5 (least deprived)	10,615,169	10,363,872	7375	68.48	69.92	6359	59.05	60.28

Table A1.7: GP Supply by IMD Quintile Related to Opening and Closing of Practices

				Opening and Closing of GP Practices					
				GP Practices Opening		GP Practices Closing		Net Change in GP Practices	
Year	IMD Quintile	Population	Need adjusted population	Number of Practices	Number of GP FTE	Number of Practices	Number of GP FTE	Number of Practices	Number of GP FTE
2004	1 (most deprived)	9,951,665	10,327,060	-	-	-	-	-	-
2004	2	9,922,657	10,048,907	-	-	-	-	-	-
2004	3	10,032,274	10,082,658	-	-	-	-	-	-
2004	4	10,062,460	9,949,765	-	-	-	-	-	-
2004	5 (least deprived)	10,140,651	9,701,318	-	-	-	-	-	-
2005	1 (most deprived)	10,017,043	10,380,909	38	25.00	59	20.00	-21	5.00
2005	2	9,998,176	10,114,567	21	19.60	36	11.60	-15	8.00
2005	3	10,115,862	10,165,383	12	25.60	31	15.20	-19	10.40
2005	4	10,133,726	10,028,822	8	9.20	31	6.60	-23	2.60
2005	5 (least deprived)	10,201,355	9,776,480	10	9.40	32	15.60	-22	-6.20
2006	1 (most deprived)	10,061,435	10,411,858	16	25.30	56	13.80	-40	11.50
2006	2	10,062,639	10,172,317	9	26.60	35	9.80	-26	16.80
2006	3	10,182,896	10,234,380	8	15.39	17	5.00	-9	10.39
2006	4	10,194,108	10,096,472	6	6.00	14	12.20	-8	-6.20
2006	5 (least deprived)	10,262,815	9,848,867	4	6.00	15	2.00	-11	4.00
2007	1 (most deprived)	10,107,634	10,443,538	18	10.04	48	13.00	-30	-2.96
2007	2	10,132,298	10,233,624	4	9.17	36	8.92	-32	0.25
2007	3	10,257,247	10,310,359	6	19.67	34	27.08	-28	-7.41
2007	4	10,268,083	10,180,175	5	8.19	24	9.91	-19	-1.72
2007	5 (least deprived)	10,340,919	9,938,486	6	3.00	26	9.06	-20	-6.06
2008	1 (most deprived)	10,172,305	10,490,011	11	8.20	42	16.00	-31	-7.80
2008	2	10,222,041	10,313,147	4	5.05	18	8.25	-14	-3.20
2008	3	10,336,944	10,392,001	3	1.00	18	7.00	-15	-6.00
2008	4	10,326,760	10,251,648	2	4.66	6	5.00	-4	-0.34
2008	5 (least deprived)	10,406,596	10,017,839	1	6.86	6	7.68	-5	-0.82
2009	1 (most deprived)	10,242,974	10,537,912	80	51.59	39	24.01	41	27.58
2009	2	10,312,215	10,390,335	56	28.87	22	27.31	34	1.56
2009	3	10,412,543	10,470,074	49	11.44	22	11.02	27	0.42
2009	4	10,376,595	10,317,632	18	1.60	13	7.75	5	-6.15
2009	5 (least deprived)	10,461,735	10,091,174	17	4.11	5	6.00	12	-1.89
2010	1 (most deprived)	10,336,179	10,604,558	99	191.98	30	24.49	69	167.49
2010	2	10,418,358	10,484,925	38	89.25	19	7.96	19	81.29
2010	3	10,500,292	10,561,037	17	32.11	10	5.88	7	26.23
2010	4	10,452,346	10,406,831	14	35.53	17	13.22	-3	22.31
2010	5 (least deprived)	10,526,870	10,176,694	7	16.95	14	7.71	-7	9.24
2011	1 (most deprived)	10,456,433	10,697,690	18	46.11	37	20.59	-19	25.52
2011	2	10,543,934	10,594,848	7	22.26	27	20.52	-20	1.74
2011	3	10,591,723	10,656,814	2	2.59	23	10.82	-21	-8.23
2011	4	10,519,160	10,489,422	4	4.28	19	12.88	-15	-8.60
2011	5 (least deprived)	10,579,453	10,251,929	1	3.00	13	9.18	-12	-6.18
2012	1 (most deprived)	10,893,479	11,062,381	10	19.26	61	74.45	-51	-55.19
2012	2	10,782,713	10,807,827	1	4.00	31	30.77	-30	-26.77
2012	3	10,694,991	10,762,883	0	0.00	23	28.52	-23	-28.52
2012	4	10,552,487	10,562,156	1	3.96	21	25.40	-20	-21.45
2012	5 (least deprived)	10,564,331	10,292,754	0	0.00	11	10.32	-11	-10.32
2013	1 (most deprived)	10,994,820	11,137,074	5	3.89	130	69.20	-125	-65.31
2013	2	10,873,567	10,885,678	3	6.97	76	23.75	-73	-16.78
2013	3	10,765,378	10,837,339	5	9.56	93	39.10	-88	-29.54
2013	4	10,610,984	10,635,953	4	13.81	61	40.30	-57	-26.50
2013	5 (least deprived)	10,615,169	10,363,872	2	5.84	46	32.35	-44	-26.51

Table A1.8: GP Supply by IMD Quintile Other Sensitivity Analyses

				Other Sensitivity Analyses			
Year	IMD Quintile	Population	Need adjusted population	Mean GP FTE per Practice	Mean LSOAs per Practice	Nurse FTE (PCT level Data)	Nurse FTE per 100k need adjusted (PCT level Data)
2004	1 (most deprived)	9,951,665	10,327,060	2.47	116	2,750.12	27.05
2004	2	9,922,657	10,048,907	3.10	97	2,877.33	26.73
2004	3	10,032,274	10,082,658	3.46	77	2,698.58	25.95
2004	4	10,062,460	9,949,765	3.79	63	2,801.97	26.87
2004	5 (least deprived)	10,140,651	9,701,318	4.03	53	619.36	5.90
2005	1 (most deprived)	10,017,043	10,380,909	2.56	114	2,827.48	25.30
2005	2	9,998,176	10,114,567	3.24	96	3,084.49	28.97
2005	3	10,115,862	10,165,383	3.58	77	2,444.92	25.17
2005	4	10,133,726	10,028,822	3.92	63	2,766.40	25.65
2005	5 (least deprived)	10,201,355	9,776,480	4.22	53	2,870.08	26.48
2006	1 (most deprived)	10,061,435	10,411,858	2.75	112	2,379.12	24.72
2006	2	10,062,639	10,172,317	3.50	95	627.92	6.02
2006	3	10,182,896	10,234,380	3.90	76	1,784.83	16.89
2006	4	10,194,108	10,096,472	4.29	63	2,970.37	26.93
2006	5 (least deprived)	10,262,815	9,848,867	4.54	53	2,709.54	25.80
2007	1 (most deprived)	10,107,634	10,443,538	2.81	113	2,743.65	26.81
2007	2	10,132,298	10,233,624	3.61	95	3,069.98	27.66
2007	3	10,257,247	10,310,359	3.89	76	2,998.94	27.82
2007	4	10,268,083	10,180,175	4.27	63	1,853.89	17.63
2007	5 (least deprived)	10,340,919	9,938,486	4.52	53	1,290.83	13.01
2008	1 (most deprived)	10,172,305	10,490,011	2.87	112	1,305.49	13.06
2008	2	10,222,041	10,313,147	3.65	94	3,304.54	31.27
2008	3	10,336,944	10,392,001	3.89	77	2,913.88	27.46
2008	4	10,326,760	10,251,648	4.24	63	2,837.45	28.24
2008	5 (least deprived)	10,406,596	10,017,839	4.51	53	2,795.96	27.67
2009	1 (most deprived)	10,242,974	10,537,912	2.97	111	3,102.89	29.14
2009	2	10,312,215	10,390,335	3.74	97	2,953.78	27.61
2009	3	10,412,543	10,470,074	3.98	77	2,579.57	25.49
2009	4	10,376,595	10,317,632	4.37	63	2,278.37	23.01
2009	5 (least deprived)	10,461,735	10,091,174	4.66	53	559.31	5.73
2010	1 (most deprived)	10,336,179	10,604,558	2.91	110	570.55	5.80
2010	2	10,418,358	10,484,925	3.67	97	2,767.23	27.92
2010	3	10,500,292	10,561,037	3.90	77	2,249.80	22.48
2010	4	10,452,346	10,406,831	4.28	63	2,990.75	27.35
2010	5 (least deprived)	10,526,870	10,176,694	4.53	53	2,393.42	23.66
2011	1 (most deprived)	10,456,433	10,697,690	2.93	112	3,151.84	28.72
2011	2	10,543,934	10,594,848	3.71	98	2,672.13	26.18
2011	3	10,591,723	10,656,814	3.91	78	2,942.80	27.44
2011	4	10,519,160	10,489,422	4.28	64	2,274.21	23.18
2011	5 (least deprived)	10,579,453	10,251,929	4.56	54	2,843.30	25.95
2012	1 (most deprived)	10,893,479	11,062,381	3.06	114	2,575.48	25.02
2012	2	10,782,713	10,807,827	3.85	100	189.61	1.99
2012	3	10,694,991	10,762,883	4.01	80	2,646.99	25.74
2012	4	10,552,487	10,562,156	4.35	65	2,787.59	27.90
2012	5 (least deprived)	10,564,331	10,292,754	4.62	55	2,716.02	26.99
2013	1 (most deprived)	10,994,820	11,137,074	3.18	119	2,558.39	25.07
2013	2	10,873,567	10,885,678	3.99	102	2,751.39	26.68
2013	3	10,765,378	10,837,339	4.11	83	2,691.70	24.76
2013	4	10,610,984	10,635,953	4.48	67	183.18	1.93
2013	5 (least deprived)	10,615,169	10,363,872	4.80	57	2,610.09	24.05

Appendix Section 2

This section presents the numbers of GP FTE in the richest and poorest fifths of areas as well as the absolute gap, relative gap, slope index of inequality and relative index of inequality for years 2004/05 to 2013/14.

In the tables that follow Q1 refers to the most deprived fifth of areas and Q5 refers to the least deprived fifth of areas. ABS_GAP referes to the absolute gap between these two groups of areas i.e. Q5 - Q1 this is similar to the slope index of inequality (SII) which models this gap but also takes into account the levels observed in the other three fifths of the distribution. REL_GAP refers to the relative gap between the most and least deprived groups calculated as ABS_GAP/Q5 and is somewhat similar to the relative index of inequality (RII) which expresses the SII as a proportion of the national average.

Table A2.1: Inequality Indices GPs FTE Including Registrars and Retainers

	All GPs (Including Registrars and Retainers)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	58.54	63.85	5.31	8%	6.90	11.39%
2005	59.63	65.06	5.43	8%	7.08	11.46%
2006	62.47	68.21	5.74	8%	7.40	11.38%
2007	62.36	65.86	3.50	5%	4.50	7.06%
2008	64.41	67.97	3.56	5%	4.72	7.19%
2009	66.96	70.62	3.66	5%	4.75	7.00%
2010	67.80	68.57	0.77	1%	1.32	1.98%
2011	67.17	68.34	1.17	2%	1.66	2.49%
2012	66.37	67.83	1.46	2%	1.99	3.00%
2013	65.85	66.46	0.61	1%	0.77	1.18%

Table A2.2: Inequality Indices GPs FTE Excluding Registrars and Retainers

	Excluding Registrars and Retainers					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII (95% CI)	RII (95% CI)
2004	54.00	57.19	3.19	6%	4.19 (3.10 to 5.28)	7.60% (5.63 to 9.57)
2005	55.37	58.79	3.42	6%	4.44 (3.26 to 5.62)	7.85% (5.77 to 9.94)
2006	58.41	62.49	4.08	7%	5.22 (4.66 to 5.77)	8.66% (7.74 to 9.58)
2007	58.99	61.70	2.71	4%	3.45 (2.53 to 4.36)	5.75% (4.22 to 7.28)
2008	59.05	60.87	1.82	3%	2.42 (1.38 to 3.46)	4.07% (2.32 to 5.82)
2009	60.84	61.97	1.13	2%	1.59 (0.02 to 3.16)	2.62% (0.03 to 5.21)
2010	61.47	59.89	-1.58	-3%	-1.65 (-3.87 to 0.57)	-2.77% (-6.49 to 0.95)
2011	61.16	59.33	-1.83	-3%	-2.10 (-4.41 to 0.21)	-3.55% (-7.45 to 0.35)
2012	59.83	59.08	-0.75	-1%	-0.75 (-2.38 to 0.88)	-1.28% (-4.06 to 1.50)
2013	60.53	59.90	-0.63	-1%	-0.68 (-2.46 to 1.11)	-1.14% (-4.15 to 1.87)

Table A2.3: Inequality Indices GPs FTE Registrars Only

	Registrars Only					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	4.26	5.85	1.59	27%	2.05	42.08%
2005	4.04	5.62	1.58	28%	2.12	44.10%
2006	3.80	4.88	1.08	22%	1.46	34.14%
2007	2.95	2.95	0.00	0%	0.09	2.94%
2008	5.03	6.07	1.04	17%	1.46	26.20%
2009	5.81	7.62	1.81	24%	2.30	34.60%
2010	6.17	8.15	1.98	24%	2.54	36.03%
2011	5.85	8.59	2.74	32%	3.43	47.97%
2012	6.38	8.30	1.92	23%	2.40	32.04%
2013	5.17	6.21	1.04	17%	1.21	20.73%

Table A2.4: Inequality Indices GPs FTE Retainers Only

	Retainers Only					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	0.28	0.81	0.53	65%	0.66	127.43%
2005	0.22	0.65	0.43	66%	0.51	122.80%
2006	0.26	0.85	0.59	69%	0.73	140.95%
2007	0.42	1.21	0.79	65%	0.96	127.32%
2008	0.33	1.02	0.69	68%	0.83	136.07%
2009	0.32	1.03	0.71	69%	0.87	142.08%
2010	0.17	0.52	0.35	67%	0.44	134.83%
2011	0.16	0.42	0.26	62%	0.32	117.20%
2012	0.17	0.45	0.28	62%	0.35	120.38%
2013	0.15	0.35	0.20	57%	0.24	102.56%

Table A2.5: Inequality Indices GPs FTE Including Registrars and Retainers Practice Level Aggregation

	ALL GPs (Practice Level Aggregation)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	58.01	64.88	6.87	11%	8.63	14.26%
2005	59.00	66.08	7.08	11%	9.15	14.81%
2006	61.49	68.82	7.33	11%	10.06	15.46%
2007	61.79	66.29	4.50	7%	6.00	9.42%
2008	63.35	68.70	5.35	8%	6.48	9.86%
2009	66.29	71.61	5.32	7%	7.06	10.39%
2010	67.34	69.26	1.92	3%	2.69	4.02%
2011	66.78	69.66	2.88	4%	3.48	5.23%
2012	66.23	68.39	2.16	3%	2.82	4.24%
2013	66.00	67.21	1.21	2%	1.51	2.31%

Table A2.6: Inequality Indices GPs FTE Excluding Registrars and Retainers Practice Level Aggregation

	Excluding Registrars and Retainers (Practice Level Aggregation)					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII	RII
2004	53.94	57.67	3.73	6%	4.97	9.02%
2005	55.25	59.33	4.08	7%	5.58	9.86%
2006	57.81	62.83	5.02	8%	7.05	11.71%
2007	58.84	61.90	3.06	5%	4.53	7.56%
2008	58.72	61.04	2.32	4%	3.25	5.46%
2009	60.85	62.22	1.37	2%	2.56	4.21%
2010	61.89	59.93	-1.96	-3%	-1.57	-2.62%
2011	61.79	59.84	-1.95	-3%	-1.96	-3.30%
2012	60.35	59.25	-1.10	-2%	-1.09	-1.86%
2013	60.99	60.28	-0.71	-1%	-0.73	-1.23%

Table A2.7: Inequality Indices GPs FTE Excluding Registrars and Retainers CCG Level Aggregation

	Excluding Registrars and Retainers					
Year	Q1	Q5	ABS_GAP	REL_GAP	SII (95% CI)	RII (95% CI)
2004	54.17	57.34	3.17	6%	4.63 (2.07 to 7.19)	0.08 (0.04 to 0.13)
2005	55.97	58.81	2.84	5%	4.82 (1.66 to 7.98)	0.08 (0.03 to 0.14)
2006	58.16	62.72	4.56	7%	6.49 (3.79 to 9.18)	0.11 (0.06 to 0.15)
2007	59.00	61.88	2.88	5%	4.37 (2.17 to 6.58)	0.07 (0.04 to 0.11)
2008	58.88	61.12	2.24	4%	3.11 (0.53 to 5.70)	0.05 (0.01 to 0.10)
2009	60.49	62.87	2.38	4%	3.06 (-0.62 to 6.75)	0.05 (-0.01 to 0.11)
2010	61.22	60.69	-0.53	-1%	-0.35 (-4.55 to 3.86)	-0.01 (-0.08 to 0.06)
2011	60.80	60.53	-0.27	0%	-0.40 (-4.81 to 4.01)	-0.01 (-0.08 to 0.07)
2012	59.29	59.37	0.08	0%	-0.18 (-4.40 to 4.04)	0.00 (-0.07 to 0.07)
2013	60.21	59.98	-0.23	0%	-0.32 (-5.61 to 4.98)	-0.01 (-0.09 to 0.08)

Table A2.8: Carr-Hill Adjustment Relative Need Gap Compared to Most Affluent Fifth

	Relative Need Gap Compared to Q5			
YEAR	Q1	Q2	Q3	Q4
2004	8.47%	5.86%	5.05%	3.36%
2005	8.14%	5.56%	4.86%	3.27%
2006	7.83%	5.34%	4.73%	3.20%
2007	7.51%	5.09%	4.59%	3.16%
2008	7.13%	4.81%	4.43%	3.13%
2009	6.66%	4.46%	4.24%	3.07%
2010	6.13%	4.10%	4.04%	2.99%
2011	5.58%	3.69%	3.83%	2.90%
2012	4.23%	2.88%	3.29%	2.73%
2013	3.75%	2.54%	3.11%	2.67%

Appendix Section 3

This section looks at GP supply by PCT in 2006/07 and 2011/12 the two years that we compare to evaluate whether the investment in underdoctored areas had any effect. PCTs are marked by underdoctored status as identified in the policy documents that defined where this investment would be targeted. Numbers are presented for all LSOAs as well as for only the most deprived fifth of LSOAs and least deprived fifth of LSOAs in each PCT. PCTs that do not include any LSOAs in the most or least deprived fifths have NAs in place of numbers in the relevant fields. There is also a second table in this worksheet showing similar results for GPs excluding registrars and retainers.

Table A3.1: GP supply by PCT 2006 and 2011 excluding registrars and retainers

		Full Time Equivalent GPs Excluding Registrars and Retainers (per 100,000 need adjusted population)								
		All LSOAs			Most Deprived Fifth of LSOAs			Least Deprived Fifth of LSOAs		
PCT	Under-Doctored PCT	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006
Ashton, Leigh and Wigan	1	54.52	54.04	-0.48	53.01	55.05	2.04	62.08	55.76	-6.32
Barking and Dagenham	1	41.72	47.99	6.27	40.58	48.78	8.20	NA	NA	NA
Barnet	0	66.07	55.37	-10.70	63.80	51.39	-12.41	68.14	55.31	-12.83
Barnsley	1	54.57	65.97	11.40	52.12	69.98	17.86	74.95	76.78	1.83
Bassetlaw	0	53.19	54.69	1.50	51.21	58.25	7.04	60.31	61.43	1.12
Bath and North East Somerset	0	61.45	59.86	-1.59	60.95	56.33	-4.62	60.35	58.82	-1.53
Bedfordshire	0	62.89	60.38	-2.51	58.52	67.38	8.86	64.71	59.20	-5.51
Berkshire East	0	56.59	57.73	1.14	53.92	60.99	7.07	60.08	59.75	-0.33
Berkshire West	0	61.35	58.24	-3.11	54.97	53.93	-1.04	62.86	58.81	-4.05
Bexley	0	44.50	48.86	4.36	44.88	50.15	5.27	45.39	50.00	4.61
Birmingham East and North	1	54.98	55.30	0.32	55.53	56.99	1.46	54.45	54.05	-0.40
Blackburn with Darwen Teaching	1	47.14	59.48	12.34	46.47	58.52	12.05	48.69	65.93	17.24
Blackpool	1	51.62	60.01	8.39	53.82	65.90	12.08	NA	NA	NA
Bolton Teaching	1	54.00	58.88	4.88	54.16	60.23	6.07	58.18	61.66	3.48
Bournemouth and Poole Teaching	0	65.05	58.21	-6.84	68.33	63.73	-4.60	65.04	57.31	-7.73
Bradford and Airedale Teaching	0	64.45	64.29	-0.16	64.11	64.87	0.76	62.53	62.43	-0.10
Brent Teaching	0	69.34	70.45	1.11	73.02	70.83	-2.19	NA	NA	NA
Brighton and Hove City	0	62.60	56.20	-6.40	60.56	58.90	-1.66	68.46	56.71	-11.75
Bristol	0	62.75	59.64	-3.11	64.96	63.77	-1.19	66.35	57.20	-9.15
Bromley	0	55.83	54.52	-1.31	50.54	53.38	2.84	58.41	55.75	-2.66
Buckinghamshire	0	66.22	62.92	-3.30	NA	NA	NA	67.47	63.39	-4.08
Bury	0	60.91	57.50	-3.41	55.61	59.66	4.05	67.98	59.07	-8.91
Calderdale	1	51.24	49.28	-1.96	50.30	46.14	-4.16	51.55	53.32	1.77
Cambridgeshire	0	69.26	61.34	-7.92	59.14	57.94	-1.20	70.01	61.38	-8.63
Camden	0	72.35	76.71	4.36	68.98	79.29	10.31	79.27	81.99	2.72
Central and Eastern Cheshire	0	59.42	54.14	-5.28	58.07	53.56	-4.51	60.23	53.91	-6.32
Central Lancashire	0	54.39	50.69	-3.70	53.04	51.02	-2.02	56.89	52.79	-4.10
City and Hackney Teaching	0	72.61	71.61	-1.00	74.43	72.63	-1.80	38.94	37.84	-1.10
Cornwall and Isles of Scilly	0	70.47	59.92	-10.55	70.65	63.96	-6.69	79.89	51.14	-28.75
County Durham	0	62.62	62.12	-0.50	59.30	62.99	3.69	72.35	64.64	-7.71
Coventry Teaching	0	58.81	60.95	2.14	62.35	65.95	3.60	50.87	57.05	6.18
Croydon	0	66.99	66.70	-0.29	68.77	66.31	-2.46	69.20	64.72	-4.48
Cumbria Teaching	0	63.22	64.60	1.38	59.44	62.00	2.56	63.48	64.23	0.75
Darlington	0	67.44	69.31	1.87	66.26	69.88	3.62	67.24	67.29	0.05
Derby City	0	56.09	52.19	-3.90	56.85	56.71	-0.14	57.79	52.39	-5.40
Derbyshire County	0	60.21	55.51	-4.70	56.90	56.08	-0.82	62.15	56.40	-5.75
Devon	0	80.32	79.07	-1.25	83.49	84.89	1.40	76.50	75.07	-1.43
Doncaster	0	55.31	60.27	4.96	55.25	64.11	8.86	63.13	63.78	0.65
Dorset	0	68.43	57.28	-11.15	70.55	67.62	-2.93	65.63	54.86	-10.77
Dudley	1	55.76	57.39	1.63	57.96	62.94	4.98	55.34	55.46	0.12
Ealing	0	56.10	61.98	5.88	53.10	62.48	9.38	59.66	64.07	4.41
East Lancashire Teaching	0	50.93	55.67	4.74	48.94	57.44	8.50	51.12	54.46	3.34
East Riding of Yorkshire	0	61.55	52.53	-9.02	55.21	54.40	-0.81	65.75	51.83	-13.92
East Sussex Downs and Weald	0	59.38	60.48	1.10	56.76	68.12	11.36	61.58	61.39	-0.19
Eastern and Coastal Kent	0	55.35	54.37	-0.98	54.32	53.18	-1.14	59.46	57.18	-2.28
Enfield	0	58.18	59.16	0.98	54.60	59.21	4.61	57.13	53.07	-4.06
Gateshead	0	58.88	63.80	4.92	62.30	64.89	2.59	53.85	64.24	10.39
Gloucestershire	0	62.86	59.13	-3.73	60.89	64.65	3.76	65.16	59.24	-5.92
Great Yarmouth and Waveney	0	55.05	58.30	3.25	52.27	61.58	9.31	55.14	57.43	2.29
Greenwich Teaching	1	48.44	61.68	13.24	49.85	64.73	14.88	NA	NA	NA
Halton and St Helens	1	51.90	54.45	2.55	52.39	53.08	0.69	52.63	55.77	3.14
Hammersmith and Fulham	1	60.47	72.94	12.47	59.66	72.70	13.04	NA	NA	NA
Hampshire	0	58.50	57.62	-0.88	61.21	57.23	-3.98	58.94	58.28	-0.66
Haringey Teaching	0	61.40	71.93	10.53	59.47	71.60	12.13	NA	NA	NA

