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Is continuity of primary care declining in England? Practice-level longitudinal study, 2012-2017

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Abstract

Background: Continuity of care is a core principle of primary care and related to improved patient outcomes and reduced healthcare costs. Evidence suggests continuity of care is declining.

Aim: (i) to confirm reports of declining continuity of care, (ii) to explore differences in decline according to practice characteristics, (iii) to examine associations between practice populations or appointment provision and changes in continuity of care.

Design and Setting: Longitudinal study of aggregated practice-level data from repeated questions in GP-Patient surveys between 2012-2017 on having a preferred GP, seeing this GP always/often (usually), appointment system and practice population characteristics, linked to rural/urban location and deprivation.

Method: Multilevel modelling; time (level-1) and practices (level-2).

Results: 56.7% of patients had a preferred GP in 2012, declining by 9.4%-points (95%CI -9.6 to -9.2) by 2017. 66.4% of patients with a preferred GP saw this GP usually in 2012, which declined by 9.7%-points (95%CI -10.0 to -9.4) by 2017. This decline was visible in all types of practices, irrespective of baseline continuity, rural/urban location, or deprivation. At practice-level, an increase over time in the percentage of patients reporting good overall experience of making appointments was associated with an increase in both the percentage of patients having a preferred GP, and the percentage of patients being able to see that GP usually.

Conclusion: Patients reported a steady decline in continuity of care over time, which should concern clinicians and policymakers. The ability of practices to offer patients a satisfactorily working appointment system could partly counteract this decline.

Keywords: continuity of care; preferred GP; primary care; GP-patient survey; longitudinal study; multilevel model

How this fits in

Some recently published studies suggested continuity of care in England is declining. However, little is known about the trend in continuity of care over recent years. This study used aggregated practice-level data from repeated questions in GP-Patient surveys between 2012-2017 on having a preferred GP and seeing this GP usually and showed a decline over time for both indicators by approximately 9%-points. This decline is visible in all types of practices, irrespective of baseline practice-level continuity, type of area or level of deprivation. Since continuity of care is a core principle of primary care, this decline should concern clinicians and policymakers. As practices with higher percentages of patients reporting a good overall experience of making appointments showed relatively more patients being usually able to see their preferred GP, a satisfactorily working appointment system could partly counteract a decline in continuity of care.

Introduction

Patients in England are registered at one general practice within which they can consult any doctor or general practitioner (GP). A core principle of primary care is continuity of care, which is usually defined as seeing the same doctor over time. Continuity of care is highly valued by patients and GPs(1) and linked with healthcare cost reduction(2) and with improved patient outcomes(3) such as patient satisfaction(4), reduced emergency hospital admissions(5, 6) and reduced mortality(7-9). Although some patients would benefit from a 'fresh pair of eyes'(10) and seeing the same doctor increases waiting time(3), in general these disadvantages of continuity of care are outweighed by the benefits mentioned above and therefore it is important to monitor continuity of care.

Although some studies suggest continuity of care in England is declining(3, 11), few studies have explored the trend over recent years or whether the decline varies according to characteristics of general practices or their patient populations(11). For example, practice appointment systems could encourage patients to consult a specific GP or could, conversely, prioritise access over continuity, while practices with a high proportion of patients with long-term health conditions or greater health needs are likely to have more patients with a strong preference for seeing a particular GP.(3, 12) We previously showed that the NHS policy of allocating patients to a named GP did not appear to have the desired effect of preserving continuity of care.(13)

Examining patient and practice characteristics associated with aspects of relationship continuity such as having a preferred GP and being able to see the preferred GP could potentially further inform policy. A decline in the percentage of patients having a preferred GP might have different causes and

consequences than a decline in the percentage of patients being able to consult their preferred GP. It is also important to note that a preferred GP (relationship continuity) does not necessarily equate with the GP a patient sees most often (longitudinal continuity), which has been the focus of most previous research on continuity. The study's aim is to improve our understanding of the time-trend of relationship continuity of care split into a) having a preferred GP and b) being able to see that GP. The objectives are (i) to confirm reports of a decline in continuity of care, (ii) to explore differences in decline according to practice characteristics, (iii) to examine associations between changes in practice populations or appointment provision and changes in continuity of care.

Methods

Study design and setting

The GP-Patient Survey (GPPS) is an independent annual survey of over a million patients carried out on behalf of NHS England. It aims to determine how patients feel about their general practice and its primary healthcare delivery. This study used a longitudinal design on GPPS data reported in June or July with English general practices in 2012 as the unit of analysis for the time-period 2012 to 2017.⁽¹⁴⁾ Practices were only included if their patients' response rate was 20% or greater and had no missing values on the characteristics included in our models. As a result, the number of practices included varied from a maximum of 7,574 (91.7% of all operative practices in 2012) to a minimum of 6,711 (90.2% of all operative practices in 2017). We used the weighted GP-patient survey data. Weights were generated to correct for the sampling design, to reduce the impact of non-response bias, and to improve generalisability.⁽¹⁵⁾

Outcome measures

Two questions in the GPPS capturing two different aspects of relationship continuity of care were used as two separate outcome measures:

1. The percentage of patients answering 'yes' to the question on having a preferred GP, excluding those who responded that 'there is usually only one GP in my GP surgery' (Supplementary Table 1A).
2. Of those patients who have a preferred GP, the percentage of patients who saw their preferred GP 'always', 'almost always' or 'a lot of the time' (Supplementary Table 1B). From here on we have referred to this as 'usually' seeing the preferred GP.

English general practice characteristics

The modifiers used in the models to explore differences in decline according to practice characteristics) were as follows:

Practice-level continuity of care: To explore whether declines in continuity varied according to whether a practice had on average poorer or better continuity of care, we categorised practices into quartiles according to the mean percentage of patients over the years 2012-2017 who had a preferred GP. Similarly, we did this for the mean percentage of patients who usually saw their preferred GP; quartile 1 being the lowest percentage.

Location: We linked Office of National Statistics 2011 data by general practice postcode to the GPPS to determine whether general practices were in rural areas, in cities and towns, or in urban conurbations.

Deprivation: Measured using the index of multiple deprivation score at practice-level for 2012 provided by Public Health England.(16) The scores were divided into quintiles; quintile 1 is least deprived.

Measures of general practice population demographics and appointment provision

To examine associations between changes in practice patients' characteristics or appointment provision and changes in continuity of care we used the following measures, calculated for each year:

Patients' health status: the percentage of patients who indicated on the GPPS that they had a longstanding health condition.

