Pay for Performance for general practitioners: lessons from the UK

Hugh Gravelle

Centre for Health Economics
University of York

Hague, Wednesday 14 March 2012

THE UNIVERSITY of York

CHE
Centre For Health Economics

Quality and P4P schemes

- Problem: variations in quality across providers.
- Policy: link payment to quality measures
- Hospitals
  - England: CQUIN (Commissioning for Quality and Innovation)
    - 1.5% of payment linked to range of quality indicators
- Primary care
  - Focus on management of long term conditions
    - Australia, Canada, Germany, Italy, Netherlands, Spain, Taiwan, USA
    - UK: Quality and Outcomes Framework
      - Large set of quality indicators base on clinical evidence; powerful incentives

NHS

- NHS: tax financed
  - No charges for hospital care
  - No charges for general practice consultations
  - Charges for general practice prescribed drugs
    - Wide range of exemptions. 90% dispensed with no charge.

- General Practice list system
  - patients register with a general practice
  - do not pay for consultations
  - gatekeeping for elective (non-emergency) hospital care

- England: 8,200 practices
  - Private, limited liability partnerships
  - 36,000 GPs, 72,000 other staff
  - 4.4 GPs per practice
  - Average list per GP 1520
  - List per practice 6640

General practice contracts

- NHS contracts with general practices
- General Medical Services contract (55% of practices)
  - Nationally negotiated
  - Capitation, lump sum, quality incentive payments
- Personal Medical Service contract (45%)
  - Locally negotiated with PCT
  - Same services as GMS plus agreed services for particular groups. Payment: Total GMS plus markup
  - 10% higher income
- Dispensing practice (14%) (GMS and PMS)
  - Dispense as well prescribe medicines
  - 10% higher income

Quality and Outcomes Framework

- Introduced April 2004
- Voluntary: nearly all practices take part (including PMS)
- 146 quality indicators
- 1050 quality indicator points

QOF indicators and points 2004/5-2005/6

	Indicators	Max points
Clinical quality	**76**	**550**
Organisation (records, information for patients, education & training, practice management)	56	184
Patient experience (consultation length, carry out patient surveys)	4	100
Additional services (screening etc)	10	36
Holistic care (3rd worst clinical perf)		100
Quality practice (3rd worst on other indics)		30
Access bonus (waits for appointment)		50
Total	146	1050

Clinical domains and points 2004/5-2005/6

	No. of indicators	Max points
Asthma	7	72
Cancer	2	12
CHD	12	101
COPD	8	45
Diabetes	18	99
Epilepsy	4	72
Hypertension	5	105
Hypothyroidism	2	8
LVD	3	20
Mental health	5	41
Stroke and TIA	10	31
Total	76	550

Some CHD indicators 2004/5-2005/6

Indicator	Max points	Upper threshold
CHD 1: Practice has register of patients with CHD	6	
CHD 5: Percentage of CHD patients whose notes record BP in previous 15 months	7	90%
CHD 6: Percentage of CHD patients whose BP in previous 15 months is 150/90 or less	19	70%

Lower threshold all 65 ratio indicators: 25%

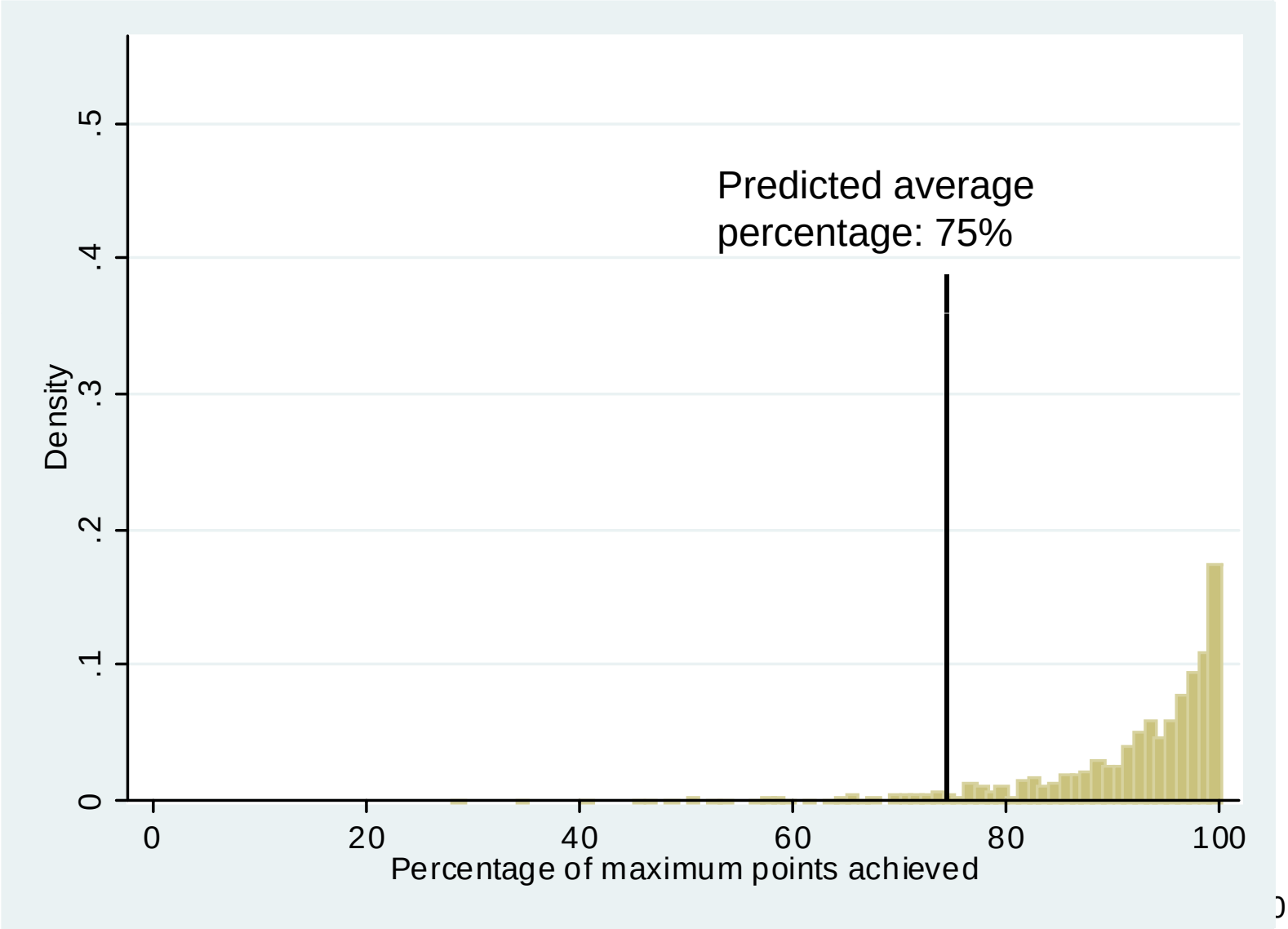
Quality and Outcomes Framework

- Introduced April 2004
- Voluntary: nearly all practices take part
- 146 quality indicators
- 1050 quality indicator points
- £76 per point for average practice in 2004/5
- payment per point varies with
  - relative practice disease prevalence
  - relative list size
- £80,000 pa potential additional gross income per average practice 2004/5

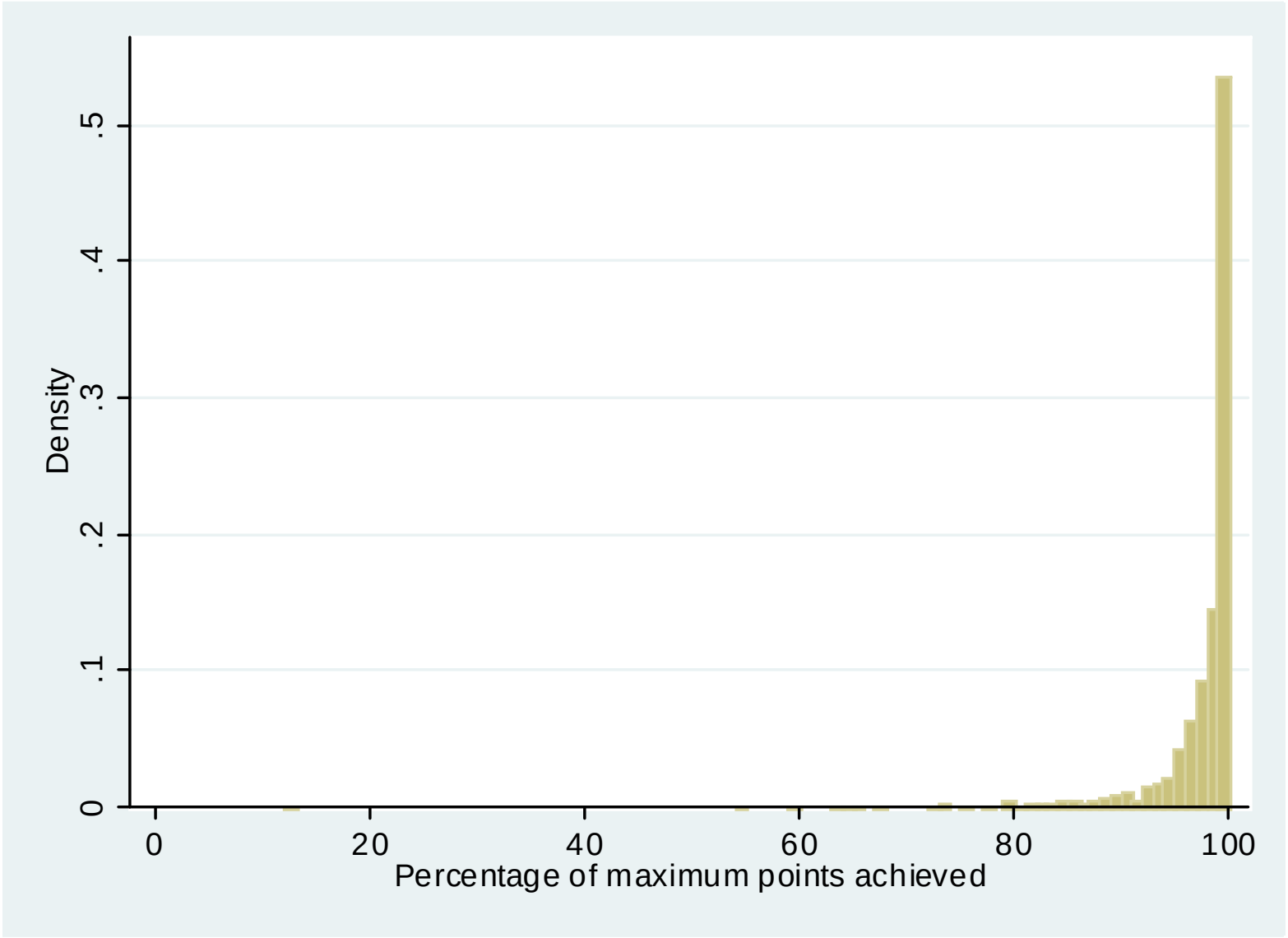
- 2005/6: payment per point increased to £125 (potential £130,000 pa per average practice) 2005/6

