

## **Online appendix for “Investigating the characteristics and outcomes of patients excluded from the UK’s primary care pay-for-performance programme: a retrospective cohort study”**

### **Methods**

#### **Recording of exception reporting**

Family practices record diagnoses, referrals, processes of care (including QOF-related activities) and exception reporting of patients on their clinical computing systems using a hierarchical coding set (‘Read’ codes). Practice level data are collated in the national Quality and Management Analysis System (QMAS) and practice performance against QOF targets is assessed annually. For each clinical indicator, achievement is calculated as the number of patients for whom the target was met divided by the number of eligible patients. For example, for indicator DM11, eligible patients are those with a diagnosis of diabetes (the denominator) and the target is met if they have a recording of blood pressure within 15 months of the end of the financial year (the numerator). Patients who are exception reported are excluded from the denominator. However, if a patient who has been exception reported also meets the target in the assessment period, the exception report is overridden and they are included in both the numerator and denominator.

#### **Data source**

National exception reporting data are only available at the practice level through QMAS, and the individual characteristics of exception reported patients cannot be directly assessed. We therefore extracted data from the Clinical Practice Research Datalink (CPRD), a database of individual patient records drawn from family practices using the Vision clinical computer system (installed in approximately a fifth of practices<sup>1</sup>). In July 2012, data were available for 645 practices and 13,772,992 patients. Anonymised electronic patient data were linked to Office of National Statistics (ONS) mortality data and to area deprivation quintile, as measured by the 2010 Index of Multiple Deprivation (IMD) in England.<sup>2</sup> However, patient deprivation quintile<sup>3</sup> and verified deaths were only available for a subgroup of English practices that have agreed to the linkages.

## Study design: retrospective cohort

The Quality and Outcomes Framework was introduced on 1 April 2004 and is reviewed annually. In a major revision in 2006: new clinical domains were introduced (for example, dementia, depression, learning disability, palliative care), several indicators were re-structured (for example, condition specific smoking indicators were amalgamated into a single smoking domain) and payment thresholds were changed.<sup>4</sup> To ensure consistency in our longitudinal analyses we limited the study period to years 3 to 8 of the scheme (1 April 2006 to 31 March 2012), after the major revision. Practice performance on the QOF is measured across financial years and we therefore divided the study period into six financial years (1 April to 31 March the following year). Within each year we identified practices that reliably contributed data for the whole year, the characteristics of which have been described elsewhere.<sup>5</sup> Within each practice and study year, we selected patients registered with the practice for the full year and from these we identified patients with at least one condition of interest, at any point in time up to the end of the respective year.

Conditions of interest were those incentivised in the QOF from 2006 onwards: atrial fibrillation, asthma, hypertension, cancer, coronary heart disease, heart failure, chronic kidney disease, chronic obstructive pulmonary disease, dementia, depression, diabetes, epilepsy, learning disability, severe mental health, stroke and hypothyroidism. We excluded clinical domains that were not a condition (e.g. palliative care), were concerned only with maintenance of a register (e.g. obesity), or that were introduced in later years (e.g. osteoporosis). We used an inclusive approach in our case finding, to better account for changes in code usage over time. In addition to the QOF business rule code sets (the algorithms used for the identification of patients in the incentive scheme) we also used clinician-identified relevant keywords to generate unrefined, inclusive lists of Read and other clinical activity codes. Two clinicians independently reviewed these lists and reached consensus on a conservative list of codes (indicating the presence of the respective condition with a high degree of certainty). All codes used in the study are available from [www.clinicalcodes.org](http://www.clinicalcodes.org).<sup>6</sup> All conditions, with the exception of asthma, depression and epilepsy, were treated as chronic and unresolvable. Patients with one of the three resolvable conditions were considered condition-free if a code denoting resolution was observed, from that time onwards.

## Datasets

Using R version 3.1.1,<sup>7</sup> we generated three datasets with which we aimed to answer our main research questions. Dataset #1 included yearly aggregated exception reporting information for patients with at least one of the conditions of interest (one record per patient, in each year). Exceptions were categorised as: i) clinical contraindication or unsuitability; ii) informed dissent; iii) unknown (where the precise reason for exclusion is not available). We did not examine logistical exceptions, as these mainly relate to patients registered or diagnosed towards the end of each year and we did not expect exclusion on the basis of registration date to be associated with mortality, given that the exception only applies in the index year. Patient data included age, sex, smoking status, Body Mass Index (BMI), patient location deprivation quintile, first diagnosis date for each study condition (if applicable), practice list size, region and practice deprivation quintile. We used the *mibmi* algorithm in Stata to interpolate BMI values over time, allowing us to make use of a more complete dataset.<sup>8</sup> Dataset #2 contained all recorded exception information for patients in dataset #1 (i.e. patients with at least one of the conditions of interest): Read exception code, type of exception, exception date and QOF indicators to which the exception applied. Dataset #3 focused on patients with diabetes aged 18 or over (one record per patient, in each year): diabetes diagnosis date, information on eligibility, achievement and exception for 15 clinical indicators that were included in the QOF diabetes domain for most (if not all) of the study period. Included indicators were modelled using diagnostic codes, but we also used codes relating to medications, tests undertaken and test results where appropriate.<sup>9</sup> In addition, some indicators have undergone small or moderate changes over time and we aimed to model these within each year. Details for the indicators are provided in appendix table A3.

## Analyses

All analyses were undertaken in Stata v13.1 and an alpha level of 1% was used throughout.<sup>10</sup> However, statistical significance is not very informative in analyses of datasets of this size (even very small absolute differences will usually be statistically significant) and we focus on the clinical significance of the effect sizes rather than p-values.

Using dataset #1 we descriptively examined the characteristics of patients who are exception reported and through regression modelling, focusing only on practices with linked ONS data,

we investigated predictors of exception reporting and examined whether exception reporting is associated with mortality. Longitudinal random-effects logistic regression models with the *xtlogit* command and the patient identifier as the panel variable were used to assess the effect of year, gender, age, number of relevant conditions (one, two, three, four or more), practice list size, region and deprivation on presence of at least one relevant exception code. Alternative models included each of the 16 conditions of interest as predictors, rather than an overall measure of multimorbidity.

Proportional-hazards survival models with the *stcox* command and yearly time-windows were used to examine the associations of age, gender, smoking status (current, ex, never smoked, missing), patient deprivation, each of the 16 conditions of interest, practice list size, practice deprivation quintile and exceptions on CPRD and ONS mortality. Since recorded clinical information, including exceptions, was more likely to be missing in the year of a patient's death (less time for events to be recorded in), and to avoid introducing a form of 'reverse' censorship bias, we introduced a 1-year lag into the analysis model. Therefore, recorded information in each year was used to model survival or death in the subsequent year; i.e. 2006/7 predictor data were linked to 2007/8 deaths, et cetera, up until 2010/11 predictors linked to 2011/12 deaths. We introduced time-varying covariates for age, smoking status, cancer, coronary heart disease, dementia, diabetes and learning disability, modelling a logarithmic increase in risk, to ensure the proportional-hazard assumption stood (tested using Schoenfeld residuals and command *estat phtest*). The relationship between being exception reported and mortality was investigated in two separate survival models: in the first, types of exception reporting (clinical contraindication, informed dissent and reason unknown) were coded and analysed separately, and in the second by type all reasons were aggregated into a single predictor. As sensitivity analyses, we calculated propensity scores (for all reasons, contraindication and informed dissent) which we used to better control for the role of the covariates (all we included in the main model) on the probability of being exception reported.

We used dataset #2 to investigate the frequency of all relevant exception codes used over time and to visualise the seasonality of exception reporting. We aggregated the data at the practice level to calculate the number of exception codes per 1000 patients in each practice. We then used a random-effects negative binomial regression model with the *xtnbreg* command (practice identifier used as panel variable) to quantify the monthly seasonality of

these overall exception rates, controlling for practice list size, year and deprivation quintile. Negative binomial regression was selected over Poisson, since initial findings indicated considerable over-dispersion of the count data.

Dataset #3 was used to descriptively provide insight on exception reported patients for which the relevant quality indicator (or indicators) was met, for all indicators in the diabetes domain and each financial year. Since only exceptions for which the relevant indicators are not met are reported under the QMAS, we calculated the 'met' and 'unmet' levels of exception reporting for the diabetes domain, over time. These rates can provide some insight on the use of the exception reporting provision, for each indicator. For each indicator, the reasons for exception reporting patients did not differ substantially between met and unmet exemptions (figure A1). For example, for tight glycaemic control (HbA1c  $\leq$ 7.0/7.5%), contraindications comprised 58% of met exemptions and 59% of unmet exemptions. For moderate glycaemic control (HbA1c  $\leq$ 9.0/10.0%) the respective proportions were 51% and 53%.

