

## **SUPPLEMENTAL MATERIAL**

### **A Nutrient-Wide Association Study on Blood Pressure**

**Short title: A nutrient-wide association study**

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**Online Supplementary Figure 1**

## Online Supplementary Tables

**Supplementary Table 1. Descriptive characteristics of INTERMAP study participants by country**

Variable	China (N=1145)		Japan (N=839)		UK (N=501)		US (N=2195)	
	Mean or %	SD	Mean or %	SD	Mean	SD	Mean	SD
Age (years)	49.37	5.31	48.96	5.80	49.15	5.61	49.14	5.39
Height (m)	1.61	0.09	1.59	0.08	1.69	0.09	1.68	0.10
Weight (kg)	61.22	10.15	58.93	10.01	78.22	15.25	82.25	19.56
Body mass index (kg/m <sup>2</sup> )	23.43	2.91	23.13	3.36	27.46	4.64	28.90	5.92
Males	50.0%		50.4%		46.9%		49.7%	
Previous heart disease, stroke or diabetes	11.4%		7%		10.8%		15.6%	
Family history of hypertension	46.1%		35.5%		48.3%		67.9%	
Systolic BP	117.24	13.79	121.26	17.42	120.40	14.55	118.60	13.89
Diastolic BP	73.64	10.30	73.19	10.22	77.29	9.93	73.41	9.68
<i>Urinary excretion</i>								
Urinary sodium to potassium ratio	4.23	1.24	6.31	2.83	2.23	0.80	3.04	1.20
Urinary calcium (mmol/24h)	4.30	1.74	4.47	2.09	4.04	1.96	4.21	2.17
Urinary magnesium (mmol/24h)	3.22	0.95	4.08	1.27	3.71	1.13	4.25	1.58
<i>Nutrients from foods</i>								
Estimated Dietary Total Protein	69.65	16.41	59.59	16.86	68.16	18.82	73.13	23.44
Alcohol (gm)	17.02	22.58	8.62	21.37	14.73	19.20	6.95	13.69
Animal protein (mg/day)	45.15	16.00	12.83	13.22	51.35	20.73	55.94	23.62
Beta-Carotene (mcg.day)	2978.93	2016.87	2399.88	2066.96	2207.40	1711.44	3941.94	3769.61
Caffeine (mg/day)	134.52	97.25	13.09	31.21	258.93	150.47	260.40	258.27
Calcium (mg/day)	606.12	221.24	302.50	142.45	933.04	319.15	791.30	371.61
Cholesterol (mg/day)	402.50	163.81	181.67	181.44	261.78	133.44	296.33	159.87
Copper (mg/day)	1.36	0.41	2.37	0.72	1.37	0.45	1.46	0.57
Total energy intake (kcal/day)	2038.64	449.05	2035.84	576.77	2167.78	631.80	2244.20	698.70
Folacin (mcg/day)	360.72	127.02	293.57	135.40	298.08	108.69	290.38	128.53
Iron (mg/day)	10.66	2.85	15.81	5.68	13.08	4.22	16.88	7.09
Magnesium (mg/day)	268.97	65.99	308.23	115.26	319.62	93.82	318.66	111.91
Myristoleic acid (g/day)	0.10	0.07	0.01	0.01	0.20	0.15	0.07	0.09
Palmitoleic acid (g/day)	1.01	0.40	0.542309297	0.44	1.50	0.75	1.55	0.85
Oleic acid (g/day)	18.31	6.18	15.35	8.15	24.75	9.99	29.75	12.59
Gadoleic acid (g/day)	0.61	0.31	0.32	0.30	0.48	0.32	0.19	0.14

Erucic acid (g/day)	0.35	0.29	2.27	3.28	0.32	0.27	0.05	0.10
Niacin (mg)	16.29	5.15	13.77	5.36	22.99	12.69	25.14	8.64
Pantothenic Acid (mg)	5.96	1.42	4.44	1.56	5.44	1.68	4.92	2.01
Linoleic acid (g/day)	11.26	3.86	12.16	6.64	13.30	6.30	15.82	7.31
Linolenic acid (g/day)	1.84	0.73	1.23	0.91	1.39	0.64	1.69	0.84
PFA 18:4 (gm)	0.08	0.07			0.00	0.01	0.00	0.02
Arachidonic acid (g/day)	0.16	0.06	0.04	0.04	0.18	0.11	0.15	0.10
Eicosapentaenoic acid (g/day)	0.39	0.28	0.02	0.04	0.12	0.16	0.05	0.10
Docosapentaenoic acid (g/day)	0.10	0.08	0.00	0.00	0.09	0.06	0.02	0.04
Docosahexaenoic acid (g/day)	0.66	0.39	0.01	0.02	0.15	0.20	0.10	0.19
Phosphorus (mg/day)	1134.43	282.34	878.92	306.64	1392.29	410.37	1295.33	441.41
Potassium (mg/day)	2786.88	700.87	1850.46	582.62	3355.49	901.08	2909.41	1006.63
Total Protein (g/day)	80.71	19.86	63.00	19.70	83.47	25.13	84.92	28.40
Retinol (mcg/day)	373.13	706.06	98.10	171.71	468.65	451.76	467.95	527.50
Riboflavin (mg)	1.40	0.41	0.70	0.25	1.85	0.73	2.00	0.76
Selenium (mcg/day)	171.05	74.62	33.93	13.64	94.57	37.94	131.48	65.17
SFA 4:0 (gm)	0.19	0.16			0.58	0.49	0.46	0.37
Caproic acid (g/day)	0.12	0.10	0.00	0.00	0.36	0.30	0.23	0.19
Caprylic acid (g/day)	0.08	0.07	0.00	0.01	0.27	0.21	0.22	0.19
Capric acid (g/day)	0.15	0.13	0.01	0.01	0.58	0.45	0.43	0.30
Lauric acid (g/day)	0.22	0.20	0.06	0.09	1.30	0.95	1.00	1.06
Myristic acid (g/day)	1.07	0.54	0.26	0.19	3.14	1.88	2.27	1.35
Palmitic acid (g/day)	9.10	2.92	7.60	3.87	15.55	6.63	15.16	6.46
Stearic acid (g/day)	3.45	1.28	2.66	1.80	7.70	3.48	7.58	3.45
Arachidic acid (g/day)	0.20	0.08	0.26	0.16	0.25	0.14	0.03	0.06
Behenic acid (g/day)	0.08	0.06	0.56	0.47	0.22	0.20	0.04	0.08
Starch (g/day)	179.22	53.83	282.88	90.41	145.01	48.81	125.11	44.82
Sugar (g/day)	93.66	27.02	43.97	30.88	107.76	42.51	148.78	65.54
Total Fibre (gm)	15.63	4.77	28.14	9.50	25.47	9.22	19.11	7.87
Thiamin (mg)	0.92	0.25	1.05	0.33	1.93	1.51	1.89	0.67
Omega-3 polyunsaturates (g/day)	3.07	1.12	1.25	0.92	1.76	0.80	1.87	0.93
Omega-6 polyunsaturates (g/day)	11.45	3.88	12.20	6.65	13.49	6.33	15.97	7.35
Dietary Vitamin E (mg/day)	10.02	3.24	10.80	4.64	9.73	4.65	9.99	5.05
Dietary Total Carbohydrate (g/day)	272.89	63.56	326.85	99.44	252.77	76.60	273.90	91.50
Dietary Total Fat (g/day)	56.80	16.65	45.94	20.37	80.96	31.74	84.35	33.94

