Supplementary Table S1 Comparison of baseline characteristics with and without mortality

Characteristic	**Overall**, N = 11737 (100%)	**Alived**, N = 10200 (87%)	**All-cause mortality**, N = 1537 (13%)	***P* value**
Cycle				<0.001
2003-2004	4,004.0 (34.1%)	3,123.0 (30.6%)	881.0 (57.3%)	
2005-2006	3,952.0 (33.7%)	3,352.0 (32.9%)	600.0 (39.0%)	
2017-2018	3,781.0 (32.2%)	3,725.0 (36.5%)	56.0 (3.6%)	
Age (years)	45.00 (29.00, 62.00)	42.00 (28.00, 57.00)	72.00 (62.00, 80.00)	<0.001
Sex (female)	5,731.0 (48.8%)	5,060.0 (49.6%)	671.0 (43.7%)	<0.001
Race				<0.001
Hispanic	2,916.0 (24.8%)	2,645.0 (25.9%)	271.0 (17.6%)	
Non-Hispanic	8,821.0 (75.2%)	7,555.0 (74.1%)	1,266.0 (82.4%)	
Poverty	2,195.0 (20.1%)	1,907.0 (20.1%)	288.0 (19.9%)	0.8
Smoking status				<0.001
Never smoker	5,829.0 (53.7%)	5,224.0 (56.0%)	605.0 (39.8%)	
Former smoker	2,650.0 (24.4%)	2,060.0 (22.1%)	590.0 (38.8%)	
Current smoker	2,368.0 (21.8%)	2,041.0 (21.9%)	327.0 (21.5%)	
Alcohol intake				<0.001
Non-drinker	1,270.0 (22.4%)	1,026.0 (20.1%)	244.0 (44.0%)	
Quit drinker	1,345.0 (23.7%)	1,143.0 (22.4%)	202.0 (36.5%)	
Current drinker	3,052.0 (53.9%)	2,944.0 (57.6%)	108.0 (19.5%)	
Educational attainment				<0.001
Below high school	1,222.0 (10.4%)	889.0 (8.7%)	333.0 (21.7%)	
High school	4,827.0 (41.2%)	4,146.0 (40.7%)	681.0 (44.4%)	
Above high school	5,678.0 (48.4%)	5,159.0 (50.6%)	519.0 (33.9%)	
Hypertension	4,570.0 (40.0%)	3,505.0 (35.3%)	1,065.0 (71.8%)	<0.001
Diabetes	1,653.0 (25.8%)	1,219.0 (22.4%)	434.0 (45.8%)	<0.001
BMI	27.70 (24.02, 32.30)	27.70 (24.01, 32.40)	27.59 (24.11, 31.72)	0.2
Waist circumference (cm)	97.90 ± 16.45	97.42 ± 16.62	101.19 ± 14.76	<0.001
Waist-to-hip ratio	0.93 ± 0.08	0.93 ± 0.08	0.97 ± 0.07	<0.001
SBP (mmHg)	121.00 (111.00, 134.00)	119.00 (110.00, 131.00)	134.00 (121.00, 149.00)	<0.001
DBP (mmHg)	71.00 (63.00, 78.00)	71.00 (63.00, 78.00)	67.00 (59.00, 76.00)	<0.001
Glucose (mmol/L)	5.50 (5.11, 6.02)	5.44 (5.06, 5.94)	5.72 (5.22, 6.71)	<0.001
HbA1c (%)	5.40 (5.10, 5.70)	5.40 (5.10, 5.70)	5.60 (5.30, 6.10)	<0.001
TG (mmol/L)	1.30 (0.88, 1.94)	1.28 (0.87, 1.92)	1.48 (1.02, 2.15)	<0.001
TC (mmol/L)	4.91 (4.24, 5.66)	4.89 (4.24, 5.64)	5.07 (4.34, 5.84)	<0.001

Characteristic	**Overall**, N = 11737 (100%)	**Alived**, N = 10200 (87%)	**All-cause mortality**, N = 1537 (13%)	***P* value**
HDL-C (mmol/L)	1.32 (1.09, 1.60)	1.32 (1.09, 1.60)	1.32 (1.09, 1.60)	0.3
LDL-C (mmol/L)	2.90 ± 0.94	2.90 ± 0.92	2.95 ± 1.08	0.2
Creatinine (μmol/L)	79.56 (64.53, 88.40)	76.91 (62.76, 88.40)	88.40 (70.72, 106.08)	<0.001
Albumin (g/L)	42.00 (40.00, 44.00)	42.00 (40.00, 44.00)	41.00 (39.00, 43.00)	<0.001
CRP (mg/dL)	0.19 (0.08, 0.45)	0.18 (0.07, 0.43)	0.27 (0.13, 0.58)	<0.001
Total lycopene (μg/dL)	38.40 (26.60, 52.20)	39.60 (28.00, 53.30)	29.56 (18.70, 43.00)	<0.001
Dietary lycopene intake (μg/day)	2,580.00 (580.00, 7,238.50)	2,743.75 (674.13, 7,378.88)	1,600.50 (257.50, 5,715.50)	<0.001
Total calories(kcal/day)	1,959.00 (1,478.00, 2,575.00)	2,009.75 (1,518.50, 2,637.00)	1,664.50 (1,284.00, 2,146.00)	<0.001
Dietary total protein intake (g/day)	74.94 (55.61, 99.52)	76.63 (56.72, 101.38)	63.73 (49.49, 84.98)	<0.001
Dietary total fat intake (g/day)	73.85 (51.83, 101.35)	76.00 (53.54, 103.79)	60.84 (43.67, 82.97)	<0.001
Dietary cholesterol intake (mg/day)	249.50 (155.50, 386.50)	253.00 (158.00, 392.00)	227.00 (140.00, 354.50)	<0.001
Dietary fiber intake (g/day)	14.20 (9.80, 19.95)	14.35 (9.90, 20.25)	13.30 (9.15, 18.15)	<0.001
Survival length (months)	162.00 (31.00, 182.00)	166.00 (29.00, 185.00)	97.00 (54.00, 141.00)	<0.001

