ESM Table 1. Alternate Mediterranean Diet (aMED) components and criteria for scoring

Component	Criteria for 0 point	Criteria for 1 point
Fresh fruit (excluding juices)	< Median	≥ Median
Fresh vegetables (excluding potatoes)	< Median	≥ Median
Whole grains	< Median	≥ Median
Nuts	< Median	≥ Median
Legumes	< Median	≥ Median
Red & processed meat	≥ Median	< Median
Fish & shellfish	< Median	≥ Median
MUFA:SFA ratio	< Median	≥ Median
Alcohol		
Women	< 5 or >15 g/d	5-15 g/d
Men	< 10 or > 25 g/d	10-25 g/d
TOTAL	0	9

MUFA, monounsaturated fatty acids; SFA, saturated fatty acids.

ESM Table 2. Healthy Eating Index (HEI)-2015 components and criteria for scoring*

Component	Maximum point	Daily intake for the maximum points	Daily intake for 0 point
Whole grains	10	≥ 1.5 oz	0
Total fruit	5	≥ 0.8 cups	0
Fresh fruit (excluding juices)	5	≥ 0.4 cups	0
Fresh vegetables (excluding potatoes)	5	≥ 1.1 cups	0
Greens & beans	5	≥ 0.2 cups	0
Total protein foods	5	≥ 2.5 oz	0
Seafood & plant proteins	5	≥ 0.8 oz	0
Total dairy	10	≥ 1.3 cups	0
Fatty acid ratio	10	(PUFA + MUFA) /SFA ≥ 2.5	(PUFA + MUFA) /SFA ≤ 1.2
Sodium	10	≤ 1.1 g	≥ 2.0 g
Refined grains	10	≤ 1.8 oz	≥ 4.3 oz
Added sugars	10	$\leq 6.5\%$ of energy	$\geq 26\%$ of energy
Saturated fats	10	$\leq 8\%$ of energy	$\geq 16\%$ of energy
TOTAL	100		

*All standards for food groups in HEI-2015 represent amounts per 4184 kJ (1000 kcal). Definitions and determination of what counts as one cup or ounce equivalent of food groups can be found at:
https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/mped/mped2_doc.pdf

MUFA, monounsaturated fatty acids; oz, ounce; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids.

ESM Table 3. Healthful Plant-based Diet Index (hPDI) components and criteria for scoring

Component	Criteria for minimum point (1)	Criteria for maximum point (5)
Healthy plant food groups		
Whole grains	Lowest quintile	Highest quintile
Fresh fruit (excluding juices)	Lowest quintile	Highest quintile
Fresh vegetables (excluding potatoes)	Lowest quintile	Highest quintile
Nuts & legumes	Lowest quintile	Highest quintile
Vegetable oils	Lowest quintile	Highest quintile
Coffee & tea (unsweetened)	Lowest quintile	Highest quintile
Unhealthy plant food groups		
SSB & fruit juices	Highest quintile	Lowest quintile
Refined grains	Highest quintile	Lowest quintile
Potatoes	Highest quintile	Lowest quintile
Sweets & desserts	Highest quintile	Lowest quintile
Animal food groups		
Red & processed meat	Highest quintile	Lowest quintile
White meat (poultry & fish/shellfish)	Highest quintile	Lowest quintile
Eggs	Highest quintile	Lowest quintile
Dairy	Highest quintile	Lowest quintile
Animal fat	Highest quintile	Lowest quintile
TOTAL	15	75

SSB, sugar-sweetened beverages.