- UK expenditure on QOF £1,000,000M pa

Percent of maximum (1050) points achieved 2004/5



Percent of maximum points achieved 2005/6



Quality and Outcomes Framework

- Introduced April 2004
- Voluntary: nearly all practices take part (including PMS)
- 146 quality indicators
- 1050 quality indicator points
- £76 per point for average practice in 2004/5
- payment per point varies with
  - relative practice disease prevalence
  - relative list size
- £80,000 pa potential additional gross income per average practice 2004/5

- 2005/6: payment per point increased to £125 (potential £130,000 pa per average practice) 2005/6

- UK expenditure on QOF £1,000,000M pa

- Subsequent changes from 2006/7 onwards
  - Indicators (definitions, upper and lower thresholds, points)
  - Disease areas
  - Prevalence adjustment

QOF 2004/5 – 2012/13

				% of total points achieved		
	indicators	clinical domains	points	Mean	% practices at 100%	Other changes
2004/5	146	11	1050	91.3	2.6	
2005/6	146	11	1050	96.2	9.7	Price per point increased
2006/7	135	19	1000	95.4	5.1	Thresholds increased
2007/8	135	19	1000	96.8	7.5	
2008/9	129	19	1000	95.4	2.0	Access points based on pat surveys
2009/10	134	20	1000	93.7	1.0	Prevalence calc
2010/11	134	20	1000	94.7	1.3	
2011/12	138	20	1000			96 points for new “Quality and Productivity indicators”
2012/13	142	22	1000			Thresholds increased

QOF questions

- Effects of QOF on
  - GPs
  - performance on incentivised activities
  - performance on unincentivised activities:
  - patient health
  - NHS costs
  - Cost effectiveness

- Lessons for pay for performance contract design
  - Appropriate incentives
  - Gaming

Trends in GP hours, income, job satisfaction

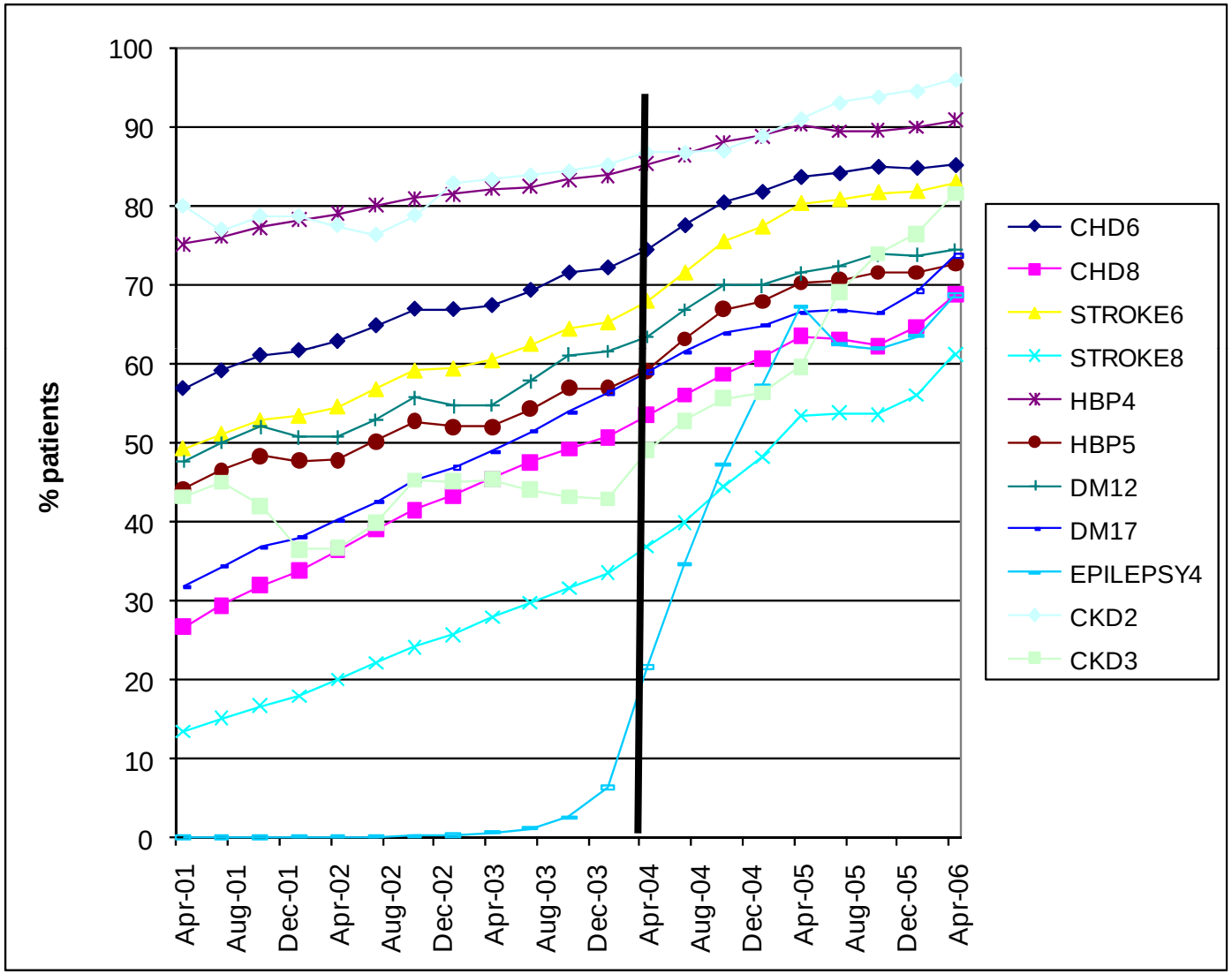
	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Gross income (£000s)		183	202	230	245	247	252	274	278	
Expenses (£000s)		111	120	130	135	140	146	265	169	
Net Income (£000s)	72	72	82	100	110	108	106	110	109	
hrs/week	45.7		44.4		38.9			40.1		41.4
Job satis(1-7)	4.0		4.7		5.2			4.7		4.9

Income data: Doctor and Dentists Review Body reports (sample tax records)
Hours, job satisfaction: National Primary Care Research and Development Centre GP Worklife Surveys

Did the QOF improve performance?

- No national data on QOF activities before QOF introduced
- No controls: simultaneous introduction in England, Scotland, Wales, Northern Ireland
- Use data on practices in GPRD, SPICE, QRESEARCH, THIN databases
  - Before/after studies (interrupted time series)
    - But not a random sample
  - Comparison of before/after for incentivised and unincentivised indicators (DID)

National trends in QOF indicators



Source: 498 practices in QRESEARCH version XX. Hippisley-Cox et al. Information Centre, October 2007.

Trends monitoring and control of blood pressure of hypertensive patients Jan 2001 to July 2007

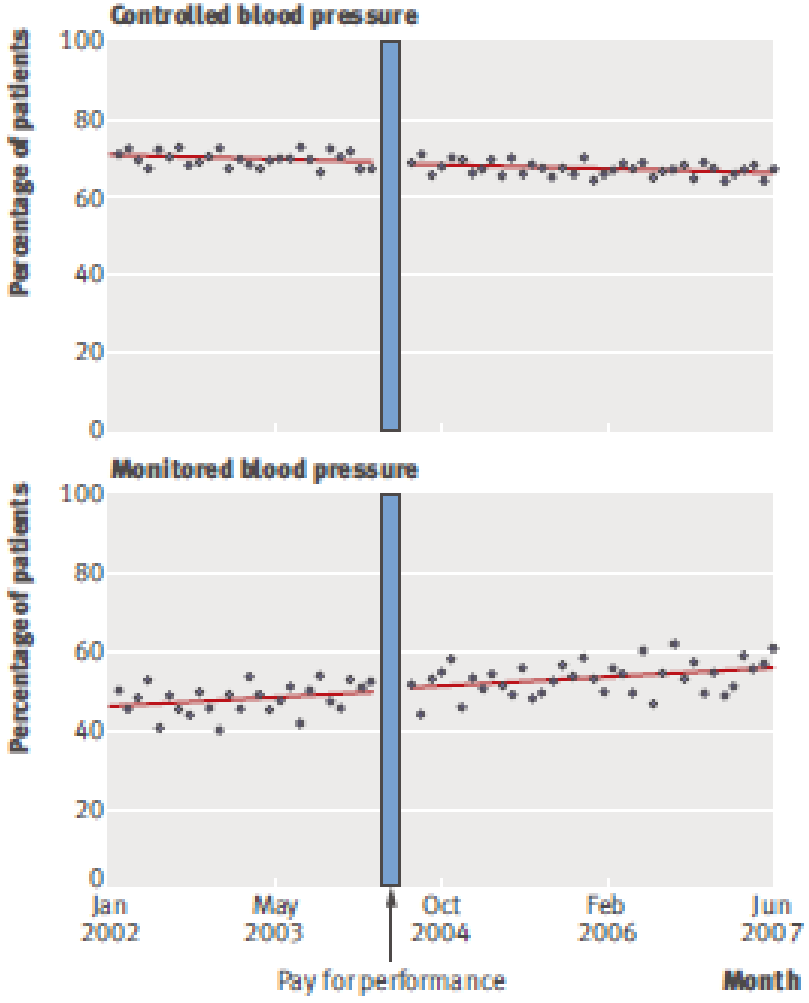


Fig 2| Effect of pay for performance on blood pressure control and monitoring in United Kingdom

N = 470,725 general practice patients with hypertension

Serumaga et al, BMJ, 2010.

