Erasmus MC
Universitair Medisch Centrum Rotterdam

Department of Gastroenterology and Hepatology

Supplementary Document
Association of dietary macronutrient composition & NAFLD in an ageing population: the Rotterdam Study

Supplementary Methods: details on the multiple imputation process

	Multiple imputation
Software used	R version 3.4.1
Imputation method and key settings	Fully conditional specification (package mice version 2.25); maximum iterations: 50
No. of imputed data sets created	10
Analyses variables	total cholesterol; triglycerides; high density lipoprotein cholesterol; body mass index; glucose; weight; physical activity; smoking status; systolic blood pressure; diastolic blood pressure; ethnicity; education level; alcohol consumption; fat intake; waist circumference; kilocalorie intake; Dutch healthy diet index; age; anti-diabetic drugs; lipid-lowering drugs; antihypertensive drugs; fibre intake; study cohort, gender, steatosis, protein intake, carbohydrate intake;
Auxiliary variables	aspartate transaminase; alanine transaminase; homeostasis model assessment of insulin resistance; hip circumference; heart rate; spleen size; calcium intake; creatinine; glomerular filtration rate; vitamin E intake; potassium intake; magnesium intake; phosphorus intake; gamma-glutamyl transferase
Treatment of not normally distributed continuous variables	Predictive mean matching
Treatment of normally distributed variables	Linear regression
Treatment of binary/categorical variables	(Proportional odds) logistic regression
Population	For the imputation we used reliable and completed FFQs. In addition participants had to have less than 30% missing on study variables. Imputed population (n=4.754).

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Supplementary Table 1: Imputation Characteristics

	Original Data n=3882	Imputed data*
Demographics		
Age (years)	69.7 ± 8.8	no missing data
Female (%)	58.3	no missing data
Caucasian (%)	97.7	97.6
Education Level (%)		
Low	48.4	48.4
Intermediate	30.3	30.2
High	21.3	21.3
Smoking status (%)		
Never / Past or Current	36.7 / 63.3	36.1 / 63.9
Alcohol (units/d)	0.45 (0.05 − 1.20)	no missing data
Physical Activity[†]	41.3 (15.8 − 78.6)	40.6 (15.7 − 77.6)
Caloric Intake (kcal/day)	2031 (1620 − 2515)	no missing data
Physical examination		
BMI (kg/m^2)	26.9 (24.5 − 29.7)	26.9 (24.5 − 29.7)
Lean	30.2	30.2
Overweight	46.7	46.7
Obese	23.0	23.0
WC (cm)		
Men	98.2 ± 10.6	98.2 ± 10.6
Women	89.1 ± 12.2	no missing data
Biochemistry		
AST (U/L)	24 (21 − 28)	24 (21 − 28)
ALT (U/L)	18 (15 − 24)	18 (15 − 24)
GGT (U/L)	23 (17 − 34)	23 (17 − 34)
Platelets (*10^9/L)	262 (223 − 305)	262 (223 − 305)
HOMA-IR	2.6 (1.7 − 4.1)	2.6 (1.7 − 4.1)
Total Cholesterol (mmol/L)	5.4 ± 1.1	5.4 ± 1.1
HDL-C (mmol/L)	1.5 ± 0.4	1.5 ± 0.4
Triglycerides (mmol/L)	1.3 (1.0 − 1.7)	1.3 (1.0 − 1.7)
Comorbidities		
Metabolic Syndrome (%)	51.9	51.9
- WC>88cm (♀) or >120cm(♂)	43.2	43.2
- Triglycerides >150mg/dL	46.2	46.0
- HDL-C <40mg/dL(♂) or 50mg/dL(♀)	44.8	44.7
- Blood pressure ≥130/85mmHg	84.3	84.3
- FPG>100mg/dL	41.5	41.5
Diabetes Mellitus (%)	13.2	13.1
Hypertension (%)	74.0	74.0
NAFLD (%)	34.4	no missing data

*Pooled data based on 10 imputations represent % for categorical variables and for continuous variables mean ± SD or median (P25-P75).[†]Physical activity in metabolic equivalent task hours/week.

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Supplementary Table 2: Absolute macronutrient consumption in grams and energy percent per quartile

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Total Protein				
in grams per Q	74.0 ± 24.6	81.5 ± 25.0	85.0 ± 26.2	86.3 ± 31.0
in energy % per Q	12.4 ± 1.5	14.8 ± 0.47	16.4 ± 0.49	19.5 ± 2.2
Animal protein				
in grams per Q	35.2 ± 14.3	46.3 ± 14.5	51.4 ± 15.7	61.1 ± 23.6
in energy % per Q	5.9 ± 1.3	8.3 ± 0.48	10.1 ± 0.58	13.6 ± 2.6
Vegetable protein				
in grams per Q	26.0 ± 9.9	31.2 ± 10.2	34.3 ± 10.7	41.7 ± 15.8
in energy % per Q	4.7 ± 0.68	5.9 ± 0.23	6.7 ± 0.24	8.1 ± 0.93
Total Fat				
in grams per Q	54.2 ± 20.1	67.8 ± 21.8	80.4 ± 25.6	108.1 ± 57.8
in energy % per Q	24.4 ± 3.0	30.0 ± 1.2	33.9 ± 1.2	41.3 ± 6.7
Saturated fat				
in grams per Q	19.0 ± 6.9	24.5 ± 8.2	29.0 ± 9.6	38.9 ± 19.4
in energy % per Q	8.3 ± 1.1	10.6 ± 0.48	12.3 ± 0.55	15.6 ± 2.6
MUFA fat				
in grams per Q	17.3 ± 6.7	22.5 ± 7.6	27.0 ± 8.0	39.9 ± 24.8
in energy % per Q	7.8 ± 1.1	10.0 ± 0.43	11.5 ± 0.48	14.9 ± 3.5
PUFA fat				
in grams per Q	10.0 ± 4.0	13.5 ± 4.6	16.6 ± 5.3	24.2 ± 14.2
in energy % per Q	4.5 ± 0.65	5.9 ± 0.31	7.0 ± 0.33	9.3 ± 2.3
Trans fatty acid				
in grams per Q	0.74 ± 0.31	1.07 ± 0.36	1.32 ± 0.44	1.92 ± 0.92
in energy % per Q	0.33 ± 0.07	0.46 ± 0.03	0.56 ± 0.03	0.76 ± 0.15
Total Carbohydrate				
in grams per Q	194.3 ± 75.9	233.1 ± 75.9	255.1 ± 79.0	289.8 ± 103.4
in energy % per Q	36.9 ± 5.2	44.1 ± 1.2	48.4 ± 1.3	54.9 ± 3.5
Mono- & disaccharides				
in grams per Q	75.1 ± 34.7	107.9 ± 37.0	134.0 ± 42.6	174.3 ± 64.0
in energy % per Q	14.3 ± 3.2	20.6 ± 1.3	25.1 ± 1.4	32.7 ± 4.4
Polysaccharides				
in grams per Q	91.3 ± 36.4	115.0 ± 37.9	126.6 ± 40.6	148.2 ± 53.6
in energy % per Q	16.8 ± 2.8	21.3 ± 0.85	24.2 ± 0.93	29.4 ± 3.3
Fibre				
in grams per Q	19.5 ± 7.5	25.4 ± 8.7	29.5 ± 9.5	36.0 ± 13.1
in energy % per Q	1.8 ± 0.30	2.4 ± 0.13	2.8 ± 0.14	3.6 ± 0.48

Mean energy intake in grams or energy% (±SD) per quartile.