ESM Table 4. Age-adjusted baseline population characteristics according to quintile of dietary pattern scores*

	aMED			HEI-2015			hPDI		
	Q1	**Q3**	**Q5**	**Q1**	**Q3**	**Q5**	**Q1**	**Q3**	**Q5**
Score median (range)	1 (0-1)	3 (3-3)	5 (5-8)	35.4 (8.6-41.6)	53.8 (50.0-57.6)	72.9 (66.5-96.8)	38 (25-40)	46 (45-47)	54 (52-68)
Age, years	36.0 (0.8)	39.3 (0.9)	41.9 (1.4)	37.6 (0.7)	38.5 (0.8)	43.5 (1.2)	33.8 (0.6)	39.3 (0.9)	43.3 (1.2)
Male, %	55.8	49.5	44.6	52.2	51.9	39.2	60.4	48.6	34.1
Study field center, %									
Bronx	37.7	25.7	17.6	35.3	24.5	18.2	25.8	26.2	26.3
Chicago	9.9	15.5	19.0	13.6	9.7	25.9	11.1	11.0	19.7
Miami	39.0	39.2	19.0	37.9	36.9	19.9	43.3	36.6	23.4
San Diego	13.4	19.7	44.4	13.2	28.8	36.0	19.8	26.2	30.6
Hispanic background, %									
Central/South American	11.5	13.5	11.0	13.7	13.6	9.3	12.2	14.2	12.4
Cuban	31.8	28.0	9.0	27.8	25.2	12.2	31.0	26.4	12.7
Dominican	9.7	10.9	4.4	9.6	10.6	7.5	8.4	9.2	11.6
Mexican	15.4	30.5	63.9	17.8	34.0	58.8	23.5	33.7	49.3
Puerto-Rican	28.0	13.9	8.5	26.4	11.6	8.3	18.9	13.5	9.3
Other heritage	3.6	3.2	3.3	4.7	5.0	3.8	6.0	3.0	4.6
Above high school education, %	41.3	41.5	49.2	37.4	44.8	46.7	42.6	42.5	45.5
Annual household income, %									
< $30,000	62.7	53.4	50.2	60.2	52.9	54.5	55.6	54.4	58.0
≥ $30,000	30.5	38.7	46.2	33.4	38.0	42.7	38.0	37.1	37.4
Not reported	6.8	7.9	3.6	6.4	9.1	2.8	6.4	8.4	4.6
Current smoker, %	32.0	21.8	16.2	29.1	22.4	12.7	30.2	21.6	23.5
Moderate drinker†, %	2.3	5.9	17.2	5.0	5.7	5.8	7.3	5.6	4.1
Use of antihypertensive drugs, %	11.9	11.1	10.1	9.1	8.3	10.6	8.4	10.4	10.5
Use of lipid-lowering drugs, %	4.1	6.1	5.8	6.9	4.5	6.8	4.1	8.4	5.8
Fasting hours for blood samples	14.5 (0.2)	14.1 (0.1)	14.2 (0.1)	14.4 (0.1)	14.0 (0.1)	14.0 (0.1)	14.1 (0.1)	14.3 (0.2)	14.2 (0.1)
Body mass index, kg/m^2	28.8 (0.4)	28.8 (0.3)	28.8 (0.5)	28.8 (0.3)	28.8 (0.4)	28.6 (0.5)	29.6 (0.7)	28.7 (0.3)	28.3 (0.5)
Physical activity, MET-hours/d	11.0 (1.1)	10.2 (0.6)	12.9 (1.0)	10.8 (0.9)	11.8 (1.0)	13.4 (1.0)	14.5 (1.2)	13.3 (1.2)	11.0 (0.9)
Total energy intake, kJ/d	8707 (272)	8703 (172)	8878 (297)	8820 (238)	8975 (226)	8171 (289)	10,996 (234)	8096 (259)	6929 (218)

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index; MET, metabolic equivalent; Q, quintile.

*Data are presented as age-adjusted mean (standard error) for continuous variables (except for age) or percentage for categorical variables after weighting for the complex survey design.

†Alcohol consumption of 5-15 g/d for women or 10-25 g/d for men.