Trends in blood pressure of hypertensive patients Jan 2001 to July 2007

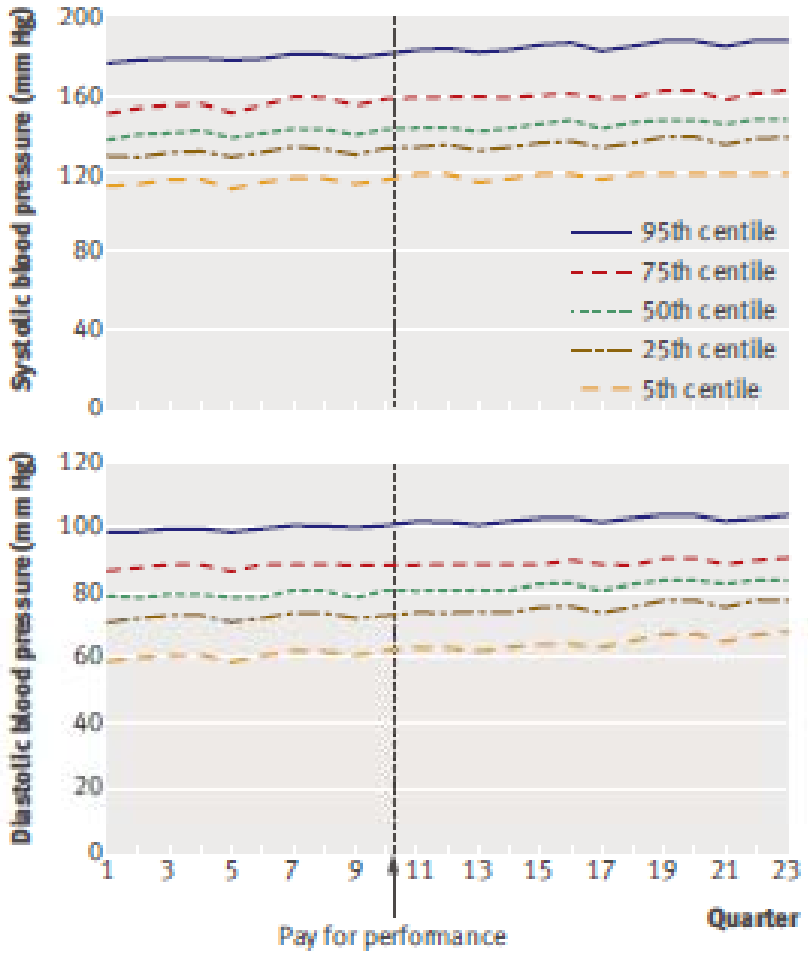


Fig 1| Time series of centiles of systolic and diastolic blood pressure in United Kingdom by quarter from January 2001 to July 2007

N = 470,725 general practice patients with hypertension

Serumaga et al, BMJ, 2010.

Trends in treatment intensity for hypertensive patients Jan 2001 to July 2007

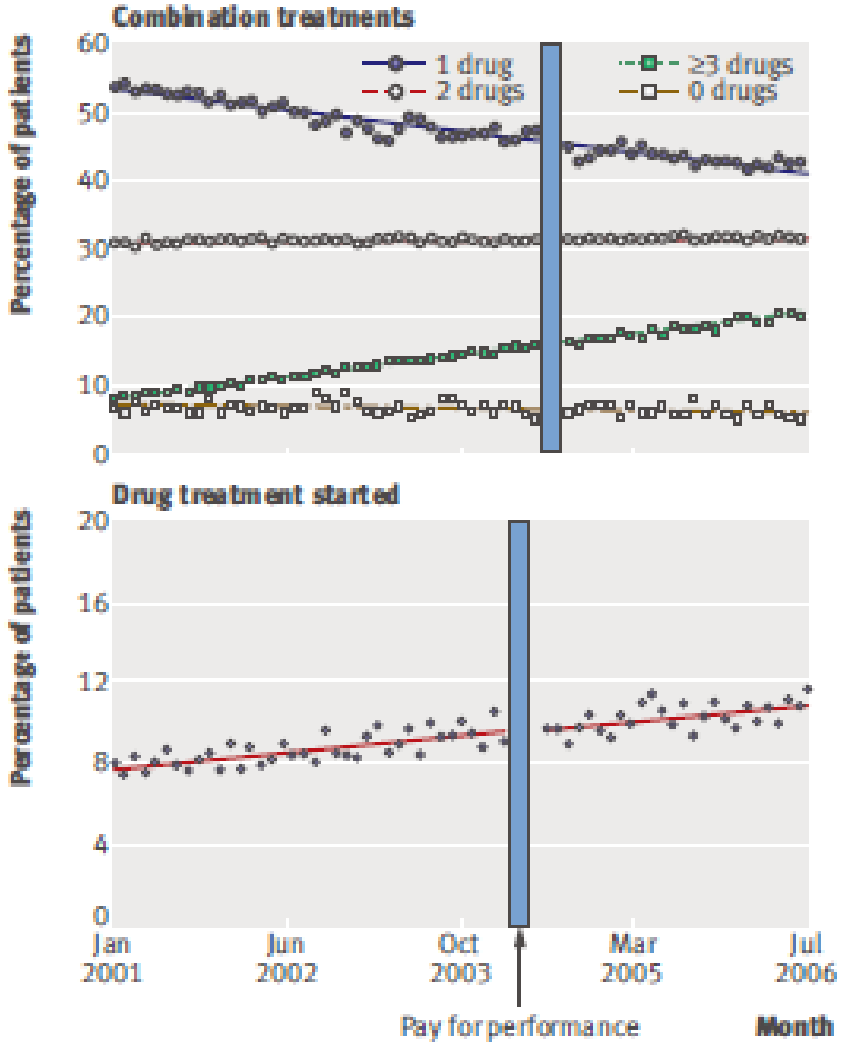
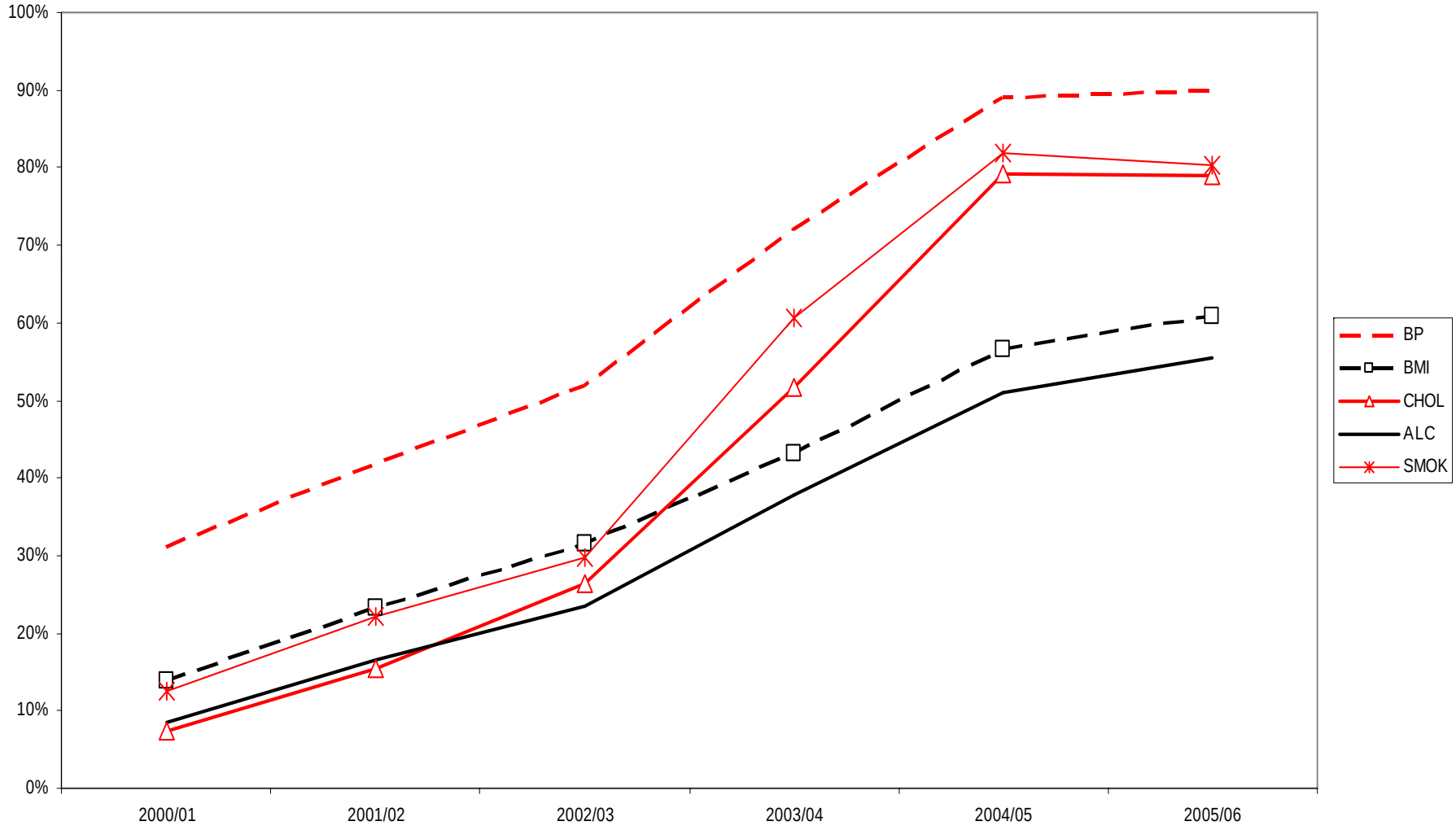


Fig 3| Effect of pay for performance on intensity of treatment for hypertension in United Kingdom

N = 470,725 general practice patients with hypertension

Serumaga et al, BMJ, 2010.