BMI: body mass index, CRP: C-reactive protein, DBP: diastolic blood pressure, HbA1c: glycohemoglobin, HDL-C: high-density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol, SBP: systolic blood pressure, TC: total cholesterol, TG: triglycerides. Normally distributed continuous variables are described as mean ± SD, and continuous variables without a normal distribution are presented as median (Q25, Q75). Categorical variables are presented as numbers (percentages).

Supplementary Table S2 Characteristics of Adults According to Quartiles of Serum Lycopene

Characteristic	Lycopene Quantile 1, N = 2952 (25%)	Lycopene Quantile 2, N = 2925 (25%)	Lycopene Quantile 3, N = 2933 (25%)	Lycopene Quantile 4, N = 2927 (25%)	*P* value
Cycle					<0.001
2003-2004	1,051.0 (35.6%)	960.0 (32.8%)	1,013.0 (34.5%)	980.0 (33.5%)	
2005-2006	818.0 (27.7%)	971.0 (33.2%)	992.0 (33.8%)	1,171.0 (40.0%)	
2017-2018	1,083.0 (36.7%)	994.0 (34.0%)	928.0 (31.6%)	776.0 (26.5%)	
Age (years)	57.00 (38.00, 70.00)	45.00 (29.00, 62.00)	41.00 (28.00, 58.00)	41.00 (27.00, 55.00)	<0.001
Sex (female)	1,566.0 (53.0%)	1,512.0 (51.7%)	1,400.0 (47.7%)	1,253.0 (42.8%)	<0.001
Race					<0.001
Hispanic	765.0 (25.9%)	867.0 (29.6%)	726.0 (24.8%)	558.0 (19.1%)	
Non-Hispanic	2,187.0 (74.1%)	2,058.0 (70.4%)	2,207.0 (75.2%)	2,369.0 (80.9%)	
Poverty	597.0 (22.0%)	588.0 (21.6%)	528.0 (19.3%)	482.0 (17.6%)	<0.001
Smoking status					0.002
Never smoker	1,409.0 (50.1%)	1,471.0 (54.5%)	1,492.0 (55.7%)	1,457.0 (54.9%)	
Former smoker	779.0 (27.7%)	647.0 (24.0%)	643.0 (24.0%)	581.0 (21.9%)	
Current smoker	625.0 (22.2%)	582.0 (21.6%)	546.0 (20.4%)	615.0 (23.2%)	
Alcohol intake					<0.001
Non-drinker	407.0 (25.1%)	313.0 (21.5%)	265.0 (19.5%)	285.0 (23.3%)	
Quit drinker	459.0 (28.3%)	306.0 (21.0%)	312.0 (22.9%)	268.0 (21.9%)	
Current drinker	757.0 (46.6%)	839.0 (57.5%)	784.0 (57.6%)	672.0 (54.9%)	
Educational attainment					<0.001
Below high school	488.0 (16.6%)	333.0 (11.4%)	243.0 (8.3%)	158.0 (5.4%)	
High school	1,272.0 (43.1%)	1,236.0 (42.3%)	1,151.0 (39.3%)	1,168.0 (40.0%)	
Above high school	1,188.0 (40.3%)	1,356.0 (46.4%)	1,537.0 (52.4%)	1,597.0 (54.6%)	
Hypertension	1,449.0 (50.5%)	1,141.0 (40.1%)	1,011.0 (35.4%)	969.0 (33.9%)	<0.001
Diabetes	615.0 (36.2%)	423.0 (25.6%)	339.0 (22.2%)	276.0 (18.2%)	<0.001
BMI	28.04 (24.20, 33.15)	27.93 (23.99, 32.70)	27.40 (23.83, 32.04)	27.41 (24.09, 31.47)	<0.001
Waist circumference (cm)	100.11 ± 17.01	98.14 ± 16.66	96.92 ± 16.49	96.44 ± 15.35	<0.001
Waist-to-hip ratio	0.94 ± 0.08	0.94 ± 0.08	0.93 ± 0.08	0.93 ± 0.08	0.001
SBP (mmHg)	125.00 (113.00, 139.00)	121.00 (111.00, 135.00)	119.00 (110.00, 131.00)	120.00 (111.00, 131.00)	<0.001
DBP (mmHg)	69.00 (62.00, 77.00)	71.00 (63.00, 78.00)	71.00 (63.00, 78.00)	71.00 (64.00, 79.00)	<0.001
Glucose (mmol/L)	5.66 (5.20, 6.38)	5.50 (5.11, 6.05)	5.40 (5.05, 5.91)	5.38 (5.01, 5.83)	<0.001
HbA1c (%)	5.50 (5.20, 5.90)	5.40 (5.10, 5.80)	5.40 (5.10, 5.70)	5.40 (5.10, 5.70)	<0.001
TG (mmol/L)	1.33 (0.90, 1.92)	1.29 (0.87, 1.95)	1.24 (0.85, 1.87)	1.33 (0.91, 2.05)	<0.001
TC (mmol/L)	4.55 (3.88, 5.28)	4.71 (4.11, 5.46)	4.97 (4.34, 5.66)	5.38 (4.76, 6.10)	<0.001
HDL-C (mmol/L)	1.27 (1.06, 1.55)	1.29 (1.06, 1.58)	1.34 (1.11, 1.63)	1.34 (1.11, 1.66)	<0.001