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Supplementary Table 3: Stratified stepwise logistic regression models with macronutrient as independent variables and NAFLD as dependent variable using quartile 1 as reference

	Q2	Q3	Q4	*P* for trend	Continuous (per SD increase)
Lean (BMI < 25 kg/m^2) n=1174					
Model 1 (Sociodemographic)					
Total protein	1.10 (0.69 – 1.77)	0.91 (0.54 – 1.53)	1.08 (0.64 – 1.84)	0.965	0.99 (0.82 – 1.20)
Animal protein	**1.75 (1.09 – 2.81)[‡]**	0.94 (0.52 – 1.70)	1.33 (0.76 – 2.35)	0.718	1.00 (0.82 – 1.22)
Vegetable protein	1.00 (0.60 – 1.68)	0.85 (0.50 – 1.45)	0.78 (0.45 – 1.36)	0.304	0.92 (0.75 – 1.12)
Total carbohydrate	1.05 (0.64 – 1.74)	0.72 (0.42 – 1.23)	0.66 (0.38 – 1.16)	0.075	0.84 (0.69 – 1.02)
Mono-disaccharide	0.73 (0.44 – 1.21)	0.64 (0.38 – 1.09)	**0.55 (0.31 – 0.98)**	**0.038**	0.82 (0.66 – 1.01)
Polysaccharide	1.13 (0.66 – 1.93)	1.19 (0.69 – 2.04)	0.70 (0.37 – 1.32)	0.354	0.95 (0.76 – 1.17)
Fibre	0.69 (0.41 – 1.17)	0.65 (0.38 – 1.09)	0.68 (0.38 – 1.22)	0.173	0.94 (0.75 – 1.17)
Total fat	0.97 (0.55 – 1.71)	1.42 (0.83 – 2.43)	**1.70 (1.01 – 2.87)**	**0.017[‡]**	1.16 (0.98 – 1.37)
Saturated fat	1.03 (0.57 – 1.84)	1.22 (0.66 – 2.27)	1.83 (0.89 – 3.77)	0.089	1.16 (0.84 – 1.60)
MUFA	1.29 (0.72 – 2.29)	1.29 (0.68 – 2.43)	1.62 (0.77 – 3.39)	0.246	1.08 (0.82 – 1.41)
PUFA	0.92 (0.54 – 1.57)	0.79 (0.45 – 1.38)	0.85 (0.46 – 1.55)	0.503	0.90 (0.71 – 1.16)
Trans fatty acid	0.77 (0.44 – 1.35)	0.76 (0.42 – 1.37)	1.17 (0.60 – 2.28)	0.716	1.02 (0.75 – 1.39)
Model 2 (Lifestyle Confounding)					
Total protein	1.08 (0.67 – 1.73)	0.89 (0.52 – 1.50)	1.02 (0.58 – 1.79)	0.869	0.98 (0.81 – 1.20)
Animal protein	**1.69 (1.05 – 2.72)**	0.93 (0.51 – 1.69)	1.25 (0.69 – 2.28)	0.862	0.98 (0.79 – 1.21)
Vegetable protein	1.13 (0.66 – 1.91)	1.03 (0.59 – 1.80)	0.98 (0.55 – 1.77)	0.866	1.00 (0.81 – 1.23)
Total carbohydrate	1.19 (0.71 – 2.00)	0.88 (0.49 – 1.55)	0.89 (0.48 – 1.65)	0.503	0.93 (0.74 – 1.15)
Mono-disaccharide	0.83 (0.49 – 1.40)	0.76 (0.43 – 1.32)	0.72 (0.38 – 1.36)	0.297	0.91 (0.71 – 1.15)
Polysaccharide	1.16 (0.68 – 1.98)	1.26 (0.73 – 2.18)	0.78 (0.40 – 1.49)	0.591	0.99 (0.79 – 1.23)
Fibre	0.73 (0.43 – 1.25)	0.70 (0.39 – 1.25)	0.80 (0.41 – 1.57)	0.493	1.04 (0.80 – 1.35)
Total fat	1.01 (0.57 – 1.78)	1.46 (0.84 – 2.54)	1.75 (0.99 – 3.08)	**0.024**	1.15 (0.95 – 1.38)
Saturated fat	1.01 (0.56 – 1.83)	1.21 (0.64 – 2.28)	1.92 (0.91 – 4.06)	0.080	1.18 (0.84 – 1.65)
MUFA	1.23 (0.69 – 2.20)	1.25 (0.66 – 2.36)	1.50 (0.71 – 3.18)	0.334	1.03 (0.78 – 1.36)
PUFA	0.95 (0.56 – 1.64)	0.85 (0.48 – 1.49)	0.96 (0.51 – 1.79)	0.803	0.95 (0.74 – 1.22)
Trans fatty acid	0.75 (0.42 – 1.32)	0.73 (0.40 – 1.33)	1.13 (0.58 – 2.22)	0.782	1.02 (0.75 – 1.39)
Model 3 (Metabolic)					
Total protein	1.08 (0.66 – 1.75)	0.87 (0.51 – 1.49)	0.97 (0.55 – 1.72)	0.734	0.99 (0.81 – 1.20)
Animal protein	1.57 (0.97 – 2.55)	0.90 (0.49 – 1.65)	1.20 (0.66 – 2.20)	0.960	0.98 (0.79 – 1.22)
Vegetable protein	1.22 (0.71 – 2.09)	1.10 (0.62 – 1.94)	1.07 (0.59 – 1.94)	0.940	1.04 (0.84 – 1.28)
Total carbohydrate	1.21 (0.71 – 2.07)	0.96 (0.54 – 1.73)	0.96 (0.51 – 1.80)	0.721	0.95 (0.77 – 1.19)
Mono-disaccharide	0.85 (0.50 – 1.45)	0.81 (0.46 – 1.44)	0.77 (0.41 – 1.48)	0.436	0.94 (0.74 – 1.20)
Polysaccharide	1.06 (0.61 – 1.83)	1.25 (0.72 – 2.18)	0.74 (0.38 – 1.43)	0.560	0.99 (0.79 – 1.24)
Fibre	0.79 (0.45 – 1.36)	0.81 (0.45 – 1.45)	0.89 (0.44 – 1.77)	0.743	1.08 (0.83 – 1.40)
Total fat	1.01 (0.56 – 1.80)	1.41 (0.80 – 2.48)	1.69 (0.95 – 3.02)	**0.038**	1.12 (0.92 – 1.35)
Saturated fat	0.95 (0.52 – 1.72)	1.28 (0.67 – 2.44)	**2.21 (1.03 – 4.72)**	**0.030**	1.26 (0.89 – 1.78)
MUFA	1.20 (0.66 – 2.17)	1.24 (0.65 – 2.38)	1.49 (0.69 – 3.22)	0.342	0.98 (0.73 – 1.30)
PUFA	1.04 (0.60 – 1.80)	0.88 (0.49 – 1.56)	0.98 (0.52 – 1.84)	0.804	0.96 (0.74 – 1.24)
Trans fatty acid	0.74 (0.41 – 1.31)	0.71 (0.39 – 1.31)	1.10 (0.55 – 2.18)	0.862	0.96 (0.70 – 1.32)

