Importance of accessibility and opening hours to overall patient experience of general practice: analysis of repeated cross-sectional data from a national patient survey in England

Thomas E Cowling, PhD, *assistant professor*[1 2]

Azeem Majeed, MD, *professor of primary care*[2]

Matthew J Harris, DPhil, *clinical senior lecturer in public health*[2 3]

[1]Department of Health Services Research and Policy, London School of Hygiene and Tropical Medicine, London

[2]Department of Primary Care and Public Health, Imperial College London, London

[3]Centre for Health Policy, Imperial College London, London

Address for correspondence: Thomas E Cowling, Department of Health Services Research and Policy, London School of Hygiene and Tropical Medicine, London, WC1H 9SH. E-mail: t.cowling@imperial.ac.uk

Abstract

Background The UK government aims to improve the accessibility of general practices in England, particularly by extending opening hours in the evenings and at weekends. It is unclear how important these factors are to patients' overall experiences of general practice.

Aim To examine associations between overall experience of general practice and patient experience of making appointments and satisfaction with opening hours, in the context of several other, established determinants of overall experience.

Design and setting Analysis of repeated cross-sectional data from the General Practice Patient Survey (2011-14). There were 2,912,535 respondents from all practices in England (n=8,289).

Method The outcome measure was overall experience (on a five-level interval scale). Associations were estimated as standardised regression coefficients (β, standard deviation changes in the outcome for a standard deviation increase in explanatory variables), adjusted for respondent characteristics and clustering within practices, using multilevel linear regression.

Results Experience of making appointments (β=0.24, 95% confidence interval [CI] = 0.24 to 0.25) and satisfaction with opening hours (β=0.15, 95% CI = 0.15 to 0.16) were modestly associated with overall experience. Overall experience was most strongly associated with the interpersonal quality of general practitioners (β=0.34, 95% CI = 0.34 to 0.35). Receptionist helpfulness was positively associated with overall experience (β=0.16, 95% CI = 0.16 to 0.17); other patient experience measures had minimal associations (β≤0.06). Models explained ≥90% of variation in overall experience between practices.

Conclusion Patient experience of making appointments and satisfaction with opening hours were only modestly associated with overall experience. Policy makers in England should not assume large improvements in overall experience of general practice through recent policies to improve access.

Keywords Primary health care; general practice; family practice; access to health care; patient satisfaction; health care survey.

Introduction

The Institute for Healthcare Improvement's "Triple Aim" includes improving patient experience as one of three main aims for healthcare systems to pursue (alongside improving population health and reducing per capita costs).[1] Patient experience of primary care could be particularly important to this aim,[2] especially in countries like England where general practices are a first point-of-contact and coordinate care within the system. In 2007, the UK Department of Health introduced a national survey—the General Practice Patient Survey (GPPS)—on patient experience of general practice.[3] Survey measures are included in England's National Health Service (NHS) Outcomes Framework.[4]

The three most recent UK Governments each pledged to improve access to general practice services in their election manifestos (since 2010).[5-7] This became a particularly high-profile and contentious area of healthcare policy around the 2015 general election.[8] Politicians stated that everyone in England will be able to see a general practitioner (GP) seven days a week, from 8 am to 8 pm, by 2020. This policy was opposed by the Royal College of General Practitioners, due to resource constraints and a lack of evidence around its benefits to patients, for example.[9] The NHS now has a government mandate to ensure that '100% of population has access to weekend/evening routine GP appointments' by 2020.[10]

Several national policies have been introduced to help progress towards this goal. The GP Access Fund provided £175 million to around 2,564 general practices (out of approximately 8,000) to implement interventions that may improve access.[11] Schemes focused on providing additional appointments in the evenings and at weekends, in particular, often by working in groups or establishing dedicated centres with longer opening hours.[12] Previously, most practices offered appointments between 8am and 6.30pm from Monday to Friday only.[13] Practices are now contractually obliged to report their opening times to national NHS organisations, and commissioners now receive extra payments for providing good experiences of access, as measured in the GPPS.[14]

Satisfaction with opening hours and patient experience of access to general practice decreased across several GPPS measures from 2011 to 2015, as did overall experiences.[8 15] The UK Secretary of State for Health has referred to these trends when explaining policies.[16] However, it remains unclear how important these factors are to patients' overall experiences relative to other aspects of general practice.

We analysed respondent-level data from the GPPS to examine associations between overall experiences of general practice and other patient experience measures. We focused on measures relevant to government policy to improve access to general practice in England, particularly satisfaction with opening hours and experiences of making appointments.

Methods

We conducted a regression analysis of repeated cross-sectional data from the GPPS. The GPPS is a quantitative postal survey conducted annually for the English NHS. Patients aged at least 18 years old who have valid NHS numbers and have been registered with a general practice continuously for the last six months are eligible for sampling. The GPPS includes all practices with eligible patients. Questionnaires are sent to stratified (by age group, gender, and practice) random samples of eligible patients in each practice. Our analysis used data from the 2011-12, 2012-13, and 2013-14 years of the GPPS. In these years, 2,912,535 patients from 8,289 practices responded to the survey (36% of 8,134,705 questionnaires sent).[17-19] The mean number of responses per practice per year was 119 (standard deviation [SD]=23). We included all respondents in our analysis.