Dietary Total MFA (g/day)	20.60	6.73	18.53	8.65	27.26	10.98	31.88	13.46
Dietary Total PFA (g/day)	14.58	4.63	13.49	6.99	15.24	6.87	17.94	8.11
Dietary Total SFA (g/day)	14.98	5.13	11.51	5.87	29.94	13.63	28.03	12.54
Total trans-fatty acids (g/day)	0.99	0.67	0.42	0.80	3.34	1.93	5.03	2.83
Dietary Total Vitamin A (RE)	870.11	767.52	496.88	392.07	838.24	538.13	1124.94	843.74
Trans-octadecenoic acid (mg)	0.82	0.61	0.29	0.64	2.41	1.37	4.28	2.49
Trans-octadecenoic (mg)	0.15	0.07	0.09	0.16	0.50	0.45	0.64	0.35
Vegetable Protein (g/day)	35.56	8.43	50.19	15.65	32.12	10.74	28.02	10.77
Vitamin A (IU/day)	6208.38	4011.10	4326.81	3518.85	5240.96	3242.98	8141.09	6634.26
Vitamin B12 (mcg)	9.03	5.63	1.00	1.55	4.76	2.63	5.06	5.31
Vitamin B6 (mg)	1.29	0.38	1.57	0.57	2.07	0.79	1.95	0.76
Vitamin C	128.61	76.15	77.71	40.65	86.30	54.80	110.53	76.40
Sum of EPA, DPA and DHA (gr/day)	1.15	0.73	0.02	0.05	0.36	0.38	0.18	0.31
Alanine (g/day)	4.08	1.07	3.16	1.14	3.81	1.26	4.07	1.48
Arginine (g/day)	4.83	1.25	3.60	1.36	4.38	1.41	4.70	1.69
Spartic acid (g/day)	7.49	1.91	5.19	1.98	7.25	2.21	7.22	2.53
Cystine (g/day)	1.26	0.28	1.33	0.38	1.15	0.34	1.14	0.37
Glutamic acid (g/day)	14.19	3.19	14.97	5.09	16.83	4.88	16.54	5.34
Glycine (g/day)	3.46	0.94	2.74	1.02	3.43	1.15	3.63	1.37
Histidine (g/day)	2.53	0.73	1.48	0.53	2.30	0.75	2.38	0.85
Isoleucine (g/day)	3.56	0.89	2.54	0.84	3.83	1.18	3.86	1.33
Leucine (g/day)	6.21	1.52	4.86	1.53	6.38	1.95	6.57	2.24
Lysine (g/day)	5.27	1.50	2.84	1.36	5.41	1.84	5.69	2.12
Methionine (g/day)	1.89	0.50	1.09	0.41	1.84	0.60	1.93	0.69
Phenylalanine (g/day)	3.57	0.83	3.07	0.95	3.68	1.09	3.69	1.22
Proline (g/day)	4.50	1.07	3.93	1.89	5.69	1.69	5.45	1.83
Threonine (g/day)	3.16	0.82	2.28	0.82	3.20	1.01	3.28	1.15
Tryptophan (g/day)	0.95	0.23	0.92	0.30	1.01	0.30	0.99	0.34
Tyrosine (g/day)	2.74	0.68	2.14	0.71	2.90	0.88	2.96	1.02
Valine (g/day)	4.24	1.03	3.36	1.12	4.30	1.30	4.30	1.46
<i>Nutrients from foods and supplements</i>								
Alanine (gm)	4.09	1.08	3.16	1.14	3.82	1.28	4.07	1.48
Potassium (mg)	2790.67	702.62	1850.46	582.62	3356.33	901.11	2928.92	1011.98
Alcohol (gm)	15.96	22.47	8.96	22.07	13.42	19.54	6.83	15.35
Proline (gm)	4.50	1.08	3.93	1.89	5.69	1.70	5.45	1.83

Animal protein (gm)	45.15	16.00	12.83	13.22	51.35	20.73	55.94	23.62
Protein (gm)	80.87	20.05	63.00	19.70	83.67	25.67	84.94	28.40
Arginine (gm)	4.84	1.26	3.60	1.36	4.38	1.41	4.70	1.69
Retinol (mcg)	390.69	758.35	98.10	171.71	621.73	587.75	873.94	1068.05
Aspartic acid (gm)	7.51	1.93	5.19	1.98	7.26	2.24	7.22	2.53
Riboflavin (mg)	1.63	1.24	0.70	0.29	2.87	13.85	5.82	13.98
Beta-Carotene (mcg)	3046.47	2204.81	2399.88	2066.96	2354.19	2159.80	4543.74	4475.66
Selenium (mcg)	171.09	74.62	33.93	13.64	96.39	39.44	141.77	73.99
Caffeine (mg)	135.88	97.33	13.09	31.21	258.93	150.47	260.40	258.27
Serine (gm)	3.55	0.85	2.99	0.93	3.77	1.13	3.80	1.26
Calcium (mg)	614.62	233.73	303.22	144.01	955.81	355.94	937.71	498.05
SFA 6:0 (gm)	0.12	0.10	0.00	0.00	0.36	0.30	0.23	0.19
Cholesterol (mg)	402.50	163.81	181.67	181.44	262.62	133.77	296.42	159.85
SFA 8:0 (gm)	0.08	0.07	0.00	0.01	0.27	0.21	0.22	0.19
Copper (mg)	1.36	0.41	2.37	0.72	1.38	0.47	2.13	5.25
SFA 10:0 (gm)	0.15	0.13	0.01	0.01	0.58	0.45	0.43	0.30
Cystine (gm)	1.27	0.28	1.33	0.38	1.15	0.35	1.14	0.37
SFA 12:0 (gm)	0.22	0.20	0.06	0.09	1.30	0.95	1.00	1.06
Glutamic acid (gm)	14.23	3.24	14.97	5.09	16.84	4.90	16.55	5.34
SFA 14:0 (gm)	1.07	0.54	0.26	0.19	3.14	1.88	2.27	1.35
Glycine (gm)	3.47	0.95	2.74	1.02	3.45	1.24	3.63	1.37
SFA 16:0 (gm)	9.10	2.92	7.60	3.87	15.57	6.64	15.17	6.46
Histidine (gm)	2.54	0.73	1.48	0.53	2.30	0.76	2.38	0.85
Iron (mg)	10.82	3.57	16.53	21.33	14.31	8.28	23.21	32.59
SFA 18:0 (gm)	3.45	1.28	2.66	1.80	7.70	3.48	7.58	3.45
Isoleucine (gm)	3.57	0.90	2.54	0.84	3.84	1.20	3.86	1.33
SFA 20:0 (gm)	0.20	0.08	0.26	0.16	0.25	0.14	0.03	0.06
PFA 22:5 (gm)	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Leucine (gm)	6.23	1.54	4.86	1.53	6.39	1.97	6.57	2.24
SFA 22:0 (gm)	0.08	0.06	0.56	0.47	0.22	0.20	0.04	0.09
PFA 20:5 (gm)	0.17	0.11	0.01	0.02	0.00	0.00	0.02	0.05
Lysine (gm)	5.28	1.51	2.84	1.36	5.43	1.87	5.70	2.13
Magnesium (mg)	269.50	66.16	308.23	115.26	325.73	112.01	359.01	162.26
Starch (gm)	179.22	53.83	282.88	90.41	145.01	48.81	125.13	44.82
Methionine (gm)	1.90	0.51	1.09	0.41	1.85	0.61	1.93	0.69

