

SUPPLEMENTAL MATERIALS

Associations between macronutrients from different dietary sources and serum lipids in 24,639 UK Biobank study participants

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SUPPLEMENTAL METHODS

Measurement of macronutrient intakes and total energy using the Oxford WebQ Questionnaire

The Oxford WebQ Questionnaire (WebQ) is an internet based 24-hour dietary assessment designed to measure diet on repeated occasions in large cohort studies. Similar to a 24-hour dietary recall, this questionnaire aims to measure the type and quantity of food and beverages consumed by a participant in the last 24 hours. However, unlike a 24-hour dietary recall, responses are limited to the 206 foods and 32 beverages presented. Further, this dietary assessment is on average quicker to complete than a traditional 24-hour dietary recall and is completed on the internet.¹

The WebQ has been validated for macronutrients and total energy intake using recovery biomarkers² and compared with interviewer-administered 24-hour dietary recall.¹ The reproducibility of macronutrient intakes measured using two WebQ was similar to intake measured using a single food frequency questionnaire.³ Further, assessment of WebQ response rates has demonstrated that the WebQ is acceptable to the public and therefore feasible for repeated administrations in large cohort studies.⁴

Participant responses to the questions “Would you say that what you ate and drank yesterday was fairly typical for you?” and “Reason for not eating or drinking normally”. If participants answered that they were “ill” or “fasting” then the WebQ assessment completed on this day was excluded from these analyses.

Sources of carbohydrates

Starch from whole grains was calculated as the sum of mixed (50/50) brown & seeded bread, wholemeal bread, wholemeal pasta & rice, bran cereal, biscuit cereal, oat cereal (with sugar), oat cereal (non-sugar) and muesli. Starch from refined grains was calculated as the sum of starch from other bread, white bread, white pasta & rice, and other cereal (with sugar).

Sources of fat

Fat from animal sources was calculated as the sum of fat contained in animal derived food items, including meats, poultry, eggs, dairy products, and fish. Fat from dairy sources was calculated as the sum of fat from whole milk (>3.6 g fat per 100g), semi-skimmed milk (>1g fat per 100g), skimmed milk (including cholesterol lowering), full fat yoghurt, low fat yoghurt, high fat cheese (>17.5g fat per 100g), medium and low fat cheese (<17.5g fat per 100g), cream, animal fat spread lower fat and animal fat spread normal. Animal fat from non-dairy sources was calculated by subtracting animal fat from dairy from total animal fat. Fat from plant sources was calculated as the sum of fat contained in plant derived food items, such as legumes, pulses, vegetables, fruits and, nuts and seeds.

170

171 *Sources of protein*

172 Protein from plant and animal sources were calculated using the same methods
173 used for fat from plant and animal sources.

174

175 *Alcohol*

176 Alcohol in grams was calculated using WebQ intake and classed as <1g/day, 1-9
177 g/day, 10-19 g/day, 20-29 g/day or ≥ 30 g/day.

178

179 *Total energy*

180 Total daily energy intake was estimated as the sum of kilojoules (kJ) consumed from
181 each food item and beverage over a 24-hour period.

182

183 **Measurement of serum lipids**

184 Serum lipids were measured in samples collected at baseline assessment from all
185 participants, and at follow-up assessment for a sub-sample, according to the UK
186 Biobank sample handling and storage protocol, which is detailed elsewhere.^{5,6} Non-
187 fasting blood samples (45ml) were collected by a trained phlebotomist at
188 assessment centres using vacutainers specific to the analysis to be performed. For
189 cholesterol this was collected in a serum separator tube (STT) to later obtain serum
190 fractions. These samples were stored in a refrigerator between 2°C to 8°C and then
191 transported to a central processing laboratory and stored at -80°C within an average
192 time of 24 hours until they were analyzed. Serum samples were centrifuged for 10
193 minutes at 2000 RCF prior to analyses using automated analyzers. Internal Quality
194 Control (IQC) samples at low, medium and high levels were run with each batch of
195 participant samples and then used to validate participant results if they were within
196 the opening and closing results of IQC for that batch. External validation was
197 performed through an external quality assurance (EQA) scheme.⁷ The UK Biobank
198 adjusted biomarker data prior to release.

199

200 Total cholesterol, LDL-C, HDL-C and ApoB were measured directly using
201 homogenous assays.⁷ Direct homogenous assays do not require ultracentrifugation
202 or precipitation.⁸ Total cholesterol was measured by CHO-POD analysis. LDL-C was
203 measured by enzymatic protective selection analysis. HDL was measured by
204 enzyme immunoinhibition analysis. Triglycerides were measured by GPO-POD
205 analysis. ApoB and ApoA1 were measured by immunoturbidimetric analysis. All
206 analyses were performed on a Beckman Coulter AU5800.

207

208 Lipid ratios were calculated using the following formulae:

- 209 • $TC - to - HDL - C \text{ ratio} = \frac{TC \text{ (mmol/L)}}{HDL-C \text{ (mmol/L)}}$,
- 210 • $TG - to - HDL - C \text{ ratio} = \frac{TG \text{ (mmol/L)}}{HDL-C \text{ (mmol/L)}}$, and
- 211 • $ApoA1 - to - ApoB \text{ ratio} = \frac{ApoA1 \text{ (mmol/L)}}{ApoB \text{ (mmol/L)}}$.

212

213 **Measurement of demographic variables using the Touchscreen questionnaire**

214 *Age at recruitment*

215 Calculated using month and year of birth, obtained from central registry and verified
 216 or updated by participants. All participants were nominally assigned 15 as the day of
 217 birth to calculate age at recruitment as <45 years, 45-49 years, 50-54 years, 55-59
 218 years, 60-64 years or ≥ 65 years.

219

220 *Region of recruitment*

221 Region of recruitment was coded based on the assessment center for each
 222 participant and included; London, North-West England, North-Eastern England,
 223 Yorkshire & the Humber, West Midlands, East Midlands, South-West England and
 224 Wales. Specifically, assessments centers were assigned the following region:
 225 London (assessment centers: St Bartholomew's Hospital, Hounslow, Croydon)
 226 North-West England (assessment centers: Stockport, Manchester, Liverpool, Bury),
 227 North-East England (assessment centers: Newcastle, Middlesbrough), Yorkshire
 228 (assessment centers: Leeds, Sheffield), West Midlands (assessment centers: Stoke,
 229 Birmingham) East Midlands (assessment center: Nottingham), South-East England
 230 (assessment centers: Oxford, Reading), South-West England (assessment center:
 231 Bristol) and Wales (assessment centers: Swansea, Wrexham, Cardiff).

232

233 *Ethnicity*

234 Participant responses to the questions "What is your ethnicity?" and "What is your
 235 ethnic background?" were used to classify participants as white (British, Irish, any
 236 other white background), mixed (white and black Caribbean, white and black African,
 237 white and Asian, any other mixed background), Asian or Asian British (Indian,
 238 Pakistani, Bangladeshi, any other Asian background), African or African British
 239 (Caribbean, African, any other Black background), Other (Other ethnic group) or
 240 missing/unknown/prefer not to say (PNTS).

241

242 *Townsend deprivation index*

243 Townsend deprivation index was used as an indicator of socioeconomic status and
 244 was calculated by assigning each participant a score based on the output area
 245 corresponding to their post-code and linking this to national census output area. This

was converted to quintiles for use in our analysis, with most-affluent (quintile 1) to most-deprived (quintile 5). An additional category for missing/unknown/ PNTS was included.

Smoking

Self-reported smoking status was based on UK biobank variable *n_20116_0_0*. Participants were classified as never smokers, ex-smokers, light smokers (<15 cigarettes per day), medium smokers (15-29 cigarettes per day), heaving smokers (≥ 30 cigarettes per day) or missing/unknown/PNTS. Quantity of cigarettes smoked per day was based on the question "About how many cigarettes do you smoke on average each day?".

Physical activity

Participant's answers to questions about daily walking, moderate physical activity and vigorous physical activity were used to estimate excess metabolic equivalents (METs) per week.⁹ Excess METs refer to energy expenditure greater than that of an inactive person. Participant's excess METs per week was used to categorize physical activity as low (<10 excess METs/week), medium (10-49.99 excess METs/week), high (≥ 50 excess METs/week) or missing/unknown/PNTS.

Anthropometric measures

All anthropometric measurements were made by trained research staff. Participant standing height was measured using the SECA 240 height measure, without shoes and to the closest centimeter (cm). Height was categorized in 5 cm increments for men as follows: <160cm, 160-164.9, 165-169.9, 170-174.9, 175-179.9, 180-184.9, 185-189.9, ≥ 190 cm. Height was categorized in 5 cm increments for women as follows: <150cm, 150-154.9, 155-159.9, 160-164.9, 165-169.9, 170-174.9, 175-179.9, ≥ 180 cm. Weight was measured using standard scales without shoes and outdoor clothing. However, if participants underwent bioimpedance analysis using the Tanita BC 418 body composition analyzer this value was used for weight instead. Body Mass Index (BMI) was calculated using weight (kg) and height (cm) measurements, as described above, using the formula: weight (kg)/height(m²). BMI was categorized in 2.5-unit increments as follows; <20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9, ≥ 40 kg/m².

Diabetes

Participant response to the question "Has a doctor ever told you that you have diabetes?" was used to classify participants with diabetes diagnosis, no history of diagnosis or missing/unknown/PNTS.

285 *Change in diet*

286 Participant response to the question “Have you made any major changes to your diet
287 in the last 5 years?” was used to create the dichotomous variable for change in diet
288 over the last five years.

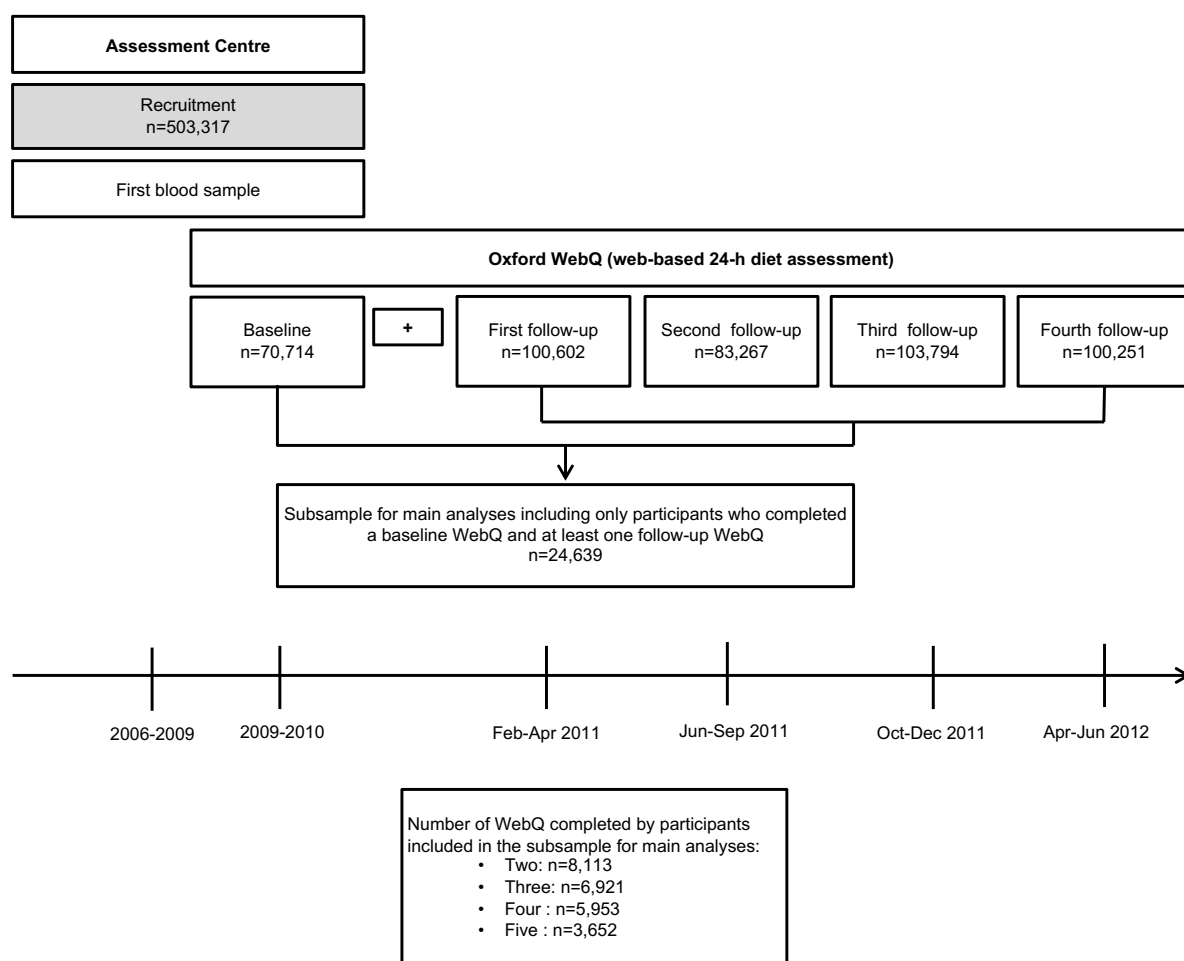
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290 *Lipid-modifying drug use*

291 Lipid-lowering medication use was coded using self-reported medication use at
292 baseline. A list of lipid-modifying drug(s) prescribed in the UK was obtained from the
293 National Institute for Clinical Excellence.¹⁰ The UK biobank ‘Treatment/medication
294 code’ variable (n_20003_0) and was hand-searched for individual lipid-modifying
295 drug names and drug Brand names found using the National Health Services
296 “Medicines A to Z” handbook (Supplemental Table XIII).¹¹
297

298 **Expanded statistical methods**

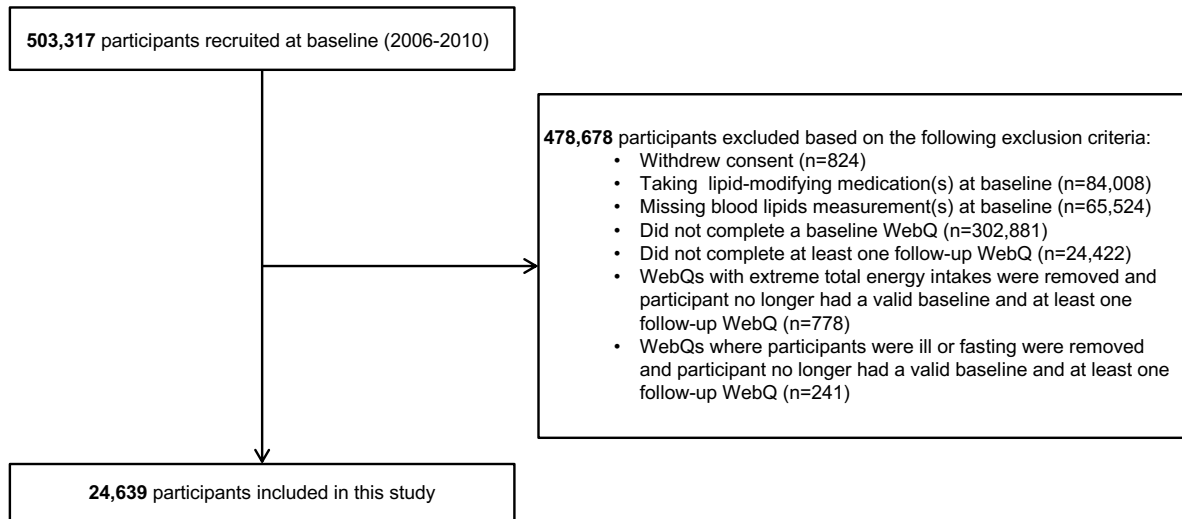
299 In sensitivity analyses, we created a derived variable for each lipid marker to identify
300 participants with extreme measurements, using the following formula: [Lower quartile
301 – 3*Interquartile range] and [Upper quartile + 3*Interquartile range]. Those beyond
302 this range were identified as having extreme values and excluded in a sensitivity
303 analysis. This method was chosen to account for the approximately non-normal
304 distribution of some biomarkers.



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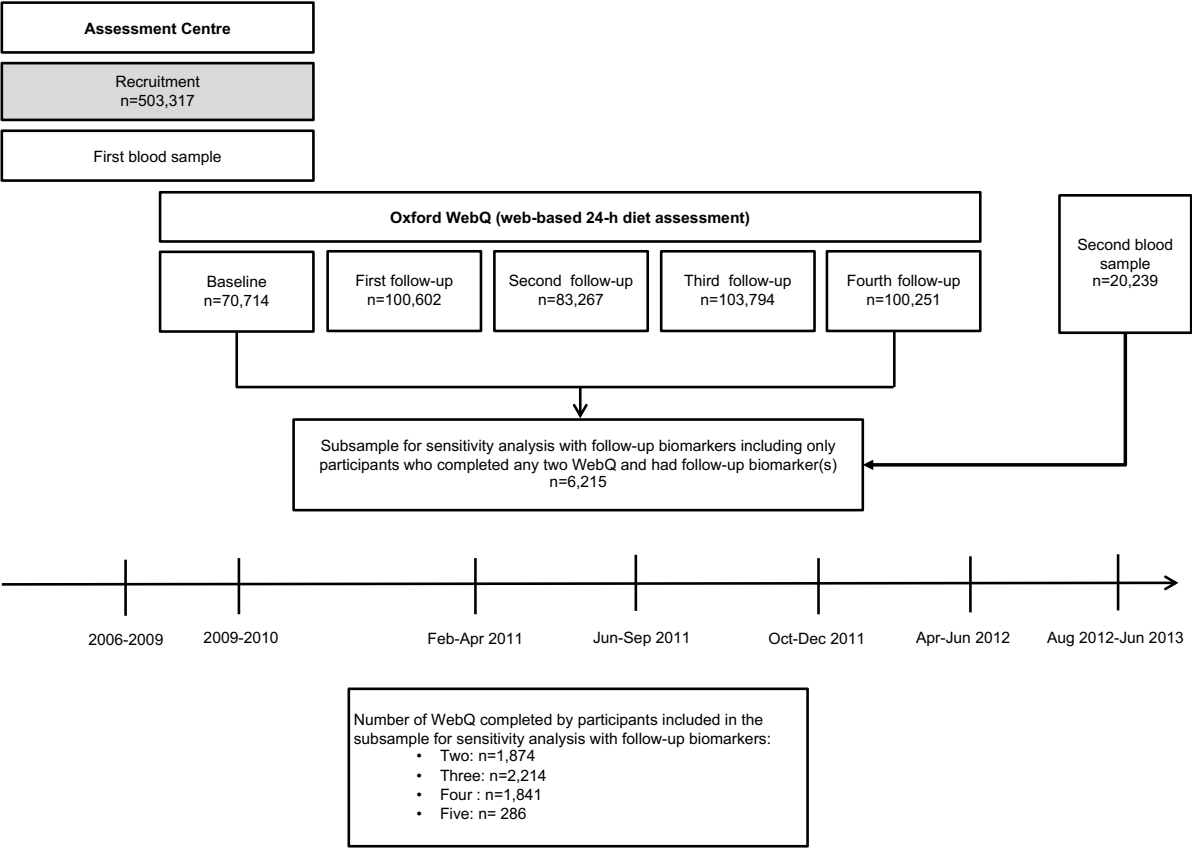
307 **Supplemental Figure I.** Dietary assessments in sub-sample of UK biobank
308 participants included in our main analyses (n=24,639).

309 Final numbers for 24-hour dietary assessment (WebQ) completion excluded
310 participants who withdrew consent, reported they were taking lipid-lowering
311 medication(s) at baseline, were missing all baseline lipid measurements, or were
312 missing a mandatory baseline 24-hour dietary assessment plus at least one follow-
313 up assessment. Participants were also excluded if they did not meet the minimum
314 requirements for a valid baseline 24-hour dietary assessment and valid follow-up 24-
315 hour dietary assessment after assessments were excluded if participants reported
316 extreme values for total energy intake or if participants reported they were ill or
317 fasting on the respective day.



Supplemental Figure II. Flow chart of UK biobank participants included in the current study after exclusion criteria were applied.

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Supplemental Figure III. Dietary assessment in sub-sample of UK biobank participants included in a sensitivity analysis restricting to participants with follow-up serum lipid measurement(s) (n=6,215).

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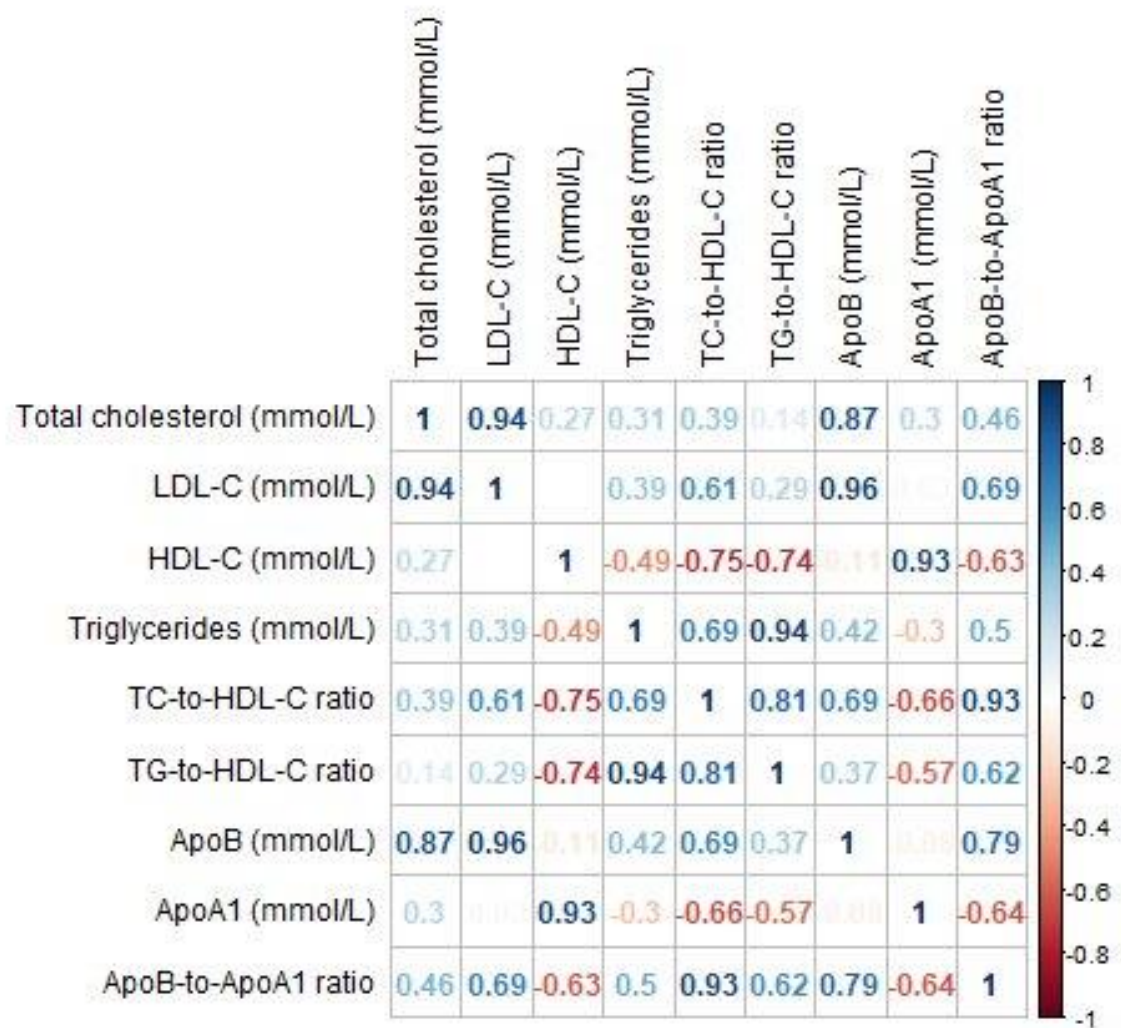
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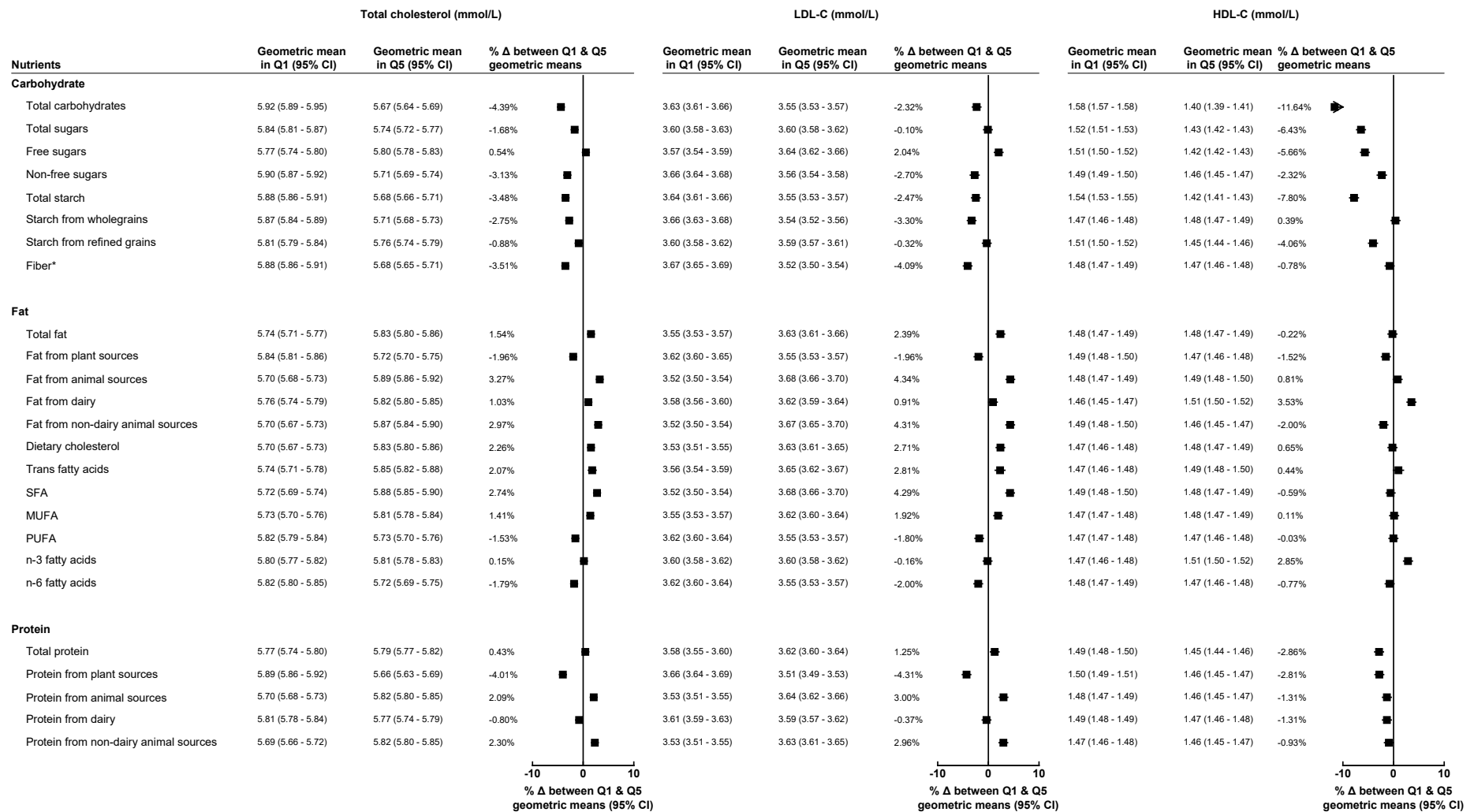
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Final numbers for 24-hour dietary assessment (WebQ) completion excluded participants who withdrew consent, reported they were taking lipid-lowering medication(s) at baseline, were missing all follow-up lipid measurements, or who did not have at least two 24-hour dietary assessments. Participants were also excluded if they did not meet the minimum requirements for at least two 24-hour dietary assessments after assessments were excluded if participants reported extreme values for total energy intake or if participants reported they were ill or fasting on the respective day.



