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Familial Hypercholesterolaemia: a Primary Care Perspective

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Pan London FH Clinic Collaboration Event 22nd January 2019

in collaboration with
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Cholesterol….

Harley Schwadron for Reader's Digest

Lambeth DataNet (LDN)

- Data source: Lambeth DataNet Primary Care EHRs from 44 practices (~400,000 patients), in SE London, inner city ethnically diverse population.

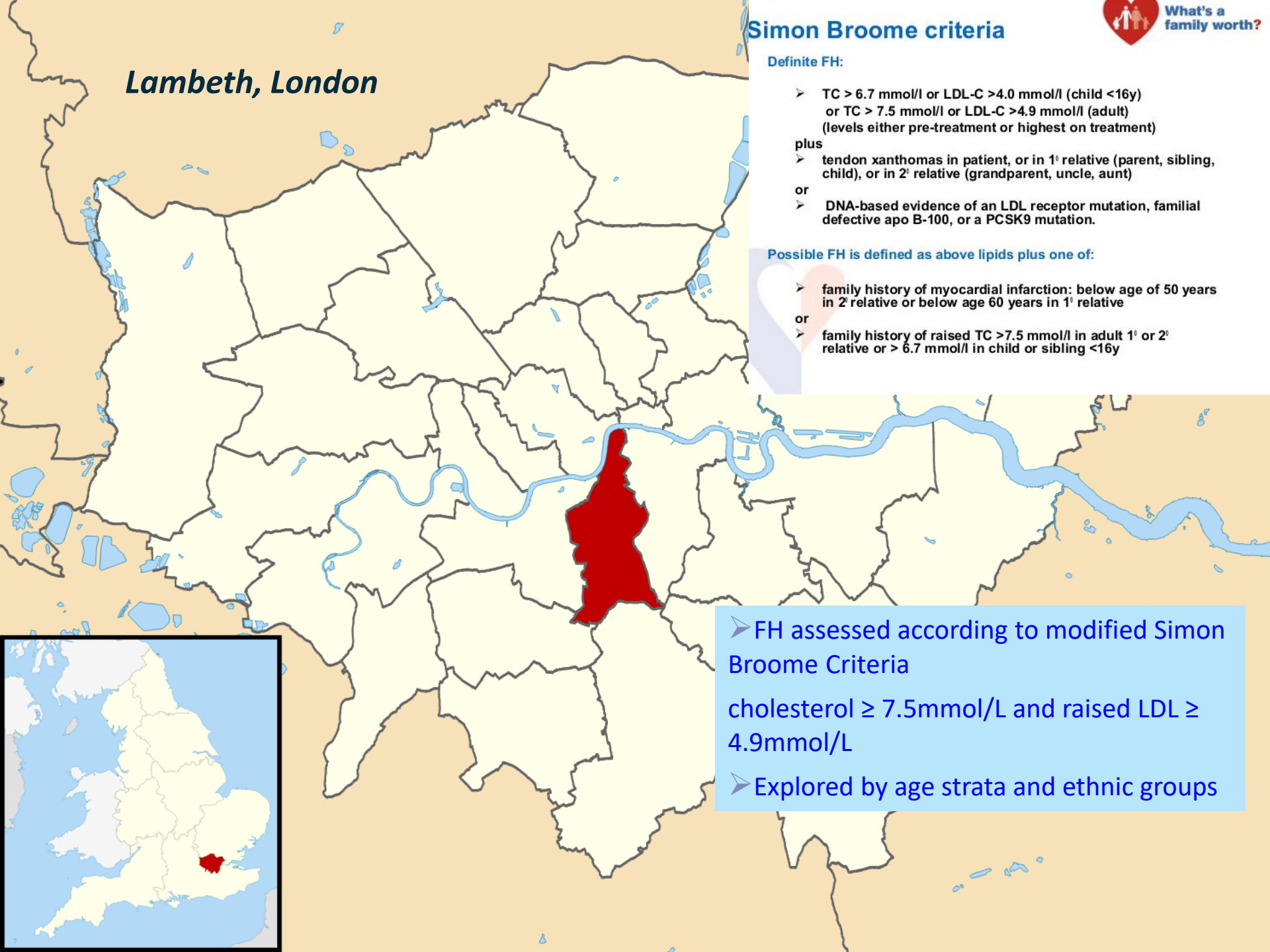
'Personal profile' data:

Ethnicity*, language*, religion, country of birth*

Clinical data: Clinical diagnoses, laboratory values, medication, measurements BMI, Blood pressure

