

Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Campbell SM, Reeves D, Kontopantelis E, Sibbald B, Roland M. Effects of pay for performance on the quality of primary care in England. *N Engl J Med* 2009;361:368-78.

QuIP: 'Quality in Practice'

Practice ID

Patient ID

Dear Patient

We would be very grateful if you could spare a few minutes of your time to fill in this questionnaire about your general practice. *Your general practitioner has given his/her full support to this study.*

Please read the accompanying patient information sheet before you complete this questionnaire.

Please answer ALL questions that apply to you. There are no right or wrong answers and no-one will be able to identify your individual responses.

If you do not wish to complete this questionnaire and do not want to be sent a reminder please tick the box below and return in the FREEPOST envelope.

I do not want to take part

Thank you.

	Less than 1 year	1 to 2 years	3 to 4 years	More than 4 years	
1	How long have you been a patient with your practice?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

	None	Once or twice	Three or four times	Five or six times	Seven times or more	
2	In the past 12 months, how many times have you seen a doctor from your practice?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

	One	Two	Three	Four	Five or more	
3	How many different doctors have you seen at your practice in the past 12 months (including locums)?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

	Very poor	Poor	Fair	Good	Very good	Excellent	
4	How do you rate the convenience of your practice's location?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

	Very poor	Poor	Fair	Good	Very good	Excellent	
5	How do you rate the hours that your practice is open for appointments?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

6	Thinking of times when you want to see a particular doctor: (please tick only one box)	Same day	Next day	Within 2 days	Within 3 days	4-5 days	More than 5 days	Does not apply
a)	How quickly do you get an appointment?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
		Very poor	Poor	Fair	Good	Very good	Excellent	Does not apply
b)	How do you rate this?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

7	Thinking of times when you are willing to see any doctor: (please tick only one box)	Same day	Next day	Within 2 days	Within 3 days	4-5 days	More than 5 days	Does not apply
a)	How quickly do you get an appointment?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
		Very poor	Poor	Fair	Good	Very good	Excellent	Does not apply
b)	How do you rate this?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

	Yes	No	Don't know/never needed to
8 If you need an urgent appointment to see your GP can you normally get one on the same day?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

	Less than 5 minutes	6-10 minutes	11-20 minutes	21-30 minutes	More than 30 minutes	
9 a) How long do you usually have to wait at the practice for your appointments to begin? (please tick only one box)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
	Very poor	Poor	Fair	Good	Very good	Excellent
b) How do you rate this?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

	Very poor	Poor	Fair	Good	Very good	Excellent	Don't know /never tried
10 Thinking about times you have phoned the practice, how do you rate the following:							
a) Ability to get through to the practice on the phone?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
b) Ability to speak to a doctor on the phone when you have a question or need medical advice?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

The next questions ask about your usual doctor. If you don't have a 'usual doctor', answer about the one doctor at your practice who you know best. If you don't know any of the doctors, go straight to question 13a.

	Not at all	A bit	Some	Well	Very well	
11a i) How well do you know your usual doctor?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
	None	One	Two	Three	Four	Five or More
11a ii) How many other doctors are there at your practice that you know <u>as well</u> ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

	Always	Almost always	A lot of the time	Some of the time	Almost never	Never
11b i) In general, how often do you see your usual doctor ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
	Very poor	Poor	Fair	Good	Very good	Excellent
ii) How do you rate this?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

Thinking about **when you** consult your usual doctor, how do you rate the following:

	Very poor	Poor	Fair	Good	Very good	Excellent
12 a) The thoroughness of your doctor's questions about your symptoms and how you are feeling?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b) Attention the doctor gives to what you say?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c) The doctor's explanations of your health problems or treatments that you need?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
d) How well the doctor involves you in decisions about your medical care?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
e) The amount of time your doctor spends with you?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
f) The doctor's patience with your questions or worries?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
g) The doctor's caring and concern for you?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
h) The doctor's knowledge of your medical history ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
i) The doctor's knowledge of you as a person ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

13a In the past 12 months, has your doctor referred you to another health professional **inside your practice** (e.g. nurse, counsellor, physiotherapist, other GP etc.)?

Yes 1 go to question 13b
No 2 go to question 14a

If YES, how do you rate....