Patient experience measures

The outcome measure was overall experience of general practice, as defined by responses to the question 'Overall, how would you describe your experience of your GP surgery?' The five response options were: very good, fairly good, neither good nor poor, fairly poor, very poor. We treated these response options as lying on a five-level interval scale, in line with previous research.[20-22]

The two main explanatory variables of interest were experience of making an appointment ('Overall, how would you describe your experience of making an appointment?') and satisfaction with opening hours ('How satisfied are you with the hours that your GP surgery is open?'). Questions had five response options: experience of making an appointment was recorded as 'very good' to 'very poor'; satisfaction with opening hours was recorded as 'very satisfied' to 'very dissatisfied' (appendix 1). We again treated responses as lying on interval scales. We focused on these variables to address national policy to improve access to, and extend opening hours in, general practice.[8 23]

We selected which other patient experience measures to use as explanatory variables based on the results of Paddison *et al*.,[24] as the measures included in their analysis explained 92% of variation in overall satisfaction between practices after accounting for respondent characteristics. We calculated a measure of GP interpersonal quality of care from five questions about GPs giving patients enough time, listening, explaining tests and treatments, involving patients in decision-making, and treating them with care (appendix 2). Each question had five response options from 'very good' to 'very poor' that we coded on an interval scale. We generated a summary measure of GP interpersonal quality of care as the mean value of responses for respondents who answered three or more of the five relevant questions.[24-26] We generated a similar measure of nurse interpersonal quality of care with the same methods but

using questions about nurses (appendix 2). Previously published factor analyses of the five questions suggest that they measure one construct, for each of GP and nurse interpersonal quality of care.[3 27]

We analysed measures of how easy it was to contact general practices by phone ('very easy' to 'not at all easy') and the helpfulness of receptionists ('very helpful' to 'not at all helpful') on four-level interval scales (appendix 2). In addition, we assessed whether respondents were able to get an appointment to see or speak to someone on their last attempt as a dichotomous variable ('Yes' or 'Yes, but I had to call back' versus 'No'). For respondents who were able to get an appointment, we generated three additional measures: whether the patient got the type of appointment wanted (such as to see a GP at the practice), for the time period wanted (such as on the same day), and how convenient the appointment was (appendix 3). The first two of these measures were dichotomous whereas appointment convenience had a four-level interval scale ('very convenient' to 'not at all convenient').

We refer to all measures above as patient 'experience' measures for conciseness, while acknowledging that these measures include subjective items about satisfaction, ratings of past experiences, and reports of what has happened in the past.

Patient characteristics

We considered six patient characteristics as potential confounders of the associations between patient experience measures. These characteristics were age group (eight ordinal categories), gender, ethnicity (white, mixed, Asian, black, or other), socioeconomic status (fifths of the Index of Multiple Deprivation 2010 for patients' residential areas), confidence in managing own health (four ordinal categories), and ability to take time off work to see a GP (yes, no, not working).[28] The first four of these characteristics are those most often included in past GPPS analyses. We also included confidence in managing own health and ability to take time off work to see a GP because of their strong associations with patient experience measures.[28 29]

Statistical methods

We calculated descriptive statistics for all GPPS respondents, both before and after weighting responses using the weights given in the GPPS datasets. These weights account for differential probabilities of non-response (based on patient age, gender, region of England, and area-based demographic and socioeconomic indicators) and of eligible patients being sent questionnaires in each practice.[17-19] When estimating associations between variables, each model included all respondents without missing data for any of the variables included in that model. This 'complete case' analysis should introduce minimal

bias as variables had similar distributions between complete cases and all GPPS respondents (appendix 4). Past analysis of the GPPS comparing results from complete case analysis and multiple imputation found no meaningful differences.[24]

We used linear regression to estimate associations between patient experience measures. Models adjusted for the six patient characteristics given above by including them as categorical variables in the regression equation. Models also included fixed effects at the general practice level to account for the clustering of respondents within general practices. This adjusted results for possible confounding from factors that do not vary between patients within a practice (such as the characteristics of that practice). Associations can be interpreted in terms of the relationships between variables within practices. We also adjusted results for the survey year. We calculated 95% confidence intervals from Huber-White standard errors to account for possible heteroscedasticity.

Before estimating associations, we standardised all patient experience measures to have means of zero and standard deviations of one. The regression models return standardised regression coefficients. These coefficients are interpreted as the estimated change in the outcome variable, in terms of standard deviations of this outcome, for a one SD increase in an explanatory variable. We also estimated associations with overall experience (the outcome variable) coded on a 0-100 scale, to help interpret the magnitudes of associations. The corresponding coefficients are the estimated change in the outcome variable on a 0-100 scale for a one SD increase in an explanatory variable.

We separated our regression analyses into three models, referred to as models A to C. Model A estimated associations between overall experience and each of the explanatory experience measures in turn, adjusting only for patient characteristics and survey year. Model B included explanatory experience measures relevant to all respondents simultaneously; associations were therefore adjusted for the correlations between experience measures. Model C also adjusted for the correlations between experience measures but only included respondents who were able to get an appointment on their last attempt; it added the type, timing, and convenience of appointments as explanatory variables.