Characteristic	Lycopene Quantile 1, N = 2952 (25%)	Lycopene Quantile 2, N = 2925 (25%)	Lycopene Quantile 3, N = 2933 (25%)	Lycopene Quantile 4, N = 2927 (25%)	*P* value
LDL-C (mmol/L)	2.57 ± 0.94	2.75 ± 0.86	2.98 ± 0.88	3.32 ± 0.92	<0.001
Creatinine (μmol/L)	77.79 (62.76, 89.28)	77.79 (61.88, 88.40)	79.56 (66.30, 88.40)	79.56 (70.72, 89.28)	<0.001
Albumin (g/L)	41.00 (39.00, 44.00)	42.00 (40.00, 44.00)	42.00 (40.00, 44.00)	42.00 (40.00, 45.00)	<0.001
CRP (mg/dL)	0.25 (0.10, 0.57)	0.19 (0.08, 0.46)	0.18 (0.07, 0.41)	0.16 (0.07, 0.36)	<0.001
Dietary lycopene intake (μg/day)	1,243.50 (78.50, 4,097.63)	2,205.50 (514.50, 6,367.00)	3,273.00 (943.50, 7,866.00)	4,522.00 (1,404.00, 10,603.00)	<0.001
Total calories(kcal/day)	1,782.25 (1,357.38, 2,321.88)	1,946.00 (1,465.50, 2,530.50)	2,027.00 (1,528.00, 2,680.50)	2,114.00 (1,596.25, 2,771.25)	<0.001
Dietary total protein intake (g/day)	67.82 (51.04, 89.93)	74.57 (55.54, 98.92)	77.19 (57.55, 102.09)	81.35 (59.70, 107.25)	<0.001
Dietary total fat intake (g/day)	65.44 (46.68, 89.39)	72.98 (50.88, 99.10)	77.75 (54.12, 106.03)	79.44 (57.12, 110.02)	<0.001
Dietary cholesterol intake (mg/day)	238.00 (143.50, 372.25)	238.50 (153.50, 383.50)	256.00 (159.50, 390.00)	265.00 (163.00, 399.00)	<0.001
Dietary fiber intake (g/day)	13.30 (8.85, 19.25)	14.15 (9.70, 20.00)	14.60 (10.30, 20.30)	14.75 (10.43, 20.25)	<0.001
All-cause mortality	668.0 (22.6%)	365.0 (12.5%)	289.0 (9.9%)	215.0 (7.3%)	<0.001
Cardiovascular mortality	191.0 (6.5%)	102.0 (3.5%)	88.0 (3.0%)	62.0 (2.1%)	<0.001
Survival length (months)	109.00 (28.00, 177.25)	161.00 (29.00, 182.00)	165.00 (32.00, 184.00)	167.00 (34.00, 183.00)	<0.001

BMI: body mass index, CRP: C-reactive protein, DBP: diastolic blood pressure, HbA1c: glycohemoglobin, HDL-C: high-density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol, SBP: systolic blood pressure, TC: total cholesterol, TG: triglycerides. Normally distributed continuous variables are described as mean ± SD, and continuous variables without a normal distribution are presented as median (Q25, Q75). Categorical variables are presented as numbers (percentages).

Supplementary Table S3 Characteristics of Adults According to Quartiles of Dietary Lycopene Intake