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Supplementary Table 3: *continued*

	Q2	Q3	Q4	*P* for trend	Continuous (per SD increase)
Overweight (BMI ≥ 25 kg/m^2) n=2708					
Model 1 (Sociodemographic)					
Total protein	1.17 (0.93 – 1.47)	**1.36 (1.09 – 1.69)[‡]**	**1.49 (1.19 – 1.85)[‡]**	**<0.001[‡]**	**1.16 (1.08 – 1.26)[‡]**
Animal protein	**1.30 (1.03 – 1.64)**	1.16 (0.93 – 1.45)	**1.62 (1.28 – 2.05)[‡]**	**<0.001[‡]**	**1.18 (1.08 – 1.28)[‡]**
Vegetable protein	1.08 (0.87 – 1.34)	0.98 (0.78 – 1.22)	1.25 (0.99 – 1.58)	0.144	1.08 (0.99 – 1.17)
Total carbohydrate	0.93 (0.75 – 1.15)	**0.78 (0.63 – 0.98)**	0.86 (0.68 – 1.09)	0.095	**0.91 (0.84 – 0.99)**
Mono-disaccharide	**0.73 (0.59 – 0.90)[‡]**	**0.71 (0.57 – 0.89)[‡]**	**0.67 (0.52 – 0.85)[‡]**	**0.001[‡]**	**0.89 (0.81 – 0.97)[‡]**
Polysaccharide	1.01 (0.81 – 1.25)	0.97 (0.78 – 1.22)	0.90 (0.71 – 1.15)	0.386	1.00 (0.91 – 1.09)
Fibre	0.85 (0.68 – 1.06)	1.00 (0.80 – 1.26)	0.93 (0.73 – 1.18)	0.910	1.01 (0.92 – 1.10)
Total fat	0.98 (0.79 – 1.22)	1.09 (0.88 – 1.36)	1.10 (0.89 – 1.37)	0.249	1.03 (0.96 – 1.12)
Saturated fat	0.96 (0.76 – 1.21)	0.95 (0.73 – 1.24)	0.86 (0.62 – 1.19)	0.406	0.91 (0.78 – 1.06)
MUFA	1.02 (0.81 – 1.30)	0.96 (0.74 – 1.24)	1.10 (0.80 – 1.50)	0.727	1.09 (0.96 – 1.25)
PUFA	1.02 (0.82 – 1.27)	0.97 (0.77 – 1.22)	0.89 (0.68 – 1.15)	0.351	0.94 (0.84 – 1.04)
Trans fatty acid	0.93 (0.74 – 1.17)	1.16 (0.90 – 1.48)	1.21 (0.89 – 1.65)	0.101	1.12 (0.98 – 1.27)
Model 2 (Lifestyle Confounding)					
Total protein	1.16 (0.92 – 1.46)	**1.32 (1.05 – 1.66)[‡]**	**1.40 (1.11 – 1.77)[‡]**	**0.003[‡]**	**1.14 (1.05 – 1.24)[‡]**
Animal protein	**1.29 (1.02 – 1.63)**	1.13 (0.90 – 1.43)	**1.54 (1.20 – 1.98)[‡]**	**0.004[‡]**	**1.14 (1.05 – 1.24)[‡]**
Vegetable protein	1.11 (0.89 – 1.38)	1.01 (0.81 – 1.28)	**1.29 (1.01 – 1.66)**	0.094	**1.10 (1.00 – 1.20)**
Total carbohydrate	0.95 (0.76 – 1.18)	0.84 (0.67 – 1.07)	0.93 (0.72 – 1.21)	0.435	0.94 (0.86 – 1.03)
Mono-disaccharide	**0.76 (0.61 – 0.95)**	**0.76 (0.60 – 0.96)**	**0.72 (0.55 – 0.94)[‡]**	0.022	0.93 (0.84 – 1.02)
Polysaccharide	1.00 (0.80 – 1.25)	0.95 (0.76 – 1.20)	0.86 (0.67 – 1.11)	0.233	0.98 (0.89 – 1.07)
Fibre	0.91 (0.72 – 1.15)	1.10 (0.85 – 1.42)	1.07 (0.81 – 1.41)	0.377	1.06 (0.96 – 1.18)
Total fat	0.96 (0.77 – 1.20)	1.04 (0.83 – 1.30)	0.99 (0.78 – 1.25)	0.896	1.00 (0.92 – 1.09)
Saturated fat	0.93 (0.73 – 1.17)	0.87 (0.67 – 1.14)	0.74 (0.53 – 1.04)	0.094	**0.84 (0.72 – 0.99)**
MUFA	1.04 (0.82 – 1.32)	0.96 (0.74 – 1.24)	1.09 (0.80 – 1.50)	0.775	1.12 (0.98 – 1.28)
PUFA	1.02 (0.82 – 1.27)	0.97 (0.77 – 1.22)	0.86 (0.66 – 1.12)	0.262	0.93 (0.83 – 1.04)
Trans fatty acid	0.92 (0.73 – 1.16)	1.15 (0.89 – 1.48)	1.17 (0.85 – 1.59)	0.161	1.12 (0.98 – 1.27)
Model 3 (Metabolic)					
Total protein	1.14 (0.90 – 1.45)	1.25 (0.99 – 1.59)	1.22 (0.95 – 1.55)	0.091	1.09 (1.00 – 1.18)
Animal protein	**1.31 (1.03 – 1.67)**	1.08 (0.84 – 1.67)	**1.36 (1.05 – 1.77)[‡]**	0.092	1.09 (1.00 – 1.20)
Vegetable protein	1.11 (0.88 – 1.40)	0.99 (0.78 – 1.26)	1.23 (0.95 – 1.59)	0.252	1.07 (0.97 – 1.18)
Total carbohydrate	1.05 (0.84 – 1.32)	0.93 (0.73 – 1.19)	1.06 (0.81 – 1.39)	0.906	0.97 (0.88 – 1.07)
Mono-disaccharide	0.80 (0.63 – 1.01)	0.85 (0.66 – 1.09)	0.83 (0.63 – 1.10)	0.283	0.98 (0.88 – 1.09)
Polysaccharide	0.93 (0.74 – 1.17)	0.96 (0.75 – 1.22)	0.83 (0.64 – 1.09)	0.246	0.97 (0.88 – 1.07)
Fibre	0.96 (0.76 – 1.23)	1.17 (0.90 – 1.52)	1.16 (0.86 – 1.55)	0.181	1.08 (0.97 – 1.20)
Total fat	1.01 (0.80 – 1.27)	1.10 (0.87 – 1.39)	0.98 (0.77 – 1.25)	0.915	0.99 (0.91 – 1.09)
Saturated fat	1.00 (0.78 – 1.28)	0.99 (0.75 – 1.31)	0.88 (0.62 – 1.26)	0.547	0.93 (0.78 – 1.09)
MUFA	1.13 (0.88 – 1.45)	1.00 (0.76 – 1.31)	1.07 (0.77 – 1.48)	0.958	1.08 (0.94 – 1.24)
PUFA	1.04 (0.83 – 1.31)	0.93 (0.73 – 1.18)	0.83 (0.63 – 1.10)	0.142	0.92 (0.82 – 1.03)
Trans fatty acid	0.94 (0.74 – 1.20)	1.16 (0.89 – 1.51)	1.08 (0.78 – 1.50)	0.332	1.07 (0.94 – 1.23)

