



Effect of Financial Incentives on Incentivised and Non-Incentivised Clinical Activities: Utilising Primary Care Databases to answer clinical, policy and methodological questions

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Citation for published version (APA):

Kontopantelis, E., Doran, T., & Reeves, D. (2012). *Effect of Financial Incentives on Incentivised and Non-Incentivised Clinical Activities: Utilising Primary Care Databases to answer clinical, policy and methodological questions*. NIHR School for Primary Care Showcase, London.

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Effect of Financial Incentives on Incentivised and Non-Incentivised Clinical Activities

Utilising Primary Care Databases to answer clinical,
policy and methodological questions

Evan Kontopantelis Tim Doran David Reeves

Reilly S, Oiler I, Springate D, Valderas J, Ashcroft D, Sutton M, Ryan R, Morris
R, Planner C, Gask L, Roland M, Campbell S, Salisbury C.

Centre for Primary Care
Institute of Population Health
Faculty of Medicine
University of Manchester

NSPCR showcase, 19th October 2012

School for Primary Care Research Primary Care Database (PCD) research



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Manchester, Nottingham, Oxford, Southampton and UCL.

The views expressed are those of the author(s) and not
necessarily those of the NHS, the NIHR or the Department of Health.

Other departments

School for Primary Care Research

Increasing the
evidence base for
primary care practice

Background

Concluded
work

Non-
incentivised
care

Diabetes

Current work

- University of Birmingham - Ronan Ryan
 - Regional GP datasets and The Health Improvement Network (THIN)
 - Implementing risk models derived from PCD data in practice (prevention, early detection)
- Keele University - Kelvin Jordan
 - CPRD and local CiPCA
 - Emphasis on musculoskeletal disorders (burden, long term course, management)
- UCL - Irene Petersen (THIN Database Research Team)
 - Drugs prescribed in pregnancy, missing data methods, cardiovascular diseases in SMI patients
 - Hosts a national primary care database user group and provides training courses
 - International initiative to develop reporting guidelines for electronic health records (RECORD)

Outline

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Increasing the
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Background

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work

Non-
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care

Diabetes

Current work

- 1 Background
- 2 Concluded work
 - Non-incentivised care
 - Diabetes
- 3 Current work

Improving quality of care

a (very) juicy carrot...

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Current work

- A pay-for-performance (p4p) program kicked off in April 2004 with the introduction of a new GP contract
 - General practices are rewarded for achieving a set of quality targets for patients with chronic conditions
 - The aim was to increase overall quality of care and to reduce variation in quality between practices
- The incentive scheme for payment of GPs was named the Quality and Outcomes Framework (QOF)
- Initial investment estimated at £1.8 bn for 3 years (increasing GP income by up to 25%)
- QOF is reviewed at least every two years

Quality and Outcomes Framework

details for years 1 (2004/5) and 7 (2010/11)

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Current work

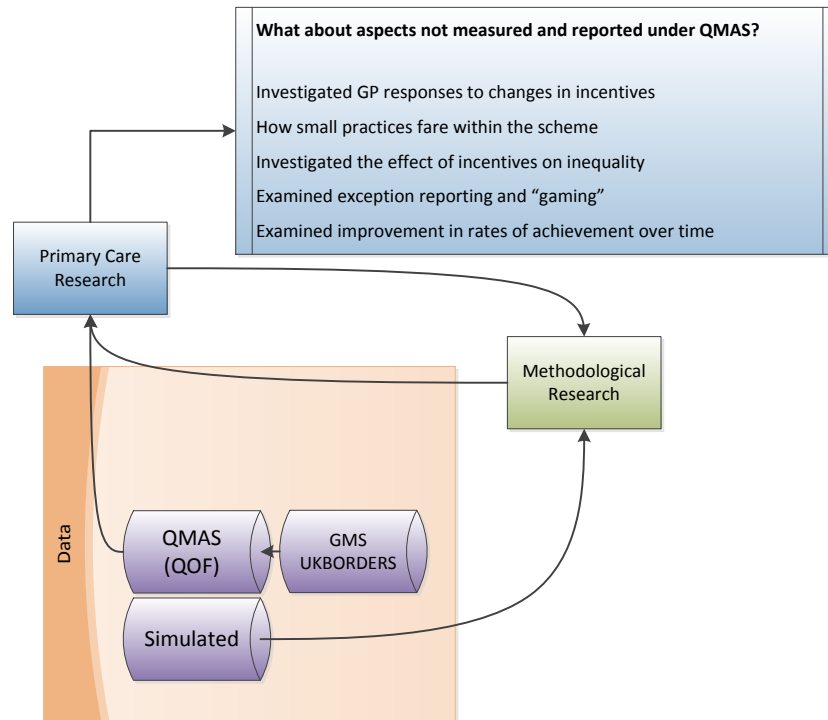
- Domains and indicators in year 1 (year 7):
 - Clinical care for 10 (19) chronic diseases, with 76 (80) indicators
 - Organisation of care, with 56 (36) indicators
 - Additional services, with 10 (8) indicators
 - Patient experience, with 4 (5) indicators
- Implemented simultaneously in all practices (a control group was out of the question)
- Practices are allowed to exclude patients from the indicators and the payment calculations
- Into the 9th year now (01Mar12/31Apr13); cost for the first 8 years was well above the estimate at £8 bn approximately