## References

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**Table A1: Characteristics of excepted and non-excepted patients in 2010/11 (percentages within each characteristic, across exception reporting categories)**

	No exception code <sup>†</sup>	Clinical contra-indication* <sup>†</sup>	Informed dissent* <sup>†</sup>	Reason unknown* <sup>†</sup>	Any (excluding logistical)* <sup>‡</sup>
<i>Populations</i>					
No of patients <sup>§</sup>	1266797	196762	145267	1578	315565
% of patients <sup>§</sup>	80.1	12.4	9.2	0.1	19.9
No of ONS linked patients <sup>§</sup>	767118	113256	84028	828	182208
% of ONS linked patients <sup>§</sup>	80.8	11.9	8.9	0.1	19.2
<i>Patient characteristics</i>					
%Male	78.5	13	10.2	0.1	21.5
%Female	81.3	12	8.4	0.1	18.7
Mean age (sd)	54.0(19.2)	64.5(18.8)	59.5(19.7)	60.3(21.9)	61.9(19.5)
Mean BMI (sd)	28.9(6.6)	28.8(6.5)	29.2(6.9)	29.2(6.6)	28.9(6.6)
Mean no of conditions (sd) <sup>#</sup>	1.6(0.9)	2.6(1.5)	2.1(1.3)	2.4(1.4)	2.3(1.4)
% dead in 2011/12	58.6	32.5	14.6	0.4	41.4
<i>Smoking status (% of cases across exception categories)</i>					
Never	82.2	10.4	8.7	0.1	17.8
Ex-smoker	78.1	14.6	9.3	0.1	21.9
Current smoker	81.3	10.4	10.0	0.1	18.7
Missing	89.8	4.6	5.8	0.1	10.2
<i>Condition (% of cases across exception categories)</i>					
Atrial fibrillation	58.6	34.0	12.1	0.2	41.4
Asthma	73.3	14.2	14.6	0.1	26.7
Hypertension	75.0	16.5	11.0	0.1	25.0
Cancer	79.6	14.0	8.4	0.1	20.4
Coronary heart disease	54.3	36.2	15.7	0.2	45.7
Heart failure	51.6	40.3	14.9	0.2	48.4
Chronic kidney disease	65.6	26.1	12.3	0.2	34.4
Chronic obstructive pulmonary disease	54.2	33.9	18.5	0.2	45.8
Dementia	61.7	31.2	11.5	0.3	38.3
Depression	84.0	11.1	6.2	0.1	16.0
Diabetes mellitus	61.4	24.5	18.9	0.2	38.6
Epilepsy	71.5	21.4	9.4	0.3	28.5
Learning disability	84.2	11.3	5.4	0.1	15.8
Severe mental illness	72.8	17.1	12.5	0.3	27.2
Stroke	59.4	28.9	17.1	0.2	40.6
Hypothyroidism	80.3	13.3	8.3	0.1	19.7
<i>Patient IMD (% of cases across exception categories)<sup>¶</sup></i>					
1 (least deprived)	82.2	10.7	8.6	0.0	17.8
2	80.9	12.3	8.3	0.1	19.1
3	80.1	12.4	9.1	0.1	19.9

	No exception code <sup>†</sup>	Clinical contra-indication* <sup>†</sup>	Informed dissent* <sup>†</sup>	Reason unknown* <sup>†</sup>	Any (excluding logistical)* <sup>‡</sup>
4	80.4	12.0	9.3	0.1	19.6
5	79.9	12.7	9.1	0.1	20.1
<i>Practice IMD (% of cases across exception categories)</i>					
1 (least deprived)	81.7	11.4	8.4	0.2	18.3
2	80.4	12.3	8.9	0.1	19.6
3	79.6	13.1	8.9	0.1	20.4
4	79.9	12.1	9.7	0.1	20.1
5	78.6	13.3	10.0	0.1	21.4
<i>Region (% of cases across exception categories)</i>					
North East	81.0	11.1	9.8	0.1	19.0
North West	80.0	12.7	9.1	0.1	20.0
Yorkshire & Humber	81.3	12.1	8.1	0.0	18.7
East Midlands	79.5	12.7	9.2	0.7	20.5
West Midlands	81.6	12.0	7.8	0.0	18.4
East England	80.7	12.3	8.5	0.2	19.3
South West	77.5	15.2	9.4	0.2	22.5
South Central	82.0	10.8	8.6	0.1	18.0
London	82.2	10.5	8.7	0.1	17.8
South East	82.4	10.8	8.2	0.1	17.6
England	80.9	11.9	8.7	0.1	19.1
Northern Ireland	82.7	11.9	6.5	0.0	17.3
Scotland	75.7	15.0	11.5	0.1	24.3
Wales	76.9	13.7	11.7	0.1	23.1

\* Patients associated with one or more codes from the respective category.

† Percentages within these categories are row percentages and add up to 100%.

‡ Within this category, reporting percentages of cases with any exception code (at least one) over all cases.

§ Patients with at least one of the 16 conditions included in the analyses: atrial fibrillation, asthma, hypertension, cancer, coronary heart disease, heart failure, chronic kidney disease, chronic obstructive pulmonary disease, dementia, depression, diabetes mellitus, epilepsy, learning disability, severe mental illness, stroke and hypothyroidism.

# Over the 16 conditions of interest.

¶ Available for ONS linked patients only.



**Table A2: Modelled condition prevalence rates for the population, 2006/7 to 2011/12**

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
<i>Populations - all practices</i>						
No of practices	569	566	565	556	534	499
Total list size	5321351	5370801	5449547	5432224	5301520	5069748
% of patients with atrial fibrillation	1.3	1.4	1.4	1.4	1.4	1.5
No of patients with atrial fibrillation	71233	73368	75881	76661	76841	74027
% of patients with asthma	5.7	5.5	5.5	5.5	5.2	4.9
No of patients with asthma	301101	296572	301319	296629	275363	246156
% of patients with hypertension	11.3	11.4	11.5	11.5	11.4	11.2
No of patients with hypertension	602729	612786	626584	622213	606603	569697
% of patients with cancer	2.1	2.2	2.3	2.3	2.4	2.5
No of patients with cancer	114055	118399	124019	127610	128828	125072
% of patients with coronary heart disease	3.2	3.1	3	2.9	2.8	2.6
No of patients with coronary heart disease	169882	165220	161679	155019	146018	133264
% of patients with heart failure	0.8	0.7	0.7	0.6	0.6	0.6
No of patients with heart failure	39917	37655	36393	34833	33114	30903
% of patients with chronic kidney disease	2.3	2.8	3	3.1	3.1	3.1
No of patients with chronic kidney disease	122367	152527	165834	169533	166836	156903
% of patients with chronic obstructive pulmonary disease	1.1	1.2	1.2	1.2	1.2	1.2
No of patients with chronic obstructive pulmonary disease	59510	62079	64390	65114	65680	63333
% of patients with dementia	0.4	0.4	0.4	0.4	0.4	0.5
No of patients with dementia	20410	20864	21744	22711	23792	23144
% of patients with depression	12.2	12.3	12.4	12.5	12.5	12.5
No of patients with depression	647458	661287	674995	676790	664269	634759
% of patients with diabetes mellitus	3.2	3.4	3.5	3.6	3.7	3.8
No of patients with diabetes mellitus	172907	179937	189010	194202	195719	190502
% of patients with epilepsy	0.6	0.6	0.6	0.6	0.6	0.6
No of patients with epilepsy	33956	33720	33956	32752	31340	29433
% of patients with learning disability	0.2	0.2	0.2	0.2	0.2	0.3
No of patients with learning disability	9666	10322	12081	13088	13052	12870
% of patients with severe mental illness	0.7	0.8	0.8	0.8	0.8	0.8
No of patients with severe mental illness	39849	41117	41957	42629	42233	40946
% of patients with stroke	1.6	1.5	1.5	1.5	1.5	1.5
No of patients with stroke	82984	82927	83622	82797	81319	76590

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
<i>Populations - all practices</i>						
% of patients with hypothyroidism	2.7	2.8	2.8	2.9	2.9	2.9
No of patients with hypothyroidism	144127	148944	154520	155713	154856	147276

**Table A3: Diabetes domain indicators in the Quality and Outcomes Framework and their changes over time**

Indicator name	CPRD definition	Type	QOF year*	QOF name	QOF definition	Lt+	Ut+	P+
DM2	% patients with DM, whose notes record BMI in the previous 15 months	Monitoring	1-2	DM2	The percentage of patients with diabetes whose notes record BMI in the previous 15 months	25	90	3
			3-8			40	90	3
DM5	% patients with DM who have a record of HbA1c or equivalent in last 15m	Monitoring	1-2	DM5	The percentage of diabetic patients who have a record of HbA1c or equivalent in the previous 15 months	25	90	3
			3-7			40	90	3
DM6/20/23/26	% patients with DM in whom last HbA1c<7.5 (or equivalent) in last 15m	Outcome	1-2	DM6	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 last 15 months	25	50	16
			3-5	DM20	The percentage of patients with diabetes in whom the last HbA1C is 7.5 or less (or equivalent test / reference range depending on local laboratory) in the previous 15 months	40	50	17
			6-7	DM23	The percentage of patients with diabetes in whom the last HbA1c is 7 or less (or equivalent test/reference range depending on local laboratory) in the previous 15 months.	40	50	17
			8	DM26	The percentage of patients with diabetes in whom the last IFCC-HbA1c is 59 mmol/mol (equivalent to HbA1c of 7.5% in DCCT values) or less (or equivalent test/reference range depending on local laboratory) in the previous 15 months.	40	50	17
DM7/25/28	% patients with DM with last HbA1C level is 10 or less in last 15 months	Outcome	1-2	DM7	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	25	85	11
			3-5			40	90	11
			6-7	DM25	The percentage of patients with diabetes in whom the last HbA1c is 9 or less (or equivalent test/reference range depending on local laboratory) in the previous 15 months.	40	90	10
			8	DM28	The percentage of patients with diabetes in whom the last IFCC-HbA1c is 75 mmol/mol (equivalent to HbA1c of 9% in DCCT values) or less (or equivalent test/reference range depending on local laboratory) in the previous 15 months.	40	90	10

Indicator name	CPRD definition	Type	QOF year*	QOF name	QOF definition	Lt+	Ut+	P+
DM8/21	% of patients with DM who have a record of retinal screening in the previous 15 months	Recording	1-2	DM8	The percentage of patients with diabetes who have a record of retinal screening in the previous 15 months	25	90	5
			3-8	DM21				
DM9	% patients with DM with a record of presence or absence of peripheral pulses in the previous 15 months	Recording	1-7		The percentage of patients with diabetes with a record of presence or absence of peripheral pulses in the previous 15 months	40	90	3
DM10	% patients with DM with a record of neuropathy testing in the previous 15 months	Recording	1-2	DM10	The percentage of patients with diabetes with a record of neuropathy testing in the previous 15 months	25	90	3
			3-8					
DM11	% patients with DM whose notes have a record of blood pressure in previous 15m	Monitoring	1-2	DM11	The percentage of patients with diabetes who have a record of the blood pressure in the past 15 months	25	90	3
			3-7					
DM12/30	% patients with DM, with last blood pressure reading (15m) is 145/85 or less	Outcome	1-2	DM12	The percentage of patients with diabetes in whom the last blood pressure is 145/85 or less	25	55	17
			3-7					
			8	DM30				
DM13	% patients with DM who have a record of micro-albuminuria testing in the previous 15 months (exception reporting for patients with proteinuria)	Recording	1-2	DM13	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)	25	90	3
			3-8					
DM14/22	% patients with DM, with record of serum creatinine testing in previous 15m	Monitoring	1-2	DM14	The percentage of patients with diabetes who have a record of serum creatinine testing in the previous 15 months	25	90	3
			3-8	DM22				
					The percentage of patients with diabetes who have a record of estimated glomerular filtration rate (eGFR) or serum creatinine testing in the previous 15 months	40	90	3