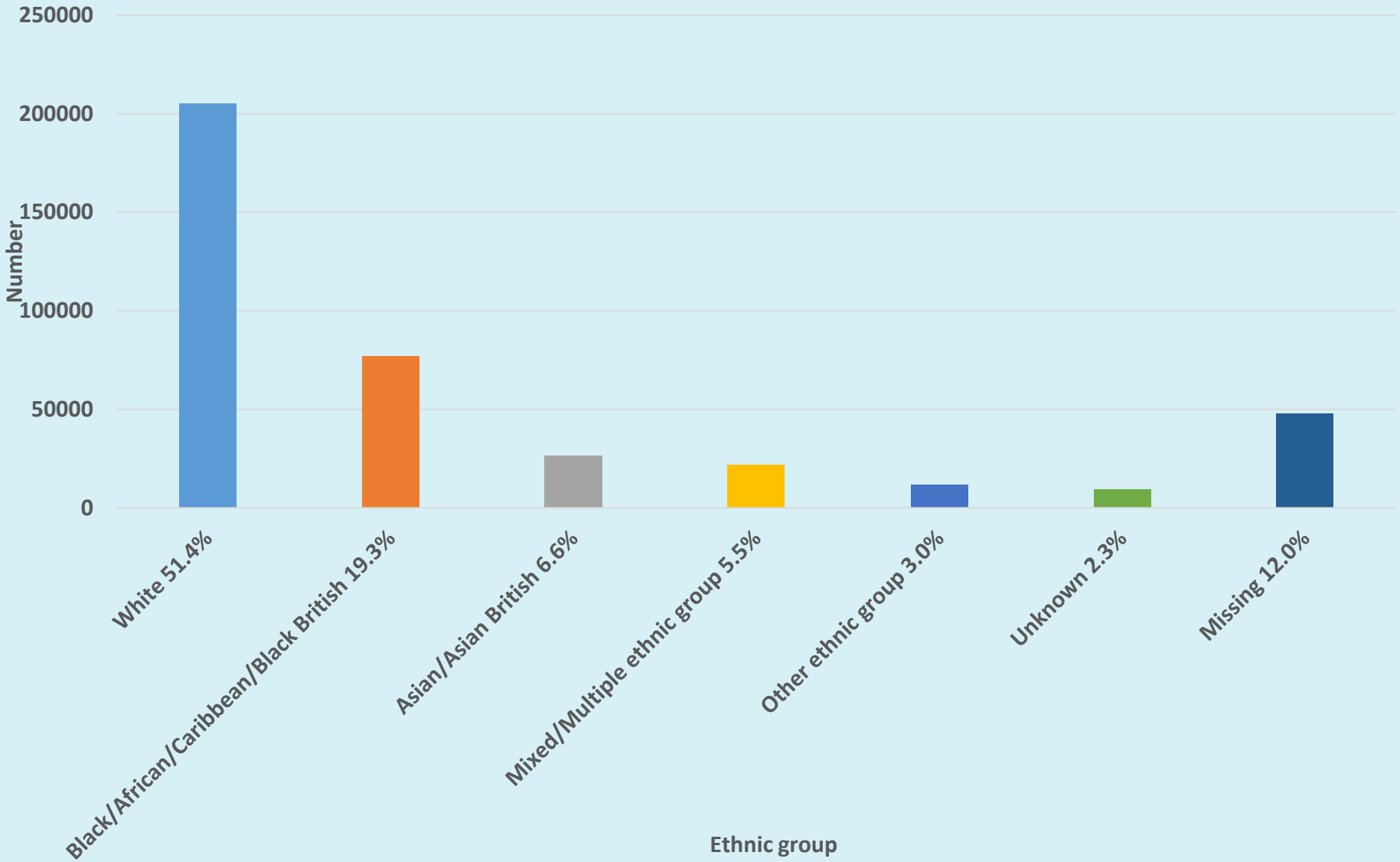
Prescribing: Dose, frequency, amount

Longitudinal data: monitoring conditions, treatments, outcomes


Lambeth, London
Simon Broome criteria
What's a family worth?
Definite FH:
TC > 6.7 mmol/l or LDL-C >4.0 mmol/l (child <16y)
or TC > 7.5 mmol/l or LDL-C >4.9 mmol/l (adult)
(levels either pre-treatment or highest on treatment)
plus
tendon xanthomas in patient, or in 1° relative (parent, sibling, child), or in 2° relative (grandparent, uncle, aunt)
or
DNA-based evidence of an LDL receptor mutation, familial defective apo B-100, or a PCSK9 mutation.
Possible FH is defined as above lipids plus one of:
family history of myocardial infarction: below age of 50 years in 2° relative or below age 60 years in 1° relative
or
family history of raised TC >7.5 mmol/l in adult 1° or 2° relative or > 6.7 mmol/l in child or sibling <16y
FH assessed according to modified Simon Broome Criteria
cholesterol ≥ 7.5mmol/L and raised LDL ≥ 4.9mmol/L
Explored by age strata and ethnic groups

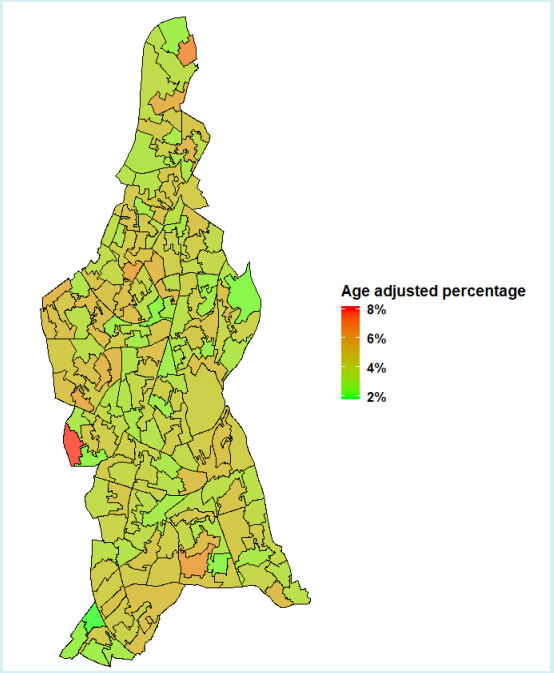
2019 Lambeth population by ethnic group (all ages)