Characteristic	Dietary Lycopene Quantile 1, N = 2937 (25%)	Dietary Lycopene Quantile 2, N = 2932 (25%)	Dietary Lycopene Quantile 3, N = 2934 (25%)	Dietary Lycopene Quantile 4, N = 2934 (25%)	*P* value
Cycle					<0.001
2003-2004	945.0 (32.2%)	929.0 (31.7%)	968.0 (33.0%)	1,162.0 (39.6%)	
2005-2006	977.0 (33.3%)	972.0 (33.2%)	1,027.0 (35.0%)	976.0 (33.3%)	
2017-2018	1,015.0 (34.6%)	1,031.0 (35.2%)	939.0 (32.0%)	796.0 (27.1%)	
Age (years)	52.00 (33.00, 66.00)	47.00 (31.00, 63.00)	43.00 (28.00, 60.00)	41.00 (27.00, 58.00)	<0.001
Sex (female)	1,523.0 (51.9%)	1,561.0 (53.2%)	1,455.0 (49.6%)	1,192.0 (40.6%)	<0.001
Race					<0.001
Hispanic	571.0 (19.4%)	708.0 (24.1%)	839.0 (28.6%)	798.0 (27.2%)	
Non-Hispanic	2,366.0 (80.6%)	2,224.0 (75.9%)	2,095.0 (71.4%)	2,136.0 (72.8%)	
Poverty	590.0 (21.7%)	563.0 (20.8%)	522.0 (19.1%)	520.0 (18.9%)	0.024
Smoking status					0.029
Never smoker	1,423.0 (51.8%)	1,507.0 (55.1%)	1,475.0 (54.5%)	1,424.0 (53.5%)	
Former smoker	681.0 (24.8%)	677.0 (24.8%)	646.0 (23.9%)	646.0 (24.3%)	
Current smoker	642.0 (23.4%)	551.0 (20.1%)	583.0 (21.6%)	592.0 (22.2%)	
Alcohol intake					<0.001
Non-drinker	381.0 (24.2%)	319.0 (21.2%)	313.0 (22.7%)	257.0 (21.3%)	
Quit drinker	439.0 (27.8%)	370.0 (24.6%)	288.0 (20.9%)	248.0 (20.5%)	
Current drinker	757.0 (48.0%)	816.0 (54.2%)	775.0 (56.3%)	704.0 (58.2%)	
Educational attainment					<0.001
Below high school	374.0 (12.7%)	313.0 (10.7%)	274.0 (9.3%)	261.0 (8.9%)	
High school	1,258.0 (42.9%)	1,175.0 (40.1%)	1,217.0 (41.5%)	1,177.0 (40.1%)	
Above high school	1,303.0 (44.4%)	1,440.0 (49.2%)	1,441.0 (49.1%)	1,494.0 (51.0%)	
Hypertension	1,291.0 (44.9%)	1,176.0 (41.4%)	1,075.0 (37.7%)	1,028.0 (36.0%)	<0.001
Diabetes	511.0 (30.7%)	443.0 (28.0%)	364.0 (23.1%)	335.0 (21.2%)	<0.001
BMI	27.74 (24.07, 32.61)	28.00 (24.18, 32.86)	27.50 (23.91, 31.90)	27.63 (23.96, 31.91)	0.005
Waist circumference (cm)	98.50 ± 16.78	98.49 ± 16.49	96.99 ± 16.13	97.61 ± 16.33	<0.001
Waist-to-hip ratio	0.94 ± 0.08	0.93 ± 0.08	0.93 ± 0.08	0.93 ± 0.08	0.4
SBP (mmHg)	123.00 (112.00, 137.00)	121.00 (111.00, 135.00)	120.00 (111.00, 133.00)	120.00 (111.00, 131.00)	<0.001
DBP (mmHg)	71.00 (63.00, 78.00)	71.00 (63.00, 78.00)	71.00 (63.00, 78.00)	71.00 (63.00, 78.00)	0.7
Glucose (mmol/L)	5.51 (5.11, 6.16)	5.50 (5.11, 6.05)	5.44 (5.05, 6.00)	5.45 (5.08, 5.94)	<0.001
HbA1c (%)	5.50 (5.20, 5.80)	5.40 (5.20, 5.80)	5.40 (5.10, 5.70)	5.40 (5.10, 5.70)	<0.001

Characteristic	Dietary Lycopene Quantile 1, N = 2937 (25%)	Dietary Lycopene Quantile 2, N = 2932 (25%)	Dietary Lycopene Quantile 3, N = 2934 (25%)	Dietary Lycopene Quantile 4, N = 2934 (25%)	*P* value
TG (mmol/L)	1.29 (0.88, 1.91)	1.31 (0.89, 1.94)	1.28 (0.88, 1.91)	1.32 (0.89, 2.00)	0.2
TC (mmol/L)	4.91 (4.22, 5.72)	4.91 (4.27, 5.69)	4.91 (4.22, 5.64)	4.89 (4.24, 5.66)	0.4
HDL-C (mmol/L)	1.32 (1.09, 1.60)	1.32 (1.09, 1.60)	1.32 (1.11, 1.60)	1.29 (1.06, 1.58)	0.002
LDL-C (mmol/L)	2.90 ± 0.96	2.91 ± 0.95	2.89 ± 0.95	2.91 ± 0.91	>0.9
Creatinine (μmol/L)	79.56 (66.30, 95.47)	79.56 (63.65, 88.40)	76.91 (62.10, 88.40)	79.56 (67.18, 88.40)	<0.001
Albumin (g/L)	41.00 (39.00, 44.00)	42.00 (39.00, 44.00)	42.00 (40.00, 44.00)	43.00 (40.00, 45.00)	<0.001
CRP (mg/dL)	0.21 (0.09, 0.48)	0.20 (0.09, 0.49)	0.19 (0.08, 0.42)	0.17 (0.07, 0.40)	<0.001
Serum lycopene(μg/dL)	31.40 (20.90, 43.33)	36.70 (25.60, 49.42)	40.50 (28.83, 53.10)	45.60 (33.53, 59.85)	<0.001
Total calories(kcal/day)	1,668.50 (1,283.50, 2,210.00)	1,829.50 (1,393.88, 2,347.88)	2,015.25 (1,564.00, 2,627.38)	2,378.00 (1,840.38, 3,020.63)	<0.001
Dietary total protein intake (g/day)	64.47 (48.21, 87.30)	70.02 (52.81, 92.86)	76.57 (57.78, 100.33)	89.41 (68.27, 115.73)	<0.001
Dietary total fat intake (g/day)	61.55 (43.97, 87.36)	69.09 (50.00, 93.64)	76.99 (54.69, 104.33)	87.94 (64.51, 118.71)	<0.001
Dietary cholesterol intake (mg/day)	223.00 (135.00, 358.00)	238.50 (149.50, 375.13)	252.75 (158.50, 389.38)	283.00 (181.13, 424.50)	<0.001
Dietary fiber intake (g/day)	11.40 (7.60, 16.80)	13.00 (9.04, 18.20)	14.53 (10.50, 19.85)	18.00 (13.00, 24.09)	<0.001
All-cause mortality	515.0 (17.5%)	393.0 (13.4%)	326.0 (11.1%)	303.0 (10.3%)	<0.001
Cardiovascular mortality	157.0 (5.3%)	104.0 (3.5%)	101.0 (3.4%)	81.0 (2.8%)	<0.001
Survival length (months)	157.00 (28.00, 178.00)	160.00 (29.00, 180.00)	164.00 (30.00, 182.00)	168.00 (34.00, 186.00)	<0.001