We conducted a sensitivity analysis with a measure of relational continuity of care as an additional explanatory variable. We examined this variable in a sensitivity analysis only because it is defined for just the 59% of respondents who stated that they had a preferred GP. For these respondents, we measured how often respondents consulted their preferred GP on a four-level interval scale (‘always or almost always’, ‘a lot of the time’, ‘some of the time’, or ‘never or almost never’).

We checked the assumption of linear associations between patient experience measures by adding quadratic terms for each of them, which did not improve the explanatory power of the models. We

report 95% confidence intervals (CIs) in the main text but not in results tables because the interval limits were often equal to the coefficients (to two decimal places). This was because of small standard errors resulting partly from the large sample size. All statistical analysis used Stata MP V.13.[30]

Results

Patients generally reported positive experiences of their general practices. Table 1 shows that 44.8% and 42.2% of weighted GPPS respondents described their overall experiences as 'very good' or 'fairly good' respectively. The corresponding percentages for satisfaction with opening hours and experiences of making appointments were lower but still indicated generally positive results (table 1).

Table 2 presents descriptive statistics for the other patient experience measures analysed. Most patients, 89.7%, were able to get an appointment on their last attempt, and 92.7% of these patients stated that this appointment was very or fairly convenient (table 2); this equals 83.1% of patients reporting a convenient appointment. Characteristics of GPPS respondents are described in appendix 5; 18.0% could not take time off work to see a GP, while 38.8% could take such time off and 43.2% were not working (due to unemployment, full-time education, and retirement, for example).

Table 3 reports standardised regression coefficients (β) for associations between overall experience and other patient experience measures. In model A (when correlations between experience measures were not adjusted for), the experience of making appointments (β=0.61, 95% CI = 0.60 to 0.61) was most strongly associated with overall experience. Satisfaction with opening hours was moderately associated with overall experience in this model (β=0.48, 95% CI = 0.47 to 0.48).

In model B (when correlations between experience measures were adjusted for), these associations weakened substantially for both experience of making appointments (β=0.24, 95% CI = 0.24 to 0.25) and satisfaction with opening hours (β=0.15, 95% CI = 0.15 to 0.16). One standard deviation increases in these variables corresponded to increases of 4.8 (95% CI = 4.8 to 4.9) and 3.1 (95% CI = 3.0 to 3.1) points in overall experience on a 0-100 scale (table 3). These associations were similar in model C (which only included respondents who were able to get an appointment).

GP interpersonal quality (β=0.34, 95% CI = 0.34 to 0.35) was most strongly associated with overall experience in models B and C. Other variables were modestly (helpfulness of receptionists: β=0.16) or minimally associated with overall experience (β≤0.06).

Model B explained 65% of variation in overall experience (R^2 within=0.63, between=0.92). Model C explained 62% of variation in this outcome variable (R^2 within=0.60, between=0.90). This is substantially more than when only patient characteristics and survey year were used as explanatory variables (R^2 overall=0.12, within=0.11, between=0.30).

In the sensitivity analysis that examined associations among respondents who had a preferred GP, the measure of relational continuity was weakly associated with overall experience (β=0.05). Coefficients for other explanatory experience measures were similar to those presented for model B in table 3.

Discussion

Summary

Experiences of making appointments and satisfaction with opening hours were modestly associated with overall experience. Increases in the former variables of one standard deviation (equating to 23-25 points on 0-100 scales) were independently associated with increases of 3 to 5 points in overall experience when measured on a 0-100 scale. Overall experience was most strongly associated with the interpersonal quality of care provided by GPs. Besides the helpfulness of receptionists, other variables—nurse interpersonal quality, ease of telephone contact, and appointment type, timing, and convenience—had minimal independent associations with overall experience. The models explained most variation in overall experience and almost all variation in this measure between practices.

Comparison with existing literature

Our study builds on earlier work by Paddison *et al.*[24] that examined associations between overall satisfaction with general practice and other patient experience measures in the 2009-10 GPPS. This study was unable to examine several policy-relevant measures that became available from the 2011-12 GPPS onwards; this includes experiences of making appointments, satisfaction with opening hours, and appointment availability and characteristics. Still, our study is consistent with Paddison *et al.*[24] in suggesting that GP interpersonal quality of care is the measure most strongly associated with overall satisfaction or experience; in 2011, the question about overall satisfaction was replaced by one about overall experience, which is why the outcome measure differs between the two studies.

Several studies[31-34] in England have used discrete choice experiments to assess the most important factors to patients when booking appointments. These experiments are limited by their simplification of the choice options and because stated preferences may differ to patients' actions. However, the studies all suggest that patients are willing to make reasonable trade-offs between different appointment characteristics. This may explain why the type, timing, and convenience of appointments and how often a preferred GP was consulted were minimally associated with overall experience. Other studies[28 29 35-37] have investigated associations between characteristics of general practices or other primary care providers and patient experience using the GPPS. One of these studies[28] suggests that patients registered to practices with extended opening hours were slightly more satisfied with opening hours, particularly if they could not take time off work to see a GP. This finding did not apply to experience of making appointments and overall experience, however.[28]

Weak associations between nurse interpersonal quality of care and overall experience, in contrast to the much stronger association for GP interpersonal quality, may reflect lower frequencies of nurse consultations.[38] It could also be explained by the nature of consultations: patients may see their GP for the most important problems that have greater potential to affect their experiences.