Supplemental Figure IV. Spearman's correlation between lipid markers collected at baseline in 24,639 participants in the UK Biobank study.

Abbreviations: Apo = apolipoprotein; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density lipoprotein cholesterol; TC = total cholesterol; TG = triglycerides



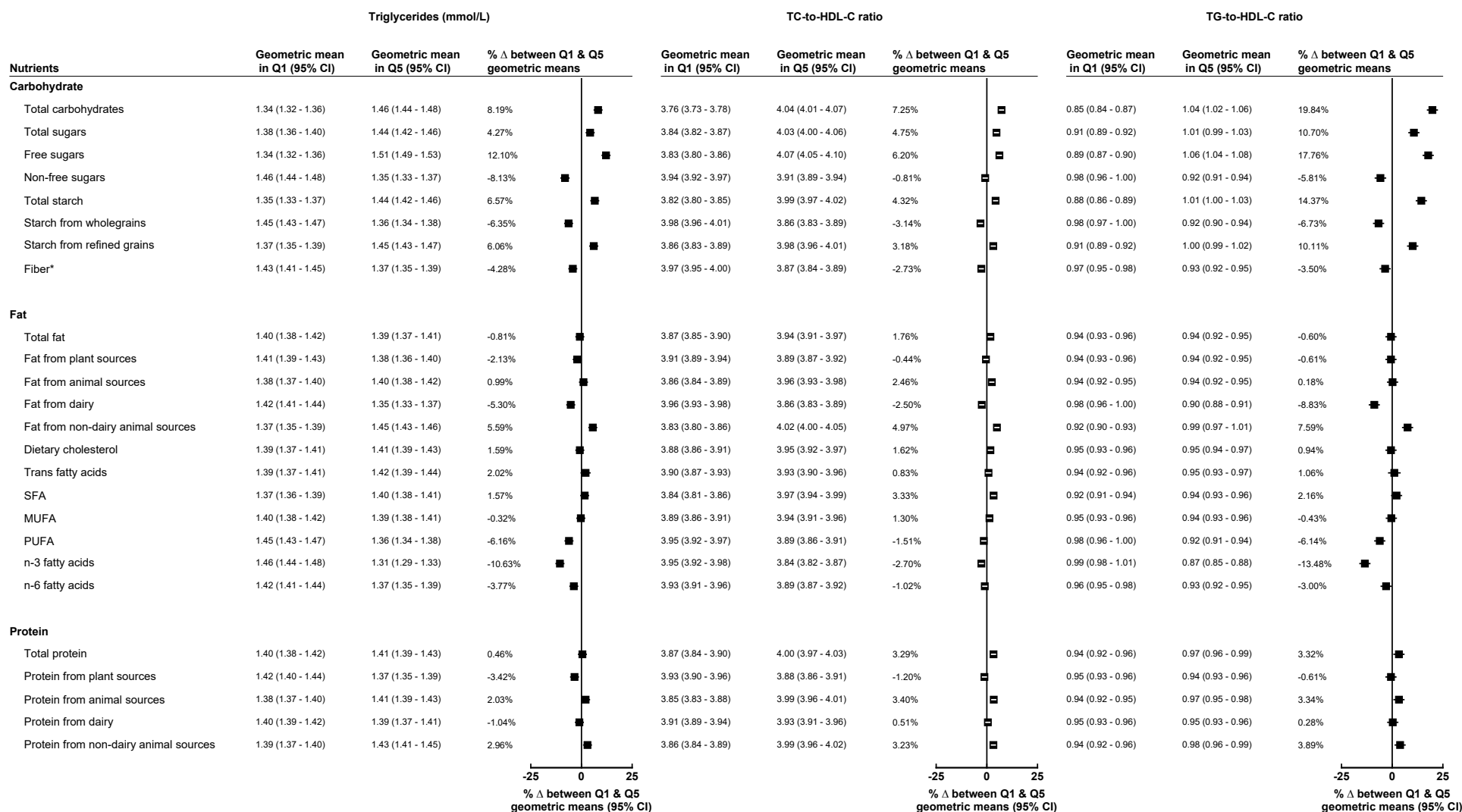
339

340 **Supplemental Figure V.** Minimally adjusted geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L)
 341 by lowest (Q1) and highest (Q5) percentage intake of macronutrients.

342 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65) and sex.

343 *For fiber, Q1 and Q5 represent quintiles of total fiber intake (g/day).

344 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
345 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
346 Q = quintile; SFA = saturated fatty acids.

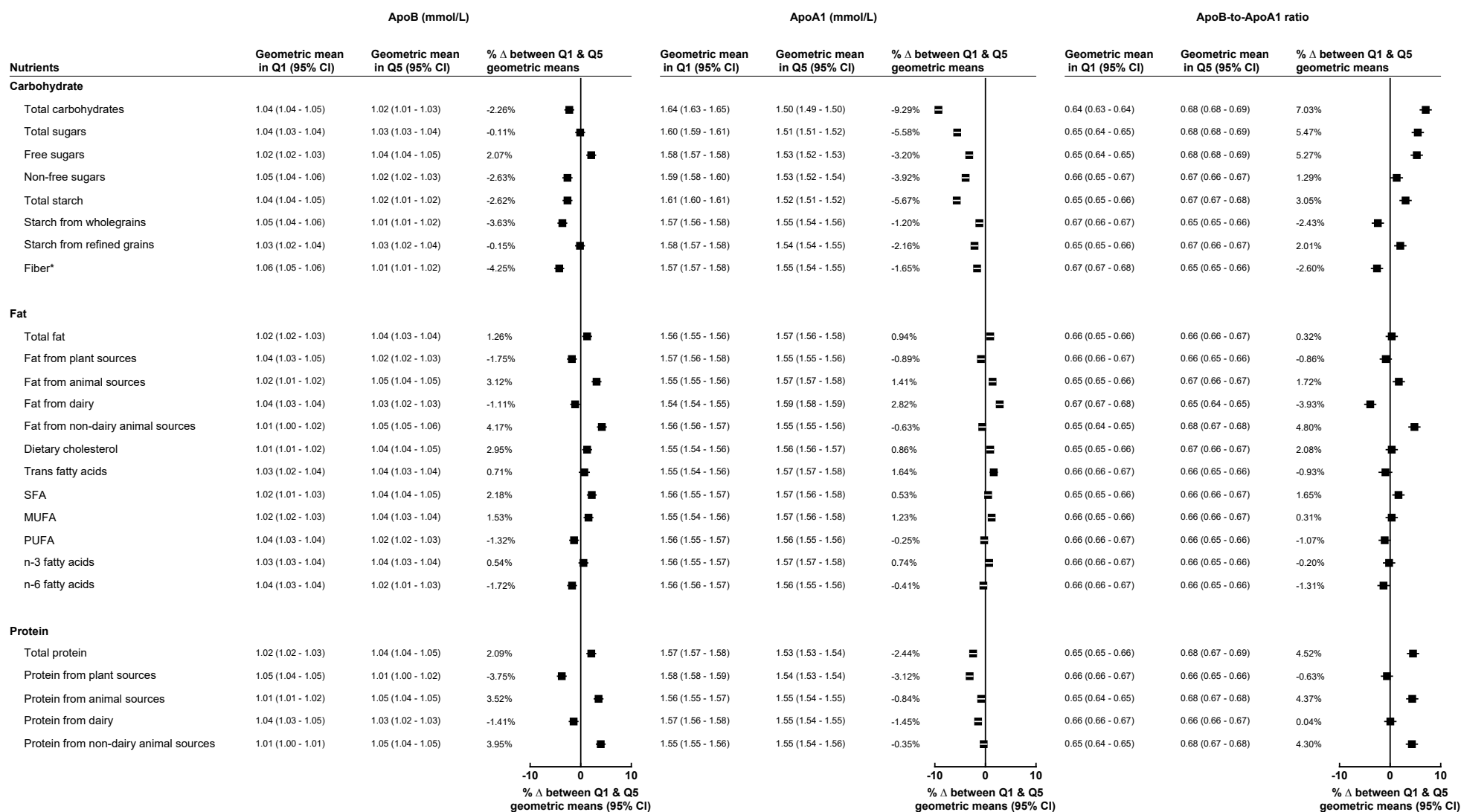


Supplemental Figure VI. Minimally adjusted geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients.

350 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, >65) and sex.

351 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

352 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
353 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
354 fatty acids; TC = total cholesterol; TG = triglycerides.

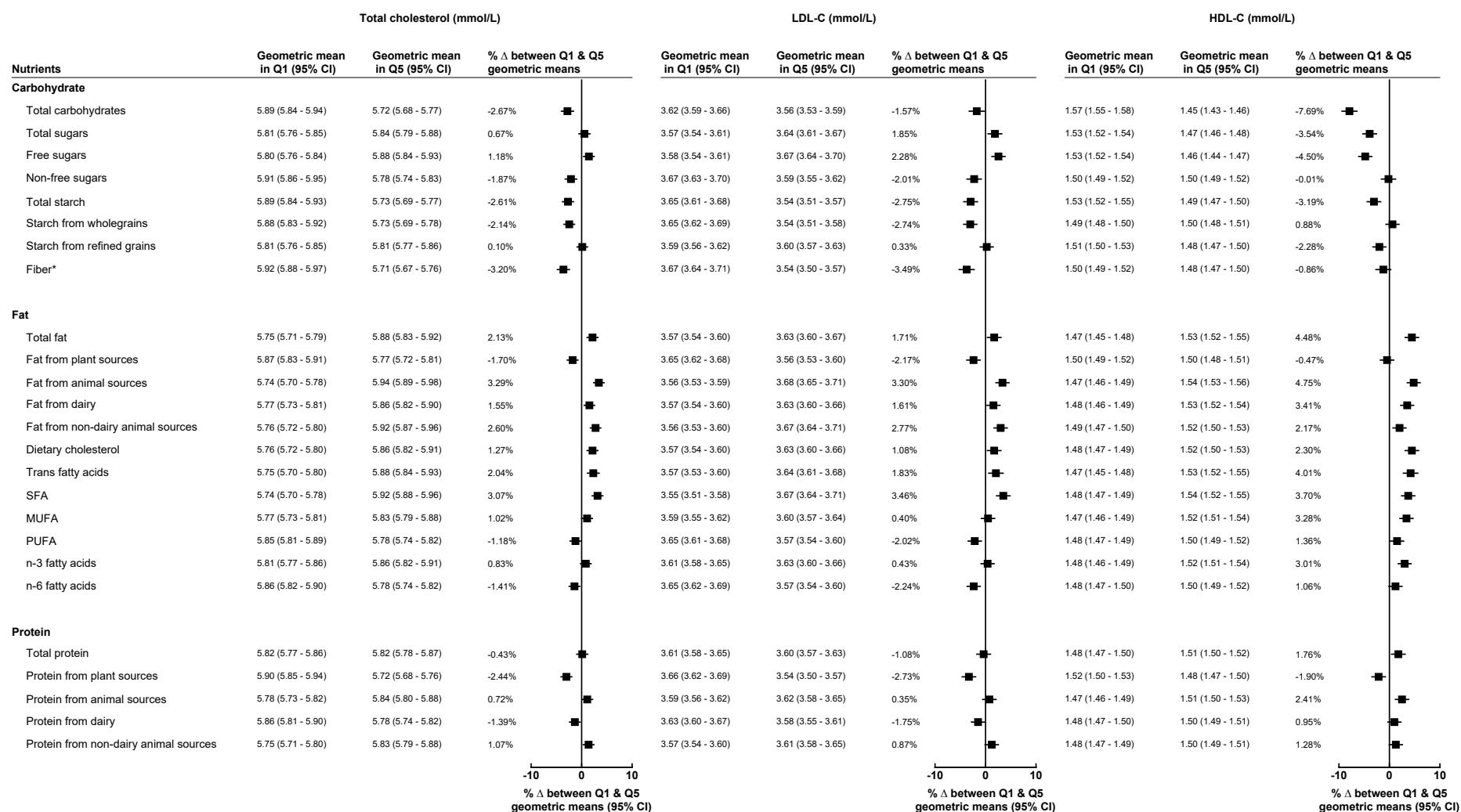


Supplemental Figure VII. Minimally adjusted geometric mean ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients.

358 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, >65) and sex.

359 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

360 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
361 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

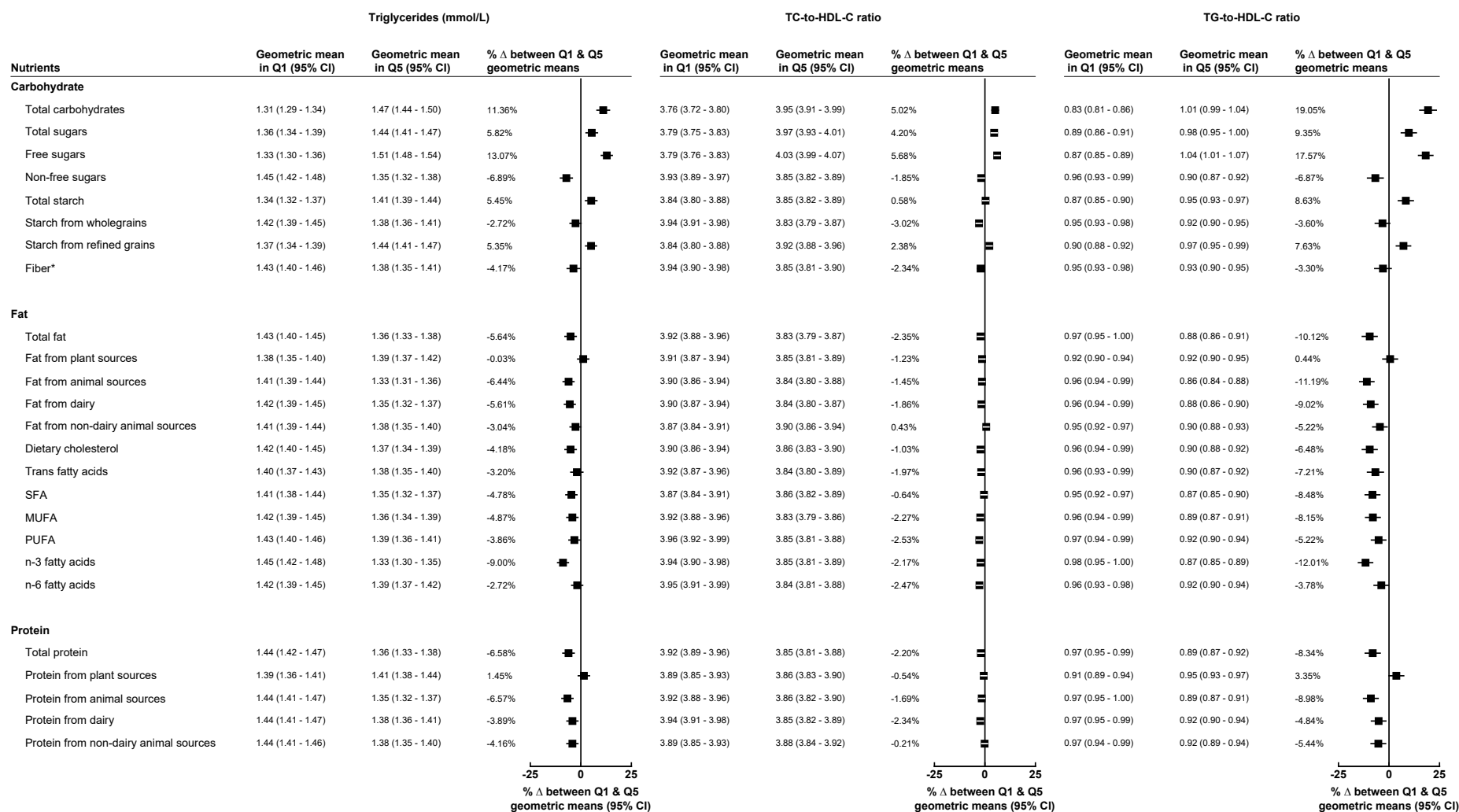


Supplemental Figure VIII. Geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L) by lowest (Q1) and highest (Q5) percentage intake of macronutrients **restricting to participants with ≥ 4 24-hour dietary assessments (including mandatory baseline assessment)** (n=9,605).

366 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
367 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
368 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
369 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
370 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
371 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
372 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
373 energy intake (quintiles).

374 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

375 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
376 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
377 Q = quintile; SFA = saturated fatty acids.

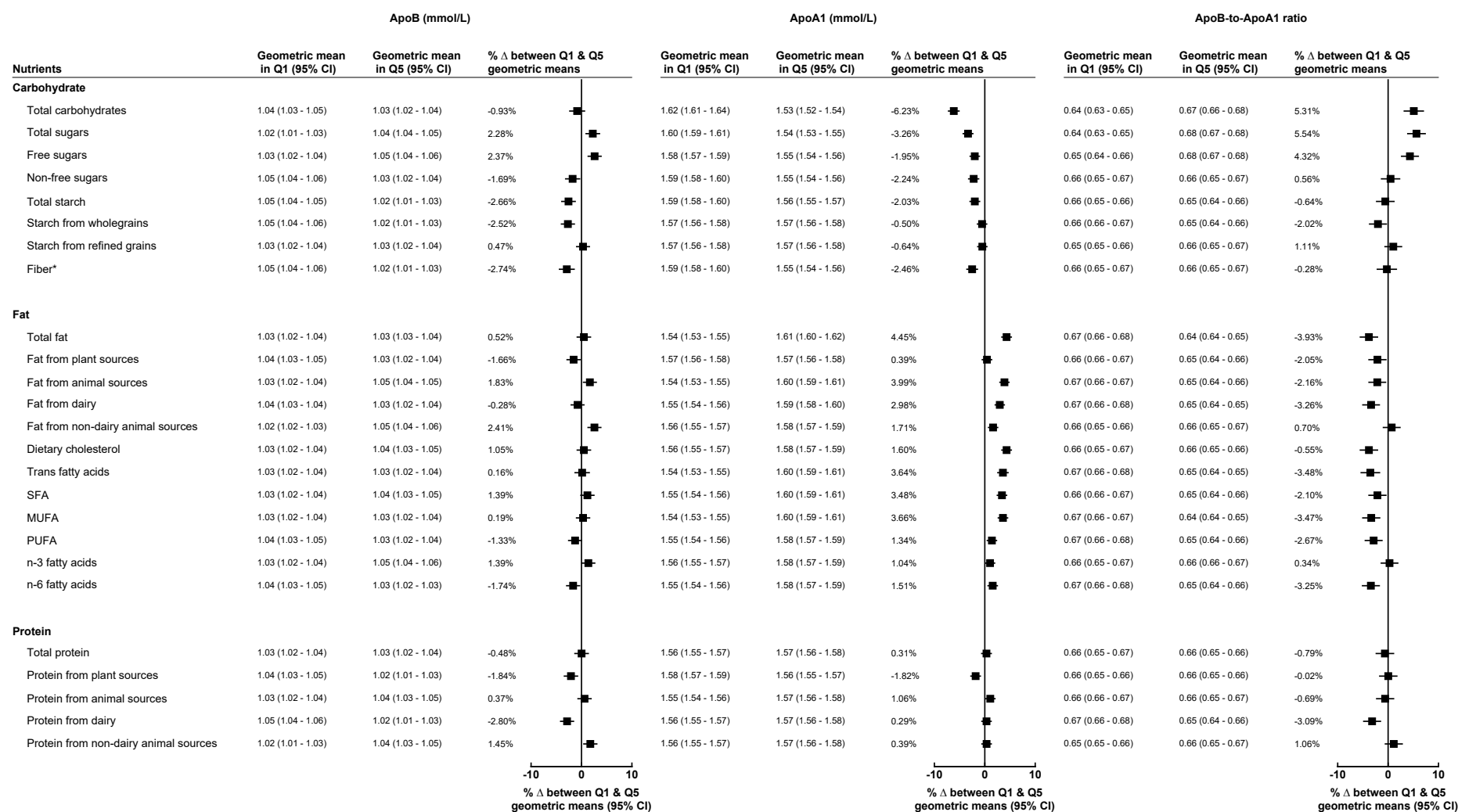


Supplemental Figure IX. Geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients restricting to participants with ≥ 4 24-hour dietary assessments (including mandatory baseline assessment) (n=9,605).

382 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
383 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
384 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
385 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
386 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
387 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
388 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
389 energy intake (quintiles).

390 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

391 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
392 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
393 fatty acids; TC = total cholesterol; TG = triglycerides.

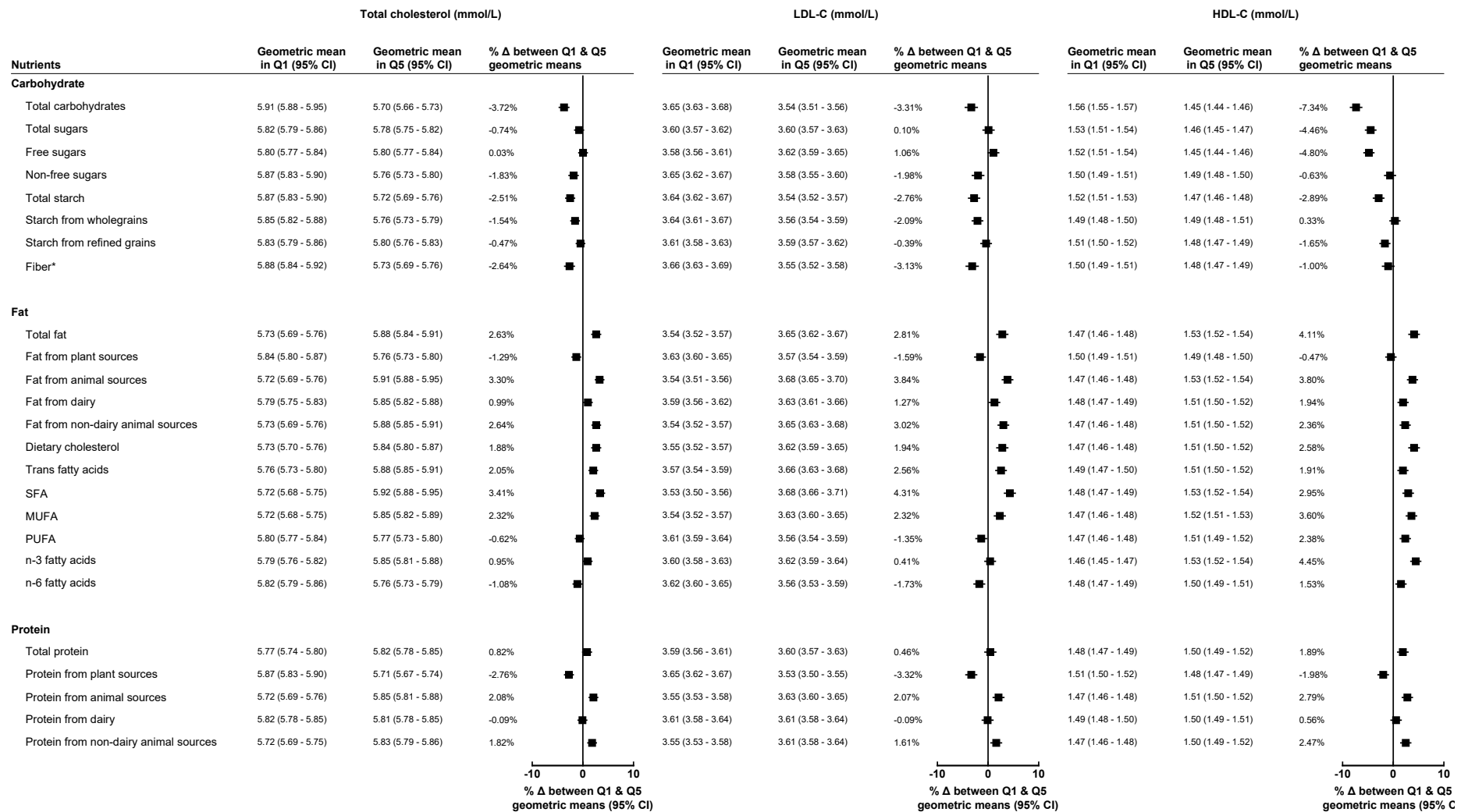


Supplemental Figure X. Geometric mean of ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients **restricting to participants with ≥ 4 24-hour dietary assessments (including mandatory baseline assessment)** (n=9,605).

398 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
399 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
400 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
401 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
402 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
403 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
404 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
405 energy intake (quintiles).