	Very poor	Poor	Fair	Good	Very good	Excellent	Don't know
13b How well informed the other health professional was about your problem and any treatment you were having?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
13c How well informed your own doctor was about the outcome of your referral?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

14a In the past 12 months, has your doctor referred you to another health professional **outside your practice** (e.g. hospital specialist etc.)? Yes ₁ go to question 14b No ₂ go to question 15

If YES, how do you rate....

	Very poor	Poor	Fair	Good	Very good	Excellent	Don't know
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14b How well informed the other health professional was about your problem and any treatment you were having? ₁ ₂ ₃ ₄ ₅ ₆ ₇

14c How well informed your own doctor was about the outcome of your referral? ₁ ₂ ₃ ₄ ₅ ₆ ₇

	None (go to question 17)	Once or twice	Three or four times	Five or six times	Seven times or more
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15 In the past 12 months, **how many times** have you seen a nurse from your practice? ₁ ₂ ₃ ₄ ₅

16 Thinking about the nurses you have seen, how do you rate the following:

	Very poor	poor	Fair	Good	Very good	Excellent
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a) The **attention** they give to what you say? ₁ ₂ ₃ ₄ ₅ ₆

b) The **quality** of care they provide? ₁ ₂ ₃ ₄ ₅ ₆

c) Their **explanations** of your health problems or treatments that you need? ₁ ₂ ₃ ₄ ₅ ₆

17 All things considered, how satisfied are you with your practice? (please tick only one box)

Completely satisfied, couldn't be better	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Completely dissatisfied, couldn't be worse
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅	<input type="checkbox"/> ₆	<input type="checkbox"/> ₇

It would help us to understand your answers if you could tell us a little about yourself

18 Are you: ₁ Male ₂ Female

19 How old are you? _____ years

20 Do you have any **long standing illness, disability or infirmity**? By long standing we mean anything that has troubled you over a period of time or that is likely to affect you over a period of time.

₁ Yes

₂ No

21 Over the last 12 months, would you say your **health** has on the whole been:

Very good

Good

Fair

Bad

Very bad

₁

₂

₃

₄

₅

22 Which **ethnic group** do you belong to? (please tick only one box)

White

Black or
Black
British

Mixed

Asian or
Asian
British

Chinese

Other
ethnic
group

₁

₂

₃

₄

₅

₆

23 Is your **accommodation**..... (please tick only one box)

Owner-occupied/
mortgaged?

Rented from a local
authority/housing
association?

Rented from a
private landlord?

Or is it under some other
arrangements? If so, please
describe:

₁

₂

₃

₄

24 Which of the following best describes you? (please tick only one box)

Employed (full- or
part-time,
including self-
employed or on a
training scheme)

Unemployed
and looking
for work

At school or
in full-time
education

Unable to
work due to
long-term
sickness or
disability

Looking
after your
home /
family

Retired
from paid
work

Other

₁

₂

₃

₄

₅

₆

₇

25 Which of these **qualifications** do you have? (please tick all boxes that apply)

1 or more O levels /
CSE / GCSEs (any
grade) (a)

1 or more A
levels or AS
levels (b)

Degree (c)

NVQ (d)

Other qualification
(e.g. City and
Guilds, RSA) (e)

No
qualifications
(f)

₁

₂

₃

₄

₅

₆

26 a) Are you **Single** ₁ **Married/cohabiting** ₂ **Divorced/separated** ₃ **Widowed** ₄

b) How many children under 18
live in your household?

₁ None

₂ One

₃ Two

₄ Three

₅ Four

₆ Five or
more

27 Is there a car or van normally available for use by you? ¹ Yes ² No

If **YES**, how many are normally available? ¹ One ² Two or more

Do you have:

28 Diabetes? ¹ Yes ² No

29 High blood pressure? ¹ Yes ² No

30 Eczema? ¹ Yes ² No

31 Angina? ¹ Yes ² No

32 Asthma? ¹ Yes ² No

33 Arthritis/Rheumatism? ¹ Yes ² No

34 Depression? ¹ Yes ² No

35 Peptic / Stomach Ulcer or dyspepsia? ¹ Yes ² No

36 Osteoporosis? ¹ Yes ² No

37 Heart failure? ¹ Yes ² No

38 Stroke? ¹ Yes ² No

39 Urinary incontinence? ¹ Yes ² No

The last set of questions ask about your general health. In each box, please tick the statement that describes you best.