Strengths and limitations

A strength of our study is that we used a national data source—the GPPS—that includes all general practices in England. We examined patient experience measures that are included in the national outcomes framework for the NHS[4] and have been used to evaluate recent policies to improve access to general practice.[12] Our findings should therefore be of direct interest to national policy makers. The large sample size of the GPPS helped to give very precise estimates (narrow confidence intervals) of the associations between patient experience measures.

We used the multilevel structure of the GPPS data to examine associations between respondents' answers while accounting for the clustering of patients within practices; the results cannot be confounded by variables that are constant within each practice. However, associations between two experience measures could be confounded by a third experience measure that differs between patients within practices, for example. Alternatively, a patient characteristic that we did not analyse may bias some associations. This particular possibility could be partly addressed if the GPPS had a cohort of respondents that completed a questionnaire each year, but such a cohort does not yet exist. Results could be influenced by the design of GPPS questionnaires, such as question ordering. However, any ordering effect may be small as weak associations were found between measures from adjacent sections, such as satisfaction with opening hours (question 25) and overall experience (question 28).

A limitation of the GPPS questions in the context of this study is that respondents are only asked about their last contact with their general practice for some questions. These include the questions relating to appointments and GP and nurse interpersonal quality of care. Assuming that typical experiences are more important to overall experience and that patients' last contacts do not reflect their typical experiences (by a random amount), estimated associations between the above variables and overall experience could be weaker than is true. For example, being unable to get an appointment on the last attempt may not affect overall experience too much if appointments normally are available. Measurement error due to respondents' recall of past experiences could also weaken associations.

Readers should not conclude that GP interpersonal quality of care is more important to overall experience than 'access'; patients must be able to access general practice services to consult their GP (so for GP interpersonal quality to even be relevant). What we can conclude is that overall experience was more strongly associated with GP interpersonal quality of care than patients' experiences of making an appointment specifically on their last attempt.

Implications for policy

We highlight that satisfaction with opening hours and experience of making appointments independently had modest associations with overall experience. Policy makers should not expect large improvements in overall experiences with short-term improvements in either of these variables. This includes from national policies such as the GP Access Fund[11] and incentive payments to commissioners.[14] However, policy may be able to improve satisfaction with opening hours and experience of making appointments simultaneously, to possibly have larger effects on overall experience. Interventions that aim to improve access could also improve overall experience independently of satisfaction with opening hours and experience of making appointments.

We also highlight that the strongest association found in our study was between the interpersonal quality of care provided by GPs and overall experience. Policy makers could reflect on this finding and consider the contexts of GPs' work that affect interactions with patients; a large workload could affect whether GPs can give each patient enough time, for example. Behaviours of individual GPs may also be important, as ratings of interpersonal quality vary more between GPs (within practices) than between practices.[21] Some interventions currently promoted to improve access to general practice, such as telephone and video consultations, change the GP-patient interaction substantially. An unintended consequence could be reduced interpersonal quality of care.

To conclude, we suggest that policy makers should not assume that recent national policies focused on access to general practice will translate into large improvements in patients' overall experiences, even if these policies do actually improve access.

How this fits in

The importance of patient experience of making appointments and satisfaction with opening hours to overall experience of general practice was unknown. Our study suggests that these two variables are only modestly associated with overall experience. National policy makers and local commissioners might consider this finding when discussing current policies designed to improve access.

Funding This article presents independent research funded by the National Institute for Health Research (Doctoral Research Fellowship, Thomas Cowling, DRF-2013-06-142). The views expressed in this publication are those of the authors and not necessarily those of the NHS, the NIHR, or the Department of Health.

Ethical approval We had permission from NHS England to analyse respondent-level General Practice Patient Survey data. No other approvals were sought.

Competing interests We have no competing interests to declare.

Acknowledgements None.

References

1. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008;27:759-69.

2. World Health Organization. The World Health Report 2008 - Primary Health Care: Now More Than Ever. 2008. http://www.who.int/whr/2008/whr08_en.pdf.

3. Campbell J, Smith P, Nissen S, Bower P, Elliott M, Roland M. The GP Patient Survey for use in primary care in the National Health Service in the UK--development and psychometric characteristics. *BMC Fam Pract* 2009;10:57. doi: 10.1186/1471-2296-10-57.

4. Department of Health. NHS Outcomes Framework 2016 to 2017. 2016. https://www.gov.uk/government/publications/nhs-outcomes-framework-2016-to-2017.

5. Conservative Party. The Conservative Manifesto 2010. 2010. https://www.conservatives.com/~/media/Files/Manifesto2010.

6. Conservative Party. The Conservative Party Manifesto 2015. 2015. https://s3-eu-west-1.amazonaws.com/manifesto2015/ConservativeManifesto2015.pdf.

7. Conservative Party. The Conservative and Unionist Party Manifesto 2017. 2017. https://www.conservatives.com/manifesto.

8. Cowling TE, Harris MJ, Majeed A. Evidence and rhetoric about access to UK primary care. *BMJ* 2015;350:h1513. doi: 10.1136/bmj.h1513.

9. Royal College of General Practitioners. Seven day access to routine general practice – position paper. 2016. http://www.rcgp.org.uk/policy/rcgp-policy-areas/~/media/Files/Policy/A-Z-policy/RCGP-Position-statement-7-day-access.ashx.

