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Investigating the effect of provider incentives for influenza immunisation

a longitudinal study

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Outline

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The Quality and Outcomes Framework

Pay-for-performance

- QOF was introduced in 04/05, rewarding GPs for achieving a set of quality targets for patients with chronic conditions.
- 76 clinical indicator for 10 conditions in 04/05 (80 indicators for 19 conditions in 08/09).
- In 04/05, 5 indicators for the influenza immunisation of patients with Asthma, CHD, COPD, DM or Stroke.
- QOF reviewed every two years and in the 06/07 review Asthma7 removed & changes were made to the remaining indicators (CHD12, COPD8, DM18 and STROKE10).
- Patients aged 65+: item-of-service (IoS) fee since 00/01.
- All conditions bar Stroke: IoS fee since 04/05.

The Quality and Outcomes Framework

some details

- Practice achievement calculated as the % of patients for which the indicator was met over eligible patients.
- To protect patients against discrimination, practices are allowed to exception report patients from indicators.
- Practices achieving...
 - below lower threshold (LT) level receive no payment.
 - within lower-upper threshold range rewarded on a linear principle.
 - above upper threshold (UT) receive no excess payment.
- Number of points directly proportional to payment size.
- Influenza immunisation indicators in the 06/07 review:
 - LT increased for 4 remaining indicators from 25 to 40%.
 - UT increased only for CHD12 from 85 to 90%.

Measures of performance

- Reported achievement (RA) - used for the QOF payments:
 - the % of patients for which the indicator was met over eligible patients - after exception reported patients have been removed from both the numerator and denominator.
- Population achievement (PA):
 - the % of patients for which the indicator was met over eligible patients including exception reported patients.
- Exception reporting (ER):
 - the % of exception reported patients over eligible patients including exception reported patients.

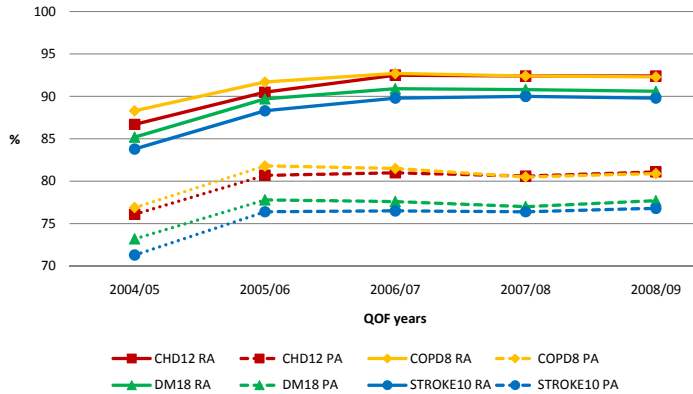
Available datasets

- Quality and Measurement System (QMAS):
 - On which the QOF scheme is based.
 - Ready to use RA (since y1), PA and ER (since y2) rates.
- General Practice Research Database (GPRD):
 - Holds event data for more than 270 English practices, from 1999 (545 active practices in Apr10 and 11.2m patients).
 - Final sample of 653,500 patients from 148 nationally representative practices in terms of list size and deprivation (IMD).
 - Can be used to construct RA, PA, ER rates...
 - Data available prior to the introduction of QOF and can be used to extract data for non-incentivised processes and/or diseases.

