

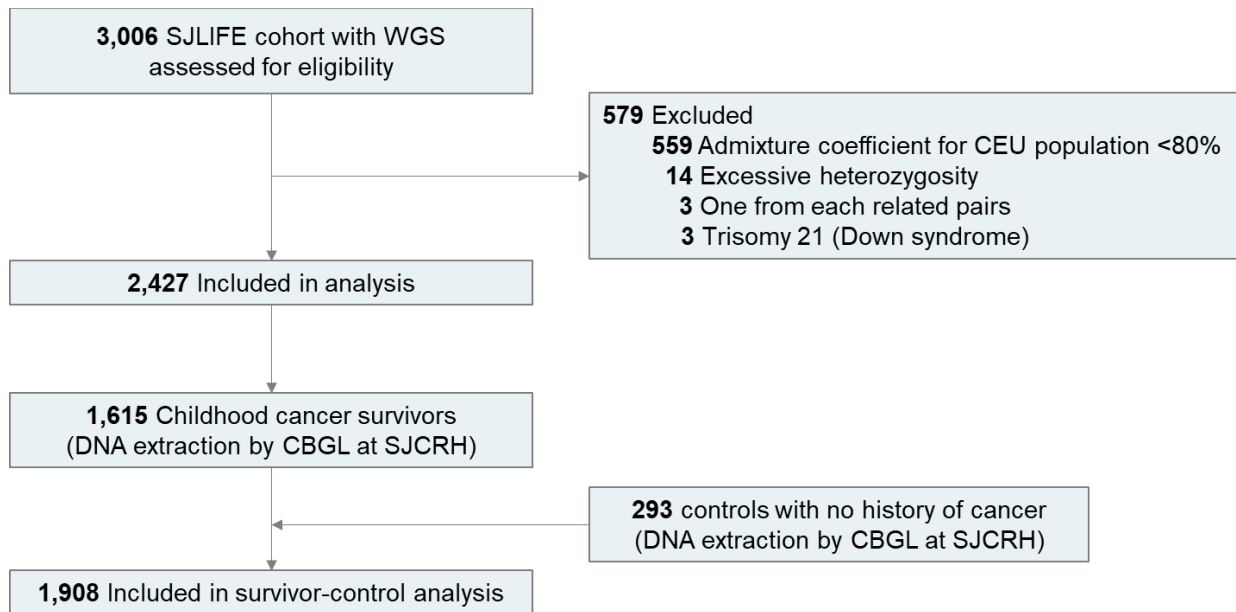
Supplementary Online Content

Song N. et al. Leukocyte Telomere Length and Prevalence of Chronic Health Conditions among Survivors of Childhood Cancer: A Report from the St. Jude Lifetime Cohort