Access to English general practice: the percentage of all GPPS respondents reporting having a 'very' or 'fairly' good overall experience of making an appointment.

Socio-demographic characteristics: the percentage of patients reported to be 65 years of age or older, female, in full-time paid work or education, to have no religion, and identifying as African and Caribbean Black, South Asian, or another non-UK-white ethnic group (UK-white ethnicity is then the reference ethnic group in the analyses).

Statistical methods

We conducted multilevel analyses to: a) calculate change over time in the two continuity outcome measures, b) calculate differences between practices over time by including an interaction between time and general practice characteristics, c) examine the association of changes in the practice population demographics with changes in continuity of care, whereby time (i.e. years) was the level-1 unit and general practices were the level-2 units.

For all variables fitted in the last model, apart from 'percentage of patients characteristics having a good overall experience of making appointments', we used the average value over the six years because these characteristics did not change substantially during the 6-year observation period in our study (see Supplementary Tables 1A and 1B). The percentage of patients having a good overall experience of making an appointment did change, from 82.4% in 2012 to 76.9% in 2016. Our third objective involved measuring the effect of these changes, at practice level, on having or seeing a preferred GP. Therefore, as well as fitting the average over the six years for this variable (time-average value) we also took the yearly average per practice (i.e. time-specific values). This allowed us to model the effects of changes in overall experience of making an appointment, respectively between practices and within practices, on changes in having or seeing a preferred GP. Adjusted regression coefficients, confidence intervals and p-values were tabulated for each predictor in this last model. The results of the first two models are presented in figures. All analyses were undertaken in Stata/MP 16.1 (StataCorp, College Station, Texas, USA)

Results

The results are described below separately for each of the three study objectives.

Objective 1: Confirmation of a decline in continuity of care over time

A multilevel analysis on having a preferred GP against survey year estimated that 56.7% of patients had a preferred GP in 2012. This declined by 9.4%-points (95%CI -9.6 to -9.2) by 2017 (see Figure 1). A similar analysis on seeing one's preferred GP estimated that 66.4% of the patients with a preferred GP usually saw this GP when consulting a doctor in 2012. This declined by 9.7%-points (95%CI -10.0 to -9.4) by 2017 (see Figure 1).

Figure 1 here

Objective 2: Exploration of differences in decline by practice characteristics

Having a preferred GP

The percentage of patients having a preferred GP declined in all four practice-level continuity of care quartiles; the decline in the first three quartiles was similar, around 9.5%-points, while the decline in highest quartile was 8.3%-points (see Figure 2). The percentage of patients having a preferred GP was lower in urban conurbations (55.2%) than in cities and towns (57.9%) or in rural areas (57.5%) in 2012 (see Figure 3). These percentages declined respectively 8.5%-points, 9.0%-points, and 10.5%-points. The percentage of patients having a preferred GP was lowest in practices within the most deprived areas (54.1%) and highest in least deprived areas (59.2%) (see Figure 4); These percentages declined respectively by 7.7%-points and 9.9%-points.

Global tests suggested these declines in having a preferred GP were significantly ($p < 0.001$) different among the practice-level continuity of care quartiles, practice locations and deprivation quartiles, though these differences are modest in magnitude.

Figures 2, 3, and 4 here

Usually seeing preferred GP

A similar set of analyses on whether patients usually saw their preferred GP also showed a decline among practices across all practice-level continuity of care quartiles (respectively, 11.4%-points, 11.5%-points, 9.1%-points, and 5.9%-points), all locations (8.9%-points, 11.1%-points, and 8.2%-points) and all levels of deprivation (9.5%-points and 9.0%-points in the most and least deprived quintiles). (see Supplementary Figures 1, 2, and 3).

Global test suggested these declines in seeing the preferred GP usually were significantly ($p < 0.003$) different among the practice-level continuity of care quartiles, practice locations and deprivation quartiles, though again these differences are modest in magnitude.

Objective 3: Association of change in practice population characteristics or practice appointment provision with change in continuity of care

Having a preferred GP

Practices with higher percentages of patients having a preferred GP were associated with higher percentage of patients having a good overall experience of making an appointment (time-average), being female, and 65 years or older, and higher percentage of patients who identified as South Asian. Practices with lower percentages of patients having a preferred GP was associated with higher percentage of patients who identified as UK-whites or as African/Caribbean Black, were in full-time paid work or education, or who had no religious affiliation. In practices where the percentage of

patients having a good overall experience of making an appointment increased over the years (time-specific), there was also an increase over the years in the percentage of patients who reported having a preferred GP (Table 1).

Table 1 here

Usually seeing preferred GP

Practices with higher percentages of patients usually seeing the preferred GP were associated with higher percentage of patients who had good overall experience of making an appointment (time-average), were aged 65 years or older, or who identified as South Asian. Practices with lower percentages of patients who usually saw their preferred GP were associated with higher percentage of patients with long-standing health conditions and being female. In practices where the percentage of patients having a good overall experience of making an appointment increased over the years (time-specific), there was also an increase over the years in the percentage of patients who usually saw their preferred GP (Table 1).

Regression coefficients for good overall experience of making an appointment were substantially larger for seeing a preferred GP than for having a preferred GP, a difference not explained by the greater variation between practices for seeing a preferred GP.

Post estimation statistics

Residual plots were undertaken and showed that residuals for the final models were found to be Normally distributed, though the small minority of practices with only one or two data points on the outcome measures had a slight tendency to show lower satisfaction than predicted. We, therefore, repeated our analyses on those practices with more than two datapoints but the regression coefficients were essentially similar.

Discussion

Summary

The percentage of patients having a preferred GP and usually being able to see this GP declined substantially between 2012 and 2017 by 9.4%-points and 9.7%-points, respectively. This decline is visible in all types of practices, irrespective of baseline practice-level continuity, type of area or level of deprivation. Although there is slight variation in the decline in continuity of care among practices according to practice-level continuity, location and level of deprivation, the magnitude of the difference in decline was small. An increase in the percentage of a practice's patients reporting

having good experiences of making appointments over time was particularly associated with an increase in the percentage being able to see their preferred GP.