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Diabetes
Current work



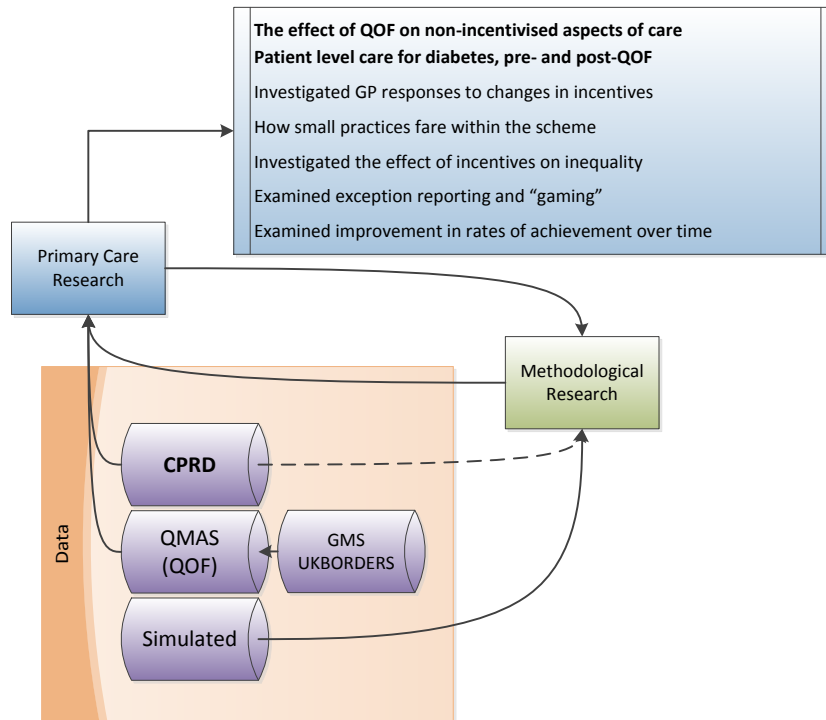
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Background

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Non-
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care
Diabetes
Current work

- Established in 1987, with only a handful of practices
- Since 1994 owned by the Secretary of State for Health
- In July 2012:
 - 644 practices (Vision system only)
 - 13,772,992 patients
- Access to the whole database is offered and costs ≈£130,000 pa
- Offers the ability to extract anything adequately recorded in primary care and construct a usable dataset



Effect of Financial Incentives on Incentivised and Non-Incentivised Clinical Activities

BMJ

BMJ 2011;342:d3590 doi: 10.1136/bmj.d3590

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RESEARCH

Effect of financial incentives on incentivised and non-incentivised clinical activities: longitudinal analysis of data from the UK Quality and Outcomes Framework

Tim Doran *clinical research fellow*¹, Evangelos Kontopantelis *research associate*¹, Jose M Valderas *clinical lecturer*², Stephen Campbell *senior research fellow*¹, Martin Roland *professor of health services research*³, Chris Salisbury *professor of primary healthcare*⁴, David Reeves *senior research fellow*¹

¹National Primary Care Research and Development Centre, University of Manchester, Manchester M13 9PL, UK; ²NIHR School for Primary Care Research, Department of Primary Health Care, University of Oxford, Oxford OX3 7LF; ³General Practice and Primary Care Research Unit, University of Cambridge, Cambridge CB2 0SR; ⁴Academic Unit of Primary Health Care, University of Bristol, Bristol BS8 2AA

Incentivised aspects keep improving

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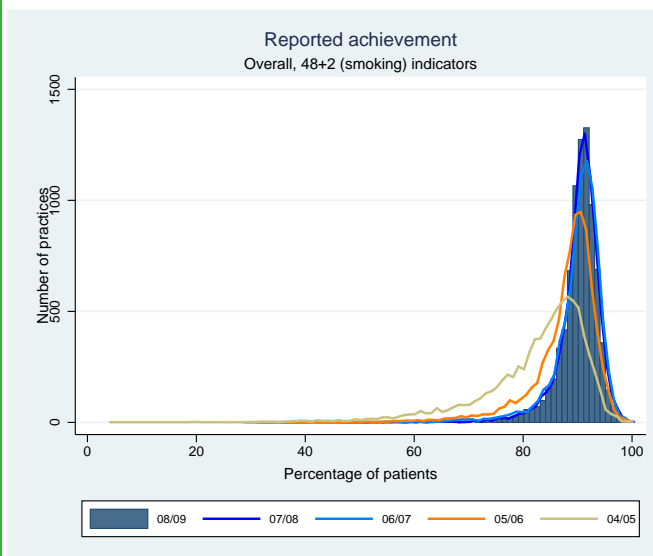
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care

Diabetes

Current work



- Quality scores for all QOF clinical indicators have been improving
- Only a small proportion of all clinical care
- Concerns that quality for non-incentivised aspects may have been neglected
- How measure performance on non-incentivised care?

Clinical indicators

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work

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care

Diabetes

Current work

- Two aspects to clinical indicators:
 - a disease condition (e.g. diabetes, CHD)
 - a care activity (e.g. influenza vaccination, BP control)
- Three indicator classes, in terms of incentivisation:
 - (FI) **Condition** & **process** incentivised in QOF (28 ind)
 - (PI) **Condition** or **process** incentivised (13 ind)
 - (UI) Neither **condition** nor **process** incentivised (7 ind)

Example (Indicators)

- (FI) DM11: Patients with diabetes in whom the last blood pressure (within 15m) is 145/85 or less
- (PI) B4: Patients with peripheral arterial disease who have a record of total cholesterol in the last 15m
- (UI) C4: Patients with back pain treated with strong analgesics (co-dydramol upwards) in the last 15m

Research questions

the obvious ones at least!

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Current work

- We aimed to compare the three classes on changes in quality from pre-QOF (2000/1 - 2002/3) to post-QOF (2004/5 - 2006/7)
- Would FI indicators show most improvement?
- Would PI show some 'halo' effects since they involve either a QOF condition or activity?
- Has quality for UI indicators declined?