ESM Table 5. Age-adjusted mean intake of food groups or nutrients according to quintile of dietary pattern scores

	aMED quintile					HEI-2015 quintile					hPDI quintile				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Food groups, servings/d															
Whole grains	0.31	0.68	1.42	2.18	2.79	0.23	0.66	1.26	2.06	3.56	0.61	1.04	1.37	1.82	2.67
Refined grains	6.19	5.87	5.09	5.39	4.53	7.27	6.76	5.06	4.21	2.88	7.46	6.32	4.94	4.55	2.76
Fresh fruit (excluding juices)	0.25	0.59	1.21	1.46	1.78	0.30	0.53	0.95	1.67	2.18	0.45	0.70	0.86	1.38	2.14
Fresh vegetables (excluding potatoes)	0.88	1.67	2.15	2.58	3.67	1.32	1.90	2.15	2.35	3.31	1.65	1.93	1.83	2.43	3.15
Nuts	0.03	0.03	0.09	0.32	0.78	0.04	0.13	0.17	0.28	0.58	0.07	0.11	0.24	0.23	0.52
Legumes	0.14	0.29	0.67	0.80	0.82	0.12	0.48	0.58	0.77	0.83	0.24	0.44	0.48	0.78	0.89
Greens & beans	0.17	0.43	0.94	1.10	1.30	0.17	0.59	0.78	1.05	1.52	0.36	0.58	0.66	1.17	1.31
Potatoes	0.57	0.39	0.40	0.41	0.28	0.47	0.53	0.38	0.37	0.25	0.85	0.43	0.27	0.20	0.09
Sweets & desserts	0.18	0.98	0.87	0.92	1.18	1.10	1.08	0.86	0.96	1.03	1.62	0.97	0.85	0.72	0.59
Red & processed meat	4.00	3.39	3.21	2.62	1.59	3.68	3.26	3.32	2.69	1.80	3.82	3.34	2.70	2.78	2.08
Poultry	1.26	1.91	1.79	2.16	2.01	1.63	1.93	2.04	1.91	1.50	2.50	2.08	1.62	1.46	1.14
Fish & shellfish	0.01	0.30	0.30	0.47	0.69	0.13	0.58	0.36	0.20	0.38	0.61	0.19	0.33	0.21	0.25
Eggs	0.44	0.50	0.44	0.46	0.52	0.47	0.50	0.48	0.41	0.49	0.79	0.45	0.35	0.34	0.29
Dairy products	1.93	1.71	1.46	1.48	1.50	1.78	1.52	1.61	1.51	1.65	2.15	1.62	1.53	1.36	1.12
Total protein foods	6.03	6.71	7.17	7.65	7.26	6.20	7.35	7.55	7.02	6.47	8.28	7.07	6.19	6.58	6.11
Seafood & plant proteins	0.33	0.91	1.73	2.41	3.14	0.43	1.67	1.70	2.01	2.67	1.17	1.20	1.52	2.01	2.60
Animal fat	1.30	1.32	1.07	1.16	1.16	1.78	1.27	0.90	1.08	0.89	2.31	1.33	0.87	0.61	0.33
Vegetable oils	1.60	2.45	1.69	2.85	2.64	1.86	2.88	2.79	2.26	2.40	2.19	2.61	2.23	2.90	2.50
Coffee (unsweetened)	0.49	0.32	0.50	0.51	0.65	0.59	0.39	0.55	0.41	0.48	0.32	0.41	0.50	0.57	0.70
Tea (unsweetened)	0.16	0.14	0.19	0.22	0.49	0.16	0.13	0.22	0.16	0.51	0.06	0.11	0.14	0.23	0.67
SSB	2.86	2.63	2.45	2.53	2.08	2.11	2.41	2.85	2.48	2.40	3.69	2.52	2.39	2.00	1.05
Fruit juices	0.65	0.82	0.69	0.80	0.80	0.37	0.58	0.96	0.94	0.99	1.06	0.68	0.77	0.72	0.35
Nutrients/food components															
SFA, % of energy	12.5	10.9	10.0	9.1	8.3	12.7	10.6	10.0	9.0	8.0	11.9	10.4	10.2	9.3	8.5
Ratio of MUFA:SFA	0.94	1.10	1.19	1.29	1.50	0.98	1.20	1.21	1.21	1.41	1.09	1.13	1.15	1.26	1.38
Ratio of (MUFA+PUFA):SFA	1.50	1.84	1.97	2.13	2.49	1.53	2.00	1.98	2.06	2.38	1.76	1.87	1.91	2.12	2.31
Sodium, g/4184 kJ (1000 kcal)/d	1.69	1.67	1.70	1.77	1.68	1.93	1.81	1.72	1.51	1.42	1.74	1.70	1.69	1.72	1.63
Added sugars, % of energy	14.3	10.8	12.0	11.4	11.3	18.3	13.3	12.6	9.6	3.0	8.4	12.2	12.6	13.7	13.9

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; Q, quintile; SFA, saturated fatty acids; SSB, sugar-sweetened beverages.

