

## Manuscript Details

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<b>Title</b>	Ethnic differences in the severity and clinical management of type 2 diabetes at time of diagnosis: A cohort study in the UK Clinical Practice Research Datalink
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### Abstract

**Aims:** To characterize ethnic differences in the severity and clinical management of type 2 diabetes at initial diagnosis. **Methods:** An observational cohort study of 179,886 people with incident type 2 diabetes between 2004 and 2017 in the Clinical Practice Research Datalink was undertaken; 63.4% of the cohort were of white ethnicity, 3.9% south Asian, and 1.6% black. Ethnic differences in clinical profile at diagnosis, consultation rates, and risk factor recording were derived from linear and logistic regression. Cox-proportional hazards regression was used to determine ethnic differences in time to initiation of therapeutic and non-therapeutic management following diagnosis. All analyses adjusted for age, sex, deprivation, and clustering by practice. **Results:** In the 12 months prior to diagnosis, non-white groups had fewer consultations compared to white groups, but risk factor recording was better than or equivalent to white groups for 9/10 risk factors for south Asian groups and 8/10 risk factors for black groups ( $p < 0.002$ ). Blood pressure, BMI, cholesterol, eGFR, and CVD risk levels were more favourable in non-white groups, and prevalence of macrovascular disease was significantly lower ( $p < 0.003$ ). Time to initiation of antidiabetic treatment and first risk assessment was faster in non-white groups relative to white groups, while time to risk factor measurement and diabetes review was slower. **Conclusions:** We find limited evidence of systematic ethnic inequalities around the time of type 2 diabetes diagnosis. Ethnic disparities in downstream consequences may relate to genetic risk factors, or manifest later in the care pathway, potentially in relation to long-term risk factor control.

<b>Keywords</b>	Type 2 diabetes; ethnicity; epidemiology; inequalities; primary care; treatment
<b>Taxonomy</b>	Electronic Health Record, Antidiabetic Agent, Prospective Cohort Study, Ethnic Health Disparity, Type 2 Diabetes, Symptom Management in Primary Care
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## Submission Files Included in this PDF

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Figure 1\_drpc.docx [Figure]

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## Research Data Related to this Submission

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2<sup>nd</sup> August 2019

Dear Editors,

**Re: Ethnic differences in the severity and clinical management of type 2 diabetes at time of diagnosis: A cohort study in the UK Clinical Practice Research Datalink**

Though marked ethnic differences in the risk of long-term vascular outcomes among people with type 2 diabetes have been established in UK populations, the extent to which these inequalities stem from modifiable factors such as quality of diabetes management have not previously been explored in a large, representative, population-based sample.

In a study funded by the Wellcome Trust, we present a large UK based study to date to examine ethnic differences in the clinical characteristics and clinical management of type 2 diabetes around time of initial diagnosis. We utilised high quality observational data from the UK CPRD cohort to examine these associations in nearly 180,000 UK adults aged 18 and over diagnosed with type 2 diabetes between 2004 and 2017.

We show that, despite a lower consultation rate and higher burden of diagnosed pre-diabetes, south Asian and black African/Caribbean groups have better capture of key risk factors, a lower age at diagnosis, and better or equivalent cardio-metabolic profile at diagnosis. Furthermore, following diagnosis, initiation of antidiabetic treatment, diabetes education, and risk assessment is faster for black and south Asian individuals. Overall, our findings suggest that downstream inequalities in diabetes outcomes do not appear to stem wholly from inequalities around the time of initial diagnosis, and in fact, highlight several positive aspects of primary care-based diabetes management.

Ethnic differences in the prevalence of diabetes, care and outcomes remains a key area of research worldwide has yet to reach its peak. We believe that DRCP would be the ideal place for the dissemination of our study, which we believe would be of great interest to your readership.

Thank you for considering our study for publication; we look forward to hearing your decision.

Yours sincerely

**Rohini Mathur**

(On behalf of all authors)

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Ethnic differences in the severity and clinical management of type 2 diabetes at time of diagnosis: A cohort study in the UK Clinical Practice Research Datalink

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## Highlights

- Non-white groups had better or equivalent capture of risk factors prior to diagnosis compared to white groups
- Risk factor levels at diagnosis were more favourable for south Asian and Black groups
- Initiation of diabetes therapy was faster for non-white groups relative to white groups
- Downstream inequalities in type 2 diabetes do not appear to stem from inequalities in initial diagnosis

## Keywords

Type 2 diabetes, ethnicity, epidemiology, inequalities, primary care, treatment

## Abstract

**Aims:** To characterize ethnic differences in the severity and clinical management of type 2 diabetes at initial diagnosis.

**Methods:** An observational cohort study of 179,886 people with incident type 2 diabetes between 2004 and 2017 in the Clinical Practice Research Datalink was undertaken; 63.4% of the cohort were of white ethnicity, 3.9% south Asian, and 1.6% black. Ethnic differences in clinical profile at diagnosis, consultation rates, and risk factor recording were derived from linear and logistic regression. Cox-proportional hazards regression was used to determine ethnic differences in time to initiation of therapeutic and non-therapeutic management following diagnosis. All analyses adjusted for age, sex, deprivation, and clustering by practice.

**Results:** In the 12 months prior to diagnosis, non-white groups had fewer consultations compared to white groups, but risk factor recording was better than or equivalent to white groups for 9/10 risk factors for south Asian groups and 8/10 risk factors for black groups ( $p < 0.002$ ). Blood pressure, BMI, cholesterol, eGFR, and CVD risk levels were more favourable in non-white groups, and prevalence of macrovascular disease was significantly lower ( $p < 0.003$ ). Time to initiation of antidiabetic treatment and first risk assessment was faster in non-white groups relative to white groups, while time to risk factor measurement and diabetes review was slower.

**Conclusions:** We find limited evidence of systematic ethnic inequalities around the time of type 2 diabetes diagnosis. Ethnic disparities in downstream consequences may relate to genetic risk factors, or manifest later in the care pathway, potentially in relation to long-term risk factor control.

## 1.0 Introduction

Marked ethnic differences in the risk of long-term vascular outcomes among people with type 2 diabetes have been established in UK populations.(1,2) The extent to which these inequalities stem from modifiable factors such as healthcare usage or quality of diabetes management remains unclear. Given that inequalities can accumulate over time, it is vital to identify where along the care pathway differences by ethnicity may arise. Though equity of service provision is a central tenet of the National Health Service (NHS) (3), recent studies have highlighted ethnic differences in access to healthcare, treatment provision and risk factor control. (4-8)

Prior to initial diagnosis, there may be differences in consultation rates and measurement of risk factors, which may impact upon the timeliness of diagnosis and severity of disease at initial presentation. Delays in diagnosis may result in delays in initiation of therapeutic and non-therapeutic management, which may further compound existing inequalities. Though guidelines exist for managing type 2 diabetes in the UK, the extent to which these are followed may differ by ethnic group, leading to inequalities in the downstream consequences of type 2 diabetes.(8,9). The 2018 UK national diabetes audit identified inequalities by age, region, diagnosed serious mental illness and learning disabilities, but did not explore differences by ethnicity, leaving a critical gap in the evidence base.(10)

The aims of this study were to (1) Quantify ethnic differences in risk factor levels and co-morbidities at the time of initial diagnosis, (2) Compare consultation rates and completeness of process of care measures between ethnic groups in the 12 months preceding type 2 diabetes diagnosis, (3) Determine whether the time to initiation of therapeutic and non-therapeutic management following initial diagnosis differed by ethnic group.

## 2.0 Methods

### 2.1 Study design and population

An observational cohort study utilizing the Clinical Practice Research Datalink (CPRD) was undertaken. The CPRD is a clinical research database containing anonymised longitudinal primary care records for approximately 15 million people from 714 general practices. The CPRD population has been shown to be representative of the UK population with respect to age, gender, and ethnicity.<sup>(11)</sup>

Type 2 diabetes was identified using an adjudication algorithm developed to minimize misclassification of diabetes status and type in electronic health records. <sup>(12)</sup> The algorithm assigns an initial diabetes type based on clinical Read codes and then applies a series of logic rules to assign a final diabetes status by identifying congruent or contradictory evidence on age at diagnosis, diabetes complications, and diabetic medications. For individuals with a prescription for antidiabetic medication in the 12 months preceding the first ever type 2 diabetes diagnosis, the diagnosis date was moved forward to the date of prescription as it was deemed plausible that the prescription was related to the initial diagnosis. Adults aged 18 and over registered between 2004 and 2017, with at least 6 months of continuous registration prior to diagnosis of type 2 diabetes (the earliest of diagnosis date or medication date where applicable) were included in the study.

## 2.2 Covariates

Self-reported ethnicity, identified using Read codes, was collapsed into the five categories of the 2001 UK census (white, south Asian, black African/Caribbean, mixed, and other). For individuals with more than one ethnicity code on their primary care record, a previously developed algorithm was used to assign a best 'single' ethnicity - based on the most commonly, and most recently recorded codes (Supplementary material, Figure S1).(13) Age at diagnosis was calculated by subtracting year of birth from year of diagnosis. Deprivation was measured using quintiles of the Index of Multiple Deprivation (IMD). For people with linkage to Office for National Statistics data, quintiles of IMD were derived from the individual's home postcode. For the 40% of people without linkage, quintiles were derived from the postcode of the individual's general practice.

Baseline risk factors were identified from the most recently recorded value in the 12 months preceding type 2 diabetes diagnosis (see supplementary table S3 for all code lists). These included glycated haemoglobin (HbA1c), fasting blood glucose (FBG), systolic and diastolic blood pressure (SBP, DBP), body mass index (BMI), total cholesterol, serum creatinine, consultations (face-to-face or telephone), smoking status ( 'Ever smoker', and 'Never smoker'), alcohol consumption ( 'Non-drinker', 'Moderate drinker', and 'Heavy drinker'), and family history of cardiovascular disease (CVD). Risk assessments included ten-year CVD risk and the NHS health check. The CVD risk score, was categorized into " $\leq 10\%$  risk of developing CVD in the next ten years" and " $>10\%$  risk of developing CVD in the next ten years".

Pre-diabetic states included coded pre-diabetes, family history of diabetes, and gestational diabetes (for women only). Co-morbidities were considered present at baseline if recorded at any time prior to diagnosis. Macrovascular co-morbidities included hypertension, coronary heart disease (CHD, including



myocardial infarction and angina), stroke, and heart failure. Microvascular co-morbidities included chronic kidney disease (CKD), retinopathy, and neuropathy. To examine diabetes management following initial diagnosis, the date of the first antidiabetic medication prescription, consultation, risk factor measurement, diabetes review, offer of structured diabetes education, and risk assessment following diagnosis was extracted.

### 2.3 Statistical analysis

As individuals attending the same general practice may have similar levels of care provision and clinical coding, multilevel modelling was used to account for the clustering of people within practices. Ethnic differences in clinical characteristics at diagnosis were derived from multilevel multivariable linear regression, (for age at diagnosis, HbA1c, FBG, SBP, DBP, BMI, total cholesterol, serum creatinine, and eGFR) and multilevel multivariable logistic regression (for deprivation quintile, presence of pre-diabetes, family history of diabetes, gestational diabetes, family history of cardiovascular disease, any macrovascular disease, any microvascular disease, smoking status, alcohol consumption, CVD risk, and use of antihypertensive or lipid lowering drugs) and adjusted for age at diagnosis, sex, and deprivation. Multilevel multivariable logistic regression adjusted for age at diagnosis, sex, and deprivation was used to determine ethnic differences in the odds of having each risk factor recorded in the 12 months prior to diagnosis. Multivariable Cox-proportional hazards regression adjusting for age at diagnosis, sex, deprivation, raised HbA1c at baseline ( $>7.5\%/53$  mmol/L), and clustering by practice was used to compare time to initiation of therapeutic and non-therapeutic diabetes management between ethnic groups. Follow-up time began at the date of type 2 diabetes onset and ended at the earliest of: first

antidiabetic prescription or care process, leaving the CPRD, last data collection, or death.

## 2.4 Sensitivity Analysis

We conducted a sensitivity analysis comparing outcomes for those of unknown ethnicity to those of any known ethnicity. As recording of ethnicity is a marker of engagement with primary care, we hypothesized that individuals with missing ethnicity would have poorer risk factor control at diagnosis, lower consultation rates, worse capture of risk factors prior to diagnosis and slower initiation of therapeutic and non-therapeutic management relative to those with ethnicity recorded.

## 3.0 Results

From 241,891 individuals diagnosed with type 2 diabetes between April 1<sup>st</sup>, 2004 and December 31<sup>st</sup>, 2016 in the CPRD, 179,886 adults aged 18 or over, with at least 6 months registration prior to initial diagnosis, were included in the study (Figure 1). Within this population, 5% (n=8,871) had been prescribed an antidiabetic medication in the year prior to diagnosis and had their diagnosis date moved backwards. Ethnicity was recorded for 70% of the cohort (n=126,331), of whom 90.2% were white (n=113,988), 5.5% were south Asian (n=6,970), 2.3% were black African/Caribbean (n=2,944), and 1.9% were of other ethnicities, including mixed (n=2,409). Comparisons between the white, south Asian and black ethnic groups are reported below.

### 3.1 Clinical characteristics at initial diagnosis

Crude ethnic differences in clinical characteristics at initial diagnosis are described in table 1 and adjusted differences are illustrated in figure 2. After adjustment for sex, deprivation, calendar year and clustering by practice, age at diagnosis was estimated to be 9.8 years earlier in south Asian groups than white groups (95%CI -10.14, -9.45) and 7 years earlier in black groups (95%CI -7.46, -6.44) relative to white. Black groups were overrepresented in the least affluent deprivation quintile than white groups (OR 1.34, 95%CI 1.20-1.51), while no differences in deprivation between white and south Asian groups were evident. After additionally accounting for age at diagnosis, mean HbA1c was lower in south Asian groups ( $\beta = -1.53$ , 95%CI -2.29, -0.77) and higher in black groups relative to white groups, ( $\beta = 1.88$  95%CI 0.76- 3.00). BMI, total cholesterol, and eGFR were more favourable in non-white groups compared to white groups at diagnosis ( $p < 0.001$ ), while fasting blood glucose, blood pressure and creatinine levels were better for south Asian groups only ( $p < 0.034$ ). The odds of having co-morbid macrovascular disease at diagnosis were reduced in south Asian groups and halved in black groups relative to white (South Asian OR 0.88, 95%CI 0.80-0.96, Black OR 0.50, 9%CI 0.43-0.58); no ethnic differences in the odds of having diagnosed microvascular disease were evident. Furthermore, non-white groups had markedly fewer prescriptions of antihypertensive and lipid lowering drugs in the 12 months preceding diagnosis, and reduced odds of having a CVD risk score over 10% relative to white groups ( $p < 0.007$ ) (Figure 2).

### 3.2 Clinical management prior to diagnosis

In the 12 months prior to diagnosis, consultation frequency was higher for white groups (median 10, IQR 6-17) than for south Asian (median 9, IQR 5-15) and

black groups (median 8, IQR 5-14). After adjustment for age at diagnosis, sex, deprivation, and clustering by practice, the consultation rate was significantly lower for black groups relative to white ( $\beta = -0.60$ , 95%CI -1.05, -0.21). Risk factor recording for south Asian groups was better than or equivalent to non-white groups for 9/10 risk factors of interest, and for black groups, risk factor recording was better or equivalent for 8/10 risk factors (Table 2).