406 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

407 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
408 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

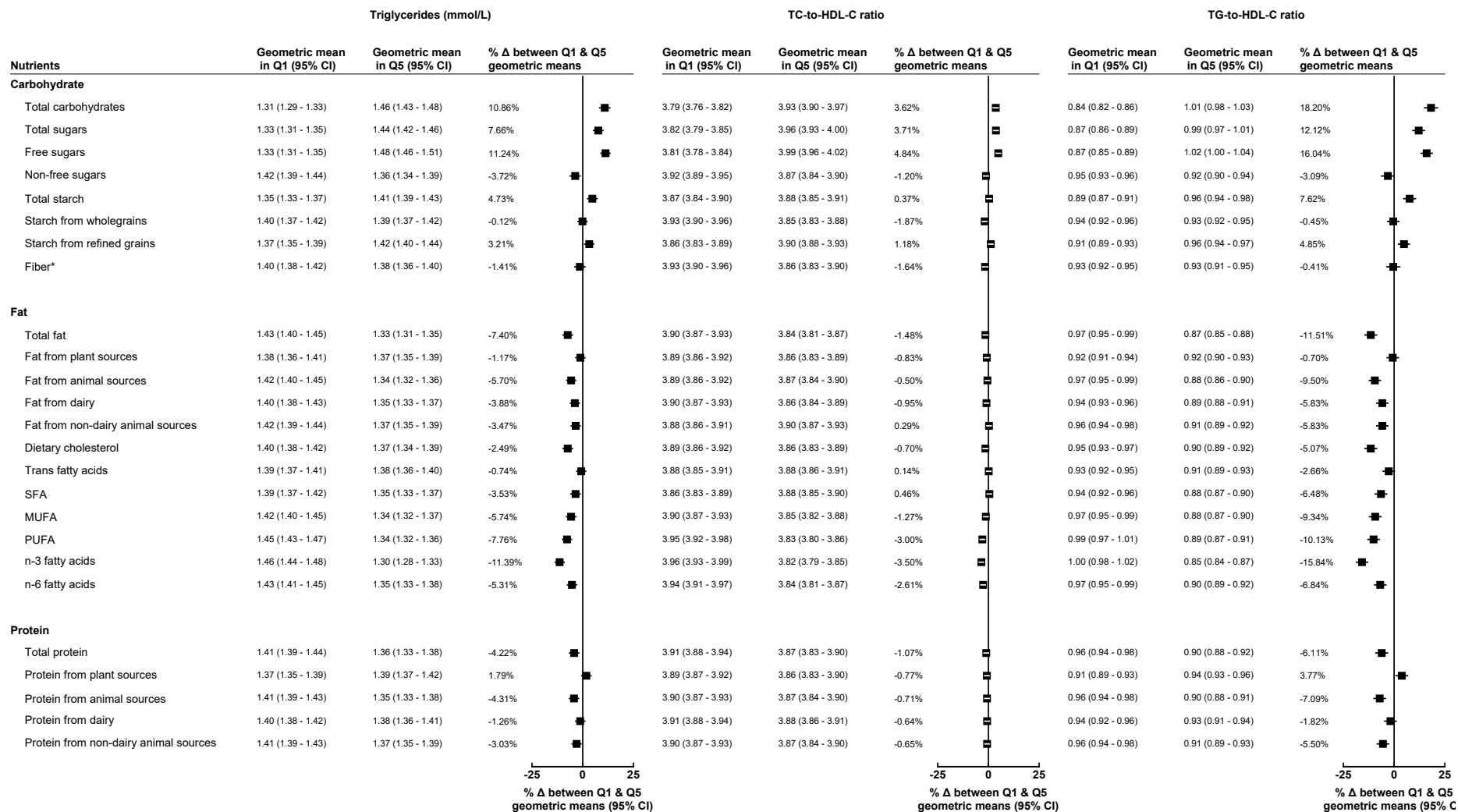


Supplemental Figure XI. Geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L) by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with a self-reported change in diet in the prior five years** (n=16,072).

413 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
414 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
415 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
416 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
417 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
418 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
419 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
420 energy intake (quintiles).

421 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

422 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
423 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
424 Q = quintile; SFA = saturated fatty acids.

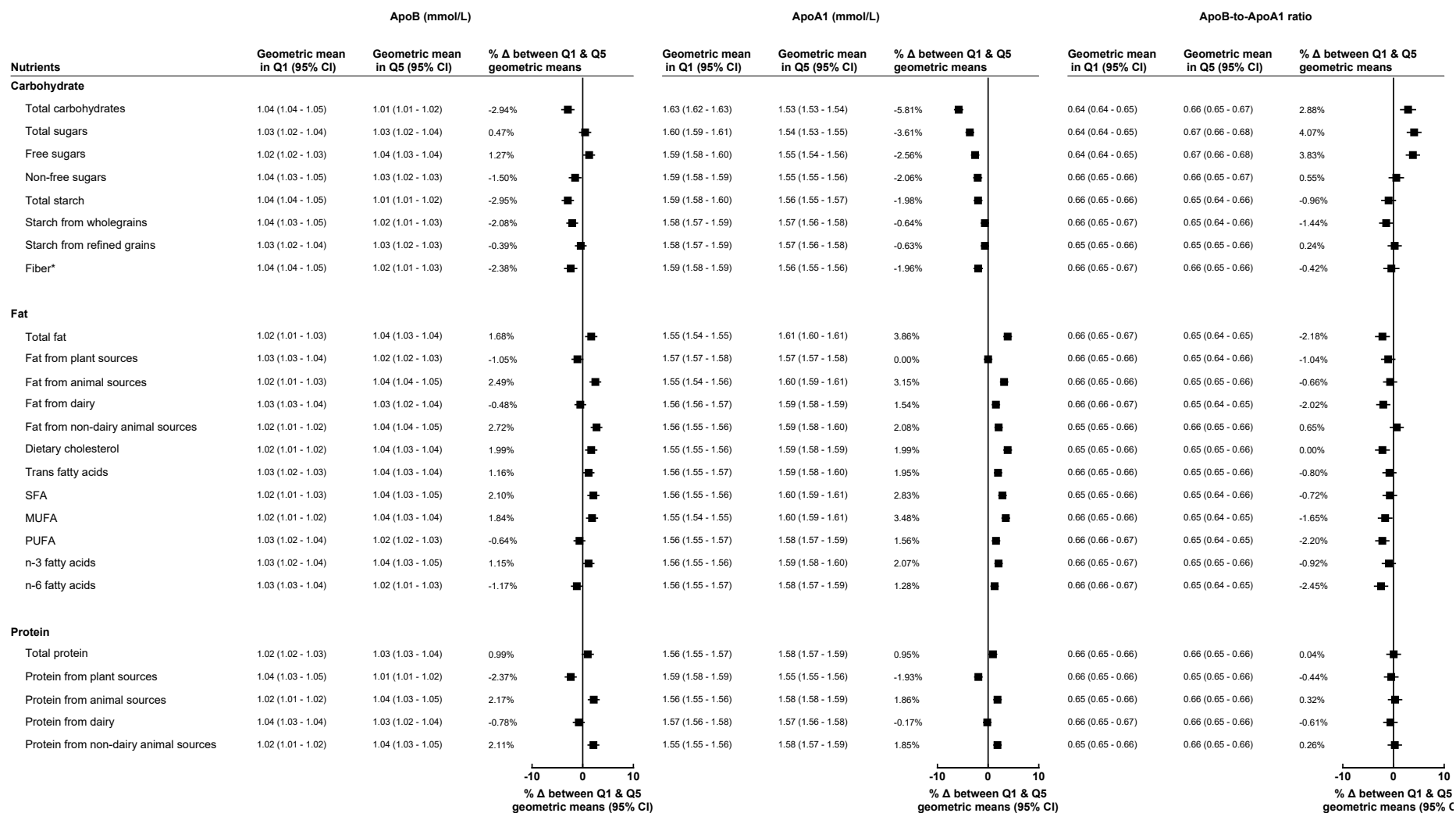


Supplemental Figure XII. Geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with a self-reported change in diet in the prior five years** (n=16,072).

429 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
430 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
431 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
432 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
433 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
434 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
435 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
436 energy intake (quintiles).

437 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

438 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
439 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
440 fatty acids; TC = total cholesterol; TG = triglycerides.

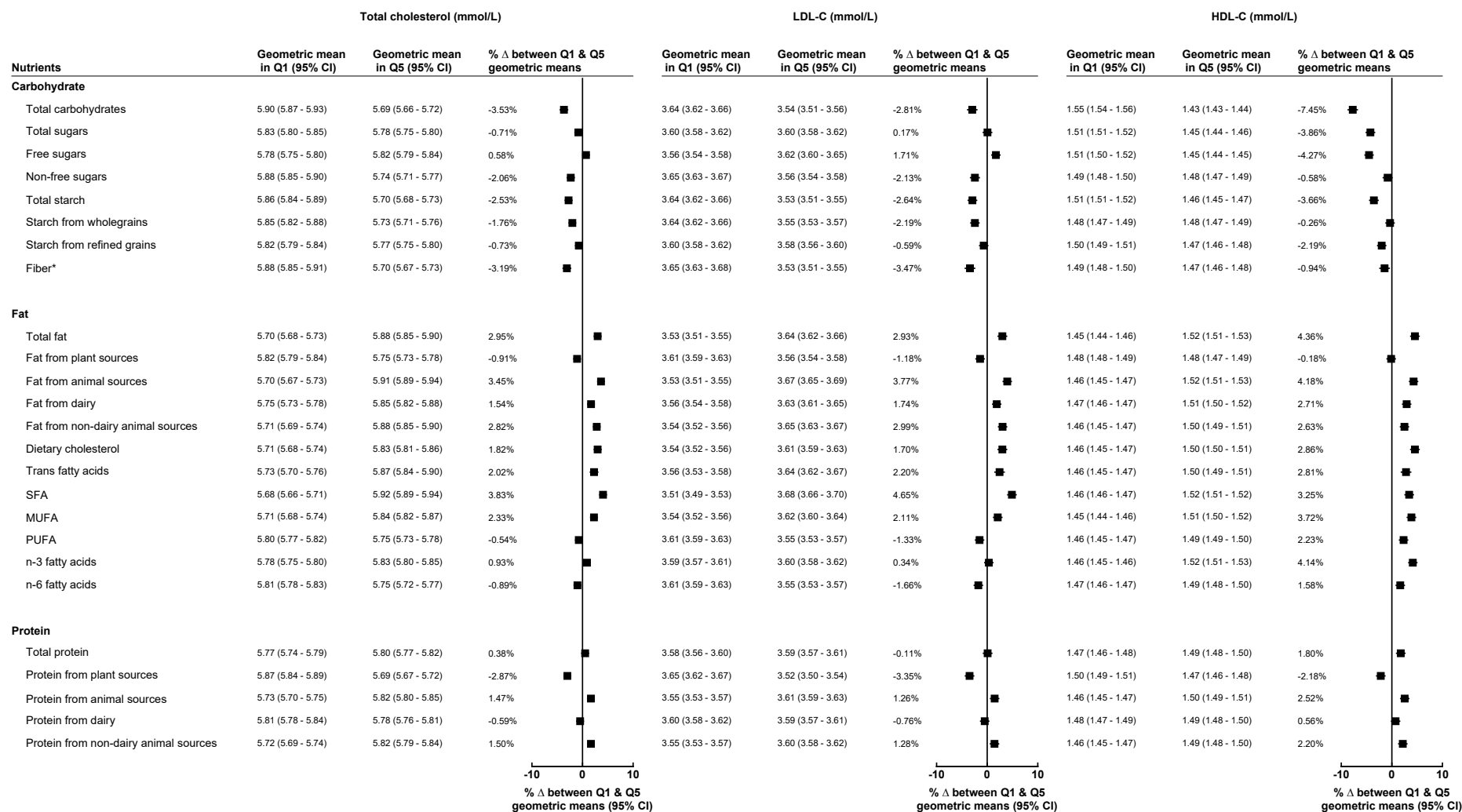


Supplemental Figure XIII. Geometric mean of ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with a self-reported change in diet in the prior five years** (n=16,072).

445 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
446 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
447 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
448 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
449 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
450 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
451 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
452 energy intake (quintiles).

453 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

454 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
455 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

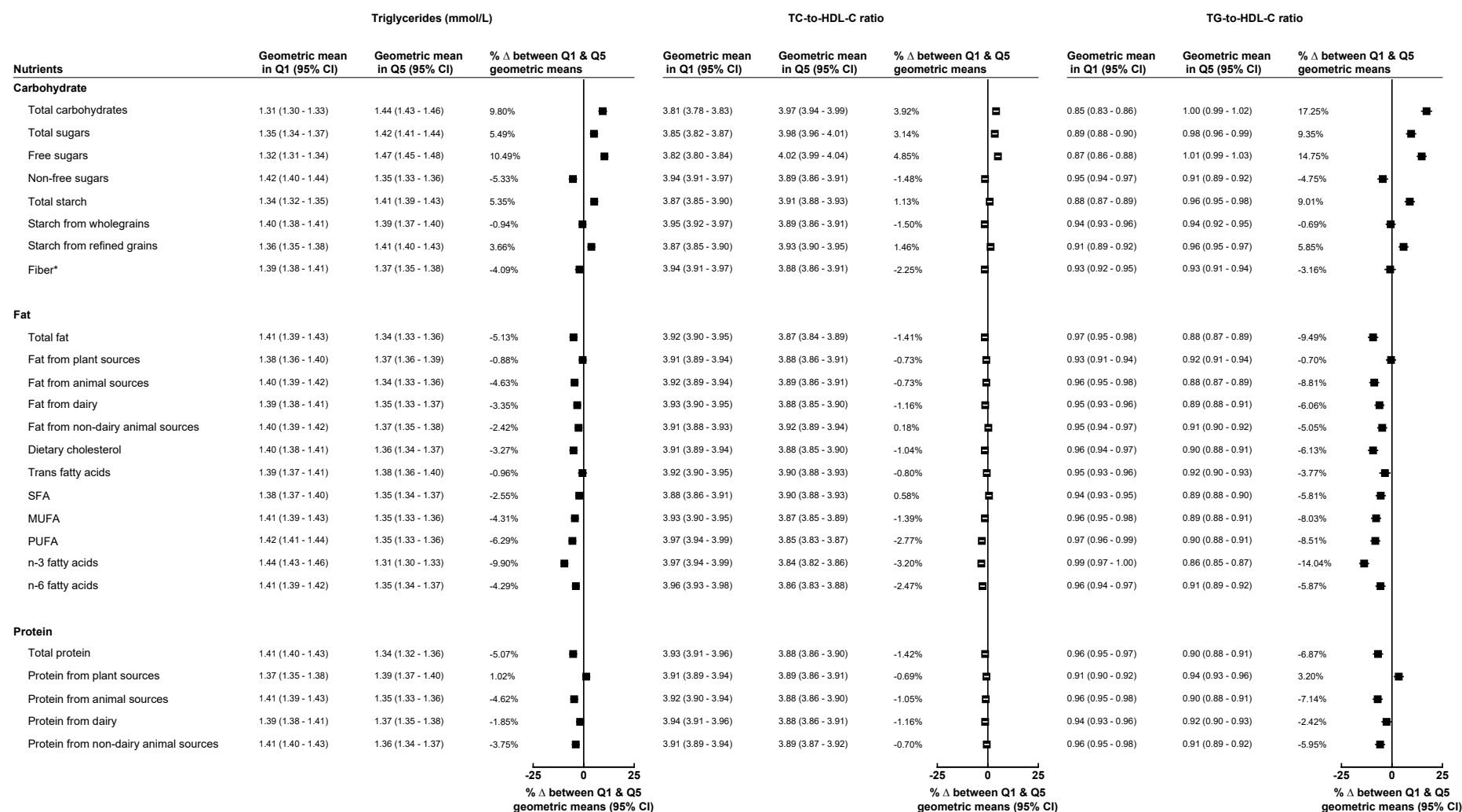


Supplemental Figure XIV. Geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L) by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with extreme levels of lipid markers** (n=24,408).

459 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
460 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
461 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
462 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
463 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
464 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
465 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
466 energy intake (quintiles).

467 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

468 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
469 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
470 Q = quintile; SFA = saturated fatty acids.

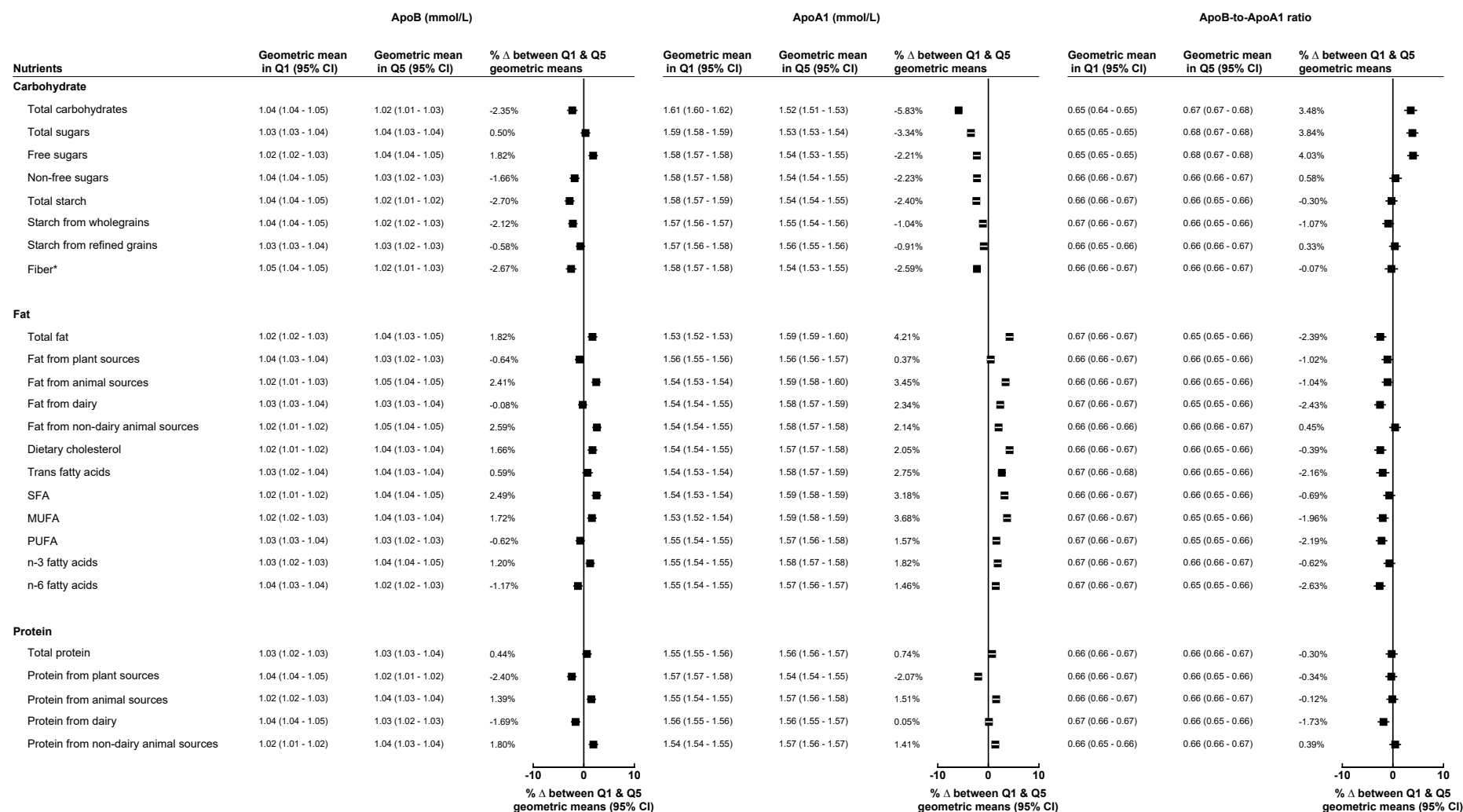


Supplemental Figure XV. Geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with extreme levels of lipid markers** (n=24,408).

474 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
475 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
476 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
477 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
478 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
479 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
480 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
481 energy intake (quintiles).

482 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

483 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
484 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
485 fatty acids; TC = total cholesterol; TG = triglycerides.

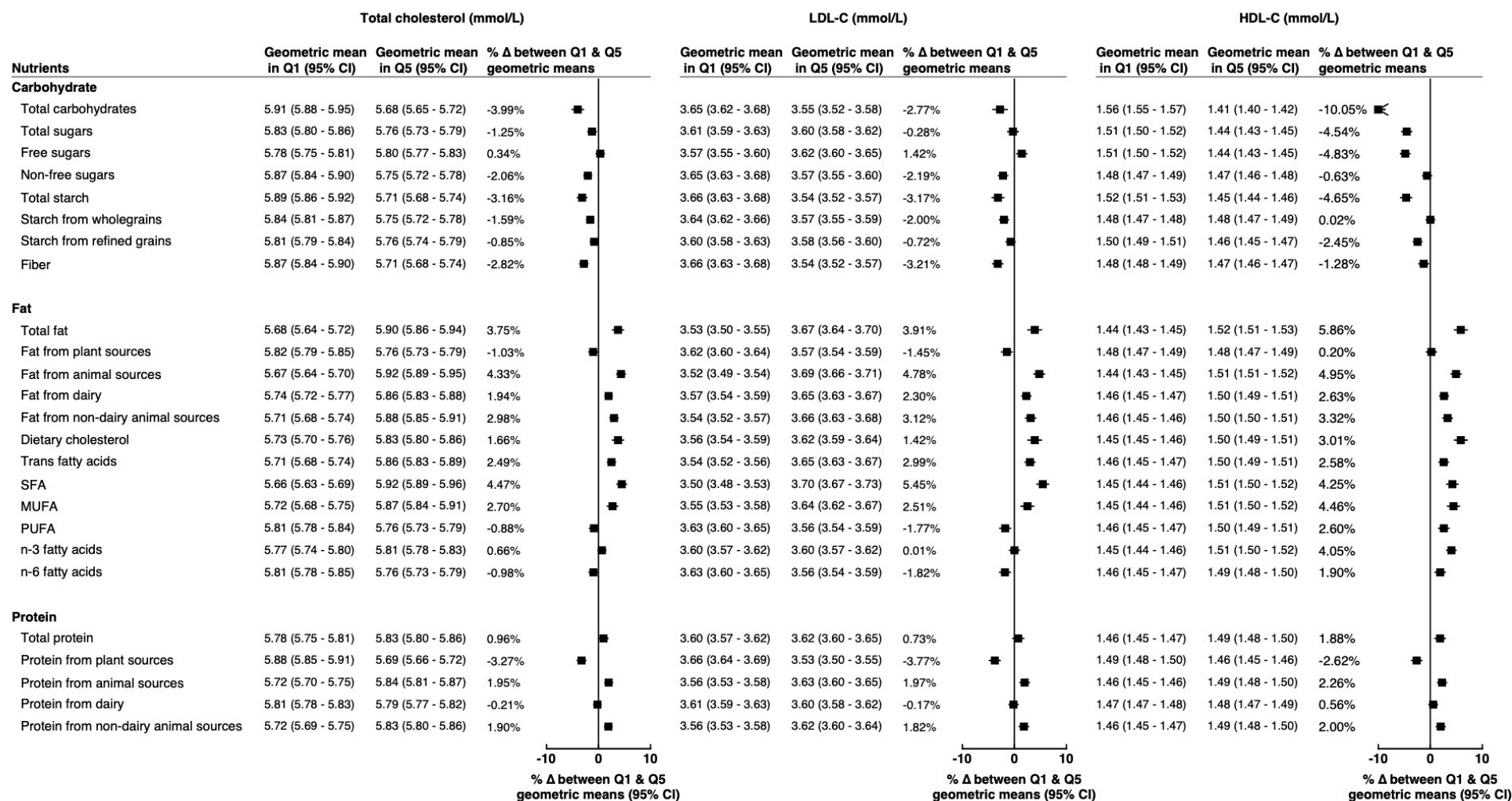


Supplemental Figure XVI. Geometric mean of ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients **excluding participants with extreme levels of lipid markers** (n=24,408).

489 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
490 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
491 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
492 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
493 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
494 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
495 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
496 energy intake (quintiles).

497 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

498 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
499 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

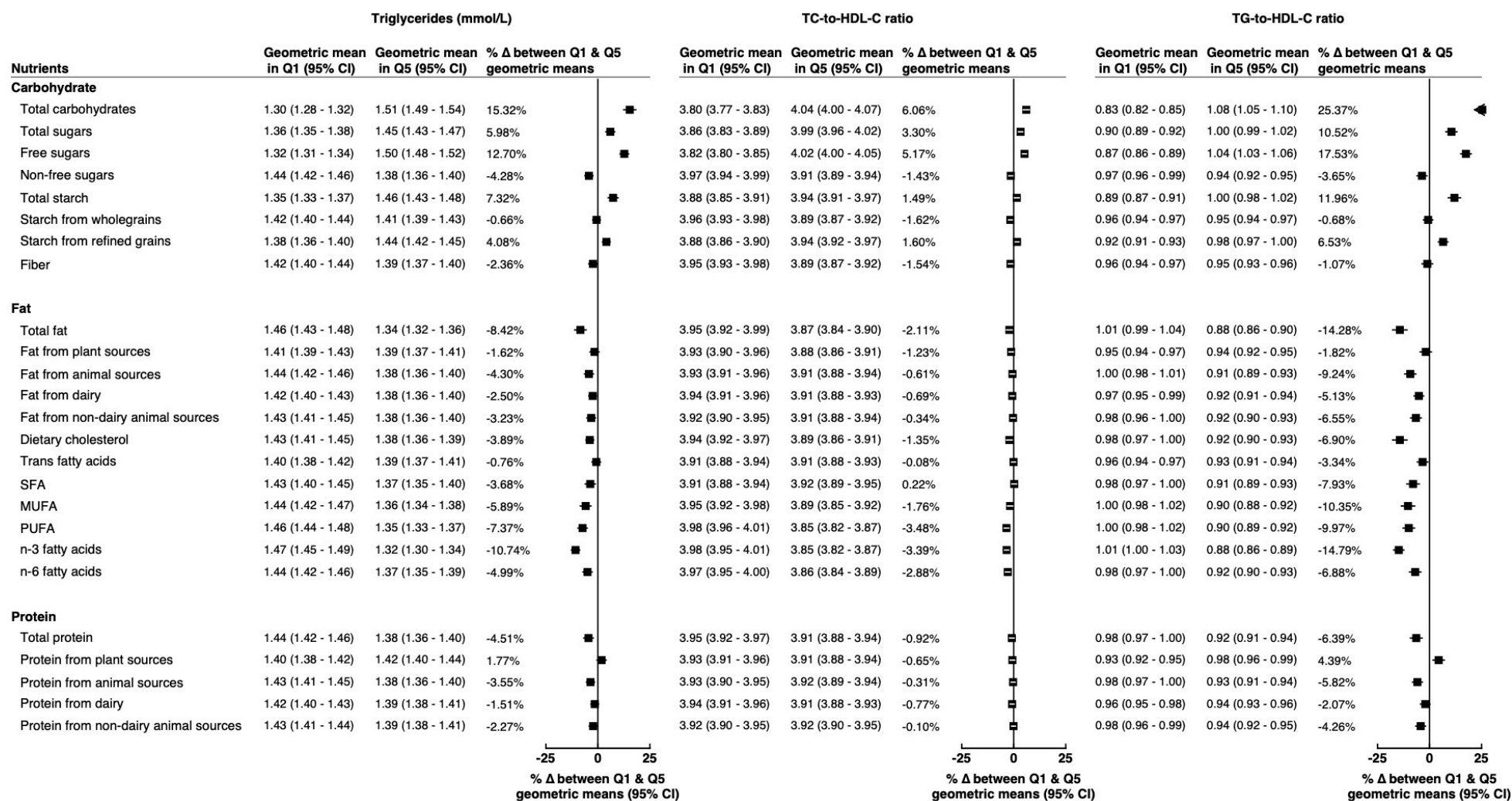


Supplemental Figure XVII. Geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L) by lowest (Q1) and highest (Q5) intake of macronutrients in grams per day (n=24,639).