Indicator name	CPRD definition	Type	QOF year*	QOF name	QOF definition	Lt†	Ut†	P†
DM15	% patients with DM with proteinuria or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists)	Treatment	1-2		The percentage of patients with diabetes with proteinuria or micro-albuminuria who are treated with ACE inhibitors (or A2 antagonists)	25	70	3
			3-8			40	80	3
DM16	% patients with DM whose notes have a record of total cholesterol in previous 15m	Monitoring	1-2	DM16	The percentage of patients with diabetes who have a record of total cholesterol in the previous 15 months	25	90	3
			3-7			40	90	3
DM17	% patients with DM whose last measured total cholesterol (15m) ≤ 5mmol/l	Outcome	1-2	DM17	The percentage of patients with diabetes whose last measured total cholesterol within previous 15 months is 5 or less	25	60	6
			3-8			40	70	6
DM18	% patients with DM with a record of influenza vaccination in preceding 1Sep-31Mar	Treatment	1-2	DM18	The percentage of patients with diabetes who have had influenza immunisation in the preceding 1 September to 31 March	25	85	3
			3-8			40	85	3

\* QOF year 1 corresponds to 2004/5, 2 to 2005/6 and so on, up to year 8 (2010/11).

† Lt: Lower threshold; Ut: Upper threshold; P: points indicator is worth (1 point≈£126). Also,  $P = \min\{(Ut - Lt), (RA - Lt)/(Ut - Lt)\}$ , where *RA* is the practice reported achievement (excluding exception reported patients) under the Quality and Outcomes Framework.

Table A4: Counts (column percentages) for all exception codes identified, over time and overall.

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
10674	9OX5.00	Influenza vaccination declined	No	Informed dissent	73165 (14.89)	79180 (15.51)	73053 (14.88)	68516 (13.84)	73704 (14.90)	65346 (14.26)	432964 (14.72)
10996	2126200	Asthma resolved	Yes	Contra-indication	23227 (4.73)	25184 (4.93)	27403 (5.58)	27939 (5.65)	28040 (5.67)	26414 (5.77)	158207 (5.38)
11695	9hA2.00	Excepted from asthma quality indicators: Informed dissent	No	Informed dissent	17106 (3.48)	18526 (3.63)	20774 (4.23)	21162 (4.28)	22507 (4.55)	22749 (4.97)	122824 (4.18)
19439	212S.00	Depression resolved	Yes	Contra-indication	7694 (1.57)	12427 (2.43)	14695 (2.99)	18329 (3.70)	22558 (4.56)	25769 (5.62)	101472 (3.45)
12267	68NE.00	No consent - influenza imm.	No	Informed dissent	16121 (3.28)	18248 (3.57)	14851 (3.02)	14971 (3.03)	15357 (3.10)	13846 (3.02)	93394 (3.18)
10566	8I62.00	Beta blocker not indicated	No	Contra-indication	16002 (3.26)	17035 (3.34)	14716 (3.00)	13716 (2.77)	10838 (2.19)	8778 (1.92)	81085 (2.76)
11667	TJC6.00	Adverse reaction to betablockers	Yes	Contra-indication	10788 (2.20)	11600 (2.27)	12493 (2.54)	14491 (2.93)	14301 (2.89)	12680 (2.77)	76353 (2.60)
10976	9h32.00	Excepted from hypertension qual indicators: Informed dissent	No	Informed dissent	8685 (1.77)	9845 (1.93)	11183 (2.28)	12666 (2.56)	13087 (2.65)	11631 (2.54)	67097 (2.28)
11056	8BL0.00	Patient on maximal tolerated antihypertensive therapy	No	Contra-indication	13852 (2.82)	13391 (2.62)	12793 (2.61)	10158 (2.05)	8406 (1.70)	7881 (1.72)	66481 (2.26)
11348	9h42.00	Excepted from diabetes quality indicators: Informed dissent	No	Informed dissent	8115 (1.65)	9209 (1.80)	10000 (2.04)	11556 (2.33)	12060 (2.44)	11261 (2.46)	62201 (2.12)
10567	8I26.00	Beta blocker contraindicated	No	Contra-indication	16714 (3.40)	12741 (2.50)	10472 (2.13)	9188 (1.86)	6167 (1.25)	4967 (1.08)	60249 (2.05)
11416	U60CA00	[X]Statin causing adverse effect in therapeutic use	Yes	Contra-indication	7423 (1.51)	8941 (1.75)	10150 (2.07)	10731 (2.17)	10976 (2.22)	10987 (2.40)	59208 (2.01)
11130	U60C400	[X]Angiotensin-convert-enz inhib caus advers eff therap use	Yes	Contra-indication	6495 (1.32)	8409 (1.65)	9515 (1.94)	9974 (2.02)	9895 (2.00)	9734 (2.12)	54022 (1.84)
10883	8I64.00	Angiotensin converting enzyme inhibitor not indicated	No	Contra-indication	10297 (2.10)	12488 (2.45)	9431 (1.92)	6233 (1.26)	5700 (1.15)	5198 (1.13)	49347 (1.68)
18721	8I6C.00	Angiotensin II receptor antagonist not indicated	No	Contra-indication	9425 (1.92)	12444 (2.44)	9177 (1.87)	6221 (1.26)	5948 (1.20)	5530 (1.21)	48745 (1.66)
28994	212R.00	Atrial fibrillation resolved	Yes	Contra-indication	4625 (0.94)	6336 (1.24)	7529 (1.53)	8352 (1.69)	8823 (1.78)	9191 (2.01)	44856 (1.53)
12213	8BL2.00	Patient on maximal tolerated therapy for diabetes	No	Contra-indication	4517 (0.92)	4840 (0.95)	4414 (0.90)	9379 (1.90)	11944 (2.41)	8835 (1.93)	43929 (1.49)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
3269	2126100	Hypertension resolved	Yes	Contra-indication	5333 (1.09)	6275 (1.23)	7035 (1.43)	7226 (1.46)	7384 (1.49)	7640 (1.67)	40893 (1.39)
10813	8I3C.00	Statin declined	No	Informed dissent	5833 (1.19)	6079 (1.19)	6141 (1.25)	6312 (1.28)	6972 (1.41)	6541 (1.43)	37878 (1.29)
11774	9h91.00	Except from mental health quality indicators: Patient unsuit	No	Contra-indication	15090 (3.07)	6140 (1.20)	5771 (1.18)	4141 (0.84)	3230 (0.65)	3265 (0.71)	37637 (1.28)
9998	TJ53.11	Adverse reaction to aspirin	Yes	Contra-indication	5760 (1.17)	5843 (1.14)	6233 (1.27)	6633 (1.34)	6467 (1.31)	6118 (1.34)	37054 (1.26)
11026	9h51.00	Excepted from COPD quality indicators: Patient unsuitable	No	Contra-indication	7467 (1.52)	6712 (1.31)	5922 (1.21)	6438 (1.30)	5744 (1.16)	4532 (0.99)	36815 (1.25)
10961	9h31.00	Excepted from hypertension qual indicators: Patient unsuit	No	Contra-indication	8667 (1.76)	6961 (1.36)	5775 (1.18)	5693 (1.15)	5352 (1.08)	4031 (0.88)	36479 (1.24)
11041	9h41.00	Excepted from diabetes qual indicators: Patient unsuitable	No	Contra-indication	7474 (1.52)	6328 (1.24)	5576 (1.14)	6106 (1.23)	6095 (1.23)	4829 (1.05)	36408 (1.24)
10910	9h02.00	Excepted from CHD quality indicators: Informed dissent	No	Informed dissent	5927 (1.21)	5801 (1.14)	6113 (1.24)	6006 (1.21)	5792 (1.17)	5169 (1.13)	34808 (1.18)
11387	9OJ2.00	Refuses asthma monitoring	No	Informed dissent	6469 (1.32)	6902 (1.35)	5557 (1.13)	5487 (1.11)	4923 (1.00)	3024 (0.66)	32362 (1.10)
43239	9hC1.00	Excepted from depression quality indicators: Informed dissen	No	Informed dissent	2269 (0.46)	3468 (0.68)	4552 (0.93)	6421 (1.30)	7234 (1.46)	7486 (1.63)	31430 (1.07)
12111	8BL1.00	Patient on maximal tolerated lipid lowering therapy	No	Contra-indication	5758 (1.17)	4971 (0.97)	4687 (0.95)	5434 (1.10)	4958 (1.00)	4489 (0.98)	30297 (1.03)
11038	9h01.00	Excepted from CHD quality indicators: Patient unsuitable	No	Contra-indication	7385 (1.50)	5853 (1.15)	4982 (1.01)	4624 (0.93)	4104 (0.83)	3180 (0.69)	30128 (1.02)
12561	8I6B.00	Clopidogrel not indicated	No	Contra-indication	6180 (1.26)	6018 (1.18)	4589 (0.93)	4300 (0.87)	4493 (0.91)	4463 (0.97)	30043 (1.02)
28970	9hC0.00	Excepted from depression quality indicators: Patient unsuita	No	Contra-indication	3845 (0.78)	4663 (0.91)	4346 (0.89)	5575 (1.13)	5480 (1.11)	5225 (1.14)	29134 (0.99)
11266	9h52.00	Excepted from COPD quality indicators: Informed dissent	No	Informed dissent	3428 (0.70)	4425 (0.87)	4768 (0.97)	5444 (1.10)	5680 (1.15)	5376 (1.17)	29121 (0.99)
11328	8I65.00	Warfarin not indicated	No	Contra-indication	5924 (1.21)	5793 (1.13)	4367 (0.89)	3960 (0.80)	4273 (0.86)	4057 (0.89)	28374 (0.96)
2526	TJ53.00	Adverse reaction to salicylates	Yes	Contra-indication	4477 (0.91)	4973 (0.97)	5043 (1.03)	4709 (0.95)	4353 (0.88)	3840 (0.84)	27395 (0.93)
12619	9hG1.00	Excepted from smoking quality indicators: Informed dissent	No	Informed dissent	2819 (0.57)	3657 (0.72)	4574 (0.93)	5512 (1.11)	5400 (1.09)	5164 (1.13)	27126 (0.92)
11039	9h21.00	Excepted from stroke quality indicators: Patient unsuitable	No	Contra-indication	6263 (1.27)	4951 (0.97)	4669 (0.95)	4117 (0.83)	3789 (0.77)	3116 (0.68)	26905 (0.91)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
12860	9hE0.00	Except chronic kidney disease qual indic: Patient unsuitable	No	Contra-indication	2705 (0.55)	3843 (0.75)	3439 (0.70)	5752 (1.16)	6196 (1.25)	4526 (0.99)	26461 (0.90)
6175	8I24.00	Aspirin prophylaxis contra-indicated	No	Contra-indication	8230 (1.67)	5947 (1.16)	4156 (0.85)	3015 (0.61)	2566 (0.52)	1993 (0.43)	25907 (0.88)
11673	9hA1.00	Excepted from asthma quality indicators: Patient unsuitable	No	Contra-indication	5476 (1.11)	4355 (0.85)	3730 (0.76)	3819 (0.77)	3567 (0.72)	2863 (0.62)	23810 (0.81)
10512	8I66.00	Aspirin not indicated	No	Contra-indication	4322 (0.88)	4376 (0.86)	3729 (0.76)	3895 (0.79)	3566 (0.72)	3747 (0.82)	23635 (0.80)
11752	8BL3.00	Patient on maximal tolerated anticonvulsant therapy	No	Contra-indication	3877 (0.79)	3788 (0.74)	3867 (0.79)	3370 (0.68)	3266 (0.66)	3670 (0.80)	21838 (0.74)
12262	8I3X.00	Diabetic retinopathy screening refused	No	Informed dissent	3059 (0.62)	4835 (0.95)	5436 (1.11)	4914 (0.99)	2389 (0.48)	836 (0.18)	21469 (0.73)
13031	TJC2400	Adverse reaction to simvastatin	Yes	Contra-indication	1936 (0.39)	2827 (0.55)	3553 (0.72)	4022 (0.81)	4330 (0.88)	4493 (0.98)	21161 (0.72)
12732	8I6a.00	Dipyridamole not indicated	No	Contra-indication	1936 (0.39)	2768 (0.54)	2667 (0.54)	3411 (0.69)	3969 (0.80)	4179 (0.91)	18930 (0.64)
11231	8I73.00	Beta blocker not tolerated	No	Contra-indication	3600 (0.73)	3422 (0.67)	2977 (0.61)	2608 (0.53)	1918 (0.39)	1618 (0.35)	16143 (0.55)
19342	212K.00	Hypertension resolved	Yes	Contra-indication	1761 (0.36)	2013 (0.39)	2650 (0.54)	2842 (0.57)	3053 (0.62)	3211 (0.70)	15530 (0.53)
11601	U60CB00	[X]Angiotensin II receptor antag adverse effect therap use	Yes	Contra-indication	1743 (0.35)	2419 (0.47)	2670 (0.54)	2857 (0.58)	2905 (0.59)	2796 (0.61)	15390 (0.52)
10681	8I63.00	Statin not indicated	No	Contra-indication	3758 (0.76)	3222 (0.63)	2562 (0.52)	2027 (0.41)	1904 (0.38)	1886 (0.41)	15359 (0.52)
11352	14LK.00	H/O: aspirin allergy	Yes	Contra-indication	2215 (0.45)	2465 (0.48)	2646 (0.54)	2702 (0.55)	2645 (0.53)	2427 (0.53)	15100 (0.51)
11529	8I76.00	Statin not tolerated	No	Contra-indication	2328 (0.47)	2246 (0.44)	2346 (0.48)	2634 (0.53)	2558 (0.52)	2298 (0.50)	14410 (0.49)
11750	9h92.00	Except from mental health quality indicators: Informed diss	No	Informed dissent	1652 (0.34)	1821 (0.36)	2051 (0.42)	2563 (0.52)	2687 (0.54)	3457 (0.75)	14231 (0.48)
11074	9h22.00	Excepted from stroke quality indicators: Informed dissent	No	Informed dissent	1935 (0.39)	2049 (0.40)	2253 (0.46)	2173 (0.44)	2254 (0.46)	2243 (0.49)	12907 (0.44)
30300	U60B700	[X]Beta-adrenorecep antag caus advers eff in ther use, NEC	Yes	Contra-indication	2026 (0.41)	2099 (0.41)	2119 (0.43)	2117 (0.43)	2033 (0.41)	1807 (0.39)	12201 (0.41)
11164	8I70.00	Aspirin not tolerated	No	Contra-indication	2466 (0.50)	2368 (0.46)	1898 (0.39)	1354 (0.27)	1385 (0.28)	1238 (0.27)	10709 (0.36)
20747	TJC7900	Adverse reaction to ramipril	Yes	Contra-indication	827 (0.17)	1267 (0.25)	1618 (0.33)	1904 (0.38)	2107 (0.43)	2217 (0.48)	9940 (0.34)



CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
12560	8I6N.00	Anticoagulation not indicated	No	Contra-indication	1467 (0.30)	1968 (0.39)	1498 (0.31)	1330 (0.27)	1888 (0.38)	1615 (0.35)	9766 (0.33)
18824	8I3W.00	Diabetic foot examination declined	No	Informed dissent	1038 (0.21)	1281 (0.25)	1485 (0.30)	1652 (0.33)	1652 (0.33)	2490 (0.54)	9598 (0.33)
8385	2126000	Epilepsy resolved	Yes	Contra-indication	1432 (0.29)	1465 (0.29)	1653 (0.34)	1670 (0.34)	1647 (0.33)	1647 (0.36)	9514 (0.32)
35383	9OLD.00	Diabetic patient unsuitable for digital retinal photography	No	Contra-indication	1337 (0.27)	1627 (0.32)	1506 (0.31)	1619 (0.33)	1690 (0.34)	1692 (0.37)	9471 (0.32)
13029	U604800	[X]Clopidogrel causing adverse effects in therapeutic use	Yes	Contra-indication	1201 (0.24)	1412 (0.28)	1640 (0.33)	1749 (0.35)	1709 (0.35)	1649 (0.36)	9360 (0.32)
10568	8I28.00	Angiotensin converting enzyme inhibitors contraindicated	No	Contra-indication	2516 (0.51)	2337 (0.46)	1494 (0.30)	1040 (0.21)	841 (0.17)	827 (0.18)	9055 (0.31)
11350	8I74.00	Angiotensin converting enzyme inhibitor not tolerated	No	Contra-indication	2114 (0.43)	2220 (0.43)	1578 (0.32)	1075 (0.22)	951 (0.19)	946 (0.21)	8884 (0.30)
13033	14LL.00	H/O: betablocker allergy	Yes	Contra-indication	1059 (0.22)	1228 (0.24)	1510 (0.31)	1664 (0.34)	1628 (0.33)	1571 (0.34)	8660 (0.29)
10684	8I2F.00	Influenza vaccination contraindicated	No	Contra-indication	872 (0.18)	756 (0.15)	1348 (0.27)	1667 (0.34)	1883 (0.38)	2024 (0.44)	8550 (0.29)
11672	9h61.00	Excepted from epilepsy quality indicators: Patient unsuitabl	No	Contra-indication	2169 (0.44)	1663 (0.33)	1421 (0.29)	1065 (0.22)	1017 (0.21)	1041 (0.23)	8376 (0.28)
19391	33BE.00	Exercise tolerance test contraindicated	Yes	Contra-indication	1061 (0.22)	1333 (0.26)	1531 (0.31)	1611 (0.33)	1549 (0.31)	1274 (0.28)	8359 (0.28)
11014	8I38.00	Aspirin prophylaxis refused	No	Informed dissent	1569 (0.32)	1499 (0.29)	1343 (0.27)	1334 (0.27)	1285 (0.26)	1128 (0.25)	8158 (0.28)
11726	8I3Y.00	Blood pressure procedure refused	No	Informed dissent	1384 (0.28)	1435 (0.28)	1097 (0.22)	1268 (0.26)	1277 (0.26)	1246 (0.27)	7707 (0.26)
18747	8I6F.00	Diabetic retinopathy screening not indicated	No	Contra-indication	1595 (0.32)	2022 (0.40)	1725 (0.35)	1308 (0.26)	610 (0.12)	224 (0.05)	7484 (0.25)
12247	8I6G.00	Diabetic foot examination not indicated	No	Contra-indication	1196 (0.24)	1444 (0.28)	1612 (0.33)	1319 (0.27)	862 (0.17)	854 (0.19)	7287 (0.25)
40100	9hE1.00	Exc chronic kidney disease quality indicators: Inform dissen	No	Informed dissent	303 (0.06)	694 (0.14)	854 (0.17)	1491 (0.30)	1896 (0.38)	1862 (0.41)	7100 (0.24)
11712	9h62.00	Excepted from epilepsy quality indicators: Informed dissent	No	Informed dissent	1075 (0.22)	1064 (0.21)	1204 (0.25)	1240 (0.25)	1261 (0.25)	1220 (0.27)	7064 (0.24)
10508	8I25.00	Warfarin contraindicated	No	Contra-indication	2126 (0.43)	1307 (0.26)	1004 (0.20)	832 (0.17)	922 (0.19)	749 (0.16)	6940 (0.24)
10767	8I36.00	Beta blocker therapy refused	No	Informed dissent	1465 (0.30)	1321 (0.26)	1160 (0.24)	1142 (0.23)	990 (0.20)	752 (0.16)	6830 (0.23)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
30674	8I2M.00	Spirometry reversibility testing contraindicated	No	Contra-indication	1351 (0.27)	1384 (0.27)	1272 (0.26)	1136 (0.23)	1007 (0.20)	647 (0.14)	6797 (0.23)
30644	9hG0.00	Excepted from smoking quality indicators: Patient unsuitable	No	Contra-indication	1673 (0.34)	1263 (0.25)	1107 (0.23)	1240 (0.25)	721 (0.15)	693 (0.15)	6697 (0.23)
13026	TJC6200	Adverse reaction to atenolol	Yes	Contra-indication	1239 (0.25)	1068 (0.21)	1063 (0.22)	1077 (0.22)	1072 (0.22)	1012 (0.22)	6531 (0.22)
11407	8I2K.00	Clopidogrel contraindicated	No	Contra-indication	1994 (0.41)	1403 (0.27)	981 (0.20)	763 (0.15)	741 (0.15)	610 (0.13)	6492 (0.22)
26349	8I3b.00	Spirometry test declined	No	Informed dissent	852 (0.17)	1118 (0.22)	965 (0.20)	1170 (0.24)	1221 (0.25)	1112 (0.24)	6438 (0.22)
12088	14LJ.00	H/O: influenza vaccine allergy	Yes	Contra-indication	941 (0.19)	1054 (0.21)	1096 (0.22)	1103 (0.22)	1077 (0.22)	1010 (0.22)	6281 (0.21)
13043	14LM.00	H/O: angiotensin converting enzyme inhibitor allergy	Yes	Contra-indication	813 (0.17)	974 (0.19)	1065 (0.22)	1113 (0.22)	1085 (0.22)	1175 (0.26)	6225 (0.21)
11465	8I6D.00	Influenza vaccination not indicated	No	Contra-indication	3092 (0.63)	882 (0.17)	603 (0.12)	488 (0.10)	381 (0.08)	416 (0.09)	5862 (0.20)
13030	TJ42100	Adverse reaction to warfarin sodium	Yes	Contra-indication	720 (0.15)	828 (0.16)	993 (0.20)	1073 (0.22)	1087 (0.22)	1010 (0.22)	5711 (0.19)
11510	8I2H.00	Angiotensin II receptor antagonists contraindicated	No	Contra-indication	1367 (0.28)	1495 (0.29)	1033 (0.21)	654 (0.13)	524 (0.11)	497 (0.11)	5570 (0.19)
12135	8I3D.00	Angiotensin converting enzyme inhibitor declined	No	Informed dissent	1169 (0.24)	1428 (0.28)	994 (0.20)	736 (0.15)	617 (0.12)	482 (0.11)	5426 (0.18)
12848	212J.00	Epilepsy resolved	Yes	Contra-indication	746 (0.15)	827 (0.16)	888 (0.18)	947 (0.19)	944 (0.19)	982 (0.21)	5334 (0.18)
28995	9hF0.00	Except from atr fib quality indicators: Patient unsuitable	No	Contra-indication	906 (0.18)	1071 (0.21)	908 (0.18)	874 (0.18)	871 (0.18)	704 (0.15)	5334 (0.18)
30573	U605100	[X]Salicylates causing adverse effects in therapeutic use	Yes	Contra-indication	722 (0.15)	810 (0.16)	894 (0.18)	937 (0.19)	929 (0.19)	896 (0.20)	5188 (0.18)
28622	2126300	Diabetes resolved	Yes	Contra-indication	573 (0.12)	716 (0.14)	854 (0.17)	914 (0.18)	955 (0.19)	1072 (0.23)	5084 (0.17)
12813	8I3E.00	Warfarin declined	No	Informed dissent	728 (0.15)	795 (0.16)	717 (0.15)	698 (0.14)	878 (0.18)	1034 (0.23)	4850 (0.16)
13025	U60K400	[X]Influenza vaccine causing adverse effects therapeutic use	Yes	Contra-indication	656 (0.13)	763 (0.15)	805 (0.16)	808 (0.16)	788 (0.16)	787 (0.17)	4607 (0.16)
12827	8I6L.00	Spirometry not indicated	No	Contra-indication	678 (0.14)	831 (0.16)	755 (0.15)	690 (0.14)	767 (0.16)	783 (0.17)	4504 (0.15)
12571	8I75.00	Angiotensin II receptor antagonist not tolerated	No	Contra-indication	789 (0.16)	1041 (0.20)	943 (0.19)	583 (0.12)	504 (0.10)	464 (0.10)	4324 (0.15)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
22335	8I3P.00	Angiotensin II receptor antagonist declined	No	Informed dissent	847 (0.17)	1204 (0.24)	807 (0.16)	528 (0.11)	489 (0.10)	367 (0.08)	4242 (0.14)
25917	9h72.00	Excepted from thyroid quality indicators: Informed dissent	No	Informed dissent	686 (0.14)	724 (0.14)	773 (0.16)	707 (0.14)	630 (0.13)	694 (0.15)	4214 (0.14)
10808	8I27.00	Statins contraindicated	No	Contra- indication	1170 (0.24)	824 (0.16)	679 (0.14)	545 (0.11)	522 (0.11)	417 (0.09)	4157 (0.14)
26495	U60C414	[X]Adverse reaction to lisinopril	Yes	Contra- indication	399 (0.08)	507 (0.10)	581 (0.12)	660 (0.13)	696 (0.14)	748 (0.16)	3591 (0.12)