### 3.3 Initiation of therapeutic and non-therapeutic management following diagnosis

After adjustment for age, sex, deprivation, baseline HbA1c, and clustering by practice, time to initiation of antidiabetic therapy was faster south Asian groups (HR 1.10, 95%CI 1.07-1.14) and black groups relative to white (HR 1.18, 95%CI 1.12-1.23). Time to first NHS health check (South Asian HR 1.30, 95%CI 1.10-1.54, Black HR 1.33, 95%CI 1.6-1.68) and offer of structured diabetes education (South Asian HR 1.17, 95%CI 1.10-1.24, Black HR 1.44, 95%CI 1.31-1.56) was also faster in south Asian and black groups relative to white. In contrast, time to first consultation, risk factor measurement and diabetes review was longer or equivalent for both non-white groups relative to white. (Table 3).

### 3.4 Sensitivity analysis

Compared to those of known ethnicity (n=126,331), individuals of unknown ethnicity (n=53,575) were younger at diagnosis ( $\beta = -1.13$ , 95%CI -1.32, -0.94), had reduced odds of risk factors recording in the 12 months prior to diagnosis for 9/10 measures, and slower initiation of therapeutic and non-therapeutic management post diagnosis compared to those of known ethnicity ( $p < 0.001$ ). While individuals of unknown ethnicity had poorer control of HbA1c, FBG, and

blood pressure, they had more favourable cholesterol, BMI and serum creatinine levels ( $p < 0.009$ ). Contrary to expectations, individuals of unknown ethnicity had greater odds of being in the most affluent quintile of deprivation relative to those of known ethnicity (OR 1.14, 95%CI 1.07, 1.21), and a lower prevalence of gestational diabetes, vascular disease, and medication use ( $p < 0.001$ , appendix figures S2 S3 , appendix tables S1,S2).

#### 4.0 Discussion

We report the findings of a large population-based cohort study examining ethnic differences in both the clinical characteristics and clinical management of type two diabetes at time of diagnosis. The results show that, despite a lower consultation rate and higher burden of pre-diabetic states, south Asian and black groups had better capture of risk factors, a lower age at diagnosis, and better or equivalent cardio-metabolic profile at diagnosis. Initiation of antidiabetic treatment was faster for black and south Asian individuals, as was time to first NHS health check and time to offer of structured education. However, time to first consultation and measurement of risk factors was largely slower for non-white groups.

Overall, our findings suggest that downstream inequalities in diabetes outcomes do not appear to stem wholly from inequalities around the time of initial diagnosis, and in fact, highlight several positive aspects of primary care-based diabetes management. Firstly, the similarity of microvascular disease between ethnic groups at time of diagnosis suggests that non-white groups are not being diagnosed at a more severe stage of diabetes progression, and that the latency between true onset of diabetes and clinical diagnosis does not disadvantage ethnic minority groups. Combined with the findings of pro-active treatment initiation and timely risk assessments, our findings suggest that the elevated

burden of cardio-metabolic risk in non-white groups is being appropriately recognized by health care professionals. Delays in risk factor measurement and diabetes review may reflect lower burden of cardio-metabolic risk at time of diagnosis or may be indicative of growing ethnic disparities with respect to longer-term diabetes management.

#### 4.1 Comparisons with existing literature

To date, only two other UK based studies have reported ethnic differences in clinical severity at initial diagnosis of type 2 diabetes.(14,15) The first, a London based study of 1,506 individuals, found that diagnosis was ten years earlier for both black and south Asian populations, and that both non-white groups had lower levels of glycaemia and vascular complications.(14) The second was a 2003 survey of 1,899 individuals with type 2 diabetes which reported equivalent access to diabetes care between black and white individuals- providing further support to our findings of equity between ethnic groups with respect to clinical care before and after diagnosis.(15)

Improvements in both quality of diabetes care and risk factor profiles of people with type 2 diabetes in the UK may be related to several overlapping causes. Firstly, the introduction of the Quality and Outcomes Framework (QOF), which incentivises achievement of quality targets for the care of individuals with chronic conditions, has both improved overall standards of diabetes care and reduced variations in diabetes care provision. (16-18) However, one study found that, though QOF incentivisation had accelerated short-term improvements in blood pressure and cholesterol, ethnic disparities in HbA1c remained – a finding echoed in our own study which showed that black people had significantly higher HbA1c at diagnosis, despite equivalence of other risk factors.(19)

Secondly, awareness amongst health care practitioners about ethnic differences in cardio-metabolic risk has increased steadily and may be responsible for the pro-active management of diabetes in non-white groups. Ethnicity has now been incorporated into clinical guidance documents for hypertension, obesity, type 2 diabetes, and smoking cessation.(20–22) In May 2018, a new guideline for promoting health amongst ethnic minority groups, was published – indicating that further reductions in ethnic disparities may become apparent over time.(23) Thirdly, improvements in risk factor profiles at diagnosis may be part of a larger trend of decreasing vascular disease across the developed world.(24) A 2017 study of trends in type 2 diabetes incidence, prevalence and mortality in the UK found a 32% decrease in all-cause mortality between 2004-2014, and a 2% increase in prevalence, thought to be driven by better survival rather than increasing incidence.(25) The findings of our study reflect these emerging trends, with reductions in ethnic inequalities likely driven by temporal improvements in population levels of risk factors, quality of clinical care, awareness of established ethnic differences in outcomes, and increased effectiveness of novel pharmacological therapies.

### 4.3 Strengths

The strengths and limitations of routine electronic health records (EHRs) for diabetes research have been comprehensively outlined in a recent review.(26) In this study, the sample size was large and drawn from a representative denominator population, allowing sufficient power to detect differences between the main ethnic groups in the UK. The cohort was identified using a validated algorithm, designed to minimize misclassification of diabetes type.(27) In order to account for the step change in diabetes management following the introduction of QOF, entry into the study cohort was restricted to individuals

diagnosed with type 2 diabetes from 2004 onwards. Recent improvements in the completeness of ethnicity recording in the CPRD as part of QOF have facilitated a more robust examination of ethnic differences in conditions managed largely in primary care. (13) Linkage to deprivation data enabled us to separate the influences of ethnicity and deprivation, which are often conflated when examining health disparities. Restricting the study sample to people with at least 6 months of continuous registration prior to their initial diagnosis of type 2 diabetes ensured that diagnoses were truly incident and that all outcomes of interest were measured as close to initiation of diabetes management as possible. General practice characteristics such as size, and participation in local enhanced service schemes have been found to play a large role in observed variations in quality of diabetes care.(28) By accounting for the clustering of people within practices, we were able to appropriately account for the influence of practice level factors on ethnic disparities.

## 4.2 Limitations

As EHRs are primarily used for patient care rather than research, data quality and completeness can vary significantly depending on the time-period, disease area, and indicator of interest. Though financial incentivisation has standardized many aspects of diabetes care, shared decision is now the preferred model for management of many long-term conditions. As such, observed differences in diabetes indicators may be due to active choices by the individual and provider to deviate from standard management plans in order to manage competing priorities. Ethnicity data was not available for 30% of the study cohort, which may have introduced bias. Linkage to other datasets such as the hospital episode statistics may have boosted completeness of ethnicity data and allowed for better generalizability to UK populations with type 2 diabetes. Since ethnicity



data are unlikely to be missing at random, it would have been inappropriate to impute these data. Sensitivity analyses showed that individuals with unknown ethnicity were younger at diagnosis and, surprisingly, less deprived than those of known ethnicity. Coupled with the findings of heterogeneity in clinical profile at diagnosis (poorer risk factor levels but fewer co-morbidities), it is likely that this is a mixed group encompassing younger, healthier, and more affluent individuals who may not need to access healthcare, and individuals who are less healthy, or less able to access care. Deprivation scores derived from the postcode of the general practice were used for 40% of participants without permissions for linkage to individual level data. The relationship between practice level and individual level deprivation will vary greatly between individuals, potentially underestimating the true confounding effect of deprivation on the association between ethnicity and diabetes when using practice level as a proxy.

The dataset did not include information on genetic risk factors, early life exposures, migration history, diet and exercise, and thus unmeasured confounding may have influenced the results. Future studies combining routine EHRs with cohort studies such as the UK Biobank will be valuable in obtaining a complete picture of an individual's health across the life course.

#### 4.4 Conclusions

Overall, we find limited evidence of systematic ethnic inequalities in identification of type 2 diabetes and management of cardio-metabolic risk around the time of initial diagnosis. Findings from this study may be illustrative of a wider trend of shrinking inequalities in diabetes care. Additional investigations into the origin and implications of missingness of ethnicity data are warranted. Future work examining the extent to which ethnic differences are explained by genetic factors and whether ethnic disparities manifest later in the

care pathway, for example, in relation to long-term risk factor control as suggested here, will be necessary to understand how patterns of ethnic disparities in risk factor control and long-term outcomes are evolving in the UK.

## Funding

RM is supported by a Sir Henry Wellcome Postdoctoral Fellowship from the Wellcome Trust (201375/Z/16/Z). The study sponsor was not involved in the design of the study; the collection, analysis, and interpretation of data; writing the report; or the decision to submit the report for publication.

## Contribution statement

RM conceived the study, curated the data, conducted the main statistical analysis and authored the initial manuscript. LP conducted statistical analysis and contributed to the manuscript. RF provided statistical advice and contributed to the manuscript. NC and LS helped conceive the study and contributed to the manuscript. Rohini Mathur is the guarantor for this project.

## Data Availability

The data used for this study comprises anonymised patient records derived from the CPRD. Only the authors have access to the CPRD data. Code lists are available in the supplementary materials and will be uploaded to the LSHTM data compass (<http://datacompass.lshtm.ac.uk>). Researchers should contact the CPRD's Independent Scientific Advisory Committee (ISAC) to obtain access to data.

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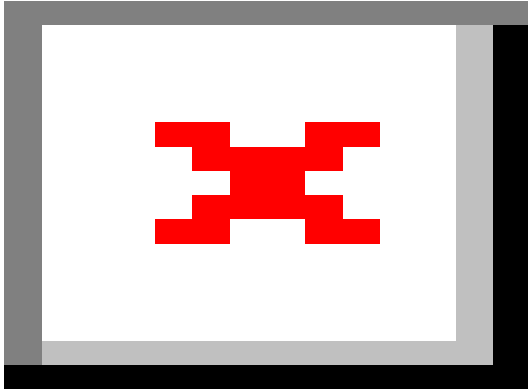
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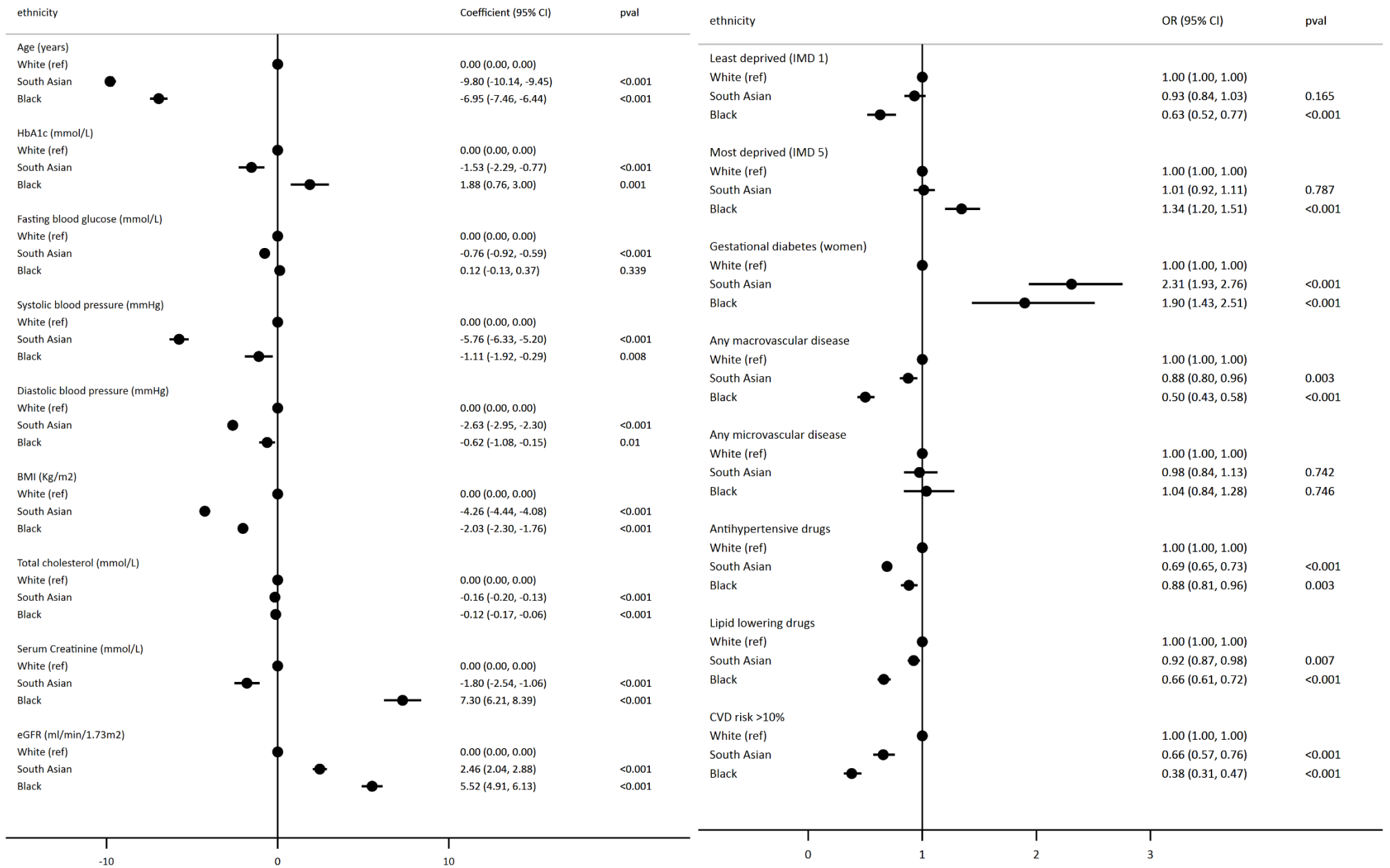
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\*All models adjust for age at diagnosis, sex, deprivation, and clustering by practice

Figure 2. Ethnic differences in clinical severity at type 2 diabetes diagnosis

Table 1. Ethnic differences in clinical characteristics at time of initial Type 2 diabetes diagnosis