Bold values indicate *P*<0.05. [‡] Indicates significant values using *P* < 0.021.
Model 1 (socio-demographic) is adjusted for age, gender, education level and study cohort
Model 2 (lifestyle confounding) is in addition previous model adjusted for past or current smoking, alcohol in E%, physical activity, energy intake and DHDI
Model 3 (metabolic) is in addition to the previous model adjusted for cholesterol, metabolic syndrome and diabetes mellitus

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Supplementary Table 4: Substitution analyses of macronutrients in the metabolic model

Substitution for:	Total population n=3882	*P*-value	Lean n=1174	*P*-value	Overweight n=2708	*P*-value
Total protein intake						
Total carbohydrates	1.00 (0.97 – 1.03)	0.946	0.98 (0.93 – 1.05)	0.856	1.03 (1.00 – 1.06)	0.070
Mono- di saccharides	1.00 (0.97 – 1.03)	0.954	0.99 (0.93 – 1.07)	0.886	1.03 (1.00 – 1.06)	0.077
Polysaccharides	1.00 (0.97 – 1.03)	0.907	0.99 (0.92 – 1.07)	0.782	1.03 (1.00 – 1.06)	0.085
Total fat	1.00 (0.97 – 1.03)	0.973	0.99 (0.92 – 1.06)	0.690	1.03 (0.99 – 1.06)	0.115
Saturated fat	0.99 (0.92 – 1.06)	0.743	0.91 (0.77 – 1.07)	0.255	1.05 (0.98 – 1.13)	0.166
MUFA	0.98 (0.94 – 1.03)	0.538	0.99 (0.89 – 1.11)	0.916	0.99 (0.94 – 1.05)	0.820
PUFA	1.03 (0.97 – 1.09)	0.286	1.01 (0.88 – 1.17)	0.873	1.06 (1.00 – 1.12)	0.056
Fibre	0.97 (0.85 – 1.10)	0.640	0.90 (0.65 – 1.26)	0.548	0.96 (0.84 – 1.12)	0.572
Animal protein intake						
Vegetable protein	1.00 (0.92 – 1.09)	0.944	1.03 (0.84 – 1.27)	0.774	1.01 (0.92 – 1.11)	0.794
Total carbohydrates	1.00 (0.97 – 1.03)	0.936	0.99 (0.93 – 1.06)	0.855	1.03 (1.00 – 1.06)	0.069
Mono- disaccharides	1.00 (0.97 – 1.03)	0.977	1.00 (0.93 – 1.07)	0.941	1.03 (1.00 – 1.06)	0.074
Polysaccharides	1.00 (0.97 – 1.04)	0.789	0.98 (0.90 – 1.07)	0.643	1.03 (1.00 – 1.07)	0.131
Total fat	1.00 (0.97 – 1.03)	0.962	0.99 (0.92 – 1.06)	0.688	1.03 (1.00 – 1.06)	0.115
Saturated fat	0.98 (0.92 – 1.05)	0.638	0.90 (0.76 – 1.60)	0.219	1.06 (0.98 – 1.14)	0.145
MUFA	0.98 (0.93 – 1.03)	0.487	0.99 (0.89 – 1.11)	0.876	1.00 (0.94 – 1.05)	0.866
PUFA	1.03 (0.98 – 1.09)	0.258	1.02 (0.88 – 1.18)	0.811	1.06 (1.00 – 1.12)	0.062
Fibre	0.98 (0.86 – 1.13)	0.824	0.90 (0.63 – 1.31)	0.592	0.96 (0.83 – 1.12)	0.628
Vegetable protein intake						
Animal protein	1.01 (0.93 – 1.09)	0.868	0.98 (0.81 – 1.18)	0.816	0.99 (0.92 – 1.08)	0.864
Total carbohydrates	1.01 (0.93 – 1.09)	0.854	0.97 (0.80 – 1.19)	0.785	1.02 (0.93 – 1.11)	0.714
Mono- disaccharides	1.02 (0.91 – 1.14)	0.747	0.93 (0.72 – 1.20)	0.579	1.02 (0.91 – 1.14)	0.768
Polysaccharides	1.03 (0.90 – 1.16)	0.700	0.91 (0.68 – 1.24)	0.561	1.02 (0.89 – 1.16)	0.792
Total fat	1.00 (0.92 – 1.09)	0.938	0.98 (0.80 – 1.21)	0.849	1.00 (0.92 – 1.10)	0.924
Saturated fat	1.01 (0.92 – 1.12)	0.778	0.96 (0.75 – 1.22)	0.749	1.04 (0.94 – 1.15)	0.454
MUFA	1.01 (0.92 – 1.11)	0.800	1.05 (0.83 – 1.31)	0.697	0.99 (0.89 – 1.09)	0.764
PUFA	1.05 (0.95 – 1.17)	0.339	1.07 (0.82 – 1.40)	0.621	1.03 (0.92 – 1.15)	0.584
Fibre	1.00 (0.84 – 1.18)	0.997	0.91 (0.58 – 1.42)	0.673	0.97 (0.81 – 1.16)	0.704
Total carbohydrate intake						
Total protein	1.00 (0.97 – 1.03)	0.997	1.01 (0.94 – 1.08)	0.848	0.97 (0.94 – 1.00)	0.070
Animal protein	1.00 (0.97 – 1.03)	0.995	1.01 (0.94 – 1.08)	0.838	0.97 (0.94 – 1.00)	0.072
Vegetable protein	1.01 (0.91 – 1.10)	0.946	1.04 (0.83 – 1.30)	0.739	0.99 (0.89 – 1.09)	0.768
Total fat	1.00 (0.98 – 1.01)	0.696	0.98 (0.95 – 1.01)	0.230	1.00 (0.98 – 1.01)	0.707
Saturated fat	0.99 (0.94 – 1.04)	0.666	0.92 (0.82 – 1.04)	0.179	1.02 (0.96 – 1.08)	0.499
MUFA	0.98 (0.95 – 1.02)	0.425	1.01 (0.92 – 1.10)	0.891	0.96 (0.92 – 1.00)	0.076
PUFA	1.03 (0.98 – 1.08)	0.258	1.02 (0.91 – 1.15)	0.703	1.02 (0.97 – 1.08)	0.406
Fibre	0.97 (0.85 – 1.10)	0.621	0.91 (0.66 – 1.26)	0.559	0.94 (0.82 – 1.07)	0.324
Mono and disaccharide intake						
Polysaccharides	1.00 (0.98 – 1.02)	0.900	0.99 (0.95 – 1.04)	0.802	1.00 (0.98 – 1.02)	0.829
Total protein	1.00 (0.97 – 1.03)	0.985	1.01 (0.94 – 1.08)	0.885	0.97 (0.94 – 1.00)	0.077
Animal protein	1.00 (0.97- 1.03)	0.956	1.00 (0.93 – 1.08)	0.934	0.97 (0.94 – 1.00)	0.076
Vegetable protein	1.00 (0.90 – 1.12)	0.985	1.07 (0.83 – 1.39)	0.578	0.98 (0.87 – 1.11)	0.793
Total fat	1.00 (0.98 – 1.01)	0.725	0.98 (0.95 – 1.01)	0.190	1.00 (0.98 – 1.01)	0.796
Saturated fat	0.99 (0.93 – 1.04)	0.632	0.90 (0.79 – 1.02)	0.107	1.02 (0.97 – 1.09)	0.426
MUFA	0.98 (0.94 – 1.02)	0.410	1.00 (0.91 – 1.09)	0.929	0.96 (0.92 – 1.01)	0.101
PUFA	1.03 (0.98 – 1.08)	0.260	1.02 (0.91 – 1.15)	0.697	1.02 (0.97 – 1.08)	0.411
Fibre	0.97 (0.85 – 1.10)	0.616	0.91 (0.66 – 1.26)	0.578	0.93 (0.82 – 1.06)	0.300