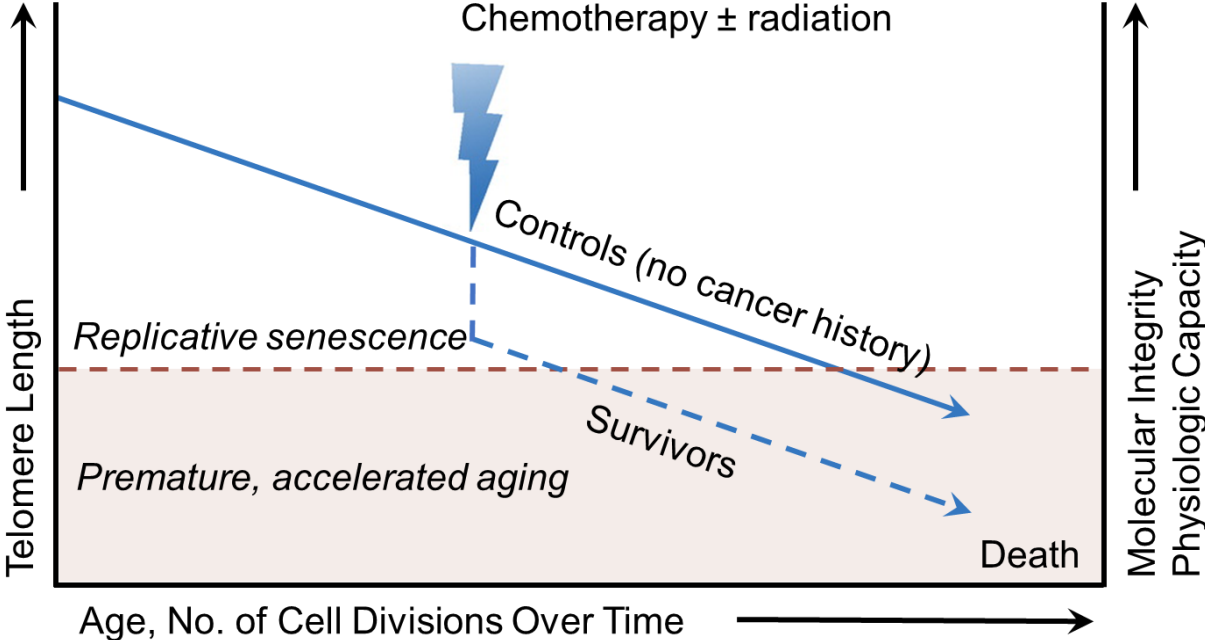
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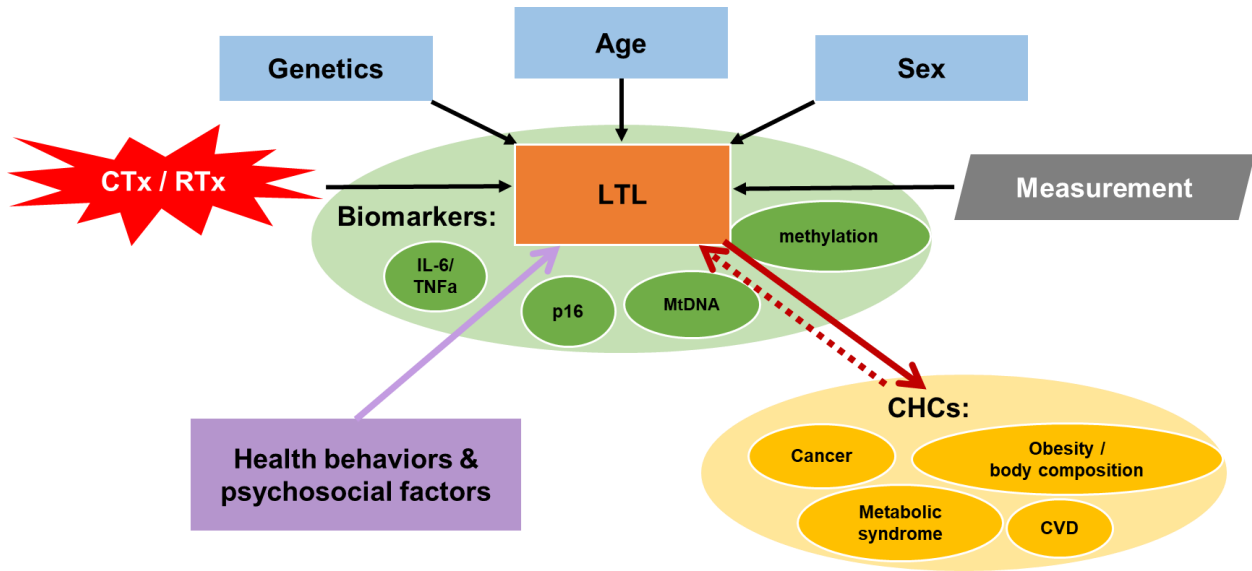
Supplementary Fig. S1. A flow diagram of the study population.



Supplementary Fig. S2. Dynamics of telomere length differs between individuals with no history of cancer and survivors of childhood cancer due to exposures to chemotherapy and/or radiation treatment.



Supplementary Fig. S3. Theoretical framework of relationships among telomere length, health behaviors and chronic health conditions.



Supplementary Table S1. Adjusted least square mean of LTL in controls and survivors overall and by diagnoses^a

	Telomere length	(Standard error)	<i>P</i>
<i>Overall</i>			
Control	6.61	(0.07)	Ref.
Survivor	6.14	(0.03)	<0.0001
<i>By primary diagnosis</i>			
Control	6.60	(0.07)	Ref.
Sarcoma	6.29	(0.08)	0.03
CNS tumor	6.24	(0.09)	<0.01
Neuroblastoma	6.18	(0.14)	0.04
Wilms tumor	6.13	(0.13)	0.01
ALL	6.10	(0.07)	<0.0001
Non-Hodgkin lymphoma	5.98	(0.11)	<0.0001
Hodgkin lymphoma	5.95	(0.08)	<0.0001
Other	6.28	(0.10)	0.05

^aAdjusted for sex, DNA sample age, genetic risk score, eigenvectors, and health behaviors.