10. Department of Health. The Government's mandate to NHS England for 2016-17. 2015. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486674/nhse-mandate16-17.pdf.

11. NHS England. Prime Minister's GP Access Fund. 2017. https://www.england.nhs.uk/gp/gpfv/redesign/improving-access/gp-access-fund/.

12. Mott MacDonald. Prime Minister's Challenge Fund: Improving Access to General Practice - First Evaluation Report. 2015. https://www.england.nhs.uk/wp-content/uploads/2015/10/pmcf-wv-one-eval-report.pdf.

13. Richards EC, Cowling TE, Gunning EJ, Harris MJ, Soljak MA, Nowlan N, et al. Online data on opening hours of general practices in England: a comparison with telephone survey data. *Br J Gen Pract* 2015;65:e806-12. doi: 10.3399/bjgp15X687841.

14. NHS England. Technical Guidance Annex B – Information on Quality Premium. 2017. https://www.england.nhs.uk/publication/technical-guidance-annex-b-information-on-quality-premium/.

15. Cowling TE. *Access to Primary Health Care in England: Policy, Theory, and Evidence*. PhD thesis. Imperial College London; 2016. https://spiral.imperial.ac.uk/handle/10044/1/42497.

16. Department of Health, Hunt J. New deal for general practice. 2015. https://www.gov.uk/government/speeches/new-deal-for-general-practice.

17. Ipsos MORI. Technical Annex for the GP Patient Survey - 2011-2012 Annual Report. 2012. http://gp-survey-production.s3.amazonaws.com/archive/2012/June/June%202012%20Technical%20Annex.pdf.

18. Ipsos MORI. Technical Annex for the GP Patient Survey - 2012-2013 Annual Report. 2013. http://gp-survey-production.s3.amazonaws.com/archive/2013/June/June%202013%20Technical%20Annex.pdf.

19. Ipsos MORI. GP Patient Survey - Technical annex: 2013-14 annual report. 2014. http://gp-survey-production.s3.amazonaws.com/archive/2014/July/1301375001_Technical%20Annex%202013-2014_FINAL%20v1.pdf.

20. Lyratzopoulos G, Elliott M, Barbiere JM, Henderson A, Staetsky L, Paddison C, et al. Understanding ethnic and other socio-demographic differences in patient experience of primary care: evidence from the English General Practice Patient Survey. *BMJ Qual Saf* 2012;21:21-9.

21. Roberts MJ, Campbell JL, Abel GA, Davey AF, Elmore NL, Maramba I, et al. Understanding high and low patient experience scores in primary care: analysis of patients' survey data for general practices and individual doctors. *BMJ* 2014;349:g6034. doi: 10.1136/bmj.g6034.

22. Paddison C, Elliott M, Parker R, Staetsky L, Lyratzopoulos G, Campbell JL, et al. Should measures of patient experience in primary care be adjusted for case mix? Evidence from the English General Practice Patient Survey. *BMJ Qual Saf* 2012;21:634-40.

23. Cowling TE, Gunning EJ. Access to general practice in England: political, theoretical, and empirical considerations. *Br J Gen Pract* 2016;66:e680-2. doi: 10.3399/bjgp16X686977.

24. Paddison CA, Abel GA, Roland MO, Elliott MN, Lyratzopoulos G, Campbell JL. Drivers of overall satisfaction with primary care: evidence from the English General Practice Patient Survey. *Health Expect* 2013;18:1081-92.

25. Paddison CAM, Saunders CL, Abel GA, Payne RA, Campbell JL, Roland M. Why do patients with multimorbidity in England report worse experiences in primary care? Evidence from the general practice patient survey. *BMJ Open* 2015;5. doi: http://dx.doi.org/10.1136/bmjopen-2014-006172.

26. Burt J, Lloyd C, Campbell J, Roland M, Abel G. Variations in GP–patient communication by ethnicity, age, and gender: evidence from a national primary care patient survey. *Br J Gen Pract* 2015;66:e47-52. doi: 10.3399/bjgp15X687637.

27. Setodji CM, Elliott MN, Abel G, Burt J, Roland M, Campbell J. Evaluating Differential Item Functioning in the English General Practice Patient Survey: Comparison of South Asian and White British Subgroups. *Med Care* 2015;53:809-17.

28. Cowling TE, Harris MJ, Majeed A. Extended opening hours and patient experience of general practice in England: multilevel regression analysis of a national patient survey. *BMJ Qual Saf* 2016. doi: 10.1136/bmjqs-2016-005233.

29. Warren FC, Abel G, Lyratzopoulos G, Elliott MN, Richards S, Barry HE, et al. Characteristics of service users and provider organisations associated with experience of out of hours general practitioner care in England: population based cross sectional postal questionnaire survey. *BMJ* 2015;350:h2040. doi: 10.1136/bmj.h2040.

30. Stata Statistical Software: Release 13 [program]. MP 13.1 version. College Station, TX: StataCorp LP, 2013.

31. Gerard K, Salisbury C, Street D, Pope C, Baxter H. Is fast access to general practice all that should matter? A discrete choice experiment of patients' preferences. *J Health Serv Res Policy* 2008;13:3-10.

32. Rubin G, Bate A, George A, Shackley P, Hall N. Preferences for access to the GP: a discrete choice experiment. *Br J Gen Pract* 2006;56:743-8.