Strengths and limitations

This longitudinal study over six years, including over 90% of all operative English general practices, involved repeated measures for both having a preferred GP and seeing a preferred GP together with a range of (potential) modifying and explanatory variables. By excluding GPPS years for practices having a response rate less than 20% or having with missing values on variables in the analyses, we excluded some practices with relatively more younger patients, more patients from an ethnic minority background, and located in more deprived areas (Supplementary Table 2). However, we repeated our analysis on practices with data present for more than two out of 6 years and found essentially similar results relating to the aims of the study. Even after making exclusions, we had a large dataset available, so that many of the statistically significant associations we reported are small.

There was a positive association between GPPS response rates and the percentage of patients having a preferred GP within a practice, which might reflect unmeasured confounding or selection bias. The GPPS questions were focused on a 'particular doctor' that the patient usually prefers to see and how often a patient could see this doctor. The wording of these questions does not allow examination of more complex aspects of continuity of care, for example patients might prefer to see different doctors for the management of different conditions.⁽¹⁷⁾ Over the years, extended hours consultations have been introduced, more GPs have been working part-time, and GP workload has increased,⁽¹⁸⁾ all of which could affect continuity. However, we were unable to include these issues in our models. Given the ecological nature of the data (aggregated to general practice level), one cannot infer associations for individual patients.

Comparison with existing literature

Many studies of continuity of care have considered longitudinal continuity (seeing the same doctor) but it is arguable that it is more relevant to consider relationship continuity (seeing a doctor that you prefer to see). Levene, Baker, Walker et al. combined the GPPS questions on having and seeing a preferred GP and showed that the proportion of patients having a preferred GP and usually able to see that GP declined between 2012 and 2017.⁽¹¹⁾ Their study concluded that level of deprivation (in deciles) was not associated with a decline in relational continuity of care. Our study investigated trends in having a preferred GP and usually seeing this preferred GP separately, showing that both

declined over time by approximately 9%-points. Forbes, Forbes, Checkland et al. found that practices that had grown in population size between 2013 and 2018 had a greater percentage fall in continuity of care supporting our conclusion that the decline in continuity of care might vary but is visible in all types of practices.(19) Furthermore, we found that the extent of decline differed significantly between levels of deprivation (quintiles), although these differences are modest in magnitude.

Our results concerning which patient characteristics are associated with having a preferred GP are in accordance with the characteristics reported by the Nuffield Trust(3) : female, older, South Asian, not in full-time work or education, and having long-term conditions. We also found an inverse relationship for patients who had no religious affiliation. Our results concerning which patient characteristics are associated with usually seeing a preferred GP are also in accordance with the characteristics reported by the Nuffield Trust: practices with a high percentage of patients who were male, older, and identified as South Asian, or had long-term conditions. We did not find, however, an association with full-time work or education but found a negative association with being African/Caribbean Black.

Implications for research and practice

A decline in continuity of care was identified in the first decade of this century after several major reforms had been introduced in UK primary care.(20) The reported decline of over 6%-points in patients being able to see their usual GP coincided with reforms prioritising access to GPs over continuity of care. Recently, the introduction of the named GP scheme for older patients in 2014, and for everyone else the year after, did not improve continuity of care.(13) The assignment of a named GP did not necessarily reflect which GP the patient had seen most often or consider their preference for a certain GP. Current reforms include the introduction of Primary Care Networks (PCNs). A core requirement of PCNs is offering extended hours access, shared across practices in a network, and this policy may well further reduce continuity of care. A Health Foundation briefing on this stated that any evaluation strategy for the networks should include monitoring the effect on continuity.(21)

Furthermore, we should rethink what we understand as continuity of care in a changing patient population and a rapidly evolving healthcare system. Accelerated by the COVID-19 pandemic, traditional face-to-face consultations are being replaced by telephone, video, and e-consultations.(22, 23) Patient access to care is increasingly triaged via algorithm-based or reception-led navigation, which directs patients to different health professionals and information technology advances are shifting some care to monitoring or information continuity through case managers and coaches/counsellors.(24) This could result in reconsidering how we distinguish between different

types of continuity of care such as longitudinal, relational, informational, and managerial and their mutual relationship,(25, 26) and the circumstances in which continuity of care most benefits patients' health outcomes.

The association between satisfaction with making an appointment and the ability to see a preferred GP could suggest that improvements in the ability of practices to offer patients a good experience of making an appointment could partly counteract the decline in patients seeing their preferred GP, although the reverse interpretation is also possible (where people were more likely to see their preferred GP they were more likely to express improved satisfaction with the appointment system). Patient satisfaction with the appointment system and ability to consult a preferred GP could reflect the organisation of the appointment system or pressures on the number of appointments available, which in turn may be related to practice workload and capacity.

Contributors

PT initiated the study. PT and RM designed the study. PT collected and managed the data and performed the analyses. PT drafted the first version of the manuscript. RM, CS, and MM contributed to the methodological approach and added significant input to the results and discussion. All authors read and approved the final manuscript.

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Ethical approval

Not applicable. All data were abstracted from publicly available websites and comprised aggregated practice-level data where neither patients nor GPs could be identified.

Competing interests

The authors have declared no competing interest.

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Table 1: Estimates of B-coefficients from multilevel regression models for the association between general practice characteristics and socio-demographic profile of patients and 1) the percentage of patients in English general practices having a preferred GP, and 2) percentage of patients seeing their preferred GP usually, 2012–2017.