n = 399036

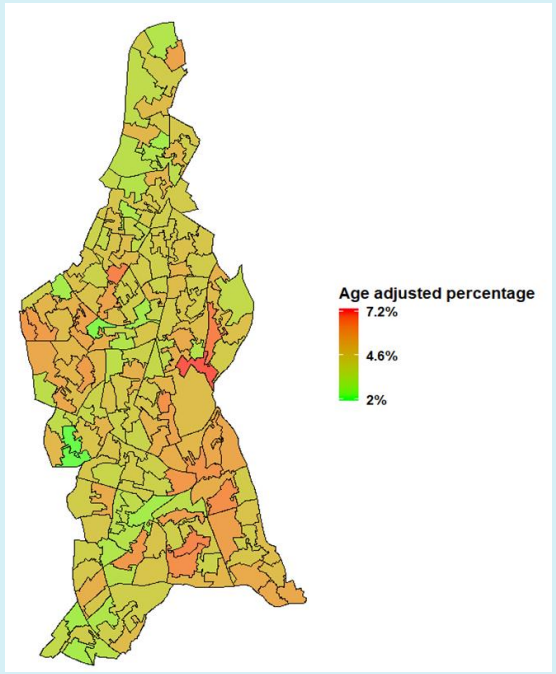


Age adjusted lipid distribution in adults ≥ 40 years

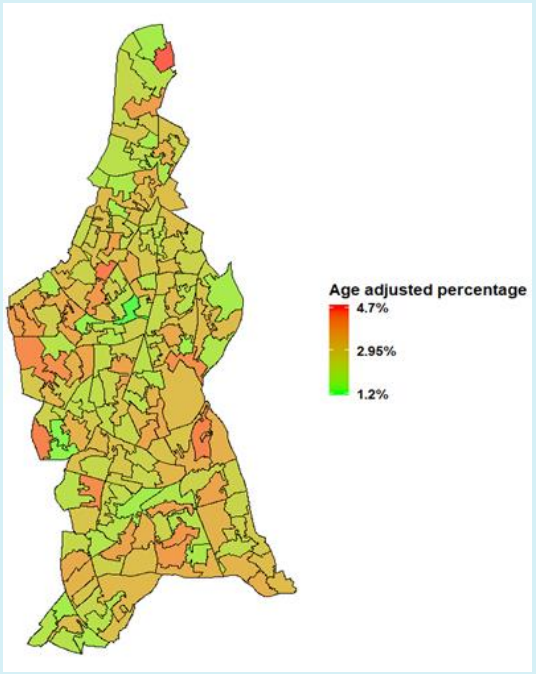
n=151, 140



Age adjusted percentage in Lambeth LSOAs for raised cholesterol ≥ 7.5mmol/L



Age adjusted percentage in Lambeth LSOAs for raised LDL ≥ 4.9mmol/L



Age adjusted percentage in Lambeth LSOAs for raised cholesterol ≥ 7.5mmol/L and raised LDL ≥ 4.9mmol/L