		% complete	White	South Asian	Black	Other	Mixed	Unknown
<i>N</i>			113,988	6,970	2,944	1,854	555	53,575
<b>Demographic characteristics</b>	Age at diagnosis (mean, SD)	100.0	63.2 (13.4) 62810	52.6 (13.1)	55.1 (13.1)	56.3 (13.2)	54.6 (13.6)	62 (13.4) 30643
	Male, %	100.0	(55.1)	3767 (54)	1498 (50.9)	1022 (55.1)	304 (54.8)	(57.2)
	Social Deprivation, %	100.0						
	Quintile 1 (Least deprived)		20889 (18.3)	880 (12.6)	169 (5.7)	302 (16.3)	86 (15.5)	11443 (21.4)
	Quintile 2		22486 (19.7)	1081 (15.5)	264 (9)	262 (14.1)	87 (15.7)	8335 (15.6)
	Quintile 3		25343 (22.2)	1456 (20.9)	611 (20.8)	368 (19.8)	120 (21.6)	9973 (18.6)
	Quintile 4		22278 (19.5)	1605 (23)	820 (27.9)	477 (25.7)	117 (21.1)	13255 (24.7)
	Quintile 5 (Most deprived)		22992 (20.2)	1948 (27.9)	1080 (36.7)	445 (24)	145 (26.1)	10569 (19.7)
<b>Health behaviours</b>	Smoking status, %	72.1						
	Non-Smokers		32098 (38.3)	3106 (70.6)	1227 (65.2)	683 (54.6)	189 (49.6)	16406 (43.2)
	Current Smokers		18479 (22) 33282	701 (15.9)	288 (15.3)	258 (20.6)	100 (26.2)	8037 (21.2) 13536
	Ex-Smokers		(39.7)	593 (13.5)	367 (19.5)	311 (24.8)	92 (24.1)	(35.6)
<b>Risk factor level (mean, SD)</b>	HbA1c, mmol/L	52.9	63.2 (22.9)	63.9 (22.7)	66.3 (25)	65 (23.5)	66.6 (24.3)	65.2 (23)
	HbA1c, %	52.9	7.9 (2.1)	8 (2.1)	8.2 (2.3)	8.1 (2.2)	8.2 (2.2)	8.1 (2.1)
	Fasting blood glucose	66.4	10.5 (5)	10.1 (4.7)	10.7 (5.6)	9.9 (4.5)	10.6 (5.3)	10.7 (5.1)
	SBP, mmHg	88.1	142.9 (19.7)	135.5 (18.7)	140.3 (19.5)	138.2 (19.6)	139.2 (20.5)	143.4 (20.2)
	DBP, mmHg	88.1	82.3 (11.6)	82.3 (11.3)	83.8 (11.4)	82.5 (11)	84 (11.7)	82.9 (11.8)
	BMI, Kg/m <sup>2</sup>	63.6	32.3 (6.1)	29.7 (5.3)	31.8 (5.9)	30.1 (5.9)	31.3 (6.4)	32.3 (6.1)
	Total cholesterol, mmol/L	78.2	5.2 (1.2)	5.3 (1.2)	5.3 (1.1)	5.3 (1.2)	5.4 (1.2)	5.3 (1.2)
	Serum creatinine, mmol/L	87.0	86.7 (28.6)	78.6 (27.7)	88.5 (42.3)	79.2 (27)	82.4 (25.4)	85.1 (25.9)
	ACR, mg/mmol	2.5	19.6 (46.7)	20.5 (44.3)	15.7 (25.3)	38.1 (70.7)	12.9 (10.8)	20.2 (51.7)
<b>CVD risk score (%)</b>	>10% risk in 10 years	17.6	79.1	58.4	50.8	64	53.6	78.3

<b>Pre-diabetic indicators<sup>+</sup></b>	Pre-diabetes	19007 (16.7)	1310 (18.8)	496 (16.8)	319 (17.2)	96 (17.3)	8693 (16.2)
		14471					
	Family history of diabetes	(12.7)	1916 (27.5)	659 (22.4)	350 (18.9)	127 (22.9)	5941 (11.1)
	Gestational diabetes*	784 (1.5)	237 (7.4)	72 (5)	41 (4.9)	15 (6)	293 (1.3)
	50813						23305
	Family history of CVD	(44.6)	2874 (41.2)	858 (29.1)	660 (35.6)	212 (38.2)	(43.5)
<b>Diagnosed co-morbidities (%)<sup>+</sup></b>		22122					
	Any macrovascular disease	(19.4)	720 (10.3)	211 (7.2)	184 (9.9)	49 (8.8)	8975 (16.8)
	Any microvascular disease	4781 (4.2)	217 (3.1)	101 (3.4)	49 (2.6)	14 (2.5)	1994 (3.7)
		57625					26000
	Hypertension	(50.6)	2320 (33.3)	1375 (46.7)	748 (40.3)	222 (40)	(48.5)
		19260					
	CHD	(16.9)	649 (9.3)	138 (4.7)	162 (8.7)	44 (7.9)	7746 (14.5)
	Stroke	507 (0.4)	12 (0.2)	8 (0.3)	9 (0.5)	0.0	204 (0.4)
	Heart failure	5117 (4.5)	133 (1.9)	90 (3.1)	33 (1.8)	8 (1.4)	2253 (4.2)
	CKD	708 (0.6)	24 (0.3)	16 (0.5)	6 (0.3)	3 (0.5)	267 (0.5)
	Retinopathy	2111 (1.9)	106 (1.5)	56 (1.9)	26 (1.4)	9 (1.6)	979 (1.8)
	Neuropathy	2215 (1.9)	101 (1.4)	38 (1.3)	20 (1.1)	2 (0.4)	845 (1.6)
		69988					
<b>Medications prescribed (%)<sup>+</sup></b>	Antihypertensives	(61.4)	2796 (40.1)	1441 (48.9)	838 (45.2)	258 (46.5)	31095 (58)
		52721					22834
	Lipid lowering	(46.3)	2566 (36.8)	926 (31.5)	729 (39.3)	190 (34.2)	(42.6)

\*Baseline covariate data taken at the date closest to Type 2 diabetes diagnosis in the 12 months preceding diagnosis, (gestational diabetes among women only).

+Pre-diabetic indicators, Diagnosed co-morbidities and medications assumed to be present if recorded and absent if not recorded

Table 2. Risk factor recording and consultations in the 12 months prior to type 2 diabetes diagnosis

	% with risk factor recorded			Adjusted difference					
	White	South Asian	Black	South Asian vs. White			Black vs. White		
N	113,988	6,970	2,944						
Risk Factors	%	%	%	OR	95%CI	p.val	OR	95%CI	p.val
HbA1c	51.8	62.3	60.9	1.37	(1.30,1.45)	<0.001	1.17	(1.08,1.27)	<0.001
Glucose	66.2	60.8	59.4	1.02	(0.97,1.08)	0.455	0.88	(0.81,0.95)	0.002
Blood Pressure	88.9	85.0	87.0	0.99	(0.92,1.06)	0.700	1.08	(0.97,1.19)	0.162
BMI	64.1	64.6	64.6	0.98	(0.93,1.03)	0.345	1.00	(0.92,1.08)	0.950
Total Cholesterol	78.9	80.8	78.6	1.12	(1.06,1.19)	<0.001	1.01	(0.92,1.09)	0.892
Creatinine	87.7	85.3	84.9	1.14	(1.07,1.21)	<0.001	1.07	(0.97,1.17)	0.163
Urine ACR	2.4	1.9	2.1	1.18	(0.96,1.44)	0.117	1.18	(0.89,1.57)	0.242
Smoking Status	73.6	63.1	63.9	0.72	(0.69,0.76)	<0.001	0.75	(0.70,0.81)	<0.001
<b>Risk assessments</b>									
NHS Health Check	4.1	8.4	10.2	1.55	(1.40,1.73)	<0.001	1.49	(1.29,1.72)	<0.001
CVD risk score	18.7	22.3	24.9	1.05	(0.98,1.12)	0.159	1.22	(1.11,1.35)	<0.001
<b>Consultations</b>									
Number of consultations	10 (6-17)	9 (5-15)	8 (5-14)	$\beta$	CI95%	p.val	$\beta$	CI95%	p.val
				-	(-0.10, 0.40)	0.452	-	(-1.05, -0.21)	0.003

\*Logistic and linear regression models adjusted for age at baseline, sex, deprivation, and clustering by practice

Table 3. Time to therapeutic and non-therapeutic clinical management following type 2 diabetes diagnosis

	% receiving clinical management			Median time to first clinical event (months)			Adjusted HR					
	White	South Asian	Black	White	South Asian	Black	SA vs. White			Black vs. White		
N	113,988	6,970	2,944				HR	CI95%	p.val	HR	CI95%	p.val
<b>First post-diagnosis consultation</b>	99.9	99.7	99.8	0.1	0.1	0.1	0.84	(0.81,0.86)	<0.001	0.92	(0.89,0.96)	<0.001
<b>Initiation of antidiabetic therapy</b>	73.2	80.9	78	3.6	2.2	1.8	1.10	(1.07,1.14)	<0.001	1.18	(1.12,1.23)	<0.001
<b>Risk Factor Measurement</b>												
HbA1c	94.8	92.4	89.7	2.7	3.2	3.2	0.93	(0.91,0.96)	<0.001	0.88	(0.84,0.91)	<0.001
Blood Glucose	61.7	58.1	56.2	10.5	10.3	9.2	0.94	(0.91,0.98)	0.001	0.96	(0.91,1.01)	0.125
Urine ACR	59	53.4	56.4	11.4	12.2	10.6	1.01	(0.98,1.05)	0.504	1.05	(1.00,1.11)	0.055
BMI	92.7	91.2	88.6	1.7	2.1	2.4	0.96	(0.94,0.99)	0.010	0.97	(0.93,1.01)	0.115
Blood Pressure	96.3	94.2	93.5	1.4	1.6	1.4	0.91	(0.88,0.93)	<0.001	1.00	(0.96,1.04)	0.872
Total Cholesterol	92.5	90.2	87.6	3.7	4.3	4.1	0.99	(0.97,1.02)	0.667	0.97	(0.93,1.02)	0.220
Smoking Status	93.2	90.4	86.6	3.0	3.4	3.6	0.90	(0.87,0.92)	<0.001	0.87	(0.83,0.91)	<0.001
Serum Creatinine	94.3	90.7	88.3	3.2	4.0	3.8	0.94	(0.92,0.97)	<0.001	0.93	(0.89,0.97)	<0.001
<b>Diabetes Review</b>												
Diabetes Review	82.4	81.1	75.9	6.0	6.7	6.8	1.03	(1.00,1.06)	0.076	1.03	(0.98,1.08)	0.194
Retinopathy Screen	41.1	37.9	41.8	22.8	22.1	19.2	0.98	(0.94,1.02)	0.305	0.93	(0.87,0.98)	0.014
Foot Examination	40	26.9	25.7	26.5	29.8	25.8	0.86	(0.81,0.90)	<0.001	0.92	(0.85,0.99)	0.027
Offer of dietary advice	6.3	3.3	1.5	47.6	43.2	38.2	0.81	(0.71,0.94)	0.005	0.64	(0.48,0.87)	0.004
<b>Structured diabetes education offered</b>	17.2	22.5	25	48.3	40.2	31.0	1.17	(1.10,1.24)	<0.001	1.44	(1.32,1.56)	<0.001
<b>Risk Assessment</b>												
CVD risk score	15.4	20.6	18.6	43.4	34.2	30.8	1.02	(0.96,1.09)	0.463	1.06	(0.96,1.16)	0.249
NHS Health Check	1.7	2.8	3.1	52.1	44.9	38.1	1.30	(1.10,1.54)	0.002	1.32	(1.05,1.67)	0.019

\*All models adjust for age at baseline, sex, deprivation, raised HbA1c at baseline, and clustering by practice. Time to initiation of antidiabetic therapy restricted to those free from antidiabetic medication in 12 months prior to diagnosis date.

## Figure Legends

Figure 1. Study population flowchart

Figure 2. Ethnic differences in clinical severity at type 2 diabetes diagnosis



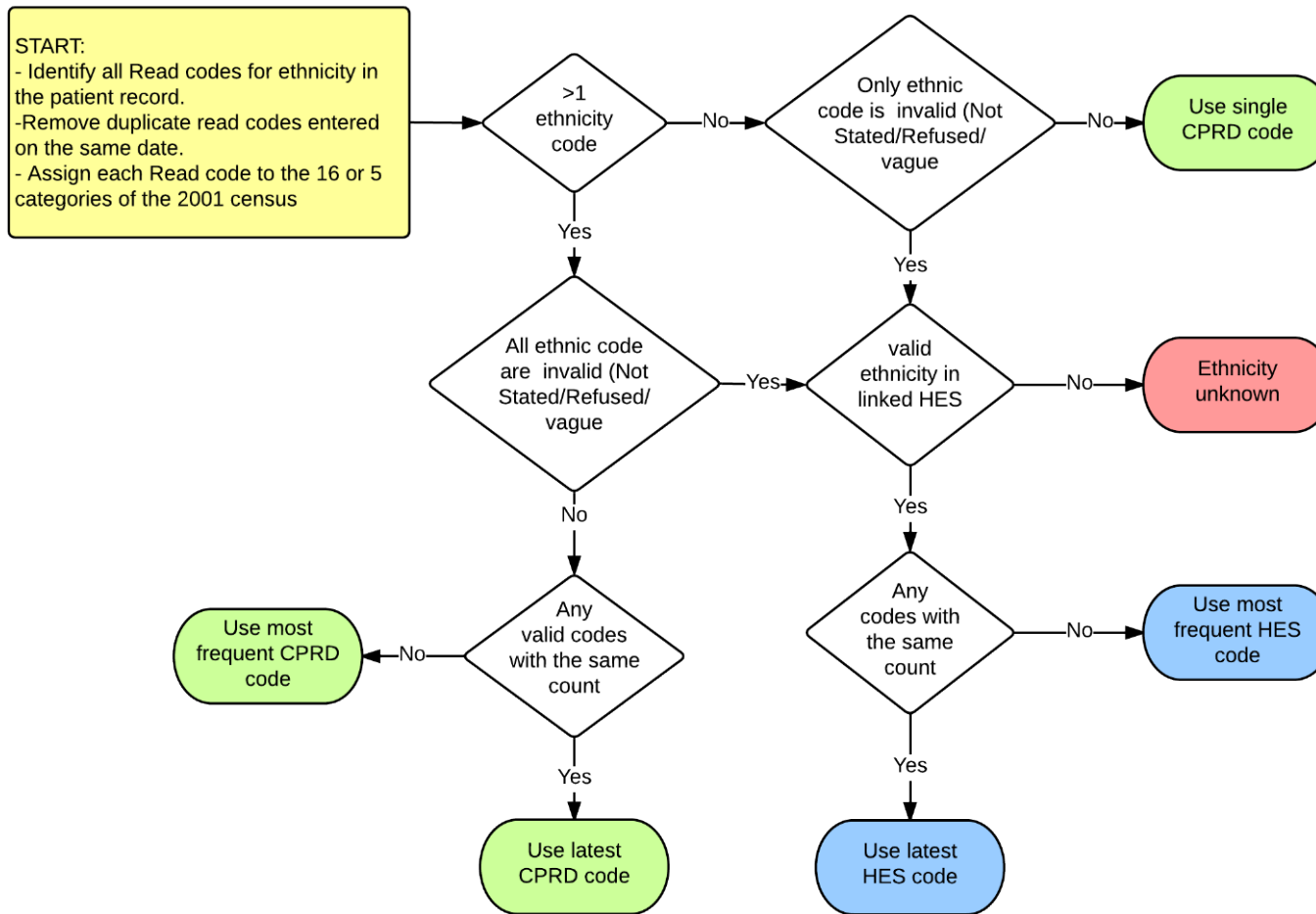


Figure S1. Algorithm to assign ethnicity to study participants (This study had access to CPRD data only)

