

Supplemental Table 1. Baseline characteristics of participants included in the analysis compared those excluded.

	Total (n=52, 769)	Included¹ (n=13, 988)	Excluded² (n=38, 781)	Standardized Difference
Age (yrs±SD) ³	51.2±9.4	52.4±9.3	50.8±9.4	-0.17
Females n (%)	33, 626 (63.7)	9, 710 (69.4)	23, 916 (61.7)	0.16
Statin use n (%)	9, 163 (17.4)	2, 639 (18.9)	6, 524 (16.8)	0.05
Elixhauser score (±SD) ⁴	2.58±2.27	2.79±2.19	2.50±2.29	-0.13
CVD incidence n (%)	4, 622 (8.8)	1, 156 (8.3)	3, 466 (8.9)	0.02

Data presented as mean± SD or n(%). CVD, cardiovascular disease.

¹All participants included in the present analysis

²Participants excluded because blood samples not provided or not processed at time of data linkage, missing complete lipid panel, negative calculated LDL-C or RC value, TG ≥ 4.5 mmol/L, missing date of blood draw variable, pre-existing CVD

³Age at baseline for those with non-missing age variable (n=13, 982 included and n=38, 746 excluded)

⁴Elixhauser score prior to enrollment date for those included and excluded

Supplemental Table 2. Mean non-fasting RC and LDL-C for those with and without prevalence of composite CVD.

Lipid	Total (n=15, 764)	Without prevalent CVD (n=13, 988)	With prevalent CVD (n=1, 776)	p-value (with vs without)
RC	0.79±0.38	0.78±0.38	0.86±0.39	<0.0001
LDL-C	2.83±0.87	2.86±0.85	2.59±0.96	<0.0001

Data presented as mean ± SD. CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

Supplemental Table 3. Results from multivariable logistic regression model for continuous lipid variables and incident composite CVD primary outcome.

Variable	Odds ratios (95% CI)	p-value
RC	1.48 (1.27-1.73)	<0.001
LDL-C	0.73 (0.68-0.79)	<0.001
Age	1.09 (1.08-1.09)	<0.001
Sex	0.75 (0.66-0.85)	<0.001
Statin use	0.79 (0.68-0.93)	0.004
Elixhauser comorbidity index	0.95 (0.92-0.98)	<0.001

Data presented as adjusted (by multivariable logistic regression) OR (CI). CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

Supplemental Table 4. Adjusted odds ratios for composite CVD incidence per mmol/L increase of non-fasting RC and LDL-C, adjusted and unadjusted for LDL-C and RC respectively.

		Adjusted for lipids ¹		Unadjusted for lipids ²	
	CVD n (%)	OR	p-value	OR	p-value
RC	1,156 (8.3)	1.48 (1.27-1.73)	<0.001	1.48 (1.26-1.73)	<0.001
LDL-C		0.73 (0.68-0.79)	<0.001	0.73 (0.68-0.79)	<0.001

Data presented as adjusted (by multivariable logistic regression) OR (CI). CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

¹One multivariable logistic regression model which included age, sex, statin use, Elixhauser comorbidity index, RC and LDL-C.

²Separate multivariable logistic regression models for RC and LDL-C, each adjusting for only age, sex, statin use and Elixhauser comorbidity index.

Supplemental Table 5. Unadjusted and adjusted hazard ratios for composite CVD incidence per mmol/L increase of non-fasting RC and LDL-C.

Lipid	CVD n (%)	Unadjusted		Adjusted ¹	
		HR	p-value	HR	p-value
RC	1,156	1.51 (1.31-1.74)	<0.001	1.28 (1.11-1.48)	0.001
LDL-C	(8.3)	0.74 (0.69-0.80)	<0.001	0.76 (0.71-0.82)	<0.001

Data presented as unadjusted and adjusted (by cox proportional hazard regression) HR (CI). CVD, cardiovascular disease; HR, hazard ratio; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

¹Adjusted model included age, sex, statin use, Elixhauser comorbidity index, LDL-C and RC.

Supplemental Table 6. Adjusted odds ratios of CVD incidence per mmol/L increase of non-fasting RC and LDL-C, stratified by sex.