Issues to tackle

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Current work

- Indicator classes are imbalanced
- Three different types of activities (x3 classes = 9 groups):
 - clinical processes related to measurement (PM/R)
FI:17 PI:9 UI:0
e.g. blood pressure measurement
 - clinical processes related to treatment (PT)
FI:6 PI:4 UI:7
e.g. influenza immunisation
 - intermediate outcome measures (I)
FI:5 PI:0 UI:0
e.g. control of HbA1c to 7.4 or below
- Quality of care was already improving (prior to QOF)
- The ceiling has been reached for certain 'easy' indicators

The approach

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Current work

- The main analysis used logit-transformed scores, due to the ceiling effect
- Untransformed scores were used in a sensitivity analysis
- The six available indicator groups (of a possible nine) were compared, on performance above expectation
- FE model selected; controlling for RTTM, denominator, patient age and gender
- All analyses performed in Stata
- Interrupted Time Series methods employed

The approach

Interrupted Time Series

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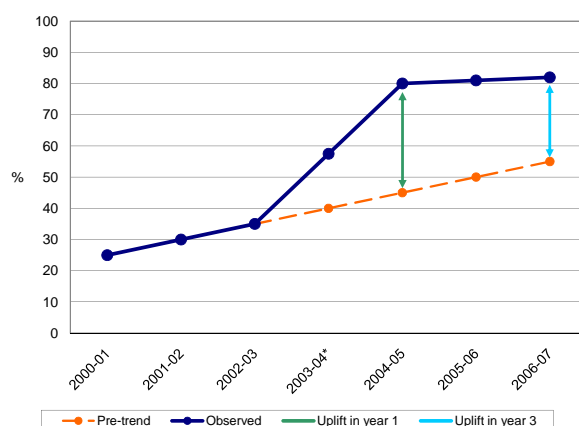
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Diabetes

Current work

- With ITS multi-level multiple regression analyses, compared the six indicator groups on two outcomes:



- The difference between observed and expected achievement, in 2004/5
- The difference between observed and expected achievement, in 2006/7

Trends by indicator group

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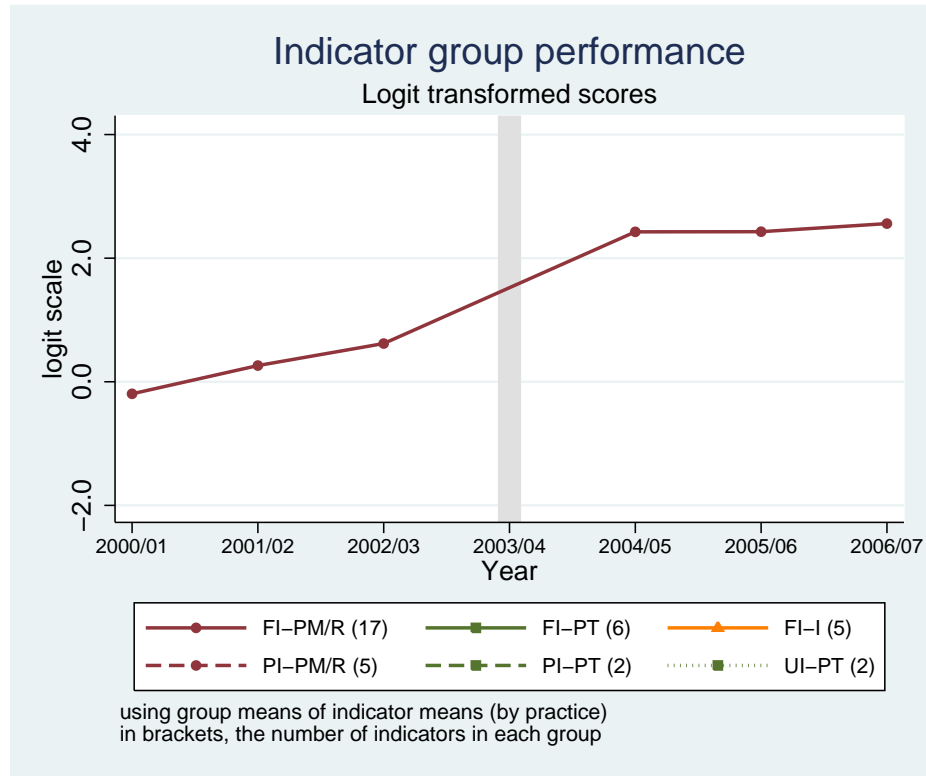
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Current work



Trends by indicator group

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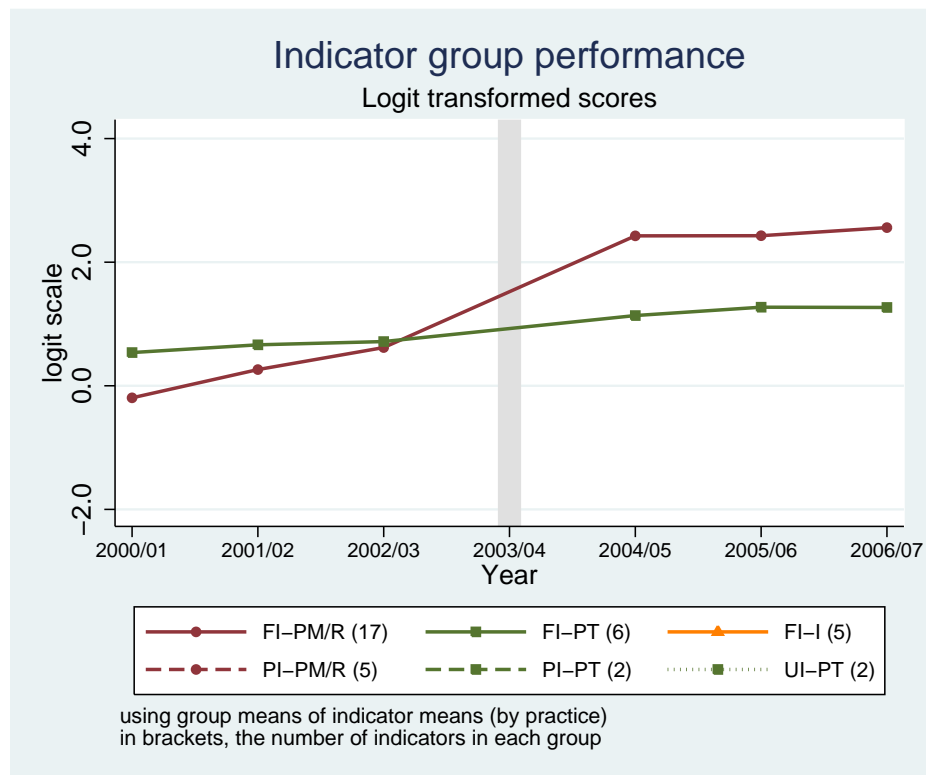
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Diabetes