ESM Table 6. Number and percentage of total and dietary pattern-related metabolites according to metabolomic super-pathways

Super-pathways	All metabolites		Significant metabolites		Shared metabolites		aMED-only metabolites		HEI-2015-only metabolites		hPDI-only metabolites	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Amino acid	161	25.8	35	22.3	13	32.5	2	4.0	3	23.1	6	37.5
Carbohydrate	20	3.2	9	5.7	1	2.5	5	10.0	2	15.4	0	0.0
Cofactor & vitamin	20	3.2	9	5.7	7	17.5	0	0.0	0	0.0	1	6.3
Energy	10	1.6	3	1.9	1	2.5	1	2.0	0	0.0	0	0.0
Lipid	285	45.7	51	32.5	3	7.5	30	60.0	3	23.1	8	50.0
Nucleotide	30	4.8	7	4.5	1	2.5	3	6.0	1	7.7	0	0.0
Peptide	28	4.5	6	3.8	0	0.0	3	6.0	0	0.0	0	0.0
Xenobiotic	70	11.2	37	23.6	14	35.0	6	12.0	4	30.8	1	6.3
TOTAL	624	100	157	100	40	100	50	100	13	100	16	100

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index.

ESM Table 7. Percent variations in dietary scores potentially explained by serum metabolites

	PC1	PC2	PC3	PC4	PC5	**All 5 PCs**
All 624 metabolites						
aMED	0.0%	0.2%	0.6%	0.3%	0.0%	**1.1%**
HEI-2015	0.1%	0.6%	0.3%	0.2%	0.1%	**1.2%**
hPDI	0.2%	2.5%	0.0%	2.2%	0.6%	**5.5%**
40 metabolites associated with all 3 dietary pattern scores						
aMED	16.3%	0.1%	0.2%	2.3%	0.5%	**19.4%**
HEI-2015	15.6%	0.5%	0.4%	1.7%	0.7%	**19.0%**
hPDI	14.3%	0.0%	0.1%	0.7%	1.7%	**16.8%**

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index; PC, principal components.

ESM Table 8. Multivariable-adjusted association between scores of dietary-pattern-related metabolites and risk of diabetes, excluding 731 individuals with dyslipidemia at baseline

	Metabolites	Tertile for metabolite score			P-trend
	(N)	T1	T2	T3	
Score of metabolites positively associated with					
aMED only	4	1.00 (Referent)	0.80 (0.44-1.47)	0.59 (0.30-1.15)	0.10
HEI-2015 only	6	1.00 (Referent)	0.85 (0.43-1.72)	0.89 (0.44-1.81)	0.75
hPDI only	5	1.00 (Referent)	0.64 (0.32-1.29)	1.39 (0.73-2.67)	0.33
All dietary scores	32	1.00 (Referent)	0.92 (0.54-1.59)	0.71 (0.39-1.31)	0.28
Score of metabolites inversely associated with					
aMED only	46	1.00 (Referent)	0.48 (0.24-0.96)	0.77 (0.37-1.56)	0.43
HEI-2015 only	7	1.00 (Referent)	0.92 (0.41-2.03)	0.64 (0.27-1.51)	0.30
hPDI only	11	1.00 (Referent)	0.97 (0.48-1.95)	1.01 (0.50-2.02)	0.99
All dietary scores	8	1.00 (Referent)	1.93 (0.93-4.00)	3.78 (2.18-6.56)	<0.0001

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index; T, tertile. Results are relative risks (95% CI) from survey Poisson regressions with adjustment for age, sex, study field center, Hispanic/Latino background, education, annual household income, smoking status, drinking status (not for aMED-only metabolite score), total energy intake, physical activity, BMI, hypertension, dyslipidemia, and fasting hours for blood samples.