40 Physical functioning (please tick only one statement)

Your health does not limit you in **vigorous activities**
(such as running, lifting heavy objects, participating in strenuous sports) ¹

Your health limits you a little in **vigorous activities**
(such as running, lifting heavy objects, participating in strenuous sports) ²

Your health limits you a little in moderate activities
(such as moving a table, pushing a vacuum cleaner, bowling, or playing golf) ³

Your health limits you a lot in **moderate activities**
(such as moving a table, pushing a vacuum cleaner, bowling, or playing golf) ⁴

Your health limits you a little in **bathing and dressing** ⁵

Your health limits you a lot in **bathing and dressing** ⁶

41 Role limitations (please tick only one statement)

- You have no problems with your work or other regular daily activities as a result of your **physical health or any emotional problems** 1
- You are limited in the kind of work or other activities as a result of your **physical health** 2
- You accomplish less than you would like as a result of **emotional problems** 3
- You are limited in the kind of work or other activities as a result of your **physical health** and accomplish less than you would like as a result of **emotional problems** 4

42 Social functioning (please tick only one statement)

- Your health limits your social activities (like visiting friends, relatives etc) **none of the time** 1
- Your health limits your social activities (like visiting friends, relatives etc) **a little of the time** 2
- Your health limits your social activities (like visiting friends, relatives etc) **some of the time** 3
- Your health limits your social activities (like visiting friends, relatives etc) **most of the time** 4
- Your health limits your social activities (like visiting friends, relatives etc) **all of the time** 5

43 Pain (please tick only one statement)

- You have pain none of the time 1
- You have **pain** but it does not interfere with your normal work (both outside the home and housework) 2
- You have **pain** that interferes with your normal work (both outside the home and housework) a little 3
- You have **pain** that interferes with your normal work (both outside the home and housework) moderately 4
- You have **pain** that interferes with your normal work (both outside the home and housework) quite a bit 5
- You have **pain** that interferes with your normal work (both outside the home and housework) extremely 6

44 Mental health (please tick only one statement)

- You feel **tense or downhearted and low** none of the time 1
- You feel **tense or downhearted and low** a little of the time 2
- You feel **tense or downhearted and low** some of the time 3
- You feel **tense or downhearted and low** most of the time 4
- You feel **tense or downhearted and low** all of the time 5

45 Vitality (please tick only one statement)

- You have a **lot of energy** all of the time 1
- You have a **lot of energy** most of the time 2
- You have a **lot of energy** some of the time 3
- You have a **lot of energy** a little of the time 4
- You have a **lot of energy** none of the time 5

Effects of pay-for-performance on the quality of English primary care

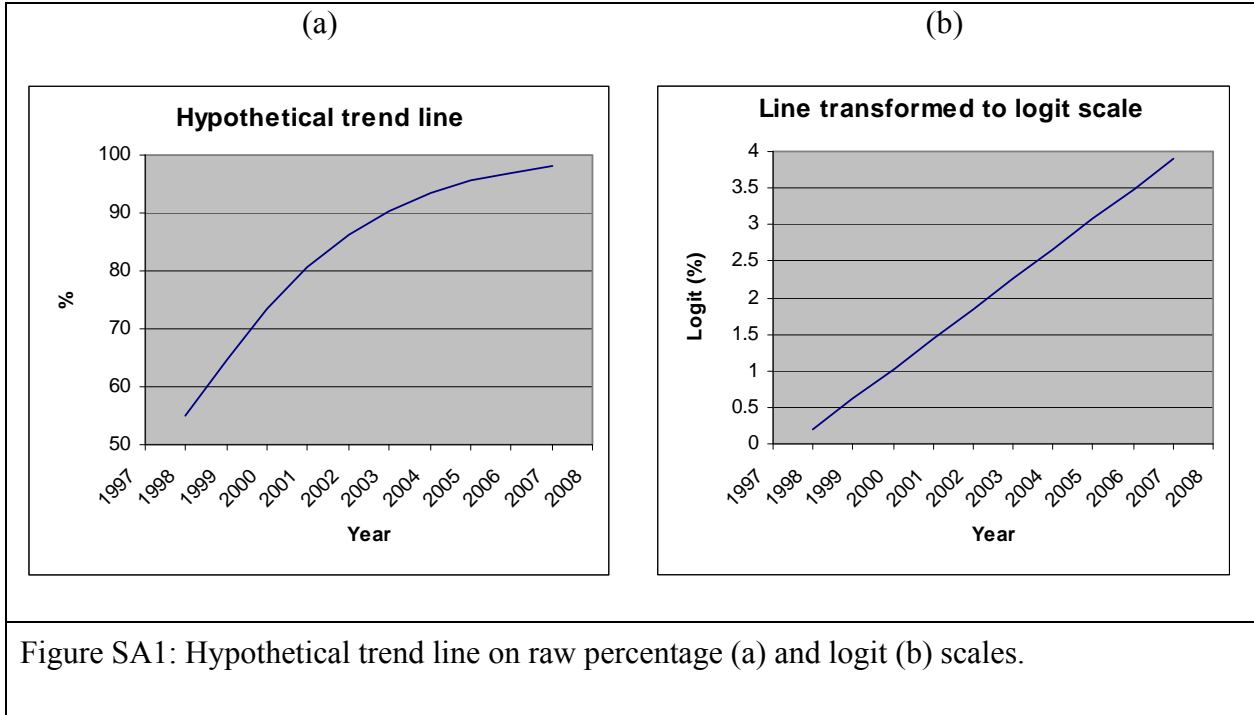
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Statistical Appendix