	Having a preferred GP		Seeing preferred GP usually	
	Univariable	Multivariable	Univariable	Multivariable
	b-coef. (95% CI), p-value	b-coef. (95% CI), p-value	b-coef. (95% CI), p-value	b-coef. (95% CI), p-value
Constant		28.45 (20.96, 35.93) p<0.001		8.67 (0.52, 16.82) p=0.037
<i>Year</i>				
2013 (ref. 2012)	-0.39 (-0.61, 57.00) p<0.001	-0.18 (-0.39, 0.04) p=0.109	-2.28 (-2.56, -2.00) p<0.001	-1.11 (-1.38, -0.85) p<0.001
2014 (ref. 2012)	-1.22 (-1.43, -1.01) p<0.001	-0.86 (-1.08, -0.65) p<0.001	-4.20 (-4.49, -3.93) p<0.001	-2.26 (-2.53, -1.99) p<0.001
2015 (ref. 2012)	-4.00 (-4.20, -3.77) p<0.001	-3.54 (-3.77 -3.32) p<0.001	-3.44 (-5.73, -5.16) p<0.001	-2.92 (-3.20, -2.64) p<0.001
2016 (ref. 2012)	-6.48 (-6.69, -6.27) p<0.001	-6.02 (-6.24, -5.80) p<0.001	-6.86 (-7.15, -6.58) p<0.001	-4.35 (-4.61, -4.07) p<0.001
2017 (ref. 2012)	-9.37 (-9.59, -9.15) p<0.001	-8.84 (-9.07, -8.62) p<0.001	-9.68 (-9.97, -9.40) p<0.001	-6.83 (-7.11, -6.55) p<0.001
<i>Practice level variables</i>				
Cities & Towns (ref. urban conurbation)	1.96 (1.45, 2.46) p<0.001	1.31 (0.76, 1.86) p<0.001	2.58 (1.87, 3.30) p<0.001	-1.18 (-1.76, -0.59) p<0.001
Rural areas (ref. urban conurbation)	1.97 (1.27, 2.67) p<0.001	-1.65 (-2.44, -0.86) p<0.001	9.55 (8.56, 10.53) p<0.001	-1.43 (-2.27, -0.58) p=0.001
Low Index of Multiple Deprivation (IMD) in 2012 quintile 2 (ref. lowest IMD)	-0.72 (-1.45, 0.07) p=0.052	-1.14 (-1.84, -0.44) p=0.001	-1.32 (-2.36, -0.28) p<0.001	-0.30 (-1.05, 0.44) p=0.420
Middle IMD in 2012 quintile 3 (ref. lowest IMD)	-1.92 (-2.64, -1.19) p<0.001	-1.72 (-2.48, -0.95) p<0.001	-4.00 (-5.04, -2.95) p=0.013	0.11 (-0.70, 0.92) p=0.787
High IMD in 2012 quintile 4 (ref. lowest IMD)	-3.39 (-4.12, -2.66) p<0.001	-2.63 (-3.51, -1.76) p<0.001	-6.17 (-7.22, -5.12) p<0.001	-0.15 (-1.09, 0.78) p=0.748
Highest IMD in 2012 (quintile 5) (ref. lowest IMD)	-4.16 (-4.90, -3.41) p<0.001	-2.96 (-4.05, -1.86) p<0.001	-8.01 (-9.08, -6.93) p<0.001	-0.03 (-1.21, 1.15) p=0.955
<i>Patient level variables</i>				
Pct. of patients having good overall experience of making appointments (time-specific)	0.22 (0.21, 0.23) p<0.001	0.09 (0.07, 0.10) p<0.001	0.67 (0.66, 0.68) p<0.001	0.46 (0.45, 0.47) p<0.001
Pct. of patients having good overall experience of making appointments (time-average)	0.19 (0.17, 0.21) p<0.001	0.09 (0.06, 0.11) p<0.001	0.97 (0.95, 0.99) p<0.001	0.46 (0.43, 0.49) p<0.001
Pct. of patients with long-standing health condition	0.24 (0.20, 0.28) p<0.001	0.07 (-0.00, 0.14) p=0.051	0.32 (0.26, 0.38) p<0.001	-0.08 (-0.12, -0.00) p=0.040
Pct. of female patients	0.22 (0.16, 0.28) p<0.001	0.15 (0.08, 0.22) p<0.001	0.23 (0.14, 0.32) p<0.001	-0.37 (-0.45, -0.29) p<0.001
Pct. of patients 65+	0.37 (0.34, 0.40) p<0.001	0.41 (0.35, 0.48) p<0.001	0.62 (0.58, 0.66) p<0.001	0.30 (0.22, 0.38) p<0.001
Pct. of patients African/Caribbean Black	-0.24 (-0.28, -0.19) p<0.001	0.02 (-0.05, 0.08) p=0.621	-0.65 (-0.71, -0.58) p<0.001	-0.09 (-0.16, -0.03) p=0.008
Pct. of patients South Asian	-0.01 (-0.03, 0.02) p=0.608	0.16 (0.13, 0.19) p<0.001	-0.31 (-0.34, -0.29) p<0.001	0.04 (0.01, 0.08) p=0.015
Pct. of patients non-British White, non-African/Caribbean Black, non-South Asian	-0.09 (-0.11, -0.07) p<0.001	0.11 (0.08, 0.14) p<0.001	-0.29 (-0.32, -0.27) p<0.001	-0.06 (-0.09, -0.03) p<0.001
Pct. of patients in full-time paid work or education	-0.29 (-0.32, -0.26) p<0.001	-0.09 (-0.15, -0.03) p=0.002	-0.30 (-0.34, -0.25) p<0.001	0.05 (-0.01, 0.11) p=0.124
Pct. of patients no religion	-0.09 (-0.12, -0.07) p<0.001	-0.08 (-0.12, -0.04) p<0.001	0.28 (0.23, 0.31) p<0.001	0.03 (-0.02, 0.07) p=0.241
<i>Random components of variance</i>				
General practice level: Intercept		87.60 (84.58, 90.52)		93.34 (89.95, 96.72)
Year level: Intercept		44.16 (43.51, 44.80)		64.97 (64.01, 65.94)
Statistics				

N		44002		41962
Deviance		310797.18		310595.57
Intra-class correlation		0.66		0.59

Figure 1: Percentage (95% CI) of patients in English general practices having a preferred GP and seeing their preferred GP always, almost always or most of the time, 2012-2017.