Current work



Trends by indicator group

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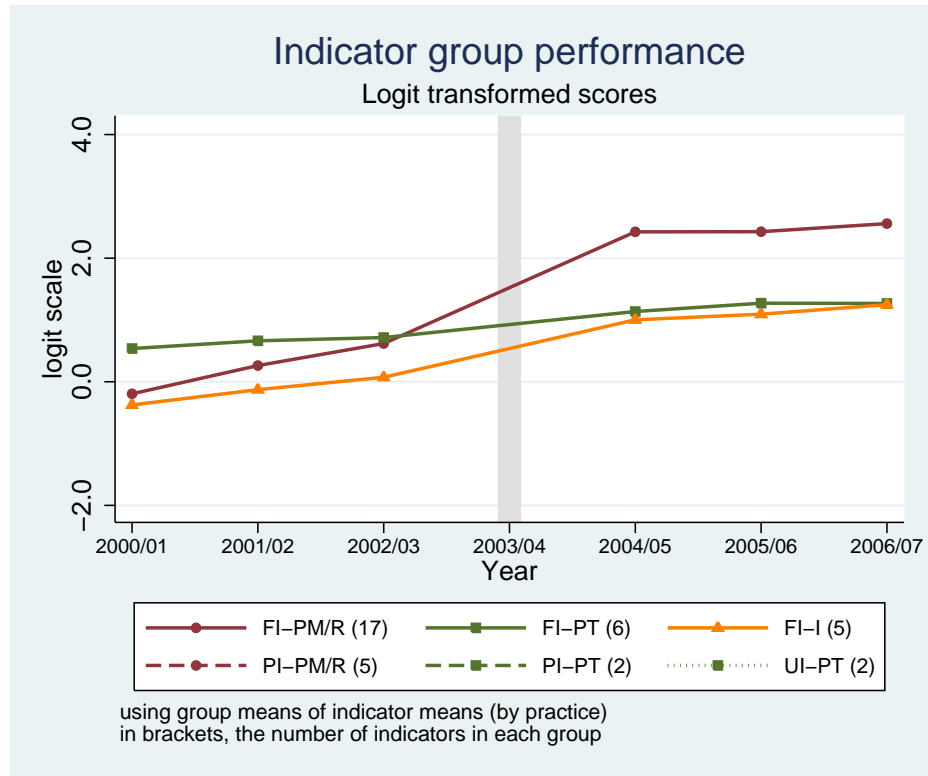
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Current work



Trends by indicator group

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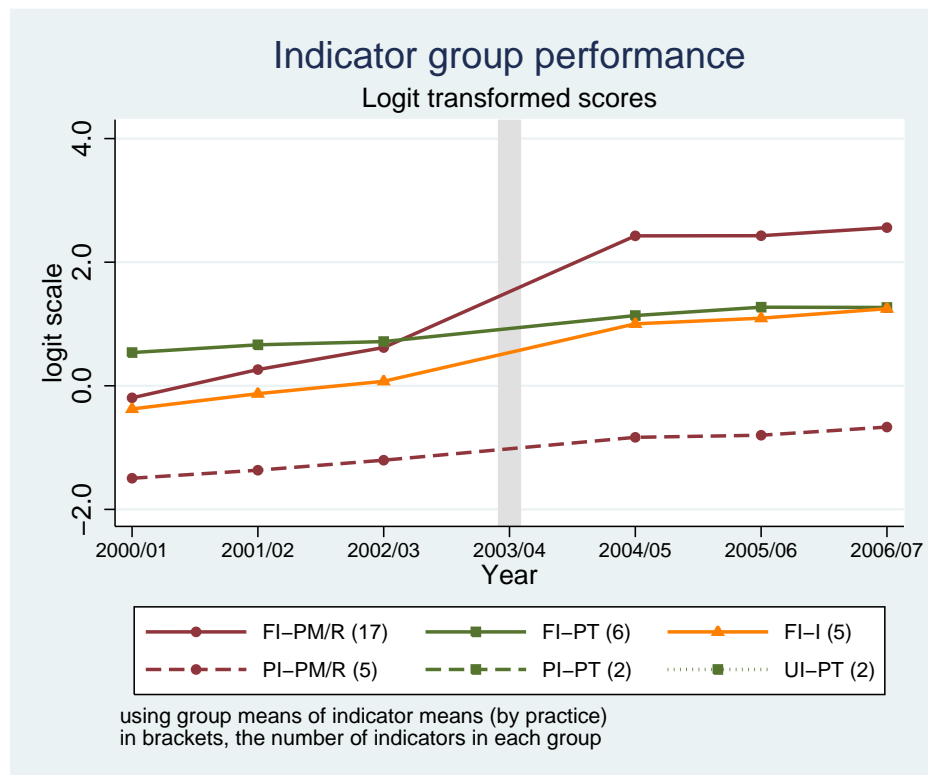
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Current work