12815	8I3R.00	Clopidogrel declined	No	Informed dissent	640 (0.13)	670 (0.13)	557 (0.11)	519 (0.10)	577 (0.12)	590 (0.13)	3553 (0.12)
19218	8I3S.00	Exercise tolerance test refused	Yes	Informed dissent	584 (0.12)	607 (0.12)	617 (0.13)	618 (0.12)	545 (0.11)	471 (0.10)	3442 (0.12)
18692	9hA..00	Exception reporting: asthma quality indicators	No	Unknown	542 (0.11)	1069 (0.21)	759 (0.15)	544 (0.11)	325 (0.07)	87 (0.02)	3326 (0.11)
18766	212H.00	Diabetes resolved	Yes	Contra- indication	331 (0.07)	409 (0.08)	481 (0.10)	532 (0.11)	583 (0.12)	635 (0.14)	2971 (0.10)
21928	TJC4400	Adverse reaction to dipyridamole	Yes	Contra- indication	200 (0.04)	290 (0.06)	489 (0.10)	643 (0.13)	667 (0.13)	676 (0.15)	2965 (0.10)
30749	9hH0.00	Excepted heart failure quality indicators: Patient unsuitabl	No	Contra- indication	159 (0.03)	558 (0.11)	627 (0.13)	638 (0.13)	473 (0.10)	414 (0.09)	2869 (0.10)
31224	8I2b.00	Dipyridamole contraindicated	No	Contra- indication	486 (0.10)	518 (0.10)	441 (0.09)	478 (0.10)	491 (0.10)	389 (0.08)	2803 (0.10)
11685	9h71.00	Excepted from thyroid quality indicators: Patient unsuitable	No	Contra- indication	755 (0.15)	520 (0.10)	400 (0.08)	298 (0.06)	341 (0.07)	350 (0.08)	2664 (0.09)
89207	8I6d.00	Spirometry reversibility testing not indicated	No	Contra- indication	3 (0.00)	87 (0.02)	428 (0.09)	751 (0.15)	836 (0.17)	493 (0.11)	2598 (0.09)
34108	9h3..00	Exception reporting: hypertension quality indicators	No	Unknown	595 (0.12)	498 (0.10)	458 (0.09)	438 (0.09)	315 (0.06)	179 (0.04)	2483 (0.08)
30641	9hD0.00	Excepted from dementia quality indicators: Patient unsuitabl	No	Contra- indication	320 (0.07)	440 (0.09)	378 (0.08)	371 (0.07)	358 (0.07)	511 (0.11)	2378 (0.08)
11790	8I72.00	Clopidogrel not tolerated	No	Contra- indication	476 (0.10)	505 (0.10)	408 (0.08)	282 (0.06)	380 (0.08)	298 (0.07)	2349 (0.08)
28574	9h4..00	Exception reporting: diabetes quality indicators	No	Unknown	501 (0.10)	469 (0.09)	439 (0.09)	404 (0.08)	282 (0.06)	156 (0.03)	2251 (0.08)
13034	TJC2500	Adverse reaction to pravastatin	Yes	Contra- indication	197 (0.04)	282 (0.06)	363 (0.07)	414 (0.08)	458 (0.09)	527 (0.12)	2241 (0.08)
21039	TJC7800	Adverse reaction to enalapril	Yes	Contra- indication	227 (0.05)	323 (0.06)	392 (0.08)	419 (0.08)	421 (0.09)	405 (0.09)	2187 (0.07)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
12816	8I3n.00	Dipyridamole declined	No	Informed dissent	222 (0.05)	305 (0.06)	299 (0.06)	411 (0.08)	441 (0.09)	460 (0.10)	2138 (0.07)
34360	9h9..00	Exception reporting: mental health quality indicators	No	Unknown	1162 (0.24)	498 (0.10)	118 (0.02)	120 (0.02)	85 (0.02)	104 (0.02)	2087 (0.07)
34768	TJ42.00	Adverse reaction to anticoagulants	Yes	Contra-indication	176 (0.04)	260 (0.05)	337 (0.07)	392 (0.08)	382 (0.08)	381 (0.08)	1928 (0.07)
13046	8I2R.00	Anticoagulation contraindicated	No	Contra-indication	403 (0.08)	411 (0.08)	320 (0.07)	257 (0.05)	270 (0.05)	238 (0.05)	1899 (0.06)
7309	ZV14800	[V]Personal history of aspirin allergy	Yes	Contra-indication	286 (0.06)	307 (0.06)	328 (0.07)	324 (0.07)	311 (0.06)	302 (0.07)	1858 (0.06)
12814	8I3d.00	Anticoagulation declined	No	Informed dissent	262 (0.05)	342 (0.07)	265 (0.05)	246 (0.05)	311 (0.06)	286 (0.06)	1712 (0.06)
25369	ZV14D00	[V]PH angiotensin-converting-enzyme inhibitor allergy	Yes	Contra-indication	261 (0.05)	267 (0.05)	278 (0.06)	264 (0.05)	245 (0.05)	234 (0.05)	1549 (0.05)
11613	9h11.00	Excepted from LVD quality indicators: Patient unsuitable	No	Contra-indication	1036 (0.21)	322 (0.06)	74 (0.02)	50 (0.01)	43 (0.01)	24 (0.01)	1549 (0.05)
11789	8I71.00	Warfarin not tolerated	No	Contra-indication	269 (0.05)	275 (0.05)	251 (0.05)	182 (0.04)	237 (0.05)	167 (0.04)	1381 (0.05)
39114	9hF1.00	Excepted from atrial fibrillation qual indic: Inform dissent	No	Informed dissent	140 (0.03)	203 (0.04)	226 (0.05)	264 (0.05)	223 (0.05)	230 (0.05)	1286 (0.04)
13367	U605112	[X] Adverse reaction to aspirin	Yes	Contra-indication	183 (0.04)	199 (0.04)	212 (0.04)	227 (0.05)	225 (0.05)	216 (0.05)	1262 (0.04)
18717	9h5..00	Exception reporting: COPD quality indicators	No	Unknown	320 (0.07)	318 (0.06)	222 (0.05)	162 (0.03)	96 (0.02)	138 (0.03)	1256 (0.04)
10963	9h0..00	Exception reporting: CHD quality indicators	No	Unknown	278 (0.06)	282 (0.06)	234 (0.05)	163 (0.03)	122 (0.02)	88 (0.02)	1167 (0.04)
13040	14LN.00	H/O: angiotensin II receptor antagonist allergy	Yes	Contra-indication	155 (0.03)	196 (0.04)	206 (0.04)	201 (0.04)	201 (0.04)	189 (0.04)	1148 (0.04)
11703	9h81.00	Excepted from cancer quality indicators: Patient unsuitable	No	Contra-indication	395 (0.08)	212 (0.04)	188 (0.04)	132 (0.03)	115 (0.02)	83 (0.02)	1125 (0.04)
32463	14LP.00	H/O: warfarin allergy	Yes	Contra-indication	132 (0.03)	154 (0.03)	188 (0.04)	206 (0.04)	207 (0.04)	198 (0.04)	1085 (0.04)
48970	9hC..00	Exception reporting: depression quality indicators	No	Unknown	79 (0.02)	257 (0.05)	295 (0.06)	178 (0.04)	109 (0.02)	120 (0.03)	1038 (0.04)
43491	8I7J.00	Dipyridamole not tolerated	No	Contra-indication	93 (0.02)	191 (0.04)	171 (0.03)	167 (0.03)	201 (0.04)	142 (0.03)	965 (0.03)
20916	U60B711	[X] Adverse reaction to betablockers	Yes	Contra-indication	122 (0.02)	131 (0.03)	143 (0.03)	159 (0.03)	154 (0.03)	140 (0.03)	849 (0.03)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
30745	8I7A.00	Anticoagulation not tolerated	No	Contra-indication	149 (0.03)	199 (0.04)	170 (0.03)	93 (0.02)	127 (0.03)	93 (0.02)	831 (0.03)
10962	9h2..00	Exception reporting: stroke quality indicators	No	Unknown	188 (0.04)	144 (0.03)	159 (0.03)	130 (0.03)	109 (0.02)	79 (0.02)	809 (0.03)
46626	9hE..00	Exception reporting: chronic kidney disease quality indicato	No	Unknown	70 (0.01)	250 (0.05)	218 (0.04)	84 (0.02)	87 (0.02)	56 (0.01)	765 (0.03)
40805	9hD1.00	Excepted from dementia quality indicators: Informed dissent	No	Informed dissent	68 (0.01)	85 (0.02)	124 (0.03)	110 (0.02)	164 (0.03)	143 (0.03)	694 (0.02)
42993	TJC6z00	Adverse reaction to betablockers NOS	Yes	Contra-indication	105 (0.02)	107 (0.02)	111 (0.02)	121 (0.02)	121 (0.02)	117 (0.03)	682 (0.02)
42312	14LX.00	H/O: dipyridamole allergy	Yes	Contra-indication	37 (0.01)	62 (0.01)	99 (0.02)	125 (0.03)	124 (0.03)	129 (0.03)	576 (0.02)
14000	56F1.00	Echocardiogram declined	Yes	Informed dissent	84 (0.02)	85 (0.02)	90 (0.02)	95 (0.02)	100 (0.02)	106 (0.02)	560 (0.02)
47141	U60C413	[X] Adverse reaction to ramipril	Yes	Contra-indication	65 (0.01)	72 (0.01)	85 (0.02)	101 (0.02)	112 (0.02)	116 (0.03)	551 (0.02)
30752	U604200	[X]Anticoagulant causing adverse effects in therapeutic use	Yes	Contra-indication	74 (0.02)	88 (0.02)	103 (0.02)	103 (0.02)	90 (0.02)	89 (0.02)	547 (0.02)
48351	U60B715	[X] Adverse reaction to atenolol	Yes	Contra-indication	76 (0.02)	84 (0.02)	86 (0.02)	95 (0.02)	95 (0.02)	96 (0.02)	532 (0.02)