Screening for possible FH: cholesterol ≥ 7.5mmol/L and raised LDL ≥ 4.9mmol/L

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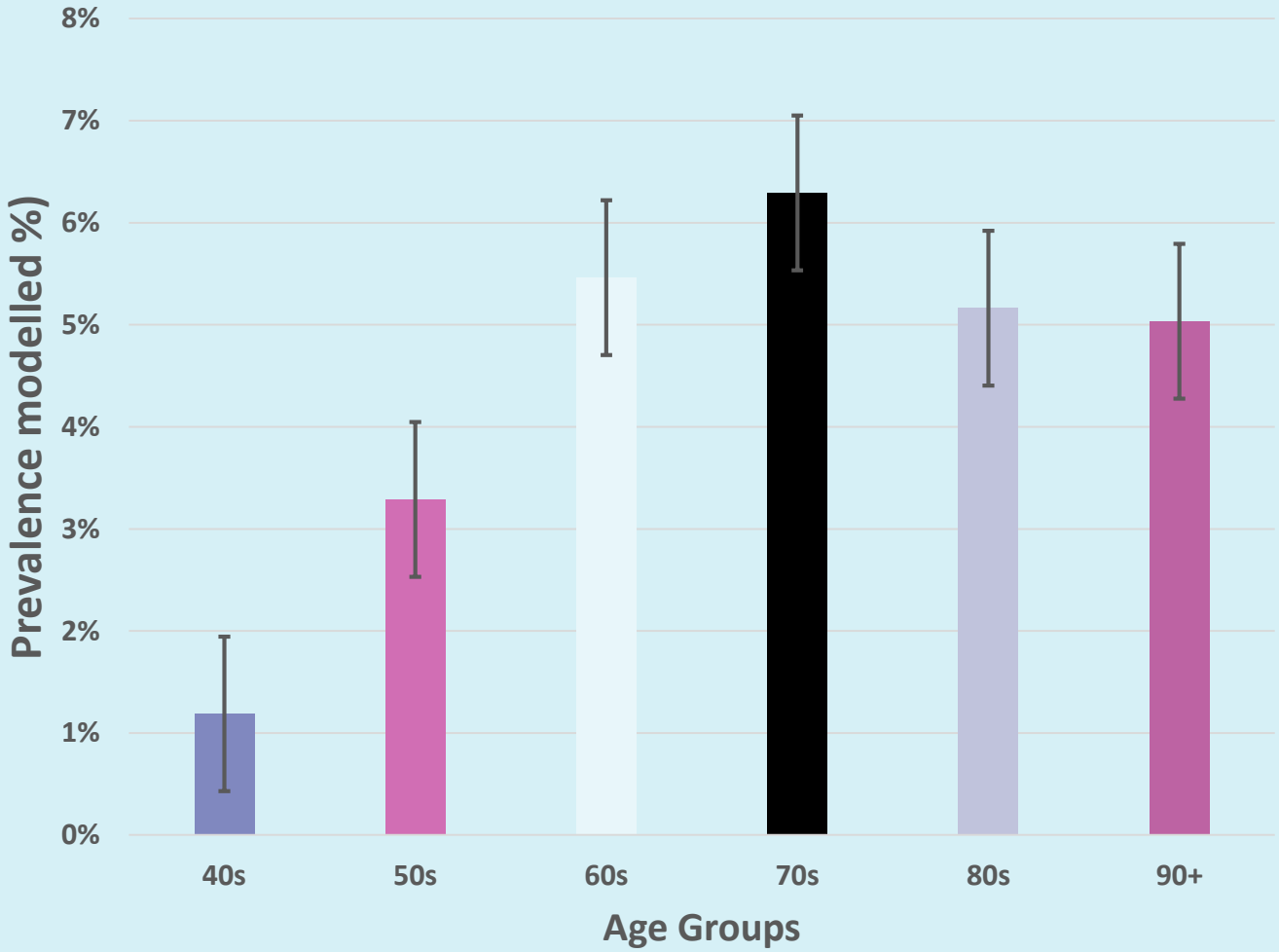
Methods:

Generalised linear models (R) (GLM) is a flexible generalization of ordinary linear regression - allows for response variables that have error distribution models other than a normal distribution

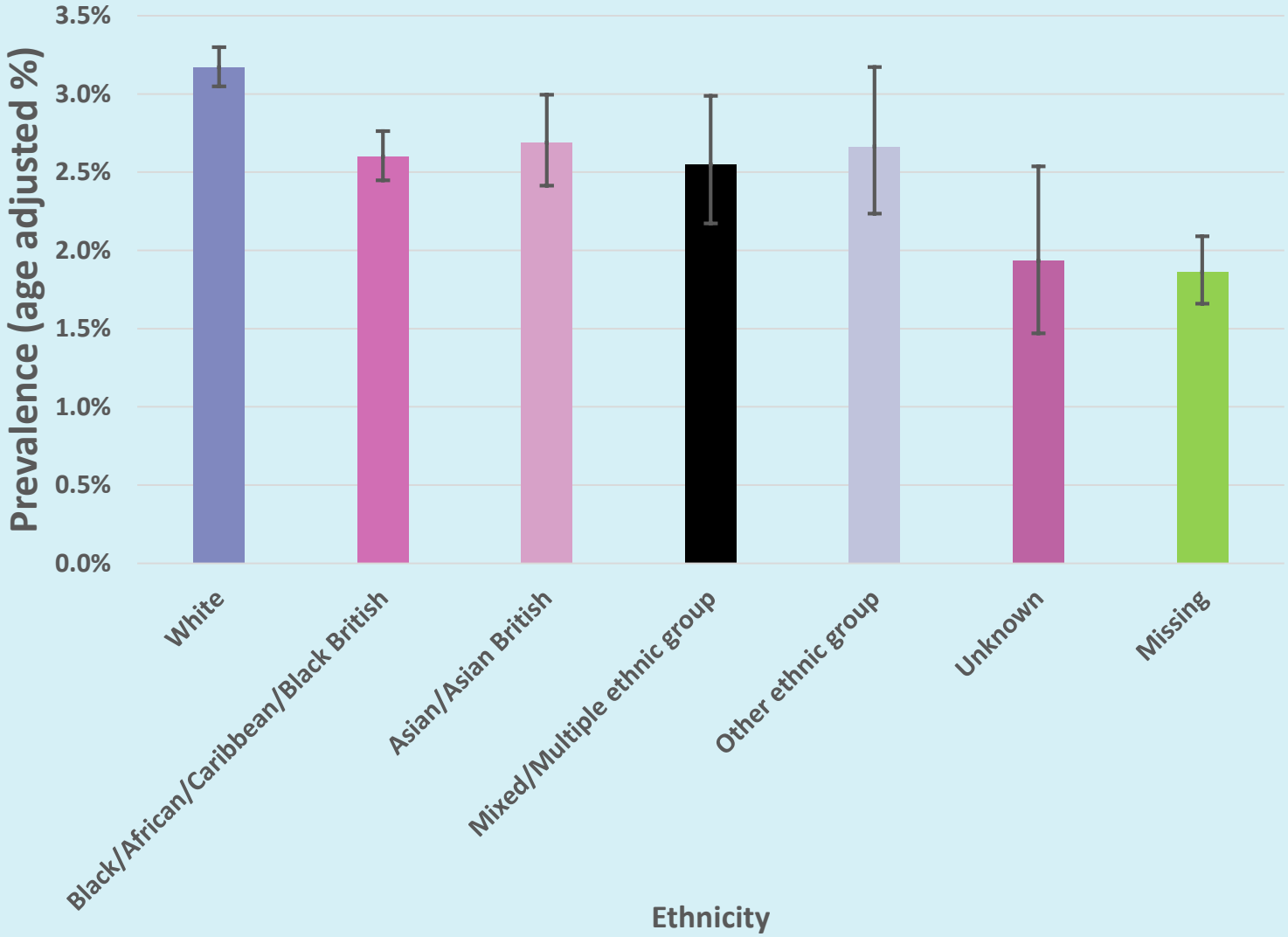
Model of raised cholesterol by i) age-group and ii) ethnicity