Supplementary Table S2. Adjusted least square mean of LTL among survivors by cancer treatments

Cancer treatment	Adjusted LS mean of LTL	(95% CI)	<i>P</i>
Brain RT			
No	6.58	(6.51-6.65)	
Yes	6.56	(6.46-6.65)	0.62
Chest RT			
No	6.62	(6.56-6.69)	
Yes	6.39	(6.29-6.51)	<0.001
Abdomen/Pelvic RT			
No	6.62	(6.55-6.69)	
Yes	6.37	(6.26-6.49)	<0.001
Anthracycline			
No	6.63	(6.54-6.71)	
Yes	6.54	(6.47-6.62)	0.08
Alkylating agent			
No	6.60	(6.52-6.69)	
Yes	6.56	(6.48-6.63)	0.33
Glucocorticoids			
No	6.63	(6.55-6.71)	
Yes	6.50	(6.44-6.60)	0.02
Vincristine			
No	6.66	(6.56-6.76)	
Yes	6.54	(6.47-6.61)	0.03
Platinum			
No	6.56	(6.50-6.63)	
Yes	6.67	(6.51-6.83)	0.18
Epipodophyllotoxin			
No	6.58	(6.51-6.65)	
Yes	6.58	(6.49-6.68)	0.86

Abbreviations: LS (least square) and LTL (leukocyte telomere length)

Supplementary Table S3. Associations of LTL with cancer treatment exposures additionally adjusted for health behaviors.

Cancer treatment	Adjusted LS mean of LTL (95% CI)		<i>P</i>
Chest RT			<0.001
No	6.50	(6.40-6.60)	
Yes	6.28	(6.14-6.42)	
Abdomen/Pelvic RT			<0.001
No	6.49	(6.39-6.59)	
Yes	6.27	(6.13-6.42)	
Glucocorticoids			0.01
No	6.52	(6.41-6.64)	
Yes	6.39	(6.28-6.50)	
Vincristine			0.01
No	6.56	(6.43-6.68)	
Yes	6.41	(6.31-6.51)	

Abbreviations: LS (least square) and LTL (leukocyte telomere length)

Supplementary Table S4. Adjusted least square mean of LTL among survivors by cancer treatments in multivariable model

Cancer treatment	Adjusted LS mean of LTL	(95% CI)	<i>P</i>
Chest RT			0.22
No	6.47	(6.33-6.60)	
Yes	6.36	(6.22-6.50)	
Abdomen/Pelvic RT			0.05
No	6.51	(6.39-6.63)	
Yes	6.32	(6.16-6.48)	
Glucocorticoids			0.02
No	6.48	(6.37-6.59)	
Yes	6.35	(6.22-6.48)	
Vincristine			0.75
No	6.42	(6.28-6.56)	
Yes	6.40	(6.30-6.51)	

Abbreviations: LS (least square) and LTL (leukocyte telomere length)

Supplementary Table S5. Associations of LTL with non-neoplastic CHCs, subsequent neoplasms, and total mortality