Harrow	0	63.86	64.33	0.47	61.57	57.58	-3.99	62.01	65.12	3.11
Hartlepool	1	50.56	58.29	7.73	50.57	57.24	6.67	53.39	60.37	6.98
Hastings and Rother	0	55.17	59.11	3.94	55.11	64.38	9.27	59.20	58.79	-0.41
Havering	1	49.75	47.10	-2.65	50.06	47.70	-2.36	51.99	45.84	-6.15
Heart of Birmingham Teaching	1	60.39	63.59	3.20	62.87	67.78	4.91	NA	NA	NA
Herefordshire	0	64.95	59.60	-5.35	60.03	57.64	-2.39	65.82	58.39	-7.43
Hertfordshire	0	63.07	58.05	-5.02	56.54	54.75	-1.79	65.72	59.78	-5.94
Heywood, Middleton and Rochdale	1	56.55	53.68	-2.87	57.16	55.77	-1.39	53.84	45.51	-8.33
Hillingdon	0	58.55	58.29	-0.26	59.65	60.11	0.46	57.69	59.07	1.38
Hounslow	1	50.83	59.94	9.11	48.83	69.99	21.16	51.56	62.67	11.11
Hull Teaching	1	54.05	52.88	-1.17	54.59	53.08	-1.51	55.12	56.52	1.40
Isle of Wight National Health Service	0	52.33	52.81	0.48	57.66	52.89	-4.77	48.88	49.23	0.35
Islington	0	75.96	79.83	3.87	76.58	82.33	5.75	NA	NA	NA
Kensington and Chelsea	0	61.81	56.55	-5.26	56.57	60.73	4.16	85.05	66.99	-18.06
Kingston	0	70.41	71.81	1.40	68.80	75.22	6.42	74.26	71.85	-2.41
Kirklees	0	56.67	55.14	-1.53	57.05	54.23	-2.82	61.51	58.04	-3.47
Knowsley	1	47.63	60.33	12.70	48.40	63.87	15.47	NA	NA	NA
Lambeth	0	77.15	75.82	-1.33	76.17	76.64	0.47	NA	NA	NA
Leeds	0	57.60	54.92	-2.68	58.88	57.12	-1.76	60.27	56.11	-4.16
Leicester City	1	49.23	60.00	10.77	50.58	60.76	10.18	47.47	68.17	20.70
Leicestershire County and Rutland	0	58.79	61.58	2.79	62.00	76.25	14.25	60.61	61.79	1.18
Lewisham	0	68.23	65.68	-2.55	69.23	66.98	-2.25	NA	NA	NA
Lincolnshire Teaching	0	50.27	51.58	1.31	48.40	53.74	5.34	53.07	53.27	0.20
Liverpool	1	61.49	62.82	1.33	60.80	63.59	2.79	70.89	67.12	-3.77
Luton	1	55.39	58.15	2.76	59.62	64.56	4.94	52.20	51.58	-0.62
Manchester Teaching	1	56.60	55.70	-0.90	56.49	55.75	-0.74	64.20	55.88	-8.32
Medway	1	49.84	54.67	4.83	46.91	56.67	9.76	49.22	50.93	1.71
Mid Essex	0	59.08	58.55	-0.53	53.06	59.09	6.03	59.49	60.38	0.89
Middlesbrough	0	56.57	61.90	5.33	57.84	66.51	8.67	57.12	58.26	1.14
Milton Keynes	0	66.86	62.28	-4.58	65.13	65.12	-0.01	68.12	61.80	-6.32
Newcastle	1	56.46	56.90	0.44	56.16	59.51	3.35	58.36	56.86	-1.50
Newham	0	72.22	72.89	0.67	71.97	72.89	0.92	NA	NA	NA
Norfolk	0	66.77	63.02	-3.75	67.27	66.26	-1.01	72.48	65.40	-7.08
North East Essex	0	53.84	50.83	-3.01	38.84	39.80	0.96	63.36	59.32	-4.04
North East Lincolnshire	0	57.26	59.43	2.17	57.58	61.87	4.29	60.09	59.09	-1.00
North Lancashire Teaching	1	56.09	52.87	-3.22	54.68	52.51	-2.17	54.72	51.49	-3.23
North Lincolnshire	0	58.80	54.34	-4.46	61.60	59.09	-2.51	59.42	55.75	-3.67
North Somerset	0	52.76	56.18	3.42	51.72	60.08	8.36	59.37	58.38	-0.99
North Staffordshire	0	54.49	56.90	2.41	52.59	58.50	5.91	56.66	59.97	3.31
North Tyneside	0	56.00	61.81	5.81	56.45	63.18	6.73	56.17	59.08	2.91
North Yorkshire and York	0	65.09	61.15	-3.94	65.64	66.15	0.51	65.18	60.60	-4.58
Northamptonshire Teaching	0	56.28	52.24	-4.04	55.73	53.22	-2.51	59.46	54.18	-5.28
Northumberland	0	83.05	65.97	-17.08	79.31	63.96	-15.35	84.62	69.63	-14.99
Nottingham City	1	51.65	49.09	-2.56	51.76	49.68	-2.08	51.18	51.75	0.57
Nottinghamshire County Teaching	0	54.52	54.23	-0.29	51.94	55.67	3.73	58.78	56.67	-2.11
Oldham	1	46.89	52.47	5.58	44.94	56.31	11.37	53.08	50.15	-2.93
Oxfordshire	0	63.34	63.18	-0.16	58.10	70.88	12.78	63.74	60.55	-3.19
Peterborough	0	60.38	61.92	1.54	59.48	62.55	3.07	56.87	59.24	2.37
Plymouth Teaching	0	71.72	68.30	-3.42	72.52	70.01	-2.51	67.51	63.17	-4.34
Portsmouth City Teaching	0	51.75	50.07	-1.68	52.24	49.93	-2.31	55.46	56.92	1.46
Redbridge	0	51.42	47.27	-4.15	51.27	50.91	-0.36	65.13	49.72	-15.41
Redcar and Cleveland	1	56.85	63.35	6.50	57.85	66.23	8.38	61.93	63.65	1.72
Richmond and Twickenham	0	70.38	62.98	-7.40	NA	NA	NA	72.97	65.45	-7.52
Rotherham	0	56.14	58.69	2.55	55.43	60.31	4.88	58.65	56.99	-1.66
Salford	1	48.72	54.20	5.48	46.76	53.19	6.43	53.06	56.49	3.43
Sandwell	1	52.23	49.78	-2.45	52.35	51.04	-1.31	NA	NA	NA
Sefton	1	54.60	48.72	-5.88	53.86	51.54	-2.32	54.88	48.91	-5.97
Sheffield	0	68.64	68.76	0.12	69.46	74.14	4.68	72.72	68.71	-4.01
Shropshire County	0	60.87	55.96	-4.91	60.66	60.93	0.27	59.70	52.87	-6.83
Solihull	0	62.64	56.85	-5.79	63.05	55.01	-8.04	67.08	60.88	-6.20
Somerset	0	70.67	60.05	-10.62	69.99	63.53	-6.46	73.55	60.49	-13.06
South Birmingham	0	60.36	58.85	-1.51	58.80	58.72	-0.08	71.35	63.84	-7.51
South East Essex	0	54.20	53.49	-0.71	52.01	45.99	-6.02	55.10	56.77	1.67
South Gloucestershire	0	64.57	61.71	-2.86	45.55	55.51	9.96	64.34	60.06	-4.28
South Staffordshire	0	57.15	57.66	0.51	58.88	56.10	-2.78	59.08	60.22	1.14
South Tyneside	1	58.94	61.39	2.45	56.87	61.01	4.14	65.20	62.24	-2.96

South West Essex	0	50.10	49.50	-0.60	49.31	43.98	-5.33	52.29	53.85	1.56
Southampton City	0	58.95	54.83	-4.12	59.22	57.86	-1.36	64.89	58.85	-6.04
Southwark	0	72.20	70.87	-1.33	70.72	72.51	1.79	51.03	38.59	-12.44
Stockport	0	54.15	50.59	-3.56	54.79	55.46	0.67	54.89	49.27	-5.62
Stockton-on-Tees Teaching	0	59.59	54.98	-4.61	64.07	59.23	-4.84	59.41	54.64	-4.77
Stoke on Trent	1	46.99	54.56	7.57	44.37	55.87	11.50	52.42	50.85	-1.57
Suffolk	0	60.84	56.81	-4.03	59.81	49.20	-10.61	61.03	57.85	-3.18
Sunderland Teaching	1	56.90	60.35	3.45	57.10	59.02	1.92	57.43	63.14	5.71
Surrey	0	63.26	64.31	1.05	65.76	64.42	-1.34	64.47	65.26	0.79
Sutton and Merton	0	66.45	67.50	1.05	60.60	63.97	3.37	71.72	71.72	0.00
Swindon	0	65.56	63.55	-2.01	62.68	66.10	3.42	67.69	58.87	-8.82
Tameside and Glossop	1	53.20	51.57	-1.63	51.59	54.65	3.06	56.80	49.83	-6.97
Telford and Wrekin	0	56.30	53.68	-2.62	56.52	55.03	-1.49	56.86	52.38	-4.48
Torbay	0	67.19	61.49	-5.70	68.30	67.15	-1.15	65.26	61.35	-3.91
Tower Hamlets	0	66.79	81.77	14.98	66.58	86.46	19.88	61.91	64.14	2.23
Trafford	0	54.28	57.39	3.11	56.84	57.47	0.63	54.74	57.29	2.55
Wakefield District	0	57.30	55.04	-2.26	55.57	55.42	-0.15	59.72	56.77	-2.95
Walsall Teaching	1	50.50	56.98	6.48	50.04	59.27	9.23	53.25	52.07	-1.18
Waltham Forest	0	64.28	60.14	-4.14	62.79	58.91	-3.88	NA	NA	NA
Wandsworth	0	74.48	81.43	6.95	81.55	92.06	10.51	73.22	82.76	9.54
Warrington	0	59.86	55.90	-3.96	63.19	57.34	-5.85	58.44	57.57	-0.87
Warwickshire	0	60.84	60.13	-0.71	51.03	62.70	11.67	63.43	60.99	-2.44
West Essex	0	59.39	59.62	0.23	52.50	58.94	6.44	64.90	63.25	-1.65
West Kent	0	55.95	55.20	-0.75	49.21	51.07	1.86	57.47	55.59	-1.88
West Sussex	0	63.52	55.74	-7.78	56.09	56.69	0.60	65.80	55.89	-9.91
Western Cheshire	0	65.25	61.10	-4.15	67.40	63.42	-3.98	63.48	60.76	-2.72
Westminster	0	63.06	54.21	-8.85	67.87	65.58	-2.29	NA	NA	NA
Wiltshire	0	69.53	64.29	-5.24	71.23	67.58	-3.65	68.96	63.11	-5.85
Wirral	0	64.33	58.40	-5.93	69.03	62.08	-6.95	59.14	54.25	-4.89
Wolverhampton City	1	47.47	52.81	5.34	46.98	55.17	8.19	47.85	48.16	0.31
Worcestershire	0	61.92	63.55	1.63	64.13	63.11	-1.02	62.44	64.99	2.55

Table A3.2: GP supply by PCT 2006 and 2011 including registrars and retainers

		Full Time Equivalent GPs Including Registrars and Retainers (per 100,000 need adjusted population)								
		All LSOAs			Most Deprived Fifth of LSOAs			Least Deprived Fifth of LSOAs		
PCT	Under-Doctored PCT	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006	2006	2011	Change 2011-2006
Ashton, Leigh and Wigan	1	56.77	54.04	-2.73	55.52	55.05	-0.47	64.58	55.76	-8.82
Barking and Dagenham	1	44.04	53.25	9.21	43.05	54.45	11.40	NA	NA	NA
Barnet	0	70.62	61.66	-8.96	67.15	56.60	-10.55	73.76	63.48	-10.28
Barnsley	1	54.66	71.92	17.26	52.17	74.84	22.67	74.95	87.39	12.44
Bassetlaw	0	59.69	64.75	5.06	56.38	65.29	8.91	70.35	76.55	6.20
Bath and North East Somerset	0	63.64	71.32	7.68	62.85	69.43	6.58	62.73	68.88	6.15
Bedfordshire	0	65.68	68.21	2.53	60.82	74.21	13.39	67.91	68.64	0.73
Berkshire East	0	62.86	65.88	3.02	60.94	69.36	8.42	66.65	67.48	0.83
Berkshire West	0	64.68	63.59	-1.09	56.93	56.72	-0.21	66.23	64.30	-1.93
Bexley	0	46.75	55.02	8.27	46.43	51.64	5.21	48.04	58.51	10.47
Birmingham East and North	1	58.86	64.95	6.09	58.68	65.94	7.26	61.89	68.19	6.30
Blackburn with Darwen Teaching	1	47.26	59.48	12.22	46.48	58.52	12.04	49.60	65.93	16.33
Blackpool	1	54.17	60.01	5.84	56.25	65.90	9.65	NA	NA	NA
Bolton Teaching	1	59.88	59.03	-0.85	58.76	60.44	1.68	64.12	61.71	-2.41
Bournemouth and Poole Teaching	0	74.68	70.14	-4.54	78.27	74.34	-3.93	73.95	73.67	-0.28
Bradford and Airedale Teaching	0	71.53	74.14	2.61	68.76	73.60	4.84	72.34	70.88	-1.46
Brent Teaching	0	77.18	79.94	2.76	83.03	81.34	-1.69	NA	NA	NA
Brighton and Hove City	0	65.67	60.90	-4.77	62.59	62.28	-0.31	71.69	60.73	-10.96
Bristol	0	63.85	66.58	2.73	66.29	72.93	6.64	67.52	59.53	-7.99
Bromley	0	59.40	59.84	0.44	52.77	55.77	3.00	62.37	61.59	-0.78
Buckinghamshire	0	73.22	74.16	0.94	NA	NA	NA	75.06	75.90	0.84
Bury	0	66.81	57.51	-9.30	58.55	59.66	1.11	78.45	59.08	-19.37
Calderdale	1	54.85	55.36	0.51	51.12	48.21	-2.91	59.14	66.43	7.29
Cambridgeshire	0	72.60	71.57	-1.03	61.43	60.67	-0.76	72.93	72.50	-0.43
Camden	0	84.42	88.87	4.45	78.66	92.50	13.84	92.73	90.51	-2.22
Central and Eastern Cheshire	0	66.36	62.76	-3.60	61.55	60.20	-1.35	68.38	63.28	-5.10
Central Lancashire	0	57.57	50.72	-6.85	56.39	51.02	-5.37	60.08	52.79	-7.29
City and Hackney Teaching	0	76.14	82.80	6.66	78.12	84.19	6.07	38.99	46.59	7.60
Cornwall and Isles of Scilly	0	74.02	67.19	-6.83	73.18	71.53	-1.65	86.01	62.95	-23.06
County Durham	0	69.09	70.58	1.49	63.94	68.17	4.23	83.44	79.68	-3.76
Coventry Teaching	0	63.23	69.99	6.76	65.24	74.60	9.36	55.60	64.79	9.19
Croydon	0	72.85	76.10	3.25	72.09	71.59	-0.50	76.56	78.88	2.32
Cumbria Teaching	0	66.32	72.05	5.73	62.30	68.16	5.86	66.60	71.57	4.97
Darlington	0	68.57	73.18	4.61	67.31	74.05	6.74	68.14	70.80	2.66
Derby City	0	59.27	58.01	-1.26	61.22	63.08	1.86	59.73	57.30	-2.43
Derbyshire County	0	65.01	65.72	0.71	60.90	65.68	4.78	66.11	65.88	-0.23
Devon	0	86.02	87.85	1.83	91.29	95.00	3.71	82.47	86.16	3.69
Doncaster	0	60.49	68.47	7.98	60.11	71.89	11.78	76.01	81.14	5.13
Dorset	0	73.82	64.12	-9.70	74.18	71.17	-3.01	72.45	63.61	-8.84
Dudley	1	63.70	64.51	0.81	65.34	69.76	4.42	65.59	65.08	-0.51
Ealing	0	59.18	69.16	9.98	55.73	67.99	12.26	62.67	74.45	11.78
East Lancashire Teaching	0	52.74	56.58	3.84	49.57	57.66	8.09	51.92	54.58	2.66
East Riding of Yorkshire	0	65.07	58.83	-6.24	57.41	58.26	0.85	69.72	57.58	-12.14
East Sussex Downs and Weald	0	63.84	67.99	4.15	59.54	76.10	16.56	66.17	67.94	1.77
Eastern and Coastal Kent	0	59.03	60.16	1.13	56.54	58.18	1.64	64.24	64.96	0.72
Enfield	0	60.87	63.11	2.24	55.34	61.26	5.92	62.80	59.29	-3.51
Gateshead	0	66.67	73.29	6.62	70.48	76.40	5.92	59.06	68.56	9.50
Gloucestershire	0	68.54	67.35	-1.19	64.94	69.54	4.60	72.14	68.62	-3.52
Great Yarmouth and Waveney	0	56.55	66.98	10.43	53.53	69.26	15.73	55.35	64.16	8.81
Greenwich Teaching	1	53.21	69.50	16.29	53.80	72.41	18.61	NA	NA	NA
Halton and St Helens	1	56.03	54.48	-1.55	57.17	53.09	-4.08	55.00	55.77	0.77
Hammersmith and Fulham	1	65.55	79.02	13.47	63.83	78.38	14.55	NA	NA	NA
Hampshire	0	64.86	66.32	1.46	65.58	64.69	-0.89	65.93	67.86	1.93
Haringey Teaching	0	67.61	77.80	10.19	63.77	74.87	11.10	NA	NA	NA
Harrow	0	73.31	73.97	0.66	69.31	67.27	-2.04	74.63	75.33	0.70
Hartlepool	1	55.81	60.40	4.59	55.64	59.27	3.63	59.20	62.82	3.62
Hastings and Rother	0	58.78	64.05	5.27	57.16	68.99	11.83	67.26	65.38	-1.88
Havering	1	55.56	53.95	-1.61	56.51	56.49	-0.02	59.88	51.48	-8.40
Heart of Birmingham Teaching	1	65.52	74.77	9.25	68.33	78.72	10.39	NA	NA	NA

Herefordshire	0	71.41	66.68	-4.73	67.88	65.14	-2.74	71.76	66.57	-5.19
Hertfordshire	0	67.81	66.50	-1.31	58.24	58.57	0.33	71.89	70.00	-1.89
Heywood, Middleton and Rochdale	1	58.18	53.68	-4.50	58.56	55.77	-2.79	55.21	45.51	-9.70
Hillingdon	0	64.62	64.26	-0.36	60.77	61.26	0.49	68.81	72.59	3.78
Hounslow	1	51.12	64.01	12.89	48.98	76.88	27.90	51.86	65.16	13.30
Hull Teaching	1	54.05	56.33	2.28	54.59	55.78	1.19	55.15	59.93	4.78
Isle of Wight National Health Service	0	54.68	58.08	3.40	60.10	58.21	-1.89	53.39	53.99	0.60
Islington	0	80.35	86.18	5.83	80.88	88.65	7.77	NA	NA	NA
Kensington and Chelsea	0	70.83	73.70	2.87	58.75	69.29	10.54	108.97	102.92	-6.05
Kingston	0	78.33	79.56	1.23	73.19	84.10	10.91	83.29	81.23	-2.06
Kirklees	0	60.02	62.44	2.42	59.66	59.18	-0.48	65.48	68.12	2.64
Knowsley	1	48.54	61.08	12.54	48.89	64.29	15.40	NA	NA	NA
Lambeth	0	80.65	77.10	-3.55	79.74	77.43	-2.31	NA	NA	NA
Leeds	0	62.92	62.54	-0.38	63.65	64.32	0.67	66.46	64.59	-1.87
Leicester City	1	51.69	66.80	15.11	52.84	67.82	14.98	51.03	74.49	23.46
Leicestershire County and Rutland	0	68.35	73.29	4.94	77.97	87.97	10.00	68.96	73.44	4.48
Lewisham	0	74.24	66.16	-8.08	77.55	67.44	-10.11	NA	NA	NA
Lincolnshire Teaching	0	50.65	57.23	6.58	48.44	58.88	10.44	53.95	60.87	6.92
Liverpool	1	67.46	67.31	-0.15	66.20	67.78	1.58	75.58	71.23	-4.35
Luton	1	59.33	76.73	17.40	64.30	86.93	22.63	55.16	68.26	13.10
Manchester Teaching	1	61.44	55.91	-5.53	61.44	55.91	-5.53	68.03	55.89	-12.14
Medway	1	52.74	62.01	9.27	48.17	60.47	12.30	51.97	57.72	5.75
Mid Essex	0	62.70	66.28	3.58	56.29	70.21	13.92	64.35	69.60	5.25
Middlesbrough	0	59.24	66.71	7.47	60.34	71.64	11.30	60.37	62.89	2.52
Milton Keynes	0	69.56	67.48	-2.08	65.35	66.54	1.19	71.60	68.76	-2.84
Newcastle	1	63.01	67.32	4.31	62.83	68.25	5.42	65.91	71.41	5.50
Newham	0	73.55	82.22	8.67	73.31	81.98	8.67	NA	NA	NA
Norfolk	0	70.02	68.79	-1.23	70.22	72.24	2.02	74.91	70.68	-4.23
North East Essex	0	53.96	57.17	3.21	38.85	41.64	2.79	63.56	65.14	1.58
North East Lincolnshire	0	60.25	64.21	3.96	60.50	66.37	5.87	63.28	63.84	0.56
North Lancashire Teaching	1	63.31	53.47	-9.84	61.58	52.92	-8.66	60.80	52.07	-8.73
North Lincolnshire	0	61.29	61.99	0.70	62.98	65.10	2.12	63.64	68.62	4.98
North Somerset	0	53.50	64.71	11.21	51.72	68.18	16.46	60.59	68.36	7.77
North Staffordshire	0	57.53	67.07	9.54	54.87	63.52	8.65	59.93	72.94	13.01
North Tyneside	0	62.40	71.33	8.93	62.58	73.44	10.86	62.44	68.24	5.80
North Yorkshire and York	0	73.71	68.94	-4.77	73.44	73.60	0.16	73.95	68.40	-5.55
Northamptonshire Teaching	0	60.01	64.91	4.90	59.44	68.98	9.54	62.95	66.23	3.28
Northumberland	0	99.46	76.95	-22.51	91.70	69.52	-22.18	104.30	82.90	-21.40
Nottingham City	1	54.92	53.90	-1.02	55.35	54.79	-0.56	53.42	55.61	2.19
Nottinghamshire County Teaching	0	58.96	71.22	12.26	55.54	74.57	19.03	65.27	77.55	12.28
Oldham	1	48.61	52.47	3.86	47.38	56.31	8.93	53.66	50.15	-3.51
Oxfordshire	0	67.80	72.36	4.56	63.94	80.27	16.33	67.02	69.67	2.65
Peterborough	0	60.54	68.12	7.58	59.48	67.08	7.60	57.87	67.01	9.14
Plymouth Teaching	0	72.88	72.38	-0.50	73.38	72.96	-0.42	69.44	68.50	-0.94
Portsmouth City Teaching	0	57.62	56.99	-0.63	58.09	54.74	-3.35	62.48	63.37	0.89
Redbridge	0	56.36	56.29	-0.07	56.12	60.73	4.61	73.37	58.26	-15.11
Redcar and Cleveland	1	60.06	68.46	8.40	59.51	70.28	10.77	67.39	73.64	6.25
Richmond and Twickenham	0	79.46	76.66	-2.80	NA	NA	NA	81.94	79.99	-1.95
Rotherham	0	61.06	69.35	8.29	60.39	70.72	10.33	63.14	65.92	2.78
Salford	1	52.60	54.20	1.60	50.92	53.19	2.27	59.20	56.49	-2.71
Sandwell	1	58.36	56.15	-2.21	58.52	57.81	-0.71	NA	NA	NA
Sefton	1	59.01	49.76	-9.25	57.91	51.79	-6.12	58.80	49.71	-9.09
Sheffield	0	78.38	80.95	2.57	83.23	89.92	6.69	78.11	74.99	-3.12
Shropshire County	0	66.04	62.38	-3.66	64.45	64.63	0.18	69.37	62.12	-7.25
Solihull	0	69.54	64.48	-5.06	65.40	60.07	-5.33	79.42	71.31	-8.11
Somerset	0	72.98	69.37	-3.61	73.19	75.09	1.90	75.92	70.79	-5.13
South Birmingham	0	71.07	69.67	-1.40	69.10	69.80	0.70	82.56	71.77	-10.79
South East Essex	0	56.91	60.97	4.06	53.56	48.73	-4.83	59.04	69.96	10.92
South Gloucestershire	0	65.56	66.06	0.50	45.55	58.97	13.42	65.45	65.23	-0.22
South Staffordshire	0	61.36	64.94	3.58	62.68	63.54	0.86	64.34	69.50	5.16
South Tyneside	1	64.01	67.83	3.82	62.04	67.52	5.48	71.16	69.57	-1.59
South West Essex	0	52.39	54.40	2.01	51.24	47.14	-4.10	54.23	60.71	6.48
Southampton City	0	62.73	61.49	-1.24	62.77	63.47	0.70	68.31	64.10	-4.21
Southwark	0	74.23	71.00	-3.23	72.44	72.53	0.09	51.09	38.63	-12.46
Stockport	0	59.74	51.76	-7.98	60.24	56.02	-4.22	61.49	50.51	-10.98
Stockton-on-Tees Teaching	0	62.99	61.77	-1.22	67.74	66.32	-1.42	62.68	61.15	-1.53