33. Cheraghi-Sohi S, Hole AR, Mead N, McDonald R, Whalley D, Bower P, et al. What patients want from primary care consultations: a discrete choice experiment to identify patients' priorities. *Ann Fam Med* 2008;6:107-15.

34. Turner D, Tarrant C, Windridge K, Bryan S, Boulton M, Freeman G, et al. Do patients value continuity of care in general practice? An investigation using stated preference discrete choice experiments. *J Health Serv Res Policy* 2007;12:132-7.

35. Kontopantelis E, Roland M, Reeves D. Patient experience of access to primary care: identification of predictors in a national patient survey. *BMC Fam Pract* 2010;11:61. doi: 10.1186/1471-2296-11-61.

36. Ahmed F, Abel GA, Lloyd CE, Burt J, Roland M. Does the availability of a South Asian language in practices improve reports of doctor-patient communication from South Asian patients? Cross sectional analysis of a national patient survey in English general practices. *BMC Fam Pract* 2015;16:55. doi: 10.1186/s12875-015-0270-5.

37. Greaves F, Laverty AA, Pape U, Ratneswaren A, Majeed A, Millett C. Performance of new alternative providers of primary care services in England: an observational study. *J R Soc Med* 2015;108:171-83.

38. Hobbs FD, Bankhead C, Mukhtar T, Stevens S, Perera-Salazar R, Holt T, et al. Clinical workload in UK primary care: a retrospective analysis of 100 million consultations in England, 2007-14. *Lancet* 2016;387:2323-30.

Table 1 | Satisfaction with opening hours, experience of making an appointment, and overall experience in the General Practice Patient Survey 2011-14

	Number of responses	Unweighted percentage of respondents (%)	Weighted percentage of respondents (%)
Satisfaction with opening hours*			
Very satisfied	1,235,576	44.8	40.0
Fairly satisfied	1,109,522	40.2	42.3
Neither satisfied nor dissatisfied	224,494	8.1	9.3
Fairly dissatisfied	132,747	4.8	5.9
Very dissatisfied	55,309	2.0	2.5
Total	2,757,648		
Experience of making an appointment			
Very good	1,176,083	42.4	35.7
Fairly good	1,080,176	38.9	41.2
Neither good nor poor	301,154	10.9	13.2
Fairly poor	145,114	5.2	6.6
Very poor	74,139	2.7	3.5
Total	2,776,666		
Overall experience			
Very good	1,452,265	51.2	44.8
Fairly good	1,080,961	38.1	42.2
Neither good nor poor	208,637	7.4	8.8
Fairly poor	71,511	2.5	3.2
Very poor	23,300	0.8	1.0
Total	2,836,674		

2,912,535 survey respondents from 8,289 general practices; data presented where available for each variable.
Weighted percentages account for survey design and non-response.
*Responses of 'I'm not sure when my GP surgery is open' were excluded (n=80,636; 2.8%).

Table 2 | Ease of contacting practices by telephone, helpfulness of receptionists, appointment characteristics, frequency of consulting a preferred GP, and interpersonal quality of care in the General Practice Patient Survey 2011-14

	Number of responses	Unweighted percentage of respondents (%)	Weighted percentage of respondents (%)
Ease of contact by telephone*			
Very easy	1,020,288	36.3	29.6
Fairly easy	1,293,282	46.0	48.5
Not very easy	355,258	12.6	15.2
Not at all easy	144,488	5.1	6.7
Total	2,813,316		
Helpfulness of receptionists†			
Very helpful	1,561,893	54.8	47.3
Fairly helpful	1,070,939	37.6	42.8
Not very helpful	165,141	5.8	7.5
Not at all helpful	53,161	1.9	2.6
Total	2,851,134		
Able to get an appointment‡			
Yes	2,486,136	91.5	89.7
No	230,237	8.5	10.3
Total	2,716,373		
Got the type of appointment wanted§			
Yes	2,333,194	94.1	93.7
No	145,954	5.9	6.3
Total	2,479,148		
Got the timing of appointment wanted§**			
Yes	1,818,058	77.8	77.5
No	520,132	22.3	22.5
Total	2,338,190		
Convenience of appointment§			
Very convenient	1,282,530	52.4	47.0
Fairly convenient	1,024,922	41.9	45.7
Not very convenient	123,640	5.1	6.5
Not at all convenient	17,145	0.7	0.9
Total	2,448,237		
Frequency of consulting preferred GP††			
Always or almost always	744,438	46.4	40.0
A lot of the time	364,934	22.8	23.4
Some of the time	412,203	25.7	29.7
Never or almost never	82,214	5.1	6.9
Total	1,603,789		
	Number of responses	**Unweighted mean (SD)**	**Weighted mean (SD)**
GP interpersonal quality of care‡‡	2,778,536	1.6 (0.7)	1.7 (0.8)
Nurse interpersonal quality of care‡‡	2,487,778	1.6 (0.7)	1.6 (0.7)

2,912,535 survey respondents from 8,289 general practices; data presented where available for each variable.
Weighted percentages account for survey design and non-response.
Responses excluded from analysis: *'Haven't tried' (n=79,574), †'Don't know' (n=40,588), ‡'Can't remember' (n=77,477), **'Can't remember' (n=124,602).
§Measure only applicable to respondents who were able to get an appointment (n=2,486,136).
††Measure only applicable to respondents who had a preferred GP (n=1,677,868).
‡‡Measures range from 1 (all items 'Very good') to 5 (all items 'Very poor').

