SUPPLEMENTAL MATERIAL

Table S1.The percentages of each of the seven cardiovascular health indices according to cumulative exposure of CVH.

| | Group of cumulative exposure of CVH | | | | | | | | | | | |
| | Women | | | | | | Men | | | | | |
CVH metrics	Q1	Q2	Q3	Q4	Q5	*P* value	Q1	Q2	Q3	Q4	Q5	*P* value
Smoking, %						<0.001						<0.001
Ideal	92.24	97.39	97.31	98.73	99.65		23.71	41.72	53.80	65.60	77.22	
Intermediate	2.59	0.87	1.31	0.68	0.23		9.95	12.06	12.24	11.60	10.57	
Poor	5.18	1.74	1.38	0.59	0.12		66.33	46.21	33.96	22.80	12.21	
Body mass index, %						<0.001						<0.001
Ideal	8.00	21.61	41.95	63.23	85.90		26.00	43.19	55.22	66.55	82.80	
Intermediate	52.00	56.35	49.09	33.86	13.14		56.00	50.02	41.27	31.83	16.68	
Poor	40.00	22.04	8.96	2.91	0.96		18.00	6.80	3.51	1.63	0.53	
Physical activity, %						<0.001						<0.001
Ideal	10.12	9.88	9.18	10.26	15.84		8.62	10.55	12.49	16.98	26.81	
Intermediate	80.47	82.63	83.90	84.34	81.57		74.51	77.96	78.66	76.62	68.69	
Poor	9.41	7.49	6.92	5.40	2.59		16.87	11.49	8.85	6.39	4.50	
Salt intake, %						<0.001						<0.001
ideal	5.65	5.65	5.61	7.35	12.85		5.98	7.57	9.38	10.44	15.60	
Intermediate	77.65	82.74	84.49	86.65	83.63		72.06	80.57	82.75	83.47	79.61	
Poor	16.71	11.62	9.91	5.99	3.52		21.96	11.86	7.87	6.09	4.79	
Total cholesterol, %						<0.001						<0.001
Ideal	21.41	39.20	52.80	64.32	77.94		39.52	59.76	69.82	76.54	84.11	

	Q1	Q2	Q3	Q4	Q5	P	Q1	Q2	Q3	Q4	Q5	P
Intermediate	41.18	38.44	34.74	27.87	18.84		38.52	30.74	25.31	19.86	14.57	
Poor	37.41	22.37	12.45	7.81	3.23		21.96	9.51	4.86	3.60	1.31	
Blood pressure, %						<0.001						<0.001
Ideal	5.65	11.83	21.49	33.09	55.32		10.86	17.66	20.83	25.43	35.08	
Intermediate	46.82	54.94	59.14	57.10	40.76		54.65	57.50	58.77	60.15	57.97	
Poor	47.53	33.22	19.37	9.80	3.92		34.49	24.83	20.40	14.41	6.95	
Fasting blood glucose, %						<0.001						<0.001
Ideal	80.47	82.84	86.02	87.38	89.45		75.37	78.62	79.84	81.15	84.61	
Intermediate	19.53	17.16	13.98	12.62	10.55		24.64	21.38	20.16	18.85	15.39	
Poor	--	--	--	--	--		--	--	--	--	--	

Abbreviation: CVH, ideal cardiovascular health;Q1=quintile1, Q2=quintile2, Q3=quintile3, Q4=quintile4, Q5=quintile5.

Table S2. Odds ratios and 95% confidence intervals of diabetes according to the time weighted cumulative exposure of CVH.

	Group of cumulative exposure of CVH					One score increase	P for trend
	Q1	Q2	Q3	Q4	Q5		
Total, n	6864	6865	6865	6865	6864		
Case number, n (%)	426(6.21)	311(4.53)	255(3.71)	186(2.71)	123(1.79)		
Model 1 *	1.00	0.68(0.59-0.80)	0.55(0.47-0.65)	0.39(0.32-0.47)	0.26(0.22-0.33)	0.73(0.70-0.76)	<0.001
Model 2 †	1.00	0.67(0.58-0.78)	0.54(0.46-0.63)	0.38(0.31-0.45)	0.26(0.21-0.32)	0.72(0.69-0.76)	<0.001
Model 3 ‡	1.00	0.72(0.62-0.85)	0.60(0.51-0.71)	0.42(0.35-0.52)	0.29(0.23-0.37)	0.76(0.72-0.79)	<0.001
Sex							
Women,	39(7.75)	54(5.91)	63(4.95)	58(2.88)	61(1.67)		
Model 3 ‡	1.00	0.94(0.59-1.50)	0.92(0.58-1.45)	0.58(0.36-0.93)	0.37(0.22-0.62)	0.75(0.67-0.84)	<0.001
Men	387(6.08)	257(4.32)	192(3.43)	128(2.64)	62(1.94)		
Model 3 ‡	1.00	0.70(0.59-0.83)	0.56(0.46-0.68)	0.41(0.33-0.51)	0.31(0.23-0.41)	0.76(0.72-0.80)	<0.001
P-interaction		0.321	0.105	0.413	0.933		
Age ,years							
<40ys	63(4.13)	39(2.67)	21(1.38)	15(0.91)	15(0.61)		
Model 3 ‡	1.00	0.74(0.49-1.13)	0.39(0.23-0.66)	0.26(0.14-0.48)	0.18(0.09-0.35)	0.70(0.62-0.80)	<0.001
40-59ys	304(6.55)	216(4.88)	181(4.15)	126(3.03)	80(2.25)		
Model 3 ‡	1.00	0.75(0.62-0.91)	0.65(0.53-0.80)	0.47(0.37-0.60)	0.32(0.24-0.43)	0.78(0.74-0.83)	<0.001
P-interaction		0.648	0.023	0.017	0.015		
≥60ys	59(8.44)	56(5.73)	53(5.42)	45(4.25)	28(3.24)		
Model 3 ‡	1.00	0.67(0.45-1.01)	0.66(0.44-1.00)	0.46(0.29-0.72)	0.42(0.25-0.70)	0.76(0.68-0.86)	<0.001
P-interaction		0.988	0.046	0.048	0.006		