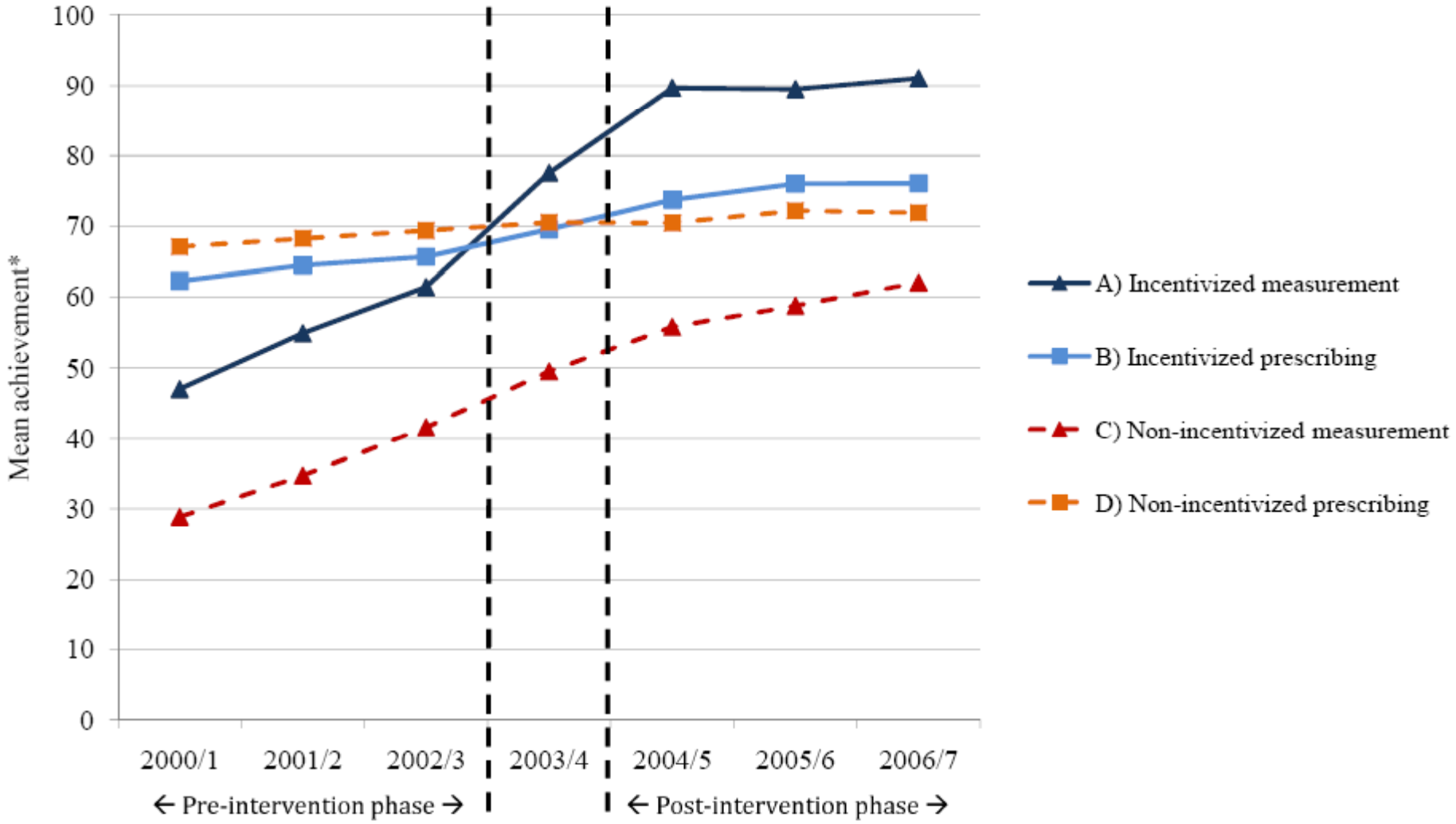
DID design: trends for **incentivised** (BP, cholesterol, smoking status) and **unincentivised** (BMI, alcohol) monitoring of CHD patients



315 Scottish practices in SPICE. Sutton et al, Health Econ, 2010

DID: Incentivised and unincentivised quality indicators (Doran et al, BMJ 2010)

Figure 1. Mean achievement rate* by indicator group, 2000/1 to 2006/7



* Equal to the mean of the adjusted means for the individual indicators within the group

Effects on patient health?

- Direct evidence:
  - Change in patient health outcomes
- Indirect evidence
  - QOF improved performance on QOF indicators
  - Better QOF performance associated with better patient outcomes

ITS: trends in adverse outcomes for hypertensive patients Jan 2001 to July

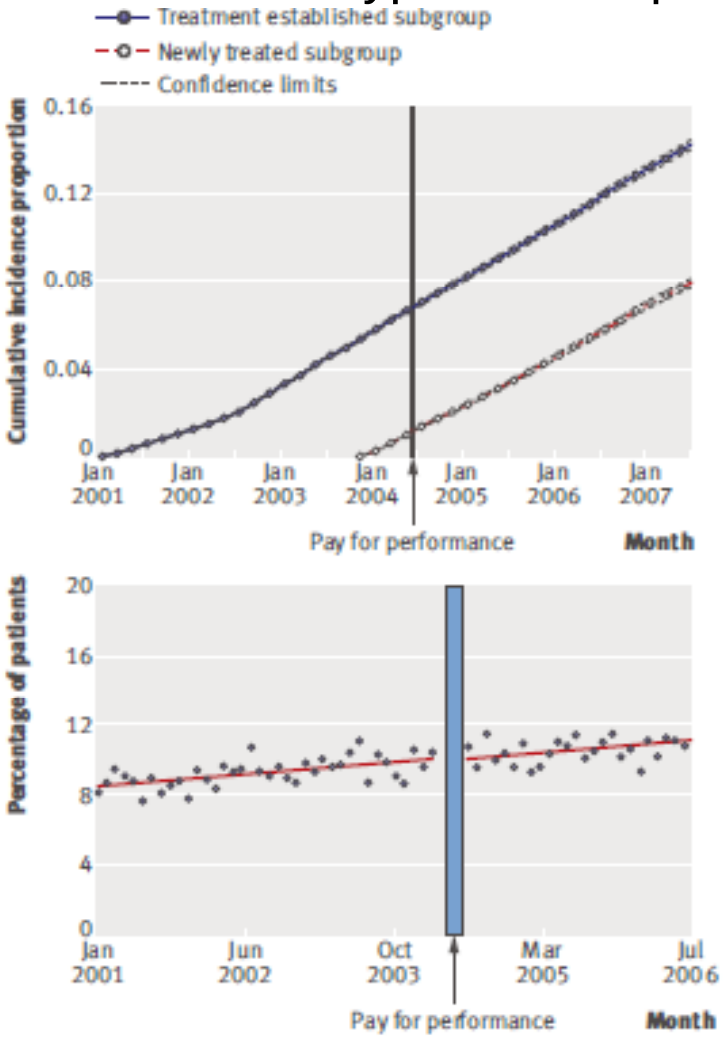
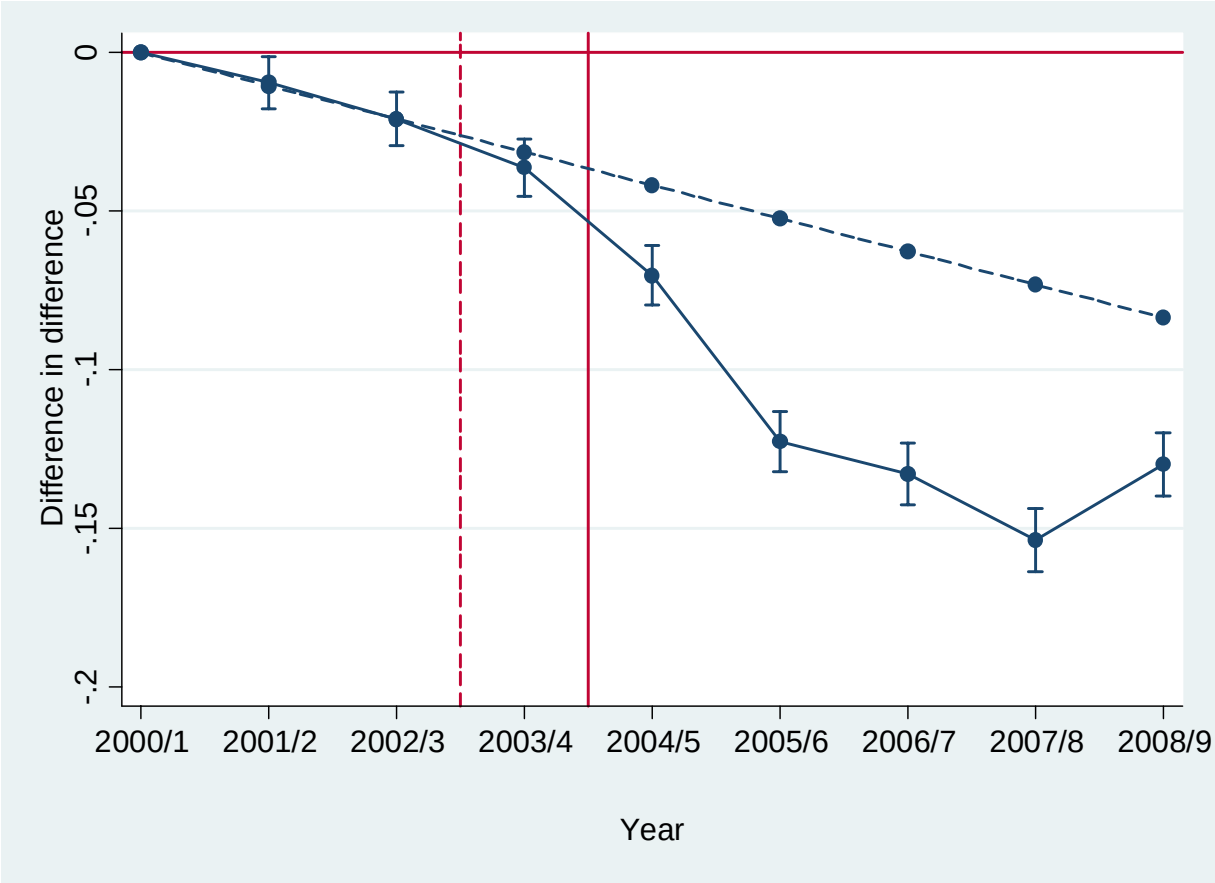


Fig 4 | Effect of pay for performance on hypertension related adverse outcomes (myocardial infarction, stroke, renal failure, heart failure) or on all cause mortality in United Kingdom

N = 470,725 general practice patients with hypertension

Serumaga et al, BMJ, 2010.

DID: changes in unplanned admission rates for incentivised ACSCs relative to 2000/1 minus changes in non-incentivised ACSCs relative to 2000/1



Hatched blue line indicates the predicted difference between incentivised ACSCS and non-incentivised ACSCs assuming that the difference in pre QOF trends was continued.
Vertical red lines indicate the announcement of the P4P scheme in 2003/4 and its introduction in 2004/5.
Error bars indicate 95% confidence interval.