ESM Table 9. Association between 8 metabolites inversely associated with 3 dietary scores and risk of diabetes
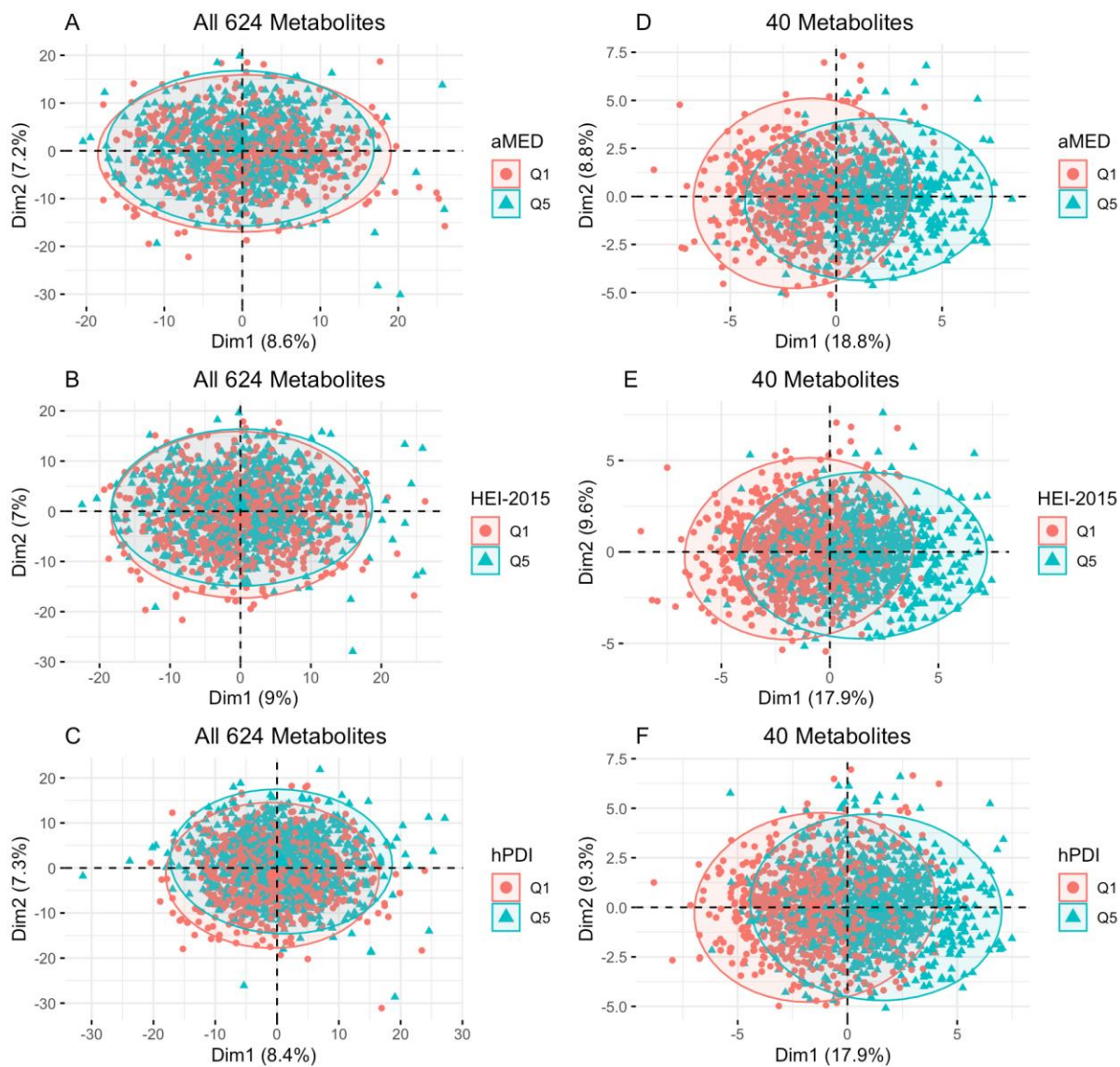
	Pyrraline	N1-methylinosine	γ/β-Tocopherol	Mannose	Proline	Trans-4-hydroxyproline	P-cresol-glucuronide	N-acetyl-cadaverine
Overall, per SD	1.03 (0.79-1.33)	1.16 (0.95-1.41)	1.49 (1.22-1.83)	1.76 (1.24-2.49)	1.20 (1.00-1.43)	1.01 (0.84-1.22)	1.11 (0.91-1.34)	1.23 (1.02-1.49)
By aMED score								
Low (T1/T2)	1.26 (0.94-1.69)	1.28 (1.03-1.60)	1.47 (1.12-1.93)	2.48 (1.83-3.37)	1.24 (1.01-1.52)	1.04 (0.83-1.31)	1.03 (0.81-1.30)	1.20 (0.98-1.46)
High (T3)	0.66 (0.44-0.99)	0.84 (0.61-1.16)	1.44 (1.06-1.97)	1.00 (0.62-1.61)	1.20 (0.89-1.61)	0.84 (0.65-1.09)	1.22 (0.85-1.74)	1.23 (0.86-1.74)
P-interaction	0.026	0.039	0.98	0.0017	0.86	0.49	0.95	0.86