Use of the logit transformation

Quality of care scores in the study took the form of percentages, where 100% indicated that all necessary care had been provided. Scores were high at many practices, particularly at later time-points. The necessary ‘flattening’ of trends as they approached the ceiling of 100% made it questionable to directly apply a linear model: first, linear predictions from prior trends might exceed 100%; second, comparison of slopes at different points on the trend (eg pre-QOF with post QOF) would not allow for the inherent plateauing of the line at higher scores. The logit transformation is a common method for addressing such ceiling effects by converting percentage scores to a different, unbounded, scale, where 0% equates to $-\infty$ and 100% to $+\infty$.

Figure SA1 shows a hypothetical trend line that follows the logit model, and increases from 55% in 1998 to 98% in 2007: the curve flattens as it approaches the 100% ceiling. The figure also shows that the trend is linear under the logit transformation.



After percentage scores have been converted to logit equivalents, linear models (such as multiple linear regression) can be applied to the new values. Since the transformed scores are unbounded, problems of making ‘out of range’ predictions do not arise. The transformation also increases the relative weight given to high and low scores, in particular above 80% and below 20%. Thus score changes from 55% to 65%, from 90% to 93%, and from 97% to 98%, all represent the same degree of change, 0.41, on the logit scale.

Figure SA2 presents plots of the mean practice logit-transformed scores from the study. Whilst the transformation created some difference, compared to the corresponding percentage scale plots (figures 1 and 2 in the main paper), the general pattern of results remained unchanged.

