

Association of kidney function with NMR-quantified lipids, lipoproteins, and metabolic measures in Mexican adults

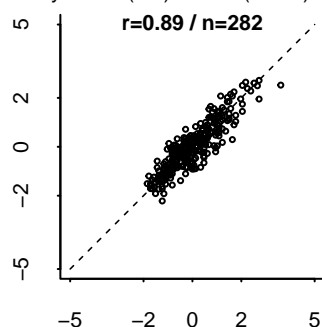
Supplemental Material, Table of Contents

Supplementary figures	Page
1. Comparison of traits measured by NMR and standard chemical assay	2
2. Associations of eGFR with NMR-quantified lipid metabolic measures among 38,081 men and women aged 35 to 84 years from the Mexico City Prospective Study, by diabetes status	3
3. Comparison of associations of eGFR <60 mL/min/1.73m ² with NMR-quantified lipid and metabolic measures between adults WITH and WITHOUT diabetes, after <i>further</i> adjustment for body-mass index and waist-hip ratio	4
4. Associations of eGFR <60 mL min 1.73m ² with NMR-quantified lipid and metabolic measures in adults <u>WITH diabetes</u> , before and after <i>further</i> adjustment for NMR-measured albumin	5
5. Associations of eGFR <60 mL min 1.73m ² with NMR-quantified lipid and metabolic measures in adults <u>WITH diabetes</u> , before and after <i>further</i> adjustment for HbA1c and insulin use	6
 Supplementary tables	
1. Amount of missing data for each NMR-measure	7
2. Characteristics of participants aged 35 to 84 years by estimated glomerular filtration rate (eGFR) and history of diabetes	8
3. Baseline mean (SD) concentrations of the 138 NMR-measures used for the main analyses in people with and without diabetes	9
4. Difference in SD units of each (log) NMR-measure associated with eGFR <60 mL/min/1.73 m ² in those with and without diabetes	11

eFigure 1. Comparison of traits measured by NMR and standard chemical assay

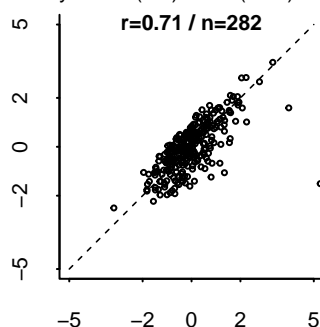
1. Creatinine

NMR mean (SD)=56.68 (12.46) $\mu\text{mol/L}$
Assay mean (SD)=63.07 (14.64) $\mu\text{mol/L}$



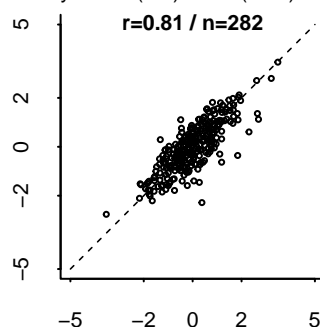
2. Total cholesterol

NMR mean (SD)=3.50 (0.74) mmol/L
Assay mean (SD)=5.05 (1.03) mmol/L



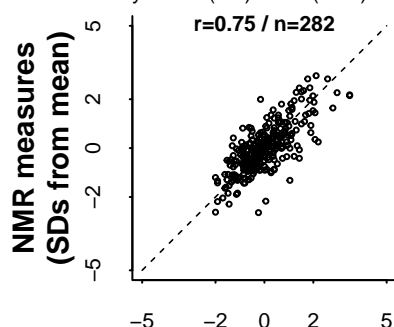
3. LDL-C

NMR mean (SD)=1.80 (0.54) mmol/L
Assay mean (SD)=2.78 (0.67) mmol/L



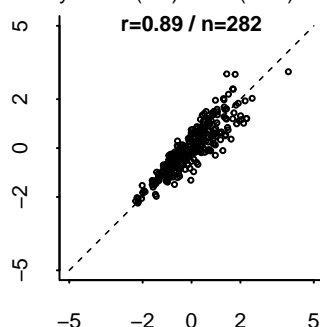
4. HDL-C

NMR mean (SD)=1.00 (0.19) mmol/L
Assay mean (SD)=1.08 (0.23) mmol/L



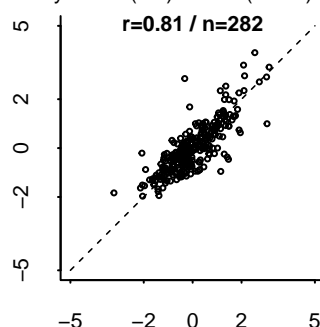
5. Log-triglycerides

NMR mean (SD)=0.37 (0.34) mmol/L
Assay mean (SD)=0.82 (0.57) mmol/L



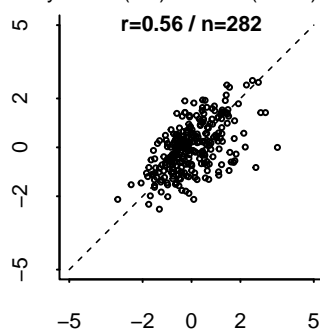
6. Apo-B

NMR mean (SD)=82.16 (16.90) mg/dL
Assay mean (SD)=96.55 (21.24) mg/dL



7. Apo-A1

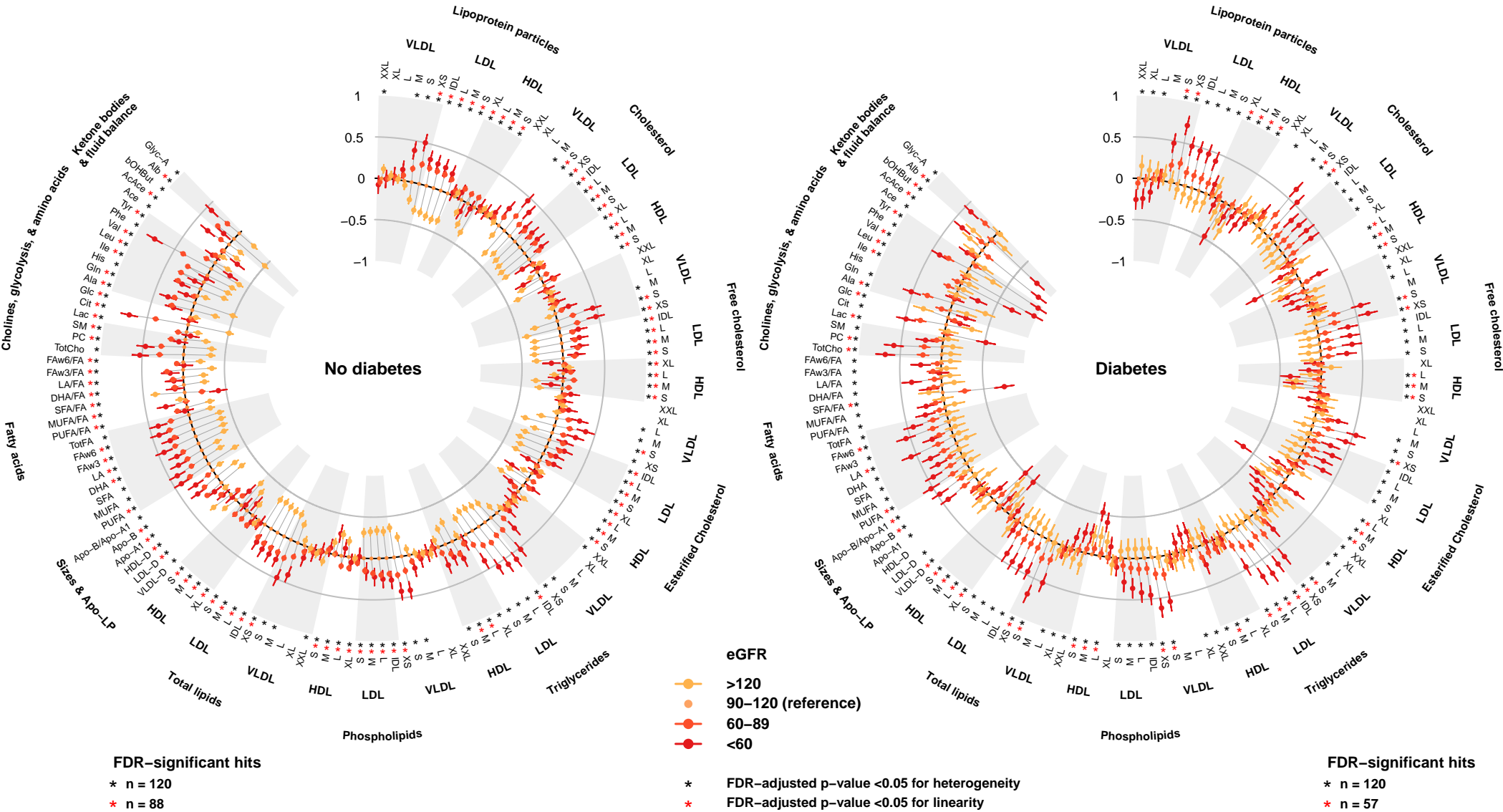
NMR mean (SD)=123.24 (12.92) mg/dL
Assay mean (SD)=123.68 (18.62) mg/dL