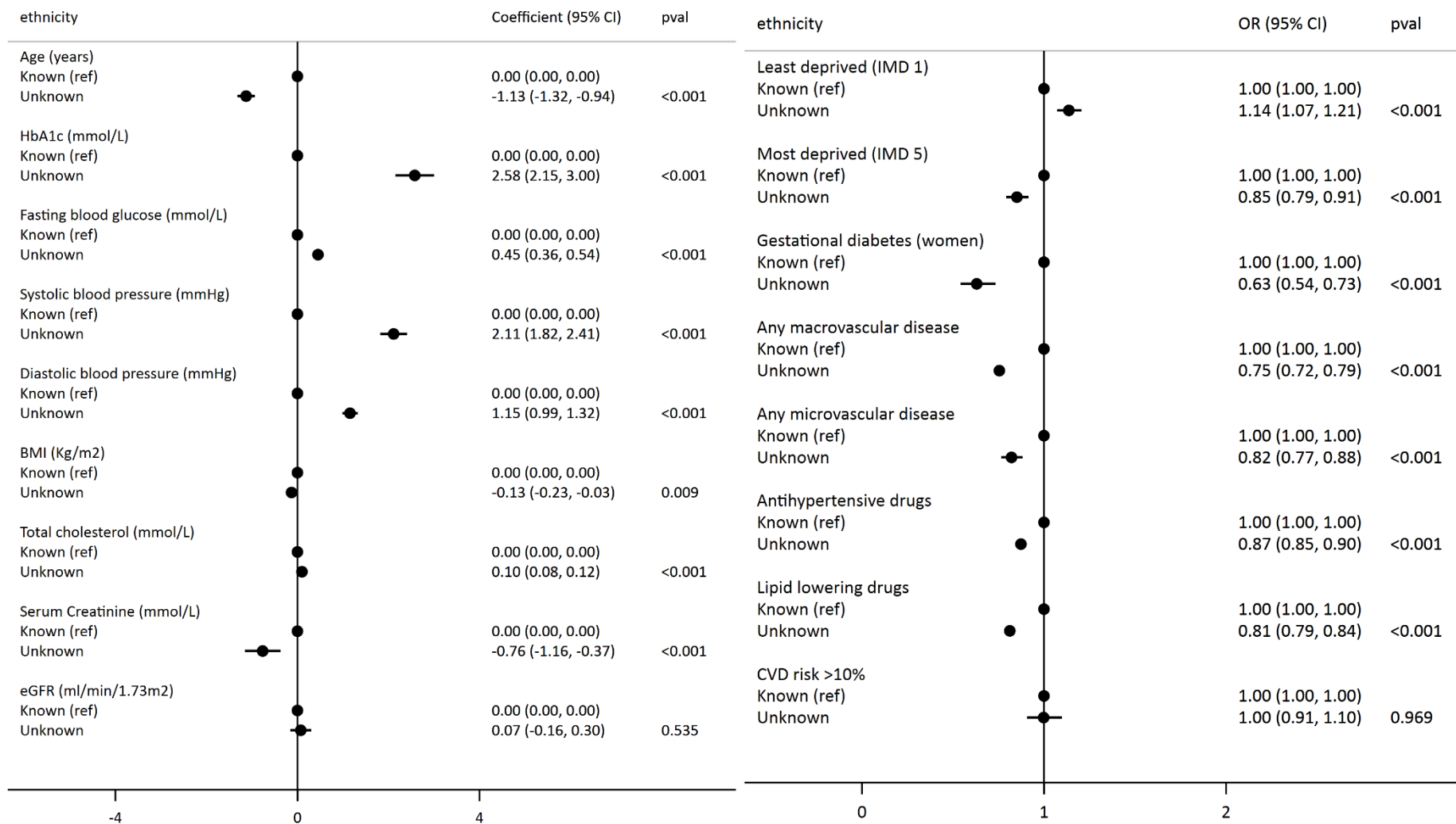


Figure S2: Clinical severity of diabetes at diagnosis for those of known ethnicity compared to those of unknown ethnicity

Table S1. Risk factor recording in the 12 months prior to T2DM diagnosis: Known vs. Unknown ethnicity

N	% with risk factor recorded		Adjusted difference		
	Known	Unknown	Unknown vs Known		
	126,311	53,575			
	%	%	OR	95%CI	p.val
HbA1c	52.8	53.0	0.86	(0.83,0.88)	<0.001
Glucose	65.7	68.1	0.80	(0.78,0.82)	<0.001
Blood Pressure	88.6	87.0	0.76	(0.74,0.79)	<0.001
BMI	64.2	62.2	0.84	(0.82,0.87)	<0.001
Total Cholesterol	79.0	76.3	0.70	(0.69,0.72)	<0.001
Creatinine	87.5	85.9	0.65	(0.63,0.67)	<0.001
Urine ACR	2.4	2.8	0.76	(0.96,1.44)	0.117
Smoking Status	72.7	70.9	0.72	(0.69,0.76)	<0.001
Risk assessments					
NHS Health Check	4.6	2.0	0.81	(0.74,0.89)	<0.001
CVD risk score	19.1	14.2	0.78	(0.75,0.82)	<0.001
Consultations	Median (IQR)		$\beta$	CI95%	p.val
Number of consultations	10 (6-17)	9 (5-15)	-3.00	(-3.14,-2.82)	<0.001

Table S2. Time to first clinical management following T2DM diagnosis: Known vs. Unknown ethnicity

	% receiving clinical management		Median time to first clinical event (months)		Adjusted HR		
	Known	Unknown	Known	Unknown	Unknown vs Known		
					HR	CI95%	p.val
<b>First post-diagnosis consultation</b>	2.6	1.5	50.5	50.4	0.96	(0.87,1.07)	0.488
<b>First antidiabetic medication</b>	94.5	93.9	2.8	2.7	0.95	(0.93,0.96)	<0.001
<b>Risk Factor Measurement</b>							
Fasting blood glucose	92.2	91	3.8	3.6	0.95	(0.94,0.97)	<0.001
HbA1c	92.8	91.9	3.0	2.9	0.91	(0.90,0.93)	<0.001
Urine ACR	73.9	72.1	3.4	3.9	0.89	(0.87,0.91)	<0.001
BMI	38.7	34.7	26.7	26.0	0.95	(0.93,0.98)	<0.001
Blood Pressure	6	4.8	47.0	47.6	0.99	(0.92,1.06)	0.723
Cholesterol	17.7	17.3	47.2	47.3	0.99	(0.95,1.02)	0.438
Creatinine	15.7	13.2	42.4	44.2	1.05	(1.01,1.09)	0.025
CVD Risk score	1.8	.6	51.1	51.0	0.65	(0.55,0.75)	<0.001
<b>Diabetes Review</b>							
Dietary Advice	99.9	99.8	0.1	0.1	0.91	(0.89,0.92)	<0.001

Diabetes review	61.3	65.3	10.4	8.0	0.92	(0.90,0.94)	<0.001
Retinopathy screen	58.6	67.1	11.4	8.0	0.90	(0.88,0.92)	<0.001
Foot examination	96.1	95.7	1.4	1.4	0.93	(0.91,0.94)	<0.001
<b>Structured diabetes education offered</b>	92.5	91.4	1.8	1.7	0.91	(0.90,0.92)	<0.001
<b>Risk Assessment</b>							
CVD risk score	1.8	.6	51.1	51.0	0.65	(0.55,0.75)	<0.001
NHS Health Check	93.9	93.3	3.3	3.1	0.92	(0.91,0.94)	<0.001

\*All models adjust for age at baseline, sex, deprivation, raised HbA1c at baseline, and clustering by practice. Time to initiation of antidiabetic therapy restricted to those free from antidiabetic medication in 12 months prior to diagnosis date

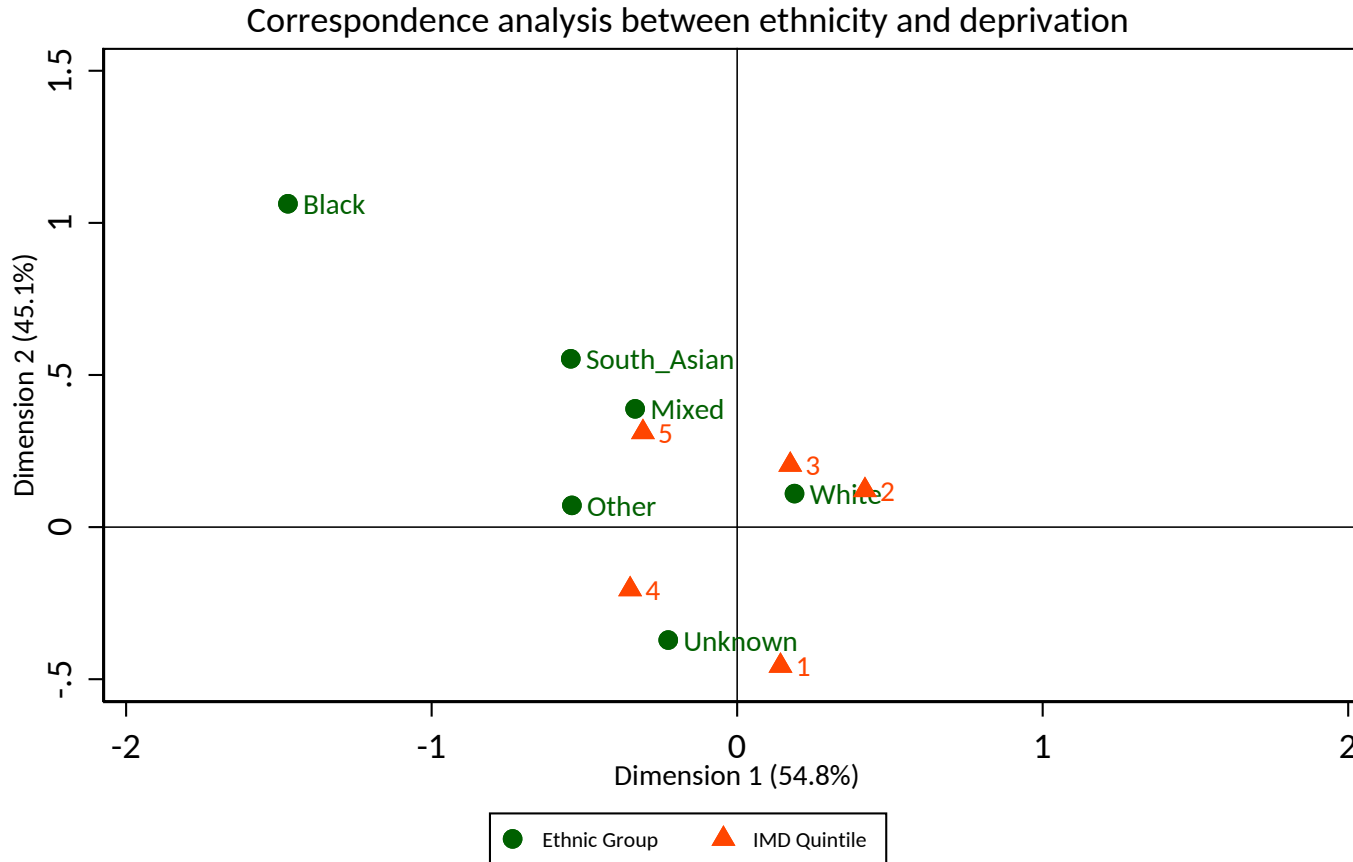


Figure S3. Correspondence analysis plot obtained from the contingency table cross-classifying ethnicity and IMD deprivation quintile

Notes: Correspondence analysis allows visualisation of relationships between two categorical variables in a two-dimensional biplot whereby a measure of association of categories of the two variables (ethnicity and deprivation) is given by the inner product of the vectors that link them to the origin. The distance of the profile points of deprivation and ethnicity from the origin defines their distance from the average socio-economic and ethnic profile. CA biplots capturing 99.4% of the dispersion in the data show a strong association between Black, South-Asian, Mixed and Other groups and the 5th quintile of deprivation (their distance from the origin is large/moderate and the angle between them acute/negligible). The white group appears to be associated with the second and third quintiles of deprivation, although less strongly as they are closer to the origin (i.e. the average deprivation profile). The group of unknown ethnicity appears to be associated with both the 4<sup>th</sup> and 1<sup>st</sup> quintile of deprivation (moderate distance from the origin and acute angle with both quintiles), suggesting this group has a more heterogenous socio-economic composition.

Table S3. Codelists for all study variables

CPRD Medcode	Readcode	Readterm		
Ethnicity			Ethnicity in 16 categories	Ethnicity in 5 categories
10196	9S...00	Ethnic groups (1991 census)	Not Stated	Not Stated
22467	9S1..00	White	British	White
12446	9S10.00	White British	British	White
24837	9S11.00	White Irish	Irish	White
12444	9S12.00	Other white ethnic group	Other White	White
26467	9S13.00	White Scottish	Other White	White
26310	9S14.00	Other white British ethnic group	British	White
12632	9S2..00	Black Caribbean	Caribbean	Black
12778	9S3..00	Black African	African	Black
24339	9S4..00	Black, other, non-mixed origin	Other Black	Black
12452	9S41.00	Black British	Other Black	Black
57435	9S42.00	Black Caribbean/W.I./Guyana	Other Black	Black
47950	9S42.11	Black Caribbean	Other Black	Black
47997	9S42.12	Black West Indian	Other Black	Black
32100	9S42.13	Black Guyana	Other Black	Black
41329	9S43.00	Black N African/Arab/Iranian	Other Black	Black
46812	9S43.11	Black North African	Other Black	Black
57752	9S43.12	Black Arab	Other Black	Black

50286	9S43.13	Black Iranian	Other Black	Black
35412	9S44.00	Black - other African country	African	Black
47965	9S45.00	Black E Afric Asia/Indo-Caribb	Other Black	Black
57753	9S45.11	Black East African Asian	Other Black	Black
57763	9S45.12	Black Indo-Caribbean	Other Black	Black
48005	9S46.00	Black Indian sub-continent	Other Black	Black
35350	9S47.00	Black - other Asian	Other Black	Black
26312	9S48.00	Black Black - other	Other Black	Black
25676	9S5..00	Black - other, mixed	Other Black	Black
25623	9S51.00	Other Black - Black/White orig	Other Mixed	Mixed
32165	9S52.00	Other Black - Black/Asian orig	Other Mixed	Mixed
12482	9S6..00	Indian	Indian	South Asian
24690	9S7..00	Pakistani	Pakistani	South Asian
24740	9S8..00	Bangladeshi	Bangladeshi	South Asian
24272	9S9..00	Chinese	Chinese	Other
30280	9SA..00	Other ethnic non-mixed (NMO)	Other ethnic group	Other
32110	9SA1.00	Brit. ethnic minor. spec.(NMO)	Other ethnic group	Other
57764	9SA2.00	Brit. ethnic minor. unsp (NMO)	Other ethnic group	Other
54593	9SA3.00	Caribbean I./W.I./Guyana (NMO)	Other Black	Black
57094	9SA3.11	Caribbean Island (NMO)	Other Black	Black
57075	9SA3.12	West Indian (NMO)	Other Black	Black