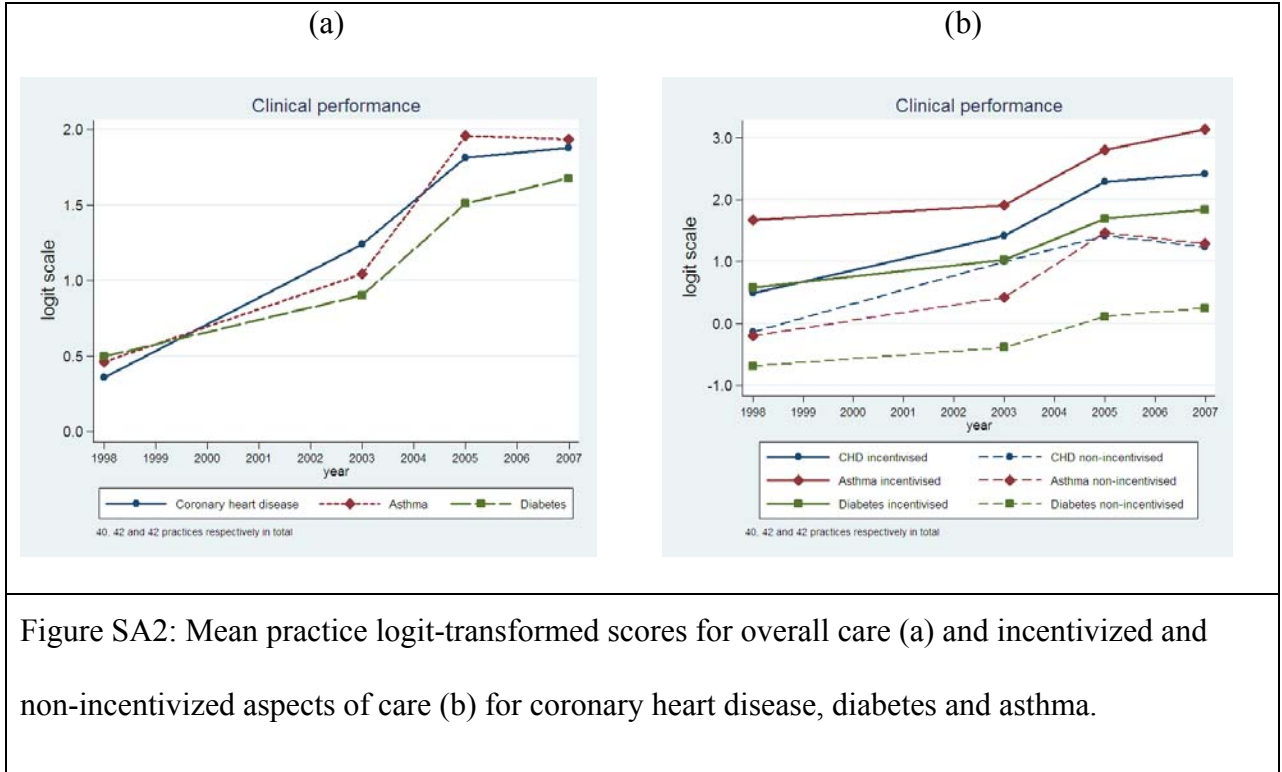


Figure SA2: Mean practice logit-transformed scores for overall care (a) and incentivized and non-incentivized aspects of care (b) for coronary heart disease, diabetes and asthma.

Details of analysis

The data was analysed as an ‘interrupted’ or ‘segmented’ time series. Under this model the within-practice variation was partitioned into three main components due to: (i) the slope in scores pre- pay-for-performance ; (ii) the ‘step-change’ in level across the trans- pay-for-performance period allowing for the pre- pay-for-performance trend; (iii) the change in slope from pre- pay-for-performance to post- pay-for-performance; plus constant and residual terms¹. The first two components replicate the analyses undertaken in our previous investigation of the first three time-points², though the estimates of standard error differ slightly due to inclusion of a fourth time-point. The third component represents the addition of the latest time-point and completes the planned time-series design

The data was multi-level, with patients nested within years by practice. Care for a substantial minority of patients was at the 100% ceiling for some time-points, making it impractical to transform, and thus analyse, the data as a full multi-level model. We therefore collapsed each year's patient data to practice level and applied the logit transformation to these values for analysis. Instances where a practice score was at 100% or 0% were dealt with by applying the empirical logit³. For analysis we used the Stata Xtre procedure, specifying practice to be a random effect. We used the cluster option to allow for correlations in practice scores across years, and – accordingly - the robust ('sandwich') estimator of variance⁴.

We used a two step process to conduct the main inference testing for each outcome measure, in which subsequent (step 2) testing depended upon there first being evidence that pay-for-performance had affected the trend in scores over time in some way (either by a change in level (allowing for existing trend) or in slope from the pre- to the post-pay-for-performance periods). This two-step approach was adopted for two main reasons: (i) without first having evidence that pay-for-performance had influenced the trend over time, there was no sound basis for conducting any further tests; (ii) this approach minimises the number of statistical tests being applied, and hence reduces the cumulative risk of a type 1 error and the likelihood of contradictory test results.

The tests for change in level and change in slope from pre- to post- pay-for-performance came directly from the relevant parameters in the regression model. To compare the

trans- and post- pay-for-performance slopes, where appropriate, we expressed the comparison in terms of model parameters (specifically, 0.5 times the change in level equals change in slope pre-to-post) and tested this using the Stata `lincom` post-estimation command. The tests of interactions with indicator set took the same form except using the regression terms corresponding to the above parameters interacted with indicator set.