Stoke on Trent	1	49.26	58.16	8.90	46.36	59.19	12.83	54.34	53.21	-1.13
Suffolk	0	65.31	64.08	-1.23	65.77	58.43	-7.34	64.97	64.68	-0.29
Sunderland Teaching	1	61.61	65.57	3.96	61.05	63.55	2.50	62.36	67.72	5.36
Surrey	0	71.89	74.96	3.07	77.20	72.15	-5.05	72.98	75.54	2.56
Sutton and Merton	0	73.99	75.20	1.21	65.96	70.18	4.22	79.39	79.85	0.46
Swindon	0	66.35	70.13	3.78	64.13	75.88	11.75	67.93	65.41	-2.52
Tameside and Glossop	1	57.17	51.85	-5.32	55.13	54.98	-0.15	63.71	49.86	-13.85
Telford and Wrekin	0	62.47	57.04	-5.43	65.33	58.86	-6.47	61.01	54.89	-6.12
Torbay	0	69.88	66.37	-3.51	70.64	70.77	0.13	70.30	69.80	-0.50
Tower Hamlets	0	73.25	94.10	20.85	73.93	99.25	25.32	65.84	77.06	11.22
Trafford	0	55.85	57.63	1.78	57.77	57.66	-0.11	56.05	57.49	1.44
Wakefield District	0	65.10	67.54	2.44	63.18	66.90	3.72	68.10	69.62	1.52
Walsall Teaching	1	54.82	64.88	10.06	52.94	65.50	12.56	59.31	64.25	4.94
Waltham Forest	0	69.98	69.35	-0.63	66.91	66.36	-0.55	NA	NA	NA
Wandsworth	0	80.97	92.01	11.04	89.84	105.91	16.07	83.39	96.74	13.35
Warrington	0	59.87	61.99	2.12	63.19	62.34	-0.85	58.45	64.93	6.48
Warwickshire	0	67.67	71.19	3.52	54.26	69.08	14.82	71.62	74.49	2.87
West Essex	0	68.60	73.07	4.47	57.79	72.17	14.38	75.90	77.21	1.31
West Kent	0	62.93	63.88	0.95	53.37	58.26	4.89	65.85	65.44	-0.41
West Sussex	0	67.22	67.68	0.46	57.66	62.90	5.24	70.39	69.00	-1.39
Western Cheshire	0	75.75	68.31	-7.44	78.16	72.46	-5.70	72.77	67.79	-4.98
Westminster	0	64.98	60.82	-4.16	68.82	71.47	2.65	NA	NA	NA
Wiltshire	0	70.63	73.22	2.59	72.52	78.04	5.52	69.94	72.26	2.32
Wirral	0	67.01	59.71	-7.30	69.94	62.72	-7.22	65.07	56.55	-8.52
Wolverhampton City	1	52.79	62.02	9.23	52.02	64.88	12.86	51.73	53.48	1.75
Worcestershire	0	68.97	71.68	2.71	71.17	71.57	0.40	69.47	72.62	3.15

Appendix Section 4

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - these are the basecase results used in the paper**

Figure A4.1: Trend in FTE GP supply over time excluding registrars and retainers

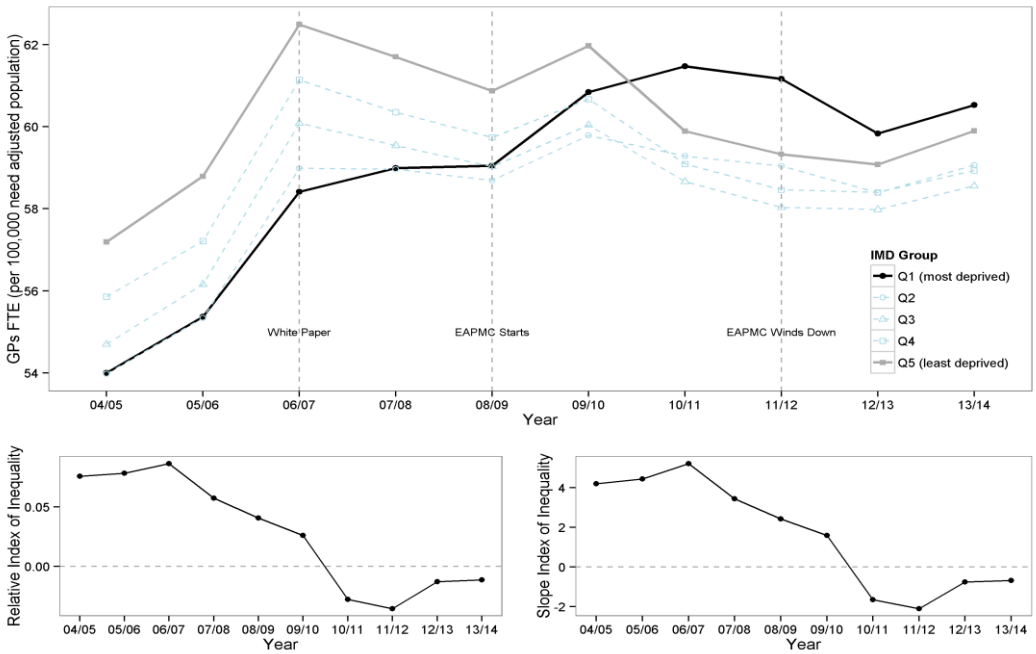


Figure A4.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

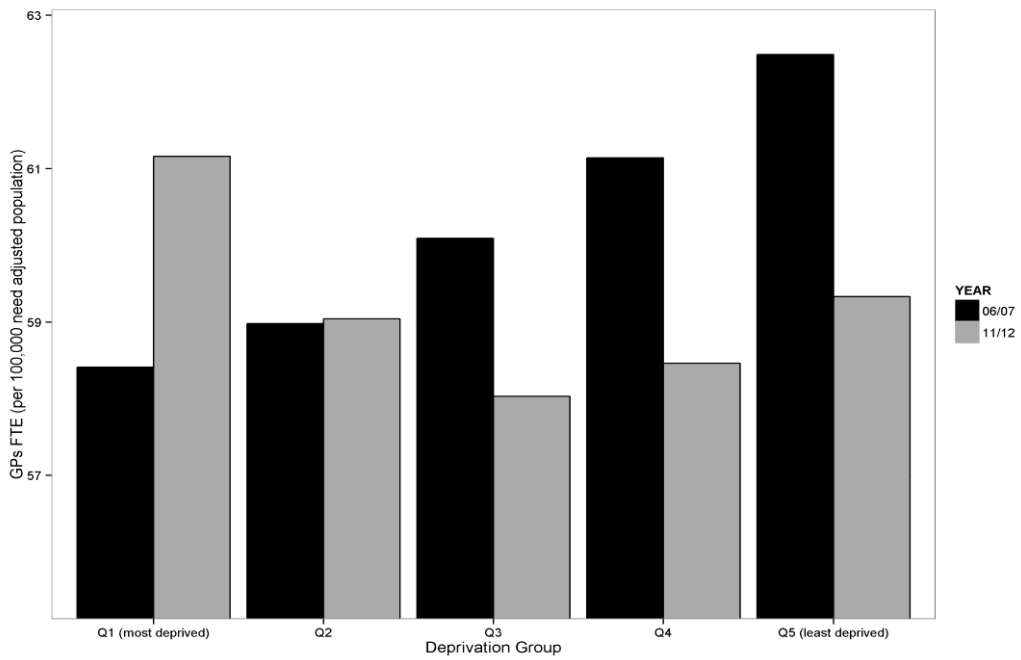


Figure A4.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

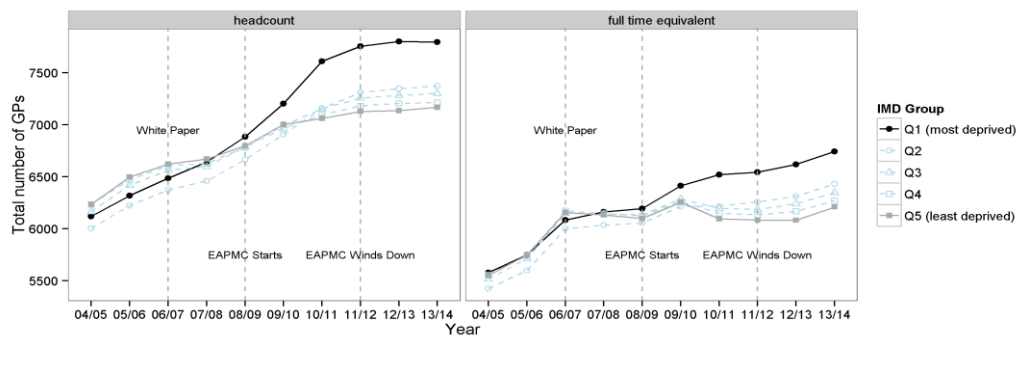
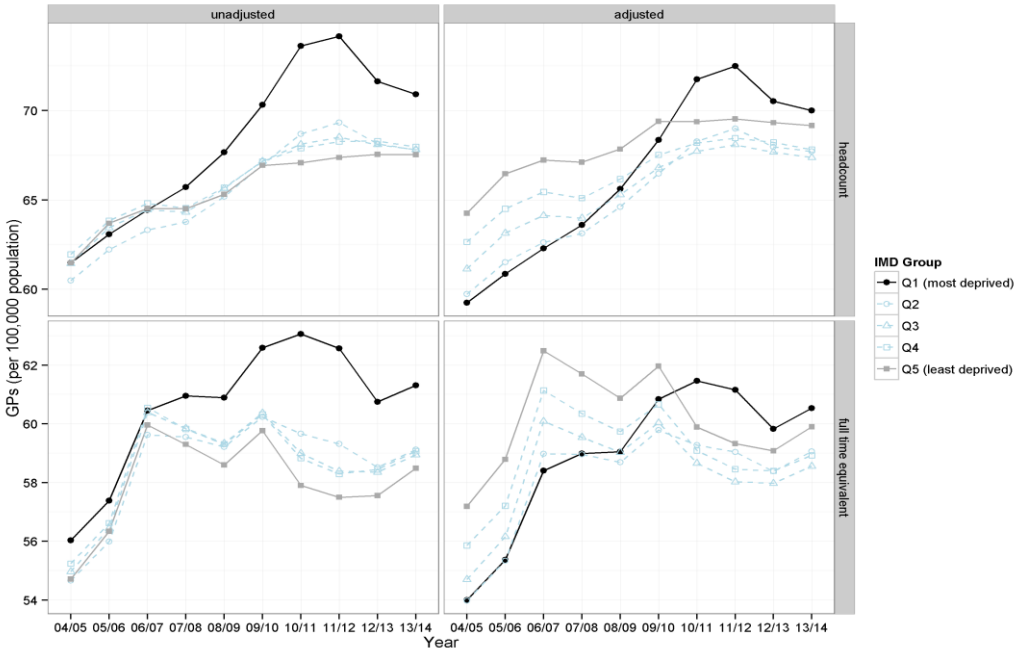


Figure A4.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A4.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.27994 -0.31105  0.01673  0.26021  1.44945

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         57.3527     0.5315 107.910  < 2e-16 ***
YEAR2011             3.0080     0.7516   4.002  0.00103 **
IMD_DECILE           5.2152     0.8566   6.088 1.57e-05 ***
YEAR2011:IMD_DECILE -7.3164     1.2114  -6.040 1.72e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.778 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.719
F-statistic:  17.2 on 3 and 16 DF,  p-value: 2.917e-05
```

Figure A4.5: Distribution of change in FTE GP supply in PCTs between 2006/07 and 2011/12 by underdoctored status excluding registrars and retainers

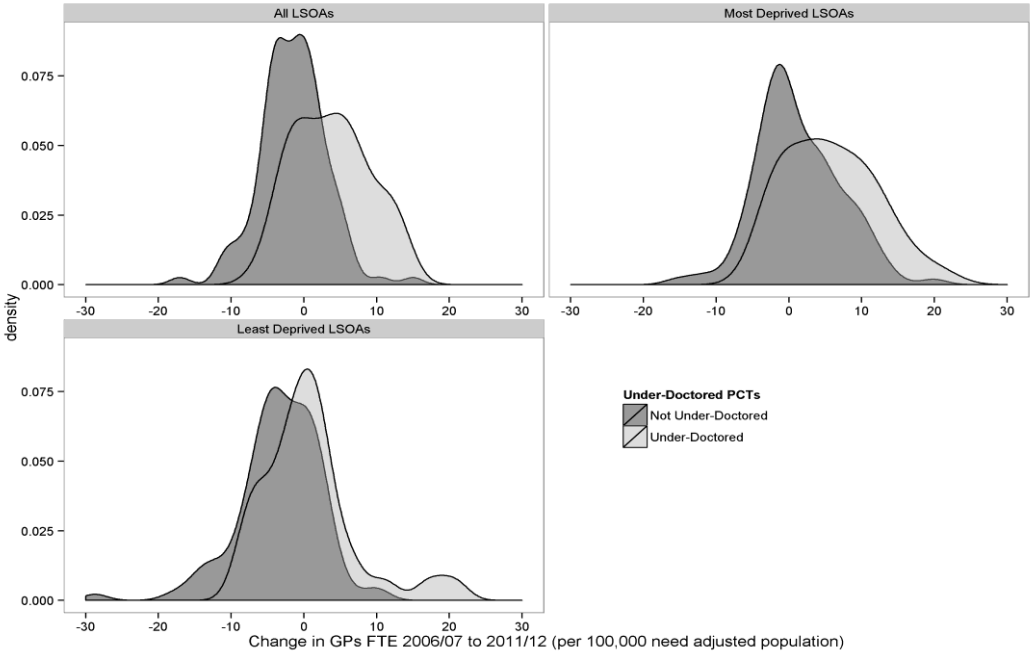


Figure A4.6: Distribution of GP Supply and Practices Nurses in 2013/14

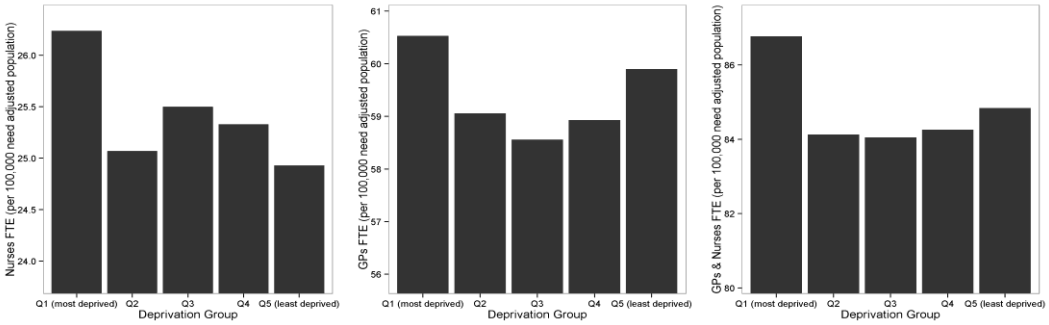


Figure A4.7: Distribution of GP Supply and Practices Nurses in 2013/14 (zeroed scale)

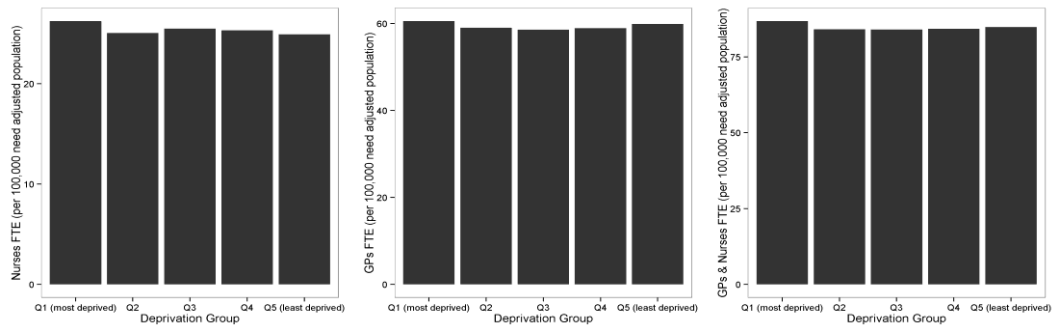


Figure A4.8: GP FTE per 100,000 at LSOA level in 2006/07 and 2011/12

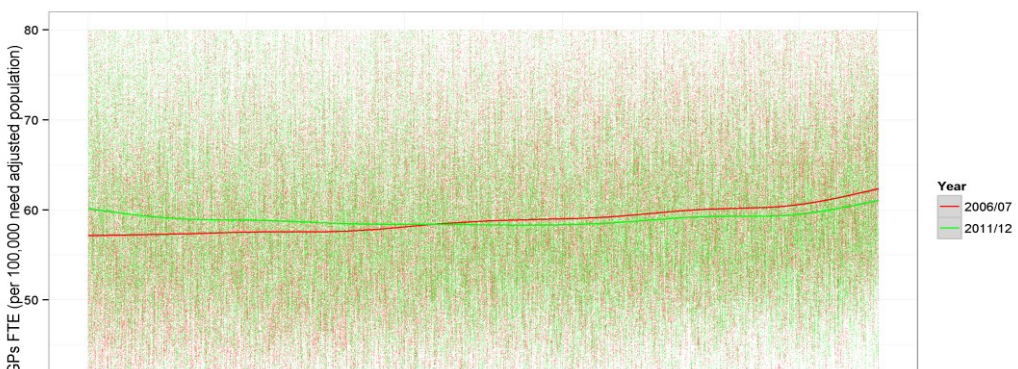


Figure A4.9: Change in GP FTE per 100,000 at LSOA level between 2006/07 and 2011/12

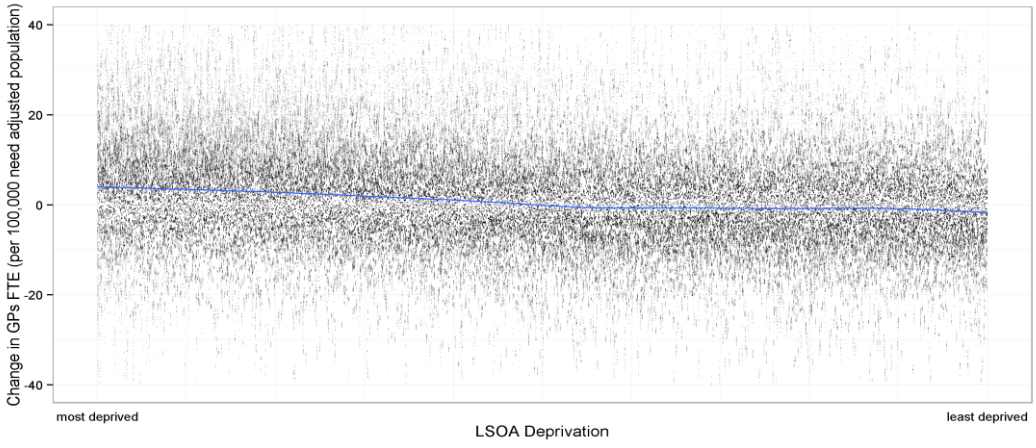
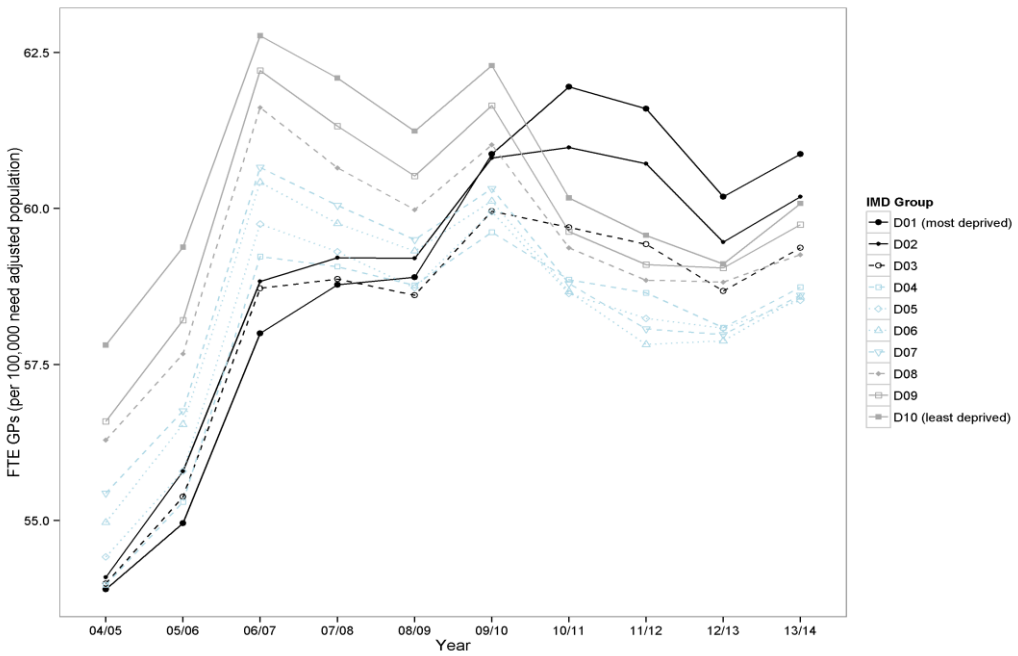


Figure A4.10: GP FTE by IMD Decile



Appendix Section 5

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **all GPs including registrars and retainers** used in the calculations

Figure A5.1: Trend in FTE GP supply over time including registrars and retainers

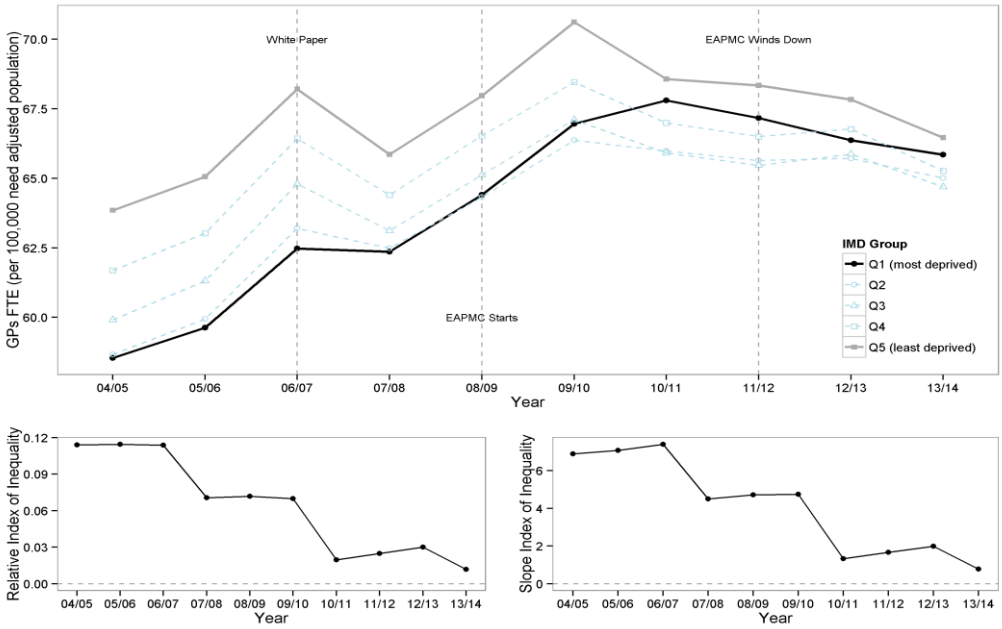


Figure A5.2: FTE GP supply in 2006/07 and 2011/12 including registrars and retainers

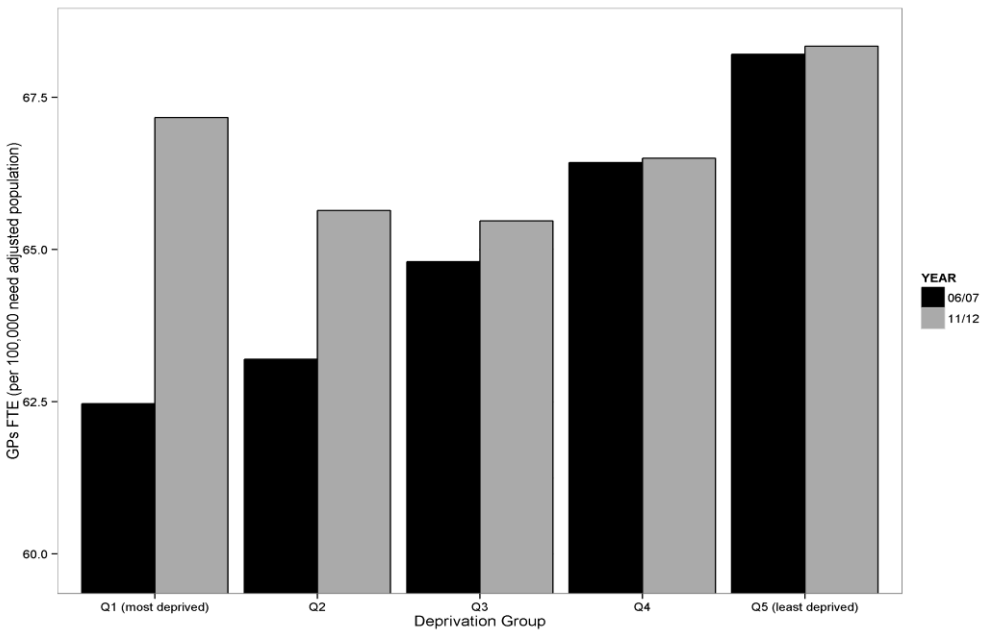


Figure A5.3: Trend in total headcount and FTE GP supply over time including registrars and retainers

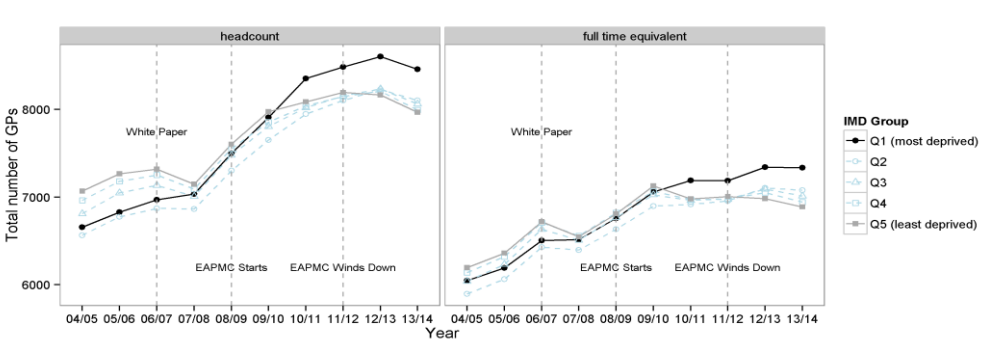
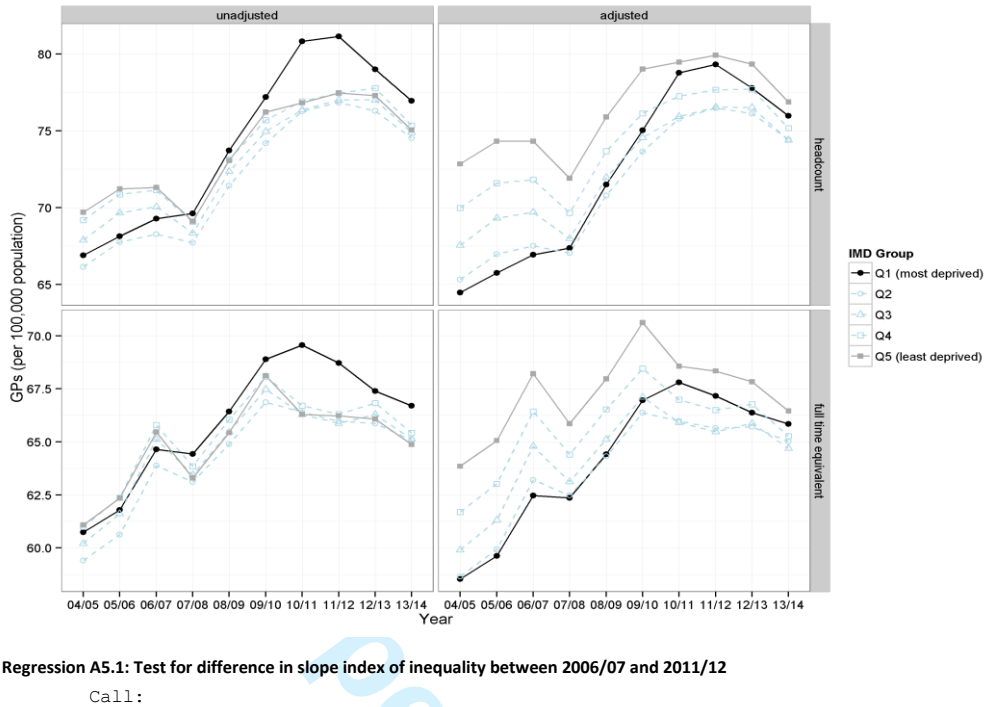


Figure A5.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time including registrars and retainers



Regression A5.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

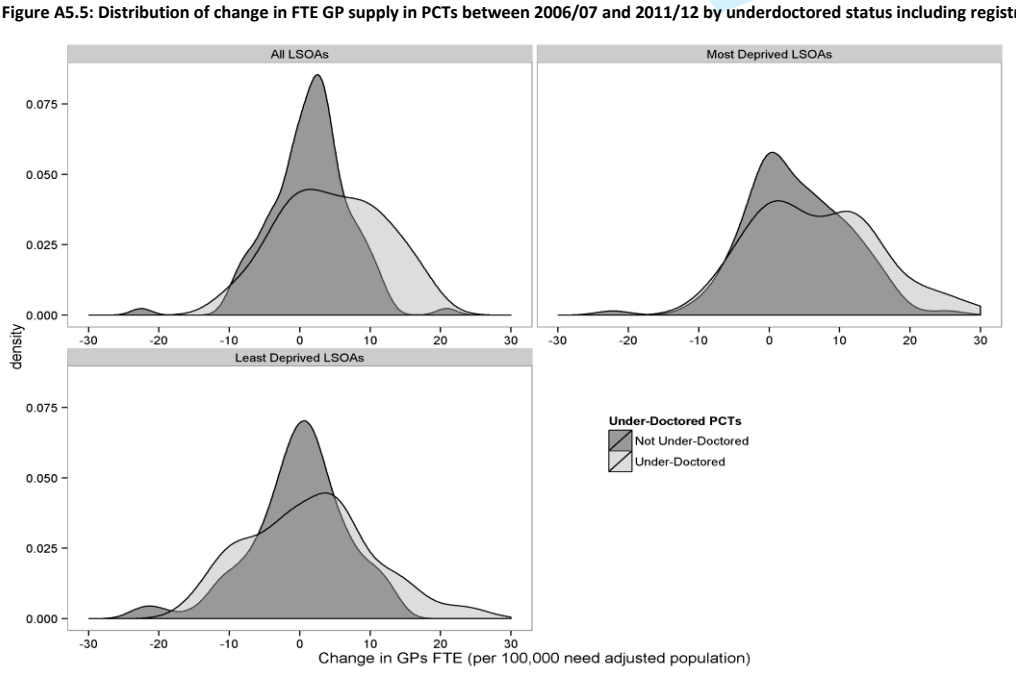
```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.16200 -0.40845 -0.07703  0.42570  1.49800