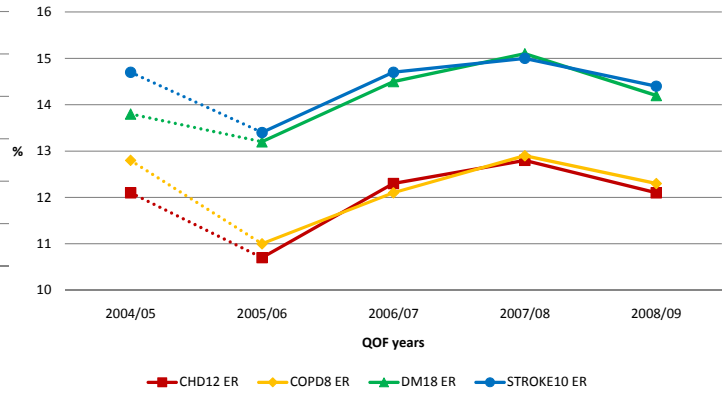
Mean rates for RA, PA and ER

QOF years 1-5

Reported and Population Achievement
means from QMAS data

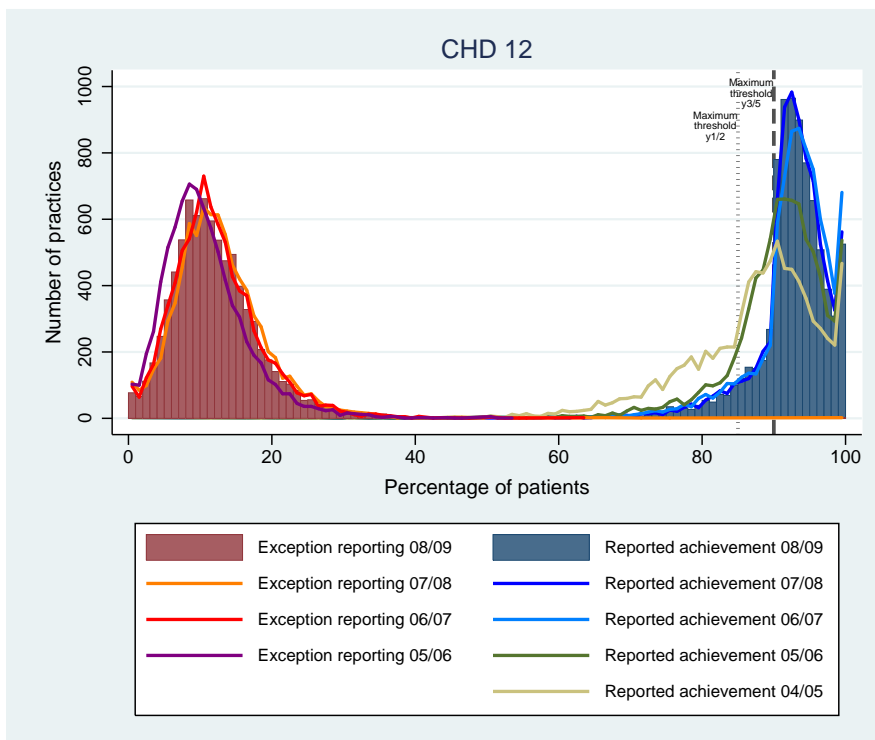


Exception Reporting
means from QMAS data



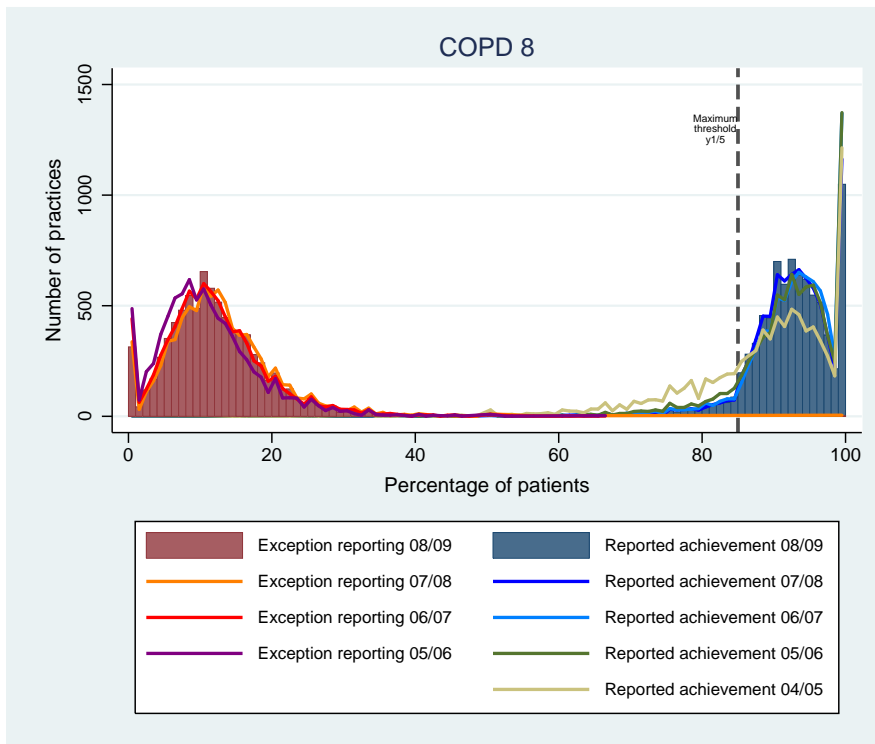
RA and ER distributions