	Males			Females		
RC ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	486 (11.4)	1.10 (0.87-1.40)	0.42	670 (6.9)	1.77 (1.44-2.19)	<0.001
IHD	447 (10.5)	1.09 (0.86-1.40)	0.47	609 (6.3)	1.80 (1.45-2.23)	<0.001
ACS ²	101 (2.4)	1.15 (0.72-1.84)	0.56	52 (0.54)	2.01 (1.03-3.91)	0.04
HF	67 (1.6)	1.32 (0.74-2.36)	0.35	101 (1.0)	1.57 (0.95-2.60)	0.08
Stroke ³	32 (0.75)	0.94 (0.40-2.17)	0.88	n/a ⁴	n/a	n/a
LDL-C ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	486 (11.4)	0.65 (0.57-0.74)	<0.001	670 (6.9)	0.77 (0.70-0.85)	<0.001
IHD	447 (10.5)	0.65 (0.57-0.74)	<0.001	609 (6.3)	0.79 (0.71-0.87)	<0.001
ACS ²	101 (2.4)	0.56 (0.43-0.73)	<0.001	52 (0.54)	0.50 (0.35-0.71)	<0.001
HF	67 (1.6)	0.73 (0.53-1.00)	0.05	101 (1.0)	0.58 (0.45-0.75)	<0.001
Stroke ³	32 (0.75)	0.50 (0.31-0.80)	0.004	n/a ⁴	n/a	n/a

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by sex. ACS, acute coronary syndrome; CVD, cardiovascular disease; HF, heart failure; IHD, ischemic heart disease; LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, statin use, Elixhauser comorbidity index, LDL-C and RC after stratification by sex.

²Aggregate of myocardial infarction and angina.

³Aggregate of transient ischemic attack and acute ischemic stroke.

⁴n/a indicates too few case numbers to report.

Supplemental Table 7. Adjusted odds ratios of CVD incidence per mmol/L increase of non-fasting RC and LDL-C, stratified by statin use.

	Statin non-users			Statin users		
RC ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	859 (7.6)	1.52 (1.26-1.82)	<0.001	297 (11.3)	1.32 (0.98-1.79)	0.07
IHD	773 (6.8)	1.52 (1.25-1.83)	<0.001	283 (10.6)	1.35 (1.00-1.84)	0.05
ACS ²	100 (0.90)	1.97 (1.25-3.10)	0.004	53 (1.9)	0.72 (0.35-1.48)	0.38
HF	107 (0.97)	1.70 (1.07-2.72)	0.03	61 (2.1)	1.11 (0.59-2.10)	0.74
Stroke ³	34 (0.31)	0.79 (0.33-1.93)	0.61	n/a ⁴	n/a	n/a
LDL-C ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	859 (7.6)	0.68 (0.62-0.74)	<0.001	297 (11.3)	0.83 (0.73-0.94)	0.004
IHD	773 (6.8)	0.69 (0.62-0.76)	<0.001	283 (10.6)	0.84 (0.73-0.96)	0.009
ACS ²	100 (0.90)	0.36 (0.27-0.47)	<0.001	53 (1.9)	0.98 (0.73-1.31)	0.87
HF	107 (0.97)	0.51 (0.39-0.67)	<0.001	61 (2.1)	0.81 (0.61-1.07)	0.14
Stroke ³	34 (0.31)	0.41 (0.26-0.67)	<0.001	n/a ⁴	n/a	n/a

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by statin use. ACS, acute coronary syndrome; CVD, cardiovascular disease; HF, heart failure; IHD, ischemic heart disease; LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, Elixhauser comorbidity index, LDL-C and RC after stratification by statin use.

²Aggregate of myocardial infarction and angina.

³Aggregate of transient ischemic attack and acute ischemic stroke.

⁴n/a indicates too few case numbers to report.

Supplemental Table 8. Results from multivariable logistic regression model for categorical lipid variables and incident composite CVD primary outcome.

Variable	Odds ratios (95% CI)	p-value
RC		
Q1	1	Reference
Q2	0.97 (0.80-1.19)	0.80
Q3	1.38 (1.15-1.67)	0.001
Q4	1.46 (1.22-1.76)	<0.001
LDL-C		
Q1	1	Reference
Q2	0.63 (0.53-0.75)	<0.001
Q3	0.52 (0.44-0.63)	<0.001
Q4	0.52 (0.43-0.62)	<0.001
Age	1.09 (1.08-0.09)	<0.001
Sex	0.73 (0.65-0.84)	<0.001
Statin use	0.77 (0.66-0.90)	0.001
Elixhauser comorbidity index	0.95 (0.92-0.98)	<0.001

Data presented as adjusted (by multivariable logistic regression) OR (CI). CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

Supplemental Table 9. Adjusted odds ratios of composite CVD incidence by quartile of non-fasting RC and LDL-C, stratified by sex.