Prevalence of cholesterol ≥ 7.5mmol/L and raised LDL ≥ 4.9mmol/L by age group



Interpretation: For patient in 40's there is a probability (fit) ~1.2% of raised cholesterol & LDL increases to around 6.3% in 70's then decreases

Prevalence of cholesterol ≥ 7.5mmol/L and raised LDL ≥ 4.9mmol/L by ethnic group in adults ≥ 40 years



FAMCAT FEASIBILITY PILOT: South London

Aim: To prospectively evaluate usability of the FAMCAT tool to identify familial hypercholesterolaemia in primary care.

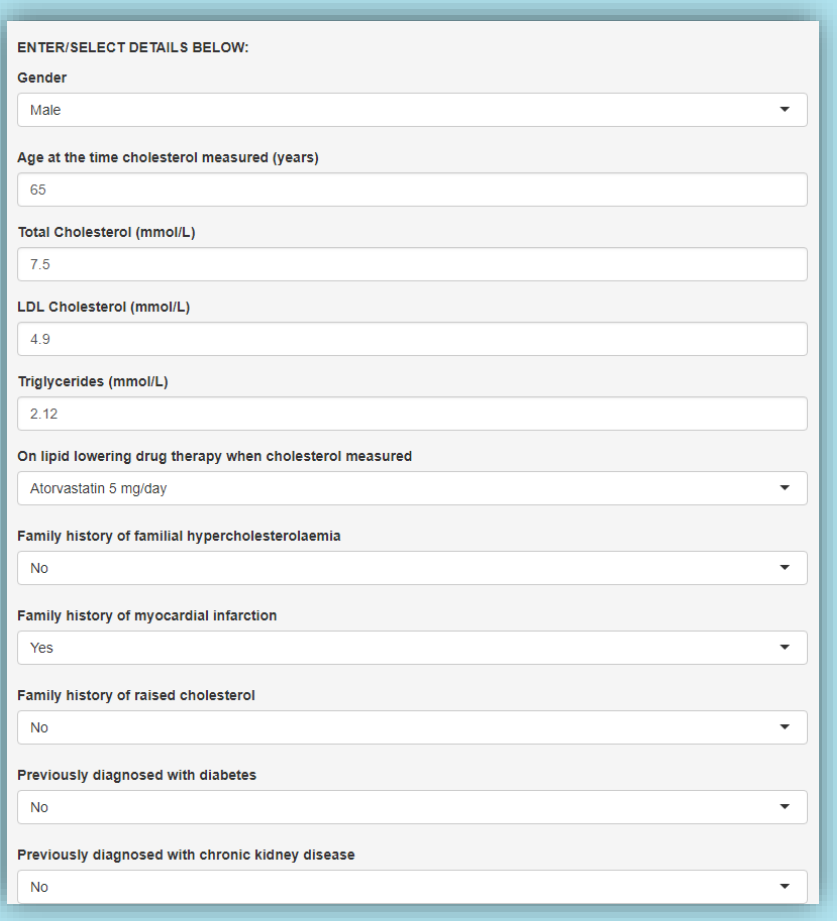
Design: Feasibility study 5 EMISWEB practices in S London (Lambeth & Southwark)

Intervention:

1. Use of a FAMCAT, in GP electronic health records, to identify patients with a high probability of FH
2. FAMCAT tool feedback

Outcomes: Ranked list high risk FH cases for further clinical assessment

Familial Hypercholesterolaemia Case Ascertainment Tool (FAMCAT) & web based calculator



Risk score

FAMCAT Calculator	Probability (%)	Relative Population Risk
Likelihood of having familial hypercholesterolaemia	0.01	3.13

https://prism-uon.shinyapps.io/FAMCAT/

Familial Hypercholesterolaemia Case Ascertainment Tool (FAMCAT)

quick guide

PRIMIS
making clinical data work

Contact PRIMIS
enquiries@primis.nottingham.ac.uk
0115 846 6420
www.nottingham.ac.uk/primis

Familial Hypercholesterolaemia

Background

Around 80-90% of familial hypercholesterolaemia (FH) cases remain undiagnosed. If left untreated, about 50% of men and 30% of women with FH will develop coronary heart disease before they are 55[1]. Early identification and effective treatment of FH patients can help to ensure normal life expectancy.

This quality improvement tool helps GP practices to case find patients who may have FH but also may be missing a coded diagnosis. The tool will also identify those at greatest risk of developing the disease (ranked in order of likelihood), so that they can be monitored or reviewed. Additionally, any patients who are currently untreated will be highlighted for review and, through use of the tool, practices can optimise lipid lowering treatment regimes for all patients with the disease.