CHD12 - worth 7 points



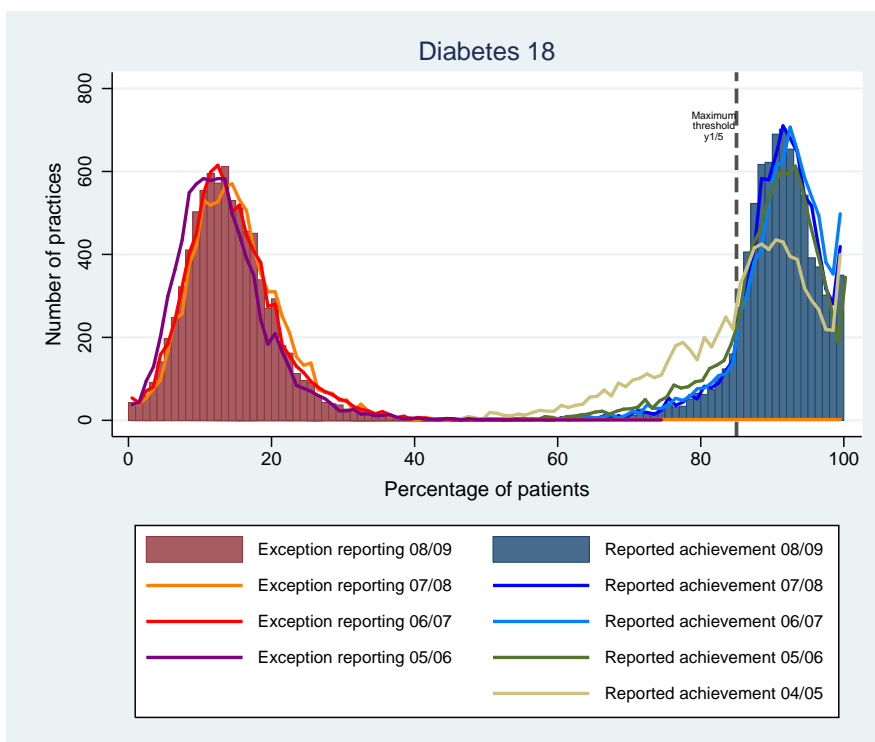
RA and ER distributions

COPD8 - worth 6 points



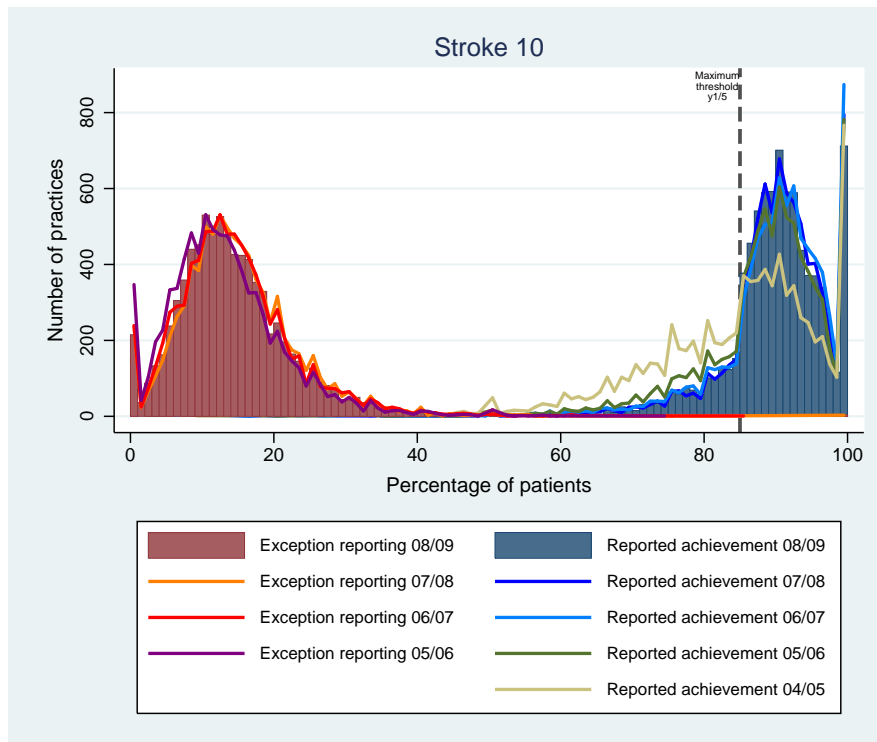
RA and ER distributions

DM18 - worth 3 points



RA and ER distributions

STROKE10 - worth 2 points



High levels of achievement

but...