Harrison, M., Dusheiko, M., Sutton, M., Gravelle, H., Doran, T., Roland, M. "The impact of primary care pay for performance on admissions for ambulatory care sensitive conditions." November 2011. mimeo

QOF performance and patient outcomes

- Better performance on process measures (monitoring etc) improves intermediate outcomes (blood pressure, HbA1c, etc)
  - DID
    - Ryan and Doran Medical Care, 2012
- Better control of blood sugar reduces emergency admissions for complications of diabetes
  - Cross sectional
  - Panel: within practices over time (2004/5 – 2008/9)
    - Dushieko et al HSR, 2010
- Patients in practices with better QOF performance have reduced mortality risk
  - Cross sectional
  - Panel: within practices over time (2004/5- 2007/8)
    - Martin et al, Health Foundation, 2010

Effects of QOF on quality?

- Effect on quality performance indicators
  - Already trending upwards pre QOF
  - QOF had small additional effect
  - No clear evidence of effort diversion from unincentivised activities to incentivised
- Effects on health and other outcomes
  - Direct evidence
    - ITS: No change in CHD related outcomes?
    - DID: Reductions in ACSCs for incentivised conditions
  - Indirect evidence:
    - QOF improved performance on process indicators
    - Better performance on process indicators leads to
      - Better performance on intermediate outcomes
      - Fewer ACSC admissions
      - Reduced hospital costs
      - Lower mortality

Equity implications?
Improvements in QOF quality by level of area deprivation

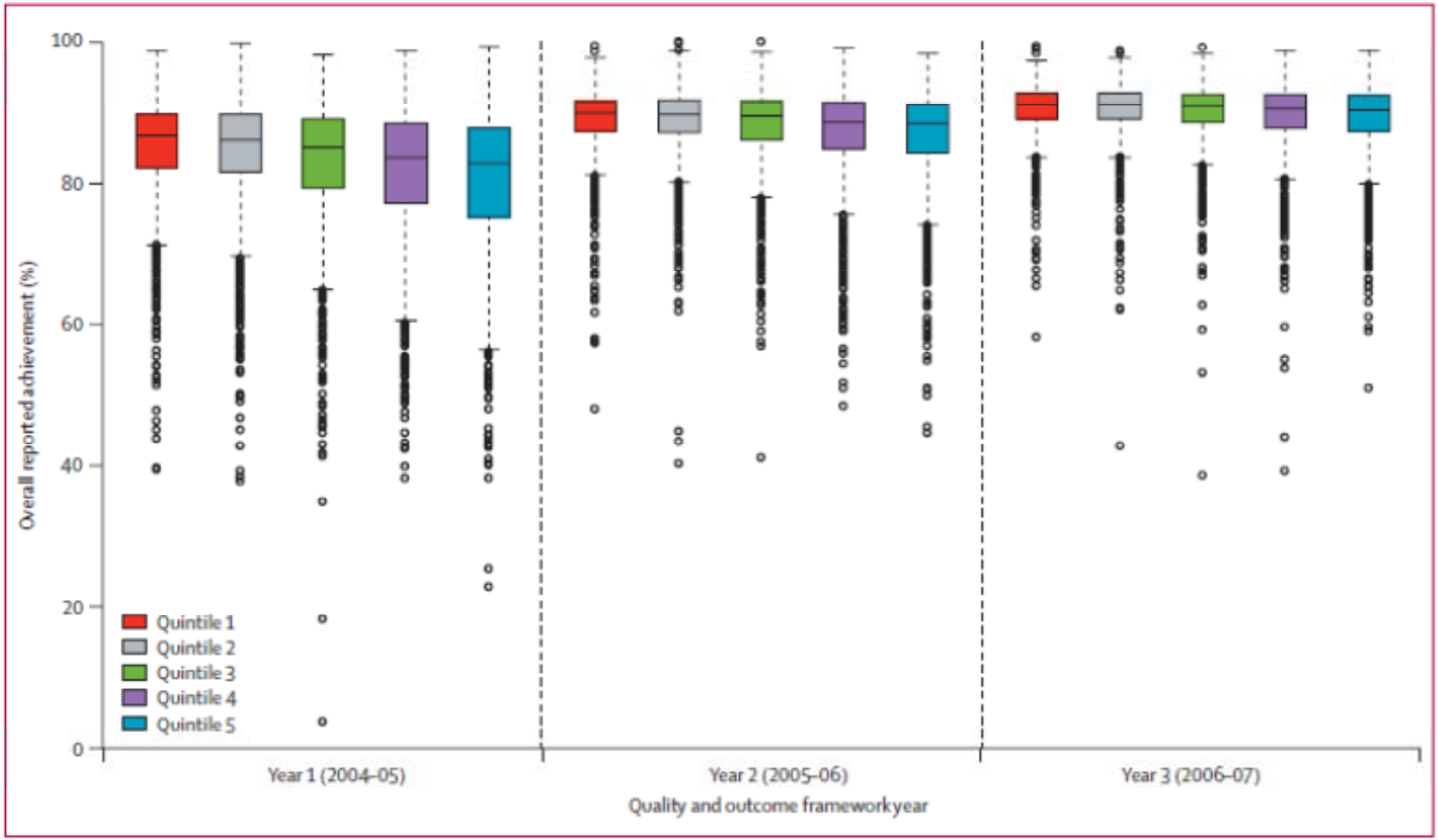


Figure 1: **Distribution of scores for overall reported achievement by deprivation quintile for year 1 (2004–05) to year 3 (2006–07)**
Central line shows median achievement and box shows interquartile range; whiskers represent range of achievement scores. Circles represent statistical outliers—ie, individual practices with achievement scores outside the range: first quartile–(1·5×IQR) to third quartile+(1·5×IQR).

Source: Doran et al, Lancet, 2008

But no evidence on deprivation and QOF quality before QOF

QOF performance and hospital costs

- Patients in practices with better QOF performance have lower hospital costs
  - Cross sectional and panel evidence
  - Reduced emergency admissions
  - Reduced outpatient attendances
  - No effect on elective admissions
  - No effect on costs once admitted
  - 10% improvement in QOF stroke performance between 2004/5 and 2007/8 reduced NHS hospital cost by £130M
    - Dusheiko et al, JHE 2012

Is the QOF cost effective?

- Does the incentivised activity improve outcomes or reduce costs?
- Did the QOF increase the incentivised activity?
- Was the incentive payment (for all patients treated) less than the value of the health gain (or cost reduction) to the additional patients treated

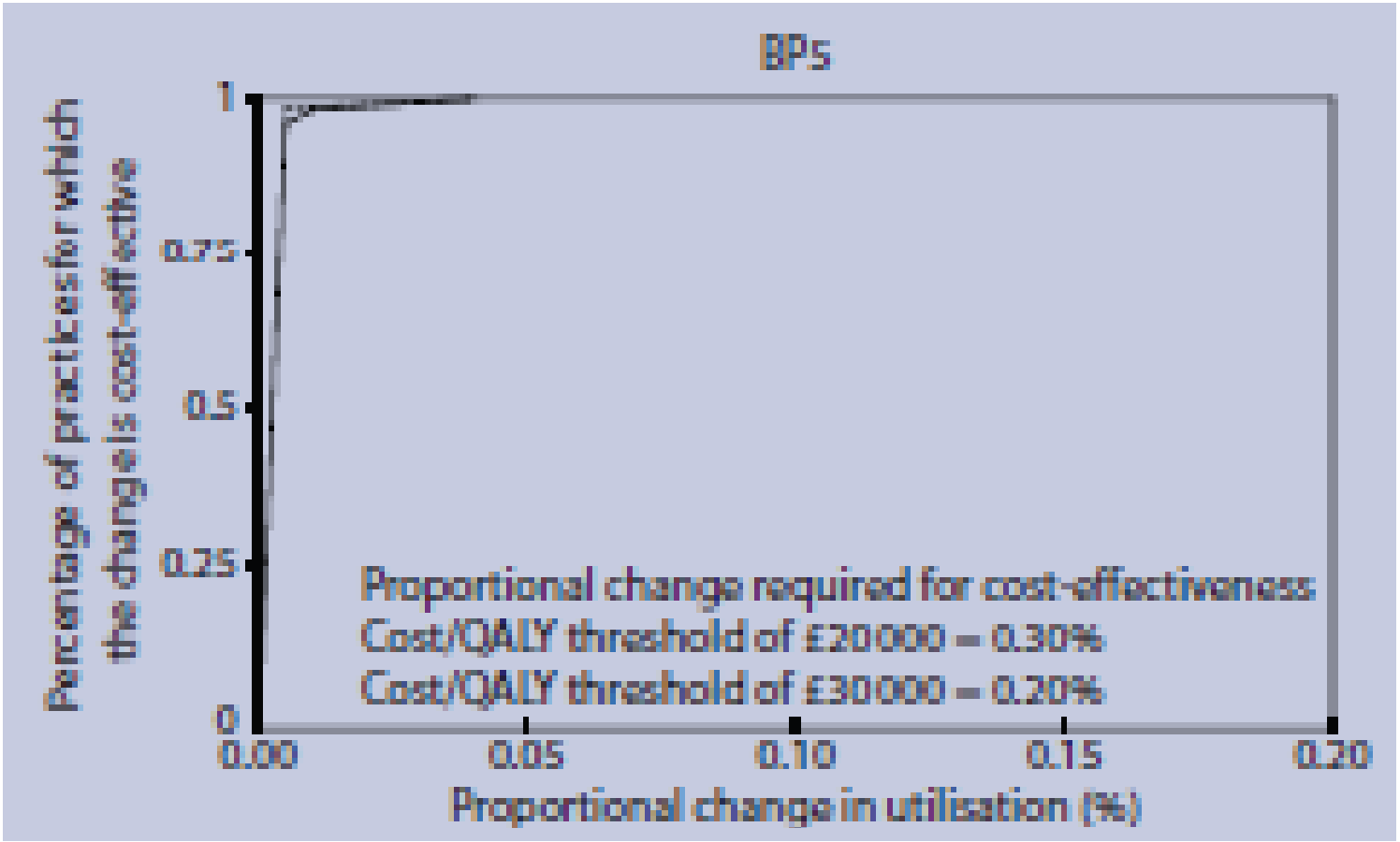
- Walker et al, BJGP 2010
  - Examined 9 QOF indicators
  - Required increase in activity for QOF to be cost effective generally very small