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the

505 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
506 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
507 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
508 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
509 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
510 energy intake (quintiles).

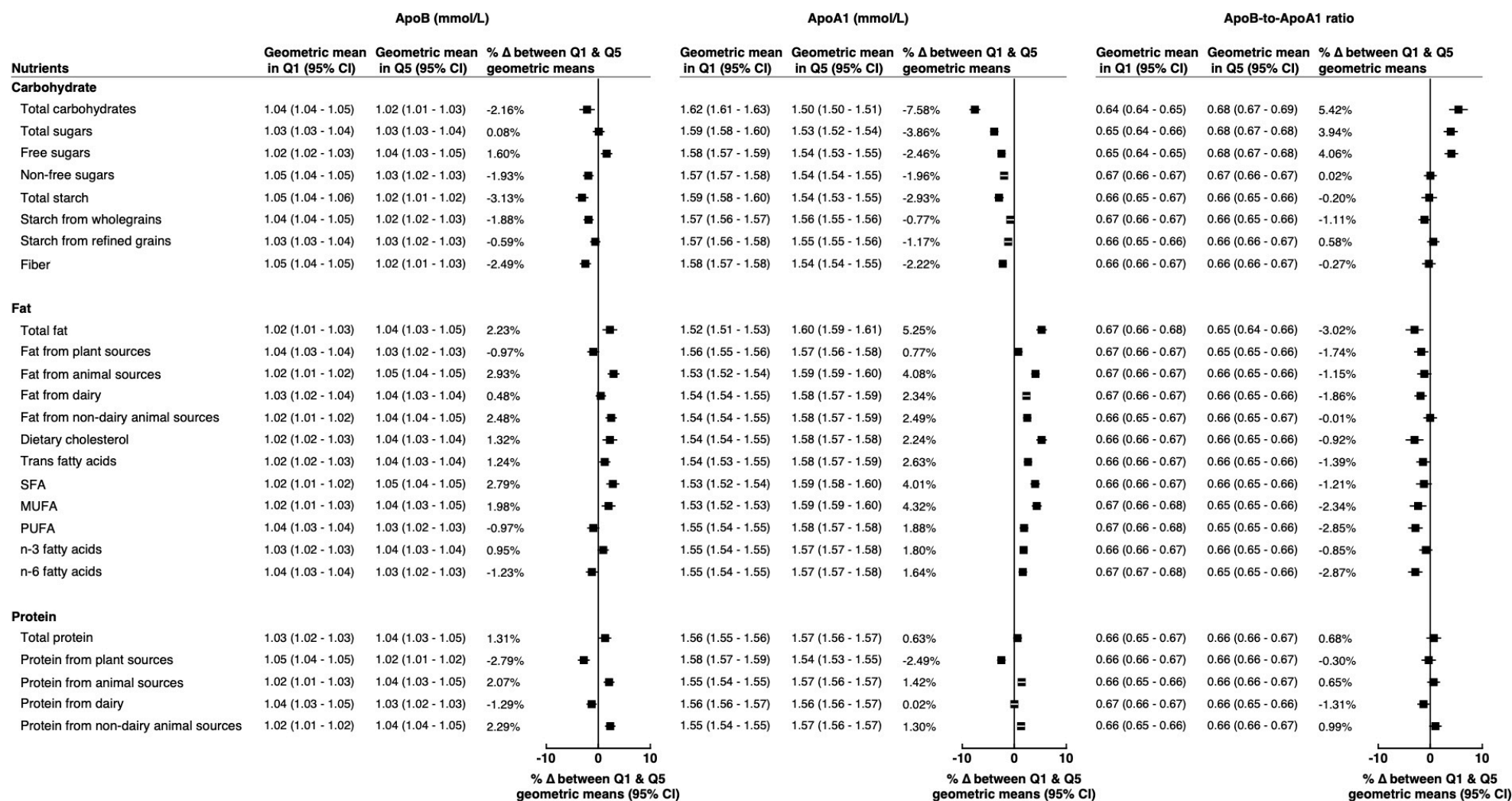
511 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
512 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
513 Q = quintile; SFA = saturated fatty acids.



Supplemental Figure XVIII. Geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) intake of macronutrients in grams per day (n=24,639).

517 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
518 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
519 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
520 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
521 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
522 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
523 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
524 energy intake (quintiles).

525 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
526 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
527 fatty acids; TC = total cholesterol; TG = triglycerides.

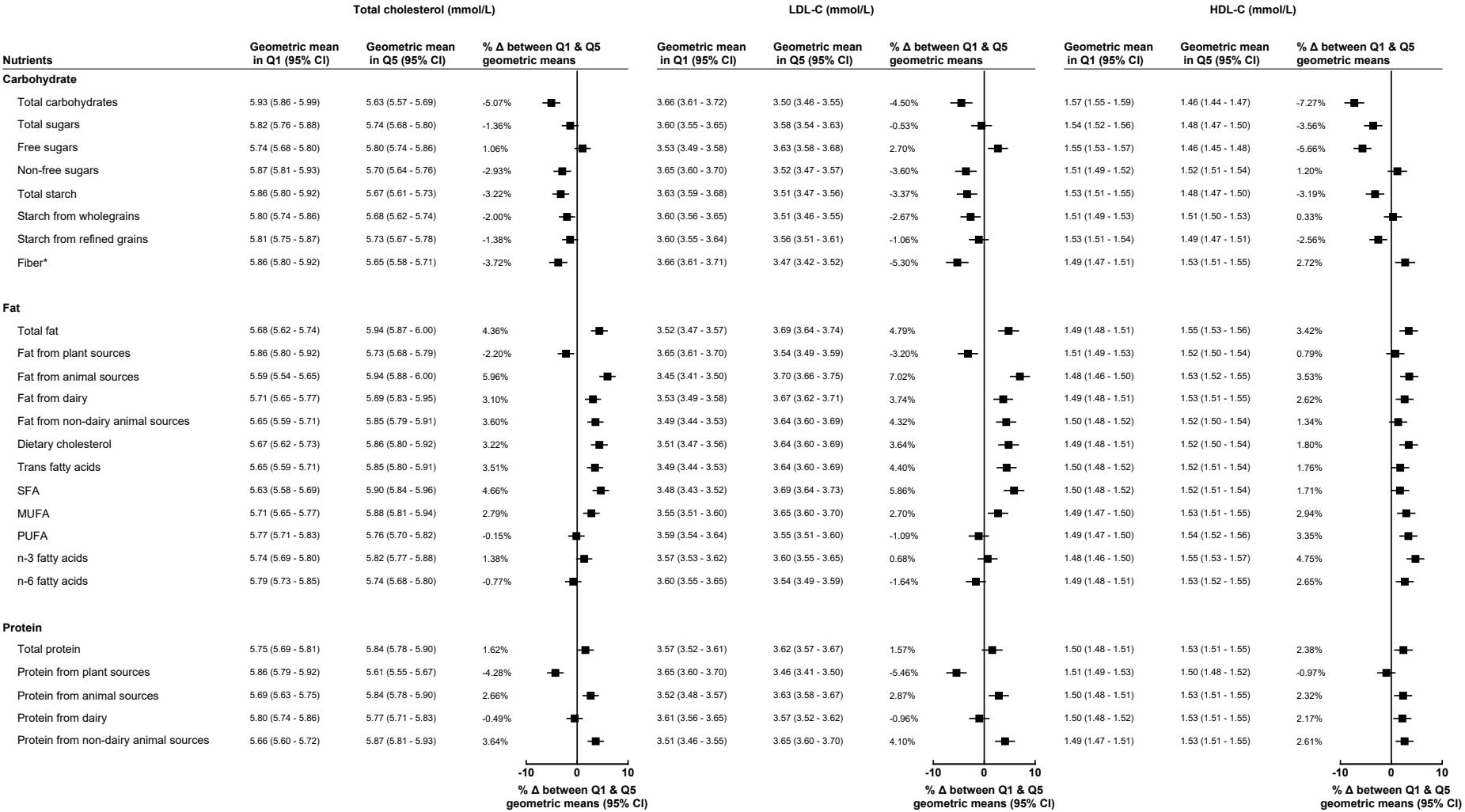


Supplemental Figure XIX. Geometric mean of ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) intake of macronutrients in grams per day (n=24,639).

531 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
532 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
533 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
534 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
535 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
536 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
537 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
538 energy intake (quintiles).

539 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
540 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

541



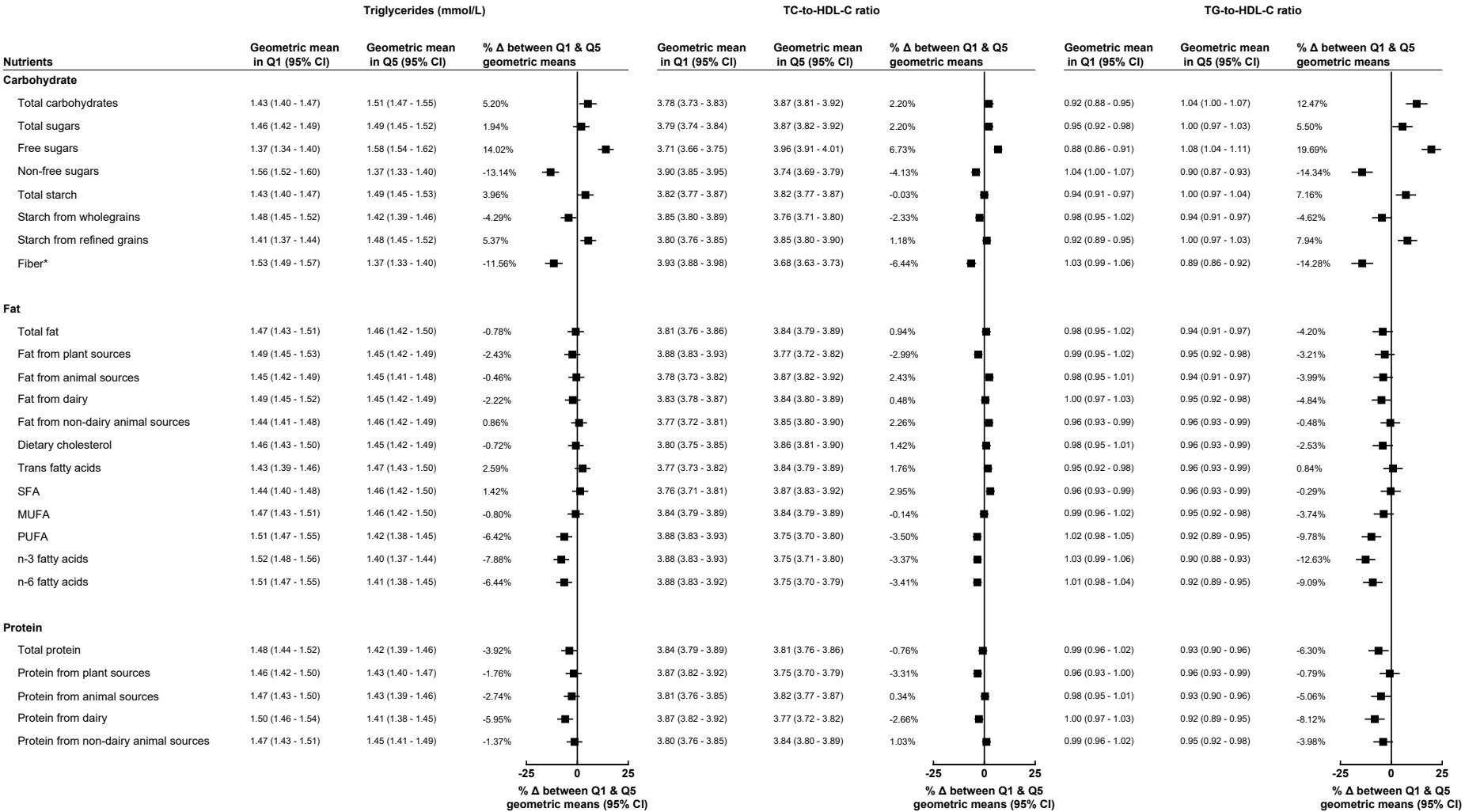
542

543 **Supplemental Figure XX.** Geometric mean of total cholesterol (mmol/L), LDL-C (mmol/L) and HDL-C (mmol/L) by lowest (Q1) and
544 highest (Q5) percentage intake of macronutrients **restricting to participants with follow-up serum lipid measurements**
545 (n=6,215).

546 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian
547 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
548 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
549 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown),
550 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day,
551 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²),
552 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
553 energy intake (quintiles).

554 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

555 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; LDL-C= low-density
556 lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids;
557 Q = quintile; SFA = saturated fatty acids.

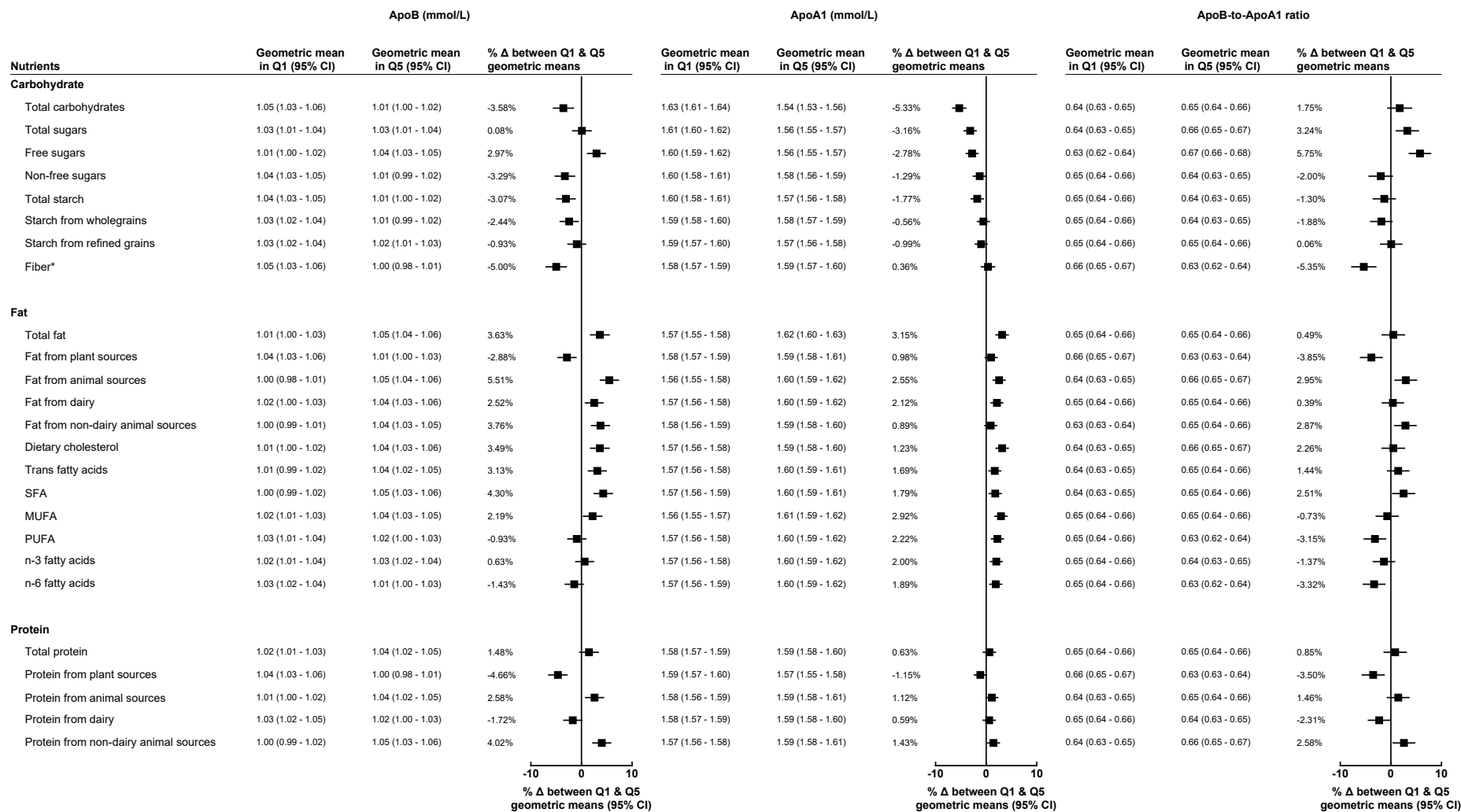


Supplemental Figure XXI. Geometric mean of triglycerides (mmol/L), TC-to-HDL-C ratio and TG-to-HDL-C ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients in a restricting to participants with follow-up serum lipid measurements (n=6,215).

563 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
564 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
565 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
566 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
567 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
568 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
569 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
570 energy intake (quintiles).

571 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

572 Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA =
573 monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated
574 fatty acids; TC = total cholesterol; TG = triglycerides



Supplemental Figure XXII. Geometric mean of ApoB (mmol/L), ApoA1 (mmol/L) and ApoB-to-ApoA1 ratio by lowest (Q1) and highest (Q5) percentage intake of macronutrients restricting to participants with follow-up serum lipid measurements (n=6,215).

579 Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian
580 British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the
581 Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most
582 affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown),
583 physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day,
584 unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²),
585 height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor (yes, no, unknown) and mean daily
586 energy intake (quintiles).

587 *For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

588 Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n-3 =
589 omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

590 **SUPPLEMENTAL TABLES AND SUPPORTING INFORMATION**591 **Supplemental Table I.** Daily macronutrient intake in quintiles by daily macronutrient
592 intake in grams and percentage of total energy intake.

Nutrient†	N	Intake*		% of total energy intake		Nutrient†	N	Intake*		% of total energy intake	
		mean	SD	mean	SD			mean	SD	mean	SD
Total carbohydrates						Dietary cholesterol					
Q1 (Lowest)	4928	205.64	53.44	39.16%	4.31%	Q1 (Lowest)	4928	118.71	42.16	0.51%	0.13%
Q2	4928	241.84	54.00	46.04%	1.21%	Q2	4928	179.18	40.85	0.77%	0.05%
Q3	4928	256.42	54.77	49.72%	0.98%	Q3	4928	219.81	51.26	0.96%	0.06%
Q4	4928	271.06	58.53	53.28%	1.14%	Q4	4928	276.24	67.27	1.21%	0.10%
Q5 (Highest)	4927	284.79	64.36	59.11%	3.34%	Q5 (Highest)	4927	408.83	132.63	1.90%	0.53%
Total sugars						Trans fatty acids					
Q1 (Lowest)	4928	83.57	23.44	16.09%	2.48%	Q1 (Lowest)	4928	0.60	0.21	0.27%	0.06%
Q2	4928	109.47	24.09	20.96%	0.98%	Q2	4928	0.92	0.22	0.40%	0.03%
Q3	4928	124.36	27.33	24.13%	0.90%	Q3	4928	1.15	0.26	0.50%	0.03%
Q4	4928	138.79	31.23	27.51%	1.11%	Q4	4928	1.40	0.32	0.60%	0.03%
Q5 (Highest)	4927	163.60	40.58	33.83%	3.96%	Q5 (Highest)	4927	1.88	0.52	0.81%	0.14%
Free sugars						SFA					
Q1 (Lowest)	4928	26.96	10.30	5.48%	1.51%	Q1 (Lowest)	4928	16.54	4.79	7.73%	1.13%
Q2	4928	44.15	10.45	8.64%	0.69%	Q2	4928	22.44	5.10	9.99%	0.46%
Q3	4928	56.57	12.80	10.90%	0.66%	Q3	4928	26.51	5.74	11.48%	0.42%
Q4	4928	70.91	16.21	13.43%	0.84%	Q4	4928	30.88	6.84	13.02%	0.50%
Q5 (Highest)	4927	98.66	29.01	18.60%	3.53%	Q5 (Highest)	4927	37.96	9.14	15.74%	1.59%
Non-free sugars						MUFA					
Q1 (Lowest)	4928	34.97	11.00	6.43%	1.44%	Q1 (Lowest)	4928	17.57	4.83	8.23%	1.04%
Q2	4928	51.55	11.85	9.80%	0.77%	Q2	4928	23.02	5.09	10.15%	0.38%
Q3	4928	63.02	13.93	12.39%	0.77%	Q3	4928	26.31	5.69	11.35%	0.33%
Q4	4928	75.63	17.06	15.36%	1.00%	Q4	4928	29.90	6.54	12.58%	0.40%
Q5 (Highest)	4927	97.37	26.01	21.47%	3.91%	Q5 (Highest)	4927	35.42	8.48	14.83%	1.43%
Total starch						PUFA					
Q1 (Lowest)	4928	88.12	27.25	17.21%	2.99%	Q1 (Lowest)	4928	8.44	2.37	3.78%	0.50%
Q2	4928	116.86	25.99	22.19%	0.90%	Q2	4928	10.95	2.44	4.79%	0.21%
Q3	4928	129.94	28.31	24.95%	0.75%	Q3	4928	12.74	2.85	5.49%	0.21%
Q4	4928	141.94	30.63	27.68%	0.87%	Q4	4928	14.51	3.30	6.28%	0.27%
Q5 (Highest)	4927	161.92	38.14	32.53%	2.94%	Q5 (Highest)	4927	18.24	4.80	7.93%	1.10%
Starch from						n-3 fatty acids					
Q1 (Lowest)	4928	2.35	3.51	0.42%	0.60%	Q1 (Lowest)	4928	1.21	0.34	0.54%	0.07%
Q2	4928	14.60	4.81	2.78%	0.61%	Q2	4928	1.62	0.37	0.69%	0.04%
Q3	4928	24.47	6.31	4.76%	0.55%	Q3	4928	1.91	0.43	0.82%	0.04%
Q4	4928	34.60	8.63	6.95%	0.75%	Q4	4928	2.28	0.52	0.98%	0.06%
Q5 (Highest)	4927	55.02	18.03	11.56%	2.92%	Q5 (Highest)	4927	2.96	0.82	1.37%	0.28%
Starch from refined						n-6 fatty acids					
Q1 (Lowest)	4928	9.74	7.99	1.83%	1.39%	Q1 (Lowest)	4928	6.90	1.96	3.11%	0.43%
Q2	4928	28.61	8.10	5.46%	0.82%	Q2	4928	9.09	2.04	3.99%	0.19%
Q3	4928	43.00	10.68	8.22%	0.80%	Q3	4928	10.75	2.38	4.61%	0.18%
Q4	4928	58.01	14.23	11.26%	1.00%	Q4	4928	12.34	2.82	5.32%	0.25%
Q5 (Highest)	4927	84.65	25.20	17.18%	3.74%	Q5 (Highest)	4927	15.82	4.24	6.83%	1.00%
Fiber						Total protein					
Q1 (Lowest)	4928	10.88	1.94			Q1 (Lowest)	4928	67.00	16.24	12.14%	1.10%
Q2	4928	14.75	0.81			Q2	4928	76.69	15.99	14.26%	0.44%
Q3	4928	17.44	0.74			Q3	4928	81.47	16.60	15.66%	0.40%
Q4	4928	20.34	0.98			Q4	4928	85.15	17.57	17.18%	0.50%
Q5 (Highest)	4927	26.27	4.02			Q5 (Highest)	4927	89.64	19.94	20.28%	2.12%
Total fat						Protein from plant					
Q1 (Lowest)	4928	50.43	13.54	23.67%	2.74%	Q1 (Lowest)	4928	21.06	5.53	3.95%	0.48%
Q2	4928	64.11	13.96	28.60%	0.93%	Q2	4928	25.48	5.64	4.84%	0.18%
Q3	4928	73.23	15.98	31.55%	0.81%	Q3	4928	27.70	5.92	5.42%	0.17%
Q4	4928	81.65	17.76	34.49%	0.94%	Q4	4928	30.35	6.77	6.07%	0.22%
Q5 (Highest)	4927	94.93	21.79	39.41%	2.92%	Q5 (Highest)	4927	36.63	9.94	7.61%	1.14%
Fat from plant sources						Protein from animal					
Q1 (Lowest)	4928	18.52	5.75	8.42%	1.57%	Q1 (Lowest)	4928	32.33	11.39	6.03%	1.51%
Q2	4928	26.12	6.03	11.48%	0.63%	Q2	4928	47.13	10.18	8.69%	0.48%
Q3	4928	31.35	6.95	13.58%	0.59%	Q3	4928	53.42	11.31	10.19%	0.41%
Q4	4928	37.03	8.31	15.89%	0.78%	Q4	4928	58.65	12.39	11.77%	0.52%
Q5 (Highest)	4927	48.50	13.27	20.61%	3.13%	Q5 (Highest)	4927	67.22	16.44	14.97%	2.27%
Fat from animal						Protein from dairy					
Q1 (Lowest)	4928	22.91	7.48	10.47%	2.25%	Q1 (Lowest)	4928	5.39	2.79	1.02%	0.45%
Q2	4928	33.36	7.68	14.64%	0.84%	Q2	4928	10.27	2.55	1.96%	0.20%
Q3	4928	40.07	8.99	17.30%	0.73%	Q3	4928	13.34	3.05	2.60%	0.18%
Q4	4928	47.20	10.68	20.11%	0.93%	Q4	4928	16.18	3.66	3.27%	0.22%

Q5 (Highest)	4927	59.31	14.96	25.22%	3.08%	Q5 (Highest)	4927	21.21	5.71	4.59%	0.88%
Fat from dairy						Protein from non-dairy					
Q1 (Lowest)	4928	3.06	1.79	1.37%	0.70%	Q1 (Lowest)	4928	18.13	8.72	3.36%	1.35%
Q2	4928	7.30	2.05	3.23%	0.46%	Q2	4928	32.72	7.56	6.05%	0.49%
Q3	4928	10.99	2.80	4.83%	0.48%	Q3	4928	39.64	8.53	7.54%	0.41%
Q4	4928	15.51	3.87	6.77%	0.68%	Q4	4928	45.67	10.13	9.06%	0.51%
Q5 (Highest)	4927	25.36	8.55	10.97%	2.64%	Q5 (Highest)	4927	56.19	15.27	12.21%	2.25%
Fat from non-dairy animal											
Q1 (Lowest)	4928	14.03	5.27	6.29%	1.76%						
Q2	4928	22.38	5.25	9.70%	0.67%						
Q3	4928	27.60	6.36	11.85%	0.61%						
Q4	4928	33.43	7.68	14.16%	0.75%						
Q5 (Highest)	4927	43.20	11.53	18.58%	2.86%						

*Amounts displayed are in grams unless otherwise specified

† Expressed in quintiles as a percentage of total daily energy intake (kJ) minus alcohol from Q1 (Lowest) to Q5(Highest)

Abbreviations: g/d = grams per day; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SD = standard deviations; SFA = saturated fatty acids.