- are there performance differences between the indicators which can be attributed to differences in their characteristics?
- what happened to immunisation rates for patients with Asthma after the indicator was removed from the QOF following the first review?
- what were the effects of the introduced changes to the remaining four indicators?
- what were the effects of the various entangled incentivisation schemes over time? (especially QOF)

Investigating the effect of indicator characteristics

- Random effects multilevel multivariate linear regressions used on RA, PA and ER.
- Years, indicators, CHD12 upper threshold change, indicator denominator at the practice level included as independent variables.
- Lower threshold and points could not be including due to perfect collinearity.
- Practices classed into 3 groups, according to their RA in previous year:
 - 90% or above
 - 85% or above but below 90%
 - below 85%
- Included interactions to estimate the effect of the upper threshold increase on each of the practice groups.

Regressions' table

variables	RA model*		PA model**		ER model†	
	Coeff (95% CI)	p-value	Coeff (95% CI)	p-value	Coeff (95% CI)	p-value
2006/07	0.629 (0.543, 0.715)	<0.001	-0.609 (-0.703, -0.516)	<0.001	1.276 (1.189, 1.363)	<0.001
2007/08	0.409 (0.314, 0.504)	<0.001	-1.321 (-1.420, -1.223)	<0.001	1.847 (1.752, 1.941)	<0.001
2008/09	0.268 (0.161, 0.374)	<0.001	-0.806 (-0.911, -0.701)	<0.001	1.133 (1.029, 1.237)	<0.001
CHD12	-0.292 (-0.434, -0.151)	<0.001	-0.167 (-0.323, -0.011)	0.036	-0.479 (-0.622, -0.336)	<0.001
DM18	-0.968 (-1.065, -0.871)	<0.001	-2.973 (-3.081, -2.865)	<0.001	1.965 (1.866, 2.064)	<0.001
STROKE10	-2.475 (-2.550, -2.401)	<0.001	-4.235 (-4.318, -4.152)	<0.001	2.219 (2.143, 2.295)	<0.001
Number of patients (per100) ‡	-0.515 (-0.564, -0.466)	<0.001	-0.271 (-0.318, -0.224)	<0.001	0.107 (0.064, 0.149)	<0.001
Upper threshold change for practices with RA≥90% in previous year	0.449 (0.304, 0.594)	<0.001	0.252 (0.092, 0.413)	0.002	0.210 (0.063, 0.357)	0.005
Upper threshold change for practices with RA in [85%, 90%) range in previous year	1.096 (0.883, 1.309)	<0.001	0.499 (0.264, 0.734)	<0.001	0.479 (0.264, 0.695)	<0.001
Upper threshold change for practices with RA<85% in previous year	2.515 (2.275, 2.754)	<0.001	1.161 (0.897, 1.426)	<0.001	1.124 (0.882, 1.366)	<0.001

* 8654 practices included. On average, data was available for 8351 practices across indicators and years. Wald's $\chi^2=11,510$ and $p<0.001$.

** 8493 practices included. On average, data was available for 8228 practices across indicators and years. Wald's $\chi^2=20,458$ and $p<0.001$.

† 8493 practices included. On average, data was available for 8228 practices across indicators and years. Wald's $\chi^2=9,017$ and $p<0.001$.