BMI: body mass index, CRP: C-reactive protein, DBP: diastolic blood pressure, HbA1c: glycohemoglobin, HDL-C: high-density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol, SBP: systolic blood pressure, TC: total cholesterol, TG: triglycerides. Normally distributed continuous variables are described as mean ± SD, and continuous variables without a normal distribution are presented as median (Q25, Q75). Categorical variables are presented as numbers (percentages).

Supplementary Table S4 Result of testing the proportional hazards assumption for multi-factor Cox regression models.

Model	All-cause mortality			Cardiovascular mortality		
	Variables	chisq	*P*	Variables	chisq	*P*
Model 1	Serum lycopene	4.11	0.04	Serum lycopene	0.59	0.44
	Sex	4.81	0.03	Sex	<0.01	0.95
	Age	0.14	0.71	Age	0.16	0.69
	Race	0.26	0.61	Race	1.14	0.29
	Global	9.73	0.05	Global	1.93	0.75
Model 2	Serum lycopene	7.82	0.01	Serum lycopene	1.00	0.32
	Sex	3.24	0.07	Sex	0.19	0.66
	Age	0.66	0.42	Age	0.56	0.46
	Race	5.37	0.02	Race	6.51	0.01
	Poverty	1.81	0.18	Poverty	0.02	0.89
	Education attainment	2.61	0.27	Education attainment	3.45	0.18
	Smoking status	5.89	0.05	Smoking status	4.92	0.09
	Alcoholic intake	2.43	0.12	Alcoholic intake	0.07	0.79
	Physical activity	4.54	0.03	Physical activity	3.03	0.08
	Total calories	0.17	0.68	Total calories	1.32	0.25
	Global	26.91	0.01	Global	17.59	0.13
Model 3	Serum lycopene	7.98	<0.01	Serum lycopene	1.11	0.29
	Sex	3.33	0.07	Sex	0.14	0.71
	Age	1.03	0.31	Age	1.24	0.27
	Race	4.32	0.04	Race	5.79	0.02
	Poverty	1.27	0.26	Poverty	0.19	0.66
	Education attainment	2.31	0.32	Education attainment	3.69	0.16
	Smoking status	4.65	0.10	Smoking status	5.21	0.07
	Alcoholic intake	1.89	0.17	Alcoholic intake	<0.01	0.99
	Physical activity	4.63	0.03	Physical activity	3.09	0.08
	Total calories	0.23	0.63	Total calories	0.51	0.48
	SBP	0.24	0.63	SBP	0.08	0.78
	HbA1c	<0.01	0.99	HbA1c	0.05	0.82
	Creatinine	0.23	0.63	Creatinine	0.03	0.86
	CRP	0.68	0.41	CRP	0.19	0.66
	Global	27.2	0.04	Global	17.4	0.36

CI= Confidence Interval, CRP: C-reactive protein, HbA1c: glycohemoglobin, HR= Hazard Ratio, SBP: Systolic blood pressure. Model 1 adjusted for age, sex, and race. Model 2 adjusted for model 1 plus poverty, education attainment, smoking status, alcoholic intake, physical activity, and total calories. Model 3 adjusted for model 2 plus SBP, HbA1c, creatinine, and CRP.