The FH quality improvement tool uses the CHART analysis software which presents data at both practice and patient levels. Users can quickly drill down to examine detailed patient care within a comprehensive datasheet and produce patient lists quickly and easily. CHART also provides the ability to create mail merge lists for patient recall invitation letters and is compatible for use with all GP clinical systems.

The Familial Hypercholesterolaemia quality improvement tool can help practices by:

- generating a list of patients who may have FH but who do not have a coded diagnosis
- identifying patients who are at increased risk of developing FH and categorising them by level of risk (using the FAMCAT algorithm)
- offering a comparative analysis service via CHART Online, which enables comparison with other practices, locally or nationally
- establishing a more accurate prevalence rate for FH within the practice population
- highlighting patients with the disease who are currently untreated
- highlighting recording rates of important family history information

- identifying opportunities to optimise lipid lowering treatment regimes for all patients with the disease
- contributing to the delivery of the NHS Outcomes Framework and the Clinical Commissioning Group Outcomes Indicator Set
- providing a mail merge function to generate letters to send to high risk patients about collecting their family history
- providing data in a format for appraisal and revalidation and providing a method for GPs to reflect on their clinical practice

PRIMIS
Date of issue: January 2017

The University of Nottingham
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Five key actions following use of the FH quality improvement tool

Review any patients at very high risk of developing FH who have not had recent screening

Click through the summary sheet to access this patient list. The inbuilt mail merge function can also assist with generating invitation letters.

Review any patients with FH who have not had recent screening

Patients with a coded diagnosis of FH who have not had screening in the last 12 months may also benefit from review to ensure they are on the best treatment.

Improve recording of important family history information through systematic collection

Patients classified as being at high risk of FH who do not have a family history recorded should be encouraged to collect systematic family history. High risk patients may well become very high risk once an accurate family history has been recorded (and this is positive). The mail merge function can assist with generating letters to send to these high risk patients about collecting their family history.

Assess current treatment regimes

Review the type and dosage of lipid lowering therapy for patients who are diagnosed with FH. If diagnosed patients are not currently being treated (and are not contraindicated), consider commencement of lipid lowering medication.

Review coding standards within the practice

Use the information provided with the report to assess the accuracy of coding, particularly in relation to confirming FH diagnoses, drug allergies and contraindications and important family history codes. Consider the reasons why any data items are missing and how to prevent recurrence for other patients.

https://www.nottingham.ac.uk/primis/tools-audits/tools-audits/familial-hypercholesterolaemia.aspx

FAMCAT Searches Lambeth: FH CHART Summary Report

Total very high risk FH (4 practices; 5th IP) n=234/37, 365 ~0.07%

G85014

Data extracted on 20/09/18 using Reference date 19/09/18

PRIMIS CHART care and health analysis in real time — The University of Nottingham

FHC CASEFINDER LIBRARY

Practice Population	11617
Of whom are aged 16 to 120	9364
Of whom have had a cholesterol recording at any time	4503
Of whom have had a cholesterol recording in last 12 months	2063

BREAK DOWN OF ABOVE PATIENTS INTO RISK GROUPS	Diagnosed	Very High Risk	High Risk	Population Risk
Of whom were diagnosed in last 12 months	1			
Of whom have been screened in last 12 months	0	0	0	0
Of whom have not been screened in last 12 months	14	48	297	4144

PATIENTS SCREENED IN LAST 12 MONTHS	Diagnosed	Very High Risk	High Risk	Population Risk
Number of patients screened/assessed/in last 12 months	0	0	0	0
Screening Methods				
Of whom were assessed by Dutch Criteria in last 12 months	0	0	0	0
Of whom were assessed by Simon Broome in last 12 months	0	0	0	0
Of whom had Hyperlipidaemia screen in last 12 months	0	0	0	0
Referred to Specialist or Consultant				
Of whom were referred to a Specialist/Consultant in last 12 months	0	0	0	0

FAMILY HISTORY CODES - Recorded since July 2016	Diagnosed	Very High Risk	High Risk	Population Risk
All patients	14	48	297	4144
Of whom have a Negative Family History	0	0	1	22
Of whom have a Positive Family History	0	3	24	108
Of whom have a Unknown Family History	14	45	272	4014
Of whom have a Contradictory Family History	0	0	0	0

LIPID LOWERING DRUGS IN LAST 6 MONTHS	Diagnosed	Very High Risk	High Risk	Population Risk
All patients	14	48	297	4144
Of whom have a contraindication to statins	0	0	1	3
Of whom are on high potency statins	5	9	51	444
Of whom are on medium potency statins	4	0	12	307
Of whom are on low potency statins	0	0	1	37
Of whom are on another lipid lowering drug	0	0	0	4
Of whom have no statin contraindication and are not on any of the above drugs	5	39	232	3349

When loading named patient data:

Mail Merge Option 2 will create a mail merge source file containing these unscreened very high risk patients

Mail Merge Option 3 will create a mail merge source file for these high risk patients who have not had a family history recorded since July 2016

Mail Merge Option 4 will create a mail merge source file for these high risk patients.