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         60.9533     0.5718 106.607  < 2e-16 ***
YEAR2011             4.7587     0.8086   5.885 2.30e-05 ***
IMD_DECILE           7.4012     0.9215   8.032 5.27e-07 ***
YEAR2011:IMD_DECILE -5.7412     1.3031  -4.406 0.000442 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.837 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.8138
F-statistic: 28.68 on 3 and 16 DF,  p-value: 1.131e-06
```

Figure A5.5: Distribution of change in FTE GP supply in PCTs between 2006/07 and 2011/12 by underdoctored status including registrars and retainers



Appendix Section 6

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **only looking at GP registrars**

Figure A6.1: Trend in FTE GP supply over time registrars only

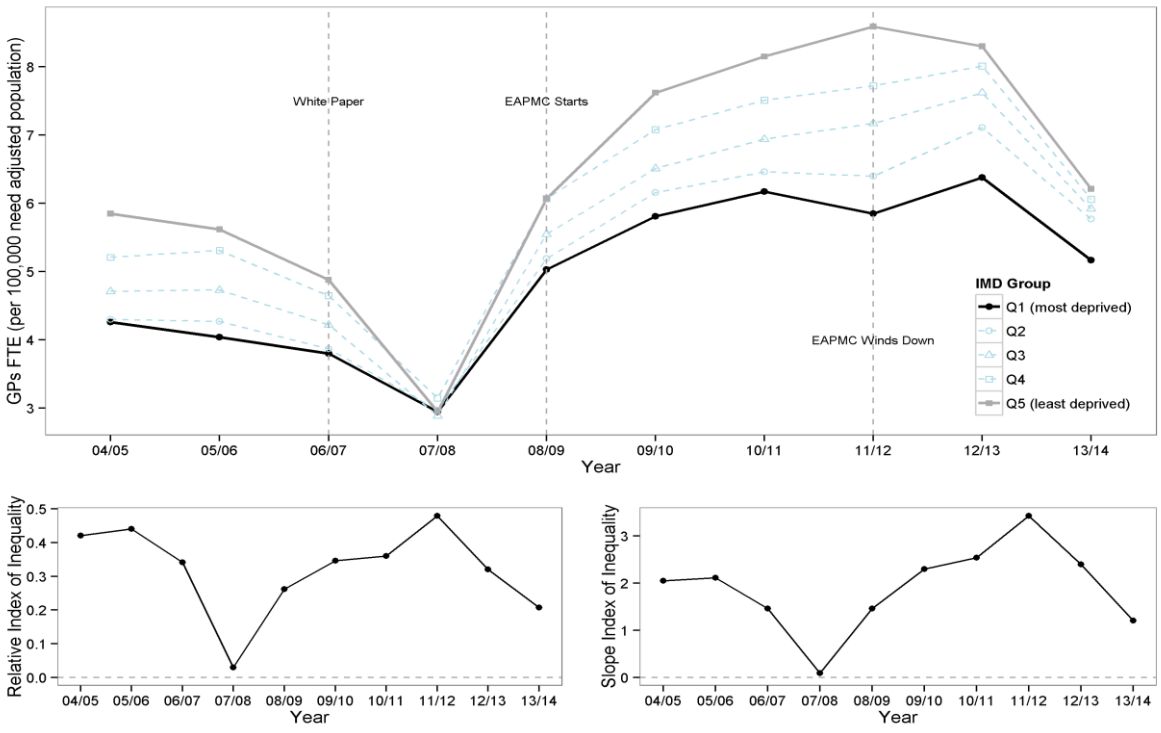


Figure A6.2: FTE GP supply in 2006/07 and 2011/12 registrars only

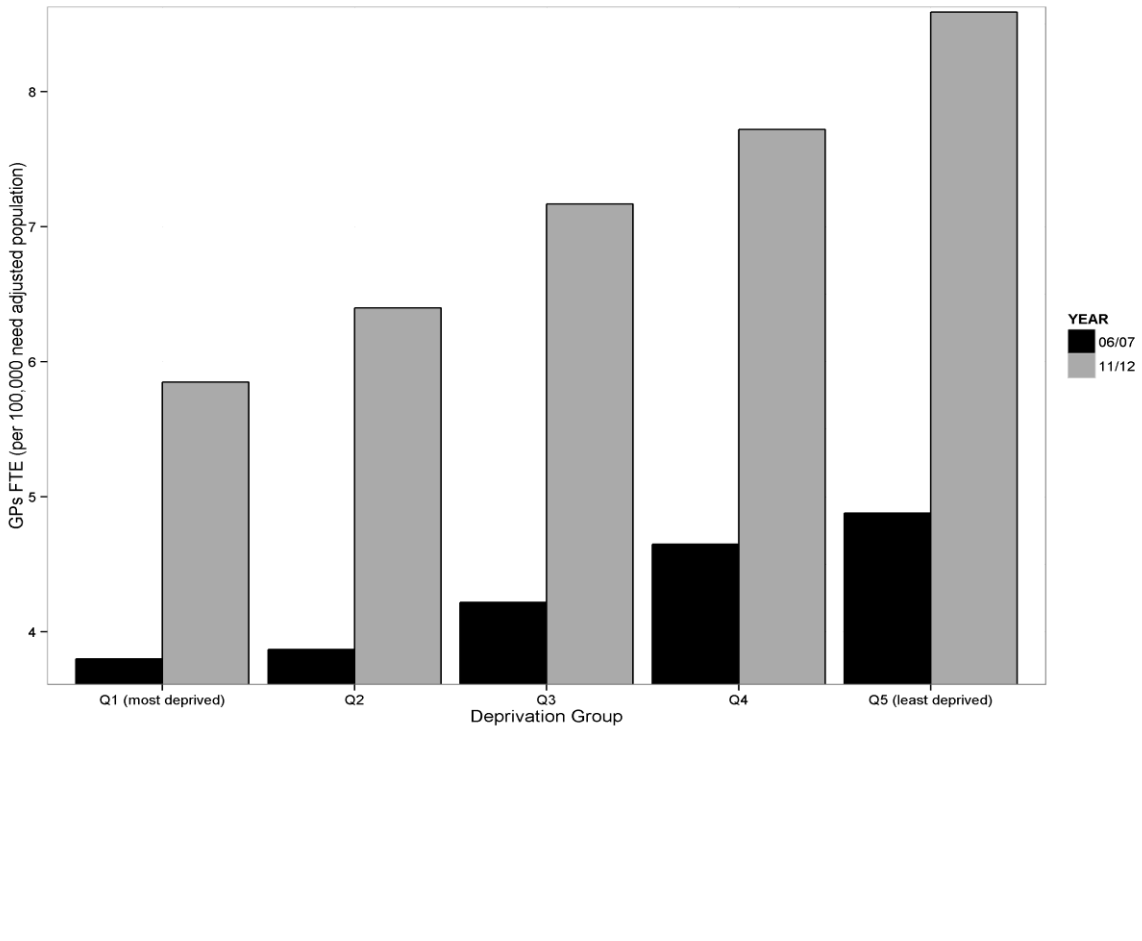


Figure A6.3: Trend in total headcount and FTE GP supply over time registrars only

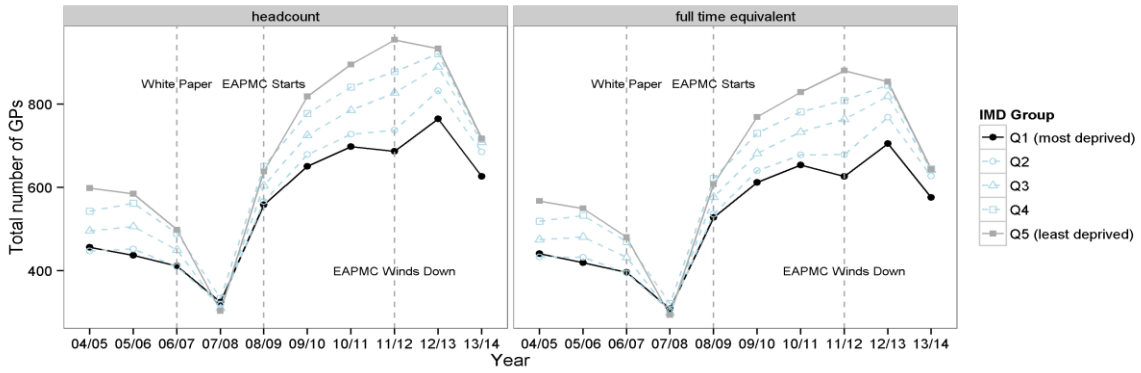
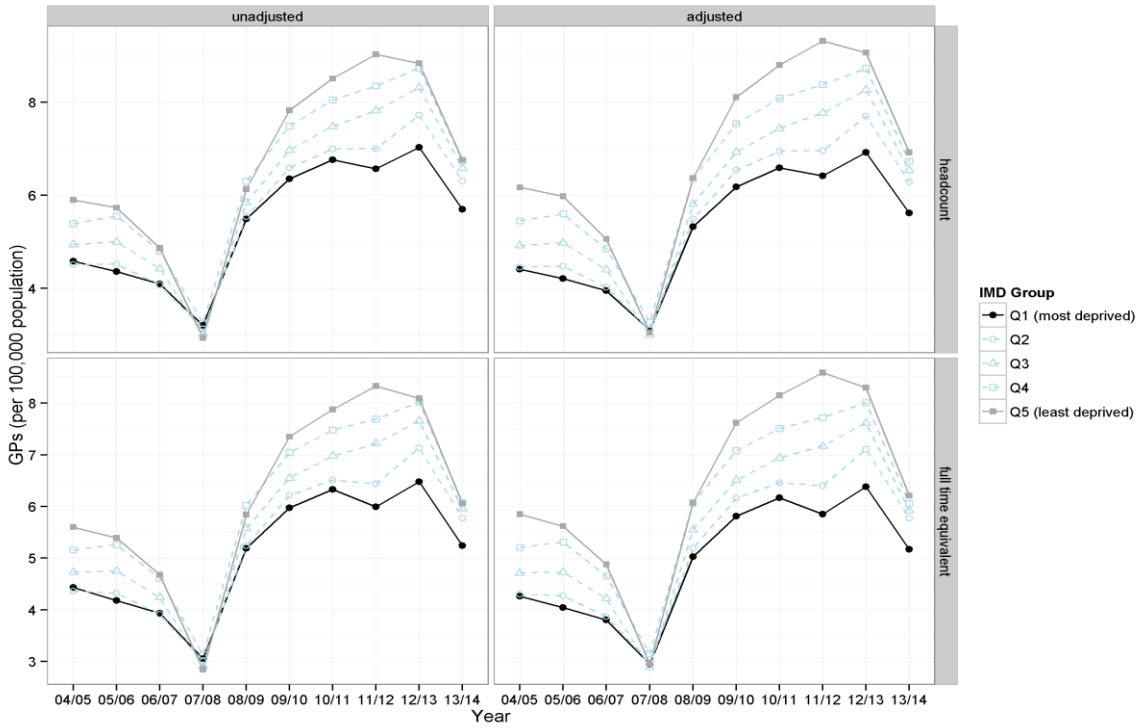


Figure A6.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time registrars only



Regression A6.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-0.21273 -0.06820 -0.01009  0.07977  0.16139

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         3.47800    0.07755   44.85  < 2e-16 ***
YEAR2011            1.78467    0.10967   16.27 2.24e-11 ***
IMD_DECILE          1.46182    0.12498   11.70 2.98e-09 ***
YEAR2011:IMD_DECILE 1.96788    0.17674   11.13 6.04e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1135 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.9954
F-statistic:  1360 on 3 and 16 DF,  p-value: < 2.2e-16
```

Appendix Section 7

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **only looking at GP retainers**

Figure A7.1: Trend in FTE GP supply over time retainers only

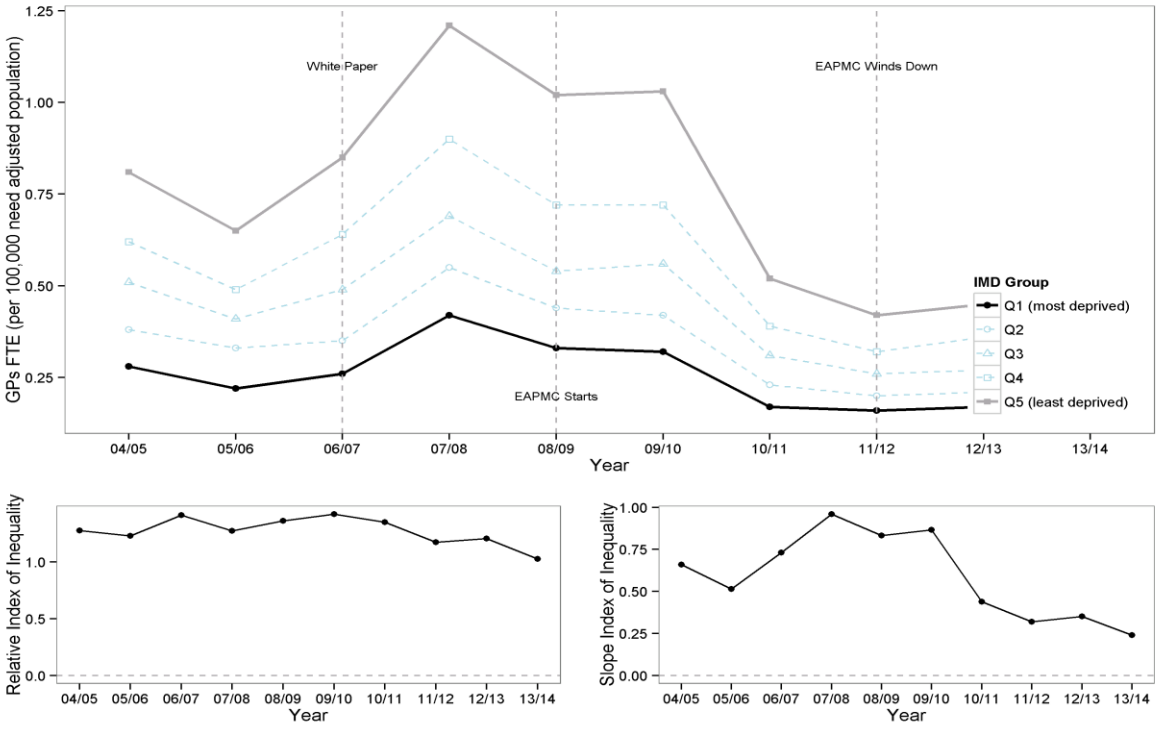


Figure A7.2: FTE GP supply in 2006/07 and 2011/12 retainers only

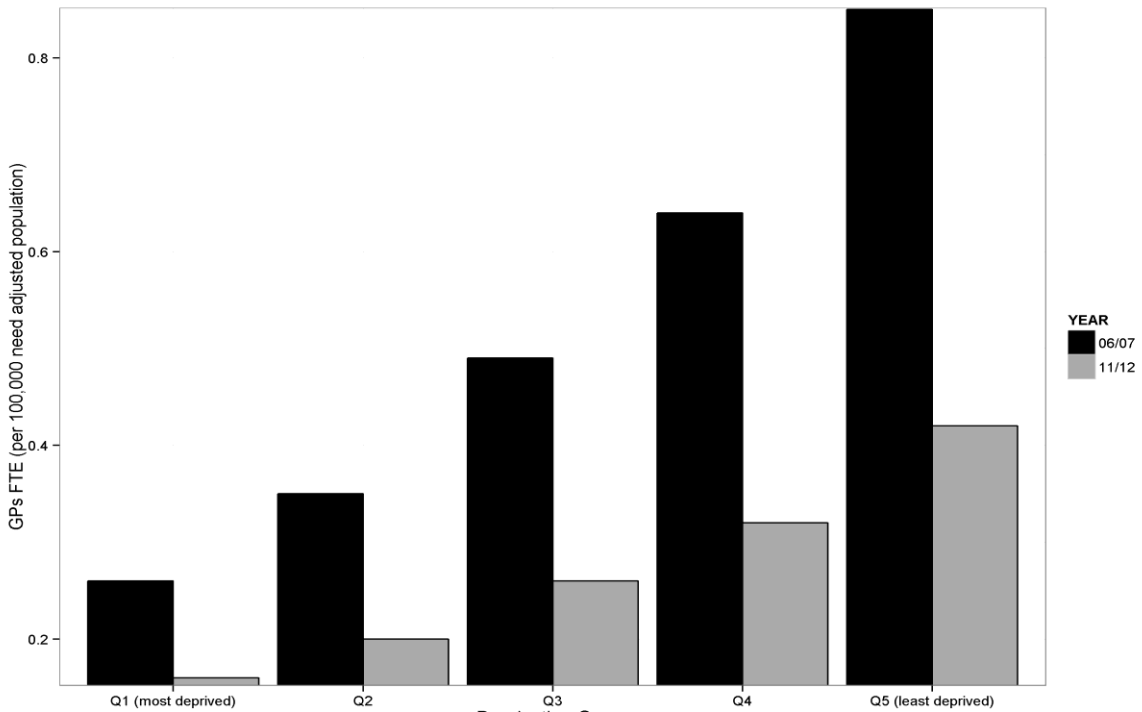


Figure A7.3: Trend in total headcount and FTE GP supply over time retainers only

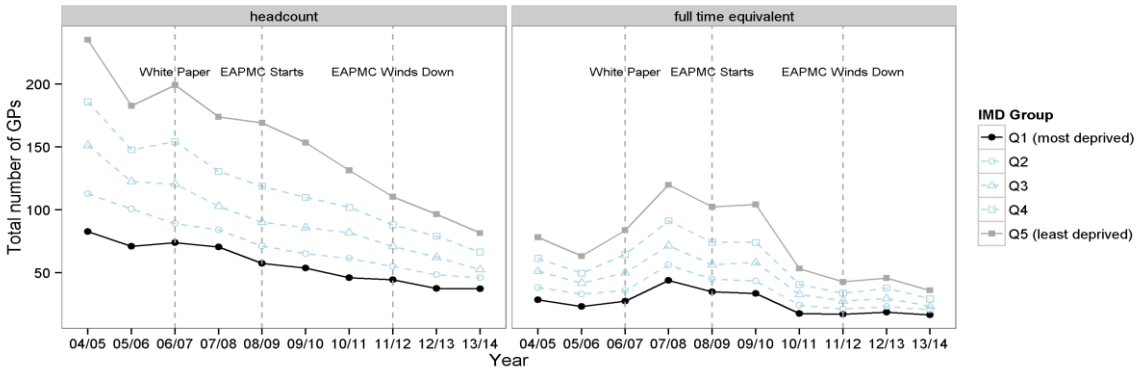
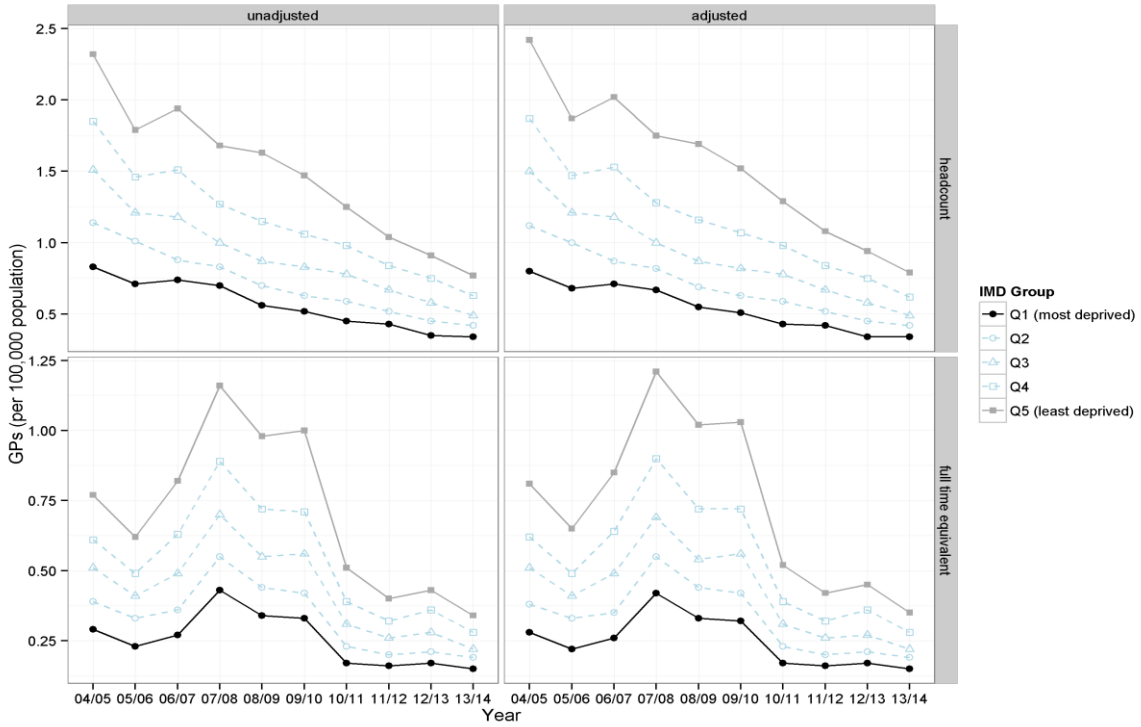