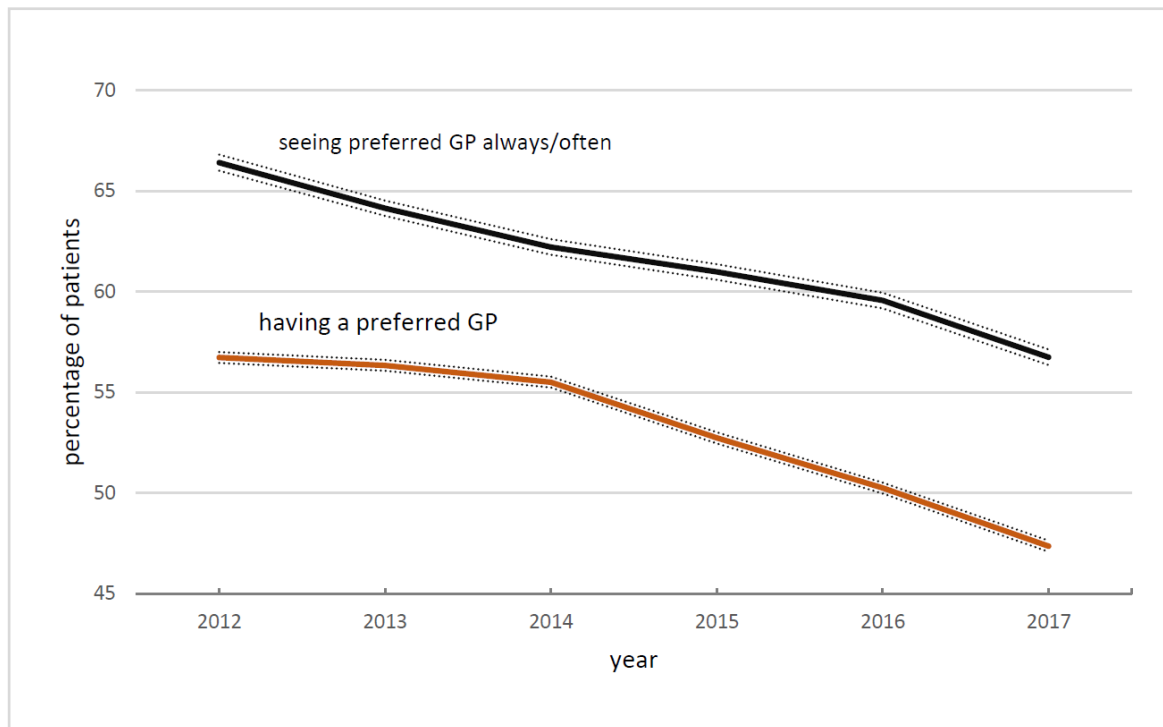


Figure 2: Change in mean percentage of patients having a preferred GP over the years 2012-2017 (95% CI), according to average percentage at the level of the practice during the period, divided by quartiles.

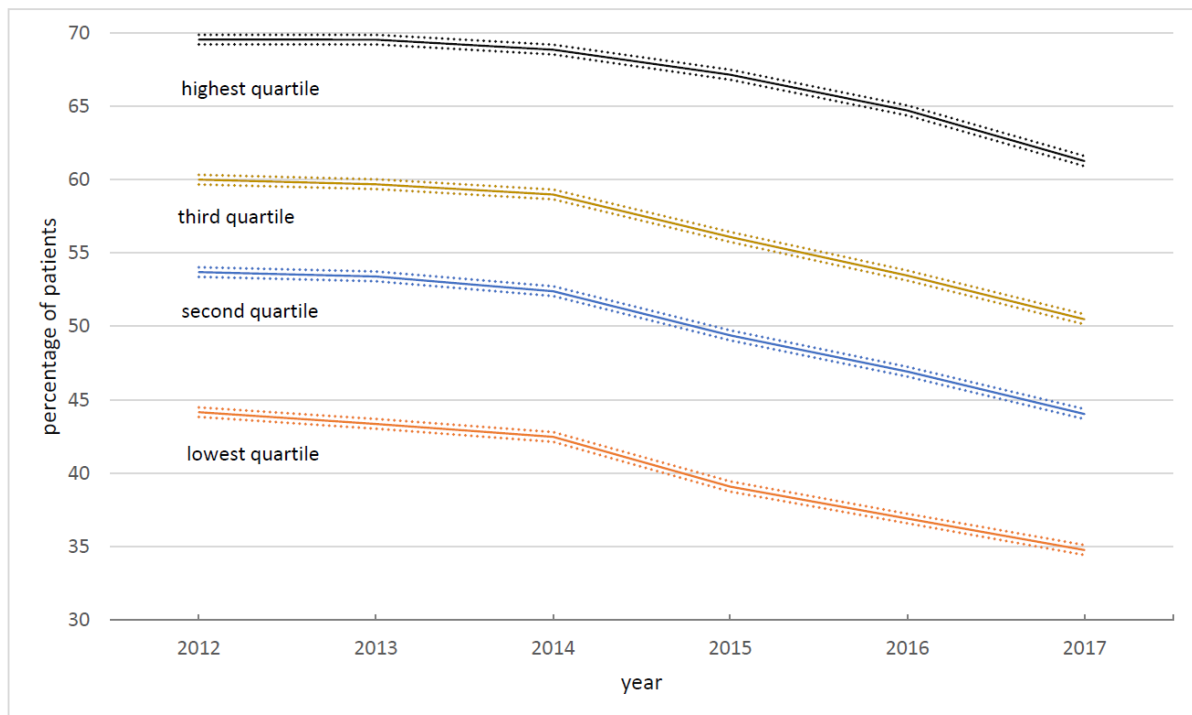


Figure 3: Change in mean percentage (95% CI) of patients in English general practices having a preferred GP by urban/rural location, 2012-2017.