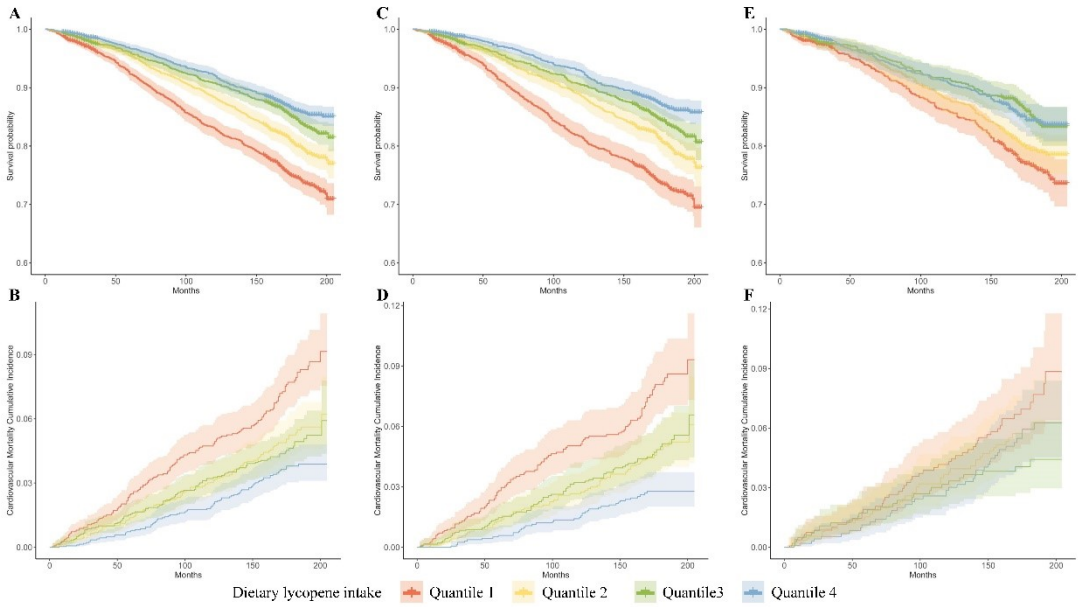
Supplementary Table S5 Results of linear regression of serum lycopene on serum CRP.

Participants	Intercept	Coefficient	*P* value
All participants	0.5493059	-0.0032329	<2e-16
Participants without obesity	0.394882	-0.0021804	3.14e-07
Participants with obesity	0.7958880	-0.0044496	2.97e-10

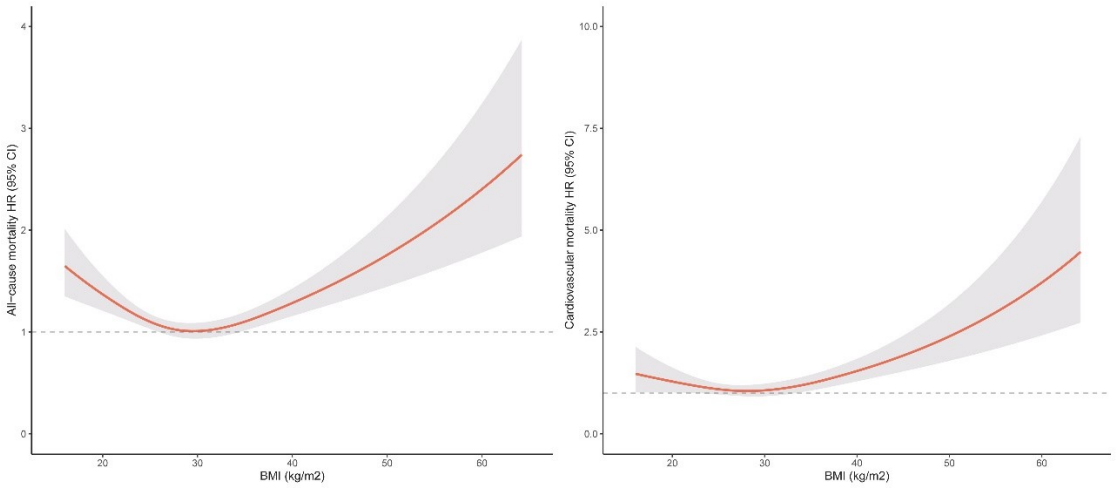
Supplementary Table S6 Multifactor COX regressions adjusted for model 3 after removing those who died within 1 year of the survey.

Participants	All-cause mortality		Cardiovascular mortality	
	HR (95%CI)	*P* value	HR (95%CI)	*P* value
All participants	0.992 (0.987, 0.996)	<0.001	0.999 (0.992, 1.007)	0.882
Participants without obesity	0.991 (0.986, 0.996)	<0.001	1.001 (0.991, 1.010)	0.884
Participants with obesity	0.994 (0.986, 1.001)	0.103	0.997 (0.983, 1.011)	0.644