Sensitivity analysis

Both raw and logit transformed quality scores had skewed distributions and variances which differed across both practices and years. In addition, the robust estimator may not perform well with fewer than 50 groups⁵. We therefore repeated the interrupted time series analysis using a bootstrap method free from parametric assumptions, using 1,000 bootstrap samples to derive estimates of error variances for the tests of regression coefficients.

Our main analysis assumed that quality and patient evaluation scores conformed to a logit model. For sensitivity we repeated the analyses using a simple linear model (regression analysis on the untransformed scores). This model made no allowance for ceiling or floor effects on scores and as such is likely to have underestimated step-changes in level, and overestimated changes in slope, relative to the trend pre- pay-for-performance.

A small number of results changed under the sensitivity analyses. The ability to see any doctor within 48 hours declined significantly between 1998 and 2003 under the linear

model (average rate = -1.2% (95% CI -0.1 to -2.4) per annum; $p=0.032$). Regarding the comparison of incentivized and non-incentivized care for coronary heart disease, the interaction with change in level was non-significant under the linear model ($p=0.456$), but the pre to post change in slope became significant under both the bootstrapped test and the linear model ($p=0.05$ and $p=0.025$ respectively).

Power

The ability of the experiment to detect an effect can be assessed from the accuracy of the resulting point estimates for the main regression parameters, as reflected in the width of the associated 95% confidence intervals. It is difficult to interpret these within the context of logit-transformed scores, therefore table SA1 provides results from the analysis of untransformed percentage scores. Confidence limits around the point estimates of step-change were all – bar one - within plus or minus 6%, and those for changes in slope nearly all within plus or minus 2%. This indicates that the study was able to detect all but a small effect of the pay-for-performance system.

Our ability to detect interactions between these parameters and incentivisation (yes/no) was necessarily lower. Confidence intervals were between one-point-five and twice as wide, implying that only moderate to large effects could be detected.

Table SA1: Point estimates (95% confidence limits) from analysis of untransformed scores (figures in percentage points)

	ITS analysis	Subsequent analysis*
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	Pre- pay-for-performance slope (98-03)	Difference between 2005 score and prediction from pre- pay-for-performance trend (98-03)	Change in slope from pre- pay-for-performance to post- pay-for-performance	Change in slope from trans- pay-for-performance to post- pay-for-performance
Coronary heart disease care	3.5 (2.8, 4.2)	1.8 (-2.0, 5.6)	-3.6 (-4.9, -2.3)	-4.5 (-6.5, -2.6)
Diabetes care	1.8 (1.1, 2.4)	7.5 (4.1, 11.0)	-0.6 (-1.4, 0.1)	-4.4 (-6.1, -2.7)
Asthma care	2.0 (0.9, 3.1)	10.0 (3.8, 16.1)	-1.7 (-3.8, 0.4)	-6.7 (-10.3, -3.0)
Communication with physicians	0.2 (-0.2, 0.7)	-1.7 (-3.8, 0.3)	0.9 (-0.1, 1.9)	NA
Percentage able to get an appointment within 48 hours (to see a particular physician)	-1.1 (-2.4, 0.1)	3.4 (-1.9, 8.7)	0.0 (-2.2, 2.1)	NA
Percentage able to get an appointment within 48 hours (to see any physician)	-1.2 (-2.4, -0.1)	5.4 (-1.3, 12.1)	1.4 (-1.0, 3.8)	NA
Rating of "How often do you see your usual doctor" (scale 0-100)	-0.1 (-0.5, 0.3)	-4.0 (-5.9, -2.1)	0.0 (-0.9, 0.9)	2.0 (0.6, 3.3)

* Subsequent analysis only conducted for outcomes with a significant change in level or slope

NA = Not Analysed

References

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Appendix: Changes to the Quality and Outcomes Framework targets for heart disease, asthma and diabetes: 2006-07

The Quality and Outcomes Framework pay-for-performance scheme was introduced in 2004. Overall there were 146 indicators covering chronic disease management, practice organization, patient experience and additional services. 76 indicators related to clinical care. The disease areas, number of indicators per area and points attached per area for the clinical indicators are shown in Box 1.