Chemical assays
(SDs from mean)

eFigure 2. Associations of eGFR with NMR-quantified lipid and metabolic measures among 38,081 men and women aged 35 to 84 years from the Mexico City Prospective Study, by diabetes status

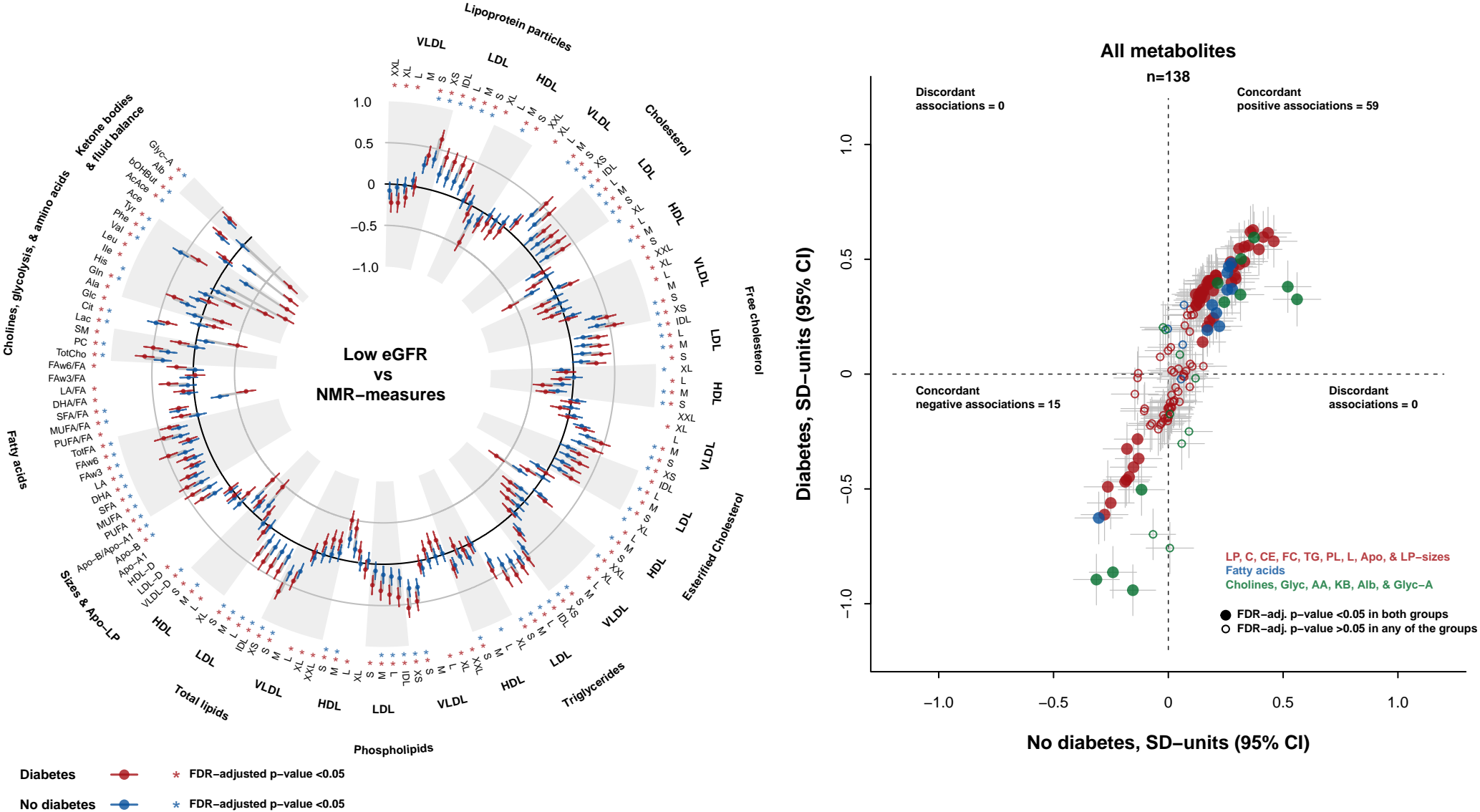
Difference (in SD units) of each log-NMR measure associated with different levels of eGFR



eGFR = estimated glomerular filtration rate. FDR = false-discovery rate. SD = standard deviation. NMR = nuclear magnetic resonance spectroscopy. Estimates are adjusted for age, sex, district of residence, smoking, fasting duration, and batch number. Differences in associations between eGFR categories and NMR measures between people with and without diabetes were assessed using standard tests of heterogeneity. NMR-measures nomenclature defined in Figure 1.

eFigure 3. Comparison of associations of eGFR < 60 mL/min/1.73m² with NMR-quantified lipid and metabolic measures between adults WITH and WITHOUT diabetes, after further adjustment for body-mass index and waist-hip ratio

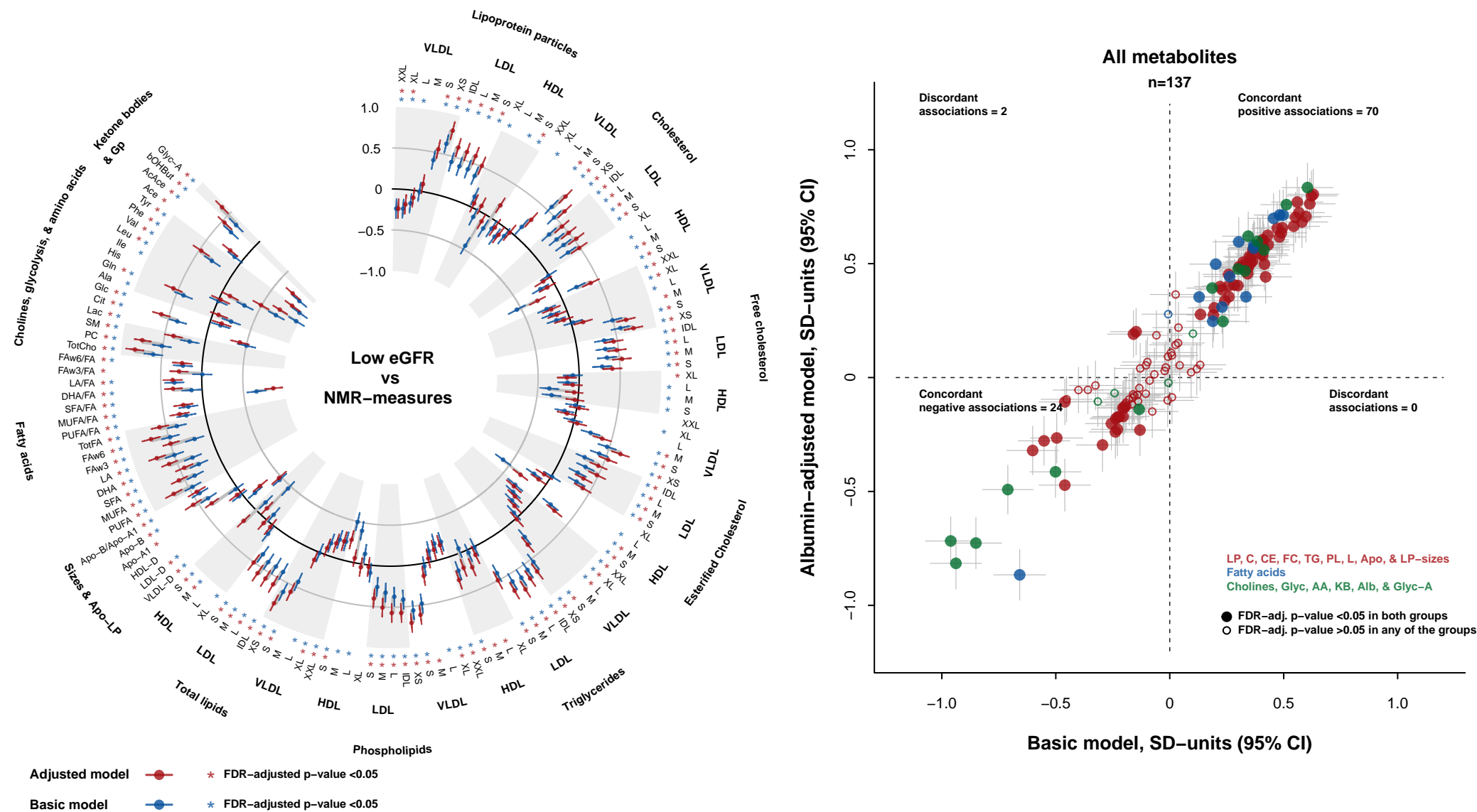
Difference (in SD units) of each log-NMR-measure associated with eGFR <60 vs ≥ 60 mL/min/1.73m²



eGFR = estimated glomerular filtration rate. FDR = false-discovery rate. SD = standard deviation. NMR = nuclear magnetic resonance spectroscopy. Estimates are adjusted for age, sex, district of residence, smoking, fasting duration, body-mass index, waist-hip ratio, and batch number. NMR-measures nomenclature defined in Figure 1.