This is a one off mail merge that you do the first time you use the audit to capture an up to date family history for these high risk patients

Diagnosis and Screening

Diagnosed	Very High Risk	High Risk	Population Risk
14	48	297	4144
1			
0	0	0	0
14	48	297	4144

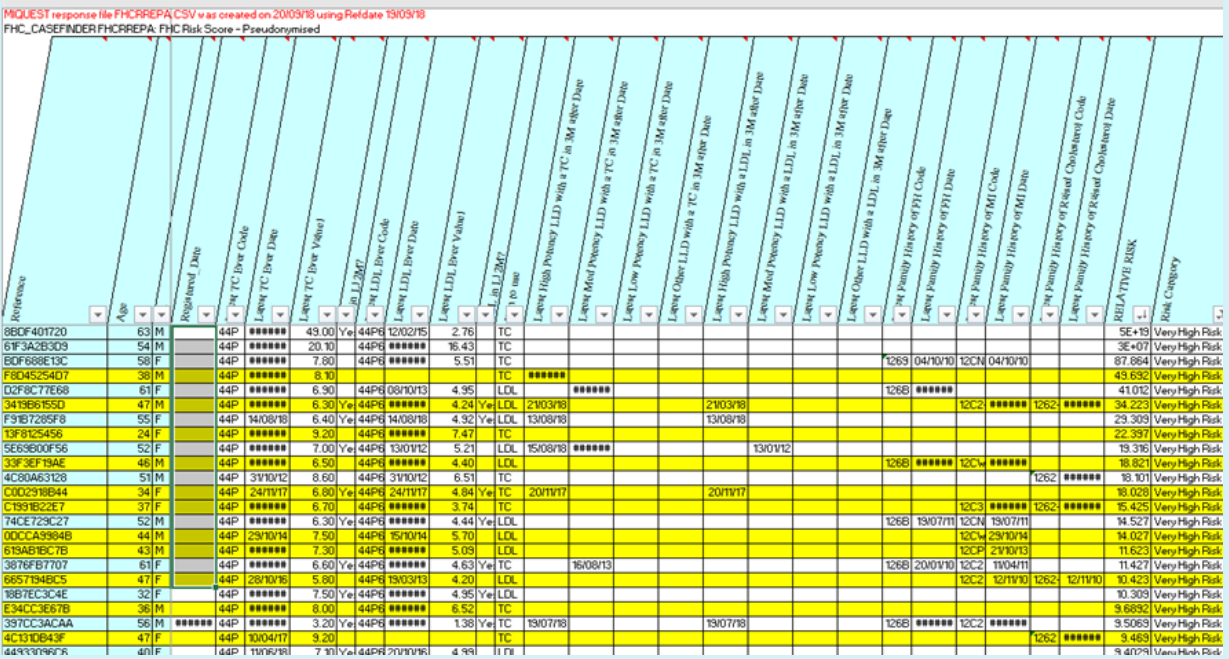
Family History Recording

Diagnosed	Very High Risk	High Risk	Population Risk
14	48	297	4144
0	0	1	22
0	3	24	108
14	45	272	4014
0	0	0	0

Lipid lowering prescribing

Diagnosed	Very High Risk	High Risk	Population Risk
14	48	297	4144
0	0	1	3
5	9	51	444
4	0	12	307
0	0	1	37
0	0	0	4
5	39	232	3349

Sample patient data from a South London general practice



Age	Sex	RELATIVE RISK	Risk Category
45	M	6.79564E+24	Very High Risk
63	M	4.70412E+19	Very High Risk
54	M	26708144	Very High Risk
58	F	87.8638382	Very High Risk
38	M	49.69217682	Very High Risk
61	F	41.01211548	Very High Risk
47	M	34.22259521	Very High Risk
55	F	29.30923462	Very High Risk
24	F	22.39707184	Very High Risk
52	F	19.31622696	Very High Risk
46	M	18.82052803	Very High Risk

Ranked list highest>lowest probability of FH

Several (< 50 years) with high FH risk

Risk stratification → these are the priority cases to be assessed

Why documenting cholesterol is important:
CPRD Matched cohort study of new users of AC/AP drugs

Comparator = non-use (within 365 days before index date)

2 Kaplan-Meier curves (all cohort data)

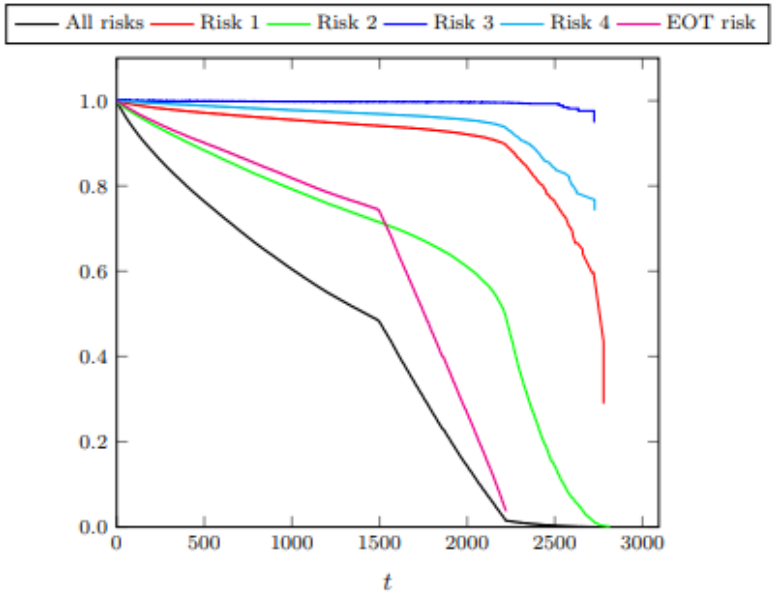


Figure 1: Kaplan-Meier curves for all risks using all cohort data.