Table 3 | Regression coefficients for associations between overall experience and other patient experience measures, estimated using multilevel fixed-effects linear regression

	Overall experience standardised (β)			Overall experience on a 0-100 scale		
	Model A*	**Model B†**	**Model C‡**	**Model A***	**Model B†**	**Model C‡**
GP interpersonal quality of care (SD=18.5)	0.60	0.34	0.34	11.8	6.8	6.7
Nurse interpersonal quality of care (SD=16.5)	0.39	0.06	0.06	7.8	1.2	1.2
Ease of telephone contact (SD=27.4)	0.45	0.04	0.04	8.9	0.9	0.8
Helpfulness of receptionists (SD=23.0)	0.52	0.16	0.16	10.4	3.3	3.1
Able to get an appointment (SD=27.9)	0.24	0.02	-	4.8	0.3	-
Type of appointment wanted (SD=23.5)	0.04	-	0.00	0.7	-	0.0
Timing of appointment wanted (SD=41.6)	0.09	-	0.00	1.8	-	0.0
Convenience of appointment (SD=20.9)	0.36	-	0.02	7.1	-	0.4
Satisfaction with opening hours (SD=23.2)	0.48	0.15	0.15	9.4	3.1	3.0
Experience of making appointments (SD=24.6)	0.61	0.24	0.23	12.0	4.8	4.5

GP: general practitioner; SD: standard deviation.
The standard deviation of overall experience was 19.8 on the 0-100 scale.
All models included a fixed effect at the general practice level.
*Model A adjusted for patient characteristics and survey year; only one experience measure was included as an explanatory variable at any one time (2,080,925≤n≤2,503,720).
†Model B adjusted for patient characteristics, survey year, and other explanatory experience measures (n=1,978,600).
‡Model C adjusted for patient characteristics, survey year, and other explanatory experience measures among respondents who were able to get an appointment (n=1,698,043).

Appendix 1 | General Practice Patient Survey questions and responses used to define patient experience measures

GP Patient Survey question
How satisfied are you with the hours that your GP surgery is open?*
Very satisfied
Fairly satisfied
Neither satisfied nor dissatisfied
Fairly dissatisfied
Very dissatisfied
Overall, how would you describe your experience of making an appointment?
Very good
Fairly good
Neither good nor poor
Fairly poor
Very poor
Overall, how would you describe your experience of your GP surgery?
Very good
Fairly good
Neither good nor poor
Fairly poor
Very poor

GP: general practitioner. Question numbers in GP Patient Survey 2013-14 were 25 (satisfaction with opening hours), 18 (experience of making an appointment) and 28 (overall experience). All respondents were asked to complete each of the tabulated questions.

*Responses of 'I'm not sure when my GP surgery is open' were excluded from analysis.

Appendix 2 | General Practice Patient Survey questions used to derive patient experience measures related to GP and nurse interpersonal quality of care, ease of contacting the practice by telephone, and helpfulness of receptionists

GP Patient Survey question
Last time you saw or spoke to a GP from your GP surgery, how good was that GP at each of the following?*†
Very good
Good
Neither good nor poor
Poor
Very poor
Last time you saw or spoke to a nurse from your GP surgery, how good was that nurse at each of the following?*†
Very good
Good
Neither good nor poor
Poor
Very poor
Generally, how easy is it to get through to someone at your GP surgery on the phone?‡
Very easy
Fairly easy
Not very easy
Not at all easy
How helpful do you find the receptionists at your GP surgery?§
Very helpful
Fairly helpful
Not very helpful
Not at all helpful

GP: general practitioner

The relevant question numbers in the GP Patient Survey 2013-14 were 21 (GP interpersonal quality of care), 23 (nurse interpersonal quality of care), 3 (ease of telephone contact), and 4 (helpfulness of receptionists). All respondents were asked to complete each of the tabulated questions.

*Question asked for five items: giving you enough time, listening to you, explaining tests and treatments, involving you in decisions about your care, and treating you with care and concern.

Responses of †'Doesn't apply' (≤18.5%), ‡'Haven't tried' (2.8%) and §'Don't know' (1.4%) were excluded from analysis.

Appendix 3 | General Practice Patient Survey questions used to derive measures relating to the last time respondents wanted to see or speak to a GP or nurse from their general practices

GP Patient Survey question	Question number
Question asked of all respondents	
What did you want to do?*	10
See a GP at the surgery	
See a nurse at the surgery	
Speak to a GP on the phone	
Speak to a nurse on the phone	
Have someone visit me at my home	
And when did you want to see or speak to them?†	11
On the same day	
On the next working day	
A few days later	
A week or more later	
I didn't have a specific day in mind	
Were you able to get an appointment to see or speak to someone?†	12
Yes	
Yes, but I had to call back closer to or on the day I wanted the appointment	
No	
Question asked only of respondents able to get an appointment‡	
What type of appointment did you get? I got an appointment:	13
To see a GP at the surgery	
To see a nurse at the surgery	
To speak to a GP on the phone	
To speak to a nurse on the phone	
For someone to visit me at my home	
How long after initially contacting the surgery did you actually see or speak to them?†	14
On the same day	
On the next working day	
A few days later	
A week or more later	
How convenient was the appointment you were able to get?	15
Very convenient	
Fairly convenient	
Not very convenient	
Not at all convenient	

GP: general practitioner. Responses of *'I didn't mind/wasn't sure what I wanted' (1.8%) and †'Can't remember' (2.6%) were excluded from analysis.
‡Respondents who answered 'Yes' or 'Yes, but I had to call back…' to the preceding question.