Regressions' results summary

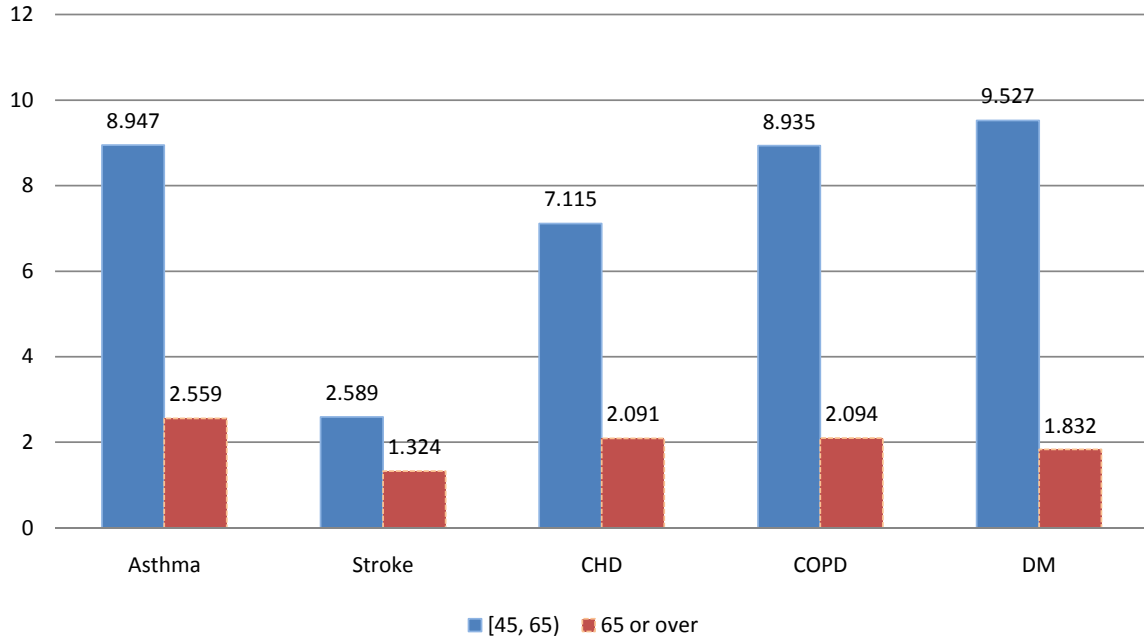
- Compared to 2005/06, RA was higher in 2008/09.
- But PA since levels in 2008/09 were lower than in 2005/06 (ER increase to blame).
- Practice register size negatively associated with achievement.
- Increase in the CHD12 upper threshold in 2006/07 had a positive effect on achievement:
 - High and low achieving practices alike improved, on average, more in CHD12 than they did in the other indicators in which the UT did not change.
 - Although a large % of the RA increase is due to a large increase in ER, PA was positively affected.

Investigating the effect of incentivisation

- Data on clinical events used to identify patient conditions and construct the QOF influenza immunisation indicators for seven QOF years (01Mar00- 31Apr07).
- Patient age, sex and relevant multi-morbidities available.
- To disentangle the incentivisation effects six mutually exclusive patient groups defined, for each of two age categories (45-65 and 65+):
 - None of the five conditions present
 - Asthma diagnosis and none of the other four conditions
 - Stroke diagnosis and none of the other four conditions
 - CHD diagnosis
 - COPD diagnosis, but no CHD diagnosis
 - Diabetes diagnosis, but no CHD and no COPD diagnosis
- Multilevel logistic regression used for each group with age, sex and their interactions included as covariates.

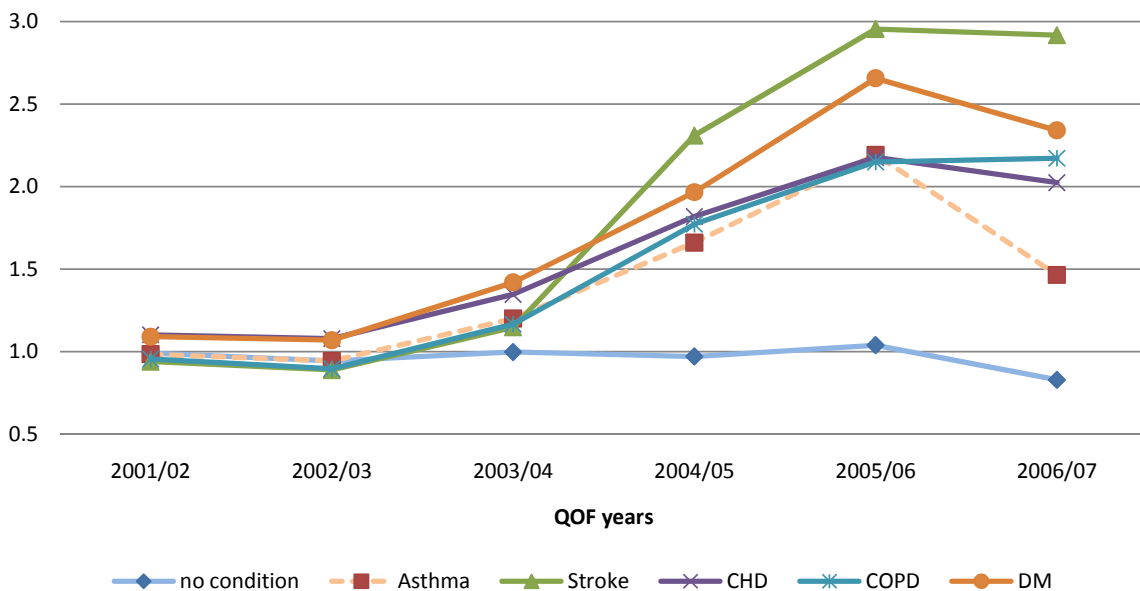
Comparison of condition groups vs no condition, 00/01