64062	9hH1.00	Excepted heart failure quality indicators: Informed dissent	No	Informed dissent	18 (0.00)	98 (0.02)	84 (0.02)	117 (0.02)	104 (0.02)	83 (0.02)	504 (0.02)
30772	ZV14F00	[V]Personal history of influenza vaccine allergy	Yes	Contra-indication	64 (0.01)	74 (0.01)	83 (0.02)	89 (0.02)	89 (0.02)	83 (0.02)	482 (0.02)
48350	TJC7700	Adverse reaction to captopril	Yes	Contra-indication	47 (0.01)	61 (0.01)	88 (0.02)	93 (0.02)	90 (0.02)	83 (0.02)	462 (0.02)
30522	9h82.00	Excepted from cancer quality indicators: Informed dissent	No	Informed dissent	73 (0.01)	62 (0.01)	87 (0.02)	84 (0.02)	84 (0.02)	51 (0.01)	441 (0.01)
45535	9h6..00	Exception reporting: epilepsy quality indicators	No	Unknown	58 (0.01)	73 (0.01)	85 (0.02)	83 (0.02)	79 (0.02)	47 (0.01)	425 (0.01)
58678	9hG..00	Exception reporting: smoking quality indicators	No	Unknown	43 (0.01)	56 (0.01)	52 (0.01)	98 (0.02)	26 (0.01)	33 (0.01)	308 (0.01)
42580	U605111	[X] Adverse reaction to salicylates	Yes	Contra-indication	41 (0.01)	51 (0.01)	51 (0.01)	53 (0.01)	50 (0.01)	50 (0.01)	296 (0.01)
30638	8I3w.00	Cholesterol test declined	No	Informed dissent	33 (0.01)	38 (0.01)	38 (0.01)	62 (0.01)	51 (0.01)	59 (0.01)	281 (0.01)
46541	U60B71C	[X] Adverse reaction to betablockers NOS	Yes	Contra-indication	40 (0.01)	41 (0.01)	44 (0.01)	48 (0.01)	52 (0.01)	48 (0.01)	273 (0.01)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
28649	9h12.00	Excepted from LVD quality indicators: Informed dissent	No	Informed dissent	147 (0.03)	37 (0.01)	25 (0.01)	10 (0.00)	5 (0.00)	20 (0.00)	244 (0.01)
30714	56F0.00	CT scan brain declined	Yes	Informed dissent	42 (0.01)	37 (0.01)	35 (0.01)	38 (0.01)	42 (0.01)	34 (0.01)	228 (0.01)
46076	TJC6400	Adverse reaction to metoprolol	Yes	Contra-indication	32 (0.01)	35 (0.01)	37 (0.01)	39 (0.01)	41 (0.01)	39 (0.01)	223 (0.01)
34469	ZV14E00	[V]PH of angiotensin II receptor antagonist allergy	Yes	Contra-indication	35 (0.01)	38 (0.01)	36 (0.01)	33 (0.01)	33 (0.01)	37 (0.01)	212 (0.01)
28681	9h7..00	Exception reporting: thyroid quality indicators	No	Unknown	16 (0.00)	24 (0.00)	50 (0.01)	30 (0.01)	45 (0.01)	40 (0.01)	205 (0.01)
39564	TJC6700	Adverse reaction to sotalol	Yes	Contra-indication	30 (0.01)	28 (0.01)	32 (0.01)	33 (0.01)	39 (0.01)	40 (0.01)	202 (0.01)
45023	U60C412	[X] Adverse reaction to enalapril	Yes	Contra-indication	21 (0.00)	23 (0.00)	25 (0.01)	29 (0.01)	31 (0.01)	27 (0.01)	156 (0.01)
34213	9h1..00	Exception reporting: LVD quality indicators	No	Unknown	55 (0.01)	69 (0.01)	13 (0.00)	12 (0.00)	4 (0.00)	1 (0.00)	154 (0.01)
90935	9hH..00	Exception reporting: heart failure quality indicators	No	Unknown	6 (0.00)	49 (0.01)	25 (0.01)	33 (0.01)	12 (0.00)	6 (0.00)	131 (0.00)
63350	9hF..00	Exception reporting: atrial fibrillation quality indicators	No	Unknown	38 (0.01)	40 (0.01)	19 (0.00)	12 (0.00)	12 (0.00)	2 (0.00)	123 (0.00)
68285	U60C314	[X] Adverse reaction to isosorbide mononitrate	Yes	Contra-indication	14 (0.00)	13 (0.00)	15 (0.00)	18 (0.00)	20 (0.00)	17 (0.00)	97 (0.00)
41412	U60B712	[X] Adverse reaction to propranolol	Yes	Contra-indication	10 (0.00)	11 (0.00)	16 (0.00)	17 (0.00)	21 (0.00)	21 (0.00)	96 (0.00)
47554	ZV14C00	[V]Personal history of betablocker allergy	Yes	Contra-indication	13 (0.00)	17 (0.00)	20 (0.00)	15 (0.00)	14 (0.00)	15 (0.00)	94 (0.00)
30713	5695.00	Magnetic resonance imaging scan declined	Yes	Informed dissent	14 (0.00)	13 (0.00)	11 (0.00)	14 (0.00)	17 (0.00)	14 (0.00)	83 (0.00)
55949	U60C316	[X] Adverse reaction to dipyridamole	Yes	Contra-indication	5 (0.00)	7 (0.00)	9 (0.00)	17 (0.00)	20 (0.00)	19 (0.00)	77 (0.00)
44341	9hD..00	Exception reporting: dementia quality indicators	No	Unknown	8 (0.00)	12 (0.00)	3 (0.00)	6 (0.00)	28 (0.01)	6 (0.00)	63 (0.00)
36674	TJ42000	Adverse reaction to heparin	Yes	Contra-indication	7 (0.00)	8 (0.00)	10 (0.00)	12 (0.00)	15 (0.00)	10 (0.00)	62 (0.00)
70388	TJ42300	Adverse reaction to phenindione	Yes	Contra-indication	6 (0.00)	9 (0.00)	9 (0.00)	10 (0.00)	10 (0.00)	11 (0.00)	55 (0.00)
52662	TJC6800	Adverse reaction to timolol	Yes	Contra-indication	7 (0.00)	6 (0.00)	7 (0.00)	7 (0.00)	9 (0.00)	11 (0.00)	47 (0.00)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
35480	TJ42z00	Adverse reaction to anticoagulants NOS	Yes	Contra-indication	4 (0.00)	5 (0.00)	6 (0.00)	6 (0.00)	12 (0.00)	10 (0.00)	43 (0.00)
39450	U604213	[X] Adverse reaction to warfarin sodium	Yes	Contra-indication	7 (0.00)	6 (0.00)	8 (0.00)	7 (0.00)	6 (0.00)	4 (0.00)	38 (0.00)
47857	U604211	[X] Adverse reaction to anticoagulants	Yes	Contra-indication	5 (0.00)	5 (0.00)	7 (0.00)	6 (0.00)	4 (0.00)	3 (0.00)	30 (0.00)
60147	ZV14B00	[V]Personal history of clopidogrel allergy	Yes	Contra-indication	2 (0.00)	4 (0.00)	6 (0.00)	6 (0.00)	5 (0.00)	5 (0.00)	28 (0.00)
12334	9h8..00	Exception reporting: cancer quality indicators	No	Unknown	8 (0.00)	6 (0.00)	5 (0.00)	4 (0.00)	1 (0.00)	2 (0.00)	26 (0.00)
43499	TJC6100	Adverse reaction to acebutolol	Yes	Contra-indication	4 (0.00)	5 (0.00)	5 (0.00)	4 (0.00)	3 (0.00)	3 (0.00)	24 (0.00)
73878	U60B717	[X] Adverse reaction to metoprolol	Yes	Contra-indication	2 (0.00)	4 (0.00)	4 (0.00)	5 (0.00)	4 (0.00)	4 (0.00)	23 (0.00)
14001	5534.00	Angiocardiology declined	Yes	Informed dissent	2 (0.00)	4 (0.00)	4 (0.00)	4 (0.00)	3 (0.00)	2 (0.00)	19 (0.00)
68465	U60C411	[X] Adverse reaction to captopril	Yes	Contra-indication	5 (0.00)	4 (0.00)	2 (0.00)	3 (0.00)	1 (0.00)	1 (0.00)	16 (0.00)
49679	U60B71A	[X] Adverse reaction to sotalol	Yes	Contra-indication	2 (0.00)	2 (0.00)	3 (0.00)	3 (0.00)	3 (0.00)	3 (0.00)	16 (0.00)
96808	U604216	[X] Adverse reaction to anticoagulants NOS	Yes	Contra-indication	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	12 (0.00)
61025	ZV14A00	[V]Personal history of warfarin allergy	Yes	Contra-indication	3 (0.00)	3 (0.00)	2 (0.00)	1 (0.00)	1 (0.00)	2 (0.00)	12 (0.00)
92414	TJ42200	Adverse reaction to nicoumalone	Yes	Contra-indication	1 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	11 (0.00)
73787	U60C312	[X] Adverse reaction to glyceryl trinitrate	Yes	Contra-indication	2 (0.00)	2 (0.00)	2 (0.00)	1 (0.00)	2 (0.00)	2 (0.00)	11 (0.00)
61975	TJC6500	Adverse reaction to nadolol	Yes	Contra-indication	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	2 (0.00)	1 (0.00)	11 (0.00)
96532	U60C311	[X] Adverse reaction to coronary vasodilator	Yes	Contra-indication	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	2 (0.00)	3 (0.00)	9 (0.00)
49682	U604212	[X] Adverse reaction to heparin	Yes	Contra-indication	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	6 (0.00)
57521	TJC6300	Adverse reaction to labetalol	Yes	Contra-indication	0 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	5 (0.00)
94109	TJC6600	Adverse reaction to oxprenolol	Yes	Contra-indication	1 (0.00)	1 (0.00)	0 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	5 (0.00)