Figure A7.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time retainers only



Regression A7.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
      Min        1Q    Median        3Q       Max
-0.049273 -0.022864 -0.010758  0.008636  0.121818

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)          0.11667    0.03033   3.847  0.00143 **
YEAR2011            -0.02000    0.04289  -0.466  0.64730
IMD_DECILE           0.73152    0.04888  14.965 7.91e-11 ***
YEAR2011:IMD_DECILE -0.41273    0.06913  -5.970 1.96e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0444 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.9565
F-statistic: 140.4 on 3 and 16 DF,  p-value: 1.056e-11
```

Appendix Section 8

Results calculated by **attributing IMD scores to practices excluding registrars and retainers** and aggregating based on fifths of population weighted practices ranked by IMD score

Figure A8.1: Trend in FTE GP supply over time excluding registrars and retainers practice level aggregation

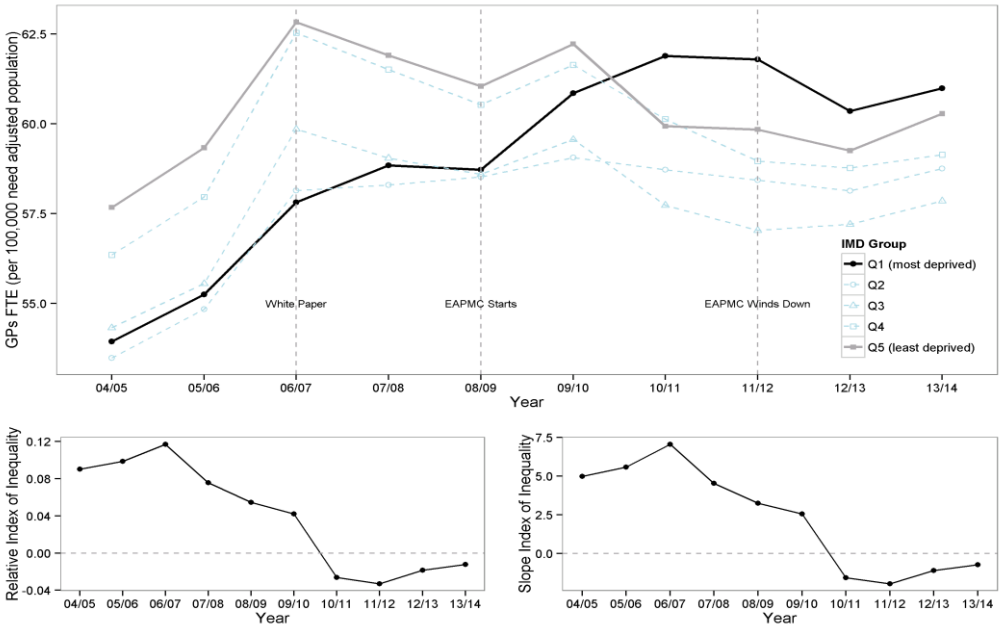


Figure A8.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers practice level aggregation

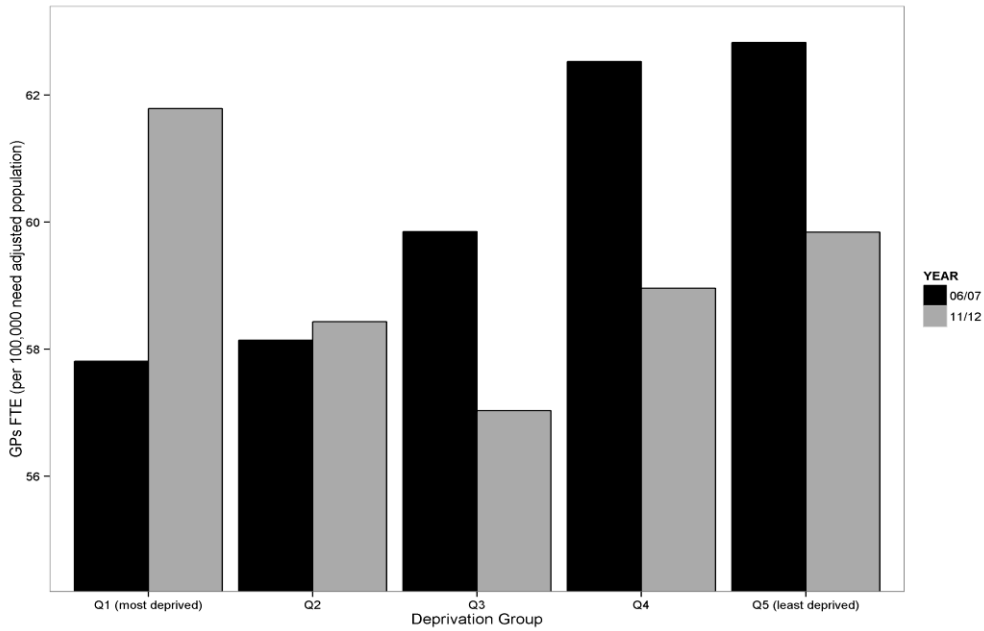


Figure A8.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers practice level aggregation

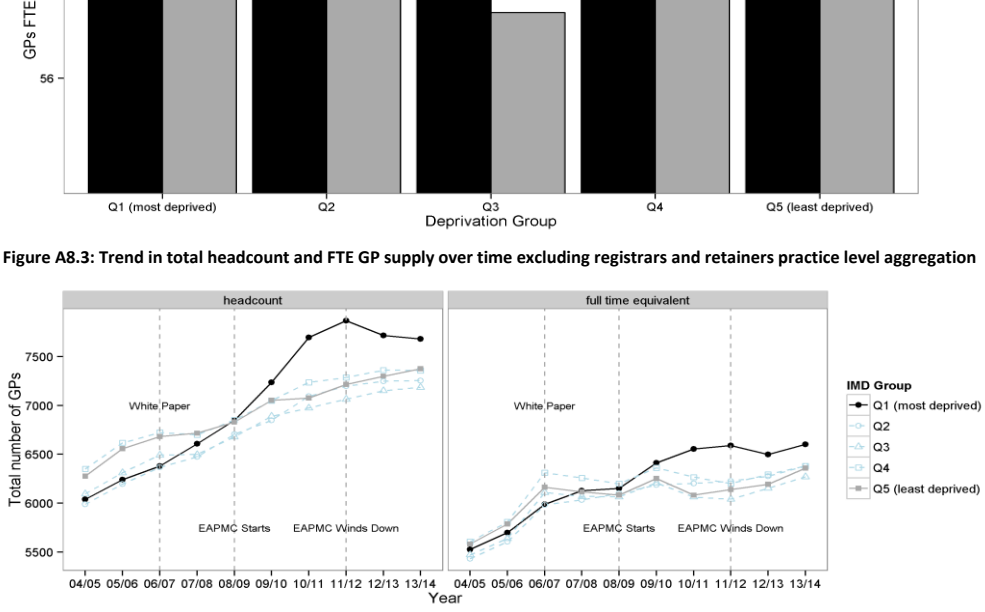
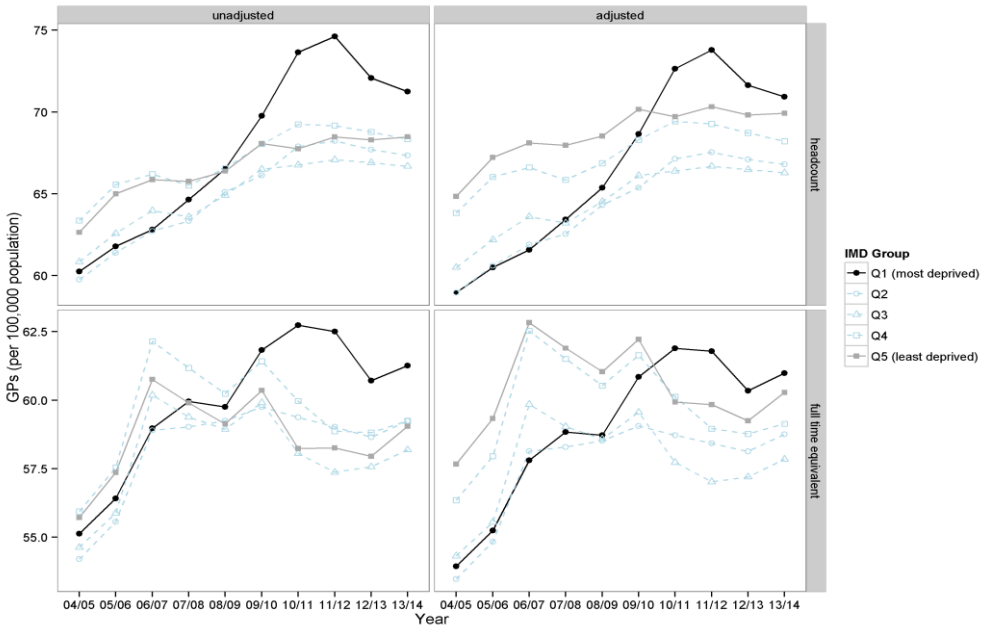


Figure A8.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers practice level aggregation



Regression A8.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.6158 -0.6283 -0.2555  0.8089  3.3422

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          56.349      0.992  56.803  < 2e-16 ***
YEAR2011              3.934      1.403   2.804 0.012732 *
IMD_DECILE            7.054      1.599   4.412 0.000436 ***
YEAR2011:IMD_DECILE  -9.009      2.261  -3.985 0.001066 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.452 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.5182
F-statistic: 7.811 on 3 and 16 DF,  p-value: 0.00196
```

Figure A8.5 Numbers of LSOA per GP Practice over Time

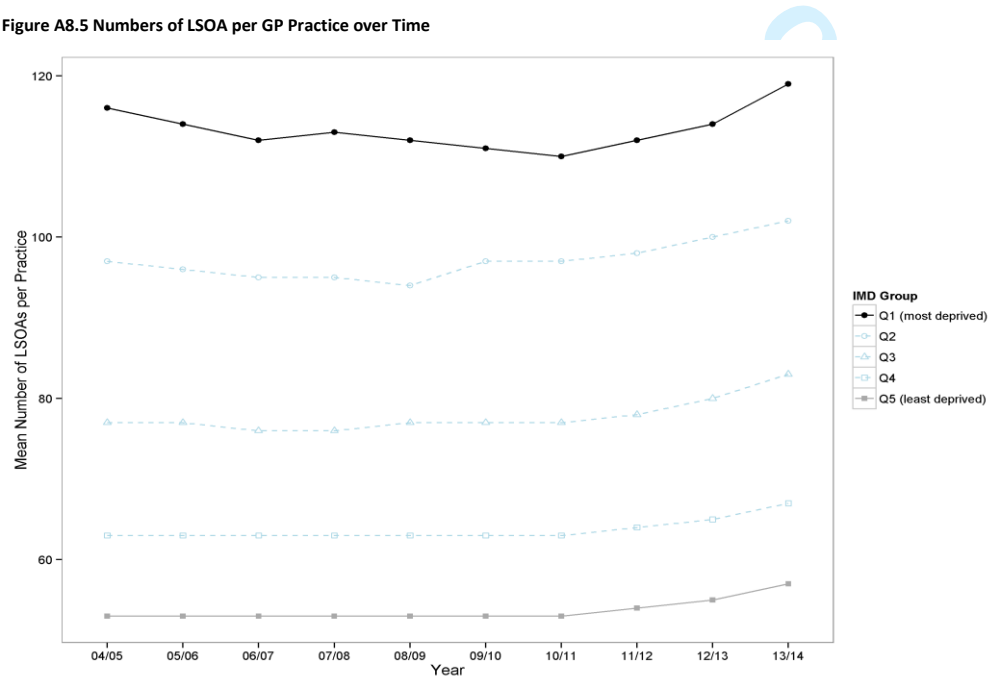
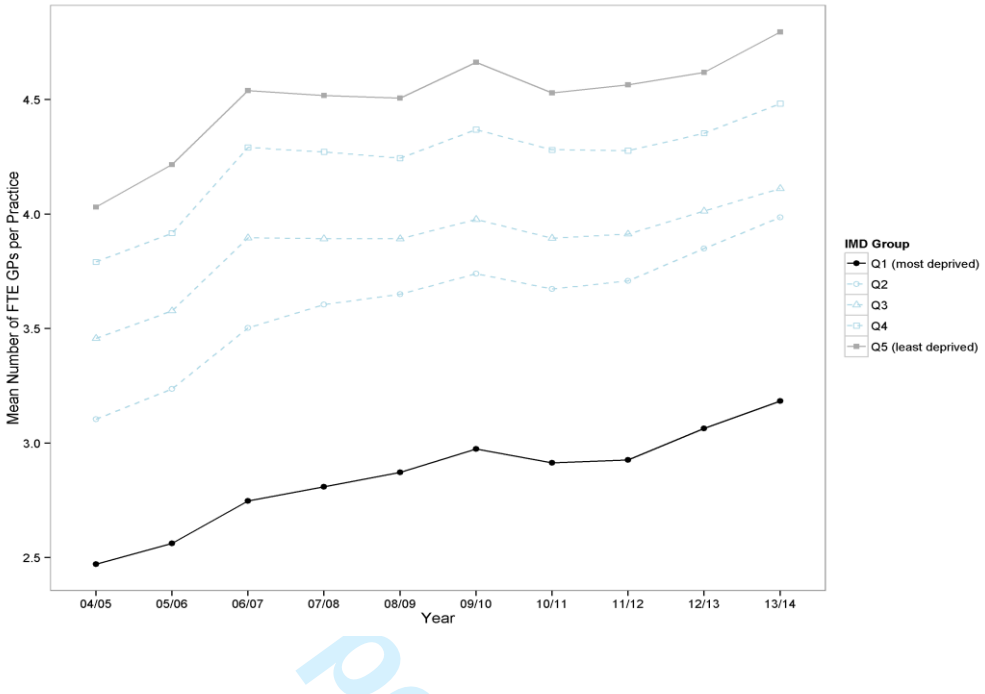


Figure A8.6 Numbers of FTE GPs per Practice over Time



Appendix Section 9

Results calculated by **attributing IMD scores to practices** and aggregating based on fifths of population weighted practices ranked by IMD score - all GPs including registrars and retainers included in the calculation

Figure A9.1: Trend in FTE GP supply over time including registrars and retainers practice level aggregation

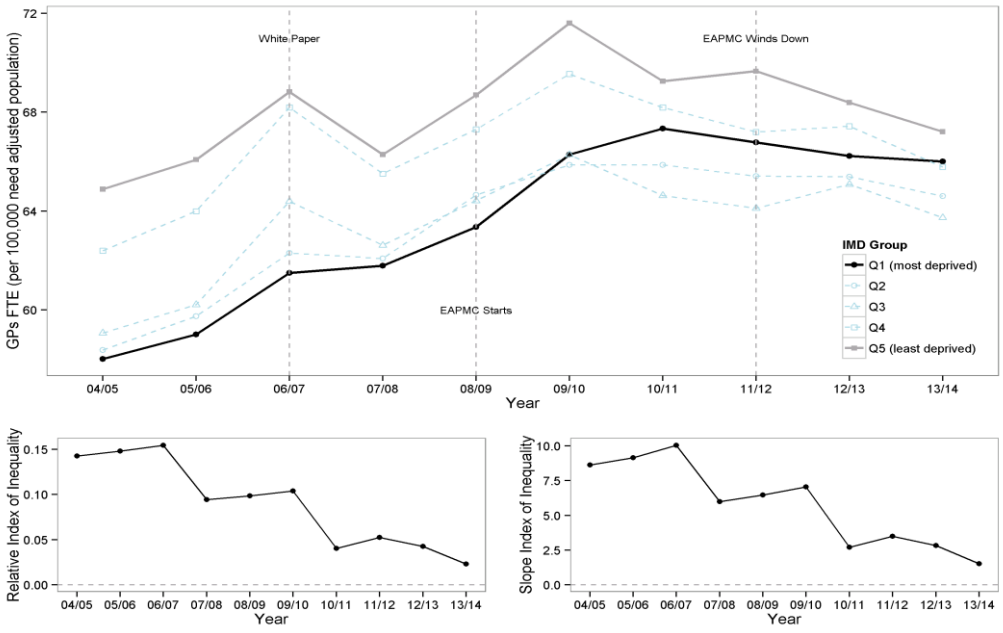


Figure A9.2: FTE GP supply in 2006/07 and 2011/12 including registrars and retainers practice level aggregation

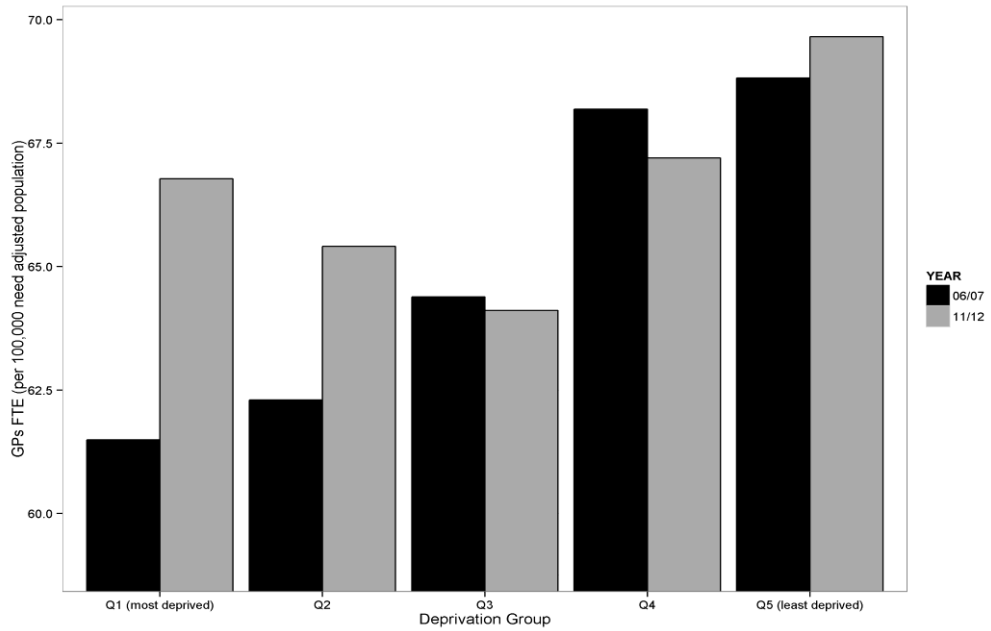


Figure A9.3: Trend in total headcount and FTE GP supply over time including registrars and retainers practice level aggregation

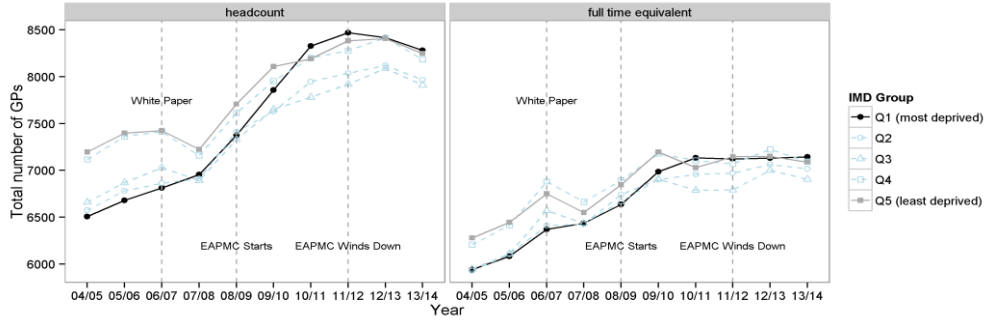
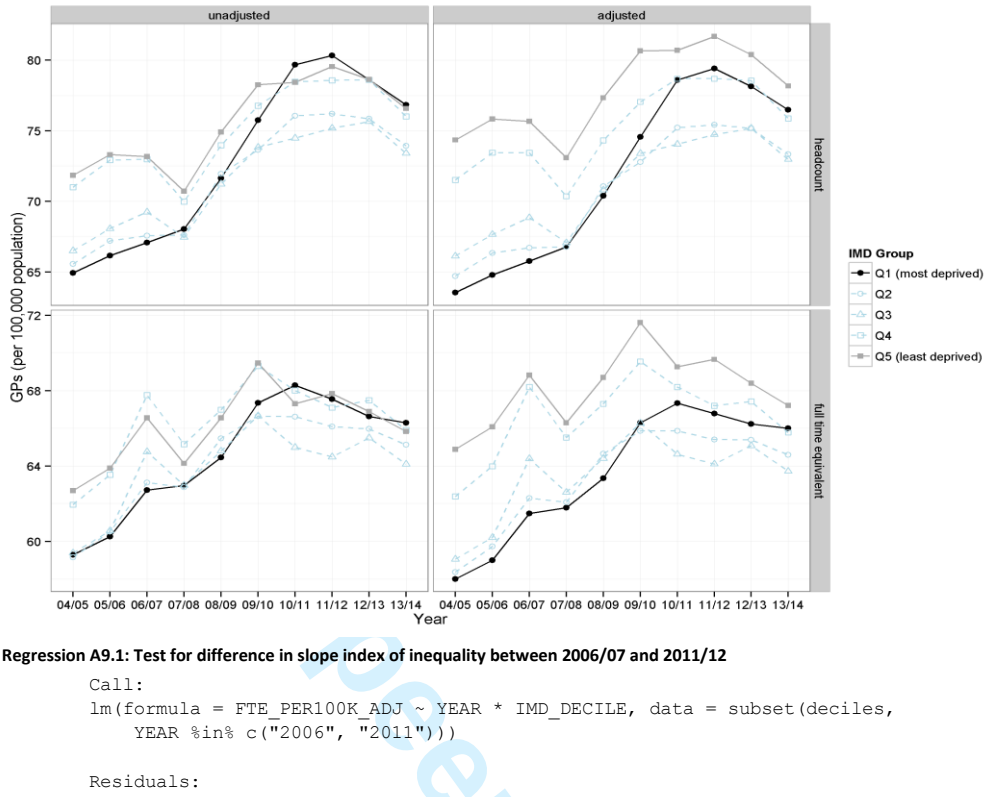


Figure A9.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time including registrars and retainers practice level aggregation



Regression A9.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.9198 -0.8870 -0.2299  1.1036  3.7836