Total fibre (gr)	15.63	4.77	28.14	9.50	25.47	9.22	19.17	7.91
MFA 14:1 (gm)	0.10	0.07	0.01	0.01	0.20	0.15	0.07	0.09
Threonine (mg)	3.17	0.82	2.28	0.82	3.21	1.02	3.28	1.15
MFA 16:1 (gm)	1.01	0.40	0.54	0.44	1.52	0.76	1.55	0.85
Total alpha-toc eq (mg)	12.62	16.88	11.28	9.17	12.42	14.45	70.82	143.50
MFA 18:1 (gm)	18.31	6.18	15.35	8.15	24.78	10.00	29.76	12.59
Total Carbohydrate (gm)	273.34	63.65	326.85	99.44	252.80	76.59	274.05	91.49
MFA 20:1 (gm)	0.61	0.31	0.32	0.30	0.50	0.34	0.19	0.15
Total Fat (gm)	56.80	16.65	45.94	20.37	81.24	31.81	84.39	33.94
MFA 22:1 (gm)	0.35	0.29	2.27	3.28	0.33	0.28	0.05	0.11
Total MFA (gm)	20.60	6.73	18.53	8.65	27.33	11.01	31.89	13.47
Niacin (mg)	16.41	5.28	13.82	5.43	25.19	19.43	39.20	54.74
Total PFA (gm)	14.58	4.63	13.49	6.99	15.29	6.89	17.96	8.12
Linoleic acid (gm)	11.26	3.86	12.16	6.64	13.31	6.30	15.83	7.31
Total fatty acids (gm)	14.98	5.13	11.51	5.87	29.97	13.63	28.03	12.54
Linolenic acid (gm)	1.84	0.73	1.23	0.91	1.40	0.64	1.69	0.84
Vitamin A (mg)	899.02	837.56	496.88	392.07	966.39	735.18	1631.23	1398.19
Eicosapentaenoic acid (gm)	0.16	0.06	0.04	0.04	0.18	0.11	0.15	0.10
Tryptophan (gm)	0.95	0.23	0.92	0.30	1.01	0.30	0.99	0.34
Docosapentaenoic acid (gm)	0.39	0.28	0.02	0.04			0.05	0.11
Tyrosine (gm)	2.74	0.69	2.14	0.71	2.90	0.90	2.97	1.02
Docosahexaenoic acid (gm)	0.66	0.39	0.01	0.02	0.16	0.21	0.11	0.20
Valine (gm)	4.24	1.04	3.36	1.12	4.31	1.32	4.30	1.46
Phenylalanine (gm)	3.58	0.85	3.07	0.95	3.68	1.10	3.70	1.22
Vegetable protein (gm)	35.56	8.43	50.19	15.65	32.12	10.74	28.02	10.77
Phosphorous (mg)	1136.41	283.41	878.92	306.64	1394.55	411.17	1318.64	450.61
Vitamin A (IU)	6380.37	4428.95	4326.81	3518.85	5881.70	4082.31	10672.53	8823.85
Thiamin (mg)	3.14	11.57	1.36	2.14	4.70	30.87	6.20	15.71
Vitamin B12 (mcg)	27.69	185.32	1.00	1.56	5.34	6.64	19.20	78.55
Vitamin B6 (mg)	2.01	5.85	1.75	2.66	2.66	5.70	7.15	20.19
Vitamin C (mg)	138.49	100.45	79.80	44.31	108.09	111.71	297.13	528.06
Folate (mcg)	363.02	130.07	293.57	135.40	323.08	159.68	409.35	264.08
Omega 3 (mg)	3.07	1.12	1.25	0.92	1.79	0.83	1.88	0.94
Omega 6 (mg)	11.45	3.88	12.20	6.65	13.50	6.33	15.98	7.35

**Supplementary Table 2. Descriptive characteristics of NHANES cohorts**

Variable	1999-2000		2001-2002		2003-2004		2005-2006	
	Mean or %	SD	Mean or %	SD	Mean or %	SD	Mean or %	SD
Age (years)	41.76	14.9	42.44	14.86	43.54	15.52	44.3	15.88
Sex (Males)	47.90%		47.60%		48.30%		46.80%	
<i>Ethnicity</i>								
Non Hispanic White	70.60%		71.80%		73.20%		71.70%	
Mexican American	6.60%		7.80%		8.50%		8.90%	
Non Hispanic Blacks	9.90%		10%		10.30%		10.40%	
Other Hispanic	8.80%		5.90%		3.50%		3.70%	
Other	4.20%		4.50%		4.40%		5.40%	
Diastolic BP	71.86	11.73	71.33	12	70.61	11.46	69.46	12.03
Systolic BP	117.82	14.63	117.65	14.15	118.1	13.88	117.88	14.07
<i>Self-reported disease</i>								
Cardiovascular disease, %	9.4		10.4		12.2		11.5	
Diabetes	4.1		5.4		6.5		6.2	
Family history of heart disease	29.7		32		32.1		14.9	
Body Mass Index (kg/m <sup>2</sup> )	27.64	6.18	27.79	6.28	28.01	6.12	28.23	6.32
Total energy intake (kg/day)	2252.22	1044.99	2270.72	1045.95	2234.94	899.13	2155.54	862.92
<i>Physical Activity</i>								
Inactivity	21.6		17.2		14.8		13.7	
Low	27		27.8		31.7		29.6	
Medium	19.8		19.1		20.2		20.8	
High	31.5		35.9		33.3		36	
Calcium (mg)	860.53	607.28	890.84	611.72	913.42	520.08	952.59	511.81
Alcohol (gm)	8.27	33.12	8.81	29.29	8.03	24.41	7.73	20.21
Iron (mg)	15.21	9.55	15.36	9.62	15.81	7.91	15.97	8.1
Magnesium (mg)	272.87	151.28	267.05	141.49	266.96	120.57	281.73	126.13
MFA 16:1 (Hexadecenoic) (gm)	1.48	1.14	1.28	0.96	1.3	0.8	1.23	0.76