Abbreviation: CVH, ideal cardiovascular health;time weighted cumulative exposure of CVH: $(CVH_1 \times time_{1-2} + CVH_2 \times time_{2-3} + CVH_3 \times time_{3-4})/(time_{1-2} + time_{2-3} + time_{3-4})$. Q1=quintile1, Q2=quintile2, Q3=quintile3, Q4=quintile4, Q5=quintile5.

* Adjusted for age (years), sex.

†Adjusted for as model 1 plus education level (elementary school, high school or college or above), income level (income≥800 ¥/month, ¥600-800, and income<600 ¥/month) and drinking (never, past, current, <1times/d or current, 1+times/d).

‡ Adjusted for as model 2 plus High sensitive C-reactive protein, uric acid, resting heart rate at exam1, and medication usage before exam4.

Table S3.Odds ratios and 95% confidence intervals of diabetes (exam2) in relation to quintile increase of baseline exposure of CVH (exam1).

	Group of baseline exposure of CVH					One score increase	P for trend
	Q1	Q2	Q3	Q4	Q5		
Total, n	10422	10218	13701	14016	16817		
Case number, n (%)	794(7.61)	623(6.10)	677(4.94)	583(4.16)	437(2.60)		
Model 1 *	1.00	0.77(0.69-0.86)	0.61(0.55-0.68)	0.52(0.46-0.58)	0.35(0.31-0.39)	0.82(0.80-0.83)	<0.001
Model 2 †	1.00	0.75(0.67-0.83)	0.58(0.52-0.64)	0.48(0.43-0.54)	0.32(0.28-0.36)	0.80(0.78-0.82)	<0.001
Model 3 ‡	1.00	0.79(0.70-0.88)	0.62(0.55-0.69)	0.53(0.47-0.60)	0.36(0.32-0.41)	0.82(0.80-0.84)	<0.001
Sex							
Women,	49(9.42)	99(8.82)	94(4.13)	124(3.75)	119(1.68)		
Model 3 ‡	1.00	1.11(0.75-1.64)	0.53(0.36-0.79)	0.61(0.42-0.89)	0.37(0.25-0.54)	0.79(0.74-0.84)	<0.001
Men	745(7.52)	524(5.76)	583(5.10)	459(4.29)	318(3.27)		
Model 3 ‡	1.00	0.75(0.67-0.85)	0.64(0.56-0.72)	0.52(0.46-0.60)	0.40(0.34-0.46)	0.84(0.81-0.86)	<0.001
P-interaction		0.143	0.131	0.746	0.035		
Age ,years							
<40ys	65(4.01)	46(2.73)	67(2.98)	43(1.59)	40(0.84)		
Model 3 ‡	1.00	0.73(0.49-1.08)	0.87(0.60-1.25)	0.49(0.32-0.75)	0.35(0.22-0.55)	0.84(0.77-0.90)	<0.001
40-59ys	593(8.11)	417(6.26)	416(4.79)	363(4.31)	272(2.94)		
Model 3 ‡	1.00	0.77(0.67-0.88)	0.57(0.50-0.66)	0.52(0.45-0.60)	0.38(0.32-0.45)	0.82(0.80-0.85)	<0.001
P-interaction		0.552	0.167	0.188	0.024		
≥60ys	136(9.07)	160(8.55)	194(6.99)	177(6.16)	125(4.46)		
Model 3 ‡	1.00	0.94(0.74-1.22)	0.75(0.59-0.96)	0.67(0.52-0.86)	0.47(0.36-0.62)	0.86(0.82-0.90)	<0.001
P-interaction		0.148	0.947	0. 018	0.002		

Abbreviation: CVH, ideal cardiovascular health; Q1=quintile1, Q2=quintile2, Q3=quintile3, Q4=quintile4, Q5=quintile5.