Supplementary Table 4: *continued*

Substitution for:	Total Population n=3882	*P*-value	Lean n=1174	*P*-value	Overweight n=2708	*P*-value
Polysaccharide intake						
Mono-and disaccharides	1.00 (0.98 – 1.02)	0.938	1.01 (0.96 – 1.05)	0.800	1.00 (0.98 – 1.02)	0.824
Total protein	1.00 (0.97 – 1.03)	0.974	1.01 (0.94 – 1.09)	0.780	0.97 (0.94 – 1.00)	0.084
Animal protein	1.00 (0.96 – 1.03)	0.867	1.02 (0.94 – 1.11)	0.635	0.97 (0.94 – 1.01)	0.135
Vegetable protein	1.00 (0.88 – 1.13)	0.995	1.09 (0.82 – 1.45)	0.554	0.98 (0.86 – 1.12)	0.820
Total fat	1.00 (0.98 – 1.02)	0.744	0.99 (0.95 – 1.04)	0.730	0.99 (0.97 – 1.01)	0.600
Saturated fat	0.99 (0.94 – 1.04)	0.658	0.92 (0.82 – 1.04)	0.194	1.02 (0.96 – 1.08)	0.506
MUFA	0.98 (0.95 – 1.03)	0.458	1.02 (0.93 – 1.12)	0.708	0.96 (0.92 – 1.00)	0.067
PUFA	1.03 (0.98 – 1.08)	0.298	1.04 (0.92 – 1.18)	0.493	1.01 (0.96 – 1.07)	0.603
Fibre	0.97 (0.85 – 1.10)	0.619	0.92 (0.67 – 1.27)	0.618	0.93 (0.82 – 1.06)	0.297
Total fat intake						
Total carbohydrates	1.00 (0.99 – 1.02)	0.669	1.02 (0.99 – 1.05)	0.223	1.00 (0.99 – 1.02)	0.712
Mono- di saccharides	1.00 (0.99 – 1.02)	0.696	1.02 (0.99 – 1.05)	0.187	1.00 (0.99 – 1.02)	0.799
Polysaccharides	1.00 (0.98 – 1.02)	0.701	1.01 (0.96 – 1.06)	0.719	1.01 (0.99 – 1.03)	0.604
Total protein	1.00 (0.97 – 1.03)	0.957	1.02 (0.95 – 1.09)	0.657	0.97 (0.94 – 1.01)	0.114
Animal protein	1.00 (0.97 – 1.03)	0.961	1.02 (0.95 – 1.09)	0.652	0.97 (0.94 – 1.01)	0.123
Vegetable protein	1.01 (0.92 – 1.11)	0.820	1.04 (0.83 – 1.30)	0.730	1.00 (0.90 – 1.11)	0.995
Fibre	0.99 (0.88 – 1.11)	0.883	1.02 (0.75 – 1.37)	0.915	0.95 (0.84 – 1.07)	0.370
Saturated fat intake						
MUFA	0.99 (0.91 – 1.07)	0.794	1.10 (0.92 – 1.32)	0.289	0.92 (0.85 – 1.01)	0.066
PUFA	1.04 (0.97 – 1.11)	0.277	1.12 (0.96 – 1.31)	0.150	0.99 (0.92 – 1.06)	0.773
Total carbohydrates	1.01 (0.95 – 1.06)	0.792	1.09 (0.97 – 1.24)	0.150	0.96 (0.91 – 1.02)	0.218
Mono- di saccharides	1.01 (0.95 – 1.07)	0.780	1.11 (0.98 – 1.27)	0.105	0.96 (0.90 – 1.02)	0.179
Polysaccharides	1.01 (0.95 – 1.06)	0.803	1.09 (0.96 – 1.23)	0.188	0.97 (0.91 – 1.02)	0.230
Protein	1.00 (0.94 – 1.08)	0.907	1.11 (0.94 – 1.31)	0.209	**0.93 (0.86 – 1.00)**	**0.041**
Animal protein	1.01 (0.94 – 1.08)	0.839	1.11 (0.95 – 1.31)	0.197	**0.93 (0.86 – 1.00)**	**0.039**
Vegetable protein	0.97 (0.87 – 1.07)	0.522	1.06 (0.82 – 1.38)	0.650	0.91 (0.81 – 1.02)	0.093
Fibre	0.92 (0.81 – 1.05)	0.226	1.03 (0.74 – 1.43)	0.876	**0.83 (0.72 – 0.95)‡**	**0.006‡**
MUFA intake						
Saturated fat	1.00 (0.93 – 1.08)	0.975	0.92 (0.77 – 1.10)	0.357	1.05 (0.96 – 1.14)	0.291
PUFA	1.04 (0.96 – 1.13)	0.342	1.02 (0.84 – 1.23)	0.834	1.05 (0.96 – 1.15)	0.315
Total carbohydrates	1.01 (0.97 – 1.06)	0.502	1.00 (0.91 – 1.09)	0.929	1.03 (0.99 – 1.08)	0.166
Mono- di saccharides	1.01 (0.97 – 1.06)	0.498	1.00 (0.91 – 1.10)	0.941	1.03 (0.98 – 1.08)	0.206
Polysaccharides	1.01 (0.97 – 1.06)	0.553	0.98 (0.89 – 1.08)	0.700	1.04 (0.99 – 1.08)	0.149
Total protein	1.01 (0.97 – 1.06)	0.640	1.01 (0.91 – 1.12)	0.875	0.99 (0.94 – 1.05)	0.834
Animal protein	1.01 (0.97 – 1.06)	0.613	1.01 (0.91 – 1.12)	0.863	0.99 (0.94 – 1.05)	0.819
Vegetable protein	0.97 (0.88 – 1.07)	0.554	0.96 (0.76 – 1.22)	0.747	0.97 (0.87 – 1.08)	0.620
Fibre	0.93 (0.82 – 1.05)	0.258	0.93 (0.67 – 1.30)	0.686	0.89 (0.78 – 1.01)	0.072
PUFA intake						
Saturated fat	0.96 (0.90 – 1.02)	0.181	0.90 (0.78 – 1.05)	0.183	0.98 (0.92 – 1.06)	0.651
MUFA	0.95 (0.87 – 1.03)	0.209	0.99 (0.82 – 1.19)	0.903	0.92 (0.84 – 1.01)	0.065
Total carbohydrates	0.97 (0.92 – 1.02)	0.183	0.98 (0.87 – 1.11)	0.745	0.96 (0.91 – 1.02)	0.172
Mono- di saccharides	0.97 (0.92 – 1.02)	0.182	0.97 (0.86 – 1.10)	0.677	0.96 (0.91 – 1.02)	0.191
Polysaccharides	0.96 (0.91 – 1.02)	0.204	0.95 (0.83 – 1.09)	0.479	0.97 (0.91 – 1.03)	0.290
Total protein	0.96 (0.91 – 1.02)	0.199	0.99 (0.86 – 1.14)	0.921	**0.93 (0.88 – 0.99)‡**	**0.014‡**
Animal protein	0.96 (0.91 – 1.02)	0.166	0.98 (0.85 – 1.14)	0.821	**0.93 (0.88 – 0.99)‡**	**0.019‡**
Vegetable protein	0.92 (0.82 – 1.03)	0.151	0.94 (0.70 – 1.26)	0.667	0.91 (0.80 – 1.02)	0.117
Fibre	0.89 (0.77 – 1.02)	0.083	0.92 (0.65 – 1.30)	0.652	**0.83 (0.71 – 0.95)‡**	**0.009‡**