Phosphorus (mg)	1283.59	653.2	1315.1	685.55	1319.53	571.55	1316.3	568.73
Carbohydrate (gm)	276.81	138.72	276.94	135.29	267.74	115.31	260.34	110.73
Vitamin A, RAE (mcg)			604.51	742.87	604.32	512.65	627.39	497.49
Dietary fiber (gm)	14.76	10.32	15.06	9.61	14.92	7.94	15.16	7.94
Copper (mg)	1.23	0.86	1.26	1.18	1.21	0.8	1.3	0.82
Folic acid (mcg)			206.39	207.39	205.55	168.03	204.62	170.63
Riboflavin (Vitamin B2) (mg)	1.97	1.14	2.19	1.24	2.26	1.1	2.24	1.12
Thiamin (Vitamin B1) (mg)	1.63	0.94	1.6	0.94	1.67	0.79	1.66	0.86
Vitamin B6 (mg)	1.8	1.19	1.82	1.22	1.86	0.99	1.97	1.12
Iron (ug/dL)	89.67	37.46	88.22	38.49	81.24	36.35	78.81	35.97
Phosphorus (mg/dL)	3.52	0.58	3.82	0.6	3.88	0.59	3.91	0.62
Folate, serum (ng/mL)	16.27	10.17	14.56	8.96	14.14	13.74	14.23	9.4
Dietary Sodium/Potassium Ratio	1.43	0.7	1.4	0.75	1.37	0.53	1.39	0.55



**Supplementary Table 3. Adjusted estimated differences in systolic and diastolic blood pressure associated with nutrients received from foods and supplements variables higher by 1SD in INTERMAP testing set excluding individuals on special diet. Only variables that were tentatively validated in INTERMAP testing set are shown.**

Dietary variable	INTERMAP Testing set	
	Difference (95% CI)	p value
<b>Systolic Blood Pressure</b>		
<i>Nutrients from foods</i>		
Alcohol	3.5 (2.2, 4.8)	10-7
Vegetable Protein	-3.8 (-6.0, -1.6)	10-3
Riboflavin	-2.2 (-3.8, -0.55)	0.008
Non-heme iron	-0.75 (-1.72, 0.22)	0.13
Total Fibre	-0.79 (-1.69, 0.11)	0.08
Thiamin	-4.0 (-6.0, -2.0)	10-4
Glutamic acid	-2.2 (-3.8, -0.57)	0.008
Magnesium	2.1 (1.2, 2.9)	10-6
Phosphorus	-1.9 (-3.4, -0.42)	0.01
Copper	-2.1 (-3.5, -0.74)	0.003
Folacin	-1.1 (-2.3, -0.03)	0.04
<i>Urinary excretion</i>		
Calcium	0.90 (0.28,1.53)	0.004
Sodium to potassium ratio <sup>#</sup>	1.75 (0.79,2.71)	10-3
<i>Nutrient from foods and supplements</i>		
Alcohol	1.62 (0.95,2.29)	10-6
Vegetable Protein	-1.58 (-2.81,-0.34)	0.01
Total Fibre	-0.81 (-1.71,0.09)	0.08
Phosphorus	-1.62 (-2.74,-0.50)	0.005
Magnesium	-0.92 (-1.91,0.06)	0.07
<b>Diastolic Blood Pressure</b>		
<i>Nutrients from foods</i>		
Alcohol	1.00 (0.54,1.46)	10-5
Vegetable Protein	-1.04 (-1.89,-0.19)	0.02
Riboflavin	-0.91 (-1.65,-0.17)	0.02
Phosphorus	-1.01 (-1.79,-0.23)	0.01
Magnesium	-0.84 (-1.50,-0.17)	0.01
Folacin		0.02
<i>Nutrient from foods and supplements</i>		
Alcohol	1.00 (0.54,1.46)	10-5
Vegetable Protein	-1.04 (-1.89,-0.19)	0.02
Phosphorus	-0.94 (-1.73,-0.16)	0.02
Magnesium	-0.64 (-1.32,0.04)	0.06

Analyses are adjusted for age, sex, reported special diet, use of dietary supplements, moderate or heavy physical activity (hours daily), doctor diagnosed cardiovascular disease and diabetes, family history of hypertension, height, weight and total energy intake. The SDs for each variable are listed in Tables 1 and 2.

**Supplementary Table 4. Multivariable analysis in INTERMAP training and testing set. Only variables selected based on FDR<5% and AIC criterion are shown.**

	INTERMAP training set		INTERMAP testing set	
	Effect size per SD	P value	Effect size per SD	P value
<i>Systolic blood pressure</i>				
Alcohol	1.46 (0.89,2.04)	10 <sup>-7</sup>	1.39 (0.74,2.04)	10 <sup>-5</sup>
Urinary calcium	0.78 (0.21,1.36)	0.008	1.05 (0.46,1.63)	10 <sup>-3</sup>
Urinary sodium to potassium ratio	0.91 (0.08,1.75)	0.031	1.53 (0.66,2.40)	0.001
Phosphorus (diet and supplement)	1.82 (0.22,3.42)	0.026	-1.41 (-3.08,0.27)	0.099
Retinol	-0.61 (-1.22,-0.01)	0.047	-0.15 (-0.75,0.46)	0.637
Magnesium (diet and supplement)	-0.71 (-1.52,0.11)	0.089	-0.21 (-1.23,0.81)	0.687
Vitamin B6 (diet and supplement)	-0.67 (-1.28,-0.06)	0.032	0.08 (-0.52,0.68)	0.795
Nonheme iron	-6.26 (-12.99,0.47)	0.068	-0.73 (-6.70,5.23)	0.810
Vitamin B12 (diet and supplement)	0.67 (0.23,1.12)	0.003	0.05 (-0.64,0.74)	0.885
Iron	5.39 (-1.58,12.35)	0.129	0.42 (-5.58,6.42)	0.891
Phenylalanine	-1.77 (-3.34,-0.19)	0.028	-0.02 (-1.63,1.58)	0.978
<i>Diastolic blood pressure</i>				
Alcohol	0.64 (0.25,1.03)	0.001	0.94 (0.49,1.39)	10 <sup>-5</sup>
Phosphorus	0.97 (-0.12,2.06)	0.081	-1.19 (-2.31,-0.08)	0.035
Leucine	3.19 (-0.73,7.11)	0.111	2.55 (-1.96,7.06)	0.267
Nonheme iron	-5.02 (-9.95,-0.09)	0.046	2.19 (-2.07,6.46)	0.313
Glutamic acid	-1.18 (-2.58,0.22)	0.099	-0.77 (-2.29,0.75)	0.319
Iron	4.56 (-0.50,9.62)	0.077	-2.14 (-6.39,2.10)	0.322
Vitamin B6 (diet and supplement)	-0.52 (-0.91,-0.13)	0.009	0.18 (-0.22,0.59)	0.371
Retinol (diet and supplement)	-0.56 (-1.02,-0.10)	0.016	-0.17 (-0.57,0.24)	0.418
Valine	-3.58 (-7.34,0.18)	0.062	-1.44 (-5.84,2.97)	0.522
Vitamin B12 (diet and supplement)	0.52 (0.21,0.82)	0.001	-0.15 (-0.62,0.32)	0.525

Analyses are adjusted for age, sex, reported special diet, use of dietary supplements, moderate or heavy physical activity (hours daily), doctor diagnosed cardiovascular disease and diabetes, family history of hypertension, height, weight, and total energy intake. The SDs for each variable are listed in Tables 1 and 2.