93144	9SA3.13	Guyana (NMO)	Other Black	Black
24962	9SA4.00	N African Arab/Iranian (NMO)	Other ethnic group	Other
47285	9SA4.11	North African Arab (NMO)	Other ethnic group	Other
25082	9SA4.12	Iranian (NMO)	Other ethnic group	Other
47969	9SA5.00	Other African countries (NMO)	African	Black
38097	9SA6.00	E Afric Asian/Indo-Carib (NMO)	Other Asian	South Asian
46818	9SA6.11	East African Asian (NMO)	Other Asian	South Asian
99316	9SA6.12	Indo-Caribbean (NMO)	Other Asian	South Asian
39696	9SA7.00	Indian sub-continent (NMO)	Other Asian	South Asian
26379	9SA8.00	Other Asian (NMO)	Other Asian	South Asian
24270	9SA9.00	Irish (NMO)	Irish	White
45947	9SAA.00	Greek/Greek Cypriot (NMO)	Other ethnic group	Other
45955	9SAA.11	Greek (NMO)	Other ethnic group	Other
47949	9SAA.12	Greek Cypriot (NMO)	Other ethnic group	Other
32066	9SAB.00	Turkish/Turkish Cypriot (NMO)	Other ethnic group	Other
32126	9SAB.11	Turkish (NMO)	Other ethnic group	Other
32069	9SAB.12	Turkish Cypriot (NMO)	Other ethnic group	Other
12633	9SAC.00	Other European (NMO)	Other ethnic group	Other
41214	9SAD.00	Other ethnic NEC (NMO)	Other ethnic group	Other
12696	9SB..00	Other ethnic, mixed origin	Other Mixed	Mixed
47401	9SB1.00	Other ethnic, Black/White orig	Other Mixed	Mixed

32401	9SB2.00	Other ethnic, Asian/White orig	White and Asian	Mixed
35459	9SB3.00	Other ethnic, mixed white orig	Other Mixed	Mixed
32420	9SB4.00	Other ethnic, other mixed orig	Other Mixed	Mixed
32425	9SB5.00	Black Caribbean and White	White and Black Caribbean	Mixed
32443	9SB6.00	Black African and White	White and Black African	Mixed
25411	9SC..00	Vietnamese	Other ethnic group	Other
12429	9SD..00	Ethnic group not given - patient refused	Not Stated	Not Stated
24340	9SE..00	Ethnic group not recorded	Not Stated	Not Stated
32136	9SG..00	Other black ethnic group	Other Black	Black
12668	9SH..00	Other Asian ethnic group	Other Asian	South Asian
47601	9SI..00	Irish traveller	Irish	White
12757	9SJ..00	Other ethnic group	Other ethnic group	Other
45199	9SZ..00	Ethnic groups (census) NOS	Not Stated	Not Stated
12435	9i...00	Ethnic category - 2001 census	Not Stated	Not Stated
12351	9i0..00	British or mixed British - ethnic category 2001 census	British	White
98111	9i00.00	White British - ethnic category 2001 census	British	White
12532	9i1..00	Irish - ethnic category 2001 census	Irish	White
98213	9i10.00	White Irish - ethnic category 2001 census	Irish	White

12421	9i2..00	Other White background - ethnic category 2001 census	Other White	White
12352	9i20.00	English - ethnic category 2001 census	Other White	White
12436	9i21.00	Scottish - ethnic category 2001 census	Other White	White
12681	9i22.00	Welsh - ethnic category 2001 census	Other White	White
28887	9i23.00	Cornish - ethnic category 2001 census	Other White	White
42294	9i24.00	Northern Irish - ethnic category 2001 census	Other White	White
40102	9i25.00	Ulster Scots - ethnic category 2001 census	Other White	White
32778	9i26.00	Cypriot (part not stated) - ethnic category 2001 census	Other White	White
12355	9i27.00	Greek - ethnic category 2001 census	Other White	White
12769	9i28.00	Greek Cypriot - ethnic category 2001 census	Other White	White
12746	9i29.00	Turkish - ethnic category 2001 census	Other White	White
32413	9i2A.00	Turkish Cypriot - ethnic category 2001 census	Other White	White
12412	9i2B.00	Italian - ethnic category 2001 census	Other White	White
55223	9i2C.00	Irish Traveller - ethnic category 2001 census	Other White	White
55113	9i2D.00	Traveller - ethnic category 2001 census	Other White	White
42290	9i2E.00	Gypsy/Romany - ethnic category 2001 census	Other White	White

12467	9i2F.00	Polish - ethnic category 2001 census	Other White	White
12433	9i2G.00	Baltic Estonian/Latvian/Lithuanian - ethn categ 2001 census	Other White	White
28973	9i2H.00	Commonwealth (Russian) Indep States - ethn categ 2001 census	Other White	White
26341	9i2J.00	Kosovan - ethnic category 2001 census	Other White	White
25422	9i2K.00	Albanian - ethnic category 2001 census	Other White	White
46956	9i2L.00	Bosnian - ethnic category 2001 census	Other White	White
28866	9i2M.00	Croatian - ethnic category 2001 census	Other White	White
47074	9i2N.00	Serbian - ethnic category 2001 census	Other White	White
28936	9i2P.00	Other republics former Yugoslavia - ethnic categ 2001 census	Other White	White
26391	9i2Q.00	Mixed Irish and other White - ethnic category 2001 census	Other White	White
12402	9i2R.00	Oth White European/European unsp/Mixed European 2001 census	Other White	White
28900	9i2S.00	Other mixed White - ethnic category 2001 census	Other White	White
12591	9i2T.00	Other White or White unspecified ethnic category 2001 census	Other White	White
12742	9i3..00	White and Black Caribbean - ethnic category 2001 census	White and Black Caribbean	Mixed
12437	9i4..00	White and Black African - ethnic category 2001 census	White and Black African	Mixed

12638	9i5..00	White and Asian - ethnic category 2001 census	White and Asian	Mixed
12873	9i6..00	Other Mixed background - ethnic category 2001 census	Other Mixed	Mixed
12795	9i60.00	Black and Asian - ethnic category 2001 census	Other Mixed	Mixed
49940	9i61.00	Black and Chinese - ethnic category 2001 census	Other Mixed	Mixed
40110	9i62.00	Black and White - ethnic category 2001 census	Other Mixed	Mixed
12706	9i63.00	Chinese and White - ethnic category 2001 census	Other Mixed	Mixed
47005	9i64.00	Asian and Chinese - ethnic category 2001 census	Other Mixed	Mixed
32408	9i65.00	Other Mixed or Mixed unspecified ethnic category 2001 census	Other Mixed	Mixed
12414	9i7..00	Indian or British Indian - ethnic category 2001 census	Indian	South Asian
12460	9i8..00	Pakistani or British Pakistani - ethnic category 2001 census	Pakistani	South Asian
28888	9i9..00	Bangladeshi or British Bangladeshi - ethnic category 2001 census	Bangladeshi	South Asian
12513	9iA..00	Other Asian background - ethnic category 2001 census	Other Asian	South Asian
26392	9iA1.00	Punjabi - ethnic category 2001 census	Other Asian	South Asian
64133	9iA2.00	Kashmiri - ethnic category 2001 census	Other Asian	South Asian

47077	9iA3.00	East African Asian - ethnic category 2001 census	Other Asian	South Asian
12608	9iA4.00	Sri Lankan - ethnic category 2001 census	Other Asian	South Asian
12760	9iA5.00	Tamil - ethnic category 2001 census	Other Asian	South Asian
12887	9iA6.00	Sinhalese - ethnic category 2001 census	Other Asian	South Asian
32399	9iA7.00	Caribbean Asian - ethnic category 2001 census	Other Asian	South Asian
12653	9iA8.00	British Asian - ethnic category 2001 census	Other Asian	South Asian
46056	9iA9.00	Mixed Asian - ethnic category 2001 census	Other Asian	South Asian
28935	9iAA.00	Other Asian or Asian unspecified ethnic category 2001 census	Other Asian	South Asian
12432	9iB..00	Caribbean - ethnic category 2001 census	Caribbean	Black
12350	9iC..00	African - ethnic category 2001 census	African	Black
32389	9iD..00	Other Black background - ethnic category 2001 census	Other Black	Black
12443	9iD0.00	Somali - ethnic category 2001 census	Other Black	Black
32886	9iD1.00	Nigerian - ethnic category 2001 census	Other Black	Black
40097	9iD2.00	Black British - ethnic category 2001 census	Other Black	Black
40096	9iD3.00	Mixed Black - ethnic category 2001 census	Other Black	Black
46047	9iD4.00	Other Black or Black unspecified ethnic category 2001 census	Other Black	Black

12468	9iE..00	Chinese - ethnic category 2001 census	Chinese	Other
12434	9iF..00	Other - ethnic category 2001 census	Other ethnic group	Other
12719	9iF0.00	Vietnamese - ethnic category 2001 census	Other ethnic group	Other
12473	9iF1.00	Japanese - ethnic category 2001 census	Other ethnic group	Other
12420	9iF2.00	Filipino - ethnic category 2001 census	Other ethnic group	Other
12730	9iF3.00	Malaysian - ethnic category 2001 census	Other ethnic group	Other
63872	9iF4.00	Buddhist - ethnic category 2001 census	Other ethnic group	Other
56127	9iF5.00	Hindu - ethnic category 2001 census	Other ethnic group	Other
46063	9iF6.00	Jewish - ethnic category 2001 census	Other ethnic group	Other
47091	9iF7.00	Muslim - ethnic category 2001 census	Other ethnic group	Other
49658	9iF8.00	Sikh - ethnic category 2001 census	Other ethnic group	Other
46059	9iF9.00	Arab - ethnic category 2001 census	Other ethnic group	Other
47028	9iFA.00	North African - ethnic category 2001 census	Other ethnic group	Other
28909	9iFB.00	Mid East (excl Israeli, Iranian & Arab) - eth cat 2001 cens	Other ethnic group	Other
46964	9iFC.00	Israeli - ethnic category 2001 census	Other ethnic group	Other
25937	9iFD.00	Iranian - ethnic category 2001 census	Other ethnic group	Other
45964	9iFE.00	Kurdish - ethnic category 2001 census	Other ethnic group	Other
25451	9iFF.00	Moroccan - ethnic category 2001 census	Other ethnic group	Other
26246	9iFG.00	Latin American - ethnic category 2001 census	Other ethnic group	Other

12756	9iFH.00	South and Central American - ethnic category 2001 census	Other ethnic group	Other
32382	9iFJ.00	Mauritian/Seychellois/Maldivian/St Helena eth cat 2001census	Other ethnic group	Other
26455	9iFK.00	Any other group - ethnic category 2001 census	Other ethnic group	Other
12459	9iG..00	Ethnic category not stated - 2001 census	Not Stated	Not Stated
Type 2 diabetes				
	C10FL	Definite T2 codes		
	C10F4	Definite T2 codes		
	C10F6	Definite T2 codes		
	C10FQ	Definite T2 codes		
	C10FP	Definite T2 codes		
	C10F9	Definite T2 codes		
	C10FG	Definite T2 codes		
	C10FH	Definite T2 codes		
	C10FK	Definite T2 codes		
	C10FJ	Definite T2 codes		
	C10FD	Definite T2 codes		
	C10FR	Definite T2 codes		
	C10FA	Definite T2 codes		
	C10FN	Definite T2 codes		



	C10F3	Definite T2 codes		
	C10F5	Definite T2 codes		
	C10FC	Definite T2 codes		
	C10F.	Definite T2 codes		
	C10F2	Definite T2 codes		
	C10F1	Definite T2 codes		
	C10FM	Definite T2 codes		
	C10F0	Definite T2 codes		
	C10FB	Definite T2 codes		
	C10FE	Definite T2 codes		
	C10FF	Definite T2 codes		
	C10F7	Definite T2 codes		
	C1071	Possible T2 codes		
	C1051	Possible T2 codes		
	C1041	Possible T2 codes		
	C1072	Possible T2 codes		
	C112z	Possible T2 codes		
	C112.	Possible T2 codes		
	L180X	Possible T2 codes		
	C1021	Possible T2 codes		
	C1031	Possible T2 codes		

	C1061	Possible T2 codes		
	C1001	Possible T2 codes		
	L1806	Probable T2 codes		
	C1099	Probable T2 codes		
	C109J	Probable T2 codes		
	C1090	Probable T2 codes		
	C109E	Probable T2 codes		
	C109G	Probable T2 codes		
	C109.	Probable T2 codes		
	C1097	Probable T2 codes		
	C109D	Probable T2 codes		
	C1095	Probable T2 codes		
	C1091	Probable T2 codes		
	C109H	Probable T2 codes		
	C1096	Probable T2 codes		
	C109B	Probable T2 codes		
	C1074	Probable T2 codes		
	C1094	Probable T2 codes		
	C109C	Probable T2 codes		
	C109K	Probable T2 codes		
	C1093	Probable T2 codes		

	C10y1	Probable T2 codes		
	C1092	Probable T2 codes		
	C10z1	Probable T2 codes		
	C109F	Probable T2 codes		
	C109A	Probable T2 codes		
Diet control				
7563	66A3.00	Diabetic on diet only		
Smoking status				
medcode	readcode	readterm		
33	1371.00	Never smoked tobacco		
54	137..00	Tobacco consumption		
60	137L.00	Current non-smoker		
90	137S.00	Ex smoker		
93	137P.00	Cigarette smoker		
776	137K.00	Stopped smoking		
1822	1376.00	Very heavy smoker - 40+cigs/d		
1823	137P.11	Smoker		
1878	1374.00	Moderate smoker - 10-19 cigs/d		
3568	1375.00	Heavy smoker - 20-39 cigs/day		
10558	137R.00	Current smoker		
11788	1371.11	Non-smoker		

12240	137G.00	Trying to give up smoking		
12878	137T.00	Date ceased smoking		
12941	1372.11	Occasional smoker		
12942	137..11	Smoker - amount smoked		
12943	137J.00	Cigar smoker		
12944	1373.00	Light smoker - 1-9 cigs/day		
12945	137M.00	Rolls own cigarettes		
12946	137F.00	Ex-smoker - amount unknown		
12947	137H.00	Pipe smoker		
12951	137Q.11	Smoking restarted		
12952	137Q.00	Smoking started		
12955	1379.00	Ex-moderate smoker (10-19/day)		
12956	137A.00	Ex-heavy smoker (20-39/day)		
12957	1378.00	Ex-light smoker (1-9/day)		
12958	1372.00	Trivial smoker - < 1 cig/day		
12959	137B.00	Ex-very heavy smoker (40+/day)		
12960	137Z.00	Tobacco consumption NOS		
12961	1377.00	Ex-trivial smoker (<1/day)		
12962	137E.00	Tobacco consumption unknown		
12963	137Y.00	Cigar consumption		
12964	137C.00	Keeps trying to stop smoking		

12965	137X.00	Cigarette consumption		
12966	137V.00	Smoking reduced		
12967	137a.00	Pipe tobacco consumption		
13351	137l.00	Passive smoker		
19488	137O.00	Ex cigar smoker		
23017	137U.00	Not a passive smoker		
26470	137N.00	Ex pipe smoker		
30423	137c.00	Thinking about stopping smoking		
30762	137d.00	Not interested in stopping smoking		
31114	137b.00	Ready to stop smoking		
32973	137W.00	Chews tobacco		
41979	137e.00	Smoking restarted		
46300	137g.00	Cigarette pack-years		
46321	137f.00	Reason for restarting smoking		
46654	137D.00	Admitted tobacco cons untrue ?		
62686	137h.00	Minutes from waking to first tobacco consumption		
97029	137k.00	Refusal to give smoking status		
97210	137j.00	Ex-cigarette smoker		
99838	137K000	Recently stopped smoking		
100495	137l.00	Ex roll-up cigarette smoker		
101069	137l000	Exposed to tobacco smoke at home		