Bold values indicate *P*<0.05. ‡Indicates significant values using *P* < 0.021.

Substitution model was performed adjusted for age, gender, education level, study cohort, past or current smoking, alcohol in E%, physical activity, energy intake, DHDI, cholesterol, metabolic syndrome, diabetes mellitus and for log-transformed BMI in the overall group.

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Supplementary Table 5: Complete case analyses

	Q2	Q3	Q4	*P* for trend	Continuous (per SD increase)
Overall n=3259					
Model 4 (Metabolic + log-transformed BMI)					
Total protein	1.11 (0.87 – 1.42)	1.16 (0.91 – 1.48)	1.04 (0.80 – 1.34)	0.741	1.02 (0.93 – 1.12)
Animal protein	1.30 (1.01 – 1.66)	0.99 (0.77 – 1.27)	1.23 (0.94 – 1.61)	0.480	1.02 (0.92 – 1.13)
Vegetable protein	0.95 (0.75 – 1.21)	0.81 (0.63 – 1.04)	0.99 (0.76 – 1.30)	0.633	1.02 (0.93 – 1.13)
Total carbohydrate	1.22 (0.96 – 1.56)	1.10 (0.85 – 1.43)	1.24 (0.94 – 1.64)	0.241	1.04 (0.94 – 1.15)
Mono-disaccharide	0.83 (0.65 – 1.06)	0.96 (0.74 – 1.25)	0.97 (0.72 – 1.30)	0.891	1.04 (0.93 – 1.16)
Polysaccharide	0.97 (0.76 – 1.23)	1.04 (0.82 – 1.34)	0.83 (0.63 – 1.09)	0.320	1.02 (0.92 – 1.12)
Fibre	0.88 (0.68 – 1.13)	1.03 (0.78 – 1.35)	1.00 (0.73 – 1.36)	0.697	1.01 (0.90 – 1.14)
Total fat	1.17 (0.92 – 1.48)	1.15 (0.90 – 1.46)	1.03 (0.79 – 1.33)	0.840	0.98 (0.89 – 1.08)
Saturated fat	1.02 (0.79 – 1.32)	1.07 (0.80 – 1.43)	1.02 (0.71 – 1.48)	0.837	0.98 (0.83 – 1.17)
MUFA	**1.32 (1.02 – 1.70)**	1.15 (0.86 – 1.53)	1.29 (0.92 – 1.83)	0.326	1.05 (0.90 – 1.22)
PUFA	1.06 (0.84 – 1.35)	0.90 (0.70 – 1.16)	0.92 (0.69 – 1.23)	0.342	0.92 (0.81 – 1.03)
Trans fatty acid	0.98 (0.76 – 1.26)	1.07 (0.82 – 1.41)	1.02 (0.72 – 1.43)	0.745	1.01 (0.88 – 1.17)
Lean (BMI < 25 kg/m^2) n=1011					
Model 3 (Metabolic)					
Total protein	1.02 (0.60 – 1.74)	0.97 (0.55 – 1.72)	0.85 (0.45 – 1.61)	0.636	0.98 (0.79 – 1.22)
Animal protein	1.53 (0.90 – 2.59)	0.83 (0.42 – 1.62)	1.13 (0.58 – 2.22)	0.839	0.98 (0.78 – 1.24)
Vegetable protein	1.16 (0.65 – 2.09)	0.89 (0.47 – 1.68)	0.99 (0.52 – 1.90)	0.770	1.03 (0.81 – 1.30)
Total carbohydrate	1.15 (0.64 – 2.08)	0.95 (0.50 – 1.82)	1.01 (0.50 – 2.02)	0.877	0.99 (0.77 – 1.26)
Mono-disaccharide	0.89 (0.49 – 1.61)	0.84 (0.44 – 1.60)	0.88 (0.43 – 1.81)	0.719	0.97 (0.74 – 1.27)
Polysaccharide	1.28 (0.69 – 2.35)	1.49 (0.81 – 2.76)	0.78 (0.36 – 1.65)	0.735	1.00 (0.78 – 1.29)
Fibre	0.67 (0.36 – 1.22)	0.70 (0.36 – 1.34)	0.81 (0.38 – 1.72)	0.614	1.04 (0.78 – 1.39)
Total fat	1.11 (0.59 – 2.09)	1.31 (0.70 – 2.44)	1.77 (0.94 – 3.33)	0.064	1.10 (0.89 – 1.37)
Saturated fat	0.91 (0.47 – 1.75)	1.13 (0.55 – 2.32)	**2.67 (1.16 – 6.19)**	**0.022**	1.34 (0.91 – 1.97)
MUFA	1.17 (0.61 – 2.23)	1.12 (0.55 – 2.30)	1.52 (0.65 – 3.52)	0.388	0.92 (0.67 – 1.26)
PUFA	1.00 (0.55 – 1.83)	0.95 (0.51 – 1.79)	1.12 (0.57 – 2.23)	0.788	1.02 (0.77 – 1.36)
Trans fatty acid	0.77 (0.41 – 1.44)	0.64 (0.32 – 1.26)	1.10 (0.51 – 2.36)	0.976	0.91 (0.63 – 1.31)
Overweight (BMI ≥ 25 kg/m^2) n=2248					
Model 3 (Metabolic)					