**Supplementary Table 5. Heterogeneity estimates using random effects meta-analysis across the INTERMAP training set**

	Systolic Blood Pressure			Diastolic Blood Pressure		
	Q	p value (Q)	I <sup>2</sup>	Q	p value (Q)	I <sup>2</sup>
Nutrients from foods						
Alcohol	17.68	0.34	0.00	18.28	0.31	1.51
Animal Protein	14.76	0.54	0.00	21.19	0.17	15.05
Beta-Carotene	12.12	0.74	0.00	20.80	0.19	13.46
Caffeine	17.62	0.35	0.00	13.98	0.60	0.00
Calcium	17.34	0.36	0.00	14.13	0.59	0.00
Cholesterol	28.01	0.03	35.75	28.28	0.03	36.36
Docosapentaenoic acid	13.09	0.67	0.00	10.14	0.86	0.00
Iron	15.49	0.49	0.00	6.43	0.98	0.00
Magnesium	13.77	0.62	0.00	17.39	0.36	0.00
Myristoleic acid	17.37	0.36	0.00	20.07	0.22	10.32
Palmitoleic acid	13.62	0.63	0.00	21.57	0.16	16.55
Oleic acid	14.97	0.53	0.00	12.02	0.74	0.00
Gadoleic acid	24.70	0.08	27.12	25.63	0.06	29.78
Erucic acid	20.47	0.20	12.05	16.68	0.41	0.00
Linoleic acid	23.87	0.09	24.60	30.64	0.01	41.25
Dietary PFA	4.54	0.97	0.00	4.67	0.97	0.00
Arachidonic acid	20.61	0.19	12.66	18.26	0.31	1.44
Eicosapentaenoic acid	27.30	0.04	34.07	21.35	0.17	15.68
Docosahexaenoic aci	14.87	0.53	0.00	13.95	0.60	0.00
Phosphorus	22.15	0.14	18.73	16.38	0.43	0.00
Linolenic acid	15.73	0.47	0.00	28.61	0.03	37.09
Sodium to potassium ratio	15.30	0.50	0.00	15.86	0.46	0.00
Total protein	14.62	0.55	0.00	15.70	0.47	0.00
Retinol	10.65	0.83	0.00	12.08	0.74	0.00
Selenium	13.06	0.67	0.00	16.18	0.44	0.00
Capric acid	24.22	0.08	25.68	18.04	0.32	0.24
Lauric acid	17.45	0.36	0.00	10.39	0.85	0.00
Myristic acid	23.28	0.11	22.69	18.49	0.30	2.66
Palmitic acid	18.00	0.32	0.02	14.43	0.57	0.00
Stearic acid	18.58	0.29	3.10	14.89	0.53	0.00
Arachidic acid	21.42	0.16	15.95	20.55	0.20	12.40
Behenic acid	19.23	0.26	6.39	17.86	0.33	0.00
SFA 4:0	20.62	0.08	27.26	19.02	0.12	21.15
Caproic acid	23.44	0.10	23.21	18.61	0.29	3.30
Caprylic acid	18.89	0.27	4.69	13.85	0.61	0.00
Starch	23.52	0.10	23.48	16.74	0.40	0.00
Total Fat	17.14	0.38	0.00	15.25	0.51	0.00
Total MFA	14.23	0.58	0.00	12.84	0.68	0.00
Total SFA	19.29	0.25	6.69	14.76	0.54	0.00

Total vitamin E	12.86	0.68	0.00	29.95	0.02	39.89
Total carbohydrates	17.24	0.37	0.00	21.75	0.15	17.24
Total Vitamin A	6.62	0.98	0.00	8.69	0.93	0.00
Omega-3 polyunsaturates	17.21	0.37	0.00	28.19	0.03	36.16
Omega-6 polyunsaturates	23.92	0.09	24.73	30.62	0.02	41.21
Total fibre	11.07	0.81	0.00	8.00	0.95	0.00
Trans-octadecenoic acid	25.75	0.06	30.11	19.58	0.24	8.07
Trans-octadecenoic acid	20.85	0.18	13.68	16.25	0.44	0.00
Total trans-fatty acids	23.00	0.11	21.75	16.41	0.42	0.00
Vegetable protein	11.12	0.80	0.00	9.95	0.87	0.00
Total PFA	23.27	0.11	22.66	32.12	0.01	43.96
Vitamin A	8.45	0.93	0.00	12.86	0.68	0.00
Vitamin C	18.25	0.31	1.35	18.44	0.30	2.38
Sugar	19.65	0.24	8.40	14.35	0.57	0.00
Cooper	16.50	0.42	0.00	14.57	0.56	0.00
Folacin	14.52	0.56	0.00	10.53	0.84	0.00
Niacin	17.09	0.38	0.00	29.55	0.02	39.09
Pantothenic Acid	12.71	0.69	0.00	14.54	0.56	0.00
Riboflavin	14.29	0.58	0.00	15.60	0.48	0.00
Thiamin	14.30	0.58	0.00	15.33	0.50	0.00
Vitamin B6	19.58	0.24	8.06	19.33	0.25	6.88
Vitamin B12	10.83	0.82	0.00	10.84	0.82	0.00
Heme iron	9.69	0.88	0.00	15.76	0.47	0.00
Non-heme iron	15.71	0.47	0.00	6.62	0.98	0.00
Alanine	12.76	0.69	0.00	16.05	0.45	0.00
Arginine	11.39	0.79	0.00	13.87	0.61	0.00
Aspartame	12.13	0.73	0.00	13.32	0.65	0.00
Glutamic acid	12.10	0.74	0.00	10.55	0.84	0.00
Glycine	9.72	0.88	0.00	15.55	0.48	0.00
Histidine	11.75	0.76	0.00	17.01	0.38	0.00
Isoleucine	14.11	0.59	0.00	14.76	0.54	0.00
Leucine	14.76	0.54	0.00	15.75	0.47	0.00
Lysine	12.47	0.71	0.00	16.53	0.42	0.00
Methionine	18.28	0.31	1.52	20.47	0.20	12.07
Phenylalanine	12.88	0.68	0.00	11.58	0.77	0.00
Proline	11.56	0.77	0.00	20.56	0.20	12.46
Serine	12.73	0.69	0.00	13.84	0.61	0.00
Cystine	10.50	0.84	0.00	10.82	0.82	0.00
Threonine	12.72	0.69	0.00	14.32	0.57	0.00
Tryptophan	16.96	0.39	0.00	13.30	0.65	0.00
Tyrosine	13.68	0.62	0.00	15.34	0.50	0.00
Valine	13.71	0.62	0.00	12.63	0.70	0.00
Sum of EPA, DPA and DHA	21.08	0.18	14.62	18.04	0.32	0.24
Urinary excretion						