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Supplemental Table II. Geometric mean concentrations of total cholesterol (mmol/L) by percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% in mmol/L (95%	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% in mmol/L (95%	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	5.89 (5.86 - 5.93)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	5.72 (5.69 - 5.75)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.80 (5.78 - 5.83)	0.98 (0.98 - 0.99)		Q2	4928	5.82 (5.79 - 5.85)	1.02 (1.01 - 1.02)	
Q3	4928	5.82 (5.79 - 5.85)	0.99 (0.98 - 0.99)		Q3	4928	5.80 (5.78 - 5.83)	1.01 (1.01 - 1.02)	
Q4	4928	5.76 (5.73 - 5.78)	0.98 (0.97 - 0.98)		Q4	4928	5.80 (5.77 - 5.83)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	5.69 (5.66 - 5.72)	0.97 (0.96 - 0.97)		Q5 (Highest)	4927	5.82 (5.80 - 5.85)	1.02 (1.01 - 1.02)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	5.82 (5.79 - 5.84)	1.00 (1.00 - 1.00)	0.0139	Q1 (Lowest)	4928	5.74 (5.71 - 5.77)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	5.81 (5.78 - 5.83)	1.00 (0.99 - 1.00)		Q2	4928	5.74 (5.71 - 5.77)	1.00 (1.00 - 1.01)	
Q3	4928	5.80 (5.77 - 5.82)	1.00 (0.99 - 1.00)		Q3	4928	5.78 (5.75 - 5.81)	1.01 (1.00 - 1.01)	
Q4	4928	5.78 (5.75 - 5.80)	0.99 (0.99 - 1.00)		Q4	4928	5.83 (5.80 - 5.87)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	5.77 (5.74 - 5.80)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	5.86 (5.83 - 5.89)	1.02 (1.02 - 1.03)	
Free sugars					SFA				
Q1 (Lowest)	4928	5.78 (5.75 - 5.80)	1.00 (1.00 - 1.00)	0.0981	Q1 (Lowest)	4928	5.69 (5.66 - 5.71)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.78 (5.76 - 5.81)	1.00 (1.00 - 1.01)		Q2	4928	5.76 (5.73 - 5.78)	1.01 (1.01 - 1.02)	
Q3	4928	5.80 (5.78 - 5.83)	1.00 (1.00 - 1.01)		Q3	4928	5.79 (5.77 - 5.82)	1.02 (1.01 - 1.02)	
Q4	4928	5.79 (5.77 - 5.82)	1.00 (1.00 - 1.01)		Q4	4928	5.82 (5.79 - 5.85)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	5.81 (5.78 - 5.84)	1.01 (1.00 - 1.01)		Q5 (Highest)	4927	5.91 (5.88 - 5.94)	1.04 (1.03 - 1.04)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	5.86 (5.83 - 5.89)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.70 (5.67 - 5.73)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.79 (5.76 - 5.82)	0.99 (0.98 - 0.99)		Q2	4928	5.81 (5.78 - 5.84)	1.02 (1.01 - 1.02)	
Q3	4928	5.78 (5.76 - 5.81)	0.99 (0.98 - 0.99)		Q3	4928	5.79 (5.76 - 5.82)	1.02 (1.01 - 1.02)	
Q4	4928	5.79 (5.76 - 5.81)	0.99 (0.98 - 0.99)		Q4	4928	5.83 (5.80 - 5.86)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	5.74 (5.71 - 5.77)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	5.84 (5.81 - 5.86)	1.02 (1.02 - 1.03)	
Total starch					PUFA				
Q1 (Lowest)	4928	5.86 (5.83 - 5.89)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.79 (5.76 - 5.82)	1.00 (1.00 - 1.00)	0.281
Q2	4928	5.83 (5.80 - 5.86)	0.99 (0.99 - 1.00)		Q2	4928	5.79 (5.76 - 5.82)	1.00 (1.00 - 1.00)	
Q3	4928	5.79 (5.76 - 5.82)	0.99 (0.98 - 0.99)		Q3	4928	5.82 (5.80 - 5.85)	1.01 (1.00 - 1.01)	
Q4	4928	5.78 (5.75 - 5.81)	0.99 (0.98 - 0.99)		Q4	4928	5.81 (5.78 - 5.83)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	5.71 (5.68 - 5.74)	0.97 (0.97 - 0.98)		Q5 (Highest)	4927	5.76 (5.73 - 5.78)	0.99 (0.99 - 1.00)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	5.84 (5.81 - 5.87)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.77 (5.75 - 5.80)	1.00 (1.00 - 1.00)	0.046
Q2	4928	5.82 (5.79 - 5.84)	1.00 (0.99 - 1.00)		Q2	4928	5.80 (5.77 - 5.83)	1.00 (1.00 - 1.01)	
Q3	4928	5.79 (5.76 - 5.82)	0.99 (0.99 - 1.00)		Q3	4928	5.78 (5.76 - 5.81)	1.00 (1.00 - 1.01)	
Q4	4928	5.78 (5.75 - 5.81)	0.99 (0.98 - 0.99)		Q4	4928	5.79 (5.76 - 5.81)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	5.74 (5.71 - 5.77)	0.98 (0.98 - 0.99)		Q5 (Highest)	4927	5.82 (5.80 - 5.85)	1.01 (1.00 - 1.01)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	5.81 (5.79 - 5.84)	1.00 (1.00 - 1.00)	0.0035	Q1 (Lowest)	4928	5.80 (5.77 - 5.83)	1.00 (1.00 - 1.00)	0.030
Q2	4928	5.82 (5.80 - 5.85)	1.00 (1.00 - 1.01)		Q2	4928	5.80 (5.77 - 5.82)	1.00 (0.99 - 1.00)	
Q3	4928	5.79 (5.76 - 5.81)	1.00 (0.99 - 1.00)		Q3	4928	5.82 (5.79 - 5.84)	1.00 (1.00 - 1.01)	
Q4	4928	5.77 (5.75 - 5.80)	0.99 (0.99 - 1.00)		Q4	4928	5.81 (5.78 - 5.83)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	5.77 (5.74 - 5.80)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	5.75 (5.72 - 5.78)	0.99 (0.99 - 1.00)	
Fiber*					Total protein				
Q1 (Lowest)	4928	5.87 (5.84 - 5.90)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	5.77 (5.74 - 5.80)	1.00 (1.00 - 1.00)	0.171
Q2	4928	5.82 (5.79 - 5.85)	0.99 (0.99 - 1.00)		Q2	4928	5.79 (5.76 - 5.82)	1.00 (1.00 - 1.01)	
Q3	4928	5.79 (5.76 - 5.82)	0.99 (0.98 - 0.99)		Q3	4928	5.81 (5.78 - 5.84)	1.01 (1.00 - 1.01)	
Q4	4928	5.78 (5.75 - 5.80)	0.98 (0.98 - 0.99)		Q4	4928	5.81 (5.78 - 5.83)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	5.71 (5.68 - 5.74)	0.97 (0.97 - 0.98)		Q5 (Highest)	4927	5.79 (5.76 - 5.82)	1.00 (1.00 - 1.01)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	5.70 (5.67 - 5.73)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.86 (5.83 - 5.89)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.77 (5.74 - 5.79)	1.01 (1.01 - 1.02)		Q2	4928	5.84 (5.81 - 5.86)	1.00 (0.99 - 1.00)	
Q3	4928	5.80 (5.77 - 5.83)	1.02 (1.01 - 1.02)		Q3	4928	5.78 (5.76 - 5.81)	0.99 (0.98 - 0.99)	
Q4	4928	5.83 (5.80 - 5.86)	1.02 (1.02 - 1.03)		Q4	4928	5.79 (5.76 - 5.82)	0.99 (0.98 - 0.99)	
Q5 (Highest)	4927	5.87 (5.84 - 5.90)	1.03 (1.02 - 1.03)		Q5 (Highest)	4927	5.70 (5.67 - 5.73)	0.97 (0.97 - 0.98)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	5.81 (5.78 - 5.83)	1.00 (1.00 - 1.00)	0.0097	Q1 (Lowest)	4928	5.73 (5.70 - 5.76)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.81 (5.79 - 5.84)	1.00 (1.00 - 1.01)		Q2	4928	5.78 (5.75 - 5.80)	1.01 (1.00 - 1.01)	
Q3	4928	5.80 (5.77 - 5.82)	1.00 (0.99 - 1.00)		Q3	4928	5.82 (5.80 - 5.85)	1.02 (1.01 - 1.02)	
Q4	4928	5.80 (5.77 - 5.82)	1.00 (0.99 - 1.00)		Q4	4928	5.83 (5.80 - 5.85)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	5.76 (5.73 - 5.78)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	5.81 (5.78 - 5.84)	1.01 (1.01 - 1.02)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	5.70 (5.68 - 5.73)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.81 (5.78 - 5.84)	1.00 (1.00 - 1.00)	0.180
Q2	4928	5.74 (5.71 - 5.76)	1.01 (1.00 - 1.01)		Q2	4928	5.79 (5.77 - 5.82)	1.00 (0.99 - 1.00)	
Q3	4928	5.79 (5.76 - 5.82)	1.01 (1.01 - 1.02)		Q3	4928	5.79 (5.76 - 5.81)	1.00 (0.99 - 1.00)	
Q4	4928	5.84 (5.81 - 5.86)	1.02 (1.02 - 1.03)		Q4	4928	5.80 (5.77 - 5.83)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	5.90 (5.87 - 5.93)	1.03 (1.03 - 1.04)		Q5 (Highest)	4927	5.77 (5.75 - 5.80)	0.99 (0.99 - 1.00)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	5.76 (5.73 - 5.78)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	5.72 (5.69 - 5.75)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	5.76 (5.73 - 5.79)	1.00 (1.00 - 1.01)		Q2	4928	5.79 (5.76 - 5.82)	1.01 (1.01 - 1.02)	
Q3	4928	5.79 (5.77 - 5.82)	1.01 (1.00 - 1.01)		Q3	4928	5.82 (5.79 - 5.84)	1.02 (1.01 - 1.02)	
Q4	4928	5.81 (5.79 - 5.84)	1.01 (1.00 - 1.01)		Q4	4928	5.83 (5.81 - 5.86)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	5.84 (5.82 - 5.87)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	5.80 (5.78 - 5.83)	1.02 (1.01 - 1.02)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	5.71 (5.68 - 5.74)	1.00 (1.00 - 1.00)	<0.000					
Q2	4928	5.78 (5.76 - 5.81)	1.01 (1.01 - 1.02)						
Q3	4928	5.78 (5.75 - 5.81)	1.01 (1.01 - 1.02)						
Q4	4928	5.82 (5.80 - 5.85)	1.02 (1.01 - 1.02)						
Q5 (Highest)	4927	5.87 (5.84 - 5.90)	1.03 (1.02 - 1.03)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n=3 = omega-3; n=6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

597 **Supplemental Table III.** Geometric mean concentrations of LDL-C (mmol/L) by
598 percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	3.65 (3.62 - 3.67)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.55 (3.53 - 3.57)	1.00 (0.99 - 1.01)	0.004
Q2	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)		Q2	4928	3.63 (3.61 - 3.65)	1.02 (1.02 - 1.03)	
Q3	4928	3.63 (3.61 - 3.65)	1.00 (0.99 - 1.00)		Q3	4928	3.61 (3.59 - 3.63)	1.02 (1.01 - 1.02)	
Q4	4928	3.59 (3.57 - 3.61)	0.98 (0.98 - 0.99)		Q4	4928	3.60 (3.58 - 3.63)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	3.54 (3.52 - 3.57)	0.97 (0.97 - 0.98)		Q5 (Highest)	4927	3.61 (3.59 - 3.63)	1.02 (1.01 - 1.02)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)	0.8907	Q1 (Lowest)	4928	3.57 (3.55 - 3.59)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)		Q2	4928	3.57 (3.54 - 3.59)	1.00 (0.99 - 1.01)	
Q3	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)		Q3	4928	3.59 (3.57 - 3.62)	1.01 (1.00 - 1.01)	
Q4	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)		Q4	4928	3.63 (3.61 - 3.66)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	3.60 (3.58 - 3.63)	1.00 (1.00 - 1.01)		Q5 (Highest)	4927	3.65 (3.63 - 3.67)	1.02 (1.02 - 1.03)	
Free sugars					SFA				
Q1 (Lowest)	4928	3.57 (3.55 - 3.59)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.52 (3.50 - 3.54)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.59 (3.57 - 3.61)	1.00 (1.00 - 1.01)		Q2	4928	3.58 (3.56 - 3.60)	1.02 (1.01 - 1.02)	
Q3	4928	3.61 (3.59 - 3.63)	1.01 (1.00 - 1.02)		Q3	4928	3.61 (3.59 - 3.63)	1.02 (1.02 - 1.03)	
Q4	4928	3.61 (3.59 - 3.63)	1.01 (1.01 - 1.02)		Q4	4928	3.62 (3.60 - 3.64)	1.03 (1.02 - 1.04)	
Q5 (Highest)	4927	3.63 (3.61 - 3.65)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	3.69 (3.67 - 3.71)	1.05 (1.04 - 1.05)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	3.65 (3.62 - 3.67)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.54 (3.52 - 3.57)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)		Q2	4928	3.62 (3.60 - 3.64)	1.02 (1.01 - 1.03)	
Q3	4928	3.60 (3.57 - 3.62)	0.99 (0.98 - 0.99)		Q3	4928	3.60 (3.58 - 3.62)	1.01 (1.01 - 1.02)	
Q4	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)		Q4	4928	3.63 (3.61 - 3.65)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	3.57 (3.55 - 3.59)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	3.62 (3.60 - 3.64)	1.02 (1.02 - 1.03)	
Total starch					PUFA				
Q1 (Lowest)	4928	3.64 (3.62 - 3.66)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.61 (3.59 - 3.63)	1.00 (0.99 - 1.01)	0.006
Q2	4928	3.62 (3.60 - 3.64)	1.00 (0.99 - 1.00)		Q2	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.00)	
Q3	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 1.00)		Q3	4928	3.62 (3.60 - 3.65)	1.00 (1.00 - 1.01)	
Q4	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)		Q4	4928	3.60 (3.58 - 3.63)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	3.55 (3.52 - 3.57)	0.97 (0.97 - 0.98)		Q5 (Highest)	4927	3.56 (3.54 - 3.58)	0.99 (0.98 - 0.99)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	3.64 (3.62 - 3.66)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)	0.834
Q2	4928	3.62 (3.60 - 3.64)	0.99 (0.99 - 1.00)		Q2	4928	3.61 (3.59 - 3.63)	1.00 (1.00 - 1.01)	
Q3	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)		Q3	4928	3.59 (3.57 - 3.62)	1.00 (0.99 - 1.00)	
Q4	4928	3.59 (3.57 - 3.61)	0.99 (0.98 - 0.99)		Q4	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	3.56 (3.54 - 3.58)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	3.61 (3.59 - 3.63)	1.00 (1.00 - 1.01)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	3.60 (3.58 - 3.63)	1.00 (0.99 - 1.01)	0.0547	Q1 (Lowest)	4928	3.62 (3.60 - 3.64)	1.00 (0.99 - 1.01)	0.000
Q2	4928	3.62 (3.60 - 3.64)	1.01 (1.00 - 1.01)		Q2	4928	3.61 (3.59 - 3.63)	1.00 (0.99 - 1.00)	
Q3	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.01)		Q3	4928	3.62 (3.60 - 3.64)	1.00 (0.99 - 1.01)	
Q4	4928	3.60 (3.57 - 3.62)	1.00 (0.99 - 1.00)		Q4	4928	3.60 (3.58 - 3.63)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	3.58 (3.56 - 3.61)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	3.56 (3.54 - 3.58)	0.98 (0.98 - 0.99)	
Fiber					Total protein				
Q1 (Lowest)	4928	3.66 (3.63 - 3.68)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.60 (3.57 - 3.62)	1.00 (0.99 - 1.01)	0.814
Q2	4928	3.62 (3.60 - 3.64)	0.99 (0.98 - 1.00)		Q2	4928	3.59 (3.57 - 3.62)	1.00 (0.99 - 1.01)	
Q3	4928	3.60 (3.58 - 3.62)	0.98 (0.98 - 0.99)		Q3	4928	3.61 (3.59 - 3.64)	1.01 (1.00 - 1.01)	
Q4	4928	3.59 (3.57 - 3.61)	0.98 (0.97 - 0.99)		Q4	4928	3.61 (3.59 - 3.63)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	3.54 (3.52 - 3.57)	0.97 (0.96 - 0.97)		Q5 (Highest)	4927	3.59 (3.57 - 3.61)	1.00 (0.99 - 1.00)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	3.54 (3.52 - 3.56)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.65 (3.63 - 3.67)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.58 (3.56 - 3.61)	1.01 (1.01 - 1.02)		Q2	4928	3.63 (3.61 - 3.65)	1.00 (0.99 - 1.00)	
Q3	4928	3.61 (3.59 - 3.63)	1.02 (1.01 - 1.02)		Q3	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)	
Q4	4928	3.63 (3.61 - 3.65)	1.03 (1.02 - 1.03)		Q4	4928	3.60 (3.58 - 3.62)	0.99 (0.98 - 0.99)	
Q5 (Highest)	4927	3.64 (3.62 - 3.67)	1.03 (1.02 - 1.04)		Q5 (Highest)	4927	3.53 (3.51 - 3.55)	0.97 (0.96 - 0.97)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	3.61 (3.59 - 3.63)	1.00 (0.99 - 1.01)	0.0037	Q1 (Lowest)	4928	3.56 (3.54 - 3.58)	1.00 (0.99 - 1.01)	0.000
Q2	4928	3.62 (3.60 - 3.64)	1.00 (1.00 - 1.01)		Q2	4928	3.59 (3.57 - 3.61)	1.01 (1.00 - 1.01)	
Q3	4928	3.61 (3.59 - 3.63)	1.00 (0.99 - 1.00)		Q3	4928	3.62 (3.60 - 3.64)	1.02 (1.01 - 1.02)	
Q4	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.00)		Q4	4928	3.62 (3.60 - 3.64)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	3.57 (3.55 - 3.59)	0.99 (0.98 - 0.99)		Q5 (Highest)	4927	3.61 (3.59 - 3.63)	1.01 (1.01 - 1.02)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	3.54 (3.52 - 3.56)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.61 (3.59 - 3.64)	1.00 (0.99 - 1.01)	0.315
Q2	4928	3.57 (3.55 - 3.59)	1.01 (1.00 - 1.01)		Q2	4928	3.59 (3.57 - 3.62)	0.99 (0.99 - 1.00)	
Q3	4928	3.59 (3.57 - 3.62)	1.02 (1.01 - 1.02)		Q3	4928	3.60 (3.58 - 3.62)	1.00 (0.99 - 1.00)	
Q4	4928	3.64 (3.62 - 3.66)	1.03 (1.02 - 1.03)		Q4	4928	3.61 (3.59 - 3.63)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	3.67 (3.65 - 3.69)	1.04 (1.03 - 1.04)		Q5 (Highest)	4927	3.59 (3.57 - 3.61)	0.99 (0.99 - 1.00)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	3.57 (3.55 - 3.60)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.56 (3.54 - 3.58)	1.00 (0.99 - 1.01)	0.000
Q2	4928	3.57 (3.55 - 3.60)	1.00 (0.99 - 1.01)		Q2	4928	3.60 (3.58 - 3.62)	1.01 (1.01 - 1.02)	
Q3	4928	3.60 (3.58 - 3.63)	1.01 (1.00 - 1.01)		Q3	4928	3.62 (3.60 - 3.64)	1.02 (1.01 - 1.02)	
Q4	4928	3.62 (3.59 - 3.64)	1.01 (1.01 - 1.02)		Q4	4928	3.63 (3.61 - 3.65)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	3.64 (3.62 - 3.66)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	3.60 (3.58 - 3.62)	1.01 (1.01 - 1.02)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	3.54 (3.52 - 3.57)	1.00 (0.99 - 1.01)	<0.000					
Q2	4928	3.60 (3.58 - 3.62)	1.02 (1.01 - 1.02)						
Q3	4928	3.59 (3.57 - 3.61)	1.01 (1.01 - 1.02)						
Q4	4928	3.63 (3.60 - 3.65)	1.02 (1.02 - 1.03)						
Q5 (Highest)	4927	3.65 (3.63 - 3.67)	1.03 (1.02 - 1.04)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; LDL-C = low-density lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n=3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

Supplemental Table IV. Geometric mean concentrations of HDL-C (mmol/L) by percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% in mmol/L (95%	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% in mmol/L (95%	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	1.54 (1.53 - 1.55)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.45 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.49 (1.48 - 1.50)	0.97 (0.96 - 0.97)		Q2	4928	1.47 (1.46 - 1.48)	1.01 (1.01 - 1.02)	
Q3	4928	1.47 (1.47 - 1.48)	0.96 (0.95 - 0.96)		Q3	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q4	4928	1.45 (1.44 - 1.46)	0.94 (0.94 - 0.95)		Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.43 (1.42 - 1.44)	0.93 (0.92 - 0.93)		Q5 (Highest)	4927	1.50 (1.49 - 1.51)	1.03 (1.02 - 1.03)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	1.51 (1.50 - 1.51)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.45 - 1.47)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.49 (1.48 - 1.50)	0.99 (0.99 - 1.00)		Q2	4928	1.46 (1.45 - 1.47)	1.00 (1.00 - 1.01)	
Q3	4928	1.48 (1.47 - 1.48)	0.98 (0.98 - 0.99)		Q3	4928	1.47 (1.46 - 1.48)	1.01 (1.00 - 1.01)	
Q4	4928	1.47 (1.46 - 1.47)	0.97 (0.97 - 0.98)		Q4	4928	1.48 (1.47 - 1.49)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.45 (1.44 - 1.45)	0.96 (0.96 - 0.97)		Q5 (Highest)	4927	1.50 (1.49 - 1.51)	1.03 (1.02 - 1.04)	
Free sugars					SFA				
Q1 (Lowest)	4928	1.51 (1.50 - 1.51)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.45 - 1.47)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.49 (1.48 - 1.50)	0.99 (0.98 - 1.00)		Q2	4928	1.46 (1.45 - 1.47)	1.00 (1.00 - 1.01)	
Q3	4928	1.49 (1.48 - 1.49)	0.99 (0.98 - 0.99)		Q3	4928	1.48 (1.47 - 1.48)	1.01 (1.01 - 1.02)	
Q4	4928	1.46 (1.45 - 1.47)	0.97 (0.97 - 0.98)		Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.44 (1.43 - 1.45)	0.96 (0.95 - 0.96)		Q5 (Highest)	4927	1.51 (1.50 - 1.52)	1.03 (1.03 - 1.04)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.01)	0.3221	Q1 (Lowest)	4928	1.45 (1.44 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.48 (1.47 - 1.48)	0.99 (0.99 - 1.00)		Q2	4928	1.47 (1.46 - 1.48)	1.02 (1.01 - 1.02)	
Q3	4928	1.48 (1.47 - 1.48)	0.99 (0.99 - 1.00)		Q3	4928	1.48 (1.47 - 1.49)	1.02 (1.02 - 1.03)	
Q4	4928	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.00)		Q4	4928	1.49 (1.48 - 1.49)	1.03 (1.02 - 1.03)	
Q5 (Highest)	4927	1.47 (1.47 - 1.48)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	1.50 (1.50 - 1.51)	1.04 (1.03 - 1.04)	
Total starch					PUFA				
Q1 (Lowest)	4928	1.51 (1.50 - 1.52)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.45 (1.45 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.49 (1.48 - 1.50)	0.99 (0.98 - 0.99)		Q2	4928	1.47 (1.46 - 1.48)	1.01 (1.00 - 1.02)	
Q3	4928	1.47 (1.47 - 1.48)	0.98 (0.97 - 0.98)		Q3	4928	1.49 (1.48 - 1.49)	1.02 (1.02 - 1.03)	
Q4	4928	1.46 (1.45 - 1.47)	0.97 (0.96 - 0.97)		Q4	4928	1.49 (1.48 - 1.50)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	1.46 (1.45 - 1.46)	0.96 (0.96 - 0.97)		Q5 (Highest)	4927	1.49 (1.48 - 1.50)	1.02 (1.02 - 1.03)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	1.48 (1.47 - 1.48)	1.00 (0.99 - 1.01)	0.3495	Q1 (Lowest)	4928	1.45 (1.44 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.48 (1.47 - 1.49)	1.00 (1.00 - 1.01)		Q2	4928	1.47 (1.47 - 1.48)	1.02 (1.01 - 1.02)	
Q3	4928	1.48 (1.47 - 1.49)	1.00 (1.00 - 1.01)		Q3	4928	1.47 (1.46 - 1.48)	1.01 (1.01 - 1.02)	
Q4	4928	1.48 (1.47 - 1.48)	1.00 (0.99 - 1.00)		Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.47 (1.47 - 1.48)	1.00 (0.99 - 1.00)		Q5 (Highest)	4927	1.51 (1.50 - 1.52)	1.04 (1.04 - 1.05)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	1.50 (1.49 - 1.50)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.45 - 1.47)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.49 (1.48 - 1.50)	0.99 (0.99 - 1.00)		Q2	4928	1.47 (1.46 - 1.48)	1.01 (1.00 - 1.01)	
Q3	4928	1.47 (1.47 - 1.48)	0.98 (0.98 - 0.99)		Q3	4928	1.49 (1.48 - 1.49)	1.02 (1.01 - 1.02)	
Q4	4928	1.47 (1.46 - 1.47)	0.98 (0.97 - 0.99)		Q4	4928	1.48 (1.48 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.46 (1.46 - 1.47)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.48 (1.48 - 1.49)	1.02 (1.01 - 1.02)	
Fiber					Total protein				
Q1 (Lowest)	4928	1.48 (1.48 - 1.49)	1.00 (0.99 - 1.01)	0.0118	Q1 (Lowest)	4928	1.46 (1.45 - 1.47)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.00)		Q2	4928	1.48 (1.47 - 1.48)	1.01 (1.00 - 1.02)	
Q3	4928	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.00)		Q3	4928	1.48 (1.47 - 1.49)	1.01 (1.01 - 1.02)	
Q4	4928	1.48 (1.47 - 1.49)	0.99 (0.99 - 1.00)		Q4	4928	1.48 (1.47 - 1.49)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.47 (1.46 - 1.47)	0.99 (0.98 - 0.99)		Q5 (Highest)	4927	1.49 (1.48 - 1.50)	1.02 (1.01 - 1.02)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	1.45 (1.44 - 1.46)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.49 (1.49 - 1.50)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.46 (1.45 - 1.47)	1.01 (1.00 - 1.01)		Q2	4928	1.48 (1.48 - 1.49)	0.99 (0.99 - 1.00)	
Q3	4928	1.47 (1.47 - 1.48)	1.02 (1.01 - 1.02)		Q3	4928	1.47 (1.46 - 1.48)	0.98 (0.98 - 0.99)	
Q4	4928	1.49 (1.48 - 1.50)	1.03 (1.02 - 1.03)		Q4	4928	1.48 (1.47 - 1.49)	0.99 (0.98 - 0.99)	
Q5 (Highest)	4927	1.51 (1.51 - 1.52)	1.05 (1.04 - 1.05)		Q5 (Highest)	4927	1.46 (1.45 - 1.47)	0.98 (0.97 - 0.98)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.01)	0.6228	Q1 (Lowest)	4928	1.46 (1.45 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.47 (1.47 - 1.48)	1.00 (0.99 - 1.00)		Q2	4928	1.48 (1.47 - 1.49)	1.01 (1.01 - 1.02)	
Q3	4928	1.47 (1.47 - 1.48)	1.00 (0.99 - 1.00)		Q3	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q4	4928	1.48 (1.47 - 1.49)	1.00 (1.00 - 1.01)		Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.48 (1.47 - 1.49)	1.00 (0.99 - 1.00)		Q5 (Highest)	4927	1.49 (1.49 - 1.50)	1.03 (1.02 - 1.03)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	1.45 (1.44 - 1.46)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.47 (1.46 - 1.48)	1.00 (0.99 - 1.01)	0.078
Q2	4928	1.46 (1.45 - 1.47)	1.01 (1.00 - 1.01)		Q2	4928	1.48 (1.47 - 1.49)	1.00 (1.00 - 1.01)	
Q3	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)		Q3	4928	1.47 (1.46 - 1.48)	1.00 (0.99 - 1.01)	
Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.03)		Q4	4928	1.48 (1.47 - 1.49)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	1.51 (1.51 - 1.52)	1.04 (1.04 - 1.05)		Q5 (Highest)	4927	1.48 (1.47 - 1.49)	1.01 (1.00 - 1.01)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	1.46 (1.45 - 1.47)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.45 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.47 (1.46 - 1.48)	1.01 (1.00 - 1.01)		Q2	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q3	4928	1.47 (1.47 - 1.48)	1.01 (1.00 - 1.02)		Q3	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q4	4928	1.48 (1.47 - 1.49)	1.01 (1.01 - 1.02)		Q4	4928	1.48 (1.47 - 1.49)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.50 (1.49 - 1.51)	1.03 (1.02 - 1.03)		Q5 (Highest)	4927	1.49 (1.48 - 1.50)	1.02 (1.02 - 1.03)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	1.46 (1.45 - 1.46)	1.00 (0.99 - 1.01)	<0.000					
Q2	4928	1.47 (1.47 - 1.48)	1.01 (1.01 - 1.02)						
Q3	4928	1.47 (1.46 - 1.48)	1.01 (1.00 - 1.02)						
Q4	4928	1.49 (1.48 - 1.50)	1.02 (1.02 - 1.03)						
Q5 (Highest)	4927	1.50 (1.49 - 1.50)	1.03 (1.02 - 1.03)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n=3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