Total protein	1.15 (0.89 – 1.50)	1.26 (0.97 – 1.64)	**1.34 (1.02 – 1.76)**	**0.028**	**1.12 (1.02 – 1.23)**
Animal protein	1.29 (0.99 – 1.68)	1.05 (0.80 – 1.37)	**1.52 (1.14 – 2.03)[‡]**	**0.027**	**1.13 (1.02 – 1.25)**
Vegetable protein	0.98 (0.76 – 1.26)	0.83 (0.64 – 1.08)	1.13 (0.85 – 1.50)	0.735	1.06 (0.95 – 1.17)
Total carbohydrate	1.13 (0.88 – 1.46)	0.99 (0.76 – 1.29)	1.11 (0.83 – 1.48)	0.701	0.99 (0.89 – 1.11)
Mono-disaccharide	0.75 (0.58 – 0.97)	0.78 (0.59 – 1.02)	0.84 (0.62 – 1.14)	0.324	1.00 (0.89 – 1.12)
Polysaccharide	0.89 (0.69 – 1.14)	0.95 (0.73 – 1.23)	0.80 (0.60 – 1.07)	0.222	0.98 (0.88 – 1.09)
Fibre	0.95 (0.73 – 1.25)	1.13 (0.84 – 1.51)	1.10 (0.80 – 1.52)	0.354	1.04 (0.92 – 1.17)
Total fat	1.10 (0.86 – 1.42)	1.09 (0.85 – 1.41)	0.94 (0.72 – 1.23)	0.713	0.97 (0.88 – 1.07)
Saturated fat	1.01 (0.78 – 1.33)	1.01 (0.74 – 1.37)	0.78 (0.53 – 1.16)	0.292	0.90 (0.75 – 1.08)
MUFA	1.26 (0.96 – 1.66)	1.12 (0.83 – 1.51)	1.21 (0.84 – 1.75)	0.511	1.12 (0.95 – 1.32)
PUFA	0.98 (0.76 – 1.26)	0.83 (0.63 – 1.08)	0.82 (0.60 – 1.12)	0.120	0.88 (0.78 – 1.01)
Trans fatty acid	1.02 (0.79 – 1.34)	1.16 (0.87 – 1.55)	1.02 (0.71 – 1.46)	0.678	1.05 (0.90 – 1.23)

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Supplementary Table 5: *Legend*

Bold values indicate *P*<0.05. [‡]Indicates significant values using *P* < 0.021.
Model 3 (metabolic) is in addition to the previous model adjusted for cholesterol, metabolic syndrome and diabetes mellitus
Model 4 (metabolic + log-transformed BMI) is in addition to the previous model adjusted for log-transformed BMI

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Supplementary Table 6: Characteristics of imputed and complete cases

	Complete cases (n=3259)	Imputed cases (n=623)	*P*-value
Age (years)	69.5 ± 8.6	71.1 ± 9.7	<0.001
Female (%)	60.4	47.0	<0.001
Caucasian (%)	97.8	97.0	0.256
RS cohort I / II / III (%)	26.6 / 30.5 / 42.9	32.4 / 30.2 / 37.4	0.006
Education Level (%)			
Low	48.2	49.4	0.287
Intermediate	30.1	31.8	
High	21.7	18.8	
Smoking status (%)			
Never / Past or Current	37.2 / 62.8	33.6 / 66.4	0.151
Alcohol (units/d)	0.45 (0.06 – 1.19)	0.40 (0.03 – 1.21)	0.439
Physical Activity[†]	41.5 (15.8 – 79.0)	36.3 (18.0 – 73.9)	0.645
Caloric Intake (kcal/day)	2040 (1636 – 2514)	1976 (1541 – 2525)	0.079
BMI (kg/m^2)	26.8 (24.4 – 29.5)	27.4 (24.8 – 30.6)	<0.001
Lean	31.0	26.2	0.015
Overweight	69.0	73.8	
ALT (U/L)	18 (15 – 24)	18 (15 – 24)	0.607
HOMA-IR	2.6 (1.7 – 4.0)	2.7 (1.8 – 4.3)	0.099
Total Cholesterol (mmol/L)	5.4 ± 1.1	5.3 ± 1.1	0.016
Metabolic Syndrome (%)	51.3	55.0	0.102
Hypertension (%)	73.6	76.1	0.192
Diabetes Mellitus (%)	12.4	17.3	0.001
NAFLD (%)	33.7	38.4	0.025

Data on imputed cases is original data, not imputed on the present variables. Data represent % for categorical variables and for continuous variables mean ± SD or median (P25 – P75).*P*-value is based on T-test, Wilcoxon rank sum test, Chi-square test or Fisher's exact test. [†]Physical activity in metabolic equivalent task hours/week.