Calcium	6.07	0.99	0.00	18.51	0.30	2.73
Magnesium	7.98	0.95	0.00	17.47	0.36	0.00
Sodium to potassium ratio	24.48	0.08	26.46	24.91	0.07	27.73
Nutrients from foods and supplements						
Alanine	13.01	0.67	0.00	16.04	0.45	0.00
Alcohol	17.69	0.34	0.00	18.27	0.31	1.48
Animal protein	14.76	0.54	0.00	21.18	0.17	15.03
Arginine	11.78	0.76	0.00	13.64	0.63	0.00
Aspartame	12.68	0.70	0.00	13.14	0.66	0.00
Beta-Carotene	8.11	0.95	0.00	16.74	0.40	0.00
Caffeine	18.04	0.32	0.20	14.42	0.57	0.00
Calcium	24.08	0.09	25.24	16.03	0.45	0.00
Cholesterol	27.77	0.03	35.18	27.96	0.03	35.63
Cooper	16.35	0.43	0.00	16.50	0.42	0.00
Cystine	10.95	0.81	0.00	10.81	0.82	0.00
Glutamic acid	12.51	0.71	0.00	10.71	0.83	0.00
Glycine	9.36	0.90	0.00	15.12	0.52	0.00
Histidine	12.20	0.73	0.00	17.27	0.37	0.00
Iron	18.78	0.28	4.14	8.73	0.92	0.00
Isoleucine	15.15	0.51	0.00	15.03	0.52	0.00
Leucine	15.82	0.47	0.00	16.03	0.45	0.00
Lysine	13.08	0.67	0.00	16.45	0.42	0.00
Magnesium	12.28	0.72	0.00	12.99	0.67	0.00
Methionine	18.83	0.28	4.41	20.30	0.21	11.34
Myristoleic acid	17.37	0.36	0.00	20.07	0.22	10.32
Palmitoleic acid	12.81	0.69	0.00	20.61	0.19	12.64
Oleic acid	14.91	0.53	0.00	12.04	0.74	0.00
Gadoleic acid	27.23	0.04	33.89	30.01	0.02	40.01
Erucic acid	22.18	0.14	18.86	19.34	0.25	6.91
Niacin	13.48	0.64	0.00	24.91	0.07	27.74
Linoleic acid	23.97	0.09	24.90	30.84	0.01	41.62
Linolenic acid	15.84	0.46	0.00	28.81	0.03	37.53
Arachidonic acid	20.00	0.22	10.00	17.70	0.34	0.00
Eicosapentaenoic acid	16.36	0.29	2.18	15.79	0.33	0.00
Gadoleic acid	16.66	0.27	3.94	10.48	0.73	0.00
Docosahexaenoic acid	2.53	0.87	0.00	2.27	0.89	0.00
Docosahexaenoic acid	14.01	0.60	0.00	13.03	0.67	0.00
Phenylalanine	14.11	0.59	0.00	12.11	0.74	0.00
Phosphorus	21.02	0.18	14.37	15.12	0.52	0.00
Sodium to potassium ratio	15.36	0.50	0.00	14.42	0.57	0.00
Proline	12.31	0.72	0.00	21.06	0.18	14.51
Total protein	15.04	0.52	0.00	15.64	0.48	0.00
Retinol	16.72	0.40	0.00	9.77	0.88	0.00
Riboflavin	36.29	0.00	50.40	22.14	0.14	18.68
Selenium	13.96	0.60	0.00	17.86	0.33	0.00

Serine	14.16	0.59	0.00	14.51	0.56	0.00
Capric acid	24.23	0.08	25.70	18.06	0.32	0.31
Lauric acid	17.45	0.36	0.00	10.39	0.85	0.00
Myristic acid	23.32	0.11	22.80	18.54	0.29	2.91
Palmitic acid	17.98	0.33	0.00	14.34	0.57	0.00
Stearic acid	18.57	0.29	3.06	14.85	0.54	0.00
Arachidic acid	21.42	0.16	15.96	20.55	0.20	12.40
Behenic acid	19.27	0.25	6.60	17.94	0.33	0.00
SFA 4:0	23.44	0.10	23.21	18.61	0.29	3.30
Caproic acid	18.86	0.28	4.56	13.91	0.61	0.00
Caprylic acid	23.52	0.10	23.45	16.74	0.40	0.00
Thiamin	13.26	0.65	0.00	5.60	0.99	0.00
Threonine	13.58	0.63	0.00	14.49	0.56	0.00
Total Fat	17.29	0.37	0.00	15.42	0.49	0.00
Total MFA	14.12	0.59	0.00	12.90	0.68	0.00
Total PFA	23.97	0.09	24.92	32.85	0.01	45.20
Total SFA	19.28	0.25	6.63	14.70	0.55	0.00
Total vitamin E	24.59	0.08	26.81	18.92	0.27	4.88
Total carbohydrates	16.83	0.40	0.00	21.69	0.15	17.03
Total Vitamin A	11.50	0.78	0.00	7.57	0.96	0.00
Tryptophan	18.39	0.30	2.10	13.77	0.62	0.00
Tyrosine	14.57	0.56	0.00	15.53	0.49	0.00
Valine	14.96	0.53	0.00	13.12	0.66	0.00
Vegetable protein	11.12	0.80	0.00	9.94	0.87	0.00
Vitamin B6	16.86	0.39	0.00	19.15	0.26	6.00
Vitamin B12	25.22	0.07	28.63	34.39	0.00	47.66
Vitamin C	20.29	0.21	11.28	23.92	0.09	24.74
Total fibre	10.15	0.86	0.00	7.38	0.97	0.00
Vitamin A	11.14	0.80	0.00	12.60	0.70	0.00
Folacin	14.83	0.54	0.00	9.19	0.91	0.00
Omega-3 polyunsaturates	17.86	0.33	0.00	30.14	0.02	40.27
Omega-6 polyunsaturates	24.04	0.09	25.13	30.84	0.01	41.64