Trends by indicator group

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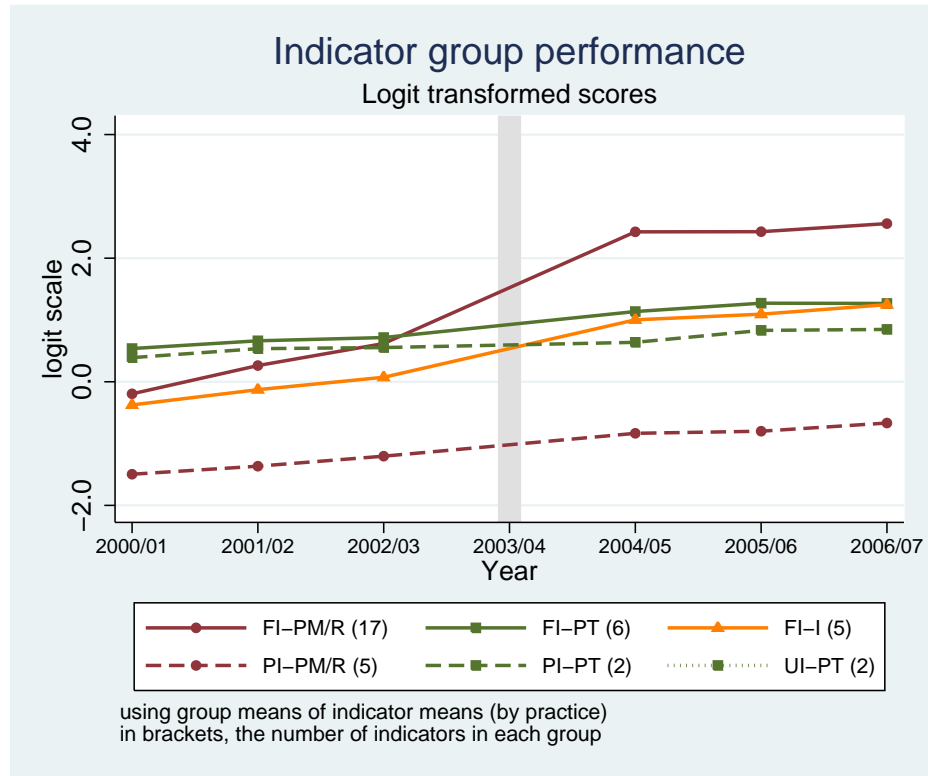
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Current work



Trends by indicator group

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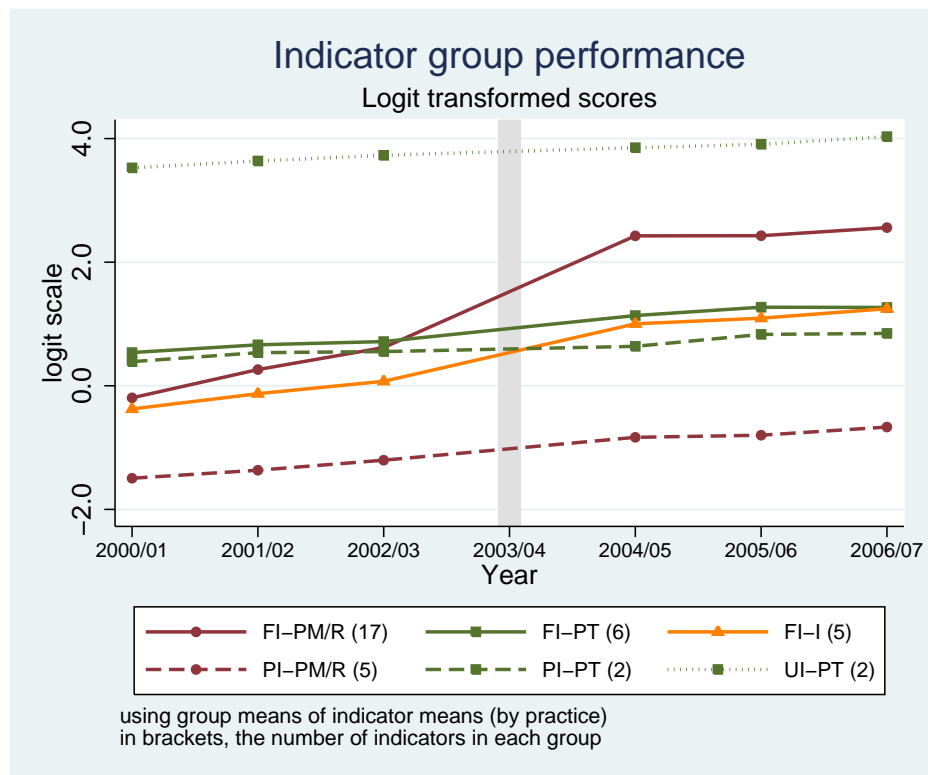
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Diabetes

Current work



Difference in 2004/5 of observed performance compared to expectation

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Background

Concluded
work

Non-
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Diabetes

Current work

- All three fully incentivised indicator groups significantly increased in level above expectation post-QOF
- Partially incentivised treatment indicators significantly decreased in level below expectation post-QOF

Uplift in 2004/5	Group	Fully incentivised measurement	Fully incentivised outcome	Fully incentivised treatment	Partially incentivised measurement	Unincentivised treatment	Partially incentivised treatment
	Mean *		14.5%	8.2%	4.2%	0.8%	-0.7%
95% confidence interval		(14.0, 15.0)	(7.3, 9.2)	(3.2, 5.3)	(-0.2, 1.8)	(-1.8, 0.5)	(-3.0, -0.2)
P value		<0.001	<0.001	<0.001	0.128	0.257	0.03
Difference between means**		[-----]					

* Group means based on logit-transformed data, back-transformed to percentage scores.