Indicator	Description	Maximum points available for indicator	Mean annual payment received per treated patient, £	Mean utilisation level for indicator in 2004/2005, %	Evidence rating[a] and source	Incremental cost per QALY gained, £
BP5	The percentage of patients with hypertension in whom the last blood pressure (measured in last 9 months) is 150/90 mmHg or less	56	8.35	71.3	Indicative[16]	989
CHD9	The percentage of patients with CHD with a record in the last 15 months that aspirin, an alternative antiplatelet therapy, or an anticoagulant is being taken (unless a contraindication or side-effects are recorded)	7	2.64	90.0	Robust[18]	Dominant (less costly and more effective than comparator)[b]
CHD10	The percentage of patients with CHD who are currently treated with a beta-blocker (unless a contraindication or side-effects are recorded)	7	4.77	63.2	Indicative[17]	58
CHD11	The percentage of patients with a history of myocardial infarction (diagnosed after 1 April 2003) who are currently treated with an ACE inhibitor	7	40.61	85.6	Robust[18]	5623
CS1	The percentage of patients aged 25–64 years (in Scotland 25–60 years) whose notes record that a cervical smear has been performed in the last 3 to 5 years	11	0.63	80.2	Indicative[19]	458
DM15	The percentage of patients with diabetes with proteinuria or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists)	3	17.86	82.1	Indicative[20]	Dominant[b]
DM21	The percentage of patients with diabetes who have a record of retinal screening in the previous 15 months	5	1.97	83.2	Robust[21]	15 654
LVD3	The percentage of patients with a current diagnosis of heart failure due to LVD who are currently treated with an ACE inhibitor or or A2 antagonist, who can tolerate therapy and for whom there is no contraindication	10	36.25	82.1	Indicative[22]	109
Stroke12	The percentage of patients with a stroke shown to be non-haemorrhagic, or a history of TIA, who have a record that an antiplatelet agent (aspirin, clopidogrel, dipyridamole or a combination), or an anticoagulant is being taken (unless a contraindication or side-effects are recorded)	4	6.00	89.3	Robust[18]	2012

Walker et al, BJGP, 2010

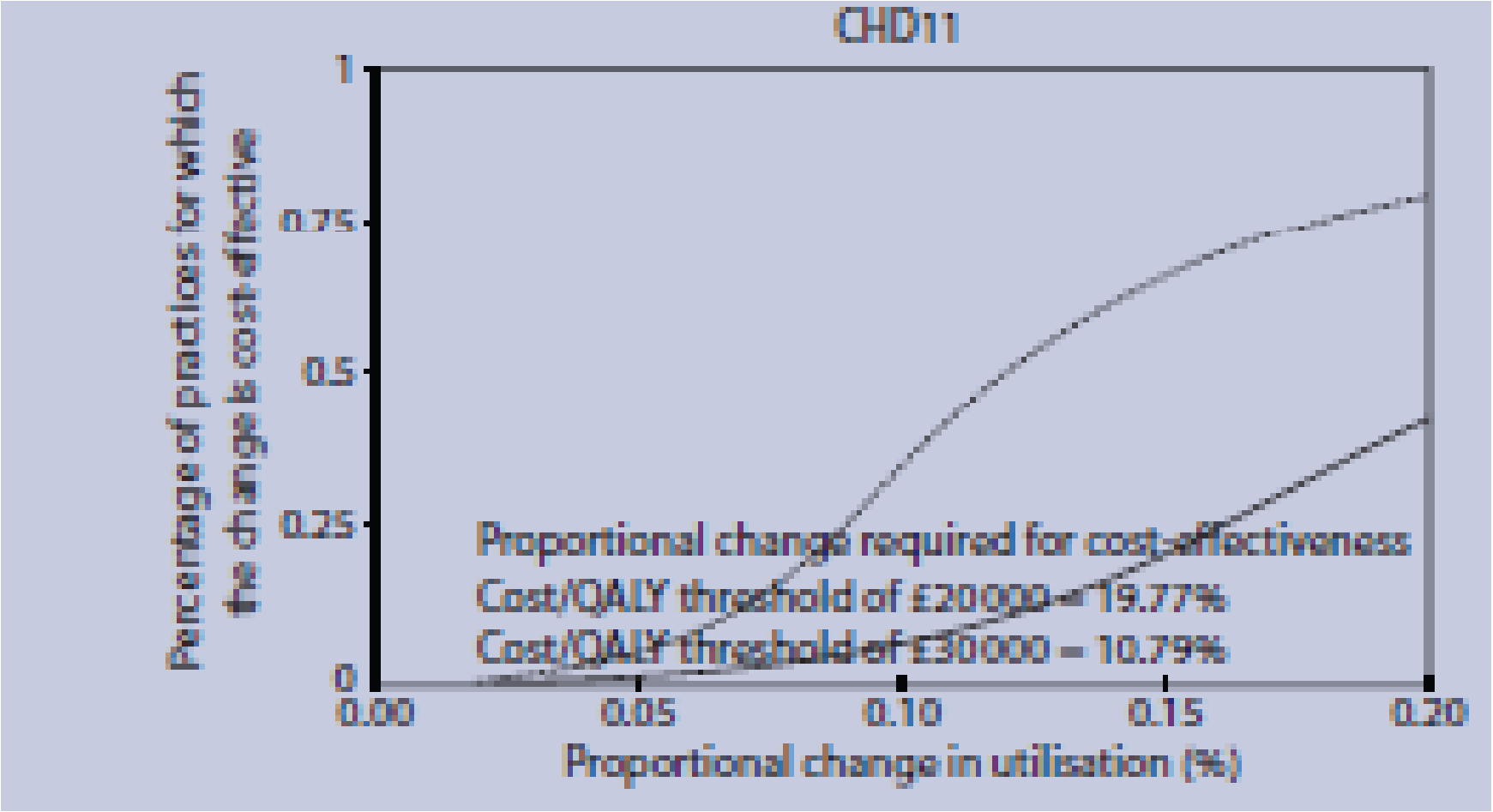
Proportionate change in achievement required for cost-effectiveness

BP5: percentage of patients in whom last recorded blood pressure is 150/90 or less



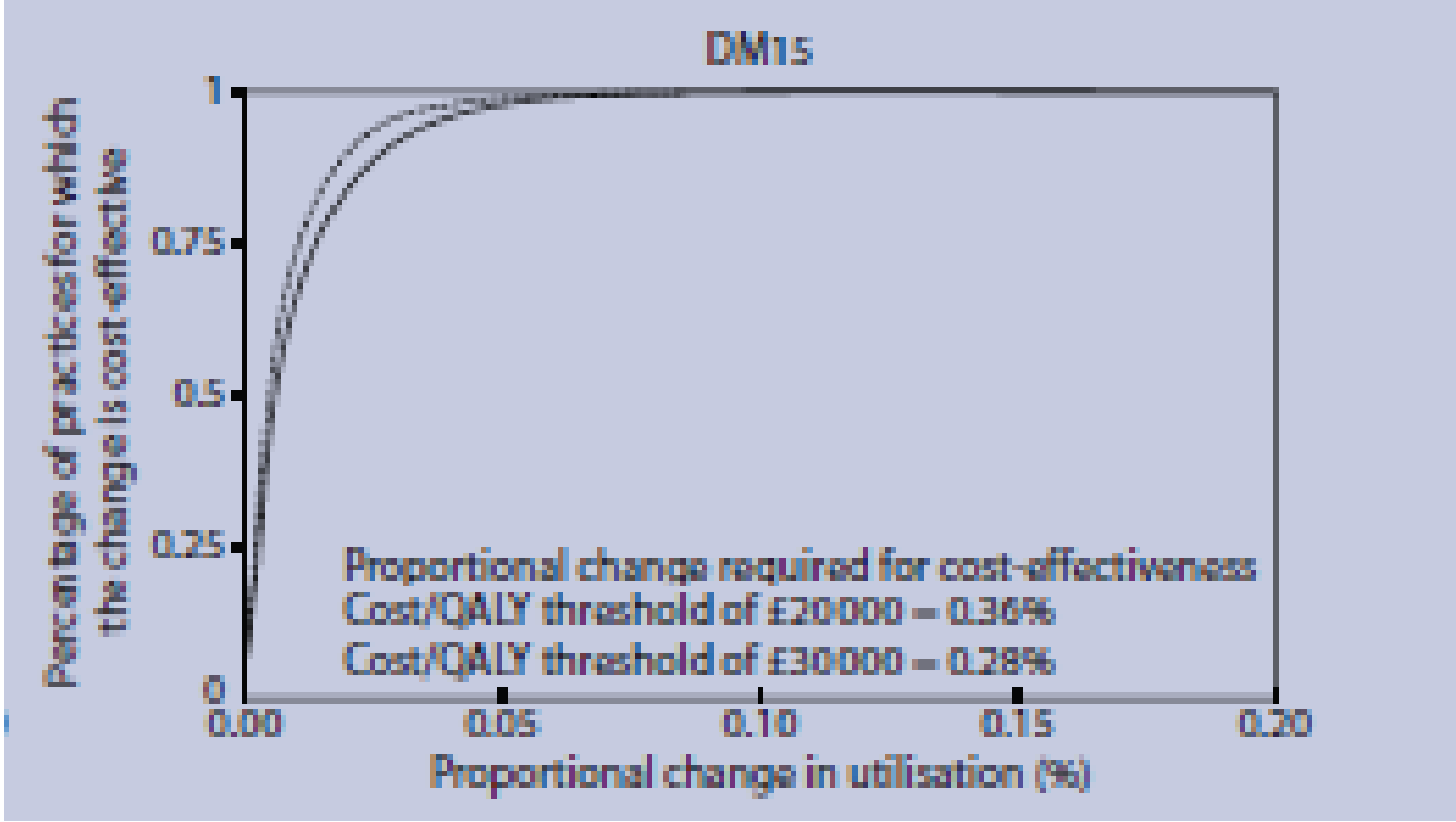
Proportionate change in achievement required for cost-effectiveness

CHD11: percentage of patients with CHD with a history of myocardial infarction who are currently treated with an ACE inhibitor



Proportionate change in achievement required for cost-effectiveness

DM15: percentage of patients with diabetes with proteinurial or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists)



QOF questions

- Effect of QOF on
  - GPs
    - Higher income, reduced hours
  - performance on incentivised activities:
    - small above trend increase
  - performance on unincentivised activities:
    - no evidence for effort diversion
  - patient health
    - small improvement?
  - NHS costs
    - Increased primary care costs
    - Reduced hospital cost
  - Cost effectiveness
    - Partial evidence of cost-effectivenss of QOF for some indicators
- Lessons for pay for performance contract design