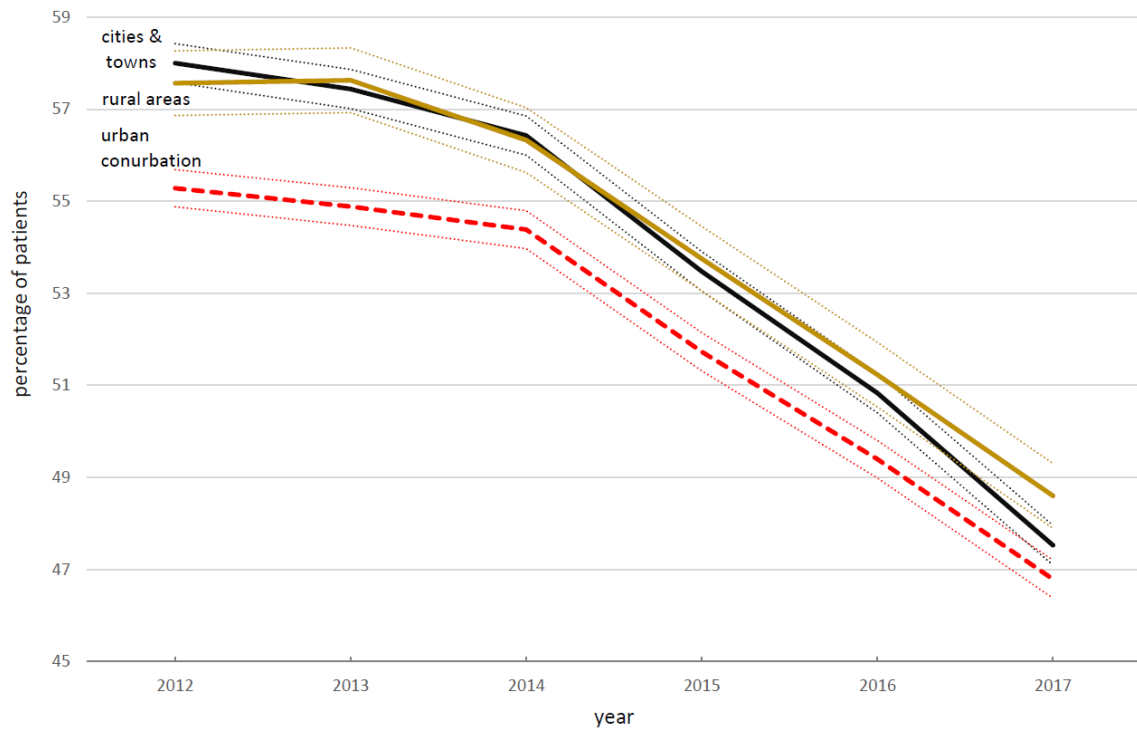
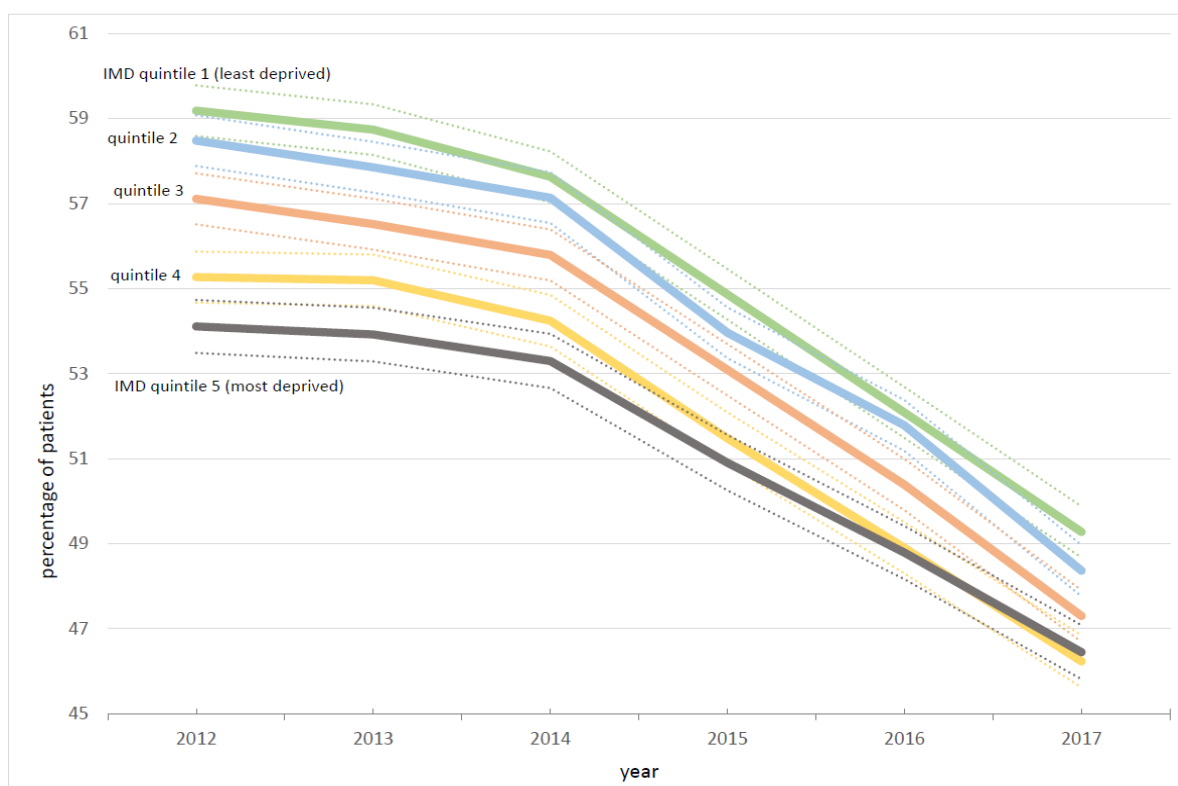


Figure 4: Change in mean percentage (95% CI) of patients in English general practices having a preferred GP by level of deprivation (quintiles), 2012-2017.



Supplementary information

Is continuity of primary care declining in England? Practice-level longitudinal study, 2012-2017

Table S1A: Descriptive statistics for general practices in England for analysis on 'having a preferred GP', longitudinal study 2012-2017.

	2012 (N=7,574)		2013 (N=7,446)		2014 (N=7,364)		2015 (N=7,113)		2016 (N=7,421)		2017 (N=7,056)	
	median	IQR	median	IQR	median	IQR	median	IQR	median	IQR	median	IQR
Response rate GPPS	41.1	33.2-48.0	39.1	31.2-45.8	38.2	30.7-45.0	36.4	29.4-43.3	42.3	33.6-49.8	41.1	32.5-48.9
Pct. of patients having pref. GP	57.02	49.4-64.5	56.8	49.0-64.3	55.9	48.1-63.7	52.9	45.0-61.0	50.2	42.1-58.4	47.3	39.2-55.7
Pct. of patients having good overall experience of making an appointment	82.4	73.9-89.1	79.8	70.8-87.6	78.3	68.7-86.3	76.9	67.4-85.6	76.9	67.0-85.2	76.0	65.7-85.0
Pct. of patients with long-standing health condition	53.6	48.7-58.3	54.1	49.0-59.0	54.4	49.5-59.5	54.6	49.5-59.7	53.6	48.6-58.6	54.1	49.1-59.2
Pct. of female patients	50.9	47.3-54.1	50.9	47.1-54.3	50.9	47.0-54.5	50.9	47.1-54.7	50.7	47.0-54.2	50.7	46.9-54.3
Pct. of patients 65+	21.8	16.4-26.3	22.6	17.1-27.3	22.9	17.8-27.7	23.6	18.3-28.5	23.1	17.2-28.3	23.7	17.9-28.9
Pct. of patients English/Welsh/Scottish/Northern Irish/British White	90.2	73.4-95.6	90.3	73.4-95.6	90.1	74.0-95.5	90.0	74.8-95.5	88.5	67.6-95.0	87.8	67.5-94.8
Pct. of patients African/Caribbean Black	0.0	0.0-2.5	0.0	0.0-2.4	0.0	0.0-2.4	0.0	0.0-2.3	0.0	0.0-3.0	0.0	0.0-3.0
Pct. of patients South Asian	1.1	0.0-4.2	0.9	0.0-4.0	0.9	0.0-4.1	0.8	0.0-4.0	1.2	0.0-5.3	1.2	0.0-5.0
Pct. of patients non-British White, non-African/Caribbean Black, non-South Asian	8.0	4.2-18.5	7.8	4.1-17.8	7.7	4.1-17.2	7.5	4.1-16.2	8.0	4.2-18.8	7.9	4.1-18.0
Pct. of patients in full-time paid work or education	46.2	41.1-51.5	46.0	40.6-51.4	46.3	40.9-51.6	46.7	41.0-52.2	47.7	42.3-53.3	47.8	42.1-53.2
Pct. of patients no religion	24.5	19.0-29.5	25.6	19.9-30.8	27.7	21.7-33.3	28.6	22.3-34.3	29.1	22.7-34.8	30.6	23.8-36.4
	Pct.		Pct.		Pct.		Pct.		Pct.		Pct.	
Lowest IMD in 2012 (quintile 1)	20.7		21.0		21.3		21.9		20.5		21.1	
Low IMD in 2012 quintile 2	20.6		20.9		21.1		21.7		20.7		21.0	
Middle IMD in 2012 quintile 3	20.4		20.7		20.7		21.0		20.3		20.4	
High IMD in 2012 quintile 4	20.2		20.1		20.1		19.9		20.0		19.9	
Highest IMD in 2012 (quintile 5)	18.1		17.3		16.8		15.5		18.4		17.7	