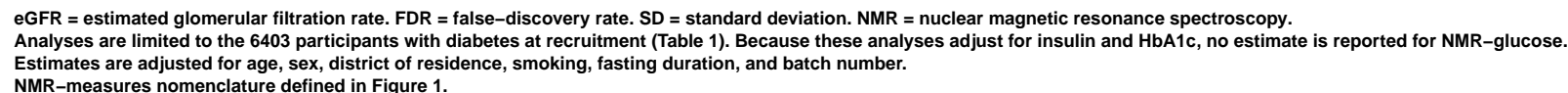
eFigure 4. Associations of eGFR < 60 mL/min/1.73m² with NMR-quantified lipid and metabolic measures in adults WITH diabetes, before and after further adjustment for NMR-measured albumin

Difference (in SD units) of each log-NMR measure associated with eGFR <60 vs ≥ 60 mL/min/1.73m²



eGFR = estimated glomerular filtration rate. FDR = false-discovery rate. SD = standard deviation. NMR = nuclear magnetic resonance spectroscopy. Analyses are limited to the 6403 participants with diabetes at recruitment (Table 1). Because these analyses adjust for NMR-albumin, no estimate is reported for this measure. Estimates are adjusted for age, sex, district of residence, smoking, fasting duration, and batch number. NMR-measures nomenclature defined in Figure 1.

Difference (in SD units) of each log-NMR measure associated with eGFR <60 vs ≥ 60 mL/min/1.73m²



eTable 1. Amount of missing data for each NMR-measure

Measure	Label	Number (%) missing
3-hydroxybutyrate (bOHBut) (mmol/l)	bOHBut	935 (2.46%)
Glutamine (Gln) (mmol/l)	Gln	372 (0.98%)
Valine (Val) (mmol/l)	Val	306 (0.80%)
Glucose (Glc) (mmol/l)	Glc	105 (0.28%)
Phenylalanine (Phe) (mmol/l)	Phe	49 (0.13%)
Leucine (Leu) (mmol/l)	Leu	24 (0.06%)
Histidine (His) (mmol/l)	His	19 (<0.05%)
Apolipoprotein B (ApoB) (g/l)	ApoB	17 (<0.05%)
Ratio of apolipoprotein B to apolipoprotein A-I (ApoB/ApoA1)	ApoB_ApoA1	17 (<0.05%)
Acetate (Ace) (mmol/l)	Ace	14 (<0.05%)
Polyunsaturated fatty acids (PUFA) (mmol/l)	PUFA	13 (<0.05%)
Monounsaturated fatty acids; 16:1, 18:1 (MUFA) (mmol/l)	MUFA	13 (<0.05%)
Saturated fatty acids (SFA) (mmol/l)	SFA	13 (<0.05%)
22:6, docosahexaenoic acid (DHA) (mmol/l)	DHA	13 (<0.05%)
18:2, linoleic acid (LA) (mmol/l)	LA	13 (<0.05%)
Omega-3 fatty acids (FAw3) (mmol/l)	FAw3	13 (<0.05%)
Omega-6 fatty acids (FAw6) (mmol/l)	FAw6	13 (<0.05%)
Total fatty acids (TotFA) (mmol/l)	TotFA	13 (<0.05%)
Ratio of polyunsaturated fatty acids to total fatty acids (PUFA/FA) (%)	PUFA_FA	13 (<0.05%)
Ratio of monounsaturated fatty acids to total fatty acids (MUFA/FA) (%)	MUFA_FA	13 (<0.05%)
Ratio of saturated fatty acids to total fatty acids (SFA/FA) (%)	SFA_FA	13 (<0.05%)
Ratio of 22:6 docosahexaenoic acid to total fatty acids (DHA/FA) (%)	DHA_FA	13 (<0.05%)
Ratio of 18:2 linoleic acid to total fatty acids (LA/FA) (%)	LA_FA	13 (<0.05%)
Ratio of omega-3 fatty acids to total fatty acids (FAw3/FA) (%)	FAw3_FA	13 (<0.05%)
Ratio of omega-6 fatty acids to total fatty acids (FAw6/FA) (%)	FAw6_FA	13 (<0.05%)
Isoleucine (Ile) (mmol/l)	Ile	11 (<0.05%)
Acetoacetate (AcAce) (mmol/l)	AcAce	10 (<0.05%)
Total cholines (TotCho) (mmol/l)	TotCho	6 (<0.05%)
Phosphatidylcholine and other cholines (PC) (mmol/l)	PC	6 (<0.05%)
Sphingomyelins (SM) (mmol/l)	SM	6 (<0.05%)
Lactate (Lac) (mmol/l)	Lac	4 (<0.05%)
Citrate (Cit) (mmol/l)	Cit	4 (<0.05%)
Tyrosine (Tyr) (mmol/l)	Tyr	4 (<0.05%)
Alanine (Ala) (mmol/l)	Ala	2 (<0.05%)
Concentration of IDL particles (IDL-P) (mol/l)	IDL_P	1 (<0.05%)
Total lipids in IDL (IDL-L) (mmol/l)	IDL_L	1 (<0.05%)
Mean diameter for VLDL particles (VLDL-D) (nm)	VLDL_D	1 (<0.05%)
Mean diameter for LDL particles (LDL-D) (nm)	LDL_D	1 (<0.05%)
Mean diameter for HDL particles (HDL-D) (nm)	HDL_D	1 (<0.05%)
Apolipoprotein A-I (ApoA1) (g/l)	ApoA1	1 (<0.05%)
All other NMR measures	-	0

eTable 2. Characteristics of participants aged 35 to 84 years by estimated glomerular filtration rate (eGFR)^a and history of diabetes