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          59.508      1.127  52.782  < 2e-16 ***
YEAR2011              5.210      1.594   3.268  0.00484 **
IMD_DECILE           10.056      1.817   5.535 4.53e-05 ***
YEAR2011:IMD_DECILE  -6.573      2.570  -2.558  0.02107 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.65 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.6544
F-statistic: 12.99 on 3 and 16 DF,  p-value: 0.0001479
```

Appendix Section 10

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - results for London**

Figure A10.1: Trend in FTE GP supply over time excluding registrars and retainers

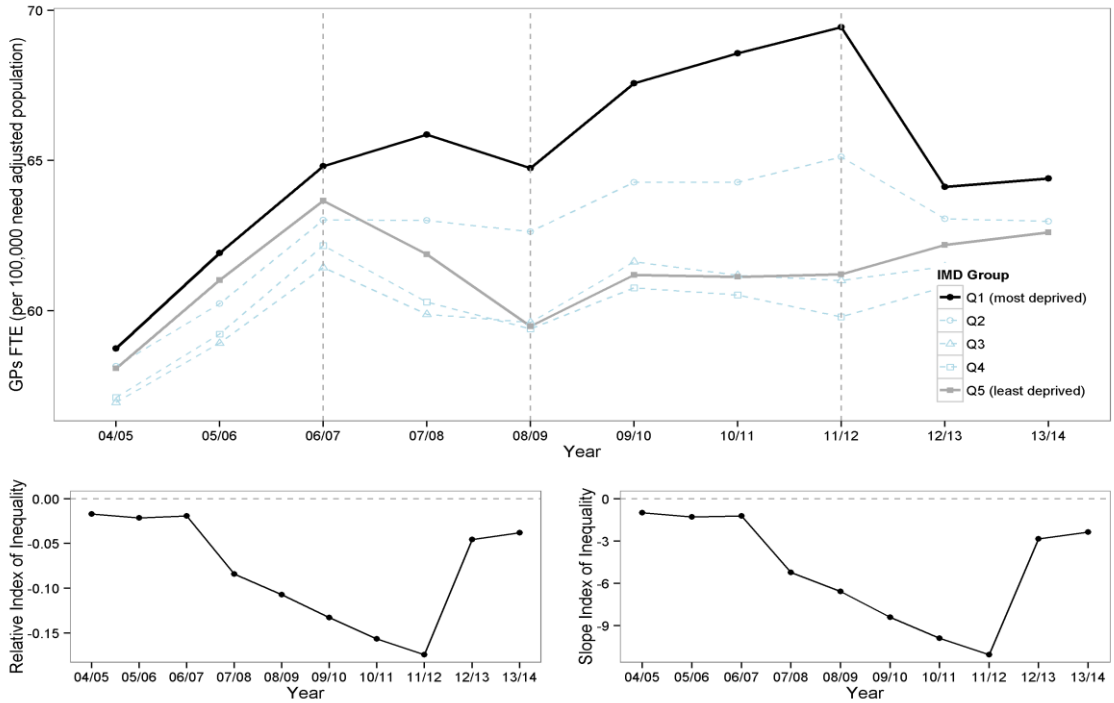


Figure A10.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

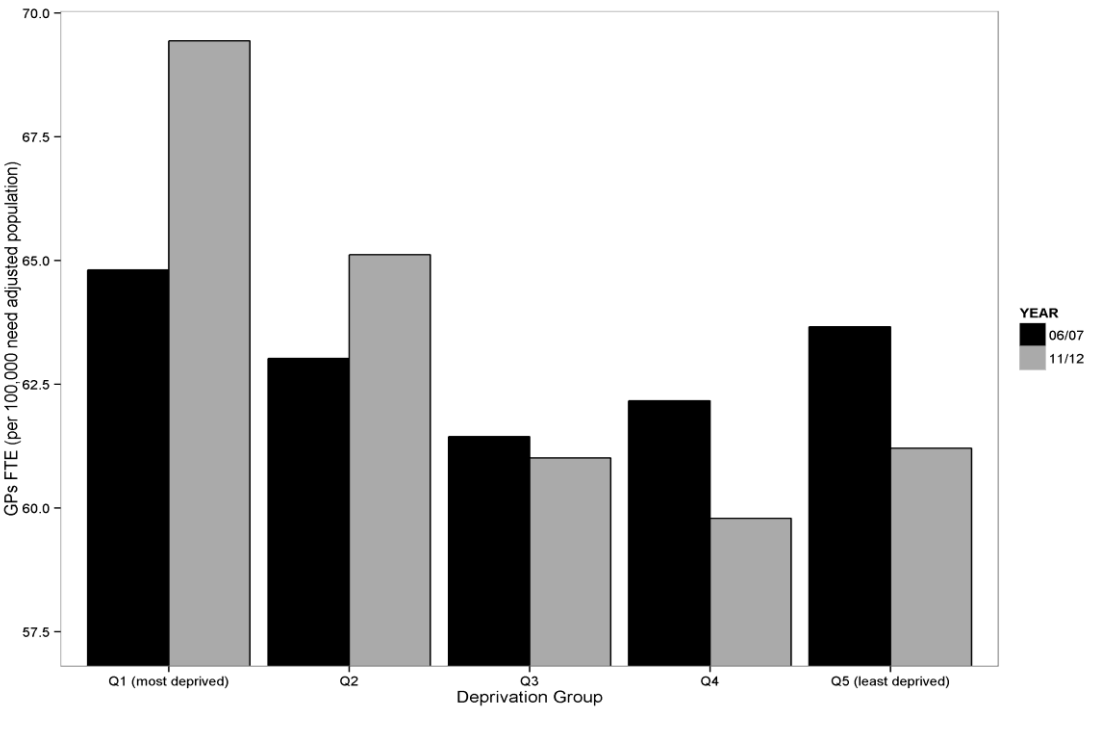


Figure A10.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

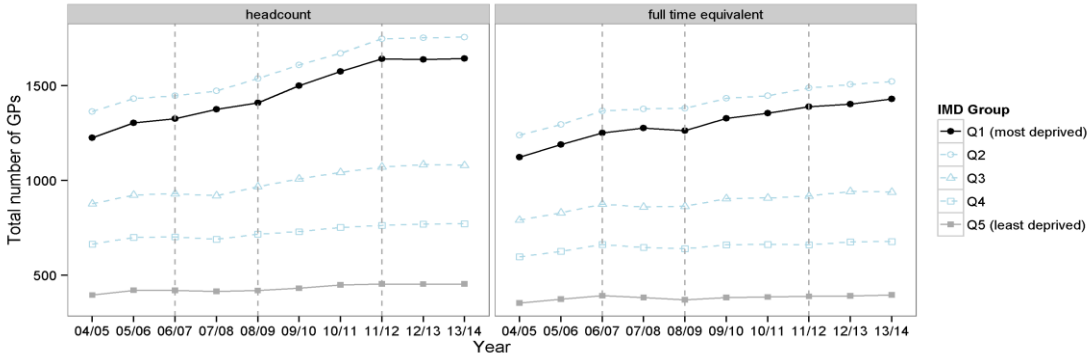
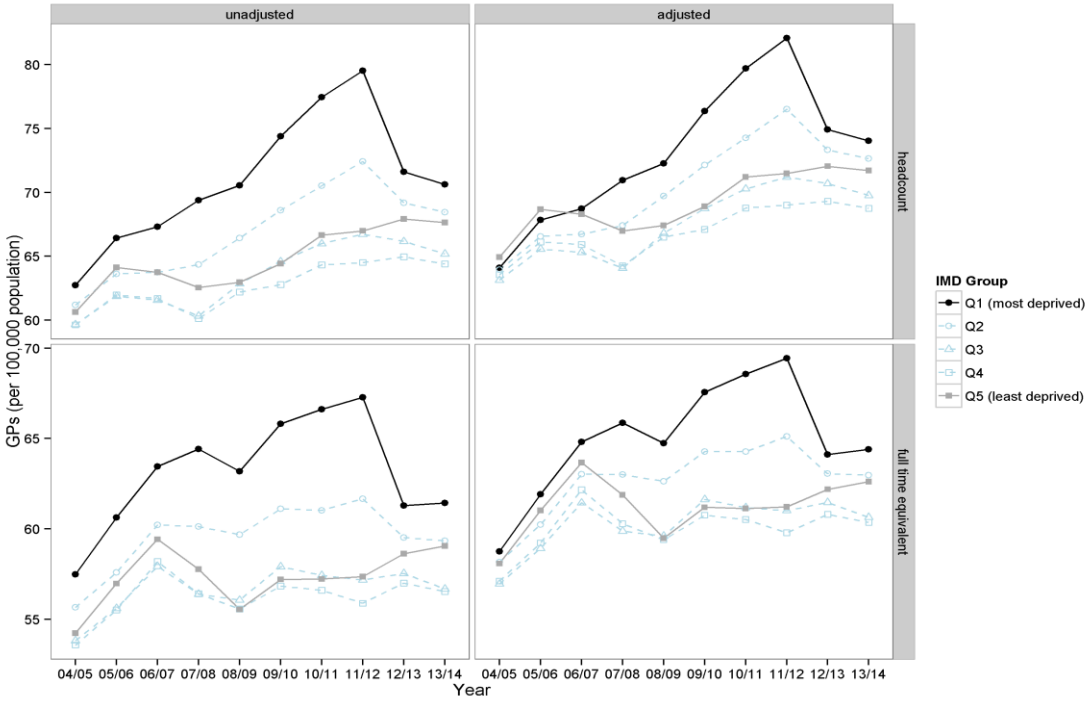


Figure A10.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A10.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-2.4398 -1.1211 -0.2092  1.3358  3.4882

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          63.687      1.257  50.664  < 2e-16 ***
YEAR2011              5.789      1.778   3.257  0.00495 **
IMD_DECILE           -1.215      2.026  -0.600  0.55704
YEAR2011:IMD_DECILE  -9.830      2.865  -3.431  0.00343 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.84 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.5896
F-statistic:  10.1 on 3 and 16 DF,  p-value: 0.0005652
```

Appendix Section 11

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation** - **results for North of England**

Figure A11.1: Trend in FTE GP supply over time excluding registrars and retainers

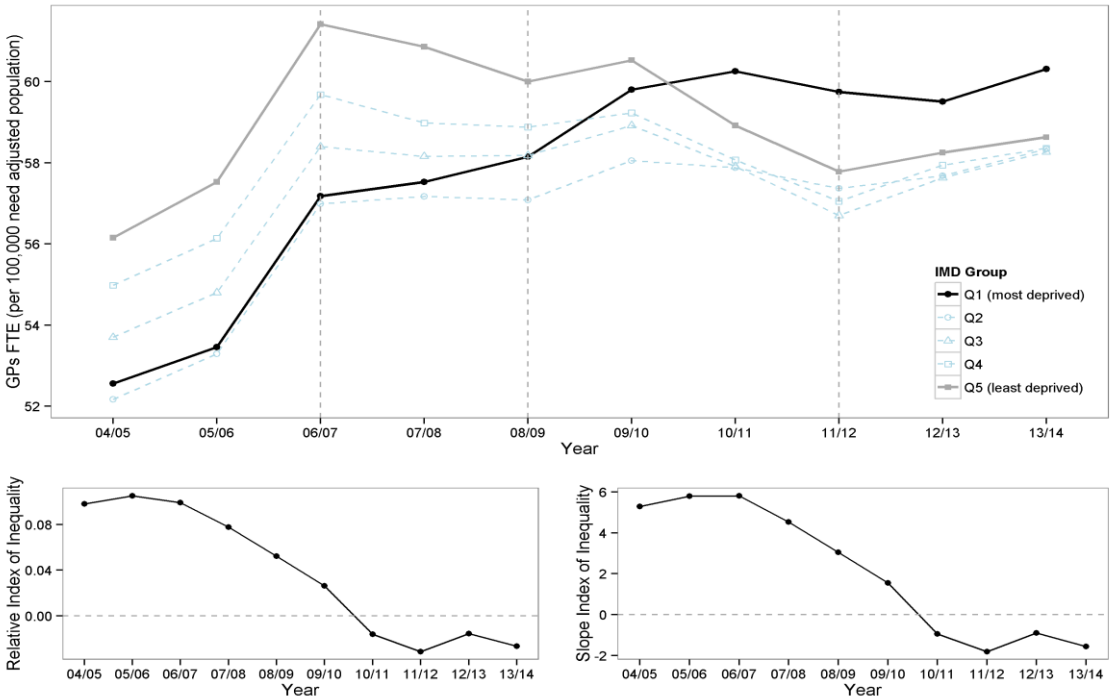


Figure A11.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

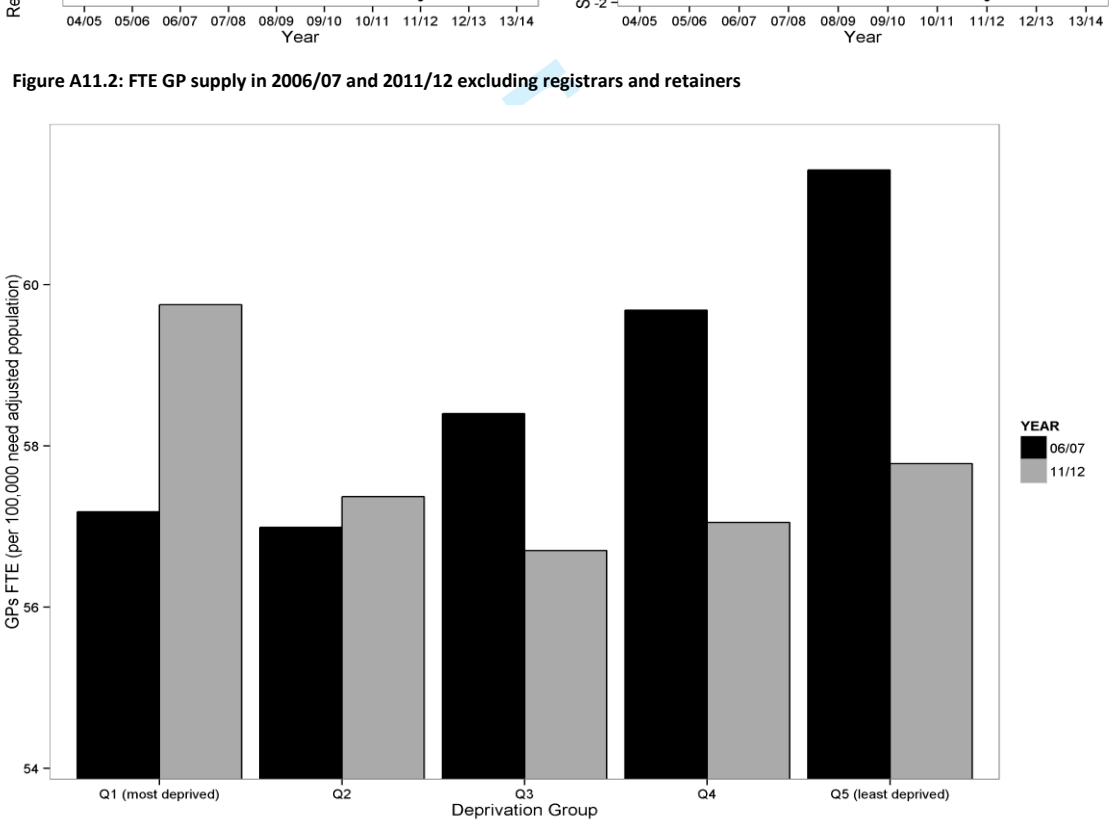


Figure A11.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

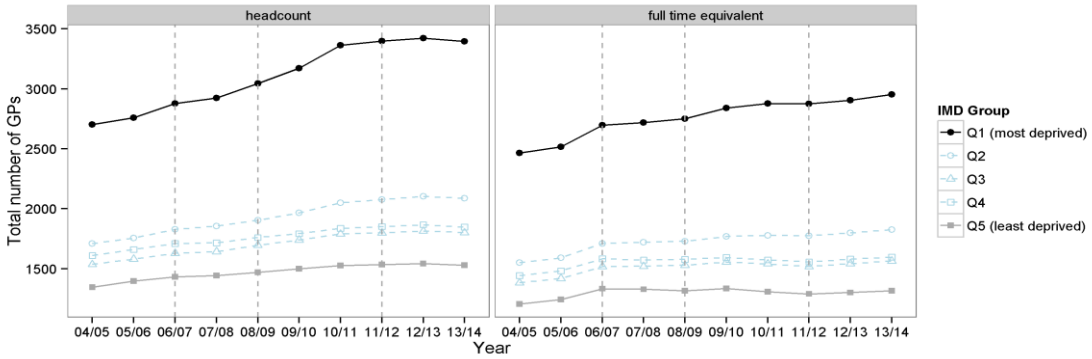
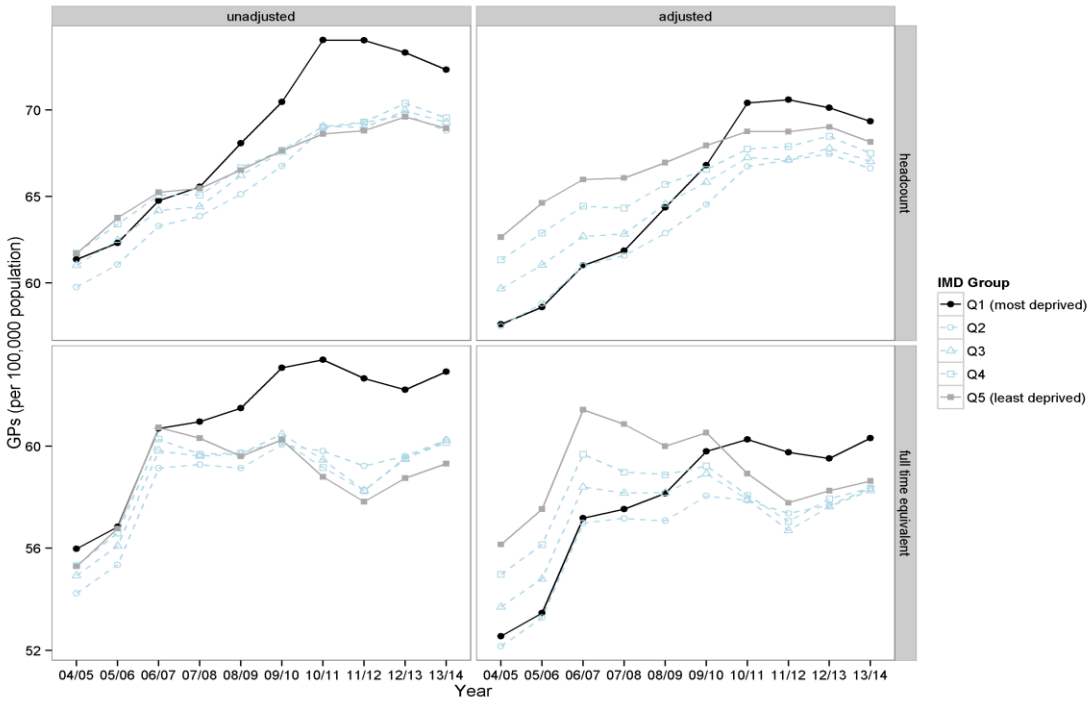


Figure A11.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A11.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.38648 -0.67520 -0.01955  0.44667  2.18964

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         55.5367     0.6595  84.211  < 2e-16 ***
YEAR2011             3.1447     0.9327   3.372 0.003885 **
IMD_DECILE           5.8152     1.0629   5.471 5.13e-05 ***
YEAR2011:IMD_DECILE -7.6248     1.5031  -5.073 0.000113 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9654 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.6529
F-statistic: 12.91 on 3 and 16 DF,  p-value: 0.0001531
```

Appendix Section 12

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation - results for Midlands and East of England**

Figure A12.1: Trend in FTE GP supply over time excluding registrars and retainers

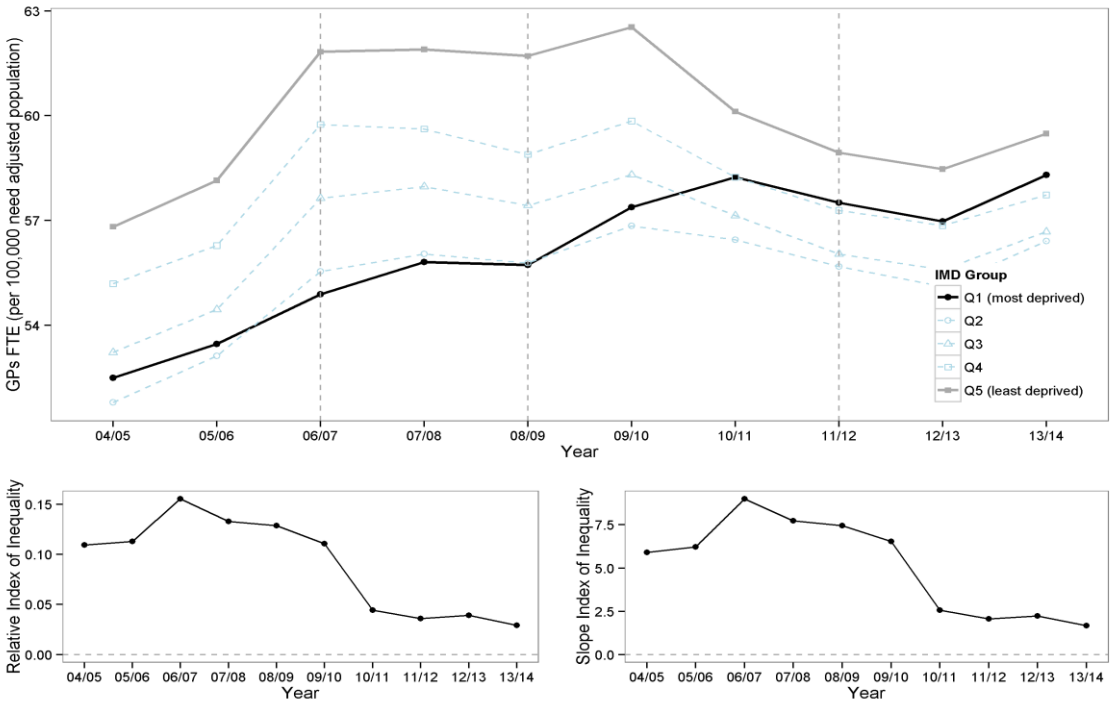


Figure A12.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

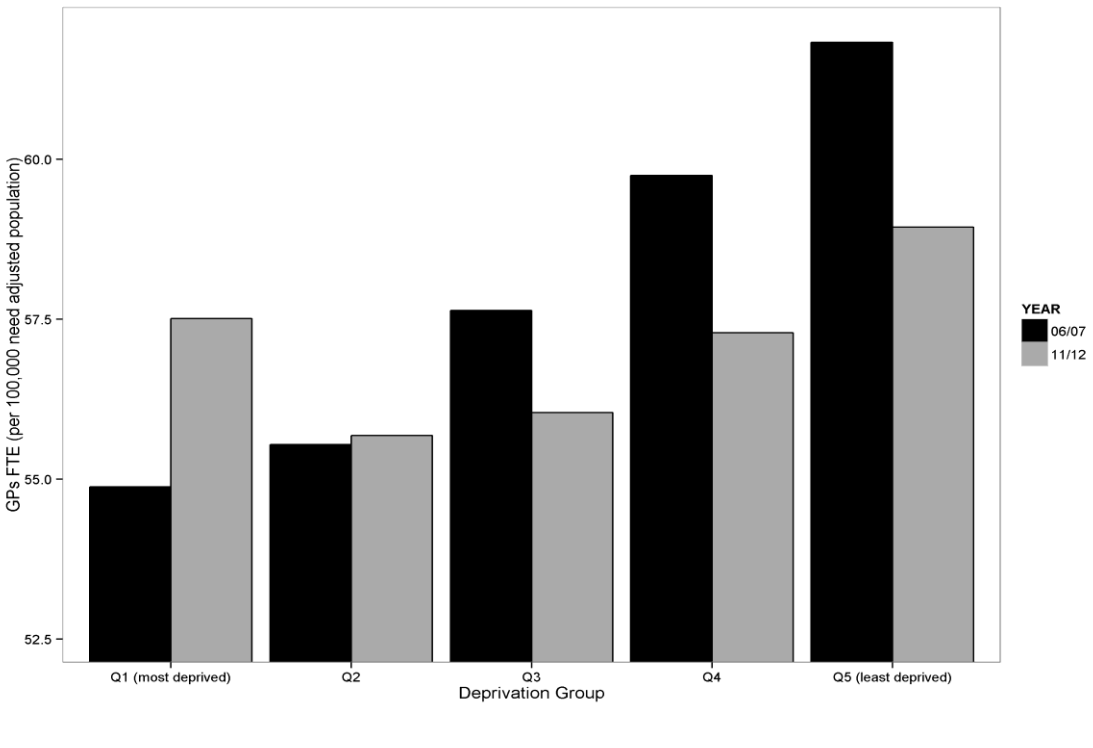


Figure A12.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

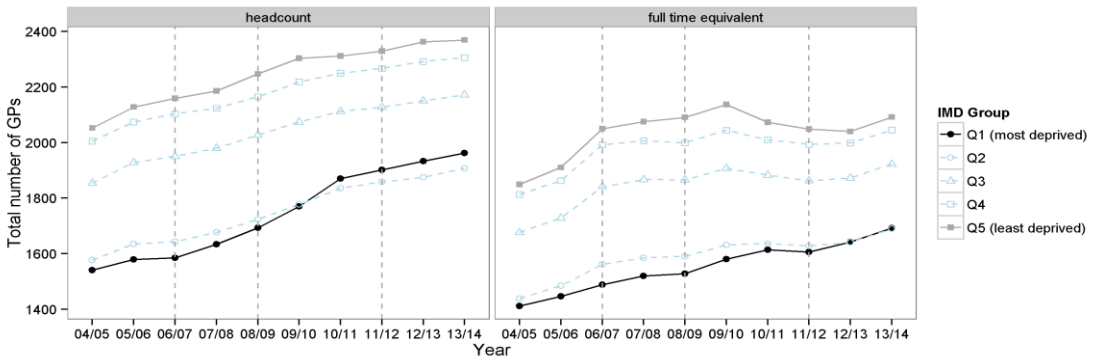
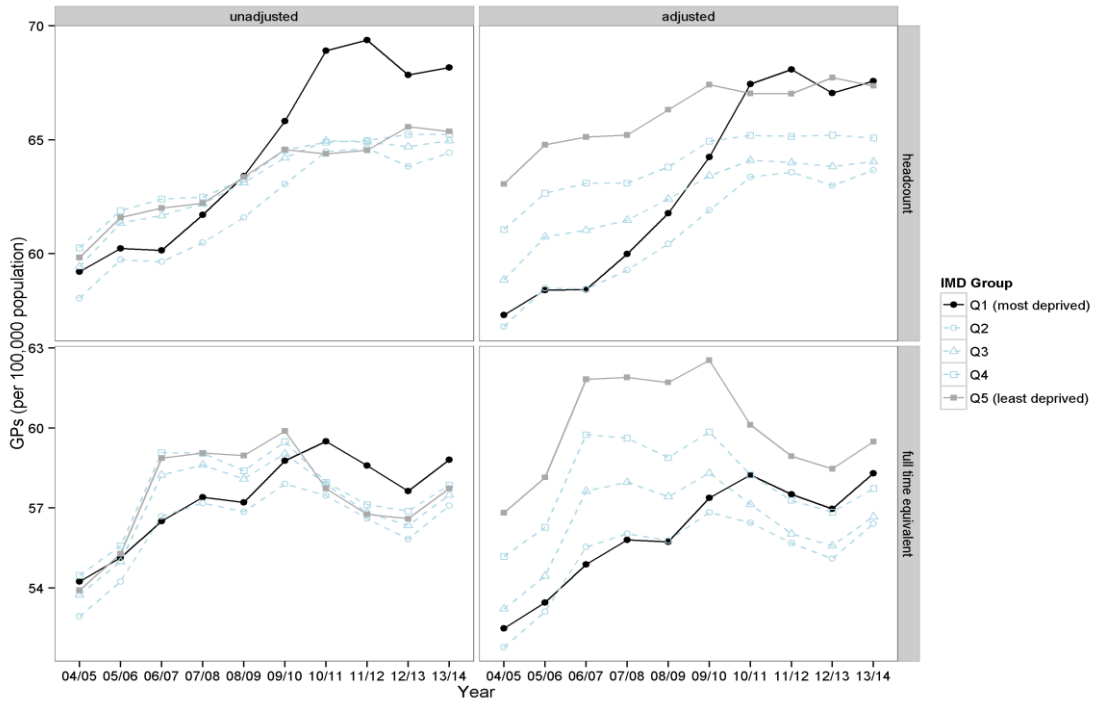


Figure A12.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A12.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-1.2693 -0.5681 -0.2970  0.3750  2.8982

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         52.9693     0.7386  71.718  < 2e-16 ***
YEAR2011             2.9867     1.0445   2.859 0.011358 *
IMD_DECILE           9.0067     1.1903   7.567 1.13e-06 ***
YEAR2011:IMD_DECILE -6.9485     1.6834  -4.128 0.000789 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.081 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.7602
F-statistic: 21.07 on 3 and 16 DF,  p-value: 8.368e-06
```