	Males		Females	
RC Quartile¹	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.85 (0.61-1.17)	0.32	1.04 (0.81-1.33)	0.77
3	1.26 (0.93-1.70)	0.14	1.41 (1.11-1.80)	0.005
4	1.10 (0.83-1.48)	0.50	1.71 (1.34-2.17)	<0.001
LDL-C Quartile¹	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.65 (0.50-0.84)	0.001	0.61 (0.48-0.76)	<0.001
3	0.46 (0.34-0.61)	<0.001	0.55 (0.44-0.70)	<0.001
4	0.46 (0.35-0.62)	<0.001	0.54 (0.43-0.67)	<0.001

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by sex. LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, statin use, Elixhauser comorbidity index, RC and LDL-C after stratification by sex.

Supplemental Table 10. Adjusted odds ratios of composite CVD incidence by quartiles of non-fasting RC and LDL-C, stratified by statin use.

	Statin non-user		Statin user	
RC Quartile ¹	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.95 (0.77-1.19)	0.68	1.03 (0.65-1.63)	0.89
3	1.43 (1.15-1.76)	0.001	1.23 (0.80-1.89)	0.35
4	1.51 (1.22-1.86)	<0.001	1.28 (0.84-1.93)	0.25
LDL-C Quartile ¹	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.52 (0.42-0.63)	<0.001	0.97 (0.71-1.33)	0.84
3	0.44 (0.36-0.54)	<0.001	0.80 (0.55-1.17)	0.25
4	0.45 (0.37-0.56)	<0.001	0.63 (0.44-0.90)	0.01

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by statin use. LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, Elixhauser comorbidity index, RC and LDL-C after stratification by statin use.

Supplemental Table 11. Unadjusted and adjusted hazard ratios for composite CVD incidence by quartile of non-fasting RC and LDL-C.

		Unadjusted		Adjusted ¹	
Lipid	Quartile	HR	p-value	HR	p-value
RC	1	1	(reference)	1	(reference)
	2	1.04 (0.86-1.25)	0.70	0.95 (0.79-1.15)	0.62
	3	1.38 (1.16-1.64)	<0.001	1.21 (1.01-1.44)	0.04
	4	1.54 (1.30-1.82)	<0.001	1.27 (1.07-1.51)	0.007
LDL-C	1	1	(reference)	1	(reference)
	2	0.65 (0.56-0.76)	<0.001	0.67 (0.57-0.78)	<0.001
	3	0.56 (0.48-0.66)	<0.001	0.56 (0.48-0.66)	<0.001
	4	0.59 (0.50-0.69)	<0.001	0.58 (0.49-0.68)	<0.001

Data presented as unadjusted and adjusted (by cox proportional hazard regression) HR (CI). HR, hazard ratio; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol.

¹Adjusted model included age, sex, statin use, Elixhauser comorbidity index, RC and LDL-C.

Supplemental Table 12. Number of prevalent cases of composite CVD, by quartile of non-fasting RC and LDL-C.

	RC (mmol/L)					LDL-C (mmol/L)			
	Q1 n=4015	Q2 n=3976	Q3 n=3907	Q4 n=3866		Q1 n=3994	Q2 n=3940	Q3 n=3894	Q4 n=3936
CVD composite n (%)	325 (8.1)	444 (11.2)	466 (11.9)	541 (14.0)		696 (17.4)	367 (9.3)	353 (9.1)	360 (9.2)

CVD, cardiovascular disease; LDL-C, low-density lipoprotein cholesterol; RC, remnant cholesterol; Q, quartile.

Supplemental Table 13. Adjusted and unadjusted odds ratios of CVD prevalence per mmol/L increase of non-fasting RC and LDL-C.