	Estimated glomerular filtration rate, mL/min/1.73 m ²										All participants (n=38081)
	Individuals <i>with</i> diabetes (n=6403)					Individuals <i>without</i> diabetes (n=31 678)					
	>120 (n=756)	90-120 (n=4523)	60-89 (n=881)	30-59 (n=152)	<30 (n=91)	>120 (n=4635)	90-120 (n=24069)	60-89 (n=2760)	30-59 (n=162)	<30 (n=52)	
eGFR ^b , mL/min/1.73 m ²	121 (5)	100 (8)	74 (9)	43 (7)	17 (7)	120 (4)	102 (9)	75 (8)	47 (6)	14 (8)	101 (15)
Age	43 (6)	58 (9)	70 (9)	66 (10)	65 (8)	39 (4)	50 (10)	68 (12)	69 (12)	63 (13)	52 (12)
Male sex	342 (45%)	1601 (35%)	295 (33%)	44 (29%)	33 (36%)	1687 (36%)	8696 (36%)	992 (36%)	59 (36%)	21 (40%)	13770 (36%)
Resident of Coyoacán	673 (89%)	4027 (89%)	751 (85%)	135 (89%)	75 (82%)	4263 (92%)	21814 (91%)	2385 (86%)	136 (84%)	43 (83%)	34302 (90%)
University/college educated	132 (17%)	289 (6%)	39 (4%)	5 (3%)	0 (0%)	1034 (22%)	3954 (16%)	249 (9%)	9 (6%)	5 (10%)	5716 (15%)
Current smoker	285 (38%)	1080 (24%)	117 (13%)	18 (12%)	12 (13%)	1659 (36%)	7243 (30%)	500 (18%)	21 (13%)	6 (12%)	10941 (29%)
Anthropometry, blood pressure, and HbA1c											
Body-mass index, kg/m ²	29.7 (5.7)	29.4 (5.2)	28.4 (4.9)	27.3 (4.7)	27.5 (4.3)	28.1 (4.8)	28.7 (4.8)	28.2 (4.7)	29.0 (4.8)	27.7 (5.0)	28.7 (4.8)
Waist-hip ratio	0.92 (0.07)	0.93 (0.07)	0.93 (0.09)	0.93 (0.08)	0.94 (0.07)	0.88 (0.07)	0.90 (0.08)	0.92 (0.08)	0.94 (0.09)	0.96 (0.08)	0.90 (0.08)
SBP, mmHg	129 (15)	136 (18)	141 (21)	148 (24)	158 (24)	122 (13)	128 (16)	136 (19)	140 (19)	153 (24)	129 (17)
HbA1c (%)	10.0 (7.8-11.5)	8.6 (6.8-10.7)	7.7 (6.6-9.7)	7.4 (6.6-9.5)	6.4 (5.6-7.5)	5.3 (5.0-5.4)	5.4 (5.1-5.5)	5.4 (5.2-5.7)	5.4 (5.2-5.7)	5.1 (4.7-5.4)	5.4 (5.2-5.8)
Self-reported comorbidities											
Cardiovascular disease	14 (2%)	212 (5%)	72 (8%)	15 (10%)	9 (10%)	49 (1%)	522 (2%)	164 (6%)	10 (6%)	5 (10%)	1072 (3%)
Chronic kidney disease	5 (1%)	45 (1%)	29 (3%)	6 (4%)	30 (33%)	37 (1%)	204 (1%)	43 (2%)	6 (4%)	20 (38%)	425 (1%)

Values are mean (SD), n (%) or median (IQR).

a. The glomerular filtration rate was estimated using the CKD-EPI equation and NMR-measured creatinine that was recalibrated to a reference creatinine measured by isotope dilution mass spectrometry (IDMS) available in a subset of participants. Pearson's correlation coefficients for NMR- and IDMS-measured creatinine were $r = 0.89$ ($n=282$) (See **eFigure 1**).

b. Mean (SD) NMR-measured and recalibrated creatinine values were (following the order of the columns above): 52 (8), 63 (11), 79 (13), 117 (23), 481 (302), 48 (9), 58 (10), 78 (14), 128 (26), 333 (172), 64 (28) $\mu\text{mol/L}$.

eTable 3. Baseline mean (SD) concentrations of the 138 NMR-measures used for the main analyses in people with and without diabetes.

NMR-measure*		Label	With diabetes (n=6,403)	Without diabetes (n=31,678)
Concentration of	Chylomicrons and extremely large VLDL particles (XXL-VLDL-P)	XXL_VLDL_P	0.25 (0.16)	0.19 (0.12)
	Very large VLDL particles (XL-VLDL-P)	XL_VLDL_P	1.29 (0.82)	0.95 (0.63)
	Large VLDL particles (L-VLDL-P)	L_VLDL_P	7.96 (4.22)	6.14 (3.22)
	Medium VLDL particles (M-VLDL-P)	M_VLDL_P	25.1 (9.86)	20.85 (7.70)
	Small VLDL particles (S-VLDL-P)	S_VLDL_P	36.4 (9.97)	32.26 (8.08)
	Very small VLDL particles (XS-VLDL-P)	XS_VLDL_P	39.0 (9.24)	36.54 (7.82)
	IDL particles (IDL-P)	IDL_P	93.7 (24.0)	92.1 (21.1)
	Large LDL particles (L-LDL-P)	L_LDL_P	150.7 (42.6)	149.7 (37.5)
	Medium LDL particles (M-LDL-P)	M_LDL_P	119.0 (37.5)	119.3 (32.9)
	Small LDL particles (S-LDL-P)	S_LDL_P	138.4 (41.9)	138.8 (36.5)
	Very large HDL particles (XL-HDL-P)	XL_HDL_P	364.5 (114.1)	349.8 (108.8)
	Large HDL particles (L-HDL-P)	L_HDL_P	744.6 (285.0)	736.4 (286.8)
	Medium HDL particles (M-HDL-P)	M_HDL_P	1579 (301.1)	1557 (285.2)
	Small HDL particles (S-HDL-P)	S_HDL_P	4447 (428.8)	4417 (384.4)
Total cholesterol in	Chylomicrons and extremely large VLDL (XXL-VLDL-C) (mmol/l)	XXL_VLDL_C	0.01 (0.01)	0.01 (0.00)