* Adjusted for age (years), sex.

†Adjusted for as model 1 plus education level (elementary school, high school or college or above), income level (income≥800 ¥/month, ¥600-800, and income<600 ¥/month) and drinking (never, past, current, <1times/d or current, 1+times/d).

‡ Adjusted for as model 2 plus High sensitive C-reactive protein, uric acid, resting heart rate, and medication usageat exam1.

TableS4. Comparison of Demographic and Other Characteristics of Participants and Non-Participants

	Participants	Non-Participants	*P-Value*
n	34323	52764	
Age (Years)	47.43 ± 11. 62	53.85 ± 12.97	<0.001
Male Sex, n (%)	25961 (75.64)	43174(81.82)	<0.001
High School Educational Level or above, n (%)	8147 (23.75)	9289 (18.80)	<0.001
Income ≥¥800/month, n (%)	5140 (14.98)	6896(13.97)	<0.001
Current Smoker, n (%)	10438(30.41)	15647 (31.28)	<0.001
Current Alcohol Drinker, n (%)	5932 (17.29)	9108 (18.19)	<0.001
Physical Activity ≥80 min, n (%)	4609 (13.43)	8092 (16.44)	<0.001
High Salt Intake, n (%)	3566 (10.39)	5352 (10.86)	0.058
Body Mass Index (kg/m^2)	24.89 ±3.42	24.81 ± 3.47	<0.001
Systolic Blood Pressure (mmHg)	127.02 ± 19.30	131.66 ± 21.40	<0.001
Diastolic Blood Pressure (mmHg)	82.20 ± 11.26	83.54 ± 11.89	<0.001
Fasting Blood Glucose Concentration (mmol/l)	5.02 ± 0.65	5.06 ± 0.69	<0.001
Total Cholesterol Concentration (mmol/l)	4.87 ± 1.13	4.93 ± 1.11	<0.001
High-Sensitive C-Reactive Protein Concentration (mg/L)	0.68 (0.25-1.80)	0.85 (0.30-2.30)	<0.001
Uric Acid Concentration (μmol/L)	283.83 ± 81.52	294.79 ± 84.41	<0.001
Resting Heart Rate (Beats / Minute)	73.15 ± 9.64	73.47 ± 10.14	0.048

Table S5. Previous analyses of the relationship between ideal cardiovascular health metrics and risk of outcomes.

Study (Author, Year)	Journal, publication date	Name of Cohort(s)	Location	Baseline Year	Participants	Outcomes	Follow Up (Years)
Shah AM[1], 1987	Circulation, 2015	ARIC study	United States	1987-1989	15,792 individuals	cardiovascular structure and function	25
Sping B[2],1985	Circulation 2014;130:10-17	CARDIA Study	United States	1985-1986	5115 adults	Coronary artery calcification and carotid intima-media thickness	20
Xanthakis V[3],1995	Circulation 2014;130:1676-1683	Framingham Offspring Study	United States	1995-1998	2680 participants	CVD biomarker levels and subclinical disease	0
Pahkala K[4],1990	Circulation 2013;127:2088-2096	STRIP study	Finland	1990-1992	1062 infants	Vascular intima-media thickness and elasticity	20
Aatola H[5],1980	Journal of the American Heart Association2014;3	Cardiovascular Risk in Young Finns Study	Finland	1986	1143 white adults	pulse wave velocity	21
Tomi T. Laitinen[6], 1980	Circulation 2012;125:1971-1978	Cardiovascular Risk in Young Finns Study	Finland	1986	856 subjects	cardiometabolic outcomes hypertension, metabolic syndrome, carotid artery intima-media thickness	21
Qian Zhang[7],2006	Stroke2013;44:2451-2456	Kailuan study	China	2006	101510 subjects	stroke	4
Chuanhui Dong[8],1993	Circulation 2012;125:2975-2984	Northern Manhattan Study	United States	1993	2981 subjects	Myocardial Infarction, Stroke, and Vascular Death	11

Shouling Wu[9],2006	Circ Cardiovasc Qual Outcomes2012;5:487-493	Kailuan study	China	2006	101510 subjects	Cardiovascular Events	4
Laura J. Rasmussen Torvik[10],1987	Circulation 2013;127:1270-1275	ARIC study	United States	1987-1989	13,253 subjects	cancer	17-19
Earl S. Ford[11],1999	Circulation 2012;125:987-995	National Health and Nutrition Examination Survey	United States	1999-2002	7622 adults	Mortality From All Causes and Diseases of the Circulatory System	5.8
Enrique G. Artero[12],1987	Mayo Clinic proceedings. Mayo Clinic. 2012;87:944-952	Aerobics Center Longitudinal Study	United States	1987-1999	11993 subjects	deaths from all causes, cardiovascular disease (CVD), and cancer	11.6

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