Appendix 4 | Comparison of all respondents and complete cases (with no missing data) for key variables in the General Practice Patient Survey, 2011-14

	Number of respondents	Percentage of respondents (%)	Number of complete cases	Percentage of complete cases (%)
Age (years):				
18 to 24	120,263	4.2	99,217	4.2
25 to 34	275,565	9.6	235,372	9.9
35 to 44	376,214	13.1	320,443	13.5
45 to 54	496,900	17.4	421,174	17.8
55 to 64	575,908	20.1	486,424	20.5
65 to 74	561,814	19.6	464,948	19.6
75 to 84	346,370	12.1	268,025	11.3
85 or over	111,737	3.9	76,592	3.2
Total	2,864,771		2,372,195	
Gender:				
Male	1,237,230	43.2	1,040,772	43.9
Female	1,627,054	56.8	1,331,423	56.1
Total	2,864,284		2,372,195	
Ethnicity:				
White	2,511,254	87.9	2,094,930	88.3
Mixed	21,459	0.8	17,404	0.7
Asian	169,559	5.9	141,032	6.0
Black	76,699	2.7	59,810	2.5
Other	78,193	2.7	59,019	2.5
Total	2,857,164		2,372,195	
Deprivation fifth:*				
1 (most deprived)	596,503	20.5	472,261	19.9
2	577,155	19.8	466,336	19.7
3	597,355	20.5	489,025	20.6
4	588,258	20.2	485,479	20.5
5 (least deprived)	550,900	18.9	459,094	19.4
Total	2,910,171		2,372,195	
Can take time off work to see GP:				
Not working†	1,460,780	53.5	1,258,060	53.0
Yes	883,318	32.4	779,570	32.9
No	384,779	14.1	334,565	14.1
Total	2,728,877		2,372,195	
Confident in managing health:				
Very	1,185,895	42.5	1,021,511	43.1
Fairly	1,392,810	49.9	1,184,691	49.9
Not very	172,691	6.2	138,932	5.9
Not at all	37,596	1.4	27,061	1.1
Total	2,788,992		2,372,195	
	Mean (SD) in respondents		**Mean (SD) in complete cases**	
Satisfaction with opening hours‡	80.3 (23.2)		80.0 (23.2)	
Experience of making an appointment‡	78.3 (24.6)		78.5 (24.4)	
Overall experience‡	84.1 (19.8)		84.3 (19.6)	

GP: general practitioner; SD: standard deviation

2,912,535 survey respondents from 8,289 general practices. Data presented where available for each variable for all respondents in the first and second results columns. Data presented for complete cases only (n=2,372,195) in the third and fourth results columns.

*Fifths of the national Index of Multiple Deprivation rank for lower layer super output areas of residence.

†Full-time education, unemployed, sick or disabled, retired, looking after home, other.

‡Measured on five-level interval scales from 0 (most negative response option) to 100 (most positive option).

Appendix 5 | Characteristics of respondents to the General Practice Patient Survey 2011-14

	Number of respondents	Unweighted percentage of respondents (%)	Weighted percentage of respondents (%)
Age (years):			
18 to 24	120,263	4.2	9.7
25 to 34	275,565	9.6	17.1
35 to 44	376,214	13.1	17.8
45 to 54	496,900	17.4	18.5
55 to 64	575,908	20.1	15.0
65 to 74	561,814	19.6	11.9
75 to 84	346,370	12.1	7.2
85 or over	111,737	3.9	2.9
Total	2,864,771		
Gender:			
Male	1,237,230	43.2	49.0
Female	1,627,054	56.8	51.0
Total	2,864,284		
Ethnicity:			
White	2,511,254	87.9	87.2
Mixed	21,459	0.8	1.0
Asian	169,559	5.9	6.4
Black	76,699	2.7	2.6
Other	78,193	2.7	2.8
Total	2,857,164		
Deprivation fifth:*			
1 (most deprived)	596,503	20.5	20.5
2	577,155	19.8	20.1
3	597,355	20.5	20.0
4	588,258	20.2	19.7
5 (least deprived)	550,900	18.9	19.7
Total	2,910,171		
Can take time off work to see GP:			
Not working†	1,460,780	53.5	43.2
Yes	883,318	32.4	38.8
No	384,779	14.1	18.0
Total	2,728,877		
Confident in managing health:			
Very	1,185,895	42.5	43.2
Fairly	1,392,810	49.9	49.5
Not very	172,691	6.2	6.0
Not at all	37,596	1.4	1.3
Total	2,788,992		

GP: general practitioner

2,912,535 survey respondents from 8,289 general practices; data presented where available for each variable.

Weighted percentages account for survey design and non-response.

*Fifths of the national Index of Multiple Deprivation rank for lower layer super output areas of residence.

†Full-time education, unemployed, sick or disabled, retired, looking after home, other.