Risk 1 (death, 10218 events)
Risk 2 (hospital admissions, 57678 events)
Risk 3 (ICB (stroke), 430 events)
Risk 4 (Gastrointestinal Bleed, 5385 events)

Bias: Informative missingness

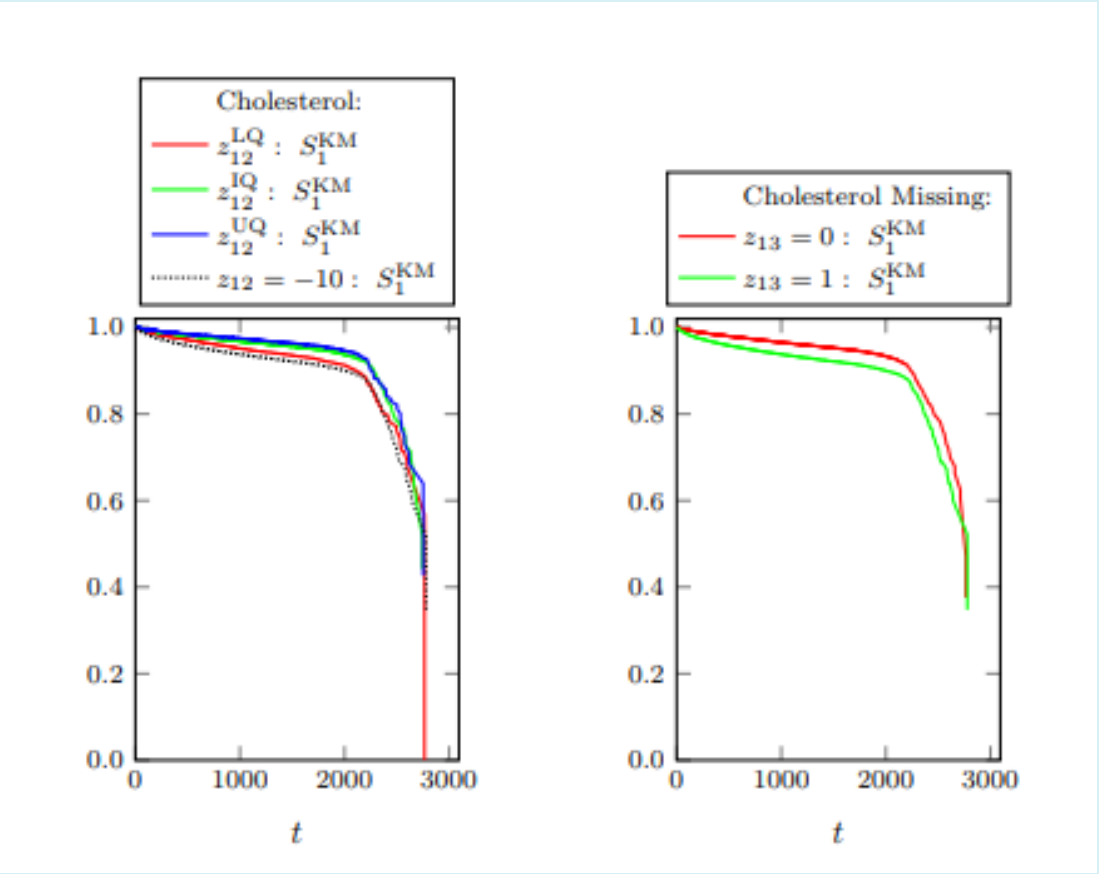


Figure 9: Covariate-conditioned risk-specific Kaplan-Meier curves S_r^{KM} for Risk 1. Curves are shown for covariate-conditioned data for the following covariates: z_7 (BMIgrp Missing), z_8 (Diastolic), z_9 (Diastolic Missing), z_{10} (Systolic), z_{11} (Systolic Missing), z_{12} (Cholesterol), z_{13} (Cholesterol Missing), and z_{14} (Creatininegrp).

Risk 1 (death): Longitudinal data suggest patients with missing cholesterol have poorer survival

Conclusions

Burden of undiagnosed and untreated cases- avoidable CVD and morbidity

Inequalities and unmet need: significant younger age groups

Feasible diagnostic and ascertainment pilot in S London

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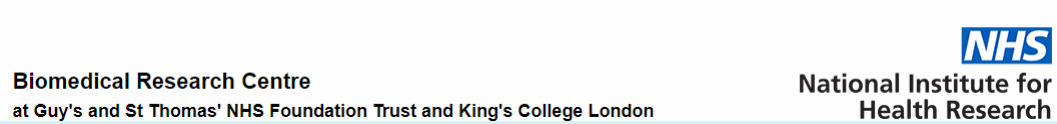
With thanks to Nadeem Qureshi, Stephen Weng, Ton Coolen, Mark Rowley, participating practices and patients and colleagues



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