CPRD code	Read code	Description	Persistent	Type*	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Total
65814	U60B716	[X] Adverse reaction to labetalol	Yes	Contra-indication	2 (0.00)	1 (0.00)	1 (0.00)	0 (0.00)	0 (0.00)	1 (0.00)	5 (0.00)
96151	U60C313	[X] Adverse reaction to isosorbide dinitrate	Yes	Contra-indication	0 (0.00)	0 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	2 (0.00)	5 (0.00)
70518	U60C318	[X] Adverse reaction to coronary vasodilators NOS	Yes	Contra-indication	0 (0.00)	0 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)	4 (0.00)
96531	U60B714	[X] Adverse reaction to acebutolol	Yes	Contra-indication	1 (0.00)	1 (0.00)	1 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (0.00)

\* Types include: informed dissent (refusal), contraindication (unsuitability) and unknown reason (generic code).



**Table A5: Predictors of exception reporting (at least one exception code within each year and patient); logistic regression analyses on ONS linked data from 357 practices.**

	Odds Ratios (99% Confidence interval)		
	All reasons*†	Clinical contraindication‡	Informed dissent
<i>QOF year</i>			
2006/7	Reference	Reference	Reference
2007/8	1.01(0.9999,1.03)	0.92(0.90,0.94)	1.13(1.11,1.15)
2008/9	0.96(0.95,0.98)	0.90(0.88,0.91)	1.06(1.04,1.08)
2009/10	1.06(1.04,1.07)	0.996(0.98,1.02)	1.16(1.14,1.18)
2010/11	1.24(1.22,1.26)	1.12(1.09,1.14)	1.40(1.37,1.42)
2011/12	1.20(1.18,1.22)	1.12(1.10,1.14)	1.29(1.27,1.32)
List size (1000s)	1.01(1.01,1.01)	0.99(0.99,0.997)	1.02(1.02,1.02)
<i>English region</i>			
North East	Reference	Reference	Reference
North West	1.09(1.02,1.16)	1.66(1.52,1.81)	0.75(0.70,0.80)
Yorkshire & The Humber	0.69(0.64,0.75)	1.01(0.91,1.11)	0.58(0.54,0.63)
East Midlands	1.15(1.06,1.25)	1.60(1.43,1.78)	0.93(0.86,1.01)
West Midlands	0.67(0.63,0.72)	1.02(0.94,1.12)	0.49(0.46,0.53)
East of England	1.09(1.02,1.17)	1.89(1.72,2.07)	0.65(0.61,0.70)
South West	1.11(1.04,1.19)	1.84(1.68,2.01)	0.70(0.65,0.75)
South Central	0.87(0.81,0.93)	1.23(1.13,1.35)	0.67(0.62,0.72)
London	0.70(0.66,0.75)	0.94(0.86,1.03)	0.61(0.57,0.65)
South East Coast	0.70(0.66,0.75)	0.93(0.85,1.02)	0.63(0.58,0.67)
<i>Practice deprivation quintile</i>			
1 (least deprived)	Reference	Reference	Reference
2	1.29(1.25,1.33)	1.60(1.53,1.67)	1.01(0.97,1.04)
3	1.51(1.46,1.57)	1.77(1.70,1.85)	1.15(1.11,1.20)
4	1.27(1.23,1.31)	1.49(1.43,1.57)	1.02(0.98,1.06)
5	1.34(1.29,1.39)	1.41(1.35,1.48)	1.19(1.14,1.24)
<i>Gender</i>			
Female	Reference	Reference	Reference
Male	1.59(1.56,1.62)	1.40(1.37,1.44)	1.53(1.49,1.56)
Age	1.02(1.02,1.02)	1.04(1.04,1.04)	1.01(1.005,1.01)
<i>Patient deprivation quintile</i>			
1 (least deprived)	Reference	Reference	Reference
2	1.07(1.04,1.10)	1.14(1.10,1.18)	1.00(0.97,1.03)
3	1.12(1.08,1.15)	1.14(1.10,1.19)	1.09(1.06,1.13)
4	1.18(1.15,1.22)	1.22(1.17,1.27)	1.15(1.11,1.19)
5	1.22(1.17,1.26)	1.44(1.38,1.51)	1.07(1.03,1.11)
<i>Number of conditions<sup>¶</sup></i>			
One	Reference	Reference	Reference
Two	3.82(3.75,3.88)	4.28(4.18,4.38)	2.68(2.63,2.74)
Three	10.43(10.18,10.69)	16.32(15.82,16.83)	4.02(3.91,4.13)
Four or more	30.34(29.43,31.28)	68.69(66.12,71.37)	5.17(5.00,5.35)

\* Clinical contraindication, informed dissent or reason unknown. Logistical exceptions were not included in analyses.