		Unadjusted		Adjusted ¹	
RC	CVD n (%)	OR	p-value	OR	p-value
CVD composite	1,766 (11.3)	1.65 (1.46-1.87)	<0.001	1.40 (1.21-1.62)	<0.001
IHD	1,657 (10.5)	1.68 (1.48-1.90)	<0.001	1.41 (1.22-1.63)	<0.001
ACS ²	303 (1.9)	1.46 (1.11-1.93)	0.008	0.93 (0.69-1.26)	0.64
HF	289 (1.8)	1.72 (1.30-2.27)	<0.001	1.30 (0.95-1.78)	0.10
Stroke ³	67 (0.43)	1.36 (0.75-2.45)	0.32	0.95 (0.51-1.77)	0.87
LDL-C	CVD n (%)	OR	p-value	OR	p-value
CVD composite	1,766 (11.3)	0.68 (0.64-0.72)	<0.001	0.72 (0.67-0.77)	<0.001
IHD	1,657 (10.5)	0.67 (0.63-0.71)	<0.001	0.71 (0.66-0.76)	<0.001
ACS ²	303 (1.9)	0.35 (0.30-0.40)	<0.001	0.37 (0.31-0.44)	<0.001
HF	289 (1.8)	0.64 (0.55-0.73)	<0.001	0.73 (0.62-0.85)	<0.001
Stroke ³	67 (0.43)	0.43 (0.32-0.58)	<0.001	0.48 (0.34-0.66)	<0.001

Data presented as unadjusted and adjusted (by multivariable logistic regression) OR (CI). ACS, acute coronary syndrome; CVD, cardiovascular disease; HF, heart failure; IHD, ischemic heart disease; LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, statin use, Elixhauser comorbidity index, RC and LDL-C.

²Aggregate of myocardial infarction and angina.

³Aggregate of transient ischemic attack and acute ischemic stroke.

Supplemental Table 14. Adjusted odds ratios for CVD prevalence per mmol/L increase of non-fasting RC and LDL-C, stratified by sex.

RC ¹	Males			Females		
	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	848 (16.5)	1.27 (1.03-1.57)	0.03	928 (8.7)	1.44 (1.18-1.75)	<0.001
IHD	809 (15.8)	1.28 (1.04-1.59)	0.02	848 (8.0)	1.43 (1.17-1.75)	0.001
ACS ²	219 (4.3)	0.82 (0.57-1.17)	0.28	84 (0.79)	1.12 (0.62-2.02)	0.71
HF	146 (2.9)	1.23 (0.80-1.91)	0.35	143 (1.3)	1.39 (0.88-2.19)	0.16
Stroke ³	32 (0.62)	0.74 (0.30-1.82)	0.52	35 (0.33)	1.23 (0.52-2.92)	0.64
LDL-C ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	848 (16.5)	0.60 (0.54-0.67)	<0.001	928 (8.7)	0.81 (0.74-0.89)	<0.001
IHD	809 (15.8)	0.59 (0.52-0.65)	<0.001	848 (8.0)	0.81 (0.74-0.89)	<0.001
ACS ²	219 (4.3)	0.30 (0.24-0.37)	<0.001	84 (0.79)	0.57 (0.43-0.76)	<0.001
HF	146 (2.9)	0.67 (0.53-0.84)	0.001	143 (1.3)	0.80 (0.64-0.99)	0.04
Stroke ³	32 (0.62)	0.44 (0.27-0.73)	0.001	35 (0.33)	0.51 (0.32-0.80)	0.003

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by sex. ACS, acute coronary syndrome; CVD, cardiovascular disease; HF, heart failure; IHD, ischemic heart disease; LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, statin use, Elixhauser comorbidity index, RC and LDL-C after stratification by sex.

²Aggregate of myocardial infarction and angina.

³Aggregate of transient ischemic attack and acute ischemic stroke.

Supplemental Table 15. Adjusted odds ratios of CVD prevalence per mmol/L increase of non-fasting RC and LDL-C, stratified by statin use.

RC ¹	Statin non-user			Statin user		
	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	1610 (12.4)	1.41 (1.21-1.64)	<0.001	166 (5.9)	1.30 (0.86-1.97)	0.22
IHD	1494 (11.6)	1.42 (1.22-1.66)	<0.001	163 (5.7)	1.26 (0.83-1.90)	0.28
ACS ²	241 (2.0)	0.97 (0.68-1.38)	0.87	62 (1.7)	0.92 (0.48-1.78)	0.82
HF	221 (1.8)	1.26 (0.87-1.83)	0.21	68 (1.8)	1.51 (0.82-2.77)	0.18
Stroke ³	46 (0.39)	0.90 (0.42-1.91)	0.77	n/a ⁴	n/a	n/a
LDL-C ¹	CVD n (%)	OR	p-value	CVD n (%)	OR	p-value
CVD composite	1610 (12.4)	0.70 (0.65-0.75)	<0.001	166 (5.9)	0.88 (0.73-1.05)	0.15
IHD	1494 (11.6)	0.68 (0.63-0.73)	<0.001	163 (5.7)	0.90 (0.75-1.08)	0.25
ACS ²	241 (2.0)	0.27 (0.22-0.33)	<0.001	62 (1.7)	0.92 (0.69-1.23)	0.56
HF	221 (1.8)	0.71 (0.59-0.85)	<0.001	68 (1.8)	0.80 (0.59-1.07)	0.13
Stroke ³	46 (0.39)	0.36 (0.24-0.54)	<0.001	n/a ⁴	n/a	n/a