IQR=Interquartile range; IMD=Index of Multiple Deprivation

Table S1B: Descriptive statistics for general practices in England for analysis on usually 'seeing preferred GP', longitudinal study 2012-2017.

	2012 (N=7,254)		2013 (N=7,150)		2014 (N=7,055)		2015 (N=6,757)		2016 (N=7,009)		2017 (N=6,711)	
	median	IQR	median	IQR	median	IQR	median	IQR	median	IQR	median	IQR
Response rate GPPS	41.5	33.7-48.2	39.4	31.6-45.9	38.6	31.1-45.1	36.9	29.9-43.5	42.8	34.3-50.0	41.7	33.1-49.3
Pct. of patients seeing pref. GP always/often	67.5	56.0-78.2	65.1	52.8-76.6	63.0	50.6-75.1	62.0	49.5-73.5	59.8	47.2-71.8	56.6	43.3-69.7
Pct. of patients having good overall experience of making an appointment	81.9	73.7-88.7	79.5	70.3-87.1	77.9	68.4-85.7	76.4	67.1-85.1	76.4	66.7-84.7	75.7	65.4-84.6
Pct. of patients with long-standing health condition	53.6	48.7-58.3	54.1	49.0-59.0	54.3	49.5-59.4	54.6	49.5-59.6	53.6	48.5-58.6	54.1	49.0-59.2
Pct. of female patients	50.9	47.4-54.1	51.0	47.3-54.4	51.0	47.2-54.6	51.1	47.3-54.8	50.8	47.2-54.3	50.7	47.1-54.3
Pct. of patients 65+	21.8	16.6-26.3	22.7	17.2-27.3	22.9	17.8-27.7	23.6	18.3-28.3	23.1	17.2-28.3	23.7	17.9-28.8
Pct. of patients English/Welsh/Scottish/Northern Irish/British White	90.4	74.2-95.7	90.4	73.7-95.6	90.2	74.3-95.6	90.2	75.0-95.6	88.8	68.3-95.0	88.0	67.8-94.8
Pct. of patients African/Caribbean Black	0.0	0.0-2.5	0.0	0.0-2.4	0.0	0.0-2.3	0.0	0.0-2.2	0.0	0.0-2.9	0.0	0.0-2.9
Pct. of patients South Asian	1.0	0.0-4.1	0.9	0.0-3.9	0.9	0.9-4.0	0.8	0.0-3.9	1.2	0.0-5.2	1.2	0.0-4.9
Pct. of patients non-British White, non-African/Caribbean Black, non-South Asian	7.9	4.1-18.0	7.7	4.1-17.6	7.6	4.1-17.1	7.4	4.0-16.1	7.9	4.2-18.5	7.8	4.1-17.9
Pct. of patients in full-time paid work or education	46.2	41.1-51.5	46.0	40.6-51.4	46.3	41.0-51.7	46.8	41.1-52.3	47.8	42.4-53.5	47.8	42.2-53.3
Pct. of patients no religion	24.5	19.1-29.5	25.7	20.0-30.9	27.8	21.8-33.4	28.7	22.5-34.4	29.3	23.0-34.9	30.7	24.0-36.5
	Pct.		Pct.		Pct.		Pct.		Pct.		Pct.	
Lowest IMD in 2012 (quintile 1)	21.3		21.5		21.7		22.5		21.2		21.7	
Low IMD in 2012 quintile 2	20.9		21.2		21.5		22.1		21.0		21.3	
Middle IMD in 2012 quintile 3	20.6		20.7		20.7		20.9		20.3		20.3	
High IMD in 2012 quintile 4	20.0		19.9		20.0		19.7		19.8		19.6	
Highest IMD in 2012 (quintile 5)	17.2		16.7		16.0		14.8		17.6		17.1	

IQR=Interquartile range; IMD=Index of Multiple Deprivation

Table S2: Descriptive statistics for 684 general practices in England in 2012 excluded from analysis on 'having a preferred GP' because of response rate lower than 20% or having missing values on variables included in the analysis.

	684 excluded practices		7,574 included practices (Table S1A)	
	median	IQR	median	IQR
Pct. of patients having pref. GP	51.3	41.1-61.1	57.02	49.4-64.5
Pct. of patients having good overall experience of making an appointment	81.5	71.2-88.9	82.4	73.9-89.1
Pct. of patients with long-standing health condition	46.5	38.1-54.8	53.6	48.7-58.3
Pct. of female patients	46.5	39.8-51.9	50.9	47.3-54.1
Pct. of patients 65+	9.1	3.5-19.3	21.8	16.4-26.3
Pct. of patients English/Welsh/Scottish/Northern Irish/British White	47.9	18.8-85.7	90.2	73.4-95.6
Pct. of patients African/Caribbean Black	2.2	0.0-7.9	0.0	0.0-2.5
Pct. of patients South Asian	5.7	0.1-34.9	1.1	0.0-4.2
Pct. of patients non-British White, non-African/Caribbean Black, non-South Asian	9.4	4.2-23.1	8.0	4.2-18.5
Pct. of patients in full-time paid work or education	45.8	38.2-54.5	46.2	41.1-51.5
Pct. of patients no religion	18.7	8.5-27.6	24.5	19.0-29.5
	Pct.		Pct.	
Lowest IMD in 2012 (quintile 1)	1.2		20.7	
Low IMD in 2012 quintile 2	1.8		20.6	
Middle IMD in 2012 quintile 3	3.5		20.4	
High IMD in 2012 quintile 4	7.0		20.2	
Highest IMD in 2012 (quintile 5)	30.0		18.1	
IMD missing	56.6			

IQR=Interquartile range; IMD=Index of Multiple Deprivation

Figure S1: Change in mean percentage of patients over the years 2012-2017 (95% CI) usually seeing their preferred GP, according to average percentage at the level of the practice during the period, divided by quartiles.