By HEI-2015 score								
Low (T1/T2)	1.25 (0.93-1.69)	1.25 (1.00-1.55)	1.49 (1.14-1.94)	2.51 (1.85-3.41)	1.19 (0.96-1.46)	1.08 (0.86-1.36)	1.08 (0.84-1.38)	1.21 (0.99-1.48)
High (T3)	0.71 (0.44-1.15)	0.94 (0.65-1.36)	1.53 (1.08-2.18)	1.02 (0.60-1.74)	1.30 (0.99-1.72)	0.81 (0.58-1.14)	1.09 (0.77-1.56)	1.15 (0.81-1.65)
P-interaction	0.036	0.22	0.72	0.019	0.40	0.50	0.37	0.84
By hPDI score								
Low (T1/T2)	1.29 (0.93-1.77)	1.15 (0.91-1.46)	1.54 (1.14-2.08)	2.49 (1.76-3.54)	1.22 (0.98-1.51)	1.02 (0.81-1.29)	1.13 (0.89-1.44)	1.23 (0.98-1.54)
High (T3)	0.79 (0.56-1.10)	1.15 (0.82-1.61)	1.40 (1.10-1.77)	1.19 (0.75-1.86)	1.30 (0.98-1.71)	1.02 (0.78-1.34)	1.09 (0.83-1.43)	1.24 (0.92-1.67)
P-interaction	0.048	0.60	0.91	0.018	0.90	0.93	0.42	0.89

aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index; SD, standard deviation; T, tertile.

Results are relative risks (95% CI) from survey Poisson regressions with adjustment for age, sex, study field center, Hispanic/Latino background, education, annual household income, smoking status, drinking status, total energy intake, physical activity, BMI, hypertension, dyslipidemia, and fasting hours for blood samples.
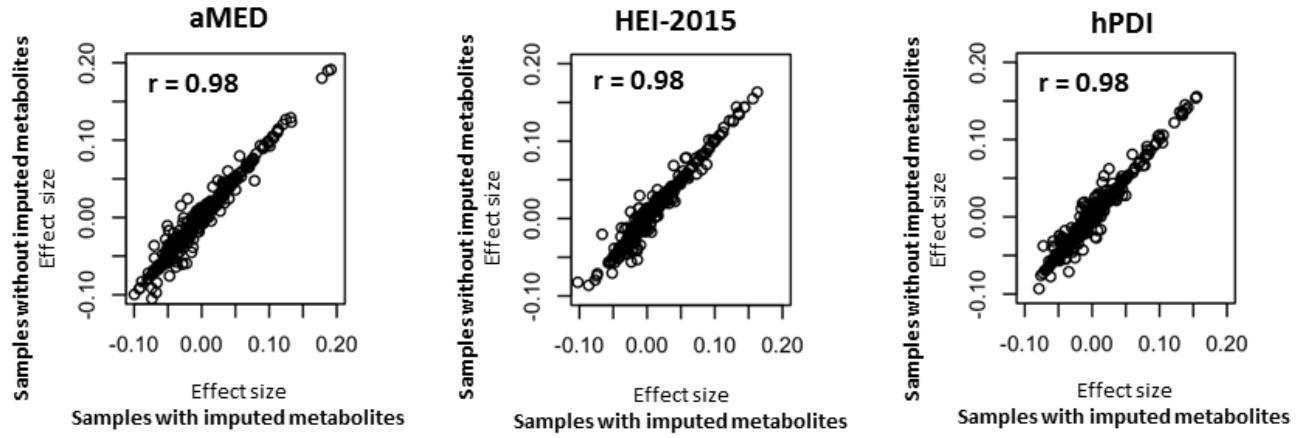
ESM Fig. 1. Principal component analysis that distinguished between individuals with high (top quintile) and those with low (bottom quintile) dietary pattern scores.

The analyses were based on all 624 metabolites (A to C) or the 40 metabolites that were associated with all 3 dietary pattern scores (D to E)

ESM Fig. 2. Comparison of the relationships between serum metabolites and 3 dietary patterns before and after excluding individuals with undetectable metabolites.
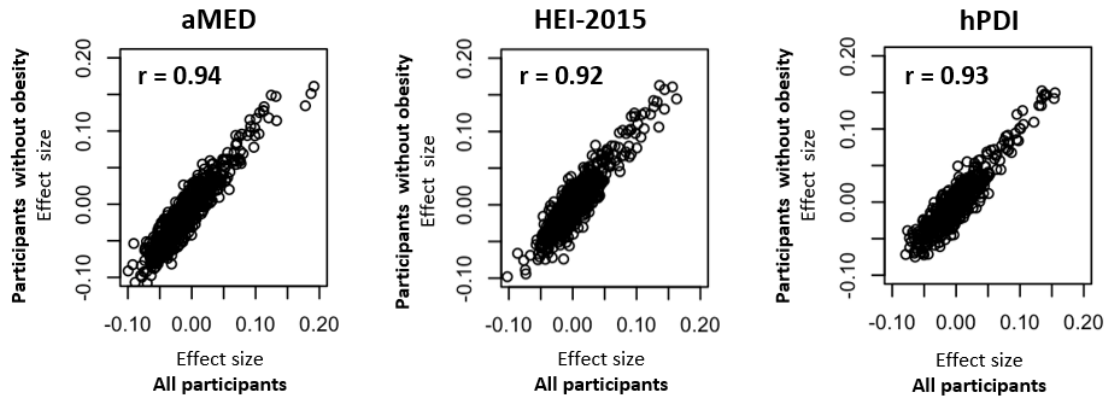
Effect sizes are regression coefficients from survey linear regression models with adjustment for age, sex, study field center, Hispanic/Latino background, education, annual household income, smoking status, drinking status (not for aMED-only metabolite score), total energy intake, physical activity, BMI, use of antihypertensive drugs, use of lipid-lowering drugs, and fasting hours for blood samples. aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index.

ESM Fig. 3. Comparison of the relationships between serum metabolites and 3 dietary patterns before and after excluding obese individuals or individuals with Dominican heritage.

Effect sizes are regression coefficients from survey linear regression models with adjustment for age, sex, study field center, Hispanic/Latino background, education, annual household income, smoking status, drinking status (not for aMED-only metabolite score), total energy intake, physical activity, BMI, use of antihypertensive drugs, use of lipid-lowering drugs, and fasting hours for blood samples. aMED, alternate Mediterranean diet; HEI, Healthy Eating Index; hPDI, healthful Plant-based Diet Index.