** Neuman-Keuls tests. Means connected by a dashed line were not significantly different (p > 0.05).

Difference in 2006/7 of observed performance compared to expectation

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Background

Concluded
work

Non-
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care

Diabetes

Current work

- All three fully incentivised indicator groups significantly increased in level above expectation post-QOF
- All partially incentivised and non-incentivised indicator groups significantly decreased in level below expectation post-QOF

Uplift in 2006/7	Group	Fully incentivised outcome	Fully incentivised measurement	Fully incentivised treatment	Unincentivised treatment	Partially incentivised treatment	Partially incentivised measurement
	Mean *		3.9%	3.9%	2.4%	-1.2%	-2.8%
95% confidence interval		(2.9, 4.8)	(3.1, 4.6)	(1.4, 3.3)	(-2.3, -0.2)	(-4.2, -1.5)	(-6.2, -3.9)
P value		<0.001	<0.001	<0.001	0.024	<0.001	<0.001
Difference between means**		[-----]					

* Group means based on logit-transformed data, back-transformed to percentage scores.

** Neuman-Keuls tests. Means connected by a dashed line were not significantly different (p > 0.05).

- Short term, on average:
 - The 3 groups of fully incentivised indicators exhibited performance above expectation
 - Partially incentivised treatment indicators demonstrated significantly lower than expected gains
- Long term, on average:
 - Fully incentivised groups continued to have positive uplifts
 - The three partially incentivised and non-incentivised groups displayed significantly negative uplifts
- QOF did not generate positive spill-overs to other activities & appears to have had a negative impact on non-incentivised ones

Quality of primary care for patients with diabetes in England pre- and post-QOF

Downloaded from qualitysafety.bmj.com on August 23, 2012 - Published by group.bmj.com
BMJ Quality & Safety Online First, published on 22 August 2012 as 10.1136/bmjqs-2012-001033

Original research

Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive scheme: a longitudinal observational study

Evangelos Kontopantelis,¹ David Reeves,¹ Jose M Valderas,^{2,3} Stephen Campbell,¹ Tim Doran¹

► An additional data is published online only. To view this file please visit the journal online (<http://bmjqs.bmj.com>)

¹Health Sciences Primary Care Research Group, University of Manchester, Manchester, UK

²Health Services and Policy Research Group, NIHR School for Primary Care Research, Department of Primary Health Care, University of Oxford, Oxford, UK

³European Observatory of Health Systems and Policies, London School of Economics, London, UK

ABSTRACT

Background: The UK's Quality and Outcomes Framework (QOF) was introduced in 2004/5, linking remuneration for general practices to recorded quality of care for chronic conditions, including diabetes mellitus. We assessed the effect of the incentives on recorded quality of care for diabetes patients and its variation by patient and practice characteristics.

Methods: Using the General Practice Research Database we selected a stratified sample of 148 English general practices in England, contributing data from 2000/1 to 2006/7, and obtained a random sample of 653 500 patients in which 23 920 diabetes patients identified. We quantified annually recorded quality of care at the patient-level, as measured by the 17 QOF diabetes indicators, in a composite score and analysed it longitudinally using an Interrupted Time Series

INTRODUCTION

In the last 15 years the National Health Service in the UK has undergone a series of reforms aimed at improving the quality of care for people with chronic conditions. These include the creation of the National Institute for Health and Clinical Excellence, and the introduction of National Service Frameworks which set minimum standards for the delivery of health services in specified clinical areas, including diabetes mellitus.¹ The quality of primary care generally, and of diabetes care in particular, improved in the early 2000s,² partly in response to these quality improvement initiatives.³ In 2004 new contractual arrangements for family doctors

Practice level care for Diabetes keeps improving but...

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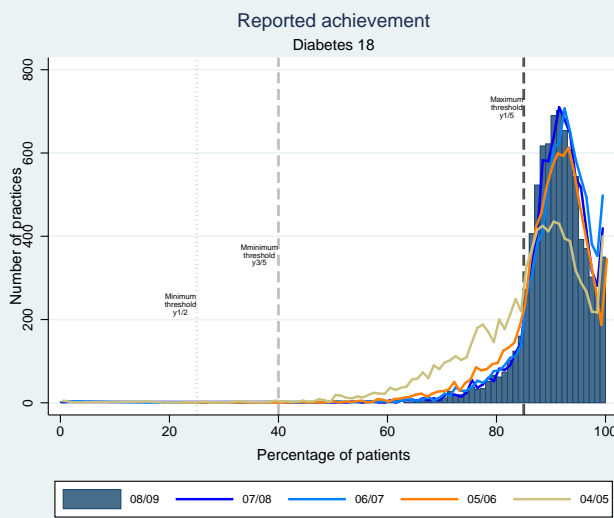
Background

Concluded work

Non-incentivised care

Diabetes

Current work



- Quality of care for diabetes known to improve post-QOF
- Did QOF really have an effect, if we account for pre-QOF trends?
- Does quality of care vary across patient subgroups?
- Did the scheme potentially benefit all subgroups uniformly?

The approach

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Background

Concluded work

Non-incentivised care

Diabetes

Current work

- 23,920 type I & II diabetes patients identified in 148 practices and a sample of 653,500 from CPRD
- Data extracted in yearly 'bins', corresponding to QOF years, from 2000/1 to 2006/7
- Three time points before and 3 after the intervention
- For each time point, annually recorded quality of care at the patient level was quantified as an aggregate of the applicable diabetes indicators (of the 17 possible)
- ITS analysis used again, the best possible quasi-experimental approach, in lack of a control group
- Logistic transformation to deal with ceiling effect

Analyses

three main analyses

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Background

Concluded
work

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Diabetes

Current work

- Examined the overall impact of the QOF pay-for-performance scheme in the CPRD diabetes population
- Compared mean QOF scores in the pre- and post-QOF periods for different patient subgroups
- Examined if the intervention impact varied by patient subgroups (controlled analysis)