101338	137m.00	Failed attempt to stop smoking		
105501	137o.00	Waterpipe tobacco consumption		
105711	137n.00	Total time smoked		
106891	137i.00	Ex-tobacco chewer		
Creatinine (for eGFR)				
5	44J3.00	Serum creatinine		
14563	46W..00	Urine microalbumin		
3927	44J3300	Serum creatinine raised		
9430	4679.00	Urine dipstick for protein		
13736	44JF.00	Plasma creatinine level		
13735	44HG.00	Serum creatine kinase level		
31277	44J3000	Serum creatinine abnormal		
26903	44J3200	Serum creatinine normal		
35545	44J3100	Serum creatinine low		
62062	44JC.00	Corrected plasma creatinine level		
42345	44J3z00	Serum creatinine NOS		
45096	44JD.00	Corrected serum creatinine level		
Alcohol consumption				
medcode	readcode	readterm		
385	1362.11	Drinks rarely		
669	E250000	Nondependent alcohol abuse, unspecified		

749	1362.12	Drinks occasionally		
956	136J.00	Social drinker		
967	1367	Stopped drinking alcohol		
1399	E23..12	Alcohol problem drinking		
1618	1365.00	Heavy drinker - 7-9u/day		
2689	136G.00	Beer drinker		
3782	E250.14	Intoxication - alcohol		
4447	1361.12	Non-drinker alcohol		
7746	E250.00	Nondependent alcohol abuse		
8999	136P.00	Heavy drinker		
9169	R103.00	[D]Alcohol blood level excessive		
10161	2577.11	O/E - alcoholic breath		
12271	E250.11	Drunkenness NOS		
12949	1361	Teetotaller		
12968	136H.00	Drinks beer and spirits		
12969	136I.00	Drinks wine		
12970	1361.11	Non drinker alcohol		
12971	136F.00	Spirit drinker		
12972	1363.00	Light drinker - 1-2u/day		
12974	E250200	Nondependent alcohol abuse, episodic		
12975	1362.00	Trivial drinker - <1u/day		

12977	1366.00	Very heavy drinker - >9u/day		
12979	136M.00	Current non drinker		
12980	136N.00	Light drinker		
12982	136K.00	Alcohol intake above recommended sensible limits		
12983	136E.00	Ex-very heavy drinker-(>9u/d)		
12984	136Q.00	Very heavy drinker		
12985	136O.00	Moderate drinker		
16587	ZV11311	[V]Problems related to lifestyle alcohol use		
17777	E250.13	Inebriety NOS		
19401	136R.00	Binge drinker		
19493	136D.00	Ex-heavy drinker - (7-9u/day)		
19494	136S.00	Hazardous alcohol use		
19495	136C.00	Ex-moderate drinker - (3-6u/d)		
22933	136A.00	Ex-trivial drinker (<1u/day)		
23610	E250100	Nondependent alcohol abuse, continuous		
23978	U81..00	[X]Evid of alcohol involv determind by level of intoxication		
24735	2577	O/E - breath - alcohol smell		
26471	136B.00	Ex-light drinker - (1-2u/day)		



26472	136L.00	Alcohol intake within recommended sensible limits		
27518	E250.12	Hangover (alcohol)		
28150	E250z00	Nondependent alcohol abuse NOS		
30695	136T.00	Harmful alcohol use		
31569	E250300	Nondependent alcohol abuse in remission		
44783	1D19.00	Pain in lymph nodes after alcohol consumption		
84218	13ZY.00	Disqualified from driving due to excess alcohol		
94670	136W.00	Alcohol misuse		
Coronary Heart Disease (QOF Definition)				
240	G3...00	Ischaemic heart disease		
241	G30..00	Acute myocardial infarction		
1204	G30..14	Heart attack		
1344	G340.12	Coronary artery disease		
1414	G33z300	Angina on effort		
1430	G33..00	Angina pectoris		
1431	G311.13	Unstable angina		
1655	G340.11	Triple vessel disease of the heart		
1676	G3z..00	Ischaemic heart disease NOS		

1677	G30..15	MI - acute myocardial infarction		
1678	G308.00	Inferior myocardial infarction NOS		
1792	G3...13	IHD - Ischaemic heart disease		
2491	G30..12	Coronary thrombosis		
3704	G307.00	Acute subendocardial infarction		
3999	G340000	Single coronary vessel disease		
4017	G32..00	Old myocardial infarction		
4656	G311.11	Crescendo angina		
5254	G340100	Double coronary vessel disease		
5387	G301.00	Other specified anterior myocardial infarction		
5413	G340.00	Coronary atherosclerosis		
7320	G343.00	Ischaemic cardiomyopathy		
7347	G311100	Unstable angina		
7696	G33z200	Syncope anginosa		
8935	G302.00	Acute inferolateral infarction		
9276	G31y000	Acute coronary insufficiency		
9413	G31y.00	Other acute and subacute ischaemic heart disease		
9507	G307000	Acute non-Q wave infarction		
9555	G33z500	Post infarct angina		

10562	G307100	Acute non-ST segment elevation myocardial infarction		
11983	G311500	Acute coronary syndrome		
12139	G300.00	Acute anterolateral infarction		
12229	G30X000	Acute ST segment elevation myocardial infarction		
12804	G33z700	Stable angina		
13566	G30..11	Attack - heart		
13571	G30..16	Thrombosis - coronary		
14658	G30z.00	Acute myocardial infarction NOS		
14897	G301z00	Anterior myocardial infarction NOS		
14898	G305.00	Lateral myocardial infarction NOS		
15754	G34z.00	Other chronic ischaemic heart disease NOS		
16408	G32..11	Healed myocardial infarction		
17307	G311200	Angina at rest		
17464	G32..12	Personal history of myocardial infarction		
17689	G30..17	Silent myocardial infarction		
17872	G301100	Acute anteroseptal infarction		
18118	G311400	Worsening angina		
18125	G330000	Nocturnal angina		
18842	G35..00	Subsequent myocardial infarction		

18889	G34z000	Asymptomatic coronary heart disease		
19655	G311.14	Angina at rest		
20095	G330.00	Angina decubitus		
20416	G3...12	Atherosclerotic heart disease		
21844	G31y300	Transient myocardial ischaemia		
22383	G3y..00	Other specified ischaemic heart disease		
23078	G34y100	Chronic myocardial ischaemia		
23892	G304.00	Posterior myocardial infarction NOS		
24540	G34y000	Chronic coronary insufficiency		
24783	G3...11	Arteriosclerotic heart disease		
25842	G33z.00	Angina pectoris NOS		
26863	G33z600	New onset angina		
27951	G31..00	Other acute and subacute ischaemic heart disease		
27977	G31yz00	Other acute and subacute ischaemic heart disease NOS		
28138	G34..00	Other chronic ischaemic heart disease		
28554	G33zz00	Angina pectoris NOS		
28736	G30y000	Acute atrial infarction		
29421	G344.00	Silent myocardial ischaemia		
29643	G303.00	Acute inferoposterior infarction		

29758	G30X.00	Acute transmural myocardial infarction of unspecif site		
29902	G330z00	Angina decubitus NOS		
30330	G309.00	Acute Q-wave infarct		
30421	G30..13	Cardiac rupture following myocardial infarction (MI)		
32272	G38..00	Postoperative myocardial infarction		
32450	G33z400	Ischaemic chest pain		
32854	G30B.00	Acute posterolateral myocardial infarction		
34328	G311300	Refractory angina		
34633	G34y.00	Other specified chronic ischaemic heart disease		
34803	G30y.00	Other acute myocardial infarction		
35713	G34yz00	Other specified chronic ischaemic heart disease NOS		
36523	G311.00	Preinfarction syndrome		
36609	G342.00	Atherosclerotic cardiovascular disease		
38609	G351.00	Subsequent myocardial infarction of inferior wall		
39449	G312.00	Coronary thrombosis not resulting in myocardial infarction		
39546	Gyu3000	[X]Other forms of angina pectoris		
39655	G311.12	Impending infarction		

39693	G31y200	Subendocardial ischaemia		
40429	G301000	Acute anteroapical infarction		
41221	G30y200	Acute septal infarction		
41835	G384.00	Postoperative subendocardial myocardial infarction		
45809	G350.00	Subsequent myocardial infarction of anterior wall		
46017	G30yz00	Other acute myocardial infarction NOS		
46112	G380.00	Postoperative transmural myocardial infarction anterior wall		
46166	G35X.00	Subsequent myocardial infarction of unspecified site		
46276	G381.00	Postoperative transmural myocardial infarction inferior wall		
47637	Gyu3300	[X]Other forms of chronic ischaemic heart disease		
52517	Gyu3.00	[X]Ischaemic heart diseases		
54251	G311z00	Preinfarction syndrome NOS		
54535	G33z100	Stenocardia		
55137	G311011	MI - myocardial infarction aborted		
61072	G311000	Myocardial infarction aborted		
62626	G30y100	Acute papillary muscle infarction		
63467	G306.00	True posterior myocardial infarction		
66388	G33z000	Status anginosus		

68357	G31y100	Microinfarction of heart		
68401	Gyu3200	[X]Other forms of acute ischaemic heart disease		
68748	G38z.00	Postoperative myocardial infarction, unspecified		
72562	G353.00	Subsequent myocardial infarction of other sites		
96838	Gyu3400	[X]Acute transmural myocardial infarction of unspecif site		
99991	Gyu3600	[X]Subsequent myocardial infarction of unspecified site		
105479	G39..00	Coronary microvascular disease		
106812	G383.00	Postoperative transmural myocardial infarction unspec site		
Heart Failure (QOF definition)				
398	G580.00	Congestive heart failure		
884	G581.00	Left ventricular failure		
2062	G58..00	Heart failure		
2906	G580.11	Congestive cardiac failure		
13188	662G.00	Hypertensive treatm.changed		
4024	G58z.00	Heart failure NOS		
1223	G58..11	Cardiac failure		
21826	662F.00	Hypertension treatm. started		
5942	G581.13	Impaired left ventricular function		

13189	662g.00	New York Heart Association classification - class II		
12948	662H.00	Hypertension treatm.stopped		
18853	662f.00	New York Heart Association classification - class I		
19066	662h.00	New York Heart Association classification - class III		
5255	G581000	Acute left ventricular failure		
32671	G580100	Chronic congestive heart failure		
10079	G580.12	Right heart failure		
9524	G580.14	Biventricular failure		
17278	G58z.12	Cardiac failure NOS		
23707	G580000	Acute congestive heart failure		
10154	G580.13	Right ventricular failure		
27964	G582.00	Acute heart failure		
27884	G580200	Decompensated cardiac failure		
23481	G581.11	Asthma - cardiac		
51214	662i.00	New York Heart Association classification - class IV		
43618	G581.12	Pulmonary oedema - acute		
11424	G580300	Compensated cardiac failure		
22262	G1yz100	Rheumatic left ventricular failure		
12590	G58z.11	Weak heart		



101138	G583.00	Heart failure with normal ejection fraction		
94870	G580400	Congestive heart failure due to valvular disease		
104275	G584.00	Right ventricular failure		
101137	G583.11	HFNEF - heart failure with normal ejection fraction		
106897	G583.12			
Ischaemic Stroke				
5363	G64..11	CVA - cerebral artery occlusion		
6155	G64..13	Stroke due to cerebral arterial occlusion		
33543	G6X..00	Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs		
53745	Gyu6400	[X]Other cerebral infarction		
40758	G6W..00	Cereb infarct due unsp occlus/stenos precerebr arteries		
40053	G671.00	Generalised ischaemic cerebrovascular disease NOS		
39403	G683.00	Sequelae of cerebral infarction		
91627	Gyu6300	[X]Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs		
94482	Gyu6G00	[X]Cereb infarct due unsp occlus/stenos precerebr arteries		
92036	Gyu6600	[X]Occlusion and stenosis of other cerebral arteries		

90572	Gyu6500	[X]Occlusion and stenosis of other precerebral arteries		
CKD stages 3-5 (QOF)				
2994	7L1A100	Peritoneal dialysis		
2996	7L1A200	Haemodialysis NEC		
2997	7B00.00	Transplantation of kidney		
5504	7B00z00	Transplantation of kidney NOS		
5911	ZV42000	[V]Kidney transplanted		
8037	7L1B000	Insertion of ambulatory peritoneal dialysis catheter		
11553	SP08300	Kidney transplant failure and rejection		
11745	7B00100	Transplantation of kidney from live donor		
11773	7L1A.11	Dialysis for renal failure		
12479	1Z13.00	Chronic kidney disease stage 4		
12585	1Z14.00	Chronic kidney disease stage 5		
18774	TB00111	Renal transplant with complication, without blame		
20073	7L1A000	Renal dialysis		
22252	ZV45100	[V]Renal dialysis status		
23773	7L1B100	Removal of ambulatory peritoneal dialysis catheter		
24361	7B00200	Transplantation of kidney from cadaver		

26862	7B06300	Exploration of renal transplant		
28158	TB11.00	Kidney dialysis with complication, without blame		
30709	7L1C000	Insertion of temporary peritoneal dialysis catheter		
30756	7L1A500	Continuous ambulatory peritoneal dialysis		
36442	7L1B.11	Placement ambulatory dialysis apparatus - compens renal fail		
45160	ZV56y11	[V]Aftercare involving peritoneal dialysis		
46145	ZV56011	[V]Aftercare involving renal dialysis NOS		
46438	SP05613	[X] Peritoneal dialysis associated peritonitis		
48057	K0B5.00	Renal tubulo-interstitial disorders in transplant rejectn		
48121	7B01500	Transplant nephrectomy		
48639	SP01500	Mechanical complication of dialysis catheter		
54844	U612200	[X]Failure sterile precautions dur kidney dialys/other perf		
54990	TB00100	Kidney transplant with complication, without blame		
55151	7B00000	Autotransplant of kidney		
59315	SP07G00	Stenosis of arteriovenous dialysis fistula		
60446	Z919.00	Care of haemodialysis equipment		

60498	Z919300	Reversing haemodialysis lines		
medcode	readcode	readterm		
60743	ZV56.00	[V]Aftercare involving intermittent dialysis		
63038	ZV56z00	[V]Unspecified aftercare involving intermittent dialysis		
63488	ZV56y00	[V]Other specified aftercare involving intermittent dialysis		
63502	Z91A.00	Peritoneal dialysis bag procedure		
64828	7L1A600	Peritoneal dialysis NEC		
66705	7B00111	Allotransplantation of kidney from live donor		
66714	TB11.11	Renal dialysis with complication, without blame		
69266	TA22000	Failure of sterile precautions during kidney dialysis		
69760	ZVu3G00	[X]Other dialysis		
70874	7B00y00	Other specified transplantation of kidney		
72004	7B01511	Excision of rejected transplanted kidney		
72336	Z919100	Priming haemodialysis lines		
88597	7L1A400	Automated peritoneal dialysis		
89924	7B00300	Allotransplantation of kidney from cadaver, heart-beating		

93366	7B0F.00	Interventions associated with transplantation of kidney		
95122	1Z1H.00	Chronic kidney disease stage 4 with proteinuria		
95405	1Z1L.00	Chronic kidney disease stage 5 without proteinuria		
95406	1Z1J.00	Chronic kidney disease stage 4 without proteinuria		
95508	1Z1K.00	Chronic kidney disease stage 5 with proteinuria		
96133	7B00400	Allotransplantation kidney from cadaver, heart non-beating		
96184	TA02000	Accid cut,puncture,perf,h'ge - kidney dialysis		
96347	7A61900	Ligation of arteriovenous dialysis fistula		
97587	1Z1J.11	CKD stage 4 without proteinuria		
97683	1Z1L.11	CKD stage 5 without proteinuria		
98364	7B00211	Allotransplantation of kidney from cadaver		
99160	1Z1K.11	CKD stage 5 with proteinuria		
99312	1Z1H.11	CKD stage 4 with proteinuria		
104963	K054.00	Chronic kidney disease stage 4		
105151	K055.00	Chronic kidney disease stage 5		
Diabetic retinopathy				