Supplemental Table V. Geometric mean concentrations of triglycerides (mmol/L) by percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	1.33 (1.31 - 1.35)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.38 (1.36 - 1.39)	1.04 (1.02 - 1.05)		Q2	4928	1.43 (1.41 - 1.44)	1.00 (0.99 - 1.02)	
Q3	4928	1.41 (1.40 - 1.43)	1.06 (1.05 - 1.08)		Q3	4928	1.42 (1.40 - 1.43)	1.00 (0.99 - 1.01)	
Q4	4928	1.45 (1.43 - 1.47)	1.09 (1.08 - 1.11)		Q4	4928	1.40 (1.38 - 1.42)	0.99 (0.97 - 1.00)	
Q5 (Highest)	4927	1.47 (1.45 - 1.49)	1.11 (1.09 - 1.12)		Q5 (Highest)	4927	1.38 (1.36 - 1.39)	0.97 (0.96 - 0.98)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	1.36 (1.35 - 1.38)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.41 (1.39 - 1.43)	1.00 (0.99 - 1.01)	0.593
Q2	4928	1.40 (1.38 - 1.41)	1.02 (1.01 - 1.04)		Q2	4928	1.43 (1.41 - 1.45)	1.01 (1.00 - 1.02)	
Q3	4928	1.42 (1.40 - 1.43)	1.04 (1.03 - 1.05)		Q3	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.02)	
Q4	4928	1.42 (1.40 - 1.43)	1.04 (1.03 - 1.05)		Q4	4928	1.43 (1.41 - 1.45)	1.01 (1.00 - 1.03)	
Q5 (Highest)	4927	1.45 (1.43 - 1.46)	1.06 (1.05 - 1.07)		Q5 (Highest)	4927	1.40 (1.38 - 1.42)	0.99 (0.98 - 1.01)	
Free sugars					SFA				
Q1 (Lowest)	4928	1.34 (1.32 - 1.36)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.41 (1.39 - 1.43)	1.00 (0.99 - 1.01)	0.003
Q2	4928	1.37 (1.36 - 1.39)	1.02 (1.01 - 1.04)		Q2	4928	1.43 (1.41 - 1.44)	1.01 (1.00 - 1.02)	
Q3	4928	1.39 (1.37 - 1.41)	1.03 (1.02 - 1.05)		Q3	4928	1.41 (1.39 - 1.43)	1.00 (0.99 - 1.01)	
Q4	4928	1.44 (1.42 - 1.46)	1.07 (1.06 - 1.09)		Q4	4928	1.42 (1.40 - 1.44)	1.01 (1.00 - 1.02)	
Q5 (Highest)	4927	1.50 (1.48 - 1.51)	1.11 (1.10 - 1.13)		Q5 (Highest)	4927	1.37 (1.35 - 1.39)	0.97 (0.96 - 0.98)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	1.44 (1.42 - 1.46)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.42 (1.40 - 1.44)	0.99 (0.97 - 1.00)		Q2	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	
Q3	4928	1.40 (1.39 - 1.42)	0.97 (0.96 - 0.99)		Q3	4928	1.41 (1.40 - 1.43)	0.99 (0.98 - 1.00)	
Q4	4928	1.41 (1.39 - 1.42)	0.98 (0.96 - 0.99)		Q4	4928	1.40 (1.38 - 1.41)	0.98 (0.97 - 0.99)	
Q5 (Highest)	4927	1.37 (1.35 - 1.38)	0.95 (0.94 - 0.96)		Q5 (Highest)	4927	1.37 (1.35 - 1.38)	0.96 (0.94 - 0.97)	
Total starch					PUFA				
Q1 (Lowest)	4928	1.36 (1.34 - 1.38)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.46 (1.44 - 1.48)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.39 (1.38 - 1.41)	1.03 (1.01 - 1.04)		Q2	4928	1.41 (1.39 - 1.43)	0.97 (0.95 - 0.98)	
Q3	4928	1.41 (1.39 - 1.43)	1.04 (1.03 - 1.05)		Q3	4928	1.41 (1.39 - 1.43)	0.97 (0.95 - 0.98)	
Q4	4928	1.44 (1.42 - 1.46)	1.06 (1.05 - 1.07)		Q4	4928	1.40 (1.38 - 1.42)	0.96 (0.95 - 0.97)	
Q5 (Highest)	4927	1.43 (1.41 - 1.45)	1.05 (1.04 - 1.07)		Q5 (Highest)	4927	1.36 (1.34 - 1.38)	0.93 (0.92 - 0.95)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)	0.5057	Q1 (Lowest)	4928	1.47 (1.45 - 1.48)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.40 (1.38 - 1.42)	0.99 (0.98 - 1.00)		Q2	4928	1.43 (1.41 - 1.45)	0.98 (0.96 - 0.99)	
Q3	4928	1.40 (1.38 - 1.42)	0.99 (0.97 - 1.00)		Q3	4928	1.43 (1.42 - 1.45)	0.98 (0.97 - 0.99)	
Q4	4928	1.41 (1.39 - 1.43)	0.99 (0.98 - 1.00)		Q4	4928	1.39 (1.37 - 1.40)	0.95 (0.93 - 0.96)	
Q5 (Highest)	4927	1.41 (1.39 - 1.42)	0.99 (0.98 - 1.00)		Q5 (Highest)	4927	1.32 (1.31 - 1.34)	0.90 (0.89 - 0.91)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	1.38 (1.37 - 1.40)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.44 (1.42 - 1.46)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.39 (1.37 - 1.41)	1.01 (0.99 - 1.02)		Q2	4928	1.41 (1.39 - 1.43)	0.98 (0.97 - 0.99)	
Q3	4928	1.41 (1.39 - 1.42)	1.02 (1.00 - 1.03)		Q3	4928	1.40 (1.38 - 1.42)	0.97 (0.96 - 0.99)	
Q4	4928	1.42 (1.40 - 1.44)	1.02 (1.01 - 1.04)		Q4	4928	1.42 (1.40 - 1.43)	0.99 (0.97 - 1.00)	
Q5 (Highest)	4927	1.44 (1.42 - 1.45)	1.04 (1.03 - 1.05)		Q5 (Highest)	4927	1.37 (1.35 - 1.39)	0.95 (0.94 - 0.97)	
Fiber					Total protein				
Q1 (Lowest)	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)	0.0063	Q1 (Lowest)	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)		Q2	4928	1.42 (1.40 - 1.44)	0.99 (0.98 - 1.00)	
Q3	4928	1.41 (1.39 - 1.43)	0.99 (0.98 - 1.01)		Q3	4928	1.41 (1.39 - 1.43)	0.98 (0.97 - 1.00)	
Q4	4928	1.40 (1.38 - 1.41)	0.98 (0.97 - 1.00)		Q4	4928	1.41 (1.39 - 1.43)	0.98 (0.97 - 1.00)	
Q5 (Highest)	4927	1.39 (1.37 - 1.40)	0.98 (0.96 - 0.99)		Q5 (Highest)	4927	1.36 (1.34 - 1.38)	0.95 (0.94 - 0.96)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.39 (1.37 - 1.41)	1.00 (0.99 - 1.01)	0.286
Q2	4928	1.44 (1.42 - 1.46)	1.00 (0.99 - 1.02)		Q2	4928	1.41 (1.39 - 1.43)	1.01 (1.00 - 1.03)	
Q3	4928	1.42 (1.41 - 1.44)	0.99 (0.98 - 1.01)		Q3	4928	1.42 (1.40 - 1.43)	1.02 (1.01 - 1.03)	
Q4	4928	1.39 (1.37 - 1.40)	0.97 (0.96 - 0.98)		Q4	4928	1.41 (1.39 - 1.43)	1.01 (1.00 - 1.03)	
Q5 (Highest)	4927	1.36 (1.34 - 1.37)	0.95 (0.93 - 0.96)		Q5 (Highest)	4927	1.41 (1.39 - 1.43)	1.01 (1.00 - 1.02)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	1.40 (1.39 - 1.42)	1.00 (0.99 - 1.01)	0.1492	Q1 (Lowest)	4928	1.43 (1.42 - 1.45)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.42 (1.40 - 1.44)	1.01 (1.00 - 1.02)		Q2	4928	1.41 (1.39 - 1.43)	0.98 (0.97 - 0.99)	
Q3	4928	1.42 (1.40 - 1.44)	1.01 (1.00 - 1.02)		Q3	4928	1.41 (1.40 - 1.43)	0.99 (0.97 - 1.00)	
Q4	4928	1.41 (1.39 - 1.43)	1.00 (0.99 - 1.02)		Q4	4928	1.41 (1.40 - 1.43)	0.99 (0.97 - 1.00)	
Q5 (Highest)	4927	1.39 (1.37 - 1.40)	0.99 (0.98 - 1.00)		Q5 (Highest)	4927	1.37 (1.35 - 1.38)	0.95 (0.94 - 0.96)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)	0.000
Q2	4928	1.42 (1.40 - 1.44)	1.00 (0.98 - 1.01)		Q2	4928	1.43 (1.41 - 1.45)	1.01 (0.99 - 1.02)	
Q3	4928	1.42 (1.40 - 1.43)	0.99 (0.98 - 1.00)		Q3	4928	1.41 (1.40 - 1.43)	1.00 (0.98 - 1.01)	
Q4	4928	1.41 (1.39 - 1.42)	0.98 (0.97 - 1.00)		Q4	4928	1.39 (1.37 - 1.41)	0.98 (0.97 - 0.99)	
Q5 (Highest)	4927	1.36 (1.35 - 1.38)	0.95 (0.94 - 0.97)		Q5 (Highest)	4927	1.39 (1.37 - 1.40)	0.98 (0.97 - 0.99)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)	0.0001	Q1 (Lowest)	4928	1.43 (1.41 - 1.45)	1.00 (0.99 - 1.01)	0.001
Q2	4928	1.43 (1.41 - 1.44)	1.00 (0.99 - 1.02)		Q2	4928	1.40 (1.38 - 1.42)	0.98 (0.97 - 0.99)	
Q3	4928	1.40 (1.39 - 1.42)	0.99 (0.98 - 1.00)		Q3	4928	1.41 (1.39 - 1.43)	0.99 (0.97 - 1.00)	
Q4	4928	1.42 (1.40 - 1.44)	1.00 (0.99 - 1.01)		Q4	4928	1.41 (1.39 - 1.43)	0.98 (0.97 - 1.00)	
Q5 (Highest)	4927	1.37 (1.35 - 1.39)	0.96 (0.95 - 0.98)		Q5 (Highest)	4927	1.38 (1.36 - 1.40)	0.96 (0.95 - 0.98)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	1.43 (1.41 - 1.44)	1.00 (0.99 - 1.01)	0.0005					
Q2	4928	1.42 (1.40 - 1.43)	0.99 (0.98 - 1.01)						
Q3	4928	1.41 (1.40 - 1.43)	0.99 (0.98 - 1.01)						
Q4	4928	1.39 (1.37 - 1.41)	0.98 (0.96 - 0.99)						
Q5 (Highest)	4927	1.39 (1.37 - 1.41)	0.97 (0.96 - 0.99)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n=3 = omega-3; n=6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

Supplemental Table VI. Geometric mean concentrations of TC-to-HDL-C ratio by percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	3.82 (3.80 - 3.85)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.01)	0.002
Q2	4928	3.89 (3.87 - 3.91)	1.02 (1.01 - 1.02)		Q2	4928	3.95 (3.93 - 3.98)	1.01 (1.00 - 1.01)	
Q3	4928	3.95 (3.92 - 3.97)	1.03 (1.03 - 1.04)		Q3	4928	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.01)	
Q4	4928	3.97 (3.95 - 4.00)	1.04 (1.03 - 1.05)		Q4	4928	3.92 (3.89 - 3.94)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	3.98 (3.95 - 4.01)	1.04 (1.03 - 1.05)		Q5 (Highest)	4927	3.89 (3.86 - 3.91)	0.99 (0.98 - 1.00)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	3.86 (3.84 - 3.89)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.94 (3.92 - 3.97)	1.00 (0.99 - 1.01)	0.372
Q2	4928	3.89 (3.87 - 3.92)	1.01 (1.00 - 1.01)		Q2	4928	3.93 (3.90 - 3.96)	1.00 (0.99 - 1.00)	
Q3	4928	3.93 (3.90 - 3.95)	1.02 (1.01 - 1.02)		Q3	4928	3.94 (3.91 - 3.97)	1.00 (0.99 - 1.01)	
Q4	4928	3.94 (3.92 - 3.96)	1.02 (1.01 - 1.03)		Q4	4928	3.95 (3.92 - 3.98)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	3.99 (3.97 - 4.01)	1.03 (1.03 - 1.04)		Q5 (Highest)	4927	3.91 (3.89 - 3.94)	0.99 (0.99 - 1.00)	
Free sugars					SFA				
Q1 (Lowest)	4928	3.84 (3.81 - 3.86)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	3.90 (3.87 - 3.92)	1.00 (0.99 - 1.01)	0.508
Q2	4928	3.88 (3.86 - 3.90)	1.01 (1.01 - 1.02)		Q2	4928	3.94 (3.91 - 3.96)	1.01 (1.00 - 1.02)	
Q3	4928	3.90 (3.88 - 3.93)	1.02 (1.01 - 1.02)		Q3	4928	3.93 (3.90 - 3.95)	1.01 (1.00 - 1.01)	
Q4	4928	3.96 (3.94 - 3.99)	1.03 (1.03 - 1.04)		Q4	4928	3.93 (3.91 - 3.95)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	4.03 (4.00 - 4.05)	1.05 (1.04 - 1.06)		Q5 (Highest)	4927	3.92 (3.89 - 3.94)	1.00 (1.00 - 1.01)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	3.95 (3.93 - 3.98)	1.00 (0.99 - 1.01)	0.0028	Q1 (Lowest)	4928	3.94 (3.91 - 3.96)	1.00 (0.99 - 1.01)	0.000
Q2	4928	3.93 (3.90 - 3.95)	0.99 (0.99 - 1.00)		Q2	4928	3.95 (3.93 - 3.97)	1.00 (1.00 - 1.01)	
Q3	4928	3.92 (3.90 - 3.94)	0.99 (0.99 - 1.00)		Q3	4928	3.91 (3.89 - 3.94)	0.99 (0.99 - 1.00)	
Q4	4928	3.91 (3.89 - 3.94)	0.99 (0.98 - 1.00)		Q4	4928	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	3.89 (3.87 - 3.92)	0.99 (0.98 - 0.99)		Q5 (Highest)	4927	3.88 (3.86 - 3.91)	0.99 (0.98 - 0.99)	
Total starch					PUFA				
Q1 (Lowest)	4928	3.88 (3.86 - 3.91)	1.00 (0.99 - 1.01)	0.0022	Q1 (Lowest)	4928	3.98 (3.96 - 4.00)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.92 (3.90 - 3.94)	1.01 (1.00 - 1.02)		Q2	4928	3.94 (3.91 - 3.96)	0.99 (0.98 - 1.00)	
Q3	4928	3.93 (3.90 - 3.95)	1.01 (1.01 - 1.02)		Q3	4928	3.92 (3.90 - 3.94)	0.98 (0.98 - 0.99)	
Q4	4928	3.96 (3.93 - 3.98)	1.02 (1.01 - 1.03)		Q4	4928	3.90 (3.88 - 3.93)	0.98 (0.97 - 0.99)	
Q5 (Highest)	4927	3.92 (3.90 - 3.95)	1.01 (1.00 - 1.02)		Q5 (Highest)	4927	3.87 (3.84 - 3.89)	0.97 (0.97 - 0.98)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	3.96 (3.93 - 3.98)	1.00 (0.99 - 1.01)	0.0015	Q1 (Lowest)	4928	3.98 (3.96 - 4.00)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.92 (3.90 - 3.95)	0.99 (0.99 - 1.00)		Q2	4928	3.93 (3.91 - 3.95)	0.99 (0.98 - 0.99)	
Q3	4928	3.91 (3.89 - 3.94)	0.99 (0.98 - 1.00)		Q3	4928	3.93 (3.91 - 3.96)	0.99 (0.98 - 0.99)	
Q4	4928	3.92 (3.89 - 3.94)	0.99 (0.98 - 1.00)		Q4	4928	3.91 (3.89 - 3.94)	0.98 (0.98 - 0.99)	
Q5 (Highest)	4927	3.90 (3.87 - 3.92)	0.99 (0.98 - 0.99)		Q5 (Highest)	4927	3.85 (3.83 - 3.87)	0.97 (0.96 - 0.97)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	3.88 (3.86 - 3.91)	1.00 (0.99 - 1.01)	0.0003	Q1 (Lowest)	4928	3.97 (3.95 - 4.00)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	3.92 (3.89 - 3.94)	1.01 (1.00 - 1.01)		Q2	4928	3.94 (3.91 - 3.96)	0.99 (0.98 - 1.00)	
Q3	4928	3.93 (3.90 - 3.95)	1.01 (1.00 - 1.02)		Q3	4928	3.92 (3.89 - 3.94)	0.99 (0.98 - 0.99)	
Q4	4928	3.94 (3.91 - 3.96)	1.01 (1.01 - 1.02)		Q4	4928	3.91 (3.89 - 3.93)	0.98 (0.98 - 0.99)	
Q5 (Highest)	4927	3.94 (3.92 - 3.97)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	3.87 (3.85 - 3.90)	0.97 (0.97 - 0.98)	
Fiber					Total protein				
Q1 (Lowest)	4928	3.95 (3.93 - 3.98)	1.00 (0.99 - 1.01)	0.0016	Q1 (Lowest)	4928	3.95 (3.92 - 3.97)	1.00 (0.99 - 1.01)	0.006
Q2	4928	3.94 (3.91 - 3.96)	1.00 (0.99 - 1.00)		Q2	4928	3.92 (3.90 - 3.94)	0.99 (0.99 - 1.00)	
Q3	4928	3.92 (3.89 - 3.94)	0.99 (0.98 - 1.00)		Q3	4928	3.93 (3.91 - 3.95)	1.00 (0.99 - 1.00)	
Q4	4928	3.91 (3.89 - 3.93)	0.99 (0.98 - 1.00)		Q4	4928	3.92 (3.90 - 3.94)	0.99 (0.99 - 1.00)	
Q5 (Highest)	4927	3.89 (3.87 - 3.92)	0.98 (0.98 - 0.99)		Q5 (Highest)	4927	3.89 (3.87 - 3.91)	0.99 (0.98 - 0.99)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	3.94 (3.91 - 3.96)	1.00 (0.99 - 1.01)	0.0002	Q1 (Lowest)	4928	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.01)	0.129
Q2	4928	3.94 (3.92 - 3.97)	1.00 (1.00 - 1.01)		Q2	4928	3.93 (3.91 - 3.96)	1.00 (1.00 - 1.01)	
Q3	4928	3.94 (3.91 - 3.96)	1.00 (0.99 - 1.01)		Q3	4928	3.93 (3.91 - 3.96)	1.00 (1.00 - 1.01)	
Q4	4928	3.91 (3.89 - 3.94)	0.99 (0.99 - 1.00)		Q4	4928	3.92 (3.90 - 3.94)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	3.88 (3.85 - 3.90)	0.98 (0.98 - 0.99)		Q5 (Highest)	4927	3.90 (3.88 - 3.92)	0.99 (0.99 - 1.00)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.01)	0.0139	Q1 (Lowest)	4928	3.93 (3.91 - 3.96)	1.00 (0.99 - 1.01)	0.104
Q2	4928	3.94 (3.92 - 3.97)	1.00 (1.00 - 1.01)		Q2	4928	3.91 (3.89 - 3.94)	0.99 (0.99 - 1.00)	
Q3	4928	3.93 (3.91 - 3.96)	1.00 (1.00 - 1.01)		Q3	4928	3.94 (3.91 - 3.96)	1.00 (0.99 - 1.01)	
Q4	4928	3.91 (3.89 - 3.93)	1.00 (0.99 - 1.00)		Q4	4928	3.93 (3.91 - 3.96)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	3.89 (3.87 - 3.92)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	3.89 (3.87 - 3.91)	0.99 (0.98 - 0.99)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.01)	0.2306	Q1 (Lowest)	4928	3.95 (3.92 - 3.97)	1.00 (0.99 - 1.01)	0.009
Q2	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.01)		Q2	4928	3.92 (3.90 - 3.94)	0.99 (0.99 - 1.00)	
Q3	4928	3.91 (3.89 - 3.94)	1.00 (0.99 - 1.00)		Q3	4928	3.93 (3.91 - 3.95)	1.00 (0.99 - 1.00)	
Q4	4928	3.94 (3.92 - 3.97)	1.00 (1.00 - 1.01)		Q4	4928	3.92 (3.89 - 3.94)	0.99 (0.99 - 1.00)	
Q5 (Highest)	4927	3.90 (3.87 - 3.92)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	3.90 (3.87 - 3.92)	0.99 (0.98 - 0.99)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	3.94 (3.92 - 3.97)	1.00 (0.99 - 1.01)	0.0088	Q1 (Lowest)	4928	3.93 (3.91 - 3.95)	1.00 (0.99 - 1.01)	0.494
Q2	4928	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.00)		Q2	4928	3.91 (3.89 - 3.94)	1.00 (0.99 - 1.00)	
Q3	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.00)		Q3	4928	3.93 (3.90 - 3.95)	1.00 (0.99 - 1.01)	
Q4	4928	3.92 (3.90 - 3.95)	0.99 (0.99 - 1.00)		Q4	4928	3.94 (3.91 - 3.96)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	3.89 (3.87 - 3.92)	0.99 (0.98 - 0.99)		Q5 (Highest)	4927	3.90 (3.88 - 3.93)	0.99 (0.99 - 1.00)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	3.92 (3.90 - 3.94)	1.00 (0.99 - 1.01)	0.9417					
Q2	4928	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.01)						
Q3	4928	3.93 (3.90 - 3.95)	1.00 (1.00 - 1.01)						
Q4	4928	3.91 (3.89 - 3.94)	1.00 (0.99 - 1.00)						
Q5 (Highest)	4927	3.92 (3.90 - 3.95)	1.00 (0.99 - 1.01)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n-3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids; TC = total cholesterol.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