	Very large VLDL (XL-VLDL-C) (mmol/l)	XL_VLDL_C	0.03 (0.02)	0.02 (0.01)
	Large VLDL (L-VLDL-C) (mmol/l)	L_VLDL_C	0.11 (0.05)	0.08 (0.04)
	Medium VLDL (M-VLDL-C) (mmol/l)	M_VLDL_C	0.21 (0.08)	0.18 (0.07)
	Small VLDL (S-VLDL-C) (mmol/l)	S_VLDL_C	0.21 (0.07)	0.19 (0.06)
	Very small VLDL (XS-VLDL-C) (mmol/l)	XS_VLDL_C	0.21 (0.06)	0.20 (0.05)
	IDL (IDL-C) (mmol/l)	IDL_C	0.54 (0.16)	0.55 (0.15)
	Large LDL (L-LDL-C) (mmol/l)	L_LDL_C	0.68 (0.23)	0.69 (0.20)
	Medium LDL (M-LDL-C) (mmol/l)	M_LDL_C	0.37 (0.14)	0.38 (0.13)
	Small LDL (S-LDL-C) (mmol/l)	S_LDL_C	0.22 (0.09)	0.23 (0.08)
	Very large HDL (XL-HDL-C) (mmol/l)	XL_HDL_C	0.17 (0.06)	0.17 (0.06)
	Large HDL (L-HDL-C) (mmol/l)	L_HDL_C	0.21 (0.09)	0.21 (0.09)
	Medium HDL (M-HDL-C) (mmol/l)	M_HDL_C	0.29 (0.07)	0.29 (0.07)
	Small HDL (S-HDL-C) (mmol/l)	S_HDL_C	0.36 (0.07)	0.38 (0.06)
	Chylomicrons and extremely large VLDL (XXL-VLDL-FC) (mmol/l)	XXL_VLDL_FC	0.00 (0.00)	0.00 (0.00)
	Very large VLDL (XL-VLDL-FC) (mmol/l)	XL_VLDL_FC	0.01 (0.01)	0.01 (0.01)
Free cholesterol in	Large VLDL (L-VLDL-FC) (mmol/l)	L_VLDL_FC	0.05 (0.03)	0.03 (0.02)
	Medium VLDL (M-VLDL-FC) (mmol/l)	M_VLDL_FC	0.10 (0.04)	0.08 (0.03)
	Small VLDL (S-VLDL-FC) (mmol/l)	S_VLDL_FC	0.09 (0.03)	0.08 (0.02)
	Very small VLDL (XS-VLDL-FC) (mmol/l)	XS_VLDL_FC	0.07 (0.02)	0.06 (0.02)
	IDL (IDL-FC) (mmol/l)	IDL_FC	0.15 (0.05)	0.15 (0.04)
	Large LDL (L-LDL-FC) (mmol/l)	L_LDL_FC	0.19 (0.06)	0.20 (0.05)
	Medium LDL (M-LDL-FC) (mmol/l)	M_LDL_FC	0.12 (0.03)	0.12 (0.02)
	Small LDL (S-LDL-FC) (mmol/l)	S_LDL_FC	0.07 (0.02)	0.07 (0.01)
	Very large HDL (XL-HDL-FC) (mmol/l)	XL_HDL_FC	0.04 (0.02)	0.04 (0.02)
	Large HDL (L-HDL-FC) (mmol/l)	L_HDL_FC	0.04 (0.02)	0.04 (0.02)
	Medium HDL (M-HDL-FC) (mmol/l)	M_HDL_FC	0.05 (0.02)	0.05 (0.01)
	Small HDL (S-HDL-FC) (mmol/l)	S_HDL_FC	0.09 (0.01)	0.09 (0.01)
	Chylomicrons and extremely large VLDL (XXL-VLDL-CE) (mmol/l)	XXL_VLDL_CE	0.01 (0.00)	0.00 (0.00)
	Very large VLDL (XL-VLDL-CE) (mmol/l)	XL_VLDL_CE	0.01 (0.01)	0.01 (0.01)
	Large VLDL (L-VLDL-CE) (mmol/l)	L_VLDL_CE	0.06 (0.03)	0.05 (0.02)
	Medium VLDL (M-VLDL-CE) (mmol/l)	M_VLDL_CE	0.12 (0.04)	0.10 (0.03)
Cholesterol esters in	Small VLDL (S-VLDL-CE) (mmol/l)	S_VLDL_CE	0.12 (0.04)	0.11 (0.04)
	Very small VLDL (XS-VLDL-CE) (mmol/l)	XS_VLDL_CE	0.14 (0.04)	0.14 (0.03)
	IDL (IDL-CE) (mmol/l)	IDL_CE	0.40 (0.12)	0.40 (0.11)
	Large LDL (L-LDL-CE) (mmol/l)	L_LDL_CE	0.49 (0.17)	0.49 (0.15)
	Medium LDL (M-LDL-CE) (mmol/l)	M_LDL_CE	0.25 (0.12)	0.27 (0.11)
	Small LDL (S-LDL-CE) (mmol/l)	S_LDL_CE	0.15 (0.07)	0.16 (0.06)
	Very large HDL (XL-HDL-CE) (mmol/l)	XL_HDL_CE	0.13 (0.05)	0.12 (0.04)
	Large HDL (L-HDL-CE) (mmol/l)	L_HDL_CE	0.17 (0.07)	0.17 (0.07)
	Medium HDL (M-HDL-CE) (mmol/l)	M_HDL_CE	0.24 (0.06)	0.24 (0.05)
	Small HDL (S-HDL-CE) (mmol/l)	S_HDL_CE	0.26 (0.07)	0.28 (0.06)
	Chylomicrons and extremely large VLDL (XXL-VLDL-TG) (mmol/l)	XXL_VLDL_TG	0.04 (0.02)	0.03 (0.02)
	Very large VLDL (XL-VLDL-TG) (mmol/l)	XL_VLDL_TG	0.08 (0.05)	0.06 (0.04)
	Large VLDL (L-VLDL-TG) (mmol/l)	L_VLDL_TG	0.27 (0.15)	0.21 (0.11)
	Medium VLDL (M-VLDL-TG) (mmol/l)	M_VLDL_TG	0.45 (0.19)	0.37 (0.14)
	Small VLDL (S-VLDL-TG) (mmol/l)	S_VLDL_TG	0.32 (0.10)	0.28 (0.08)
	Very small VLDL (XS-VLDL-TG) (mmol/l)	XS_VLDL_TG	0.13 (0.03)	0.12 (0.03)
Triglycerides in	IDL (IDL-TG) (mmol/l)	IDL_TG	0.13 (0.03)	0.12 (0.03)
	Large LDL (L-LDL-TG) (mmol/l)	L_LDL_TG	0.11 (0.03)	0.10 (0.02)
	Medium LDL (M-LDL-TG) (mmol/l)	M_LDL_TG	0.05 (0.01)	0.05 (0.01)
	Small LDL (S-LDL-TG) (mmol/l)	S_LDL_TG	0.04 (0.01)	0.03 (0.01)
	Very large HDL (XL-HDL-TG) (mmol/l)	XL_HDL_TG	0.02 (0.01)	0.02 (0.01)
	Large HDL (L-HDL-TG) (mmol/l)	L_HDL_TG	0.03 (0.01)	0.02 (0.01)
	Medium HDL (M-HDL-TG) (mmol/l)	M_HDL_TG	0.05 (0.01)	0.05 (0.01)
	Small HDL (S-HDL-TG) (mmol/l)	S_HDL_TG	0.07 (0.01)	0.06 (0.01)