† No. of observations=5787456, No of subjects=1414897, Log likelihood=-1906771, Wald Chi<sup>2</sup>=177557.

‡ No. of observations=5787456, No of subjects=1414897, Log likelihood=-1233953, Wald Chi<sup>2</sup>=155098.

§ No. of observations=5787456, No of subjects=1414897, Log likelihood=-1278646, Wald Chi<sup>2</sup>=44177.

¶ From the 16 conditions included in the analyses: atrial fibrillation, asthma, hypertension, cancer, coronary heart disease, heart failure, chronic kidney disease, chronic obstructive pulmonary disease, dementia, depression, diabetes mellitus, epilepsy, learning disability, severe mental illness, stroke and hypothyroidism.

Table A6: Exception reporting (all reasons\*) as a predictor of survival in the subsequent year; proportional-hazards survival analyses on ONS linked data from 357 practices.

	Hazard Ratios (99% Confidence Interval)	
	CPRD deaths <sup>†</sup>	ONS deaths <sup>‡</sup>
<i>Exception reported<sup>§</sup></i>		
All reasons	1.38(1.35,1.41)	1.38(1.35,1.41)
Age <sup>¶</sup>	1.07(1.05,1.09)	1.07(1.05,1.09)
<i>Gender</i>		
Female	Reference	Reference
Male	1.29(1.26,1.31)	1.28(1.25,1.30)
<i>Smoking status</i>		
Never smoked	Reference	Reference
Ex-smoker	0.96(0.94,0.98)	0.97(0.95,0.996)
Current smoker	1.58(1.53,1.64)	1.60(1.55,1.66)
Missing <sup>¶</sup>	6.19(0.95,40.30)	8.45(1.19,59.85)
<i>Patient deprivation quintile</i>		
1 (least deprived)	Reference	Reference
2	1.07(1.04,1.10)	1.06(1.03,1.09)
3	1.15(1.11,1.18)	1.12(1.09,1.16)
4	1.22(1.18,1.26)	1.20(1.16,1.24)
5	1.36(1.31,1.41)	1.32(1.27,1.37)
Practice list size (1000s)	1.001(0.9995,1.003)	1.000(0.999,1.002)
<i>Practice deprivation quintile</i>		
1 (least deprived)	Reference	Reference
2	1.01(0.97,1.04)	0.99(0.96,1.03)
3	0.97(0.93,1.001)	0.98(0.95,1.01)
4	0.96(0.93,0.997)	0.99(0.95,1.02)
5	1.03(0.99,1.07)	1.03(0.99,1.07)
<i>Conditions</i>		
Atrial fibrillation	1.33(1.30,1.37)	1.33(1.29,1.36)
Asthma	0.92(0.89,0.95)	0.92(0.89,0.95)
Hypertension	0.90(0.88,0.92)	0.90(0.88,0.92)
Cancer <sup>¶</sup>	2.75(1.93,3.93)	1.60(1.11,2.31)
Coronary heart disease	0.98(0.96,1.01)	0.98(0.96,1.005)
Heart failure	1.71(1.66,1.77)	1.69(1.63,1.74)
Chronic kidney disease <sup>¶</sup>	1.50(1.07,2.12)	1.62(1.14,2.29)
Chronic obstructive pulmonary disease	1.76(1.70,1.81)	1.73(1.68,1.79)
Dementia <sup>¶</sup>	3.52(2.12,5.86)	3.14(1.89,5.22)
Depression	1.05(1.03,1.08)	1.06(1.04,1.08)
Diabetes mellitus <sup>¶</sup>	1.52(1.03,2.22)	1.39(0.94,2.05)
Epilepsy	1.67(1.56,1.78)	1.69(1.58,1.80)
Learning disability <sup>¶</sup>	12.02(0.53,274.09)	9.44(0.35,258.31)
Severe mental illness	1.46(1.38,1.54)	1.43(1.35,1.51)
Stroke	1.33(1.29,1.36)	1.32(1.29,1.36)
Hypothyroidism	0.99(0.96,1.02)	0.99(0.96,1.02)

	Hazard Ratios (99% Confidence Interval)	
	CPRD deaths <sup>†</sup>	ONS deaths <sup>‡</sup>
<i>Time-varying (x log(_t))</i>		
Age	1.01(0.998,1.01)	1.01(0.999,1.01)
Smoking status: missing	0.40(0.16,0.99)	0.34(0.13,0.89)
Cancer	0.93(0.79,1.10)	1.20(1.01,1.43)
Chronic kidney disease	0.90(0.77,1.06)	0.87(0.74,1.03)
Dementia	0.82(0.65,1.04)	0.89(0.70,1.13)
Diabetes mellitus	0.90(0.76,1.08)	0.94(0.78,1.13)
Learning disability	0.46(0.10,2.14)	0.52(0.10,2.64)

\* Clinical contraindication, informed dissent or reason unknown. Logistical exceptions were not included in analyses.

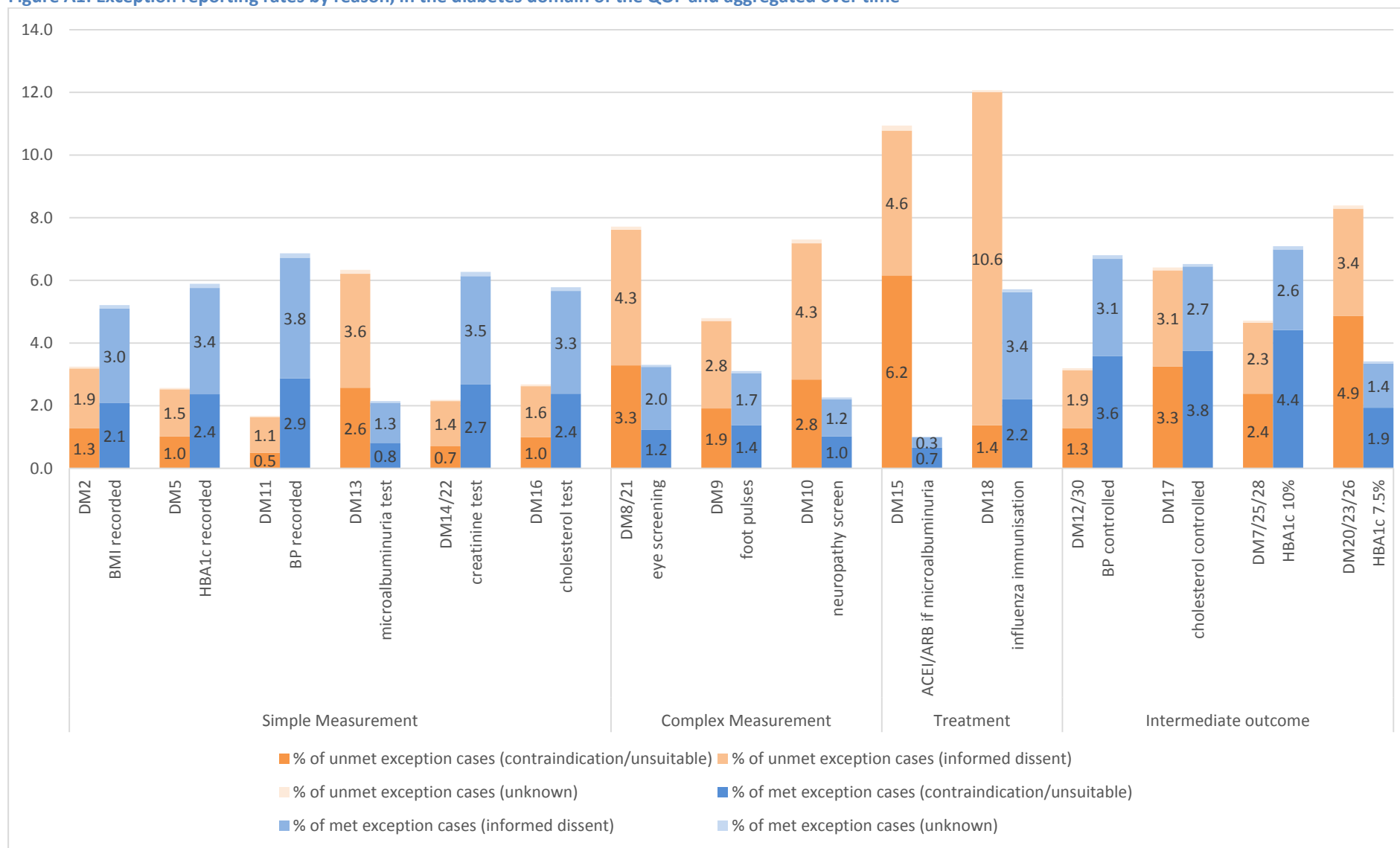
† No. of observations / time at risk=4416374, No of subjects=1194389, No. of failures=68567, Log pseudolikelihood=-869257, Wald Chi<sup>2</sup>=119932.

‡ No. of observations / time at risk=4416374, No of subjects=1194389, No. of failures=68756, Log pseudolikelihood=-869508, Wald Chi<sup>2</sup>=121371.

§ At least one code.

¶ Interpretation of the hazard ratios for these covariates is not straightforward because of the inclusion of the time-varying components.

Figure A1: Exception reporting rates by reason, in the diabetes domain of the QOF and aggregated over time\*\*†‡



\* Details on the indicators are provided in appendix table A3

† DM9 changes significantly in 2011/12 so calculations for that indicator are limited to 2006/7-2010/11

‡ The reason for the first exception associated with a patient is reported