**Supplementary Table 6. Heterogeneity estimates for random effects meta-analysis across the INTERMAP testing set**

	Systolic Blood Pressure			Diastolic Blood Pressure		
	Q	p value (Q)	I <sup>2</sup>	Q	p value (Q)	I <sup>2</sup>
Nutrients from foods						
Alcohol	47.76	0.00	62.31	46.93	0.00	61.64
Animal Protein	9.33	0.90	0.00	10.83	0.82	0.00
Beta-Carotene	8.23	0.94	0.00	12.62	0.70	0.00
Caffeine	17.00	0.39	0.00	12.13	0.74	0.00
Calcium	13.43	0.64	0.00	7.47	0.96	0.00
Cholesterol	18.59	0.29	3.19	23.87	0.09	24.60
Docosapentaenoic acid	11.35	0.73	0.00	12.04	0.68	0.00
Iron	18.03	0.32	0.19	29.04	0.02	38.02
Magnesium	5.94	0.99	0.00	13.15	0.66	0.00
Myristoleic acid	17.78	0.34	0.00	21.30	0.17	15.51
Palmitoleic acid	19.98	0.22	9.92	16.15	0.44	0.00
Oleic acid	13.04	0.67	0.00	12.08	0.74	0.00
Gadoleic acid	18.38	0.30	2.05	16.25	0.44	0.00
Erucic acid	23.00	0.11	21.74	19.65	0.24	8.38
Linoleic acid	9.90	0.87	0.00	16.29	0.43	0.00
Linolenic acid	19.87	0.23	9.39	23.97	0.09	24.90
Dietary PFA	8.99	0.62	0.00	11.09	0.44	0.00
Arachidonic acid	10.87	0.82	0.00	13.97	0.60	0.00
Eicosapentaenoic acid	10.97	0.81	0.00	11.17	0.80	0.00
Docosahexaenoic acid	12.30	0.72	0.00	11.42	0.78	0.00
Phosphorus	11.50	0.78	0.00	16.33	0.43	0.00
Sodium to potassium ratio	8.14	0.94	0.00	5.52	0.99	0.00
Total protein	7.51	0.96	0.00	8.43	0.93	0.00
Retinol	11.60	0.77	0.00	13.86	0.61	0.00
Selenium	7.51	0.96	0.00	12.16	0.73	0.00
Capric acid	12.71	0.69	0.00	14.57	0.56	0.00
Lauric acid	11.82	0.76	0.00	24.15	0.09	25.46
Myristic acid	11.43	0.78	0.00	19.19	0.26	6.18
Palmitic acid	16.04	0.45	0.00	17.08	0.38	0.00
Stearic acid	17.74	0.34	0.00	22.39	0.13	19.60
Arachidic acid	6.66	0.98	0.00	18.16	0.31	0.90
Behenic acid	7.63	0.96	0.00	16.31	0.43	0.00
SFA 4:0	15.91	0.25	5.73	12.61	0.48	0.00
Caproic acid	20.24	0.21	11.06	15.63	0.48	0.00
Caprylic acid	14.63	0.55	0.00	19.99	0.22	9.95
Starch	25.26	0.07	28.74	28.43	0.03	36.69
Total Fat	13.02	0.67	0.00	15.42	0.49	0.00
Total MFA	12.35	0.72	0.00	10.00	0.87	0.00
Total PFA	10.13	0.86	0.00	17.28	0.37	0.00

Total SFA	15.26	0.51	0.00	19.24	0.26	6.45
Total vitamin E	12.18	0.73	0.00	14.37	0.57	0.00
Total carbohydrates	31.72	0.01	43.26	37.88	0.00	52.49
Total Vitamin A	6.49	0.98	0.00	11.06	0.81	0.00
Omega-3 polyunsaturates	17.55	0.35	0.00	20.11	0.22	10.49
Omega-6 polyunsaturates	10.14	0.86	0.00	16.41	0.43	0.00
Total fibre	12.08	0.74	0.00	10.91	0.81	0.00
Trans-octadecenoic acid	14.80	0.54	0.00	18.83	0.28	4.41
Trans-octadecenoic acid	14.94	0.53	0.00	20.20	0.21	10.88
Total trans-fatty acids	14.33	0.57	0.00	19.50	0.24	7.69
Vegetable protein	10.26	0.85	0.00	16.96	0.39	0.00
Vitamin A	4.85	1.00	0.00	12.17	0.73	0.00
Vitamin C	19.51	0.24	7.76	15.44	0.49	0.00
Sugar	20.16	0.21	10.72	22.95	0.12	21.56
Cooper	4.21	1.00	0.00	7.50	0.96	0.00
Folacin	21.53	0.16	16.40	15.88	0.46	0.00
Niacin	22.34	0.13	19.43	21.87	0.15	17.71
Pantothenic Acid	14.25	0.58	0.00	13.16	0.66	0.00
Riboflavin	14.76	0.54	0.00	20.09	0.22	10.39
Thiamin	13.91	0.61	0.00	12.26	0.73	0.00
Vitamin B6	26.57	0.05	32.25	19.29	0.25	6.69
Vitamin B12	6.93	0.97	0.00	9.56	0.89	0.00
Heme iron	8.31	0.94	0.00	11.68	0.77	0.00
Non-heme iron	20.21	0.21	10.95	29.77	0.02	39.54
Alanine	9.70	0.88	0.00	11.00	0.81	0.00
Arginine	11.03	0.81	0.00	11.67	0.77	0.00
Aspartame	9.45	0.89	0.00	10.28	0.85	0.00
Cystine	10.25	0.85	0.00	15.22	0.51	0.00
Glutamic acid	10.27	0.85	0.00	9.98	0.87	0.00
Glycine	13.17	0.66	0.00	13.60	0.63	0.00
Histidine	8.39	0.94	0.00	9.02	0.91	0.00
Isoleucine	7.37	0.97	0.00	7.08	0.97	0.00
Leucine	7.89	0.95	0.00	7.89	0.95	0.00
Lysine	8.03	0.95	0.00	7.91	0.95	0.00
Methionine	9.45	0.89	0.00	9.31	0.90	0.00
Phenylalanine	7.39	0.96	0.00	8.04	0.95	0.00
Proline	9.98	0.87	0.00	7.50	0.96	0.00
Serine	6.99	0.97	0.00	8.84	0.92	0.00
Threonine	7.61	0.96	0.00	8.43	0.94	0.00
Tryptophan	7.96	0.95	0.00	10.12	0.86	0.00
Tyrosine	7.93	0.95	0.00	7.48	0.96	0.00
Valine	7.09	0.97	0.00	8.17	0.94	0.00
long_O7	10.66	0.83	0.00	10.22	0.86	0.00
Urinary excretion						
Calcium	20.55	0.20	12.42	18.53	0.29	2.86