eTable 3. Baseline mean (SD) concentrations of the 138 NMR-measures used for the main analyses in people with and without diabetes.

NMR-measure*		Label	With diabetes (n=6,403)	Without diabetes (n=31,678)
Phospholipids in	Chylomicrons and extremely large VLDL (XXL-VLDL-PL) (mmol/l)	XXL_VLDL_PL	0.01 (0.00)	0.00 (0.00)
	Very large VLDL (XL-VLDL-PL) (mmol/l)	XL_VLDL_PL	0.02 (0.01)	0.01 (0.01)
	Large VLDL (L-VLDL-PL) (mmol/l)	L_VLDL_PL	0.08 (0.04)	0.06 (0.03)
	Medium VLDL (M-VLDL-PL) (mmol/l)	M_VLDL_PL	0.16 (0.06)	0.14 (0.05)
	Small VLDL (S-VLDL-PL) (mmol/l)	S_VLDL_PL	0.16 (0.04)	0.15 (0.03)
	Very small VLDL (XS-VLDL-PL) (mmol/l)	XS_VLDL_PL	0.13 (0.04)	0.13 (0.03)
	IDL (IDL-PL) (mmol/l)	IDL_PL	0.25 (0.06)	0.25 (0.06)
	Large LDL (L-LDL-PL) (mmol/l)	L_LDL_PL	0.27 (0.06)	0.27 (0.06)
	Medium LDL (M-LDL-PL) (mmol/l)	M_LDL_PL	0.18 (0.04)	0.17 (0.03)
	Small LDL (S-LDL-PL) (mmol/l)	S_LDL_PL	0.13 (0.03)	0.13 (0.02)
	Very large HDL (XL-HDL-PL) (mmol/l)	XL_HDL_PL	0.17 (0.06)	0.17 (0.06)
	Large HDL (L-HDL-PL) (mmol/l)	L_HDL_PL	0.22 (0.08)	0.22 (0.08)
	Medium HDL (M-HDL-PL) (mmol/l)	M_HDL_PL	0.32 (0.06)	0.31 (0.05)
	Small HDL (S-HDL-PL) (mmol/l)	S_HDL_PL	0.55 (0.07)	0.53 (0.06)
Total lipids in	Chylomicrons and extremely large VLDL (XXL-VLDL-L) (mmol/l)	XXL_VLDL_L	0.05 (0.03)	0.04 (0.03)
	Very large VLDL (XL-VLDL-L) (mmol/l)	XL_VLDL_L	0.13 (0.08)	0.09 (0.06)
	Large VLDL (L-VLDL-L) (mmol/l)	L_VLDL_L	0.46 (0.24)	0.35 (0.19)
	Medium VLDL (M-VLDL-L) (mmol/l)	M_VLDL_L	0.83 (0.33)	0.69 (0.26)
	Small VLDL (S-VLDL-L) (mmol/l)	S_VLDL_L	0.70 (0.19)	0.62 (0.16)
	Very small VLDL (XS-VLDL-L) (mmol/l)	XS_VLDL_L	0.48 (0.12)	0.45 (0.10)
	IDL (IDL-L) (mmol/l)	IDL_L	0.93 (0.25)	0.92 (0.22)
	Large LDL (L-LDL-L) (mmol/l)	L_LDL_L	1.06 (0.31)	1.06 (0.27)
	Medium LDL (M-LDL-L) (mmol/l)	M_LDL_L	0.60 (0.19)	0.60 (0.17)
	Small LDL (S-LDL-L) (mmol/l)	S_LDL_L	0.38 (0.12)	0.39 (0.10)
	Very large HDL (XL-HDL-L) (mmol/l)	XL_HDL_L	0.37 (0.12)	0.35 (0.11)
	Large HDL (L-HDL-L) (mmol/l)	L_HDL_L	0.46 (0.18)	0.46 (0.18)
	Medium HDL (M-HDL-L) (mmol/l)	M_HDL_L	0.66 (0.13)	0.65 (0.12)
	Small HDL (S-HDL-L) (mmol/l)	S_HDL_L	0.97 (0.10)	0.97 (0.09)
Mean diameter	Of VLDL particles (VLDL-D) (nm)	VLDL_D	38.06 (1.13)	37.64 (1.04)
	Of LDL particles (LDL-D) (nm)	LDL_D	23.62 (0.11)	23.60 (0.10)
	Of HDL particles (HDL-D) (nm)	HDL_D	9.82 (0.16)	9.81 (0.17)
Fatty acids and ratios of fatty acids	Apolipoprotein A-I (ApoA1) (g/l)	ApoA1	1.27 (0.14)	1.25 (0.13)
	Apolipoprotein B (ApoB) (g/l)	ApoB	0.87 (0.18)	0.82 (0.16)
	Ratio of apolipoprotein B to apolipoprotein A-I (ApoB/ApoA1)	ApoB_ApoA1	0.68 (0.12)	0.66 (0.11)
	Polyunsaturated fatty acids (PUFA) (mmol/l)	PUFA	3.86 (0.80)	3.61 (0.68)
	Monounsaturated fatty acids; 16:1, 18:1 (MUFA) (mmol/l)	MUFA	3.65 (0.91)	3.26 (0.74)
	Saturated fatty acids (SFA) (mmol/l)	SFA	4.55 (0.97)	4.19 (0.79)
	22:6, docosahexaenoic acid (DHA) (mmol/l)	DHA	0.09 (0.03)	0.09 (0.03)
	18:2, linoleic acid (LA) (mmol/l)	LA	3.02 (0.65)	2.79 (0.55)
	Omega-3 fatty acids (FAw3) (mmol/l)	FAw3	0.35 (0.12)	0.31 (0.10)
	Omega-6 fatty acids (FAw6) (mmol/l)	FAw6	3.51 (0.70)	3.29 (0.59)
	Total fatty acids (TotFA) (mmol/l)	TotFA	12.05 (2.59)	11.05 (2.13)
	Ratio of polyunsaturated fatty acids to total fatty acids (PUFA/FA) (%)	PUFA_FA	32.11 (2.24)	32.70 (2.12)
	Ratio of monounsaturated fatty acids to total fatty acids (MUFA/FA) (%)	MUFA_FA	30.12 (1.79)	29.38 (1.75)
	Ratio of saturated fatty acids to total fatty acids (SFA/FA) (%)	SFA_FA	37.77 (1.35)	37.92 (1.30)
	Ratio of 22:6 docosahexaenoic acid to total fatty acids (DHA/FA) (%)	DHA_FA	0.71 (0.20)	0.78 (0.19)
Other NMR-measures	Ratio of 18:2 linoleic acid to total fatty acids (LA/FA) (%)	LA_FA	25.13 (2.14)	25.32 (2.09)
	Ratio of omega-3 fatty acids to total fatty acids (FAw3/FA) (%)	FAw3_FA	2.82 (0.60)	2.76 (0.58)
	Ratio of omega-6 fatty acids to total fatty acids (FAw6/FA) (%)	FAw6_FA	29.29 (2.11)	29.94 (2.00)
	Total cholines (TotCho) (mmol/l)	TotCho	2.23 (0.33)	2.11 (0.29)
	Phosphatidylcholine and other cholines (PC) (mmol/l)	PC	1.81 (0.31)	1.71 (0.27)
	Sphingomyelins (SM) (mmol/l)	SM	0.37 (0.07)	0.38 (0.06)
	Lactate (Lac) (mmol/l)	Lac	3.54 (1.61)	3.32 (1.38)
	Citrate (Cit) (mmol/l)	Cit	0.14 (0.03)	0.13 (0.03)
	Glucose (Glc) (mmol/l)	Glc	9.56 (5.55)	3.11 (1.09)
	Alanine (Ala) (mmol/l)	Ala	0.42 (0.07)	0.39 (0.06)
	Glutamine (Gln) (mmol/l)	Gln	0.35 (0.06)	0.38 (0.06)
	Histidine (His) (mmol/l)	His	0.05 (0.01)	0.06 (0.01)
	Isoleucine (Ile) (mmol/l)	Ile	0.07 (0.02)	0.06 (0.02)
	Leucine (Leu) (mmol/l)	Leu	0.09 (0.03)	0.08 (0.02)
	Valine (Val) (mmol/l)	Val	0.18 (0.05)	0.16 (0.04)
	Phenylalanine (Phe) (mmol/l)	Phe	0.07 (0.01)	0.06 (0.01)
	Tyrosine (Tyr) (mmol/l)	Tyr	0.06 (0.02)	0.06 (0.01)
	Acetate (Ace) (mmol/l)	Ace	0.06 (0.10)	0.05 (0.09)
	Acetoacetate (AcAce) (mmol/l)	AcAce	0.04 (0.06)	0.03 (0.01)
	3-hydroxybutyrate (bOHBut) (mmol/l)	bOHBut	0.16 (0.13)	0.14 (0.05)
	Albumin (Alb) (signal area)	Alb	0.08 (0.01)	0.08 (0.01)
	Glycoprotein acetyls, mainly a1-acid glycoprotein (Gp) (mmol/l)	Gp	1.25 (0.21)	1.16 (0.17)