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Supplementary Table 7: Sensitivity analyses using RS-cohort I and II in which FFQs were completed at the same time as all other measurements, amongst them abdominal ultrasound

	Q2	Q3	Q4	*P* for trend	Continuous (per SD increase)
RS I and II only n=2252					
Model 4 (Metabolic + log-transformed BMI)					
Total protein	1.08 (0.80 – 1.45)	1.02 (0.76 – 1.37)	0.92 (0.68 – 1.25)	0.537	0.97 (0.88 – 1.07)
Animal protein	1.27 (0.93 – 1.72)	0.99 (0.73 – 1.34)	1.11 (0.80 – 1.53)	0.949	0.97 (0.87 – 1.08)
Vegetable protein	0.91 (0.69 – 1.20)	0.79 (0.59 – 1.06)	1.08 (0.78 – 1.49)	0.951	1.01 (0.89 – 1.13)
Total carbohydrate	**1.35 (1.01 – 1.80)**	1.20 (0.88 – 1.64)	1.18 (0.84 – 1.65)	0.493	1.02 (0.91 – 1.15)
Mono-disaccharide	0.91 (0.68 – 1.23)	1.02 (0.74 – 1.40)	0.91 (0.65 – 1.30)	0.786	1.03 (0.91 – 1.17)
Polysaccharide	0.92 (0.70 – 1.22)	0.90 (0.67 – 1.21)	0.88 (0.63 – 1.24)	0.454	0.99 (0.88 – 1.12)
Fibre	0.94 (0.69 – 1.27)	1.13 (0.81 – 1.56)	1.03 (0.71 – 1.50)	0.624	1.06 (0.92 – 1.21)
Total fat	1.19 (0.89 – 1.59)	**1.42 (1.06 – 1.90)[‡]**	1.16 (0.86 – 1.57)	0.180	1.03 (0.93 – 1.15)
Saturated fat	1.10 (0.80 – 1.51)	1.24 (0.88 – 1.76)	1.16 (0.75 – 1.79)	0.398	1.04 (0.85 – 1.27)
MUFA	1.34 (0.99 – 1.82)	1.16 (0.82 – 1.64)	1.01 (0.67 – 1.53)	0.850	0.96 (0.81 – 1.13)
PUFA	1.28 (0.97 – 1.70)	1.04 (0.77 – 1.41)	0.99 (0.70 – 1.39)	0.728	1.00 (0.87 – 1.14)
Trans fatty acid	0.97 (0.71 – 1.32)	1.20 (0.87 – 1.67)	1.26 (0.84 – 1.90)	0.158	1.08 (0.91 – 1.28)
Lean (BMI < 25 kg/m²) in RSI and II n=664					
Model 3 (Metabolic)					
Total protein	1.51 (0.81 – 2.85)	0.84 (0.40 – 1.79)	1.07 (0.50 – 2.32)	0.817	0.95 (0.74 – 1.23)
Animal protein	1.64 (0.85 – 3.17)	0.86 (0.37 – 1.97)	1.20 (0.54 – 2.64)	0.998	0.95 (0.72 – 1.25)
Vegetable protein	0.89 (0.45 – 1.77)	0.77 (0.37 – 1.61)	1.16 (0.53 – 2.52)	0.897	1.02 (0.77 – 1.36)
Total carbohydrate	1.00 (0.47 – 2.13)	1.44 (0.67 – 3.10)	1.04 (0.45 – 2.43)	0.729	1.00 (0.75 – 1.35)
Mono-disaccharide	0.68 (0.32 – 1.46)	0.82 (0.37 – 1.81)	0.82 (0.35 – 1.94)	0.794	1.02 (0.74 – 1.40)
Polysaccharide	0.83 (0.41 – 1.65)	0.90 (0.43 – 1.90)	0.69 (0.29 – 1.64)	0.482	0.98 (0.72 – 1.34)
Fibre	0.83 (0.40 – 1.74)	0.99 (0.44 – 2.24)	1.12 (0.43 – 2.91)	0.730	1.16 (0.80 – 1.66)
Total fat	1.15 (0.55 – 2.39)	1.44 (0.70 – 2.98)	1.33 (0.61 – 2.87)	0.386	1.07 (0.84 – 1.37)
Saturated fat	0.87 (0.39 – 1.92)	1.08 (0.45 – 2.60)	2.19 (0.80 – 6.01)	0.119	1.44 (0.91 – 2.26)
MUFA	1.50 (0.72 – 3.14)	1.04 (0.45 – 2.44)	1.05 (0.37 – 3.00)	0.850	0.83 (0.56 – 1.23)
PUFA	0.93 (0.45 – 1.90)	1.03 (0.49 – 2.16)	0.94 (0.40 – 2.23)	0.964	1.03 (0.73 – 1.45)
Trans fatty acid	0.85 (0.40 – 1.83)	0.66 (0.28 – 1.54)	1.07 (0.41 – 2.77)	0.947	0.91 (0.61 – 1.36)
Overweight (BMI ≥ 25 kg/m²) in RSI and II n=1588					
Model 3 (Metabolic)					
Total protein	1.03 (0.75 – 1.41)	1.12 (0.82 – 1.53)	1.16 (0.85 – 1.59)	0.282	1.07 (0.96 – 1.18)
Animal protein	1.29 (0.93 – 1.78)	1.07 (0.78 – 1.47)	1.33 (0.95 – 1.85)	0.229	1.07 (0.96 – 1.20)
Vegetable protein	0.99 (0.74 – 1.31)	0.85 (0.63 – 1.16)	1.17 (0.84 – 1.64)	0.675	1.03 (0.91 – 1.16)
Total carbohydrate	1.30 (0.96 – 1.75)	0.96 (0.69 – 1.32)	1.04 (0.73 – 1.47)	0.747	0.97 (0.86 – 1.09)
Mono-disaccharide	0.93 (0.68 – 1.27)	0.88 (0.64 – 1.23)	0.81 (0.57 – 1.16)	0.251	0.98 (0.86 – 1.11)
Polysaccharide	0.89 (0.67 – 1.19)	0.84 (0.62 – 1.15)	0.88 (0.62 – 1.25)	0.388	0.96 (0.85 – 1.08)
Fibre	1.01 (0.73 – 1.38)	1.19 (0.85 – 1.68)	1.08 (0.74 – 1.59)	0.517	1.08 (0.94 – 1.24)
Total fat	1.05 (0.78 – 1.41)	1.33 (0.98 – 1.79)	1.08 (0.79 – 1.47)	0.345	1.02 (0.91 – 1.14)
Saturated fat	1.08 (0.78 – 1.49)	1.20 (0.84 – 1.71)	0.94 (0.60 – 1.47)	0.996	0.93 (0.75 – 1.15)
MUFA	1.23 (0.89 – 1.69)	1.20 (0.84 – 1.71)	1.04 (0.68 – 1.60)	0.885	1.07 (0.90 – 1.27)
PUFA	1.22 (0.91 – 1.64)	0.93 (0.68 – 1.28)	0.85 (0.60 – 1.21)	0.221	0.93 (0.81 – 1.08)
Trans fatty acid	0.97 (0.71 – 1.33)	1.26 (0.90 – 1.77)	1.29 (0.84 – 1.96)	0.124	1.11 (0.93 – 1.33)

Supplementary Table 7: *Legend*

Bold values indicate $P<0.05$. [‡]Indicates significant values using $P < 0.021$.
Model 3 (metabolic) is in addition to the previous model adjusted for cholesterol, metabolic syndrome and diabetes mellitus
Model 4 (metabolic + log-transformed BMI) is in addition to the previous model adjusted for log-transformed BMI