Appendix Section 13

Results calculated by attributing GP supply to LSOAs and aggregating based on fifths of LSOAs ranked by IMD score - **GP registrars and retainers excluded from the calculation** - **results for South of England**

Figure A13.1: Trend in FTE GP supply over time excluding registrars and retainers

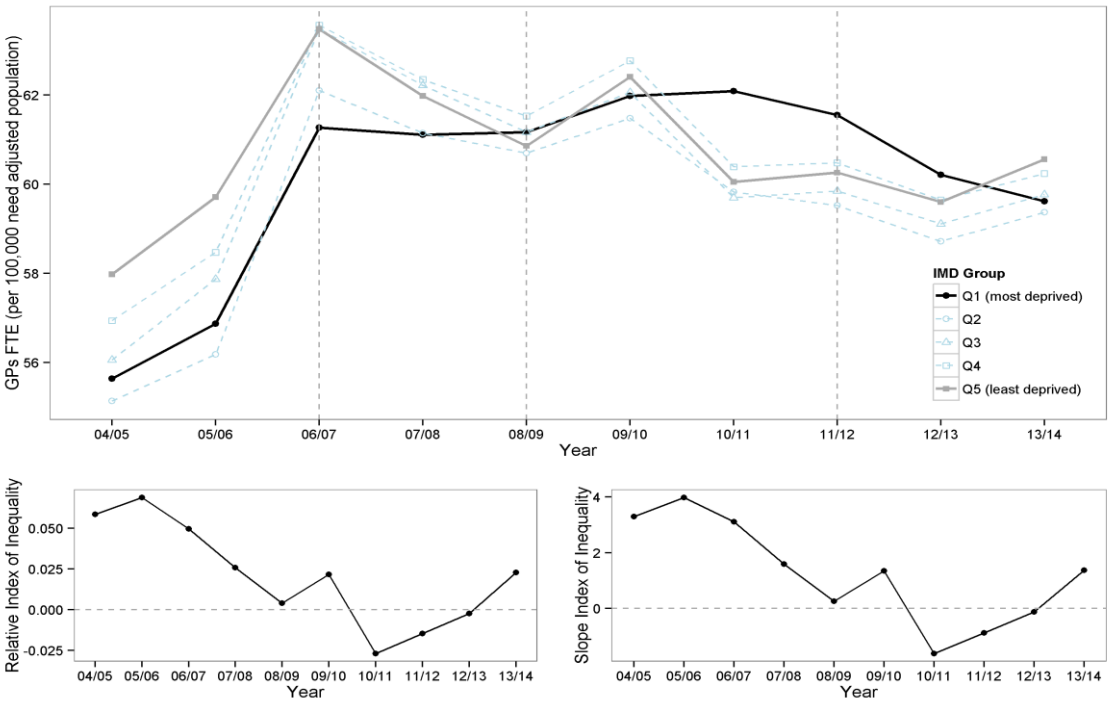


Figure A13.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

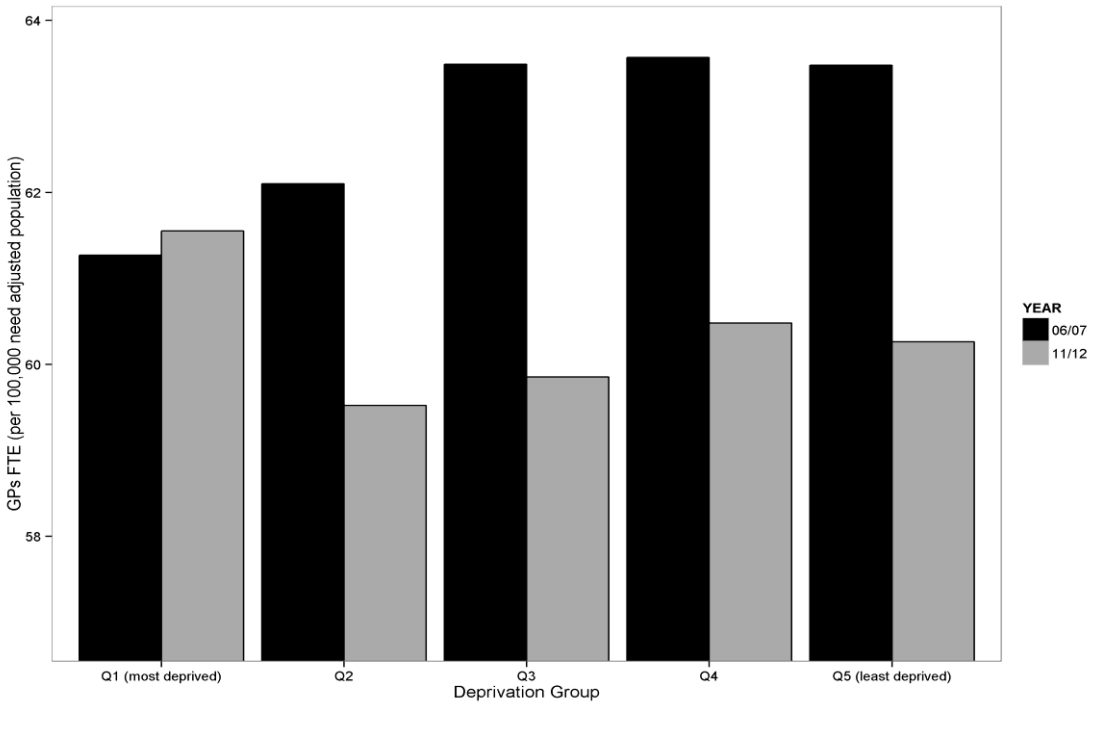


Figure A13.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

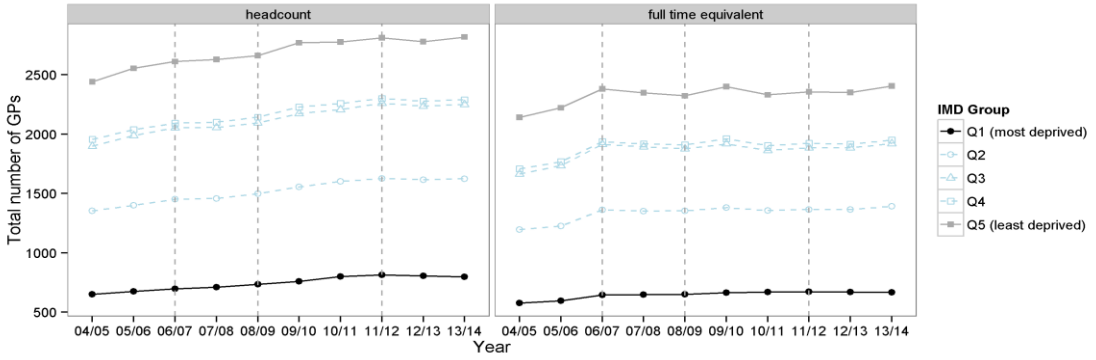
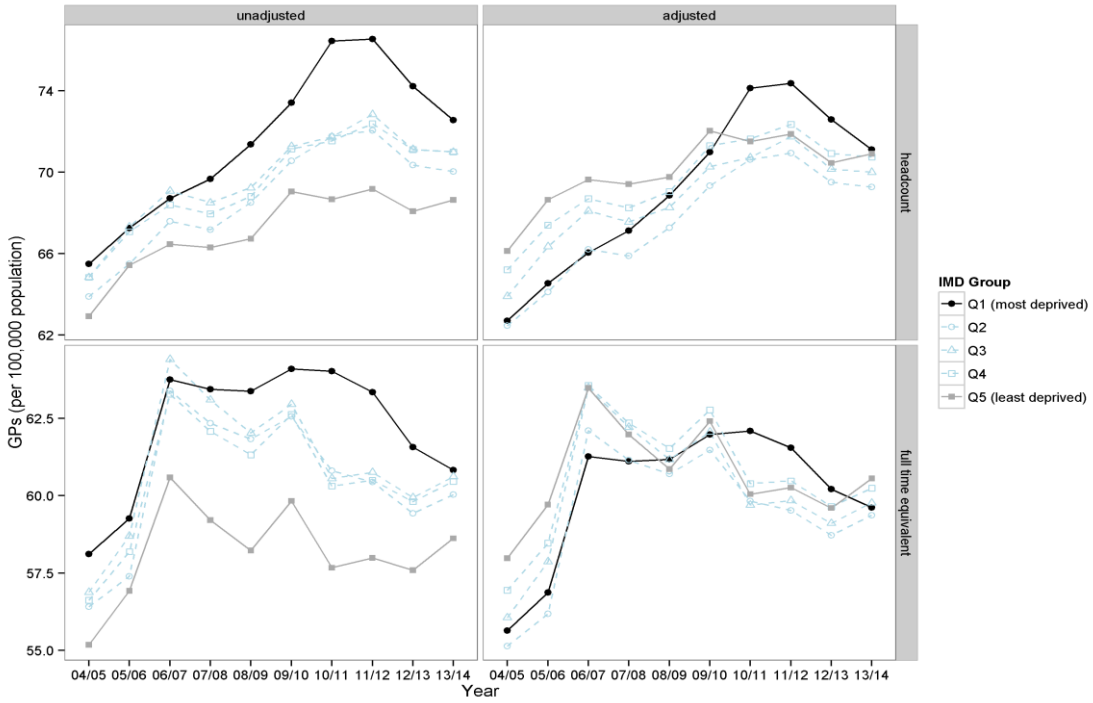


Figure A13.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A13.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
     Min       1Q   Median       3Q      Max
-1.38576 -0.55121  0.08591  0.48395  1.16764

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         61.0387     0.5336 114.399  < 2e-16 ***
YEAR2011            -0.2180     0.7546  -0.289  0.77636
IMD_DECILE           3.1170     0.8599   3.625  0.00228 **
YEAR2011:IMD_DECILE -4.0000     1.2161  -3.289  0.00462 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7811 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.7568
F-statistic:  20.7 on 3 and 16 DF,  p-value: 9.354e-06
```

Appendix Section 14

Results calculated by attributing GP supply to **PCTs** and aggregating based on population weighted fifths of PCTs ranked by IMD score - **GP registrars and retainers excluded from the calculation**

Figure A14.1: Trend in FTE GP supply over time excluding registrars and retainers

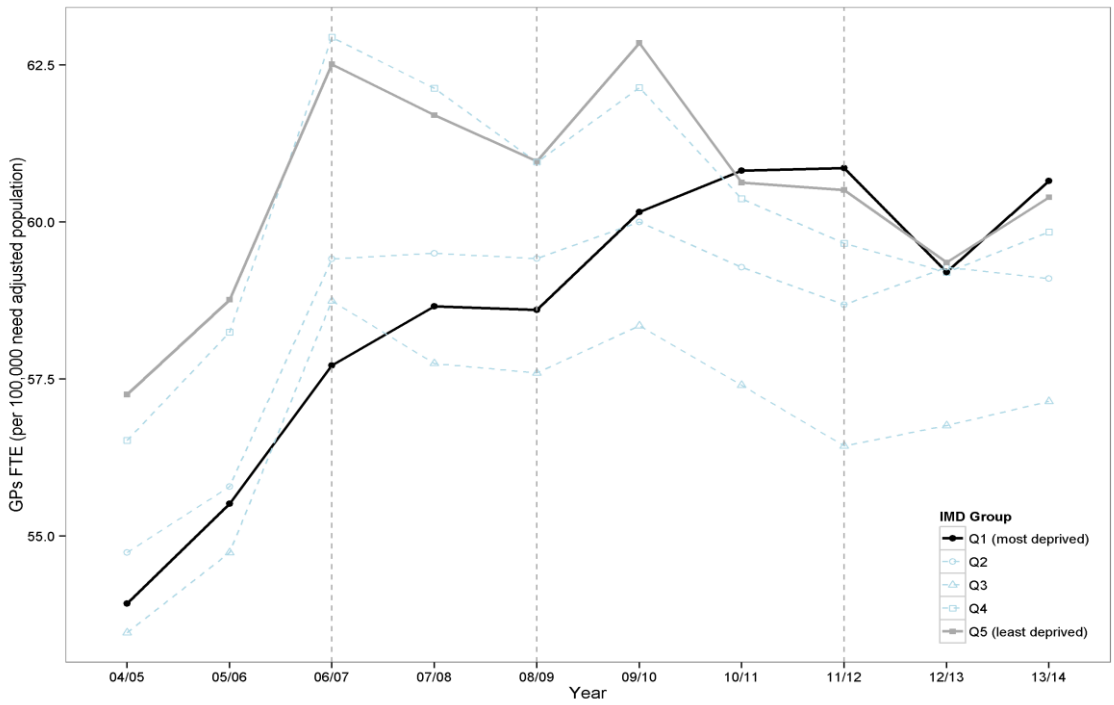


Figure A14.2: Trend in FTE nurse supply over time

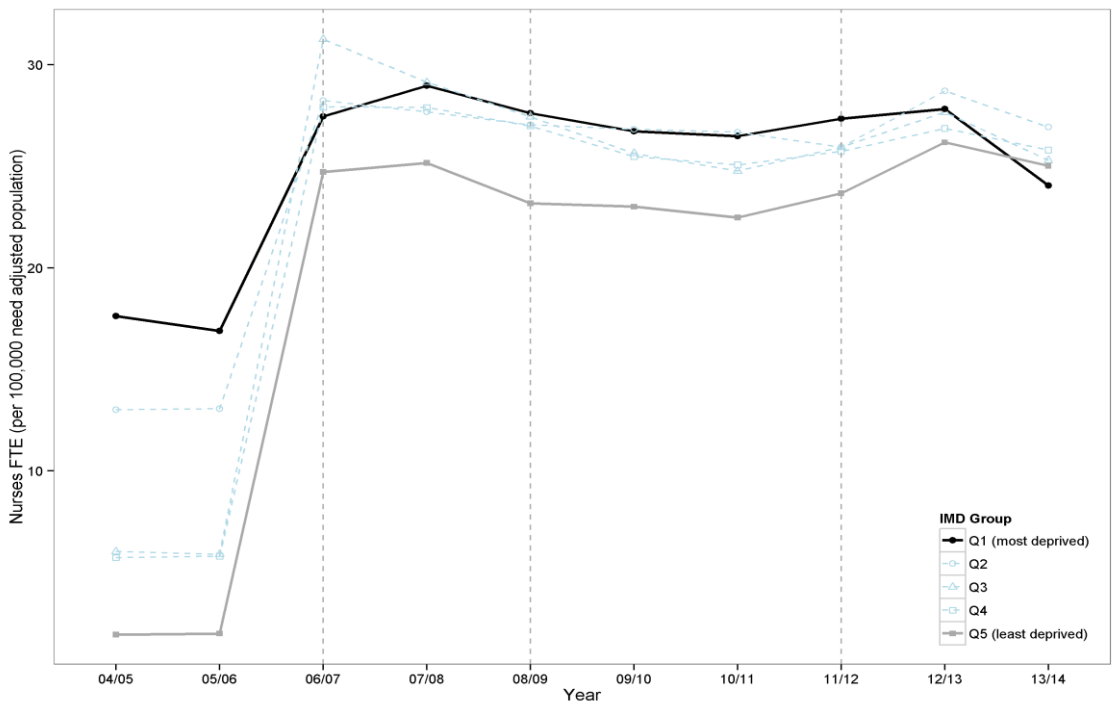
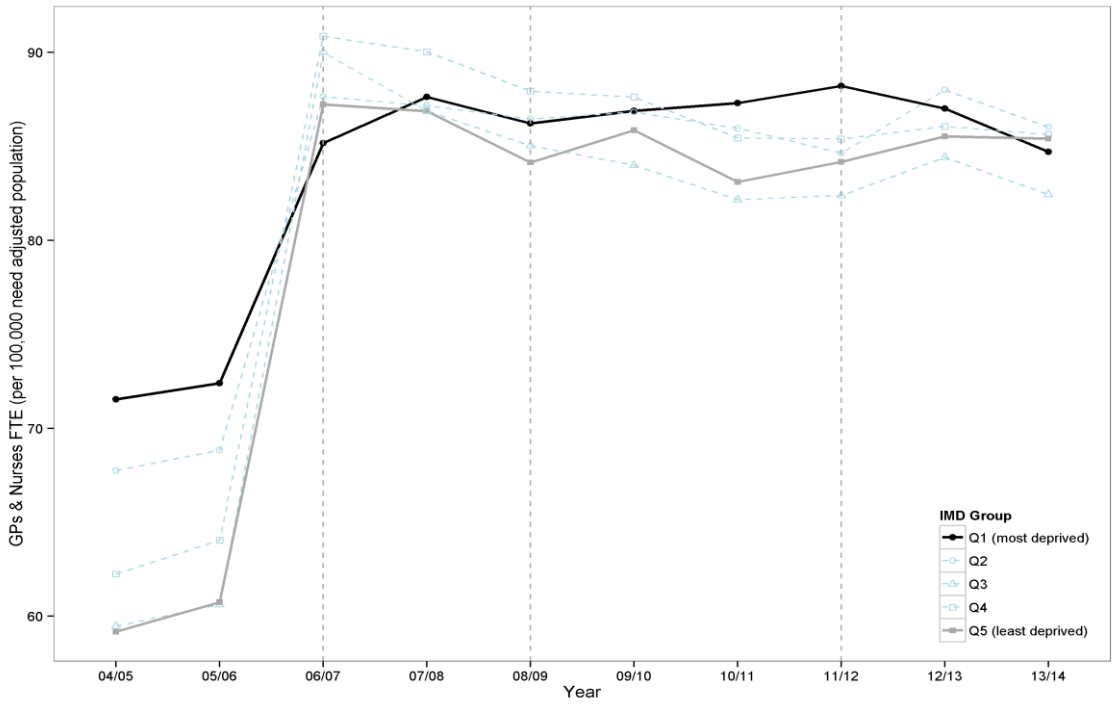


Figure A14.3: Combined trend in FTE GP and nurse supply over time



Appendix Section 15

Results calculated by attributing GP supply to **CCG**s and aggregating based on population weighted fifths of CCGs ranked by IMD score - **GP registrars and retainers excluded from the calculation**

Figure A15.1: Trend in FTE GP supply over time excluding registrars and retainers

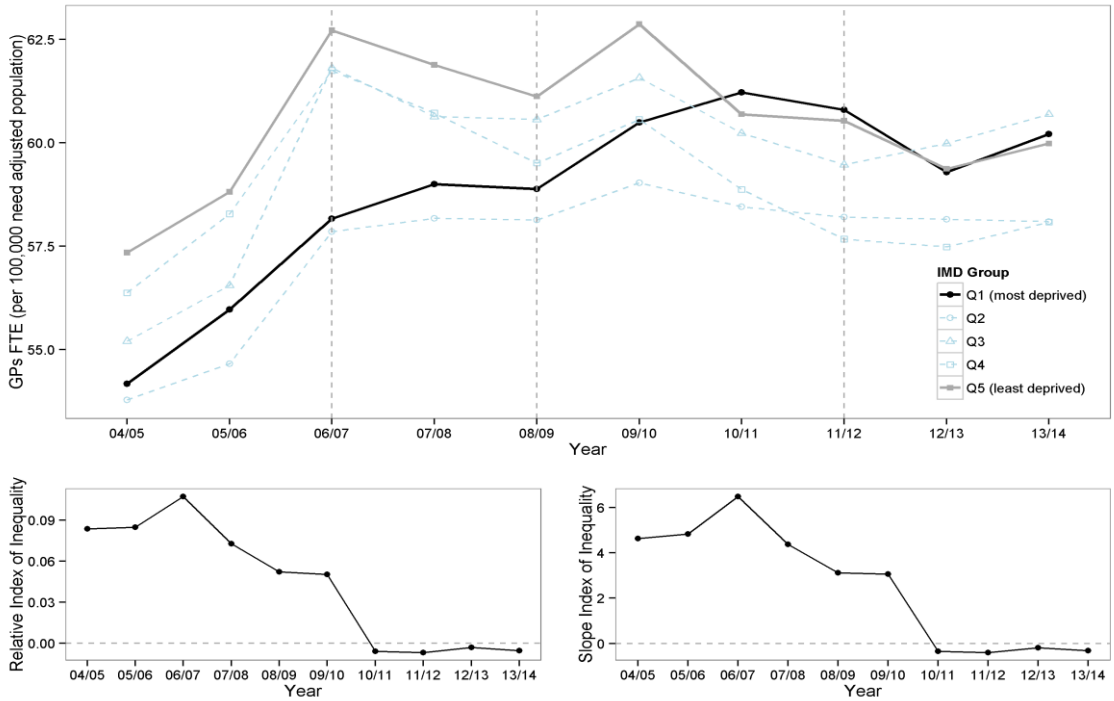


Figure A15.2: FTE GP supply in 2006/07 and 2011/12 excluding registrars and retainers

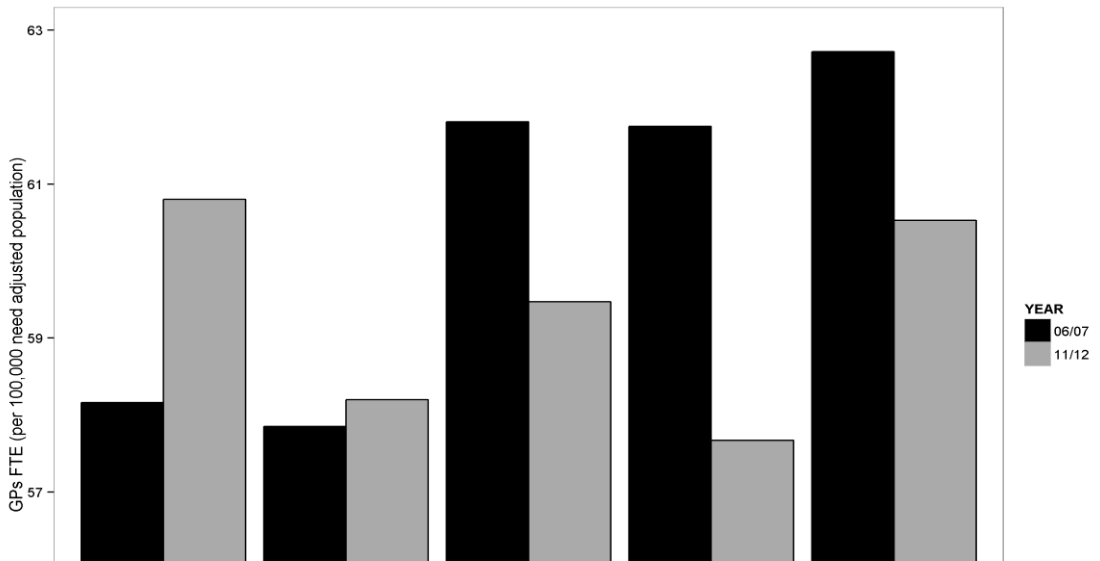


Figure A15.3: Trend in total headcount and FTE GP supply over time excluding registrars and retainers

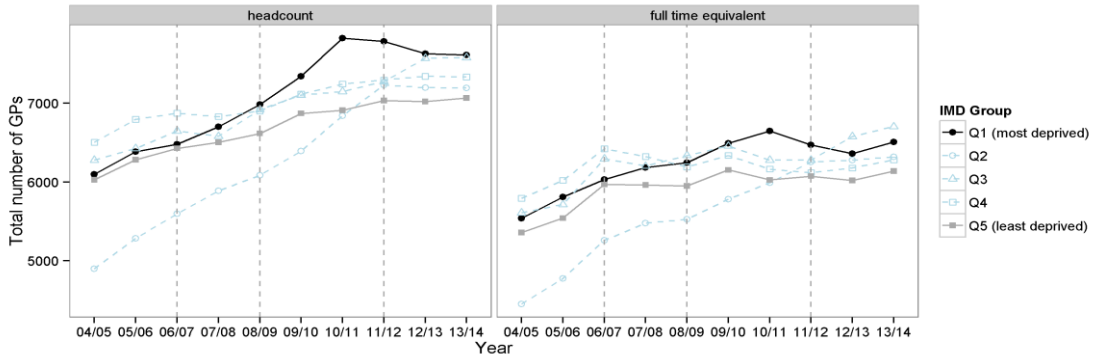
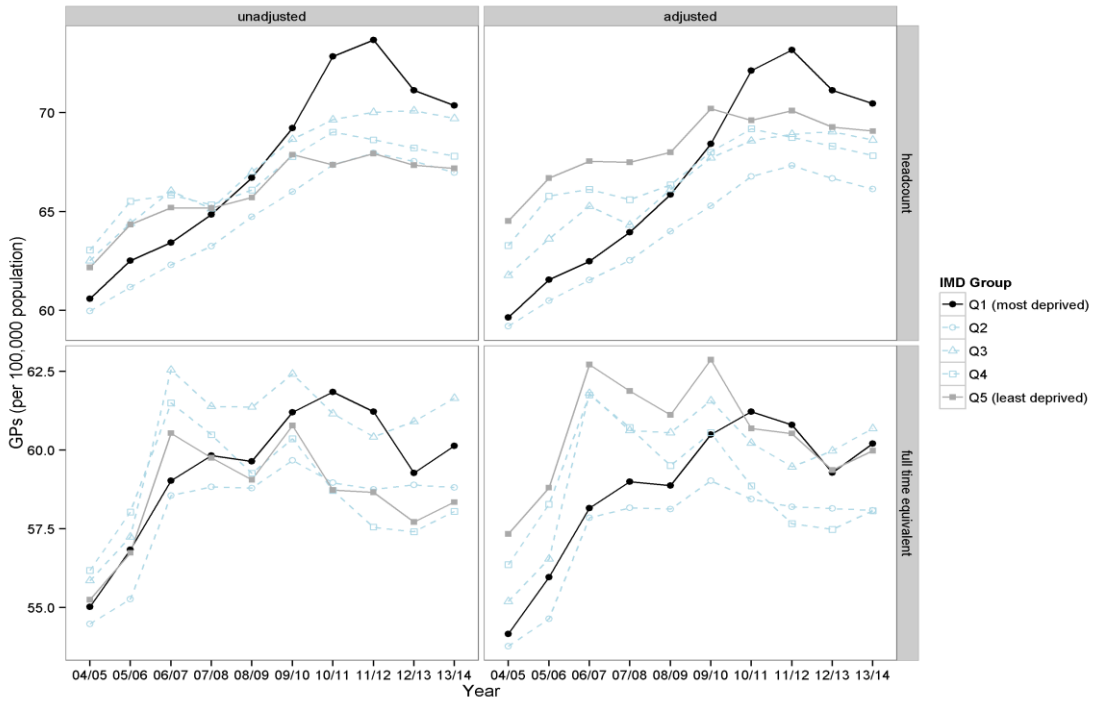


Figure A15.4: Trend in unadjusted and adjusted headcount and FTE GP supply over time excluding registrars and retainers



Regression A15.1: Test for difference in slope index of inequality between 2006/07 and 2011/12