* NMR-measures are ordered in metabolically relevant groups as shown in Figure 3.

eTable 4. Difference in SD units of each (log) NMR-measure associated with eGFR <60 mL/min/1.73 m² in those with and without diabetes

NMR-measure*		Label	Difference in SD units of log-NMR measure† (95% CI)	
			With diabetes (n=6,403)	Without diabetes (n=31,678)
Concentration of	Chylomicrons and extremely large VLDL particles (XXL-VLDL-P)	XXL_VLDL_P	-0.24 (-0.35, -0.12)	-0.05 (-0.16, 0.05)
	Very large VLDL particles (XL-VLDL-P)	XL_VLDL_P	-0.24 (-0.35, -0.12)	-0.01 (-0.11, 0.10)
	Large VLDL particles (L-VLDL-P)	L_VLDL_P	-0.16 (-0.28, -0.05)	0.03 (-0.07, 0.13)
	Medium VLDL particles (M-VLDL-P)	M_VLDL_P	-0.01 (-0.12, 0.11)	0.10 (-0.00, 0.20)
	Small VLDL particles (S-VLDL-P)	S_VLDL_P	0.40 (0.29, 0.52)	0.30 (0.20, 0.40)
	Very small VLDL particles (XS-VLDL-P)	XS_VLDL_P	0.63 (0.52, 0.74)	0.38 (0.28, 0.48)
	IDL particles (IDL-P)	IDL_P	0.43 (0.32, 0.54)	0.21 (0.11, 0.31)
	Large LDL particles (L-LDL-P)	L_LDL_P	0.41 (0.30, 0.52)	0.19 (0.09, 0.29)
	Medium LDL particles (M-LDL-P)	M_LDL_P	0.41 (0.29, 0.52)	0.18 (0.08, 0.28)
	Small LDL particles (S-LDL-P)	S_LDL_P	0.36 (0.25, 0.48)	0.15 (0.05, 0.26)
	Very large HDL particles (XL-HDL-P)	XL_HDL_P	0.13 (0.02, 0.25)	-0.00 (-0.10, 0.10)
	Large HDL particles (L-HDL-P)	L_HDL_P	-0.10 (-0.21, 0.01)	0.01 (-0.09, 0.11)
	Medium HDL particles (M-HDL-P)	M_HDL_P	-0.45 (-0.56, -0.34)	-0.19 (-0.29, -0.09)
	Small HDL particles (S-HDL-P)	S_HDL_P	-0.16 (-0.27, -0.05)	-0.11 (-0.21, -0.00)
Total cholesterol in	Chylomicrons and extremely large VLDL (XXL-VLDL-C)	XXL_VLDL_C	-0.11 (-0.22, 0.01)	0.04 (-0.06, 0.14)
	Very large VLDL (XL-VLDL-C)	XL_VLDL_C	-0.17 (-0.28, -0.05)	0.03 (-0.08, 0.13)
	Large VLDL (L-VLDL-C)	L_VLDL_C	-0.09 (-0.20, 0.03)	0.07 (-0.03, 0.18)
	Medium VLDL (M-VLDL-C)	M_VLDL_C	0.13 (0.02, 0.25)	0.18 (0.07, 0.28)
	Small VLDL (S-VLDL-C)	S_VLDL_C	0.56 (0.45, 0.67)	0.34 (0.24, 0.45)
	Very small VLDL (XS-VLDL-C)	XS_VLDL_C	0.49 (0.38, 0.60)	0.27 (0.17, 0.38)
	IDL (IDL-C)	IDL_C	0.30 (0.19, 0.42)	0.12 (0.02, 0.22)
	Large LDL (L-LDL-C)	L_LDL_C	0.33 (0.22, 0.45)	0.14 (0.03, 0.24)
	Medium LDL (M-LDL-C)	M_LDL_C	0.36 (0.24, 0.47)	0.14 (0.03, 0.24)
	Small LDL (S-LDL-C)	S_LDL_C	0.35 (0.23, 0.46)	0.13 (0.02, 0.23)
	Very large HDL (XL-HDL-C)	XL_HDL_C	-0.01 (-0.12, 0.11)	-0.14 (-0.24, -0.04)
	Large HDL (L-HDL-C)	L_HDL_C	-0.18 (-0.29, -0.07)	-0.02 (-0.12, 0.08)
	Medium HDL (M-HDL-C)	M_HDL_C	-0.55 (-0.67, -0.44)	-0.27 (-0.37, -0.16)
	Small HDL (S-HDL-C)	S_HDL_C	0.22 (0.11, 0.33)	0.06 (-0.05, 0.16)
	Chylomicrons and extremely large VLDL (XXL-VLDL-FC)	XXL_VLDL_FC	-0.22 (-0.34, -0.11)	0.00 (-0.10, 0.11)
Free cholesterol in	Very large VLDL (XL-VLDL-FC)	XL_VLDL_FC	-0.20 (-0.32, -0.09)	0.03 (-0.08, 0.13)
	Large VLDL (L-VLDL-FC)	L_VLDL_FC	-0.16 (-0.28, -0.05)	0.05 (-0.06, 0.15)
	Medium VLDL (M-VLDL-FC)	M_VLDL_FC	0.03 (-0.09, 0.14)	0.14 (0.03, 0.24)
	Small VLDL (S-VLDL-FC)	S_VLDL_FC	0.49 (0.38, 0.61)	0.35 (0.25, 0.45)
	Very small VLDL (XS-VLDL-FC)	XS_VLDL_FC	0.57 (0.46, 0.68)	0.35 (0.25, 0.45)
	IDL (IDL-FC)	IDL_FC	0.34 (0.23, 0.46)	0.15 (0.05, 0.25)
	Large LDL (L-LDL-FC)	L_LDL_FC	0.34 (0.23, 0.46)	0.14 (0.03, 0.24)
	Medium LDL (M-LDL-FC)	M_LDL_FC	0.35 (0.24, 0.46)	0.12 (0.01, 0.22)
	Small LDL (S-LDL-FC)	S_LDL_FC	0.28 (0.17, 0.40)	0.09 (-0.01, 0.20)
	Very large HDL (XL-HDL-FC)	XL_HDL_FC	-0.08 (-0.19, 0.04)	-0.15 (-0.26, -0.05)
	Large HDL (L-HDL-FC)	L_HDL_FC	-0.14 (-0.25, -0.03)	-0.01 (-0.11, 0.09)
	Medium HDL (M-HDL-FC)	M_HDL_FC	-0.36 (-0.47, -0.25)	-0.14 (-0.24, -0.04)
	Small HDL (S-HDL-FC)	S_HDL_FC	-0.33 (-0.44, -0.21)	-0.18 (-0.28, -0.07)
	Chylomicrons and extremely large VLDL (XXL-VLDL-CE)	XXL_VLDL_CE	-0.02 (-0.14, 0.09)	0.09 (-0.01, 0.20)
	Very large VLDL (XL-VLDL-CE)	XL_VLDL_CE	-0.14 (-0.25, -0.02)	0.03 (-0.07, 0.14)
Cholesterol esters in	Large VLDL (L-VLDL-CE)	L_VLDL_CE	-0.02 (-0.13, 0.10)	0.09 (-0.01, 0.20)
	Medium VLDL (M-VLDL-CE)	M_VLDL_CE	0.23 (0.11, 0.34)	0.20 (0.10, 0.31)
	Small VLDL (S-VLDL-CE)	S_VLDL_CE	0.47 (0.36, 0.58)	0.29 (0.18, 0.39)
	Very small VLDL (XS-VLDL-CE)	XS_VLDL_CE	0.41 (0.30, 0.52)	0.22 (0.11, 0.32)
	IDL (IDL-CE)	IDL_CE	0.26 (0.14, 0.37)	0.10 (-0.00, 0.21)
	Large LDL (L-LDL-CE)	L_LDL_CE	0.31 (0.20, 0.43)	0.13 (0.03, 0.24)
	Medium LDL (M-LDL-CE)	M_LDL_CE	0.26 (0.15, 0.37)	0.11 (0.00, 0.21)
	Small LDL (S-LDL-CE)	S_LDL_CE	0.30 (0.18, 0.41)	0.12 (0.01, 0.22)
	Very large HDL (XL-HDL-CE)	XL_HDL_CE	0.01 (-0.11, 0.12)	-0.14 (-0.24, -0.03)
	Large HDL (L-HDL-CE)	L_HDL_CE	-0.19 (-0.30, -0.08)	-0.02 (-0.12, 0.08)
	Medium HDL (M-HDL-CE)	M_HDL_CE	-0.60 (-0.72, -0.49)	-0.29 (-0.40, -0.19)
	Small HDL (S-HDL-CE)	S_HDL_CE	0.19 (0.08, 0.31)	0.08 (-0.03, 0.18)
	Chylomicrons and extremely large VLDL (XXL-VLDL-TG)	XXL_VLDL_TG	-0.30 (-0.41, -0.18)	-0.11 (-0.22, -0.01)
	Very large VLDL (XL-VLDL-TG)	XL_VLDL_TG	-0.26 (-0.37, -0.14)	-0.02 (-0.12, 0.09)
	Large VLDL (L-VLDL-TG)	L_VLDL_TG	-0.19 (-0.31, -0.08)	0.01 (-0.09, 0.11)
Triglycerides in	Medium VLDL (M-VLDL-TG)	M_VLDL_TG	-0.07 (-0.18, 0.05)	0.06 (-0.04, 0.17)
	Small VLDL (S-VLDL-TG)	S_VLDL_TG	0.24 (0.13, 0.36)	0.23 (0.12, 0.33)
	Very small VLDL (XS-VLDL-TG)	XS_VLDL_TG	0.54 (0.43, 0.66)	0.42 (0.32, 0.52)
	IDL (IDL-TG)	IDL_TG	0.58 (0.47, 0.69)	0.48 (0.38, 0.58)
	Large LDL (L-LDL-TG)	L_LDL_TG	0.61 (0.50, 0.73)	0.45 (0.35, 0.56)
	Medium LDL (M-LDL-TG)	M_LDL_TG	0.60 (0.49, 0.71)	0.43 (0.33, 0.53)
	Small LDL (S-LDL-TG)	S_LDL_TG	0.42 (0.30, 0.53)	0.31 (0.21, 0.41)
	Very large HDL (XL-HDL-TG)	XL_HDL_TG	0.01 (-0.11, 0.12)	0.03 (-0.07, 0.14)
	Large HDL (L-HDL-TG)	L_HDL_TG	0.04 (-0.07, 0.15)	0.16 (0.06, 0.26)
	Medium HDL (M-HDL-TG)	M_HDL_TG	-0.06 (-0.17, 0.05)	0.12 (0.01, 0.22)
	Small HDL (S-HDL-TG)	S_HDL_TG	0.20 (0.08, 0.31)	0.20 (0.10, 0.31)

eTable 4. Difference in SD units of each (log) NMR-measure associated with eGFR <60 mL/min/1.73 m² in those with and without diabetes