Influenza Immunisation Odds Ratios, 2000/01
 compared to condition free group of same age range



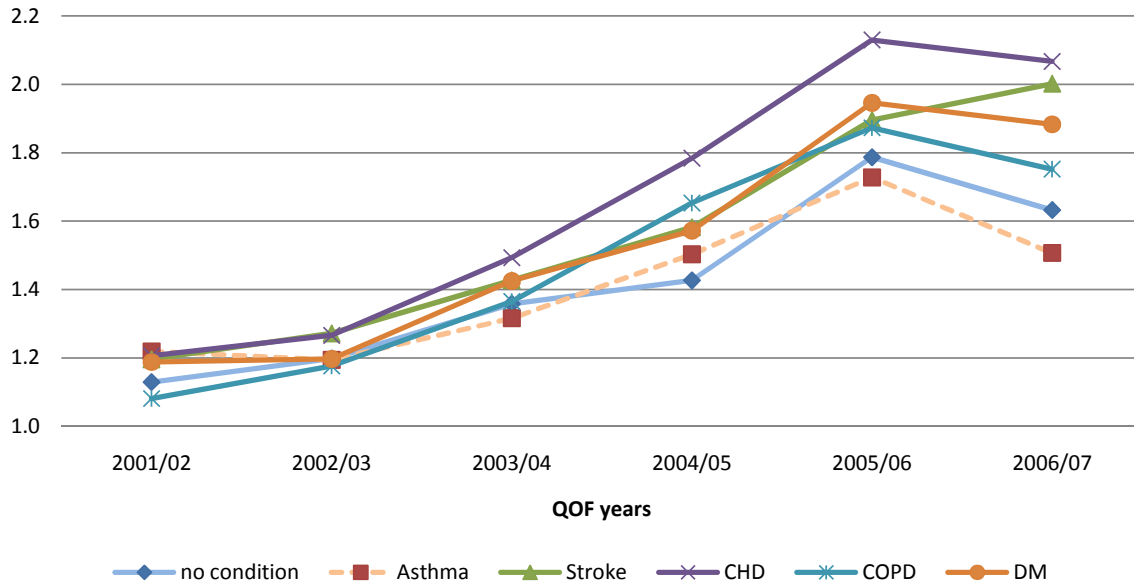
Condition groups over time, 45-65

Influenza Immunisation Odds Ratios across time for patients aged [45, 65]
 compared to the same patient group, in 00/01



Condition groups over time, 65+

Influenza Immunisation Odds Ratios across time for patients aged 65 or over compared to the same patient group, in 00/01



Regressions' results summary

- Continuous increase in immunisation rates...
 - from 03/04 to 05/06 for condition groups aged [45-65].
 - from 02/03 to 05/06 for condition groups aged 65+.
- Drop in immunisation rates in 06/07 for all groups bar COPD [45-65) and Stroke 65+:
 - for Asthma the odds ratios fell to 04/05 levels or below.
 - for the other conditions odds ratios were above 04/05 levels.
- The QOF increased (often doubled) the immunisation rate in patients aged 45 to 65 with one of the incentivised conditions, compared to the non-incentivised group.
- In contrast, for patients aged 65+, both the incentivised and the non-incentivised group rise.

Discussion

- If the aim of the QOF is continuous improvement (and not only rewarding good practice):
 - increasing the upper threshold seems to be the simplest policy decision to that end.
- The QOF seems to have increased vaccination rates for those with the incentivised conditions aged 45 to 64.
- Rates for both incentivised and non-incentivised groups aged 65+ increased after the introduction of the QOF:
 - underlying positive trend for this age group, and therefore the QOF had no additional effect?
 - QOF did have a positive effect on the incentivised conditions, but also exerted a positive externality on non-incentivised patients?