1323	F420.00	Diabetic retinopathy		
1411	3128100	Fundoscopy abnormal		
1438	F421000	Unspecified background retinopathy		
2254	F424100	Central serous retinopathy		
2986	F420200	Preproliferative diabetic retinopathy		
3286	F420100	Proliferative diabetic retinopathy		
3822	2BB8.00	O/E - vitreous haemorrhages		
3837	F420400	Diabetic maculopathy		
3914	2BB9.00	O/E - retinal pigmentation		
4514	7270011	Anterior vitrectomy		
6509	C108700	Insulin dependent diabetes mellitus with retinopathy		
6702	F421300	Hypertensive retinopathy		
6836	7271100	Laser photocoagulation of retina for detachment		
7069	F420000	Background diabetic retinopathy		
7890	F422.00	Other proliferative retinopathy		
8595	F42y600	Retinal exudate or deposit		
8742	2BB5.00	O/E - retinal haemorrhages		
9318	7272300	Laser destruction of lesion of retina		
9339	F421.00	Other background retinopathy		

9835	2BBL.00	O/E - diabetic maculopathy present both eyes		
10099	F420300	Advanced diabetic maculopathy		
10755	F420600	Non proliferative diabetic retinopathy		
10882	F421400	Exudative retinopathy		
11053	F421800	Retinal microaneurysms NOS		
11129	2BBQ.00	O/E - left eye background diabetic retinopathy		
11433	2BBP.00	O/E - right eye background diabetic retinopathy		
11626	F420z00	Diabetic retinopathy NOS		
11858	7270400	Pars plana vitrectomy		
11874	F422100	Proliferative retinopathy due to sickle cell disease		
11912	5B4..11	Retinal laser therapy		
13097	2BBT.00	O/E - right eye proliferative diabetic retinopathy		
13099	2BBR.00	O/E - right eye preproliferative diabetic retinopathy		
13101	2BBV.00	O/E - left eye proliferative diabetic retinopathy		
13102	2BBW.00	O/E - right eye diabetic maculopathy		
13103	2BBS.00	O/E - left eye preproliferative diabetic retinopathy		

13106	2BB6.00	O/E - retinal exudates		
13107	2BBn.00	O/E - left eye clinically significant macular oedema		
13108	2BBX.00	O/E - left eye diabetic maculopathy		
17262	C109600	Non-insulin-dependent diabetes mellitus with retinopathy		
17293	727..00	Retina and other parts of eye operations		
17916	F422011	Retinopathy of prematurity		
18387	C10E700	Type 1 diabetes mellitus with retinopathy		
18496	C10F600	Type 2 diabetes mellitus with retinopathy		
18775	2BBO.00	O/E - Laser photocoagulation scars		
19532	2BB4.00	O/E - retinal microaneurysms		
19533	2BBY.00	O/E - referable retinopathy		
22871	C10EP00	Type 1 diabetes mellitus with exudative maculopathy		
medcode	readcode	readterm		
22967	2BBF.00	Retinal abnormality - diabetes related		
25591	C10FQ00	Type 2 diabetes mellitus with exudative maculopathy		
25888	2BBm.00	O/E - right eye clinically significant macular oedema		
27022	5B42.00	Laser therapy - retinal lesion		



30477	F420700	High risk proliferative diabetic retinopathy		
31829	F433100	Solar retinopathy		
34455	F421112	Atheroscleritic retinopathy		
35659	2BB7.00	O/E - retinal vascular prolif.		
36035	F422y00	Other specified other proliferative retinopathy		
36119	F421111	Arteriosclerotic retinopathy		
36855	2BBG.00	Retinal abnormality - non-diabetes		
36867	2BBa.00	O/E- non-referable retinopathy		
38096	F422z00	Proliferative retinopathy NOS		
38161	C108711	Type I diabetes mellitus with retinopathy		
39457	F421C00	Other intraretinal microvascular abnormality		
40982	F421z00	Other background retinopathy NOS		
41049	C108712	Type 1 diabetes mellitus with retinopathy		
41229	F421100	Atherosclerotic retinopathy		
42762	C109612	Type 2 diabetes mellitus with retinopathy		
45145	2BB2.00	O/E - retinal vessel narrowing		
45876	F421200	Renal retinopathy		
46068	7272500	Panretinal laser photocoagulation to lesion of retina NEC		

47328	2BBk.00	O/E - right eye stable treated proliferative diabetic retinopathy		
48751	2BB3.00	O/E - retinal A-V nicking		
49655	C10F611	Type II diabetes mellitus with retinopathy		
50656	2BBc.00	O/E - No retinal laser photocoagulation scars		
52041	2BBl.00	O/E - left eye stable treated proliferative diabetic retinopathy		
52630	2BBo.00	O/E - sight threatening diabetic retinopathy		
55026	7270B11	Anterior vitrectomy		
58604	C109611	Type II diabetes mellitus with retinopathy		
65463	F420800	High risk non proliferative diabetic retinopathy		
66964	F426500	Pseudoretinitis pigmentosa		
69662	F421G00	Venostasis retinopathy		
72424	7270B00	Vitrectomy using anterior approach		
86068	7272800	Panretinal laser photocoagulation to lesion of retina		
88368	7270411	Vitrectomy using pars plana approach		
93875	C10E712	Insulin dependent diabetes mellitus with retinopathy		
95343	C10E711	Type I diabetes mellitus with retinopathy		

96926	FyuF700	[X]Other proliferative retinopathy		
97894	C10EP11	Type I diabetes mellitus with exudative maculopathy		
100979	7272900	Focal laser photocoagulation of retina		
101881	2BBr.00	Impaired vision due to diabetic retinopathy		
102242	2BBs.00	Retinal arteries silverwire		
Neuropathy				
2342	F372.12	Diabetic neuropathy		
2790	F367.00	Peripheral neuropathy		
2925	F375.00	Alcoholic polyneuropathy		
3958	F366.00	Polyneuropathy		
5002	F372.11	Diabetic polyneuropathy		
6908	F36yz00	Other idiopathic peripheral neuropathy NOS		
7635	F362.00	Hereditary sensory neuropathy		
7795	C106.12	Diabetes mellitus with neuropathy		
8591	F35z.11	Peripheral neuropathy - hereditary or idiopathic		
9193	F336.00	Phantom limb syndrome		
10722	F37..00	Inflammatory and toxic neuropathy		
11544	N242300	Neuropathic pain		
11663	M271100	Neuropathic diabetic ulcer - foot		

14883	F36z.00	Hereditary or idiopathic peripheral neuropathy NOS		
14884	F36y.00	Other idiopathic peripheral neuropathy		
15481	F37z.00	Toxic or inflammatory neuropathy NOS		
16230	C106.00	Diabetes mellitus with neurological manifestation		
16491	C106.13	Diabetes mellitus with polyneuropathy		
18016	F336000	Phantom limb syndrome with pain		
18075	F36..00	Hereditary and idiopathic peripheral neuropathy		
18425	C10FB00	Type 2 diabetes mellitus with polyneuropathy		
18534	F342400	Ulnar neuropathy		
19454	F374A00	Polyneuropathy in uraemia		
22573	C106z00	Diabetes mellitus NOS with neurological manifestation		
24121	F378.00	Intercostal neuropathy		
24216	F370100	Postinfectious polyneuritis		
24222	F376.00	Polyneuropathy due to drugs		
24226	F37z.11	Polyneuropathy unspecified		
24355	F374200	Polyneuropathy in vitamin B deficiency		
24571	F372200	Asymptomatic diabetic neuropathy		
24694	C108B00	Insulin dependent diabetes mellitus with mononeuropathy		

28333	C373200	Familial neuropathic amyloid		
30537	F373.00	Polyneuropathy in malignant disease		
31551	F37X.00	Inflammatory polyneuropathy, unspecified		
31790	F372.00	Polyneuropathy in diabetes		
32527	F368.00	Hereditary motor and sensory neuropathy		
34268	C10F200	Type 2 diabetes mellitus with neurological complications		
35465	F368100	Hereditary motor and sensory neuropathy type II		
35537	Fyu7C00	[X] Polyneuropathy, unspecified		
35785	F372100	Chronic painful diabetic neuropathy		
36643	N035.12	Neuropathic arthritis		
37315	F3y0.00	Diabetic mononeuropathy		
38401	F360z00	Hereditary peripheral neuropathy NOS		
39317	C106100	Diabetes mellitus, adult onset, + neurological manifestation		
39528	F360.00	Hereditary peripheral neuropathy		
39858	Fyu7B00	[X]Inflammatory polyneuropathy, unspecified		
40751	F374900	Polyneuropathy in sarcoidosis		
41652	F37y.00	Other toxic or inflammatory neuropathy		

41716	C108C00	Insulin dependent diabetes mellitus with polyneuropathy		
42831	C10E200	Type 1 diabetes mellitus with neurological complications		
44095	F371000	Polyneuropathy in disseminated lupus erythematosus		
44512	F364.00	Idiopathic progressive polyneuropathy		
45081	F37..11	Toxic neuropathy		
45467	C109B00	Non-insulin dependent diabetes mellitus with polyneuropathy		
45919	C109212	Type 2 diabetes mellitus with neurological complications		
46301	C10EC00	Type 1 diabetes mellitus with polyneuropathy		
46937	F365.00	Neuropathy in association with hereditary ataxia		
47409	C109B11	Type II diabetes mellitus with polyneuropathy		
47465	F371100	Polyneuropathy in polyarteritis nodosa		
49146	C108211	Type I diabetes mellitus with neurological complications		
50527	C10FB11	Type II diabetes mellitus with polyneuropathy		
50813	C109A11	Type II diabetes mellitus with mononeuropathy		

52089	F374300	Polyneuropathy in diphtheria		
52283	C108200	Insulin-dependent diabetes mellitus with neurological comps		
54124	F377.00	Other toxic agent polyneuropathy		
55076	Fyu7.00	[X]Polyneuropathies & other disord of peripheral nerv syst		
55842	C109200	Non-insulin-dependent diabetes mellitus with neuro comps		
56159	Z6P2100	Control of phantom sensation technique		
56272	F374.00	Polyneuropathy in disease EC		
56910	F368000	Hereditary motor and sensory neuropathy type I		
57313	F371.00	Polyneuropathy in collagen vascular disease		
58758	F374800	Polyneuropathy in porphyria		
59903	C106.11	Diabetic amyotrophy		
medcode	readcode	readterm		
61523	C106y00	Other specified diabetes mellitus with neurological comps		
61829	C108212	Type 1 diabetes mellitus with neurological complications		
62401	F371200	Polyneuropathy in rheumatoid arthritis		
62674	C10FA00	Type 2 diabetes mellitus with mononeuropathy		

63555	F374z00	Polyneuropathy in disease NOS		
66336	F374000	Polyneuropathy in amyloidosis		
67853	C106000	Diabetes mellitus, juvenile, + neurological manifestation		
67905	C109211	Type II diabetes mellitus with neurological complications		
68105	C10EB00	Type 1 diabetes mellitus with mononeuropathy		
68960	F374500	Polyneuropathy in hypoglycaemia		
69047	F37y000	Serum neuropathy		
71258	F371z00	Polyneuropathy in collagen vascular disease NOS		
72320	C109A00	Non-insulin dependent diabetes mellitus with mononeuropathy		
72922	Fyu6B00	[X]Other mononeuropathies of lower limb		
73337	F374100	Polyneuropathy in beriberi		
91741	Fyu6C00	[X]Other specified mononeuropathies		
91943	C10EC11	Type I diabetes mellitus with polyneuropathy		
93228	Fyu1300	[X]Paraneoplastic neuromyopathy and neuropathy		
93868	Fyu6A00	[X]Other mononeuropathies of upper limb		



95351	C10FA11	Type II diabetes mellitus with mononeuropathy		
96256	F37y100	Axonal sensorimotor neuropathy		
97306	Fyu7200	[X]Other specified polyneuropathies		
97449	Fyu7000	[X]Other hereditary and idiopathic neuropathies		
97479	Fyu7100	[X]Other inflammatory polyneuropathies		
97848	A72x100	Mumps polyneuropathy		
98616	C10F211	Type II diabetes mellitus with neurological complications		
99231	C108B11	Type I diabetes mellitus with mononeuropathy		
99855	M271700	Neuropathic foot ulcer		
100064	F374600	Polyneuropathy in mumps		
101311	C10EC12	Insulin dependent diabetes mellitus with polyneuropathy		
101735	C10E212	Insulin-dependent diabetes mellitus with neurological comps		
105825	C373K13	Familial amyloid polyneuropathy type III		
106103	F368200	Hereditary motor and sensory neuropathy type III		
107322	Fyu6D00	[X]Other mononeuropathies in diseases classified elsewhere		
Hypertension (QOF)				

204	G2...00	Hypertensive disease		
799	G20..00	Essential hypertension		
351	G20..11	High blood pressure		
15377	G200.00	Malignant essential hypertension		
1894	G201.00	Benign essential hypertension		
4372	G202.00	Systolic hypertension		
83473	G203.00	Diastolic hypertension		
10818	G20z.00	Essential hypertension NOS		
3712	G20z.11	Hypertension NOS		
7329	G24..00	Secondary hypertension		
31755	G240.00	Secondary malignant hypertension		
73293	G240z00	Secondary malignant hypertension NOS		
57288	G241.00	Secondary benign hypertension		
51635	G241z00	Secondary benign hypertension NOS		
34744	G244.00	Hypertension secondary to endocrine disorders		
16059	G24z.00	Secondary hypertension NOS		
31387	G24z000	Secondary renovascular hypertension NOS		
42229	G24zz00	Secondary hypertension NOS		
69753	Gyu2.00	[X]Hypertensive diseases		
102458	Gyu2000	[X]Other secondary hypertension		

Pre-diabetes				
10921	C11y200	Impaired glucose tolerance		
10983	C11y300	Impaired fasting glycaemia		
106604	C11y500	Pre-diabetes		
10042	R10E.00	[D]Impaired glucose tolerance		
10791	R10D000	[D]Impaired fasting glycaemia		
31161	R10D011	[D]Impaired fasting glucose		
11149	R102.11	[D]Prediabetes		
11818	R102.00	[D]Glucose tolerance test abnormal		
Gestational diabetes				
10278	L180800	Diabetes mellitus arising in pregnancy		
8446	L180811	Gestational diabetes mellitus		
2664	L180900	Gestational diabetes mellitus		
Family history of diabetes				
23005	1253	FH: Diabetes mellitus in first degree relative		
6795	1252	FH: Diabetes mellitus		
Family history of CVD				
2973	ZV17312	[V]Family history of myocardial infarction		
3198	12C2.00	FH: Ischaemic heart dis. <60		
5970	ZV17311	[V]Family history of ischaemic heart disease (IHD)		