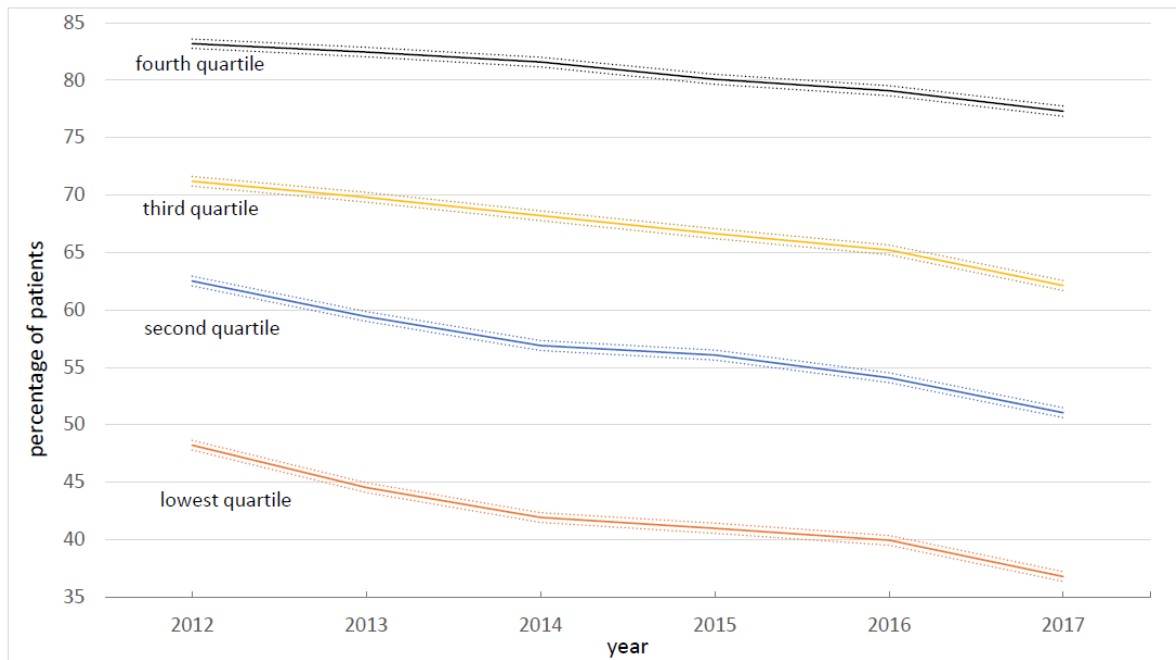


Figure S2: Change in mean percentage (95% CI) of patients in English general practices usually seeing their preferred GP by urban/rural location, 2012-2017.

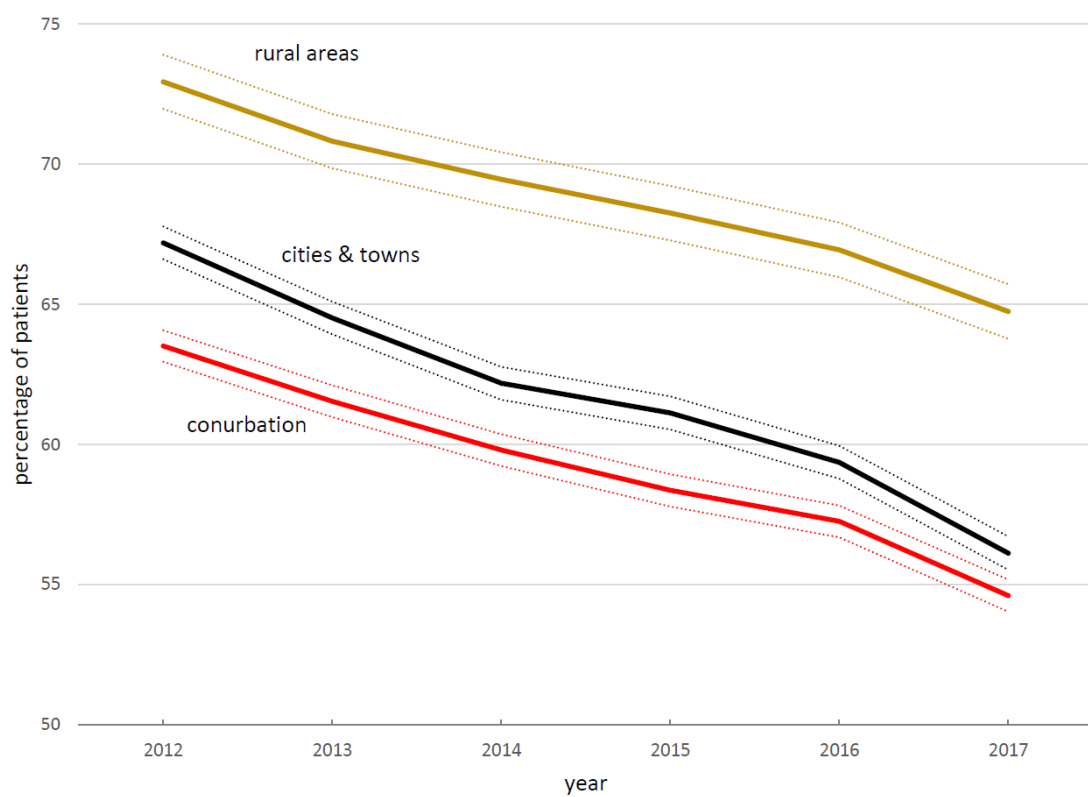


Figure S3: Change in mean percentage (95% CI) of patients in English general practices usually seeing their preferred GP by level of deprivation (quintiles), 2012-2017.