NMR-measure*		Label	Difference in SD units of log-NMR measure† (95% CI)	
			With diabetes (n=6,403)	Without diabetes (n=31,678)
Phospholipids in	Chylomicrons and extremely large VLDL (XXL-VLDL-PL)	XXL_VLDL_PL	-0.20 (-0.32, -0.09)	0.00 (-0.10, 0.11)
	Very large VLDL (XL-VLDL-PL)	XL_VLDL_PL	-0.21 (-0.32, -0.09)	0.02 (-0.08, 0.12)
	Large VLDL (L-VLDL-PL)	L_VLDL_PL	-0.13 (-0.25, -0.02)	0.05 (-0.05, 0.16)
	Medium VLDL (M-VLDL-PL)	M_VLDL_PL	0.04 (-0.08, 0.15)	0.13 (0.02, 0.23)
	Small VLDL (S-VLDL-PL)	S_VLDL_PL	0.48 (0.37, 0.59)	0.33 (0.23, 0.43)
	Very small VLDL (XS-VLDL-PL)	XS_VLDL_PL	0.55 (0.44, 0.66)	0.31 (0.21, 0.41)
	IDL (IDL-PL)	IDL_PL	0.41 (0.30, 0.52)	0.17 (0.07, 0.28)
	Large LDL (L-LDL-PL)	L_LDL_PL	0.37 (0.26, 0.49)	0.15 (0.05, 0.25)
	Medium LDL (M-LDL-PL)	M_LDL_PL	0.32 (0.21, 0.44)	0.13 (0.03, 0.24)
	Small LDL (S-LDL-PL)	S_LDL_PL	0.26 (0.14, 0.37)	0.08 (-0.02, 0.19)
	Very large HDL (XL-HDL-PL)	XL_HDL_PL	0.09 (-0.02, 0.21)	-0.05 (-0.15, 0.05)
	Large HDL (L-HDL-PL)	L_HDL_PL	-0.13 (-0.24, -0.02)	-0.00 (-0.10, 0.09)
	Medium HDL (M-HDL-PL)	M_HDL_PL	-0.40 (-0.51, -0.29)	-0.16 (-0.26, -0.06)
	Small HDL (S-HDL-PL)	S_HDL_PL	-0.50 (-0.61, -0.38)	-0.26 (-0.36, -0.15)
Total lipids in	Chylomicrons and extremely large VLDL (XXL-VLDL-L)	XXL_VLDL_L	-0.23 (-0.34, -0.11)	-0.05 (-0.15, 0.06)
	Very large VLDL (XL-VLDL-L)	XL_VLDL_L	-0.23 (-0.34, -0.12)	-0.00 (-0.11, 0.10)
	Large VLDL (L-VLDL-L)	L_VLDL_L	-0.16 (-0.27, -0.04)	0.03 (-0.07, 0.14)
	Medium VLDL (M-VLDL-L)	M_VLDL_L	0.01 (-0.11, 0.12)	0.11 (0.00, 0.21)
	Small VLDL (S-VLDL-L)	S_VLDL_L	0.43 (0.32, 0.55)	0.31 (0.21, 0.42)
	Very small VLDL (XS-VLDL-L)	XS_VLDL_L	0.62 (0.51, 0.73)	0.37 (0.26, 0.47)
	IDL (IDL-L)	IDL_L	0.41 (0.30, 0.52)	0.19 (0.09, 0.29)
	Large LDL (L-LDL-L)	L_LDL_L	0.39 (0.28, 0.51)	0.18 (0.07, 0.28)
	Medium LDL (M-LDL-L)	M_LDL_L	0.40 (0.28, 0.51)	0.17 (0.06, 0.27)
	Small LDL (S-LDL-L)	S_LDL_L	0.36 (0.24, 0.47)	0.14 (0.04, 0.25)
	Very large HDL (XL-HDL-L)	XL_HDL_L	0.12 (0.01, 0.23)	-0.01 (-0.11, 0.09)
	Large HDL (L-HDL-L)	L_HDL_L	-0.10 (-0.22, 0.01)	0.01 (-0.09, 0.10)
	Medium HDL (M-HDL-L)	M_HDL_L	-0.46 (-0.57, -0.35)	-0.20 (-0.30, -0.10)
	Small HDL (S-HDL-L)	S_HDL_L	-0.15 (-0.26, -0.03)	-0.11 (-0.21, -0.00)
Mean diameter	Of VLDL particles (VLDL-D)	VLDL_D	-0.46 (-0.57, -0.35)	-0.14 (-0.25, -0.04)
	Of LDL particles (LDL-D)	LDL_D	-0.13 (-0.24, -0.02)	0.06 (-0.04, 0.16)
	Of HDL particles (HDL-D)	HDL_D	0.04 (-0.07, 0.15)	0.03 (-0.07, 0.13)
Fatty acids and ratios of fatty acids	Apolipoprotein A-I (ApoA1)	ApoA1	0.03 (-0.09, 0.14)	0.02 (-0.09, 0.12)
	Apolipoprotein B (ApoB)	ApoB	0.37 (0.25, 0.48)	0.21 (0.11, 0.31)
	Ratio of apolipoprotein B to apolipoprotein A-I (ApoB/ApoA1)	ApoB_ApoA1	0.42 (0.31, 0.54)	0.23 (0.13, 0.33)
	Polyunsaturated fatty acids (PUFA)	PUFA	0.46 (0.34, 0.57)	0.27 (0.16, 0.37)
	Monounsaturated fatty acids; 16:1, 18:1 (MUFA)	MUFA	0.37 (0.25, 0.48)	0.30 (0.20, 0.41)
	Saturated fatty acids (SFA)	SFA	0.26 (0.15, 0.38)	0.23 (0.13, 0.33)
	22:6, docosahexaenoic acid (DHA)	DHA	0.30 (0.19, 0.42)	0.20 (0.09, 0.30)
	18:2, linoleic acid (LA)	LA	0.50 (0.38, 0.61)	0.29 (0.18, 0.39)
	Omega-3 fatty acids (FAw3)	FAw3	0.20 (0.09, 0.32)	0.18 (0.08, 0.29)
	Omega-6 fatty acids (FAw6)	FAw6	0.48 (0.37, 0.60)	0.27 (0.17, 0.38)
	Total fatty acids (TotFA)	TotFA	0.37 (0.26, 0.48)	0.28 (0.17, 0.38)
	Ratio of polyunsaturated fatty acids to total fatty acids (PUFA/FA)	PUFA_FA	0.23 (0.11, 0.34)	-0.03 (-0.13, 0.08)
	Ratio of monounsaturated fatty acids to total fatty acids (MUFA/FA)	MUFA_FA	0.19 (0.07, 0.30)	0.25 (0.15, 0.35)
	Ratio of saturated fatty acids to total fatty acids (SFA/FA)	SFA_FA	-0.66 (-0.77, -0.54)	-0.30 (-0.41, -0.20)
	Ratio of 22:6 docosahexaenoic acid to total fatty acids (DHA/FA)	DHA_FA	0.13 (0.01, 0.24)	0.05 (-0.05, 0.16)
Other NMR-measures	Ratio of 18:2 linoleic acid to total fatty acids (LA/FA)	LA_FA	0.33 (0.22, 0.45)	0.05 (-0.05, 0.16)
	Ratio of omega-3 fatty acids to total fatty acids (FAw3/FA)	FAw3_FA	-0.01 (-0.12, 0.11)	0.06 (-0.05, 0.16)
	Ratio of omega-6 fatty acids to total fatty acids (FAw6/FA)	FAw6_FA	0.23 (0.12, 0.35)	-0.05 (-0.15, 0.05)
	Total cholines (TotCho)	TotCho	0.60 (0.49, 0.72)	0.38 (0.28, 0.48)
	Phosphatidylcholine and other cholines (PC)	PC	0.51 (0.40, 0.62)	0.33 (0.22, 0.43)
	Sphingomyelins (SM)	SM	0.19 (0.07, 0.30)	-0.01 (-0.12, 0.09)
	Lactate (Lac)	Lac	-0.50 (-0.61, -0.39)	-0.11 (-0.21, -0.00)
	Citrate (Cit)	Cit	0.39 (0.27, 0.50)	0.52 (0.42, 0.62)
	Glucose (Glc)	Glc	-0.13 (-0.25, -0.02)	0.02 (-0.09, 0.12)
	Alanine (Ala)	Ala	-0.24 (-0.36, -0.13)	0.10 (-0.01, 0.20)
	Glutamine (Gln)	Gln	0.41 (0.30, 0.53)	0.20 (0.10, 0.30)
	Histidine (His)	His	-0.01 (-0.12, 0.11)	0.11 (0.01, 0.22)
	Isoleucine (Ile)	Ile	-0.32 (-0.43, -0.20)	0.08 (-0.02, 0.18)
	Leucine (Leu)	Leu	-0.71 (-0.82, -0.60)	-0.05 (-0.15, 0.05)
	Valine (Val)	Val	-0.96 (-1.07, -0.85)	-0.14 (-0.24, -0.04)
	Phenylalanine (Phe)	Phe	0.30 (0.18, 0.42)	0.57 (0.47, 0.68)
	Tyrosine (Tyr)	Tyr	-0.94 (-1.05, -0.83)	-0.30 (-0.40, -0.19)
	Acetate (Ace)	Ace	0.10 (-0.01, 0.22)	0.05 (-0.05, 0.15)
	Acetoacetate (AcAce)	AcAce	-0.85 (-0.96, -0.74)	-0.23 (-0.34, -0.13)
	3-hydroxybutyrate (bOHBut)	bOHBut	0.33 (0.21, 0.45)	0.25 (0.14, 0.35)
	Albumin (Alb)	Alb	-0.76 (-0.87, -0.65)	0.01 (-0.09, 0.11)
	Glycoprotein acetyls, mainly α1-acid glycoprotein (Gp)	Gp	0.34 (0.23, 0.46)	0.34 (0.24, 0.44)

* NMR-measures are ordered in metabolically relevant groups as shown in Figure 3.

† Estimates are derived from linear regression models adjusted for age, sex, district of residence, education level, smoking, and fasting duration.