609 **Supplemental Table VII.** Geometric mean concentrations of TG-to-HDL-C ratio by
610 percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	0.86 (0.85 - 0.88)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.97 (0.96 - 0.99)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.92 (0.91 - 0.94)	1.07 (1.05 - 1.09)		Q2	4928	0.97 (0.95 - 0.98)	0.99 (0.98 - 1.01)	
Q3	4928	0.96 (0.94 - 0.97)	1.11 (1.10 - 1.13)		Q3	4928	0.96 (0.94 - 0.97)	0.98 (0.97 - 1.00)	
Q4	4928	1.00 (0.99 - 1.02)	1.16 (1.15 - 1.18)		Q4	4928	0.94 (0.93 - 0.96)	0.97 (0.95 - 0.98)	
Q5 (Highest)	4927	1.03 (1.01 - 1.05)	1.19 (1.17 - 1.21)		Q5 (Highest)	4927	0.92 (0.90 - 0.93)	0.94 (0.93 - 0.96)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	0.91 (0.89 - 0.92)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.97 (0.95 - 0.99)	1.00 (0.98 - 1.02)	0.006
Q2	4928	0.94 (0.92 - 0.95)	1.03 (1.02 - 1.05)		Q2	4928	0.98 (0.96 - 0.99)	1.00 (0.99 - 1.02)	
Q3	4928	0.96 (0.94 - 0.97)	1.06 (1.04 - 1.08)		Q3	4928	0.97 (0.95 - 0.98)	1.00 (0.98 - 1.01)	
Q4	4928	0.97 (0.95 - 0.98)	1.07 (1.05 - 1.08)		Q4	4928	0.97 (0.95 - 0.99)	1.00 (0.98 - 1.02)	
Q5 (Highest)	4927	1.00 (0.98 - 1.01)	1.10 (1.09 - 1.12)		Q5 (Highest)	4927	0.94 (0.92 - 0.95)	0.96 (0.95 - 0.98)	
Free sugars					SFA				
Q1 (Lowest)	4928	0.89 (0.88 - 0.90)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.97 (0.95 - 0.98)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.92 (0.91 - 0.94)	1.03 (1.02 - 1.05)		Q2	4928	0.98 (0.96 - 0.99)	1.01 (0.99 - 1.03)	
Q3	4928	0.93 (0.92 - 0.95)	1.05 (1.03 - 1.06)		Q3	4928	0.96 (0.94 - 0.97)	0.99 (0.97 - 1.01)	
Q4	4928	0.99 (0.97 - 1.00)	1.11 (1.09 - 1.12)		Q4	4928	0.96 (0.94 - 0.97)	0.99 (0.98 - 1.01)	
Q5 (Highest)	4927	1.04 (1.02 - 1.05)	1.16 (1.15 - 1.18)		Q5 (Highest)	4927	0.91 (0.89 - 0.92)	0.94 (0.92 - 0.95)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	0.97 (0.96 - 0.99)	1.00 (0.98 - 1.02)	0.0002	Q1 (Lowest)	4928	0.99 (0.97 - 1.00)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.96 (0.95 - 0.98)	0.99 (0.98 - 1.01)		Q2	4928	0.97 (0.96 - 0.99)	0.99 (0.97 - 1.00)	
Q3	4928	0.95 (0.94 - 0.97)	0.98 (0.97 - 1.00)		Q3	4928	0.95 (0.94 - 0.97)	0.97 (0.95 - 0.98)	
Q4	4928	0.95 (0.94 - 0.97)	0.98 (0.97 - 1.00)		Q4	4928	0.94 (0.93 - 0.95)	0.95 (0.94 - 0.97)	
Q5 (Highest)	4927	0.93 (0.91 - 0.94)	0.95 (0.94 - 0.97)		Q5 (Highest)	4927	0.91 (0.89 - 0.92)	0.92 (0.91 - 0.93)	
Total starch					PUFA				
Q1 (Lowest)	4928	0.90 (0.89 - 0.91)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	1.00 (0.99 - 1.02)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.94 (0.92 - 0.95)	1.04 (1.03 - 1.06)		Q2	4928	0.96 (0.94 - 0.97)	0.96 (0.94 - 0.97)	
Q3	4928	0.96 (0.94 - 0.97)	1.06 (1.05 - 1.08)		Q3	4928	0.95 (0.93 - 0.96)	0.95 (0.93 - 0.96)	
Q4	4928	0.99 (0.97 - 1.00)	1.10 (1.08 - 1.11)		Q4	4928	0.94 (0.93 - 0.96)	0.94 (0.93 - 0.96)	
Q5 (Highest)	4927	0.98 (0.97 - 1.00)	1.09 (1.07 - 1.11)		Q5 (Highest)	4927	0.91 (0.90 - 0.93)	0.91 (0.90 - 0.93)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	0.96 (0.95 - 0.98)	1.00 (0.98 - 1.02)	0.8402	Q1 (Lowest)	4928	1.01 (0.99 - 1.03)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.95 (0.93 - 0.96)	0.98 (0.97 - 1.00)		Q2	4928	0.97 (0.95 - 0.98)	0.96 (0.95 - 0.97)	
Q3	4928	0.95 (0.93 - 0.96)	0.98 (0.97 - 1.00)		Q3	4928	0.98 (0.96 - 0.99)	0.97 (0.95 - 0.98)	
Q4	4928	0.95 (0.94 - 0.97)	0.99 (0.98 - 1.01)		Q4	4928	0.94 (0.92 - 0.95)	0.93 (0.91 - 0.94)	
Q5 (Highest)	4927	0.95 (0.94 - 0.97)	0.99 (0.98 - 1.01)		Q5 (Highest)	4927	0.88 (0.86 - 0.89)	0.87 (0.85 - 0.88)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	0.92 (0.91 - 0.94)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.98 (0.97 - 1.00)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.94 (0.92 - 0.95)	1.01 (1.00 - 1.03)		Q2	4928	0.96 (0.94 - 0.97)	0.97 (0.96 - 0.99)	
Q3	4928	0.95 (0.94 - 0.97)	1.03 (1.02 - 1.05)		Q3	4928	0.94 (0.93 - 0.96)	0.96 (0.94 - 0.97)	
Q4	4928	0.97 (0.95 - 0.98)	1.05 (1.03 - 1.06)		Q4	4928	0.95 (0.94 - 0.97)	0.97 (0.95 - 0.98)	
Q5 (Highest)	4927	0.98 (0.97 - 1.00)	1.06 (1.05 - 1.08)		Q5 (Highest)	4927	0.92 (0.91 - 0.94)	0.94 (0.92 - 0.95)	
Fiber					Total protein				
Q1 (Lowest)	4928	0.96 (0.94 - 0.97)	1.00 (0.98 - 1.02)	0.1944	Q1 (Lowest)	4928	0.98 (0.96 - 1.00)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.96 (0.95 - 0.98)	1.01 (0.99 - 1.02)		Q2	4928	0.96 (0.95 - 0.98)	0.98 (0.97 - 1.00)	
Q3	4928	0.95 (0.94 - 0.97)	1.00 (0.98 - 1.01)		Q3	4928	0.95 (0.94 - 0.97)	0.97 (0.96 - 0.99)	
Q4	4928	0.95 (0.93 - 0.96)	0.99 (0.97 - 1.00)		Q4	4928	0.95 (0.94 - 0.97)	0.97 (0.96 - 0.99)	
Q5 (Highest)	4927	0.95 (0.93 - 0.96)	0.99 (0.97 - 1.01)		Q5 (Highest)	4927	0.92 (0.90 - 0.93)	0.93 (0.92 - 0.95)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	0.99 (0.97 - 1.01)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.93 (0.92 - 0.95)	1.00 (0.98 - 1.02)	0.007
Q2	4928	0.98 (0.97 - 1.00)	0.99 (0.98 - 1.01)		Q2	4928	0.95 (0.94 - 0.97)	1.02 (1.01 - 1.04)	
Q3	4928	0.97 (0.95 - 0.98)	0.98 (0.96 - 0.99)		Q3	4928	0.96 (0.95 - 0.98)	1.04 (1.02 - 1.05)	
Q4	4928	0.93 (0.92 - 0.95)	0.94 (0.93 - 0.96)		Q4	4928	0.95 (0.94 - 0.97)	1.02 (1.01 - 1.04)	
Q5 (Highest)	4927	0.90 (0.88 - 0.91)	0.90 (0.89 - 0.92)		Q5 (Highest)	4927	0.96 (0.95 - 0.98)	1.03 (1.02 - 1.05)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	0.95 (0.93 - 0.96)	1.00 (0.98 - 1.02)	0.1815	Q1 (Lowest)	4928	0.98 (0.97 - 1.00)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.96 (0.95 - 0.98)	1.01 (1.00 - 1.03)		Q2	4928	0.95 (0.94 - 0.97)	0.97 (0.95 - 0.98)	
Q3	4928	0.96 (0.95 - 0.98)	1.01 (1.00 - 1.03)		Q3	4928	0.96 (0.94 - 0.97)	0.97 (0.96 - 0.99)	
Q4	4928	0.95 (0.94 - 0.96)	1.00 (0.99 - 1.02)		Q4	4928	0.96 (0.94 - 0.97)	0.97 (0.96 - 0.99)	
Q5 (Highest)	4927	0.94 (0.92 - 0.95)	0.99 (0.97 - 1.00)		Q5 (Highest)	4927	0.91 (0.90 - 0.93)	0.93 (0.91 - 0.94)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	0.98 (0.97 - 1.00)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.96 (0.95 - 0.98)	1.00 (0.98 - 1.02)	0.000
Q2	4928	0.97 (0.96 - 0.99)	0.99 (0.97 - 1.00)		Q2	4928	0.97 (0.95 - 0.98)	1.00 (0.99 - 1.02)	
Q3	4928	0.96 (0.94 - 0.97)	0.97 (0.96 - 0.99)		Q3	4928	0.96 (0.94 - 0.97)	1.00 (0.98 - 1.01)	
Q4	4928	0.95 (0.93 - 0.96)	0.96 (0.95 - 0.98)		Q4	4928	0.94 (0.92 - 0.95)	0.98 (0.96 - 0.99)	
Q5 (Highest)	4927	0.90 (0.89 - 0.91)	0.91 (0.90 - 0.93)		Q5 (Highest)	4927	0.93 (0.92 - 0.95)	0.97 (0.96 - 0.99)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	0.97 (0.96 - 0.99)	1.00 (0.98 - 1.02)	<0.000	Q1 (Lowest)	4928	0.98 (0.97 - 1.00)	1.00 (0.98 - 1.02)	<0.00
Q2	4928	0.97 (0.96 - 0.99)	1.00 (0.98 - 1.01)		Q2	4928	0.95 (0.93 - 0.96)	0.96 (0.95 - 0.98)	
Q3	4928	0.95 (0.94 - 0.97)	0.98 (0.96 - 0.99)		Q3	4928	0.95 (0.94 - 0.97)	0.97 (0.95 - 0.98)	
Q4	4928	0.96 (0.94 - 0.97)	0.98 (0.97 - 1.00)		Q4	4928	0.95 (0.94 - 0.96)	0.97 (0.95 - 0.98)	
Q5 (Highest)	4927	0.91 (0.90 - 0.93)	0.94 (0.92 - 0.95)		Q5 (Highest)	4927	0.93 (0.91 - 0.94)	0.94 (0.93 - 0.96)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	0.98 (0.96 - 0.99)	1.00 (0.98 - 1.02)	<0.000					
Q2	4928	0.96 (0.95 - 0.98)	0.98 (0.97 - 1.00)						
Q3	4928	0.96 (0.95 - 0.98)	0.98 (0.97 - 1.00)						
Q4	4928	0.93 (0.92 - 0.95)	0.96 (0.94 - 0.97)						
Q5 (Highest)	4927	0.93 (0.91 - 0.94)	0.95 (0.93 - 0.96)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; MUFA = monounsaturated fatty acids; n=3 = omega-3; n=6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids; TG = triglyceride.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

612 **Supplemental Table VIII.** Geometric mean concentrations of ApoB (mmol/L) by
613 percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% trend	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% trend	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.02 (1.01 - 1.03)	1.00 (0.99 - 1.01)	0.006
Q2	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q2	4928	1.04 (1.03 - 1.05)	1.02 (1.01 - 1.03)	
Q3	4928	1.04 (1.03 - 1.04)	0.99 (0.99 - 1.00)		Q3	4928	1.03 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Q4	4928	1.03 (1.02 - 1.03)	0.98 (0.98 - 0.99)		Q4	4928	1.03 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.02 (1.01 - 1.03)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.2692	Q1 (Lowest)	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.01)	0.017
Q2	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.00)		Q2	4928	1.02 (1.02 - 1.03)	0.99 (0.99 - 1.00)	
Q3	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.01)		Q3	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.01)	
Q4	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)		Q4	4928	1.04 (1.03 - 1.04)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.00 (1.00 - 1.01)		Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.01 (1.00 - 1.01)	
Free sugars					SFA				
Q1 (Lowest)	4928	1.02 (1.02 - 1.03)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.02 (1.01 - 1.02)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.03 (1.02 - 1.03)	1.00 (1.00 - 1.01)		Q2	4928	1.03 (1.02 - 1.03)	1.01 (1.00 - 1.02)	
Q3	4928	1.03 (1.03 - 1.04)	1.01 (1.00 - 1.01)		Q3	4928	1.03 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Q4	4928	1.03 (1.03 - 1.04)	1.01 (1.00 - 1.02)		Q4	4928	1.03 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.04 (1.04 - 1.05)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	1.04 (1.04 - 1.05)	1.03 (1.02 - 1.03)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	0.0008	Q1 (Lowest)	4928	1.02 (1.01 - 1.03)	1.00 (0.99 - 1.01)	0.000
Q2	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q2	4928	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Q3	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q3	4928	1.03 (1.02 - 1.03)	1.01 (1.00 - 1.02)	
Q4	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q4	4928	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.03 (1.02 - 1.03)	0.98 (0.98 - 0.99)		Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Total starch					PUFA				
Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.322
Q2	4928	1.04 (1.03 - 1.04)	0.99 (0.99 - 1.00)		Q2	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.00)	
Q3	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q3	4928	1.04 (1.03 - 1.04)	1.00 (1.00 - 1.01)	
Q4	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q4	4928	1.03 (1.03 - 1.04)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	1.02 (1.01 - 1.02)	0.97 (0.97 - 0.98)		Q5 (Highest)	4927	1.03 (1.02 - 1.03)	0.99 (0.99 - 1.00)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.01)	0.016
Q2	4928	1.03 (1.03 - 1.04)	0.99 (0.99 - 1.00)		Q2	4928	1.03 (1.02 - 1.04)	1.00 (1.00 - 1.01)	
Q3	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q3	4928	1.03 (1.02 - 1.03)	1.00 (0.99 - 1.00)	
Q4	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)		Q4	4928	1.03 (1.02 - 1.04)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	1.02 (1.02 - 1.03)	0.98 (0.97 - 0.99)		Q5 (Highest)	4927	1.04 (1.03 - 1.05)	1.01 (1.01 - 1.02)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.0714	Q1 (Lowest)	4928	1.04 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.021
Q2	4928	1.04 (1.03 - 1.04)	1.01 (1.00 - 1.01)		Q2	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.00)	
Q3	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.00)		Q3	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	
Q4	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.00)		Q4	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	1.03 (1.02 - 1.03)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	1.02 (1.02 - 1.03)	0.99 (0.98 - 0.99)	
Fiber					Total protein				
Q1 (Lowest)	4928	1.05 (1.04 - 1.05)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.03 (1.02 - 1.03)	1.00 (0.99 - 1.01)	0.124
Q2	4928	1.03 (1.03 - 1.04)	0.99 (0.98 - 0.99)		Q2	4928	1.03 (1.02 - 1.03)	1.00 (0.99 - 1.01)	
Q3	4928	1.03 (1.02 - 1.04)	0.98 (0.98 - 0.99)		Q3	4928	1.03 (1.03 - 1.04)	1.00 (1.00 - 1.01)	
Q4	4928	1.03 (1.02 - 1.03)	0.98 (0.98 - 0.99)		Q4	4928	1.03 (1.03 - 1.04)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	1.02 (1.01 - 1.03)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.03 (1.03 - 1.04)	1.00 (1.00 - 1.01)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	1.02 (1.01 - 1.03)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.03 (1.02 - 1.03)	1.01 (1.00 - 1.01)		Q2	4928	1.04 (1.03 - 1.04)	1.00 (0.99 - 1.00)	
Q3	4928	1.03 (1.03 - 1.04)	1.01 (1.01 - 1.02)		Q3	4928	1.03 (1.03 - 1.04)	0.99 (0.98 - 1.00)	
Q4	4928	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)		Q4	4928	1.03 (1.03 - 1.04)	0.99 (0.98 - 1.00)	
Q5 (Highest)	4927	1.04 (1.03 - 1.05)	1.02 (1.01 - 1.02)		Q5 (Highest)	4927	1.02 (1.01 - 1.02)	0.98 (0.97 - 0.98)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.1019	Q1 (Lowest)	4928	1.02 (1.02 - 1.03)	1.00 (0.99 - 1.01)	0.000
Q2	4928	1.03 (1.03 - 1.04)	1.00 (1.00 - 1.01)		Q2	4928	1.03 (1.02 - 1.03)	1.00 (1.00 - 1.01)	
Q3	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)		Q3	4928	1.04 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Q4	4928	1.03 (1.02 - 1.04)	1.00 (0.99 - 1.00)		Q4	4928	1.04 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.03 (1.02 - 1.03)	0.99 (0.99 - 1.00)		Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.01 (1.01 - 1.02)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	1.02 (1.01 - 1.03)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	1.04 (1.04 - 1.05)	1.00 (0.99 - 1.01)	0.000
Q2	4928	1.03 (1.02 - 1.03)	1.00 (1.00 - 1.01)		Q2	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)	
Q3	4928	1.03 (1.02 - 1.04)	1.01 (1.00 - 1.01)		Q3	4928	1.03 (1.02 - 1.04)	0.99 (0.98 - 0.99)	
Q4	4928	1.04 (1.03 - 1.05)	1.02 (1.01 - 1.02)		Q4	4928	1.03 (1.03 - 1.04)	0.99 (0.98 - 1.00)	
Q5 (Highest)	4927	1.04 (1.04 - 1.05)	1.02 (1.02 - 1.03)		Q5 (Highest)	4927	1.02 (1.02 - 1.03)	0.98 (0.98 - 0.99)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)	0.4918	Q1 (Lowest)	4928	1.02 (1.01 - 1.02)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	1.03 (1.02 - 1.03)	0.99 (0.99 - 1.00)		Q2	4928	1.03 (1.02 - 1.03)	1.01 (1.00 - 1.02)	
Q3	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.00)		Q3	4928	1.03 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Q4	4928	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.01)		Q4	4928	1.04 (1.03 - 1.05)	1.02 (1.02 - 1.03)	
Q5 (Highest)	4927	1.03 (1.03 - 1.04)	1.00 (0.99 - 1.00)		Q5 (Highest)	4927	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	1.02 (1.01 - 1.02)	1.00 (0.99 - 1.01)	<0.000					
Q2	4928	1.03 (1.02 - 1.04)	1.01 (1.01 - 1.02)						
Q3	4928	1.03 (1.02 - 1.03)	1.01 (1.00 - 1.02)						
Q4	4928	1.04 (1.03 - 1.04)	1.02 (1.01 - 1.02)						
Q5 (Highest)	4927	1.04 (1.04 - 1.05)	1.03 (1.02 - 1.03)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n=3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

615 **Supplemental Table IX.** Geometric mean concentrations of ApoA1 (mmol/L) by
616 percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	1.61 (1.61 - 1.62)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.54 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.57 (1.57 - 1.58)	0.98 (0.97 - 0.98)		Q2	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.56)	0.97 (0.96 - 0.97)		Q3	4928	1.56 (1.55 - 1.57)	1.01 (1.01 - 1.01)	
Q4	4928	1.54 (1.53 - 1.54)	0.95 (0.95 - 0.96)		Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.52 (1.51 - 1.53)	0.94 (0.94 - 0.95)		Q5 (Highest)	4927	1.58 (1.57 - 1.58)	1.02 (1.02 - 1.02)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	1.59 (1.58 - 1.59)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.54 (1.53 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.57 (1.57 - 1.58)	0.99 (0.99 - 0.99)		Q2	4928	1.55 (1.54 - 1.56)	1.01 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.57)	0.98 (0.98 - 0.99)		Q3	4928	1.55 (1.55 - 1.56)	1.01 (1.01 - 1.01)	
Q4	4928	1.55 (1.54 - 1.56)	0.98 (0.97 - 0.98)		Q4	4928	1.56 (1.56 - 1.57)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.53 (1.53 - 1.54)	0.97 (0.96 - 0.97)		Q5 (Highest)	4927	1.58 (1.57 - 1.59)	1.03 (1.02 - 1.03)	
Free sugars					SFA				
Q1 (Lowest)	4928	1.58 (1.57 - 1.58)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.54 (1.53 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.57 (1.56 - 1.57)	0.99 (0.99 - 1.00)		Q2	4928	1.55 (1.54 - 1.55)	1.01 (1.00 - 1.01)	
Q3	4928	1.57 (1.56 - 1.57)	0.99 (0.99 - 1.00)		Q3	4928	1.56 (1.55 - 1.56)	1.01 (1.01 - 1.02)	
Q4	4928	1.55 (1.55 - 1.56)	0.99 (0.98 - 0.99)		Q4	4928	1.57 (1.56 - 1.57)	1.02 (1.01 - 1.02)	
Q5 (Highest)	4927	1.54 (1.53 - 1.55)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.59 (1.58 - 1.60)	1.03 (1.03 - 1.04)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	1.58 (1.57 - 1.58)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.53 (1.52 - 1.54)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.56 (1.56 - 1.57)	0.99 (0.99 - 1.00)		Q2	4928	1.55 (1.55 - 1.56)	1.02 (1.01 - 1.02)	
Q3	4928	1.56 (1.55 - 1.56)	0.99 (0.98 - 0.99)		Q3	4928	1.56 (1.56 - 1.57)	1.02 (1.02 - 1.02)	
Q4	4928	1.56 (1.55 - 1.57)	0.99 (0.98 - 0.99)		Q4	4928	1.57 (1.56 - 1.57)	1.03 (1.02 - 1.03)	
Q5 (Highest)	4927	1.54 (1.54 - 1.55)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.59 (1.58 - 1.59)	1.04 (1.03 - 1.04)	
Total starch					PUFA				
Q1 (Lowest)	4928	1.58 (1.58 - 1.59)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.55 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.57 (1.56 - 1.57)	0.99 (0.99 - 0.99)		Q2	4928	1.55 (1.55 - 1.56)	1.00 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.56)	0.98 (0.98 - 0.99)		Q3	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q4	4928	1.55 (1.54 - 1.56)	0.98 (0.98 - 0.98)		Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.54 (1.54 - 1.55)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.57 (1.56 - 1.58)	1.02 (1.01 - 1.02)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	1.57 (1.56 - 1.57)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.55 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.57 (1.56 - 1.57)	1.00 (0.99 - 1.00)		Q2	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.01)	
Q3	4928	1.56 (1.55 - 1.57)	0.99 (0.99 - 1.00)		Q3	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)	
Q4	4928	1.56 (1.55 - 1.56)	0.99 (0.99 - 1.00)		Q4	4928	1.56 (1.55 - 1.57)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	1.55 (1.55 - 1.56)	0.99 (0.99 - 0.99)		Q5 (Highest)	4927	1.58 (1.57 - 1.58)	1.02 (1.01 - 1.02)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	1.57 (1.56 - 1.58)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.55 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.56 (1.56 - 1.57)	1.00 (0.99 - 1.00)		Q2	4928	1.55 (1.55 - 1.56)	1.01 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.57)	0.99 (0.99 - 1.00)		Q3	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q4	4928	1.55 (1.54 - 1.56)	0.99 (0.98 - 0.99)		Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.56 (1.55 - 1.56)	0.99 (0.99 - 0.99)		Q5 (Highest)	4927	1.57 (1.56 - 1.58)	1.01 (1.01 - 1.02)	
Fiber					Total protein				
Q1 (Lowest)	4928	1.58 (1.57 - 1.58)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.55 (1.55 - 1.56)	1.00 (1.00 - 1.00)	0.026
Q2	4928	1.57 (1.56 - 1.57)	0.99 (0.99 - 1.00)		Q2	4928	1.56 (1.56 - 1.57)	1.01 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.57)	0.99 (0.99 - 0.99)		Q3	4928	1.56 (1.55 - 1.57)	1.01 (1.00 - 1.01)	
Q4	4928	1.56 (1.55 - 1.56)	0.99 (0.98 - 0.99)		Q4	4928	1.56 (1.56 - 1.57)	1.01 (1.00 - 1.01)	
Q5 (Highest)	4927	1.54 (1.54 - 1.55)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	1.56 (1.56 - 1.57)	1.01 (1.00 - 1.01)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	1.53 (1.52 - 1.54)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.58 (1.57 - 1.58)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.55 (1.54 - 1.55)	1.01 (1.01 - 1.02)		Q2	4928	1.57 (1.56 - 1.57)	1.00 (0.99 - 1.00)	
Q3	4928	1.56 (1.55 - 1.56)	1.02 (1.02 - 1.02)		Q3	4928	1.56 (1.55 - 1.56)	0.99 (0.98 - 0.99)	
Q4	4928	1.57 (1.56 - 1.58)	1.03 (1.02 - 1.03)		Q4	4928	1.56 (1.55 - 1.56)	0.99 (0.98 - 0.99)	
Q5 (Highest)	4927	1.60 (1.59 - 1.60)	1.04 (1.04 - 1.05)		Q5 (Highest)	4927	1.54 (1.54 - 1.55)	0.98 (0.98 - 0.98)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	1.56 (1.55 - 1.56)	1.00 (1.00 - 1.00)	0.0117	Q1 (Lowest)	4928	1.55 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.55 (1.55 - 1.56)	1.00 (0.99 - 1.00)		Q2	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)	
Q3	4928	1.56 (1.55 - 1.56)	1.00 (1.00 - 1.01)		Q3	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.00 - 1.01)		Q4	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.01)	
Q5 (Highest)	4927	1.56 (1.56 - 1.57)	1.00 (1.00 - 1.01)		Q5 (Highest)	4927	1.57 (1.56 - 1.58)	1.02 (1.01 - 1.02)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	1.54 (1.53 - 1.54)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.56 (1.55 - 1.56)	1.00 (1.00 - 1.00)	0.965
Q2	4928	1.55 (1.54 - 1.55)	1.01 (1.00 - 1.01)		Q2	4928	1.56 (1.56 - 1.57)	1.00 (1.00 - 1.01)	
Q3	4928	1.56 (1.56 - 1.57)	1.02 (1.01 - 1.02)		Q3	4928	1.56 (1.55 - 1.57)	1.00 (1.00 - 1.00)	
Q4	4928	1.56 (1.56 - 1.57)	1.02 (1.01 - 1.02)		Q4	4928	1.56 (1.55 - 1.57)	1.00 (1.00 - 1.00)	
Q5 (Highest)	4927	1.59 (1.58 - 1.60)	1.04 (1.03 - 1.04)		Q5 (Highest)	4927	1.56 (1.55 - 1.57)	1.00 (1.00 - 1.00)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	1.54 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.000	Q1 (Lowest)	4928	1.54 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.00
Q2	4928	1.55 (1.55 - 1.56)	1.01 (1.00 - 1.01)		Q2	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.01)	
Q3	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)		Q3	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)		Q4	4928	1.56 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Q5 (Highest)	4927	1.58 (1.58 - 1.59)	1.02 (1.02 - 1.03)		Q5 (Highest)	4927	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	1.54 (1.54 - 1.55)	1.00 (1.00 - 1.00)	<0.000					
Q2	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)						
Q3	4928	1.56 (1.55 - 1.56)	1.01 (1.00 - 1.01)						
Q4	4928	1.57 (1.56 - 1.57)	1.01 (1.01 - 1.02)						
Q5 (Highest)	4927	1.58 (1.57 - 1.58)	1.02 (1.02 - 1.03)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: Apō = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n=3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

Supplemental Table X. Geometric mean concentrations of ApoB-to-ApoA1 ratio by percentage intake of macronutrients.

Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend	Nutrient	N	Geometric mean in mmol/L (95% CI)	Relative geometric mean	p- trend
Total carbohydrates					Dietary cholesterol (mg)				
Q1 (Lowest)	4928	0.65 (0.64 - 0.65)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.070
Q2	4928	0.65 (0.65 - 0.66)	1.01 (1.00 - 1.02)		Q2	4928	0.67 (0.66 - 0.67)	1.01 (1.00 - 1.02)	
Q3	4928	0.67 (0.66 - 0.67)	1.03 (1.02 - 1.04)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q4	4928	0.67 (0.66 - 0.67)	1.03 (1.02 - 1.04)		Q4	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	0.67 (0.67 - 0.68)	1.04 (1.03 - 1.04)		Q5 (Highest)	4927	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)	
Total sugars					Trans fatty acids				
Q1 (Lowest)	4928	0.65 (0.65 - 0.65)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	0.67 (0.66 - 0.68)	1.00 (0.99 - 1.01)	0.003
Q2	4928	0.66 (0.65 - 0.66)	1.01 (1.00 - 1.01)		Q2	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 0.99)	
Q3	4928	0.66 (0.66 - 0.66)	1.02 (1.01 - 1.02)		Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q4	4928	0.67 (0.66 - 0.67)	1.02 (1.02 - 1.03)		Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q5 (Highest)	4927	0.68 (0.67 - 0.68)	1.04 (1.03 - 1.05)		Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.98 (0.97 - 0.99)	
Free sugars					SFA				
Q1 (Lowest)	4928	0.65 (0.64 - 0.65)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.074
Q2	4928	0.66 (0.65 - 0.66)	1.01 (1.00 - 1.02)		Q2	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Q3	4928	0.66 (0.65 - 0.66)	1.01 (1.01 - 1.02)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q4	4928	0.67 (0.66 - 0.67)	1.02 (1.02 - 1.03)		Q4	4928	0.66 (0.66 - 0.66)	1.00 (0.99 - 1.00)	
Q5 (Highest)	4927	0.68 (0.67 - 0.68)	1.04 (1.03 - 1.05)		Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.99 (0.99 - 1.00)	
Non-free sugars					MUFA				
Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.3136	Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.000
Q2	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)		Q2	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q3	4928	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)	
Q4	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)	
Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.01 (1.00 - 1.01)		Q5 (Highest)	4927	0.65 (0.65 - 0.66)	0.98 (0.97 - 0.99)	
Total starch					PUFA				
Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.9921	Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q2	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)	
Q3	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)		Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q4	4928	0.66 (0.66 - 0.67)	1.01 (1.00 - 1.01)		Q4	4928	0.66 (0.65 - 0.66)	0.99 (0.98 - 0.99)	
Q5 (Highest)	4927	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)		Q5 (Highest)	4927	0.65 (0.65 - 0.66)	0.98 (0.97 - 0.99)	
Starch from wholegrains					n-3 fatty acids				
Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.1157	Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.264
Q2	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)		Q2	4928	0.66 (0.66 - 0.66)	0.99 (0.99 - 1.00)	
Q3	4928	0.66 (0.66 - 0.66)	0.99 (0.99 - 1.00)		Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)	
Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)		Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)	
Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)		Q5 (Highest)	4927	0.66 (0.66 - 0.66)	0.99 (0.99 - 1.00)	
Starch from refined					n-6 fatty acids				
Q1 (Lowest)	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.01)	0.3715	Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	<0.00
Q2	4928	0.66 (0.66 - 0.67)	1.01 (1.00 - 1.02)		Q2	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q3	4928	0.66 (0.66 - 0.67)	1.01 (1.00 - 1.01)		Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q4	4928	0.66 (0.66 - 0.67)	1.01 (1.00 - 1.02)		Q4	4928	0.66 (0.65 - 0.66)	0.98 (0.98 - 0.99)	
Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)		Q5 (Highest)	4927	0.65 (0.65 - 0.66)	0.97 (0.97 - 0.98)	
Fiber					Total protein				
Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.7867	Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.988
Q2	4928	0.66 (0.66 - 0.66)	0.99 (0.99 - 1.00)		Q2	4928	0.66 (0.65 - 0.66)	0.99 (0.99 - 1.00)	
Q3	4928	0.66 (0.66 - 0.66)	0.99 (0.99 - 1.00)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q4	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.00)		Q4	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.00)	
Total fat					Protein from plant				
Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.773
Q2	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.00)		Q2	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.99 - 1.00)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)		Q4	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	
Q5 (Highest)	4927	0.65 (0.65 - 0.66)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)	
Fat from plant sources					Protein from animal sources				
Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.0063	Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.736
Q2	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q2	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.00)	
Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Q4	4928	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)		Q4	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)		Q5 (Highest)	4927	0.66 (0.66 - 0.66)	1.00 (0.99 - 1.01)	
Fat from animal sources					Protein from dairy				
Q1 (Lowest)	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.1113	Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	0.006
Q2	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q2	4928	0.66 (0.65 - 0.66)	0.99 (0.98 - 0.99)	
Q3	4928	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)		Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q4	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)		Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)	
Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.99 (0.98 - 1.00)		Q5 (Highest)	4927	0.66 (0.65 - 0.66)	0.98 (0.98 - 0.99)	
Fat from dairy					Protein from non-dairy animal sources				

Q1 (Lowest)	4928	0.67 (0.66 - 0.67)	1.00 (0.99 - 1.01)	<0.000	Q1 (Lowest)	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.01)	0.129
Q2	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 0.99)		Q2	4928	0.66 (0.65 - 0.66)	1.00 (0.99 - 1.01)	
Q3	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 1.00)		Q3	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Q4	4928	0.66 (0.66 - 0.67)	0.99 (0.98 - 0.99)		Q4	4928	0.67 (0.66 - 0.67)	1.01 (1.00 - 1.02)	
Q5 (Highest)	4927	0.65 (0.65 - 0.66)	0.98 (0.97 - 0.98)		Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)	
Fat from non-dairy animal sources									
Q1 (Lowest)	4928	0.66 (0.66 - 0.66)	1.00 (0.99 - 1.01)	0.5330					
Q2	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)						
Q3	4928	0.66 (0.66 - 0.67)	1.00 (0.99 - 1.01)						
Q4	4928	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)						
Q5 (Highest)	4927	0.66 (0.66 - 0.67)	1.00 (1.00 - 1.01)						

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, <15 cigarettes/day, 15-29 cigarettes/day, ≥30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥40 in kg/m²), height (sex-specific groups in 5cm increments, unknown), diabetes diagnosed by a doctor

Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; MUFA = monounsaturated fatty acids; n=3 = omega-3; n-6 = omega-6; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids.

*For fiber Q1 and Q5 represent quintiles of total fiber intake (g/day).

p-trend was calculated by modelling quintiles of macronutrient intake as continuous variables in the regression model.

621 **Supplemental Table XI.** Percentage change in serum lipids for every 5% of energy intake increase in macronutrients (main model)
622 and percentage change in serum lipids for a 5% of energy intake isoenergetic replacement of saturated fatty acids with other
623 macronutrients (isoenergetic substitution model).

	Total cholesterol (mmol/L)	LDL-C (mmol/L)	HDL-C (mmol/L)	Triglycerides (mmol/L)	TC-to-HDL-C ratio	TG-to-HDL-C ratio	ApoB (mmol/L)	ApoA1 (mmol/L)	ApoB-to-ApoA1 ratio
Main model *									
Change in lipid marker for every 5% increase in:									
Carbohydrate from free sugars									
Absolute Δ in geometric mean (95% CI)	0.01 (0.00, 0.02)	0.02 (0.01, 0.03)	-0.02 (-0.03, -0.02)	0.06 (0.05, 0.07)	0.08 (0.07, 0.09)	0.07 (0.06, 0.08)	0.01 (0.00, 0.01)	-0.01 (-0.02, -0.01)	0.01 (0.01, 0.01)
% Δ in geometric mean Δ (95% CI)	0.17% (-0.05%, 0.40%)	0.59% (0.31%, 0.86%)	-1.70% (-1.96%, -1.44%)	4.04% (3.45%, 4.63%)	1.88% (1.59%, 2.16%)	5.74% (5.01%, 6.48%)	0.64% (0.36%, 0.92%)	-0.91% (-1.10%, -0.72%)	1.55% (1.21%, 1.89%)
Carbohydrate from non-free sugars									
Absolute Δ in geometric mean (95% CI)	-0.04 (-0.05, -0.02)	-0.03 (-0.04, -0.02)	0.00 (0.00, 0.00)	-0.03 (-0.04, -0.02)	-0.02 (-0.04, -0.01)	-0.02 (-0.03, -0.01)	-0.01 (-0.01, 0.00)	-0.01 (-0.01, -0.01)	0.00 (0.00, 0.00)
% Δ in geometric mean Δ (95% CI)	-0.62% (-0.83%, -0.40%)	-0.70% (-0.97%, -0.43%)	0.00% (-0.26%, 0.25%)	-1.68% (-2.25%, -1.11%)	-0.61% (-0.89%, -0.34%)	-1.67% (-2.38%, -0.96%)	-0.57% (-0.83%, -0.30%)	-0.58% (-0.76%, -0.40%)	0.01% (-0.31%, 0.34%)
Carbohydrate from whole grains									
Absolute Δ in geometric mean (95% CI)	-0.04 (-0.06, -0.03)	-0.03 (-0.05, -0.02)	0.00 (-0.01, 0.00)	0.00 (-0.01, 0.01)	-0.03 (-0.04, -0.01)	-0.01 (-0.02, 0.01)	-0.01 (-0.01, 0.00)	-0.01 (-0.01, 0.00)	0.00 (-0.01, 0.00)
% Δ in geometric mean Δ (95% CI)	-0.72% (-0.99%, -0.46%)	-0.89% (-1.22%, -0.56%)	-0.13% (-0.44%, 0.18%)	-0.14% (-0.84%, 0.57%)	-0.59% (-0.93%, -0.25%)	-0.01% (-0.88%, 0.87%)	-0.77% (-1.10%, -0.44%)	-0.44% (-0.66%, -0.21%)	-0.33% (-0.74%, 0.07%)
Carbohydrate from refined grains									
Absolute Δ in geometric mean (95% CI)	-0.02 (-0.03, -0.01)	-0.01 (-0.02, 0.00)	-0.01 (-0.01, -0.01)	0.02 (0.01, 0.03)	0.01 (0.00, 0.03)	0.02 (0.01, 0.03)	0.00 (-0.01, 0.00)	0.00 (-0.01, 0.00)	0.00 (0.00, 0.00)
% Δ in geometric mean (95% CI)	-0.33% (-0.52%, -0.14%)	-0.35% (-0.59%, -0.11%)	-0.66% (-0.88%, -0.43%)	1.14% (0.63%, 1.65%)	0.32% (0.08%, 0.57%)	1.80% (1.16%, 2.43%)	-0.32% (-0.56%, -0.09%)	-0.27% (-0.43%, -0.11%)	-0.06% (-0.35%, 0.24%)
SFA									
Absolute Δ in geometric mean (95% CI)	0.14 (0.12, 0.17)	0.10 (0.08, 0.12)	0.04 (0.04, 0.05)	-0.05 (-0.07, -0.03)	-0.02 (-0.04, 0.00)	-0.07 (-0.09, -0.05)	0.01 (0.01, 0.02)	0.04 (0.04, 0.05)	-0.01 (-0.01, 0.00)
% Δ in geometric mean (95% CI)	2.49% (2.10%, 2.88%)	2.82% (2.34%, 3.31%)	2.87% (2.41%, 3.33%)	-2.47% (-3.51%, -1.44%)	-0.38% (-0.88%, 0.12%)	-5.35% (-6.63%, -4.06%)	1.50% (1.02%, 1.98%)	2.56% (2.23%, 2.89%)	-1.06% (-1.65%, -0.46%)
MUFA									
Absolute Δ in geometric mean (95% CI)	0.11 (0.08, 0.13)	0.06 (0.04, 0.08)	0.05 (0.04, 0.06)	-0.06 (-0.09, -0.04)	-0.06 (-0.09, -0.04)	-0.09 (-0.11, -0.06)	0.01 (0.01, 0.02)	0.05 (0.04, 0.06)	-0.01 (-0.02, -0.01)
% Δ in geometric mean (95% CI)	1.83% (1.37%, 2.30%)	1.54% (0.96%, 2.12%)	3.44% (2.89%, 3.99%)	-4.28% (-5.52%, -3.04%)	-1.61% (-2.21%, -1.00%)	-7.72% (-9.25%, -6.18%)	1.38% (0.80%, 1.96%)	3.14% (2.75%, 3.54%)	-1.76% (-2.47%, -1.05%)
PUFA									
Absolute Δ in geometric mean (95% CI)	-0.04 (-0.08, 0.00)	-0.06 (-0.09, -0.03)	0.05 (0.03, 0.06)	-0.12 (-0.16, -0.09)	-0.16 (-0.20, -0.12)	-0.14 (-0.17, -0.10)	-0.01 (-0.02, 0.00)	0.04 (0.03, 0.05)	-0.02 (-0.03, -0.01)
% Δ in geometric mean (95% CI)	-0.75% (-1.47%, -0.03%)	-1.87% (-2.76%, -0.98%)	3.25% (2.41%, 4.09%)	-7.84% (-9.74%, -5.94%)	-4.00% (-4.92%, -3.08%)	-11.09% (-13.44%, -8.73%)	-0.85% (-1.74%, 0.04%)	2.33% (1.73%, 2.93%)	-3.18% (-4.27%, -2.09%)
Protein									
Absolute Δ in geometric mean (95% CI)	0.02 (0.00, 0.04)	0.00 (-0.02, 0.02)	0.03 (0.02, 0.03)	-0.05 (-0.07, -0.03)	-0.05 (-0.07, -0.03)	-0.05 (-0.07, -0.03)	0.00 (0.00, 0.01)	0.01 (0.01, 0.02)	0.00 (-0.01, 0.00)
% Δ in geometric mean (95% CI)	0.33% (-0.05%, 0.71%)	-0.05% (-0.52%, 0.42%)	1.68% (1.23%, 2.12%)	-3.71% (-4.72%, -2.71%)	-1.35% (-1.83%, -0.86%)	-5.39% (-6.64%, -4.14%)	0.38% (-0.09%, 0.85%)	0.78% (0.46%, 1.10%)	-0.39% (-0.97%, 0.19%)
Isoenergetic substitution model †									
For each substitution of 5% SFA by:									
Carbohydrate from free sugars									
Absolute Δ in geometric mean (95% CI)	-0.06 (-0.11, -0.02)	-0.04 (-0.07, 0.00)	-0.06 (-0.07, -0.04)	0.13 (0.10, 0.17)	0.13 (0.09, 0.17)	0.16 (0.12, 0.19)	0.01 (0.00, 0.02)	-0.04 (-0.05, -0.03)	0.03 (0.02, 0.04)
% Δ in geometric mean Δ (95% CI)	-1.03% (-1.78%, -0.28%)	-0.98% (-1.91%, -0.05%)	-3.84% (-4.71%, -2.96%)	6.64% (4.66%, 8.62%)	2.81% (1.85%, 3.77%)	10.48% (8.03%, 12.93%)	1.25% (0.33%, 2.18%)	-2.60% (-3.23%, -1.97%)	3.85% (2.71%, 4.99%)
Carbohydrate from non-free sugars									

Absolute Δ in geometric mean (95% CI)	-0.08 (-0.12, -0.04)	-0.06 (-0.09, -0.03)	-0.03 (-0.04, -0.02)	0.06 (0.02, 0.09)	0.05 (0.01, 0.08)	0.08 (0.04, 0.11)	0.00 (-0.01, 0.01)	-0.03 (-0.04, -0.02)	0.02 (0.01, 0.02)
% Δ in geometric mean (95% CI)	-1.34% (-2.03%, -0.65%)	-1.58% (-2.44%, -0.72%)	-2.20% (-3.00%, -1.39%)	1.92% (0.09%, 3.74%)	0.86% (-0.02%, 1.75%)	4.11% (1.85%, 6.37%)	0.35% (-0.51%, 1.20%)	-2.00% (-2.58%, -1.42%)	2.35% (1.30%, 3.40%)
Carbohydrate from whole grains									
Absolute Δ in geometric mean (95% CI)	-0.10 (-0.14, -0.06)	-0.08 (-0.11, -0.05)	-0.04 (-0.06, -0.03)	0.10 (0.06, 0.13)	0.05 (0.01, 0.09)	0.11 (0.08, 0.14)	0.00 (-0.01, 0.01)	-0.03 (-0.04, -0.02)	0.01 (0.01, 0.02)
% Δ in geometric mean (95% CI)	-1.75% (-2.45%, -1.05%)	-2.10% (-2.97%, -1.23%)	-2.86% (-3.68%, -2.05%)	4.61% (2.77%, 6.46%)	1.11% (0.21%, 2.01%)	7.48% (5.19%, 9.77%)	-0.20% (-1.06%, 0.67%)	-2.14% (-2.72%, -1.55%)	1.94% (0.88%, 3.01%)
Carbohydrate from refined grains									
Absolute Δ in geometric mean (95% CI)	-0.10 (-0.14, -0.06)	-0.07 (-0.10, -0.04)	-0.05 (-0.06, -0.03)	0.10 (0.07, 0.14)	0.08 (0.04, 0.11)	0.12 (0.09, 0.16)	0.00 (-0.01, 0.01)	-0.03 (-0.04, -0.02)	0.02 (0.01, 0.02)
% Δ in geometric mean (95% CI)	-1.63% (-2.33%, -0.93%)	-1.92% (-2.78%, -1.05%)	-3.20% (-4.01%, -2.38%)	4.78% (2.93%, 6.63%)	1.56% (0.67%, 2.46%)	7.98% (5.69%, 10.26%)	0.07% (-0.80%, 0.93%)	-2.17% (-2.76%, -1.59%)	2.24% (1.18%, 3.31%)
MUFA									
Absolute Δ in geometric mean (95% CI)	0.00 (-0.07, 0.07)	-0.01 (-0.06, 0.04)	-0.03 (-0.05, -0.01)	0.13 (0.07, 0.19)	0.10 (0.04, 0.17)	0.14 (0.08, 0.20)	0.02 (0.01, 0.04)	-0.01 (-0.02, 0.01)	0.02 (0.01, 0.03)
% Δ in geometric mean (95% CI)	0.16% (-1.03%, 1.35%)	-0.09% (-1.57%, 1.38%)	-1.93% (-3.31%, -0.54%)	5.28% (2.14%, 8.43%)	2.09% (0.56%, 3.62%)	7.21% (3.32%, 11.10%)	2.21% (0.73%, 3.68%)	-0.54% (-1.54%, 0.46%)	2.74% (0.93%, 4.56%)
PUFA									
Absolute Δ in geometric mean (95% CI)	-0.19 (-0.24, -0.13)	-0.15 (-0.19, -0.11)	-0.01 (-0.03, 0.00)	-0.06 (-0.10, -0.01)	-0.10 (-0.15, -0.05)	-0.04 (-0.09, 0.01)	-0.02 (-0.03, -0.01)	-0.02 (-0.03, -0.01)	0.00 (-0.01, 0.01)
% Δ in geometric mean (95% CI)	-3.39% (-4.36%, -2.42%)	-4.48% (-5.68%, -3.28%)	-0.80% (-1.93%, 0.32%)	-3.83% (-6.38%, -1.27%)	-2.59% (-3.83%, -1.34%)	-3.02% (-6.19%, 0.15%)	-2.22% (-3.42%, -1.02%)	-1.30% (-2.11%, -0.48%)	-0.92% (-2.40%, 0.55%)
Protein									
Absolute Δ in geometric mean (95% CI)	-0.05 (-0.09, -0.01)	-0.04 (-0.08, -0.01)	-0.03 (-0.04, -0.01)	0.07 (0.04, 0.11)	0.06 (0.02, 0.10)	0.09 (0.05, 0.12)	0.01 (0.00, 0.02)	-0.02 (-0.03, -0.01)	0.02 (0.01, 0.03)
% Δ in geometric mean (95% CI)	-0.87% (-1.61%, -0.13%)	-1.29% (-2.21%, -0.38%)	-1.89% (-2.75%, -1.03%)	2.32% (0.37%, 4.27%)	1.02% (0.08%, 1.97%)	4.21% (1.80%, 6.63%)	1.08% (0.16%, 1.99%)	-1.61% (-2.23%, -0.99%)	2.68% (1.56%, 3.81%)

*Main model included the % of total energy intake for the nutrient of interest (expressed in 5% increments) and daily total energy intake (kJ) and was adjusted for covariates (see below). Concentrations are expressed as geometric means.

† Isoenergetic substitution model included % of total energy intake from carbohydrates, % of total energy intake from MUFA, % of total energy intake from PUFA, % of total energy intake from protein, daily total energy intake (kJ), and was adjusted for covariates (see below).

Models adjusted for age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, ≥ 65), sex, ethnicity (white, mixed race, Asian or Asian British, black or black British, other, unknown), region (London, North-West England, North-Eastern England, Yorkshire & the Humber, West Midlands, East Midlands, South-West England, Wales), Townsend deprivation index (quintiles from least to most affluent, unknown), smoking status (never, previous, ≤ 15 cigarettes/day, 15-29 cigarettes/day, ≥ 30 cigarettes/day, unknown), physical activity (low, medium or high according to MET hours per week, unknown), alcohol (<1, 1-9, 10-19, 20-29, ≥ 30 g/day, unknown), body mass index (<20, 20-22.4, 22.5-24.9, 25-27.4, 27.5-29.9, 30-32.4, 32.5-34.9, 35-37.4, 37.5-39.9 or ≥ 40 in kg/m²), height (sex-specific groups in 5cm increments, unknown) and diabetes diagnosed by a doctor (yes, no, unknown).

Abbreviations: Apo = apolipoprotein; CI = confidence interval; g/day = grams per day; HDL-C = high-density lipoprotein cholesterol; kJ = kilojoules; LDL-C = low-density lipoprotein cholesterol; MUFA = monounsaturated fatty acids; PUFA = polyunsaturated fatty acids; Q = quintile; SFA = saturated fatty acids; TC = total cholesterol; TEI = total energy intake; TG = triglycerides.

625 **Supplemental Table XII.** Sample aliquot number for lipid marker measurements at
626 baseline in 24,639 UK Biobank participants.

Lipid Marker	Manual	Aliquot 1	Aliquot 2	Missing
Total cholesterol	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)
LDL-C	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)
HDL-C	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)
Triglycerides	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)
ApoB	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)
ApoA1	543 (2.20%)	23,183 (94.10%)	881 (3.58%)	32 (0.13%)

Abbreviations: Apo = apolipoprotein; HDL-C = high-density lipoprotein cholesterol; LDL-C = low-density lipoprotein cholesterol.

627

Supplemental Table XIII. List of lipid-modifying drug names and codes obtained from baseline touchscreen questionnaire used to exclude participants taking lipid modifying medication (n=84,008).

Coding	Description
1140861848	colestid 5g/sachet granules
1140861856	gemfibrozil
1140861858	lopid 300 capsule
1140861866	nicofuranose
1140861868	nicotinic acid product
1140861876	probucol
1140861878	lurselle 250mg tablet
1140861922	lipid lowering drug
1140861924	bezafibrate
1140861926	bezalip 200mg tablet
1140861928	bezalip-mono 400mg m/r tablet
1140861936	questran 4g/sachet powder
1140861942	cholestyramine+aspartame 4g/sachet powder
1140861944	clofibrate
1140861946	atromid-s 500mg capsule
1140861954	fenofibrate
1140861958	simvastatin
1140862026	ciprofibrate
1140862028	modalim 100mg tablet
1140864592	lescol 20mg capsule
1140865576	cholestyramine
1140881748	zocor 10mg tablet
1140888590	colestipol
1140888594	fluvastatin
1140888648	pravastatin
1140910632	eptastatin
1140910654	velastatin
1140910670	niacin
1141146138	lipitor 10mg tablet
1141146234	atorvastatin
1141157260	bezafibrate product
1141157262	gemfibrozil product
1141157416	cholestyramine product
1141188546	niaspan 500mg m/r tablet
1141192410	rosuvastatin
1141192414	crestor 10mg tablet
1141192736	ezetimibe
1141200040	zocor heart-pro 10mg tablet

MAJOR RESOURCES TABLE

In order to allow validation and replication of experiments, all essential research materials listed in the Methods should be included in the Major Resources Table below. Authors are encouraged to use public repositories for protocols, data, code, and other materials and provide persistent identifiers and/or links to repositories when available. Authors may add or delete rows as needed.

Data & Code Availability

Description	Source / Repository	Persistent ID / URL
Bona fide researchers can apply to use the UK Biobank dataset by registering and applying at	UK Biobank	http://ukbiobank.ac.uk/register-apply/ .

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