Overall pay-4-performance impact Analysis 1

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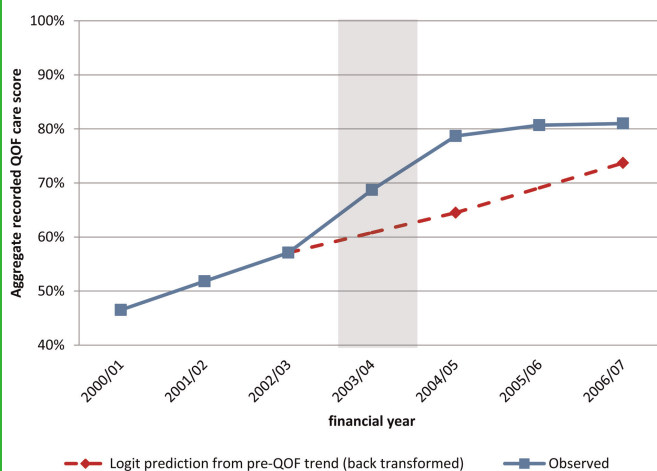
Background

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Non-
incentivised
care

Diabetes

Current work



- In 2004/5 there was improvement in composite recorded QOF care over-and-above that expected from the pre-intervention trend, of 14.2% (13.7%-14.6%)
- By the third year (2006/7), the difference was smaller, at 7.3% (6.7%-8.0%)

Differences in pre- and post-QOF level of care Analysis 2

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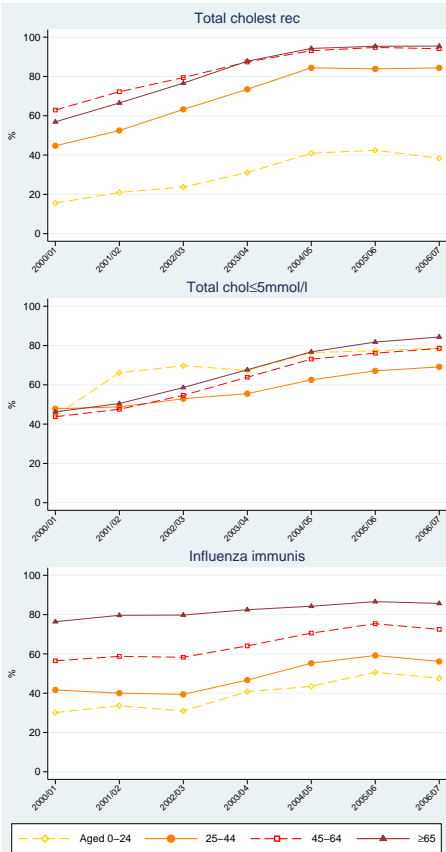
Background

Concluded
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Non-
incentivised
care

Diabetes

Current work



- Score higher for patients aged 65+ than in patients aged 17-39 by 11% pre- and 11.7% post-QOF
- QOF care marginally lower for females in both time periods, by around 2%
- Scores for patients with 3+ conditions higher on average by 6.3% pre- & 6.1% post-QOF compared to patients with no co-morbidities
- Highest for patients living with diabetes for 1-4 yr, lowest for new diagnoses (4.7% pre & 9.1% post)

Pay-4-performance impact variation Analysis 3

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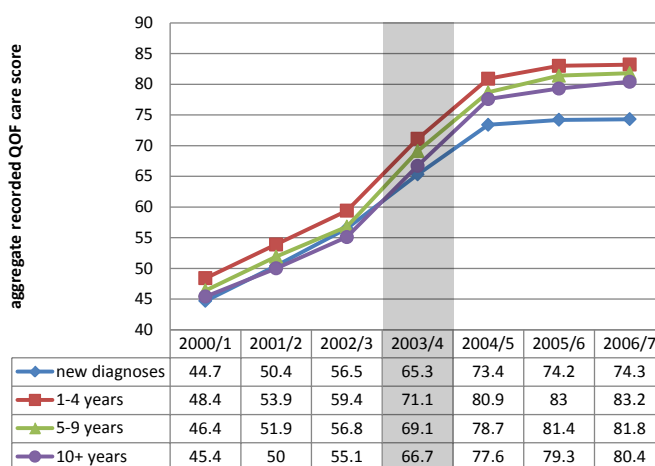
Background

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Non-
incentivised
care

Diabetes

Current work



- No significant variation by sex, age, number of co-morbid conditions
- Significant variation by number of years living with condition
- Compared to new diagnoses, all other subgroups more positively affected both in 04/5 & 06/07 ($\approx 6-7\%$)

Conclusions

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Diabetes

Current work

- Recorded quality of primary care, as measured by the QOF diabetes indicators, was already improving prior to the introduction of the scheme
- Improved at an accelerated rate in the first years of implementation but gains diminished in following years
- QOF may have led to immediate gains in quality of care than would have eventually been achieved in its absence (although it may have taken longer)
- QOF care tended to be higher for patients with more co-morbid conditions throughout the entire study period, including pre-QOF years
- Newly diagnosed patients seem to have benefitted less from the QOF