Disease area	Indicators	Points
asthma	7	72
cancer	2	12
chronic obstructive pulmonary disease	8	45
coronary heart disease	15	121
diabetes	18	99
epilepsy	4	16
hypertension	5	105
hypothyroidism	2	8
mental health	5	41
stroke	10	31
total	76	550

Box 1: 2004-05 QOF disease areas and points

Each indicator was allocated between 0.5 & 56 points (1,050 in total). In 2004-05 each point earned an average practice £76. In 2005-06 and onwards each point earned an average practice £125.

In 2006-07, the QOF underwent a number of changes, with some indicators withdrawn, points allocated to indicators changed, new disease areas and indicators introduced. The new disease areas, indicators and points are shown in Box 2.

Disease area	Indicators	Points
atrial fibrillation	3	30
chronic kidney disease	4	27

dementia	2	20
depression	2	33
learning difficulties	1	4
obesity	1	8
palliative care	2	6
(smoking	2	68)
total	15	128

Box 2: Changes to disease areas and indicators in 2006-07

In general, for all indicators in the 2006-07 iteration of QOF, the minimum achievement threshold was increased from 25% to 40%. In addition, the smoking indicators in each disease domain (asthma, heart disease, diabetes, stroke, hypertension, and chronic obstructive pulmonary disease) were amalgamated into two dedicated smoking indicators.

There were specific changes to the three conditions discussed in this study, as follows:

Changes to heart disease indicators in the 2006-07 QOF

CHD indicator 1: *The practice can produce a register of patients with coronary heart disease:* Points reduced from 6 to 4

CHD indicator 2: *The percentage of patients with newly diagnosed angina (diagnosed after 1 April 2003) who are referred for exercise testing and/or specialist assessment:* No change

CHD indicator 3: *The percentage of patients with coronary heart disease whose notes record smoking status in the past 15 months, except those who have never smoked where smoking status need be recorded only once -* Amalgamated in to two dedicated smoking indicators as above.

CHD indicator 4: *The percentage of patients with coronary heart disease who smoke, whose notes contain a record that smoking cessation advice or referral to a specialist service, where available, has been offered within the last 15 months -* Amalgamated in to two dedicated smoking indicators as above.

CHD indicator 5: *The percentage of patients with coronary heart disease whose notes have a record of blood pressure in the previous 15 months:* No change

CHD indicator 6: *The percentage of patients with coronary heart disease in whom the last blood pressure reading (measured in the last 15 months) is 150/90 or less:* No change

CHD indicator 7: *The percentage of patients with coronary heart disease whose notes have a record of total cholesterol in the previous 15 months:* No change.

CHD indicator 8: *The percentage of patients with coronary heart disease whose last measured total cholesterol (measured in the last 15 months) is 5 mmol/l or less:*

Maximum threshold increased from 60% to 70%, points increased from 16 to 17

CHD indicator 9: *The percentage of patients with coronary heart disease with a record in*

the last 15 months that aspirin, an alternative anti-platelet therapy, or an anti-coagulant is being taken (unless a contraindication or side-effects are recorded): No change

CHD indicator 10: *The percentage of patients with coronary heart disease who are currently treated with a beta blocker (unless a contraindication or side-effects recorded): Maximum threshold increased from 50% to 60%*

CHD indicator 11: *The percentage of patients with a history of myocardial infarction (diagnosed after 1 April 2003) who are currently treated with an ACE inhibitor: Maximum threshold increased from 70% to 80%*

CHD indicator 12: *The percentage of patients with coronary heart disease who have a record of influenza immunisation with the preceding 1 September to 31 March: Maximum threshold increased from 85% to 90%*

Changes to asthma indicators in the 2006-07 QOF

Asthma indicator 1: *The practice can produce a register of all patients with asthma, excluding patients with asthma who have been prescribed no asthma-related drugs in the previous twelve months: Points reduced from 7 to 4*

Asthma indicator 2: *Wording changed from “The percentage of patients aged eight and over diagnosed as having asthma from 1 April 2003 where the diagnosis has been confirmed by spirometry or peak flow measurement” to “The percentage of patients aged eight and over diagnosed as having asthma from 1 April 2006 with measures of variability or reversibility”:* Maximum threshold also increased from 70% to 80%