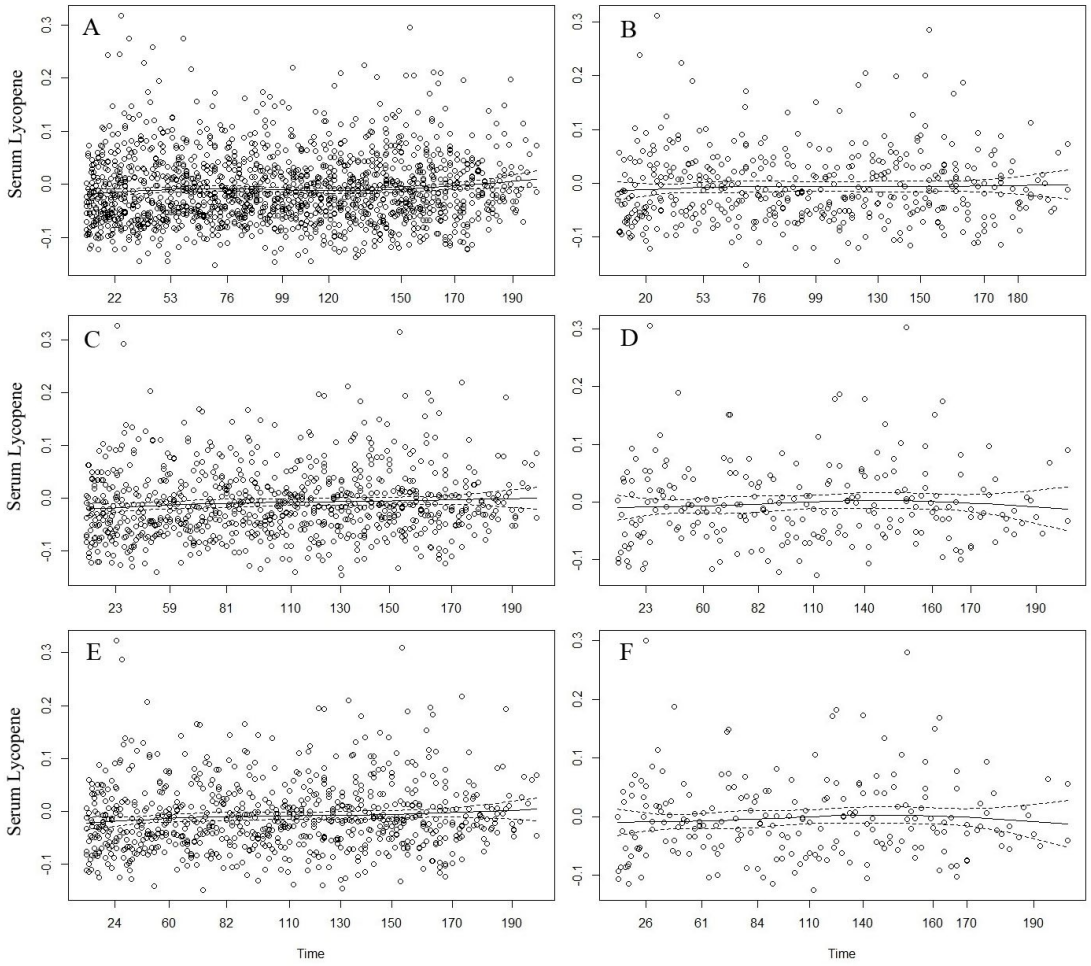
CI= Confidence Interval, HR= Hazard Ratio, Model 3 adjusted for age, sex, race, poverty, education attainment, smoking status, alcoholic intake, physical activity, total calories, SBP, HbA1c, creatinine, and CRP.



Supplementary Figure S1 Kaplan-Meier curves and cumulative incidence function curves for quartile subgroups of dietary lycopene intake with all-cause mortality and cardiovascular mortality (A) KM curves for dietary lycopene intake and all-cause mortality in all participants, $P<0.001$, (B) CIF curves for dietary lycopene intake and cardiovascular mortality in all participants, $P<0.001$, (C) KM curves for dietary lycopene intake and all-cause mortality in participants without obesity, $P<0.001$, (D) CIF curves for dietary lycopene intake and cardiovascular mortality in participants without obesity, $P<0.001$, (E) KM curves for dietary lycopene intake and all-cause mortality in participants with obesity, $P<0.001$, (F) CIF curves for dietary lycopene intake and cardiovascular mortality in participants with obesity, $P=0.1$