Problematic features of QOF design

- Rewards and patient benefits
- Multiple payments for one activity
- Variation in incentives across practices
- Exception reporting
- Case finding and prevalence adjustment

Multiple rewards for same activity

- Multiple payment for activity undertaken in respect of same patient if
  - if undertaken in January-March (activities count if untaken in15 months prior to 31 March)
    - Activity needs to be achieved once every two years
  - If the outcome is controlled when initially measured (reward not contingent on treating the previously untreated)
  - If the patient has more than one QOF health condition (over 20% are multimorbid)

Alignment of rewards and patient benefit

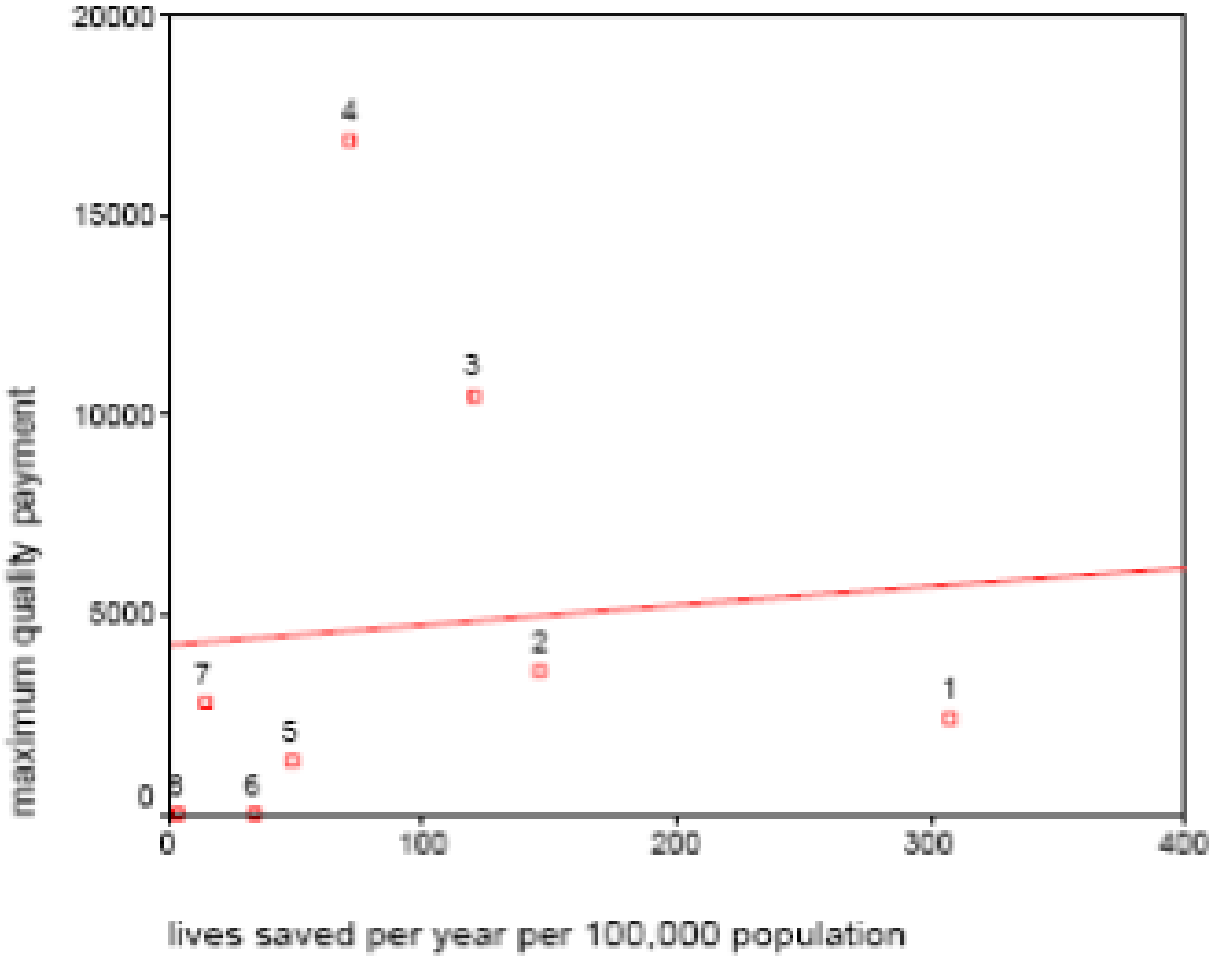


Figure 1: Scatterplot of potential quality payments against potential lives saved for the eight McColl interventions

Source: Fleetcroft and Cookson, JHSRP 2006

But: Gravelle & Siciliani (2012) - payment should be linked to costs and benefits unless these are uncorrelated across patients

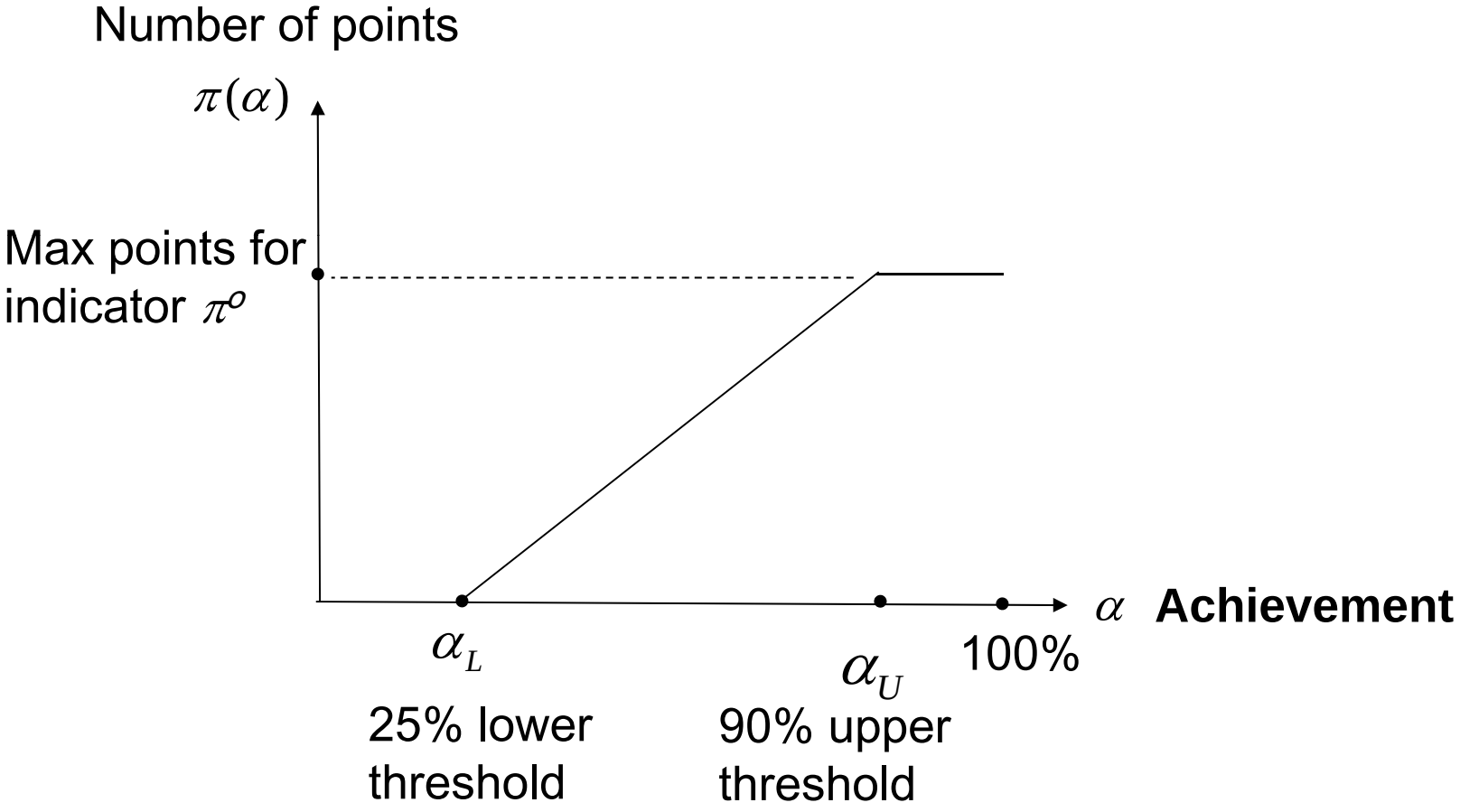
QOF incentives: (i)

Practice revenue from clinical indicators depends on

- points achieved
  - varies with proportion of eligible patients for whom indicator achieved
- price per point
  - varies with practice characteristics:
    - reported disease prevalence
    - practice list size

QOF incentives: clinical indicators

Points vary with **achievement** (α): proportion of relevant patients getting intervention



QOF incentives (iii): points

Reported achievement – determines points

$$\alpha = \frac{N}{D} = \frac{N}{P - E}$$

N: number achieved (eg patients with CHD treated with beta blocker)

D: number patients declared suitable for intervention

$D = P - E$

P: reported prevalence (disease register eg number with CHD)

E: exceptions

Grounds for exceptions

- indicator inappropriate eg terminal illness, extreme frailty
- patient has recently received a diagnosis or has recently registered with the practice.
- patient already on maximal tolerated dose of a medication
- adverse reaction or contraindication.
- required investigative service is unavailable

- patient has received at least three invitations for a review during the preceding 12 months but has not attended.
- patient does not agree to investigation or treatment.

QOF incentives (iii): points

Reported achievement – determines points

$$\alpha = \frac{N}{D} = \frac{N}{P - E}$$

N: number achieved (eg patients with CHD treated with beta blocker)

D: number patients declared suitable for intervention

P: reported prevalence (disease register eg number with CHD)

E: exceptions

Incentives for

treatment *N*

gaming of reported prevalence *P*

gaming of exception reporting *E*

Ratio indicators with exceptions and thresholds

- Exception reporting intended to reduce the risk that providers would inappropriately treat some patients
- Setting upper thresholds below 100% was justified on the same grounds

- The rationale is peculiar for those indicators where there is no risk to patients, for example the recording of blood pressure

- Marginal reward for achievement is zero above upper threshold
  - achievement above upper threshold in 91% cases in 2005/6
  - could have reduced number patients treated by 12.4% without reducing income
  - Altruism? Risk aversion? Rounding and small numbers?