Data presented as adjusted (by multivariable logistic regression) OR (CI), stratified by statin use. ACS, acute coronary syndrome; CVD, cardiovascular disease; HF, heart failure; IHD, ischemic heart disease; LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, Elixhauser comorbidity index, RC and LDL-C after stratification by statin use.

²Aggregate of myocardial infarction and angina.

³Aggregate of transient ischemic attack and acute ischemic stroke.

⁴n/a indicates too few case numbers to report.

Supplemental Table 16. Adjusted odds ratios of composite CVD prevalence by quartile of non-fasting RC and LDL-C.

	Unadjusted		Adjusted¹	
RC Quartile	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	1.43 (1.23-1.66)	<0.001	1.33 (1.12-1.57)	0.001
3	1.54 (1.32-1.78)	<0.001	1.31 (1.10-1.55)	0.002
4	1.85 (1.60-2.14)	<0.001	1.50 (1.27-1.78)	<0.001
LDL-C Quartile	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.49 (0.43-0.56)	<0.001	0.49 (0.42-0.57)	<0.001
3	0.47 (0.41-0.54)	<0.001	0.45 (0.38-0.53)	<0.001
4	0.48 (0.42-0.55)	<0.001	0.47 (0.40-0.55)	<0.001

Data presented as unadjusted and adjusted (by multivariable logistic regression) OR (CI). LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, statin use, Elixhauser comorbidity index, RC and LDL-C.

Supplemental Table 17. Adjusted odds ratios for composite CVD prevalence by quartile of non-fasting RC and LDL-C, stratified by sex.

RC Quartile ¹	Males		Females	
	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	1.43 (1.08-1.90)	0.01	1.25 (1.01-1.55)	0.04
3	1.36 (1.03-1.79)	0.03	1.25 (1.00-1.55)	0.05
4	1.55 (1.19-2.02)	0.001	1.43 (1.15-1.78)	0.002
LDL-C Quartile ¹	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.43 (0.34-0.54)	<0.001	0.55 (0.45-0.69)	<0.001
3	0.35 (0.28-0.45)	<0.001	0.54 (0.44-0.67)	<0.001
4	0.36 (0.28-0.47)	<0.001	0.56 (0.46-0.69)	<0.001

Data presented as unadjusted and adjusted (by multivariable logistic regression) OR (CI), stratified by sex. LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, statin use, Elixhauser comorbidity index, RC and LDL-C after stratification by sex.

Supplemental Table 18. Adjusted odds ratios for composite CVD prevalence by quartile of non-fasting RC and LDL-C, stratified by statin use.

RC Quartile ¹	Statin non-user		Statin user	
	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	1.32 (1.11-1.58)	0.002	1.33 (0.72-2.48)	0.36
3	1.31 (1.09-1.56)	0.003	1.23 (0.68-2.22)	0.50
4	1.53 (1.28-1.82)	<0.001	1.22 (0.69-2.17)	0.49
LDL-C Quartile ¹	OR		OR	
	OR	p-value	OR	p-value
1	1	(reference)	1	(reference)
2	0.47 (0.40-0.56)	<0.001	0.60 (0.38-0.95)	0.03
3	0.44 (0.37-0.52)	<0.001	0.54 (0.31-0.96)	0.04
4	0.45 (0.38-0.53)	<0.001	0.62 (0.38-1.03)	0.06

Data presented as unadjusted and adjusted (by multivariable logistic regression) OR (CI), stratified by statin use. LDL-C, low-density lipoprotein cholesterol; OR, odds ratio; RC, remnant cholesterol.

¹Adjusted model included age, sex, Elixhauser comorbidity index, RC and LDL-C after stratification by statin use.