Asthma indicator 3: *The percentage of patients with asthma between the ages of 14 and 19 in whom there is a record of smoking status in the previous 15 months: Max threshold increased from 70% to 80%*

Asthma indicator 4: *The percentage of patients aged 20 and over with asthma whose notes record smoking status in the past 15 months, except those who have never smoked where smoking status should be recorded at least once: Amalgamated in to two dedicated smoking indicators as above.*

Asthma indicator 5: *The percentage of patients with asthma who smoke, and whose notes contain a record that smoking cessation advice or referral to a specialist service, if available, has been offered within the last 15 months: Amalgamated in to two dedicated smoking indicators as above.*

Asthma indicator 6: *The percentage of patients with asthma who have had an asthma review in the previous 15 months: No change*

Asthma indicator 7: *The percentage of patients aged 16 and over with asthma who have had influenza immunisation in the preceding 1 September to 31 March: Dropped*

Changes to diabetes indicators in the 2006-07 QOF

* Indicators originally applied to all patients with diabetes mellitus, but were changed to age 17+ with Type 1 or 2 specified. Otherwise:

Diabetes Mellitus indicator 1: *The practice can produce a register of all patients with diabetes mellitus: No change*

Diabetes Mellitus indicator 2: *The percentage of patients with diabetes whose notes record BMI in the previous 15 months: No change*

Diabetes Mellitus indicator 3: *The percentage of patients with diabetes in whom there is a*

record of smoking status in the previous 15 months, except those who have never smoked where smoking status should be recorded once: Amalgamated in to two dedicated smoking indicators as above.

Diabetes Mellitus indicator 4: The percentage of patients with diabetes who smoke and whose notes contain a record that smoking cessation advice or referral to a specialist service, where available, has been offered in the last 15 months: Amalgamated in to two dedicated smoking indicators as above.

Diabetes Mellitus indicator 5: *The percentage of diabetic patients who have a record of HbA1c or equivalent in the previous 15 months:* No change

Diabetes Mellitus indicator 6: *The percentage of patients with diabetes in whom the last HbA1C is 7.4 or less (or equivalent test/reference range depending on local laboratory) in the last 15 months:* HbA1c threshold changed from 7.4% to 7.5%. Points increased from 16 to 17.

Diabetes Mellitus indicator 7: *The percentage of patients with diabetes in whom the last HbA1C is 10 or less (or equivalent test/reference range depending on local laboratory) in last 15 months:* Maximum threshold increased from 85% to 90%

Diabetes Mellitus indicator 8: *The percentage of patients with diabetes who have a record of retinal screening in the previous 15 months:* No change

Diabetes Mellitus indicator 9: *The percentage of patients with diabetes with a record of the presence or absence of peripheral pulses in the previous 15 months:* No change

Diabetes Mellitus indicator 10: *The percentage of patients with diabetes with a record of neuropathy testing in the previous 15 months:* No change

Diabetes Mellitus indicator 11: *The percentage of patients with diabetes who have a record of the blood pressure in the past 15 months:* No change

Diabetes Mellitus indicator 12: *The percentage of patients with diabetes in whom the last blood pressure is 145/85 or less:* Maximum threshold increased from 55% to 60%. Points increased from 17 to 18.

Diabetes Mellitus indicator 13: *The percentage of patients with diabetes who have a record of micro-albuminuria testing in the previous 15 months (exception reporting for patients with proteinuria):* No change

Diabetes Mellitus indicator 14: *The percentage of patients with diabetes who have a record of serum creatinine testing in the previous 15 months:* Estimated glomerular filtration rate accepted as alternative to serum creatinine testing

Diabetes Mellitus indicator 15: *The percentage of patients with diabetes with proteinuria or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists):* Maximum threshold increased from 70% to 80%

Diabetes Mellitus indicator 16: *The percentage of patients with diabetes who have a record of total cholesterol in the previous 15 months:* No change

Diabetes Mellitus indicator 17: *The percentage of patients with diabetes whose last measured total cholesterol within the previous 15 months is 5mmol/l or less:* Maximum threshold increased from 60% to 70%

Diabetes Mellitus indicator 18: *The percentage of patients with diabetes who have had influenza immunisation in the preceding 1 September to 31 March:* No change