Magnesium	10.56	0.84	0.00	10.12	0.86	0.00
Sodium to potassium ratio	21.09	0.17	14.67	21.11	0.17	14.74
Nutrients from foods and supplements						
Alanine	10.62	0.83	0.00	10.52	0.84	0.00
Alcohol	47.76	0.00	62.31	46.93	0.00	61.64
Animal protein	9.35	0.90	0.00	10.83	0.82	0.00
Arginine	11.27	0.79	0.00	11.91	0.75	0.00
Aspartame	9.95	0.87	0.00	10.06	0.86	0.00
Beta-Carotene	10.24	0.85	0.00	13.50	0.64	0.00
Caffeine	17.10	0.38	0.00	12.20	0.73	0.00
Calcium	10.49	0.84	0.00	11.12	0.80	0.00
Cholesterol	19.01	0.27	5.33	24.15	0.09	25.48
Cooper	10.91	0.82	0.00	11.28	0.79	0.00
Cystine	10.45	0.84	0.00	14.91	0.53	0.00
Glutamic acid	10.09	0.86	0.00	9.72	0.88	0.00
Glycine	15.79	0.47	0.00	13.49	0.64	0.00
Histidine	9.00	0.91	0.00	8.84	0.92	0.00
Iron	12.33	0.72	0.00	9.68	0.88	0.00
Isoleucine	7.70	0.96	0.00	6.78	0.98	0.00
Leucine	8.23	0.94	0.00	7.53	0.96	0.00
Lysine	8.59	0.93	0.00	7.58	0.96	0.00
Magnesium	8.74	0.92	0.00	16.52	0.42	0.00
Methionine	10.31	0.85	0.00	9.05	0.91	0.00
Myristoleic acid	17.78	0.34	0.00	21.30	0.17	15.51
Palmitoleic acid	20.83	0.19	13.58	16.87	0.39	0.00
Oleic acid	13.10	0.67	0.00	12.20	0.73	0.00
Gadoleic acid	18.65	0.29	3.48	20.85	0.18	13.67
Erucic acid	22.99	0.11	21.71	23.10	0.11	22.09
Niacin	13.69	0.62	0.00	8.11	0.95	0.00
Linoleic acid	9.90	0.87	0.00	16.34	0.43	0.00
Linolenic acid	19.85	0.23	9.32	24.18	0.09	25.55
Arachidonic acid	11.42	0.78	0.00	14.29	0.58	0.00
Eicosapentaenoic acid	12.78	0.54	0.00	13.83	0.46	0.00
Gadoleic acid	11.94	0.61	0.00	13.81	0.46	0.00
Docosahexaenoic acid	1.19	0.95	0.00	4.05	0.54	0.00
Docosahexaenoic acid	13.50	0.64	0.00	15.70	0.47	0.00
Phenylalanine	7.71	0.96	0.00	7.83	0.95	0.00
Phosphorus	11.02	0.81	0.00	16.99	0.39	0.00
Sodium to potassium ratio	7.99	0.95	0.00	5.59	0.99	0.00
Proline	9.58	0.89	0.00	7.19	0.97	0.00
Total protein	8.01	0.95	0.00	7.87	0.95	0.00
Retinol	10.36	0.85	0.00	11.38	0.79	0.00
Riboflavin	18.40	0.30	2.18	12.49	0.71	0.00
Selenium	11.99	0.74	0.00	13.40	0.64	0.00
Serine	7.10	0.97	0.00	8.34	0.94	0.00

Capric acid	12.71	0.69	0.00	14.57	0.56	0.00
Lauric acid	11.82	0.76	0.00	24.15	0.09	25.46
Myristic acid	11.50	0.78	0.00	19.36	0.25	7.04
Palmitic acid	16.13	0.44	0.00	17.25	0.37	0.00
Stearic acid	17.79	0.34	0.00	22.45	0.13	19.83
Arachidic acid	6.66	0.98	0.00	18.16	0.31	0.91
Behenic acid	10.41	0.84	0.00	22.73	0.12	20.81
SFA 4:0	20.24	0.21	11.06	15.63	0.48	0.00
Caproic acid	14.63	0.55	0.00	19.99	0.22	9.95
Caprylic acid	25.29	0.06	28.83	28.45	0.03	36.73
Thiamin	14.10	0.59	0.00	9.65	0.88	0.00
Threonine	8.29	0.94	0.00	8.03	0.95	0.00
Total Fat	13.87	0.61	0.00	15.93	0.46	0.00
Total MFA	12.53	0.71	0.00	10.33	0.85	0.00
Total PFA	10.19	0.86	0.00	17.63	0.35	0.00
Total SFA	15.33	0.50	0.00	19.42	0.25	7.30
Total vitamin E	19.22	0.26	6.35	9.03	0.91	0.00
Total carbohydrates	32.07	0.01	43.87	37.91	0.00	52.52
Total Vitamin A	9.11	0.91	0.00	13.57	0.63	0.00
Tryptophan	7.95	0.95	0.00	10.49	0.84	0.00
Tyrosine	8.30	0.94	0.00	7.17	0.97	0.00
Valine	7.33	0.97	0.00	7.79	0.95	0.00
Vegetable protein	10.26	0.85	0.00	16.95	0.39	0.00
Vitamin B6	26.00	0.05	30.78	18.12	0.32	0.65
Vitamin B12	19.37	0.25	7.05	8.83	0.92	0.00
Vitamin C	23.24	0.11	22.56	24.57	0.08	26.74
Total fibre	11.90	0.75	0.00	11.17	0.80	0.00
Vitamin A	8.18	0.94	0.00	13.78	0.61	0.00
Folacin	29.60	0.02	39.19	23.15	0.11	22.26
Omega-3 polyunsaturates	17.48	0.36	0.00	21.05	0.18	14.48
Omega-6 polyunsaturates	10.15	0.86	0.00	16.48	0.42	0.00

**Supplementary Table 7. Heterogeneity estimates for random effects meta-analysis across the NHANES cohorts**

	Q	p value (Q)	I <sup>2</sup>
<b>Systolic Blood Pressure</b>			
<i>Nutrients from foods</i>			
Alcohol (gm)	2.48	0.479	0
Calcium (mg)	4.71	0.194	36
Copper (mg)	6.15	0.104	51
Folic acid (mcg)	0.76	0.684	0
Dietary fiber (gm)	13.60	0.004	78
Iron (mg)	3.83	0.281	22
Magnesium (mg)	13.41	0.004	78
Phosphorus (mg)	6.25	0.100	52
Thiamin (mg)	3.19	0.363	6
Riboflavin (mg)	5.39	0.146	44
Sodium/Potassium ratio	9.17	0.027	67
<i>Nutrients from foods and supplements</i>			
Total Dietary Fiber (gm)	12.93	0.005	77
Total Magnesium (mg)	11.03	0.012	73
Total Phosphorus (mg)	8.69	0.034	65
<i>Serum biomarkers</i>			
Folate (ng/mL)	1.22	0.748	0
Iron (ug/dL)	0.34	0.952	0
Calcium (mg/dL)	1.20	0.753	0
Phosphorus (mg/dL)	0.64	0.886	0
<b>Diastolic Blood Pressure</b>			
<i>Nutrients from foods</i>			
Alcohol (gm)	2.64	0.450	0
Folic acid (mcg)	5.89	0.053	66
Magnesium (mg)	7.98	0.046	62
Phosphorus (mg)	5.89	0.117	49
Riboflavin (Vitamin B2) (mg)	2.32	0.509	0
<i>Nutrients from foods and supplements</i>			
Total Magnesium (mg)	8.89	0.031	66
Total Phosphorus (mg)	6.56	0.087	54
<i>Serum biomarkers</i>			
Folate (ng/mL)	5.30	0.151	43
Phosphorus (mg/dL)	1.86	0.601	0

**Supplementary Figure 1. Power calculations in INTERMAP study to detect different effect sizes per 1SD based on models with  $R^2=0.2$**