```
Call:
lm(formula = FTE_PER100K_ADJ ~ YEAR * IMD_DECILE, data = subset(deciles,
    YEAR %in% c("2006", "2011")))

Residuals:
    Min      1Q  Median      3Q     Max
-3.9218 -0.9508  0.3906  1.1253  2.2385

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)          56.880      1.158  49.140  < 2e-16 ***
YEAR2011              2.683      1.637   1.639  0.12076
IMD_DECILE            6.487      1.865   3.478  0.00311 **
YEAR2011:IMD_DECILE  -6.888      2.638  -2.611  0.01891 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.694 on 16 degrees of freedom
Multiple Adjusted R-squared:  0.3723
F-statistic: 4.757 on 3 and 16 DF,  p-value: 0.0148
```

Appendix Section 16

Results calculated looking at opening and closing GP practices and their impact on GP FTE numbersby IMD score - **GP registrars and retainers excluded from the calculation**

Figure A16.1: Trend in GP practices opening

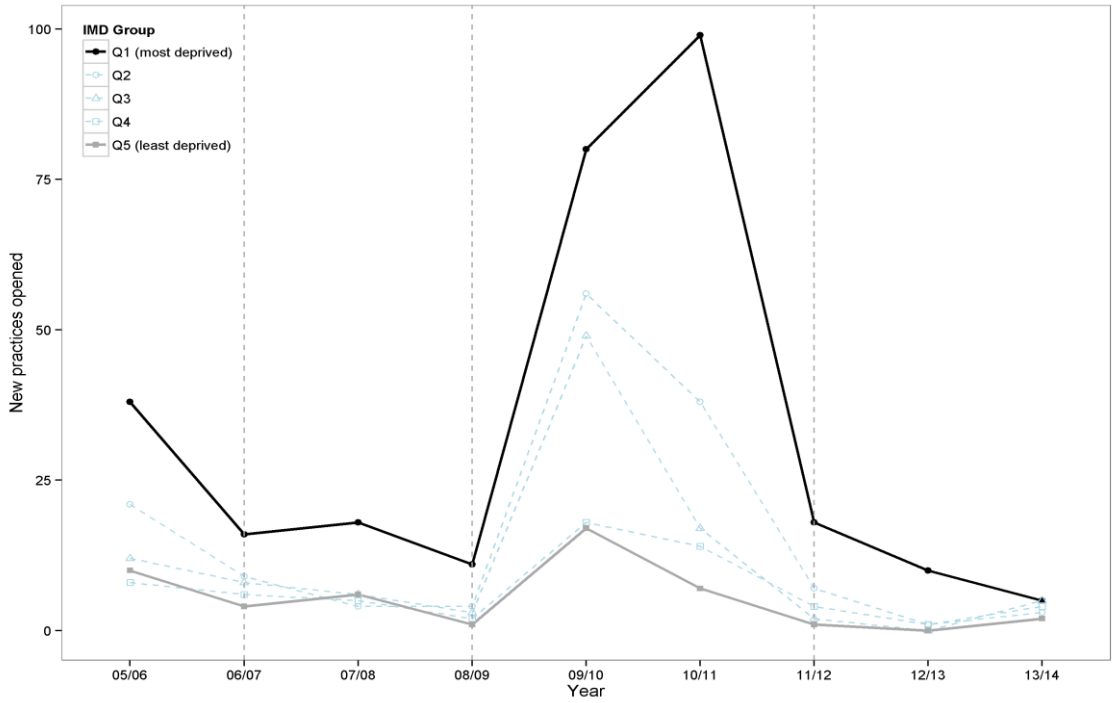


Figure A16.2: Trend in GP FTE due to GP practices opening

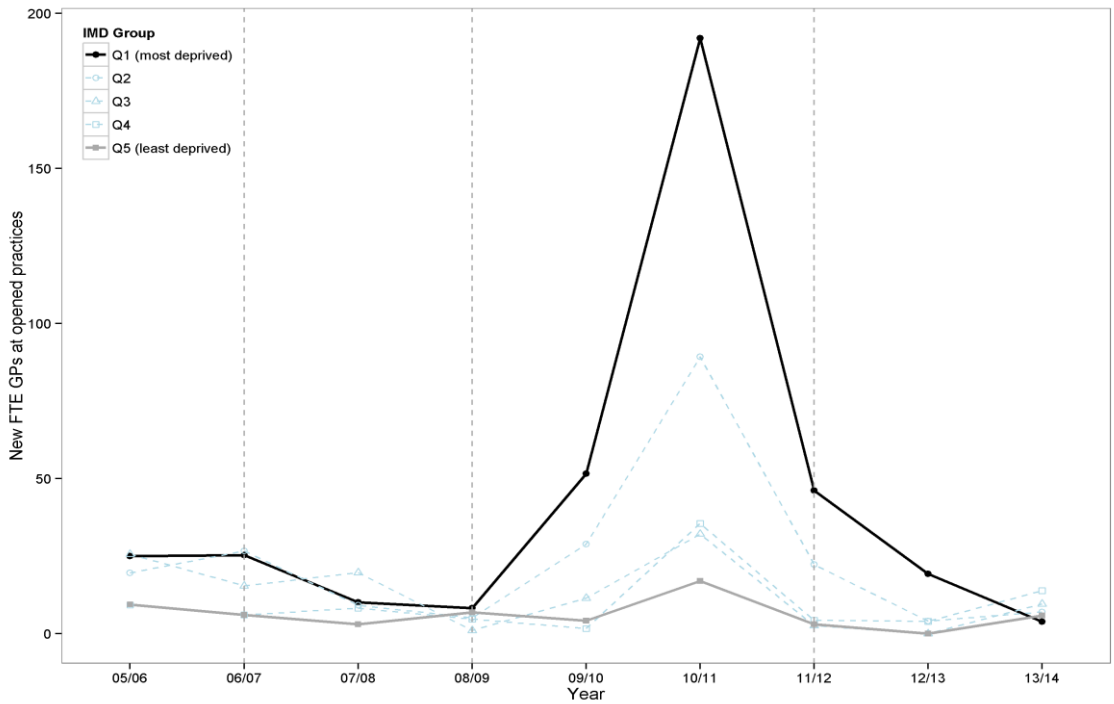


Figure A16.3: Trend in GP practices closing

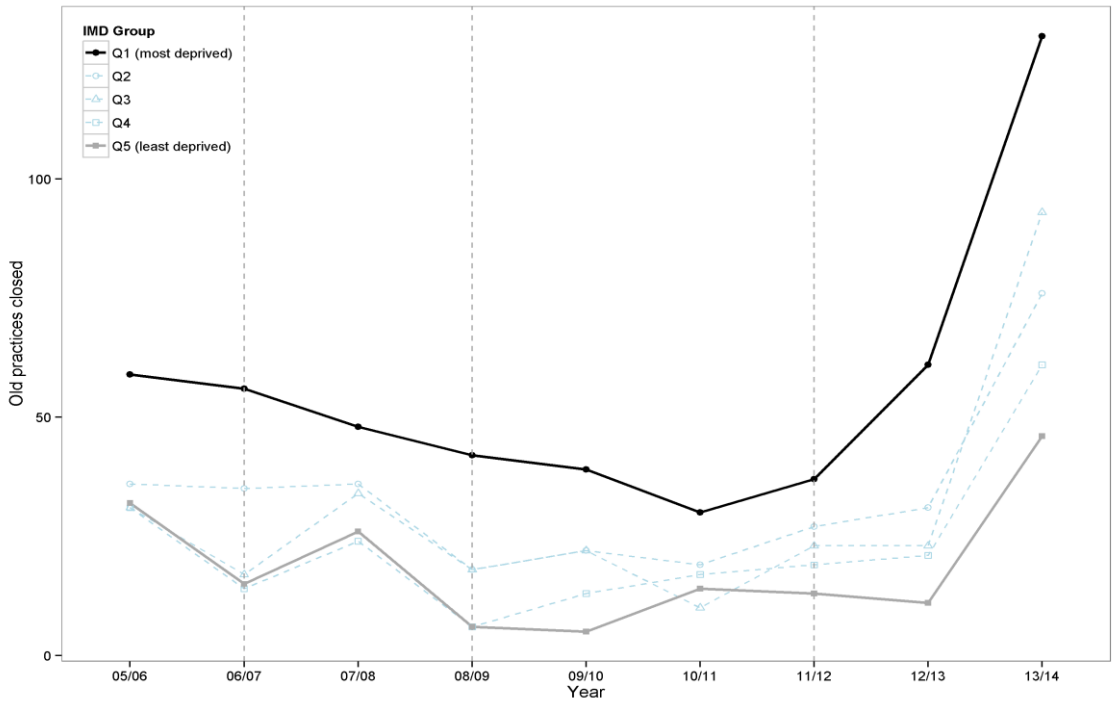


Figure A16.4: Trend in GP FTE due to GP practices closing

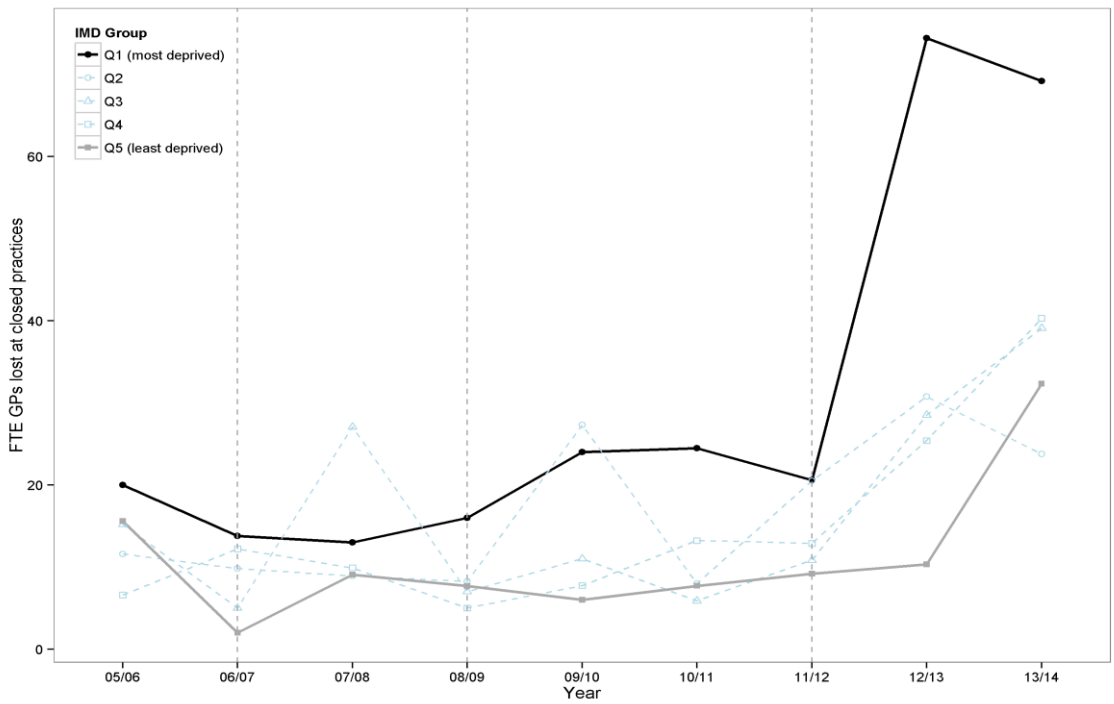


Figure A16.5: Trend in net change in GP practices

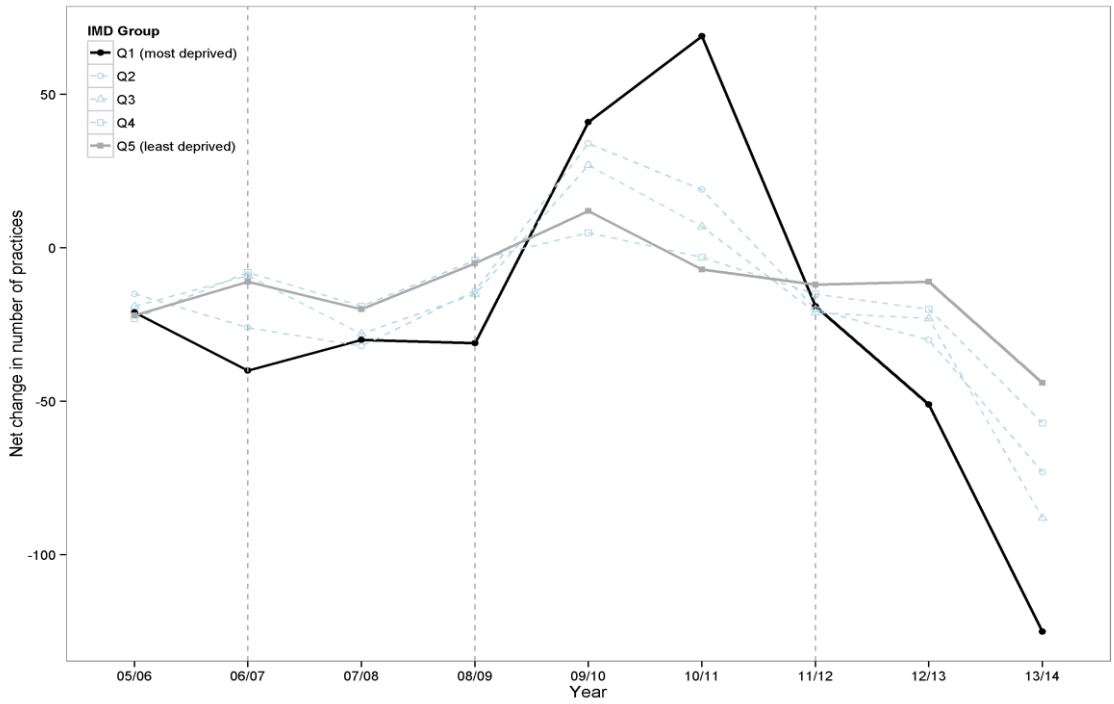
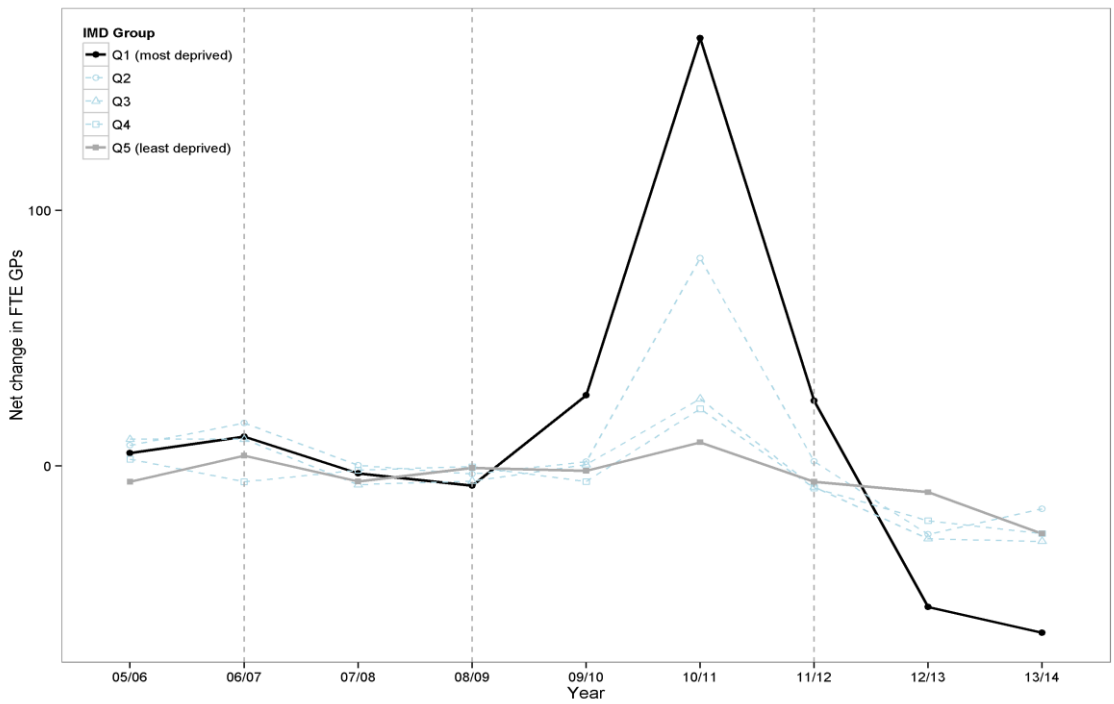


Figure A16.6: Trend in net change in GP FTE due to net change in practices



Appendix Section 17

Exploring the impact of need adjustment over time for the deprivation quintiles

Table A17.1: Carr-Hill Need Adjustment Workload Weights

Age-Sex weight		Registration status weight		IMD Health Domain score weight
Band	Weight	Band	Weight	Weight
Male 0-4 years	2.354	Registered with practice for 12 months+	1.000	The weight is calculated as:
Male 5-14 years	1.000			
Male 15-44 years	0.913			1.054 to the power of the IMD Health Domain score associated with the patient's postcode)
Male 45-64 years	1.373			
Male 65-74 years	2.531	Registered with practice in last 12 months	1.689	
Male 75-84 years	3.254			
Male 85+ years	3.193			
Female 0-4 years	2.241			
Female 5-14 years	1.030			
Female 15-44 years	1.885			
Female 45-64 years	2.115			
Female 65-74 years	2.820			
Female 75-84 years	3.301			
Female 85+ years	3.090			

Source: Review of the Generla Medical Services global sum formula (2007) - Table 1 - http://www.nhsemployers.org/~/media/Employers/Documents/Primary%20care%20contracts/GMS/GMS%20Finance/Global%20Sum/frg_report_final_cd_090207.pdf

We were unable to get data on duration of registration with practice so this part of the calculation is ommited from our results

The formula was applied at LSOA level populations and adjusted populations were re-normalised to sum to the pre-adjusted total

The IMD Health Domain score ranges from -3.10 to 3.79 corresponding to pre-normalisation deprivation adustment weights of 0.85 and 1.22.

The biggest increase in LSOA population due to adjustment over the period of analysis was 165% and the smallest increase was 8%
After normalisation these changes reduced to an increase of 50% and a decrease of 38% respectively

Figure A17.1: Trend in Carr-Hill Relative Need Index Over Time - LSOA level IMD Quintile Aggregation

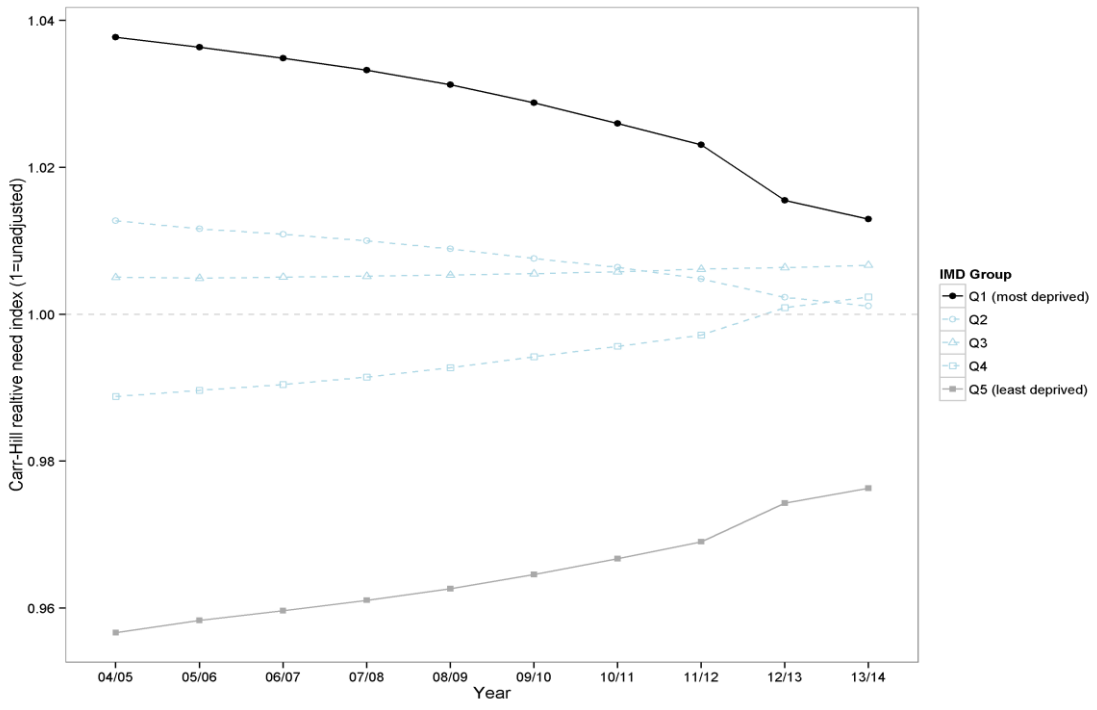
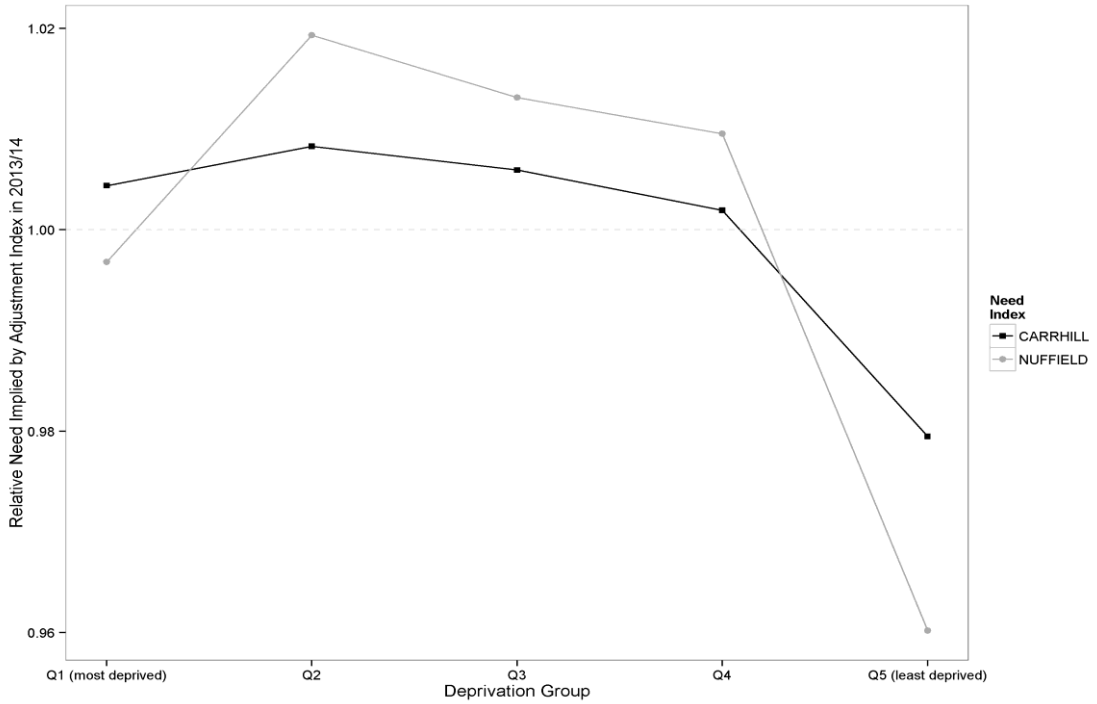


Figure A17.2: Comparing Carr-Hill and Nuffield PBRA Relative Need Index 2013/14 - Practice Level IMD Quintile Aggregation



Source: Nuffield Person Based Resource Allocation - Technical Guide to Clinical Commissioning Group and Area Team allocations 2014-15 and 2015-16: http://www.england.nhs.uk/2014/03/27/allocations-tech-guide/ speadsheet: http://www.england.nhs.uk/wp-content/uploads/2014/03/c-nph-gen-acute.xlsx

Figure A17.3: Impact of Carr-Hill and Nuffield PBRA Need Adjustment on GP FTE Excluding Registrars and Retianers 2013/14