6323	12C4.12	FH: Stroke		
6324	12C5.00	FH: Myocardial infarction		
6784	12C..13	FH: Heart disorder		
7207	12C3.13	FH: Angina > 60yrs		
7765	12C4.11	FH: CVA		
8223	12C3.00	FH: Ischaemic heart dis. >60		
8258	12C4.00	FH: CVA/stroke		
9398	1225.00	No FH: Stroke/TIA		
9490	12C5.12	FH: Ischaemic heart disease		
9528	1226.11	No FH: Angina		
9576	12C..11	FH: CVS disorder		
10934	12C5.11	FH: Coronary thrombosis		
11135	ZV17300	[V]Family history of ischaemic heart disease		
11799	1226.00	No FH: Ischaemic heart disease		
12089	12C3.12	FH: MI- myocardial infarct >60		
12572	1225.11	No FH: CVA/Stroke/TIA		
12709	12C2.13	FH: Angina < 60yrs		
12806	12C2.12	FH: MI- Myocardial infarct <60		
13222	12C..14	FH: Angina		
13249	12C..12	FH: Cardiac disorder		

13253	ZV17100	[V]Family history of stroke (cerebrovascular)		
13258	12C..00	FH: Cardiovascular disease		
13261	12C8.00	FH: Congenital heart disease		
13269	12CA.00	FH myocardial infarction male first degree age known		
13270	12C2.11	FH: Myocardial infarction < 60		
13274	12CJ.00	FH: Cardiomyopathy		
13275	12CQ.00	Family history of deep vein thrombosis		
18661	12CP.00	FH: Myocardial infarct in 1st degree male relative <55 years		
18997	12C7.00	Family history of transient ischaemic attack		
19127	12CN.00	FH: Myocardial infarct in 1st degree female relative <65 yrs		
19560	12C3.11	FH: Myocardial infarction > 60		
19561	12C7.11	FH: TIA		
19566	1224.00	No FH: Cardiovascular disease		
23000	12CZ.00	FH: CVS disease NOS		
26625	12J3.11	FH: Congenital heart disease		
26636	12CE.00	FH angina male first degree age known		
26637	12CC.00	FH myocardial infarction female first degree age known		
26639	12CK.00	FH: Aortic aneurysm		

26653	12CM.00	FH: Angina in 1st degree male relative <55 years		
28347	12CI.00	FH: premature coronary heart disease		
29064	ZV17111	[V]Family history of cerebrovascular accident (CVA)		
30256	ZV17400	[V]Family history of other cardiovascular disease		
30789	12CL.00	FH: Angina in 1st degree female relative <65 years		
34500	12J3.00	FH: Congenital CVS anomaly		
39572	12CB.00	FH myocardial infarction male first degree age unknown		
40865	12CF.00	FH angina male first degree age unknown		
42996	12CH.00	FH angina female first degree age unknown		
43954	12CD.00	FH myocardial infarction female first degree age unknown		
52870	ZVu6600	[X]Family hist/ischaemic hrt disease+oth dis/circultr system		
88482	12CS.00	FH: Anomalous coronary artery		
96212	12CV.00	FH: Cardiovascular disease 1st degree male relative < 55 yrs		
96596	12CW.00	FH: Cardiovascular disease 1st degree female reltve < 65 yrs		

103601	12CX.00	Family history of thromboembolic disorder		
106585	12CY.00	FH: peripheral vascular disease		
107341	12Ca.00	FH: Long QT syndrome		
CVD Risk Score				
7913		Coronary heart disease risk		
10128		Cardiovascular event risk		
10302		Framingham coronary heart disease 10 year risk score		
13283		Coronary heart disease risk		
18581		Low risk of primary heart disease		
18948		Moderate risk of primary heart disease		
22210		High risk of primary heart disease		
24721		Framingham coronary heart disease 10 year risk score		
26627		At risk of heart disease		
29433		High risk of heart disease		
36908		UKPDS 10yr coronary heart disease risk score		
43934		Joint British Societies cardiac risk score		
43938		Framingham coronary heart disease 10 yr adjusted risk score		
55103		JBS cardiovascular disease risk 10-20% over next 10 years		

55104		JBS cardiovascular disease risk <10% over next 10 years		
55105		JBS cardiovascular disease risk >30% over next 10 years		
55109		JBS cardiovascular disease risk >20% up to 30% ov next 10 yr		
71748		Coronary heart disease risk clinical management plan		
85854		Review of patient at risk from coronary heart disease		
95889		Assessing cardiovascular risk using SIGN score		
QDiabetes Risk score				
106622	38Gj.00	QDiabetes risk calculator		
99822	38DK.00	Finnish diabetes risk score		
107554	38Gv.00	Diabetes UK diabetes risk score		
NHS Health Check				
106237	9mC3.00	NHS Health Check invitation third letter		
100682	9NiS.00	Did not attend NHS Health Check		
105569	8BAg000	NHS Health Check completed by third party		
106223	9mC4.00	NHS Health Check verbal invitation		
106361	8IEd.00	NHS Health Check annual review declined		



107476	9NSH.00	NHS Health Check not appropriate		
107003	9RL0.00	NHS continuing healthcare checklist completed		
110462	9mC6.00	NHS Health Check invitation SMS text message		
106222	9mC0.00	NHS Health Check telephone invitation		
102360	6AH..00	NHS Health Check annual review		
106215	9mC..00	NHS Health Check invitation		
100460	9Nj5.00	Failed to respond to NHS Health Check invitation		
99856	8BAg.00	NHS Health Check completed		
102511	8IAx.00	NHS Health Check declined		
106961	9Nie.00	Did not attend NHS Health Check annual review		
106217	9mC1.00	NHS Health Check invitation first letter		
100000	8BR2.00	NHS Health Check indicated		
106221	9mC2.00	NHS Health Check invitation second letter		
100142	6B5..00	NHS Health Check programme		
108311	8HBR.00	NHS Health Check follow up		
110509	9mC5.00	NHS Health Check invitation email		
Bacterial infections (UTI, LRTI, cellulitis)				

150	K190z00	urinary tract infection, site not specified nos		
389	K15..00	cystitis		
1289	K190.00	urinary tract infection, site not specified		
7579	1J4..00	suspected uti		
10857	K15y.00	other specified cystitis		
12484	K15z.00	cystitis nos		
15074	K150.00	acute cystitis		
34630	K15yz00	other cystitis nos		
70189	Kyu5100	[x]other cystitis		
97002	K190500	urinary tract infection		
104141	K190600	urosepsis		
medcode	readcode	readterm		
68	H06z011	chest infection		
312	H060.00	acute bronchitis		
572	H26..00	pneumonia due to unspecified organism		
886	H25..00	bronchopneumonia due to unspecified organism		
1382	H060w00	acute viral bronchitis unspecified		
1934	H301.00	laryngotracheobronchitis		
2581	H06z000	chest infection nos		
3163	H300.00	tracheobronchitis nos		

3358	H06z100	lower resp tract infection		
3480	H30z.00	bronchitis nos		
3683	H261.00	basal pneumonia due to unspecified organism		
5978	H060.11	acute wheezy bronchitis		
6094	H2z..00	pneumonia or influenza nos		
6124	H062.00	acute lower respiratory tract infection		
9389	H20..11	chest infection - viral pneumonia		
9639	H260.00	lobar pneumonia due to unspecified organism		
11072	H060300	acute purulent bronchitis		
11101	H060500	acute tracheobronchitis		
14976	H20z.00	viral pneumonia nos		
16287	H25..11	chest infection - unspecified bronchopneumonia		
17359	H30..11	chest infection - unspecified bronchitis		
19400	H26..11	chest infection - pneumonia due to unspecified organism		
20198	H060z00	acute bronchitis nos		
21061	H3y0.00	chronic obstruct pulmonary dis with acute lower resp infectn		
22795	H22..11	chest infection - other bacterial pneumonia		
23095	H22z.00	bacterial pneumonia nos		

23333	H540000	hypostatic pneumonia		
24356	H540100	hypostatic bronchopneumonia		
24800	H060x00	acute bacterial bronchitis unspecified		
28634	H22..00	other bacterial pneumonia		
30653	H23..11	chest infection - pneumonia organism os		
33478	H20y.00	viral pneumonia nec		
37447	H06z112	acute lower respiratory tract infection		
40498	H24..00	pneumonia with infectious diseases ec		
43884	H22yz00	pneumonia due to bacteria nos		
50867	H22y.00	pneumonia due to other specified bacteria		
52520	Hyu0800	[x]other viral pneumonia		
53753	Hyu0H00	[x]other pneumonia, organism unspecified		
63763	Hyu0A00	[x]other bacterial pneumonia		
66362	H24z.00	pneumonia with infectious diseases ec nos		
66397	Hyu1.00	[x]other acute lower respiratory infections		
69782	H24y.00	pneumonia with other infectious diseases ec		
70559	H24yz00	pneumonia with other infectious diseases ec nos		

98381	Hyu0B00	[x]pneumonia due to other specified infectious organisms		
104121	H2B..00	community acquired pneumonia		
4126	A98yy14	Gonococcal cellulitis		
4328	F4G0100	Orbital cellulitis		
8852	F501112	Cellulitis, external ear		
25156	H1y2100	Pharynx or nasopharynx cellulitis		
64484	H1y5100	Cellulitis of vocal cords		
61518	H1y7100	Cellulitis of larynx		
4748	J083.00	Oral cellulitis and abscess		
5228	J083000	Cellulitis of floor of mouth		
15336	J083100	Oral soft tissue cellulitis unspecified		
19944	J083z00	Oral cellulitis and abscess NOS		
17562	J085100	Cellulitis of lip		
27933	J54..11	Cellulitis - anus or rectum		
37424	J540.11	Perianal cellulitis		
26239	K170300	Periurethral cellulitis		
16304	K272300	Cellulitis of penis		
4456	K284300	Cellulitis of scrotum		
70783	K403.00	Acute parametritis and pelvic cellulitis		
33659	K403100	Acute pelvic cellulitis		
48663	K404.00	Chronic parametritis and pelvic cellulitis		

24294	K404000	Chronic female pelvic cellulitis		
15687	K405.00	Parametritis and pelvic cellulitis unspecified		
30982	K405100	Pelvic cellulitis unspecified		
5697	M02..00	Cellulitis and abscess of finger and toe		
4779	M020.00	Cellulitis and abscess of finger		
3527	M020000	Cellulitis and abscess of finger unspecified		
26071	M020z00	Cellulitis and abscess of finger NOS		
3960	M021.00	Cellulitis and abscess of toe		
3363	M021000	Cellulitis and abscess of toe unspecified		
20384	M021z00	Cellulitis and abscess of toe NOS		
25081	M02z.00	Cellulitis and abscess of digit NOS		
16536	M03..00	Other cellulitis and abscess		
16606	M03..13	Cellulitis of skin area excluding digits of hand or foot		
3998	M030.00	Cellulitis and abscess of face		
24401	M030000	Cellulitis and abscess of cheek (external)		
2658	M030011	Cellulitis and abscess of cheek		
21580	M030100	Cellulitis and abscess of nose (external)		
10485	M030111	Cellulitis and abscess of nose		
15549	M030200	Cellulitis and abscess of chin		

15327	M030300	Cellulitis and abscess of submandibular region		
15475	M030400	Cellulitis and abscess of forehead		
16032	M030500	Cellulitis and abscess of temple region		
27681	M030600	Cellulitis of face		
20389	M030z00	Cellulitis and abscess of face NOS		
2711	M031.00	Cellulitis and abscess of neck		
27717	M032.00	Cellulitis and abscess of trunk		
4394	M032000	Cellulitis and abscess of chest wall		
16176	M032100	Cellulitis and abscess of breast		
1874	M032200	Cellulitis and abscess of back		
4973	M032300	Cellulitis and abscess of abdominal wall		
14937	M032400	Cellulitis and abscess of umbilicus		
23585	M032500	Cellulitis and abscess of flank		
1923	M032600	Cellulitis and abscess of groin		
4400	M032700	Cellulitis and abscess of perineum		
52366	M032800	Cellulitis of trunk		
29345	M084.00	[X]Cellulitis of breast		
6368	M085.00	Cellulitis of leg		
31534	M086.00	Cellulitis of ankle		
9648	M088.00	Cellulitis of arm		
28181	M089.00	Cellulitis of neck		

17226	M08A.00	Cellulitis of axilla		
7684	M08B.00	Cellulitis of foot		
94868	M08C.00	Cellulitis of toe		
30260	M08y.00	[X]Cellulitis of other sites		
Structured diabetes programme				
93854	9OLM.00	Diabetes structured education programme declined		
26605	9OLB.00	Attended diabetes structured education programme		
47011	8Hj0.00	Referral to diabetes structured education programme		
107414	8I94.00	Diabetes structured education programme not available		
95093	8I83.00	Did not complete DESMOND diabetes structured educat program		
94956	8I84.00	Did not complete XPERT diabetes structured education program		
97809	8I82.00	Did not complete DAFNE diabetes structured education program		
95641	8Hj1.00	Family/carer referral to diabetes structured education prog		
94955	9NiE.00	Did not attend XPERT diabetes structured education programme		



93631	9OLL.00	XPERT diabetes structured education programme completed		
110511	67W1.00	Recommendation self-refer for diabetes structured education		
106953	8IEa.00	Referral to DAFNE diabetes structured educn prog declined		
95094	8I81.00	Did not complete diabetes structured education programme		
93491	9OLJ.00	DAFNE diabetes structured education programme completed		
95159	9NiD.00	Did not attend DESMOND diabetes structured education program		
93870	8Hj5.00	Referral to XPERT diabetes structured education programme		
94011	9OLG.00	Attended XPERT diabetes structured education programme		
99277	9NiC.00	Did not attend DAFNE diabetes structured education programme		
93657	8Hj4.00	Referral to DESMOND diabetes structured education programme		
12682	679R.00	Patient offered diabetes structured education programme		
51066	9OLC.00	Family/carer attended diabetes structured education prog		
93390	9OLH.00	Attended DAFNE diabetes structured education programme		

94186	9OLF.00	Diabetes structured education programme completed		
93704	8Hj3.00	Referral to DAFNE diabetes structured education programme		
95553	9NiA.00	Did not attend diabetes structured education programme		
93529	9OLK.00	DESMOND diabetes structured education programme completed		
Diabetes review				
6125	66AS.00	Diabetic annual review		
11471	8B3l.00	Diabetes medication review		
28873	66Ai.00	Diabetic 6 month review		
32619	66Af.00	Patient diabetes education review		
83532	66Ao.00	Diabetes type 2 review		
101177	66At.00	Diabetic dietary review		
101801	66At100	Type II diabetic dietary review		
102434	66Au.00	Diabetic erectile dysfunction review		
102611	66At111	Type 2 diabetic dietary review		
107423	661N400	Diabetes self-management plan review		
107464	66AS000	Diabetes Year of Care annual review		
Retinopathy screening/review				
18662	8HBH.00	Diabetic retinopathy 6 month review		
18311	68A7.00	Diabetic retinopathy screening		

11891	68A8.00	Digital retinal screening		
9974	9N1v.00	Seen in diabetic eye clinic		
12636	9N2f.00	Seen by retinal screener		
18747	8I6F.00	Diabetic retinopathy screening not indicated		
12262	8I3X.00	Diabetic retinopathy screening refused		
Diabetic foot screening				
22823	66Ab.00	Diabetic foot examination		
95994	66Aq.00	Diabetic foot screen		
50175	66AW.00	Diabetic foot risk assessment		
108890	679L300	Diabetic foot care education		
18824	8I3W.00	Diabetic foot examination declined		
12247	8I6G.00	Diabetic foot examination not indicated		
10824	9N1i.00	Seen in diabetic foot clinic		

Table S5. Code lists