- Ratio indicators imply marginal reward for exception reporting if below upper threshold - gaming incentive

QOF incentives (iv): indicator revenue

Revenue from indicator $R = \pi(\alpha) v [M / \bar{M}] F$

$$R = \pi(\alpha) \left[PM \right]^{\frac{1}{2}} v \Big/ \left[\bar{M} \ \text{Avg} \sqrt{\text{Prev}} \right]$$

Adjusted disease prevalence factor $F = \sqrt{P / M} \Big/ \left[\text{Avg} \sqrt{\text{prev}} \right]$

Indicator points $\pi(\alpha)$

Achievement $\alpha = N / D = N / (P - E)$

v national average price per point

M list size $\bar{M}$ Avg list size

Effects of practice list size

Revenue from indicator

$$R = \pi(\alpha)\left[PM\right]^{\frac{1}{2}} v \Big/ \left[\bar{M}\ \text{Avg}\ \sqrt{\text{Prev}}\right]$$

Larger practices get higher revenue:

$$\left.\frac{\partial R}{\partial M}\right|_{N,P,E} = \frac{1}{2}\frac{R}{M} > 0$$

Larger practices have higher marginal revenue from treating patients

$$\left.\frac{\partial}{\partial M}\left(\frac{\partial R}{\partial N}\right)\right|_{N,P,E} = \frac{1}{2}\frac{1}{M}\frac{\partial R}{\partial N} > 0$$

Incentives for case finding/reporting?

$$R = \pi(\alpha)\left[PM\right]^{\frac{1}{2}} v \Big/ \left[\bar{M}\ \text{Avg}\ \sqrt{\text{Prev}}\right]$$

$$\alpha = \frac{N}{P - E}$$

- Higher reported prevalence
  - Increases price per point and marginal rewards for achievement
  - Reduces reported achievement and hence points if below upper threshold
  - Increases revenue if above upper threshold
  - Reduces revenue if below upper threshold

Testing for gaming

- Compared to practices with $\alpha < \alpha_u$, practices with $\alpha > \alpha_u$ will have
  - lower exception reporting rates
  - higher reported prevalence

Test for gaming of 2005/6 exceptions

Model	Effects allowed for	Coeff on $U^{04/05}$	t (or z)	n
Linear	Clustering	-0.129	-7.35	56980
	FE Practice	-0.108	-8.78	56980
	FE Practice-Disease	-0.139	-12.02	56899
NegBin	Clustering	-0.165	-11.75	56980
	FE Practice	-0.080	-11.56	56980
	FE Practice-disease	-0.115	-17.11	53500

$\mathbf{U^{04/05}}$ = 1 if practice above upper threshold for indicator in 2004/5

Gravelle, Sutton & Ma, EJ 2010

Tests of exception gaming: distance from upper threshold

		Effect of being above upper threshold $\alpha^{2004/5} \geq \alpha_U$			
		versus being near below ($0.8\alpha_U \leq \alpha^{2004/5} < \alpha_U$)		versus being further below ($\alpha^{2004/5} < 0.8\alpha_U$)	
		Coef	t (or z)	Coef	t (or z)
WLS	Clustered SEs	-0.075	-4.58	-0.230	-7.18
	Practice FE	-0.064	-4.98	-0.180	-9.92
	Practice-disease FE	-0.099	-7.64	-0.227	-12.61
NegBin	Clustered SEs	-0.103	-7.72	-0.254	-12.38
	Practice FE	-0.049	-6.25	-0.138	-14.85
	Practice-disease FE	-0.082	-11.10	-0.207	-21.23

$\mathbf{U^{04/05}}$ = 1 if practice above upper threshold for indicator in 2004/5

Gravelle, Sutton & Ma, EJ 2010

Magnitude of gaming effect

- 25% of 56,980 practice-indicator cases were below upper threshold in 2004/5
- estimated effect (NegBin pooled model) of exception gaming was to increase reported exception rate from 7.25% to 8.55%

Test for gaming of reported prevalence

- Gaming incentives: revenue increases if
  - reduce prevalence if below upper threshold
  - increase prevalence if above upper threshold

QOF incentives and prevalence reporting:

Effects allowed for	Coef on $U^{04/05}$	t	n
Clustering	0.026	2.41	10044
FE practice	0.000	-0.02	10044

$U^{04/05}$ maximum points weighted proportion of indicators in disease domain for which practice is above the upper threshold

11 diseases. Dependent variable practice 2005/06 reported prevalence relative to national mean for disease

Prevalence adjustment and exception reporting

- Square root adjustment replaced with simple relative prevalence from 2009/10

$$R = \pi(\alpha))v\left[\frac{P}{M} \div \left(\frac{\bar{P}}{\bar{M}}\right)\right]\frac{M}{\bar{M}} = \pi(\alpha))v\left(\frac{P}{\bar{P}}\right)$$

- Next step: remove exception reporting: α = N/P?
  - redundant because of upper thresholds
  - too easy to game
- So if practice below upper threshold:

$$R = v\frac{N}{P}\left[\frac{P}{M} \div Av\left(\frac{\bar{P}}{\bar{M}}\right)\right]\frac{M}{\bar{M}} \quad = vN\left[\frac{1}{\bar{P}}\right]$$

make payment proportional to patients treated - FFS

Do practices respond to small changes in QOF incentives?

Changes in flu vaccination indicators

Condition	*Attribute*	*2005/6*	*2006/7 onwards*
CHD	Lower threshold	25%	**40%**
	Upper threshold	85%	**90%**
COPD	Lower threshold	25%	**40%**
	Upper threshold	85%	85%
Diabetes	Lower threshold	25%	**40%**
	Upper threshold	85%	85%
Stroke	Lower threshold	25%	**40%**
	Upper threshold	85%	85%

Dependent variable	%Reported Achievement	%Population Achievement	%Exception Reporting
	Coef % (95% CI)	Coefficient % (95% CI)	Coefficient % (95% CI)
Model 1 DID			
Effect of change in CHD upper threshold on CHD outcome	0.69 (0.55, 0.82)	0.41 (0.25, 0.56)	0.26 (0.12, 0.40)
Model 2 DID			
Effect of CHD upper threshold change on CHD outcome for practices with 2005/06 CHD RA $\geq$ 90%	0.49 (0.35, 0.63)	0.37 (0.21, 0.53)	0.13 (-0.02, 0.28)
2005/06 CHD RA in [85, 90]% range	0.98 (0.80, 1.16)	0.60 (0.40, 0.80)	0.29 (0.10, 0.47)
2005/06 CHD RA below 85%	1.47 (1.27, 1.68)	0.85 (0.62, 1.08)	0.50 (0.29, 0.72)

RA = 100*N/D PA = 100*N/(D+E) ER = 100*E/(D+E)

Kantopelis et al, *Health Services Research* (2011)

Lessons for design of PfP

- Measure activity to be incentivised before introducing incentives
  - Don’t pay for activity already achieved before P4P
- Trial major P4P schemes
- Cap total payments
- Use indicators with evidence base
- Use wide set of indicators
- Relative rewards should reflect health gain
- Include patient satisfaction measures
- No need for exceptions and upper thresholds to prevent over treatment
- Keep it simple: make payment proportional to numbers of treated

QOF effects

- Effect of QOF on
  - GPs
    - Higher income, reduced hours
  - performance on incentivised activities:
    - small above trend increase?
  - performance on unincentivised activities:
    - no evidence for effort diversion
  - patient health
    - small improvement?
  - NHS costs
    - Increased primary care costs
    - Reduced hospital cost
  - Cost effectiveness
    - Partial evidence of cost-effectivenss of QOF for some indicators

Latest version of the QOF

http://www.nhsemployers.org/PayAndContracts/GeneralMedicalServicesContract/QOF/Pages/QualityOutcomesFramework.aspx

Audit Body reports

National Audit Office (2008) *NHS Pay Modernisation: New contracts for general practice services in England*.

Audit Scotland (2008) *Review of the New General Medical Services Contract*.

Some Research studies

Cupples ME, Byrne MC, Smith SM, Leathem CS, Murphy AW. Secondary prevention of cardiovascular disease in different primary healthcare systems with and without pay-for-performance. *Heart* 2008;94:1594-1600

Doran, T., et al. "Effect of financial incentives on incentivised and non-incentivised clinical activities: longitudinal analysis of data from the UK Quality and Outcomes Framework ." *BMJ* 2011;342:d3590 (Published 28 June 2011)

Doran, T. & Roland, M. Lessons from major initiatives to improve primary care in the United Kingdon. *Health Affairs*. 2010, 1023-1026

Doran, T. et al. Effect of financial incentives on inequalities in the delivery of primary clinical care in England. *Lancet*, 2008; 372: 728-736

Dushieko, M., Gravelle, H., Martin, S., Rice, N. and Smith, P. "Does disease management reduce hospital costs? Evidence from English primary care". *Journal of Health Economics*. 2011, 30, 919-932.

Gillam, S. et al. Pay for performance in the UK: the impact of the Quality and Outcomes Framework – a systematic review. *Annals of Internal Medicine*. In press

Gravelle H, Sutton M, Ma A. Doctor behaviour under a pay for performance contract: treating, cheating and case finding? *The Economic Journal* 2010; 120: F129–F156

Guthrie B, McLean G, Sutton M. Workload and reward in the quality and outcomes framework of the 2004 general practice contract. *British Journal of General Practice* 2006; 56: 836-41

Hippisley-Cox, J., Vinogradova, Y. and Coupland, C. (2007), "Time Series Analysis for selected clinical indicators from the Quality and Outcomes Framework 2001-2006", Leeds: Information Centre for Health & Social Care

Kantopelis, E. et al. Family doctor responses to changes in incentives for influenza immunization under the Quality and Outcomes Framework pay-for-performance scheme." *Health Services Research.* In press.

Martin, S., Smith, P., Dusheiko, M., Gravelle, H., Rice, N. *Do Quality Improvements in Primary Care Reduce Secondary Care Costs?* Health Foundation. July 2010.

Ryan, A. & Doran, T. The effect of improved processes of care on patient outcomes: evidence from the UK's Quality and Outcomes Framework. *Medical Care*, 20: 191-199

Serumaga, B. et al. Effect of pay for performance on the management and outcomes of hypertension in the UK. *BMJ* 2011;342:d108 doi:10.1136/bmj.d108

Sutton M, Elder R, Guthrie B, Watt GCM. Record rewards: the effects of targeted quality incentives on the recording of risk factors by primary care providers. *Health Economics* 2010; 19(1): 1-13.