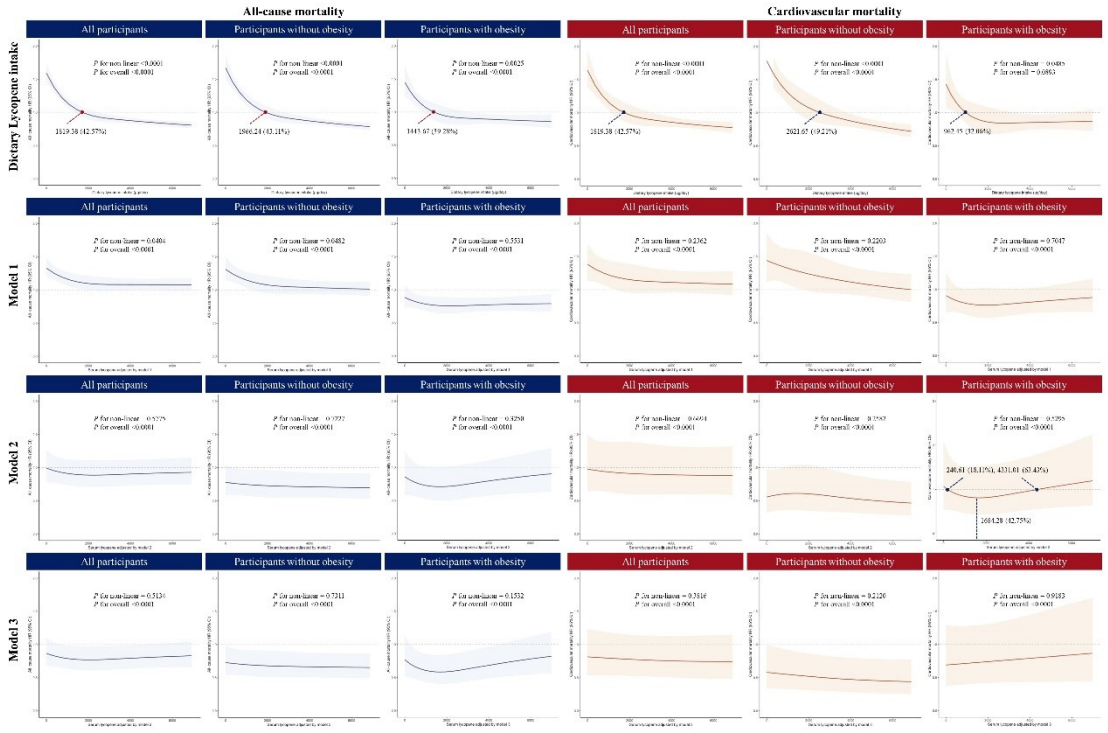


Supplementary Figure S2 Restricted cubic spline analyses of the nonlinear association of BMI with all-cause and cardiovascular mortality.



Supplementary Figure S3 Plots of proportional hazards test for three prediction models for all-cause and cardiovascular mortality in all participants

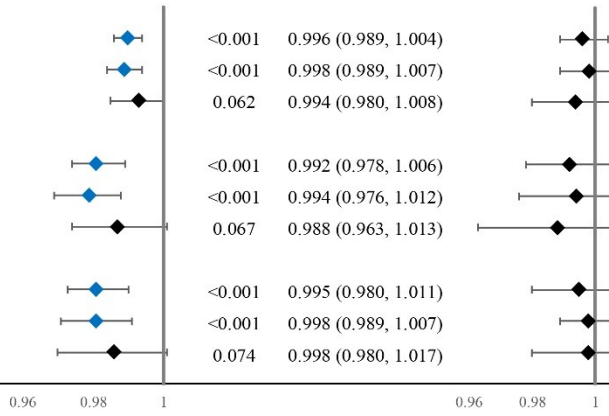
(A) Plot of proportional hazards (PH) test for serum lycopene over time in multifactorial Cox regression for all-cause mortality adjusted for model 1. (B) Plot of PH test for serum lycopene over time in multifactorial Cox regression for cardiovascular mortality adjusted for model 1. (C) Plot of PH test for serum lycopene over time in multifactorial Cox regression for all-cause mortality adjusted for model 2. (D) Plot of PH test for serum lycopene over time in multifactorial Cox regression for cardiovascular mortality adjusted for model 2. (E) Plot of PH test for serum lycopene over time in multifactorial Cox regression for all-cause mortality adjusted for model 3. (F) Plot of PH test for serum lycopene over time in multifactorial Cox regression for cardiovascular mortality adjusted for model 3. Model 1 adjusted for age, sex, and race. Model 2 adjusted for model 1 plus poverty, education attainment, smoking status, alcoholic intake, physical activity, and total calories. Model 3 adjusted for model 2 plus SBP, HbA1c, creatinine, and CRP.



Supplementary Figure S4 Restricted cubic spline analyses of the nonlinear association of dietary lycopene intake with all-cause and cardiovascular mortality.

Model 1 adjusted for age, sex, and race. Model 2 adjusted for model 1 plus poverty, education attainment, smoking status, alcoholic intake, physical activity, and total calories. Model 3 adjusted for model 2 plus SBP, HbA1c, creatinine, and CRP.

Characteristic	All-cause mortality		Cardiovascular mortality	
	HR (95% CI)	*P* value	HR (95% CI)	*P* value
Total lycopene adjusted by model 3				
All participants	0.990 (0.986, 0.994)	<0.001	0.996 (0.989, 1.004)	0.362
Participants without obesity	0.989 (0.984, 0.994)	<0.001	0.998 (0.989, 1.007)	0.653
Participants with obesity	0.993 (0.985, 1.000)	0.062	0.994 (0.980, 1.008)	0.394
Trans-lycopene adjusted by model 3				
All participants	0.981 (0.974, 0.989)	<0.001	0.992 (0.978, 1.006)	0.259
Participants without obesity	0.979 (0.969, 0.988)	<0.001	0.994 (0.976, 1.012)	0.498
Participants with obesity	0.987 (0.974, 1.001)	0.067	0.988 (0.963, 1.013)	0.338
Cis-lycopene adjusted by model 3				
All participants	0.981 (0.973, 0.990)	<0.001	0.995 (0.980, 1.011)	0.533
Participants without obesity	0.981 (0.971, 0.991)	<0.001	0.998 (0.989, 1.007)	0.653
Participants with obesity	0.986 (0.970, 1.001)	0.074	0.998 (0.980, 1.017)	0.851



Supplementary Figure S5 Multifactorial COX regression results for two conformations of lycopene (trans-lycopene and cis-lycopene) adjusted for model 3.

CI= Confidence Interval, HR= Hazard Ratio, Model 3 adjusted for age, sex, race, poverty, education attainment, smoking status, alcoholic intake, physical activity, total calories, SBP, HbA1c, creatinine, and CRP.