Research CPRD and/or QOF related

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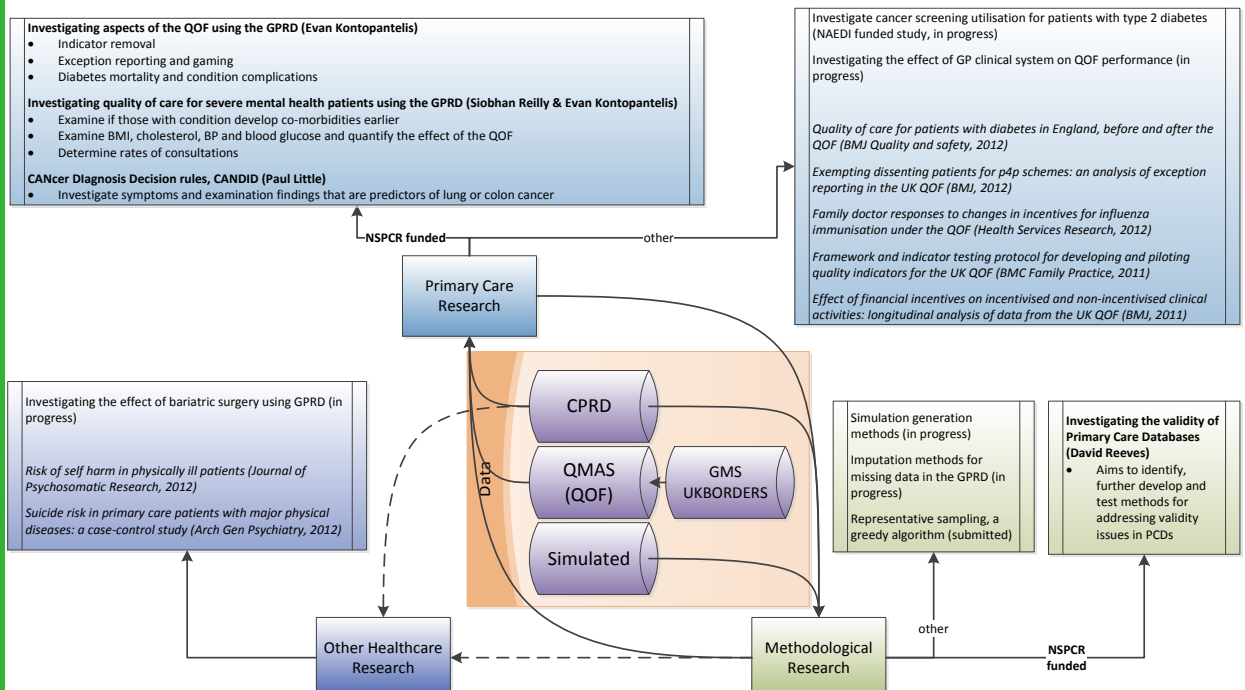
Background

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Diabetes

Current work



Validity of evaluations of effectiveness based on PCDs

Reeves, Kontopantelis, Doran, Ashcroft, Ryan, Morris

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Current work

- Recommend methods by which the internal and external validity of evaluations of effectiveness based on PCDs can be assessed and maximised



Exploring physical health and primary care management of SMI patients using the CPRD

Reilly, Kontopantelis, Doran, Reeves, Ashcroft, Gask, Planner

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Current work

- Patients with SMI (schizophrenia, schizophrenia-like psychosis, bipolar affective disorder or other psychosis) are at greater risk of developing chronic physical illnesses than the general population
- This is a result of both the primary illnesses and their treatment
- This higher incidence of chronic disease is compounded by generally poorer health outcomes in patients with SMI
- This despite frequent contact with health care professionals

Exploring physical health and primary care management of SMI patients using the CPRD

Reilly, Kontopantelis, Doran, Reeves, Ashcroft, Gask, Planner

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Current work

- By examining 2000-2011 CPRD data aims to:
 - Determine frequency of primary care usage and of primary preventative activities for patients with SMI compared to patients without
 - Compare the number and pattern of comorbidities in patients with SMI compared with those without SMI
 - Examine whether patients with SMI develop comorbidities at a younger age than those without SMI
 - Assess quality of care for all mental health related activities incentivised under the QOF scheme, and whether this changed following the introduction of QOF

An investigation of the Quality and Outcomes Framework (QOF) using the CPRD

Kontopantelis, Doran, Reeves, Campbell, Sutton, Valderas, Ashcroft

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Current work

- Three different projects which aim to investigate aspects of the UK primary care pay-for-performance scheme with the use of CPRD
- These projects, albeit different in scope, share a common background and require the same or a very similar extraction procedure
 - Indicator removal
 - Exception reporting
 - Diabetes management on survival and diabetes-related complications
- Therefore, combined in a single programme of work

An investigation of the Quality and Outcomes Framework (QOF) using the CPRD

Project 1 - indicator removal

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Current work

- Performance of GPs under the p4p scheme has been quantified using indicators that express the percentage of the patients for which the appropriate treatment, test, examination etc was performed
- Considering resources are fixed, in order to maximise the benefit from the scheme, indicators would need to be routinely replaced
- However, we do not know what the effect of removal will be on levels of performance
- Three indicators were removed in 2006/7 and we will investigate their performance over time

An investigation of the Quality and Outcomes Framework (QOF) using the CPRD

Project 2 - Exception reporting

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Background

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work

Non-
incentivised
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Diabetes

Current work

- To protect patients from being discriminated against, the scheme allows for practices to exclude patients from the payment calculations for a variety of reasons
- However, the true levels of this provision are unknown since patients that have been excluded and for which the respective clinical indicator has been 'met' are included in the payment calculations
- Using the CPRD we will
 - estimate the actual levels of exception reporting
 - investigate the profile of excluded patients
 - use the timing of exceptions to assess whether they have been used appropriately

An investigation of the Quality and Outcomes Framework (QOF) using the CPRD

Project 3 - Diabetes complications and survival

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Background

Concluded
work

Non-
incentivised
care

Diabetes

Current work

- Diabetes is one of the conditions incentivised under the QOF, through 17 clinical indicators
- Some of these indicators are based on findings from the UKPDS study which established the positive effects of blood pressure, HbA1c and total cholesterol control
- However, in that study only patients aged 25-65 were enrolled, while various other patient exclusion criteria were applied
- Using the CPRD we will determine the effects for all subgroups and would be able to control the analyses for other important factors, such as co-morbidities
- We will also investigate the effect of all the indicators on survival and diabetes complications

School for
Primary Care
Research

Increasing the
evidence base for
primary care practice

Background

Concluded
work

Non-
incentivised
care

Diabetes

Current work



Something goes around something but
that's as far as I've got...

- Comments and questions:
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