	Total (N=2,427, 100%)		1st Tertile (N=809, 100%)		2nd Tertile (N=809, 100%)		3rd Tertile (N=809, 100%)		<i>P</i> _{trend} ^a
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	
<i>Non-neoplastic CHC</i>									
Abnormal glucose metabolism	111	(4.57)	43	(5.32)	36	(4.45)	32	(3.96)	0.095
Abnormal sperm concentration	213	(8.78)	71	(8.78)	77	(9.52)	65	(8.03)	0.299
Amputation	79	(3.26)	17	(2.10)	24	(2.97)	38	(4.70)	0.002
Asthma	49	(2.02)	14	(1.73)	20	(2.47)	15	(1.85)	0.430
Cardiac dysrhythmia	28	(1.15)	7	(0.87)	9	(1.11)	12	(1.48)	0.122
Cardiomyopathy	102	(4.20)	44	(5.44)	32	(3.96)	26	(3.21)	0.013
Cataract	61	(2.51)	18	(2.22)	23	(2.84)	20	(2.47)	0.375
Cerebrovascular accident	59	(2.43)	22	(2.72)	20	(2.47)	17	(2.10)	0.210
Cervical dysplasia	70	(2.88)	20	(2.47)	25	(3.09)	25	(3.09)	0.229
Cholecystitis	198	(8.16)	76	(9.39)	66	(8.16)	56	(6.92)	0.035
Chronic hepatitis C	55	(2.27)	22	(2.72)	21	(2.60)	12	(1.48)	0.047
Chronic kidney disease	25	(1.03)	13	(1.61)	4	(0.49)	8	(0.99)	0.109
Chronic obstructive pulmonary disease	20	(0.82)	9	(1.11)	4	(0.49)	7	(0.87)	0.291
Hypercholesterolemia	23	(0.95)	9	(1.11)	11	(1.36)	3	(0.37)	0.062
Hypertriglyceridemia	52	(2.14)	26	(3.21)	15	(1.85)	11	(1.36)	0.005
Dysphagia	58	(2.39)	22	(2.72)	20	(2.47)	16	(1.98)	0.164
Endometriosis	61	(2.51)	17	(2.10)	20	(2.47)	24	(2.97)	0.133
Enucleation	51	(2.10)	12	(1.48)	16	(1.98)	23	(2.84)	0.028
Esophageal stricture	66	(2.72)	26	(3.21)	22	(2.72)	18	(2.22)	0.111
Esophagitis	23	(0.95)	9	(1.11)	8	(0.99)	6	(0.74)	0.221
Fibrosis/cirrhosis	73	(3.01)	28	(3.46)	30	(3.71)	15	(1.85)	0.029
Gastritis/duodenitis	50	(2.06)	25	(3.09)	17	(2.10)	8	(0.99)	0.001
Gastrointestinal obstruction	22	(0.91)	8	(0.99)	6	(0.74)	8	(0.99)	0.500
Gastrointestinal tract infection	68	(2.80)	21	(2.60)	23	(2.84)	24	(2.97)	0.326
Gastrointestinal ulcer	30	(1.24)	15	(1.85)	8	(0.99)	7	(0.87)	0.036
Genitourinary adhesions	44	(1.81)	18	(2.22)	12	(1.48)	14	(1.73)	0.228
Headaches	89	(3.67)	38	(4.70)	28	(3.46)	23	(2.84)	0.024
Hearing loss	279	(11.50)	96	(11.87)	99	(12.24)	84	(10.38)	0.175
Heart valve disorder	35	(1.44)	8	(0.99)	14	(1.73)	13	(1.61)	0.149
Hernia	132	(5.44)	43	(5.32)	44	(5.44)	45	(5.56)	0.413
Hypertension	170	(7.00)	66	(8.16)	56	(6.92)	48	(5.93)	0.040
Intervertebral disc disorder	48	(1.98)	15	(1.85)	23	(2.84)	10	(1.24)	0.186
Intracranial hemorrhage	22	(0.91)	5	(0.62)	6	(0.74)	11	(1.36)	0.058
Limb length discrepancy	22	(0.91)	9	(1.11)	9	(1.11)	4	(0.49)	0.095
Lymphatic infection	23	(0.95)	11	(1.36)	7	(0.87)	5	(0.62)	0.062
Myocardial Infarction	118	(4.86)	41	(5.07)	44	(5.44)	33	(4.08)	0.178
Obesity	962	(39.64)	346	(42.77)	326	(40.30)	290	(35.85)	0.002
Obstructive pulmonary deficit	97	(4.00)	43	(5.32)	30	(3.71)	24	(2.97)	0.008
Obstructive sleep apnea	127	(5.23)	47	(5.81)	42	(5.19)	38	(4.70)	0.158
Obstructive uropathy	30	(1.24)	10	(1.24)	11	(1.36)	9	(1.11)	0.411
Osteonecrosis	30	(1.24)	10	(1.24)	12	(1.48)	8	(0.99)	0.326
Otitis media	24	(0.99)	9	(1.11)	8	(0.99)	7	(0.87)	0.308
Peripheral motor neuropathy	55	(2.27)	20	(2.47)	19	(2.35)	16	(1.98)	0.252
Peripheral sensory neuropathy	69	(2.84)	20	(2.47)	27	(3.34)	22	(2.72)	0.382
Pleural space disorders	21	(0.87)	7	(0.87)	8	(0.99)	6	(0.74)	0.394
Primary ovarian failure	152	(6.26)	56	(6.92)	50	(6.18)	46	(5.69)	0.152
Prosthetic malfunction	33	(1.36)	4	(0.49)	17	(2.10)	12	(1.48)	0.043
Pulmonary diffusion deficits	45	(1.85)	18	(2.22)	16	(1.98)	11	(1.36)	0.099
Pulmonary embolism	26	(1.07)	5	(0.62)	12	(1.48)	9	(1.11)	0.167

Restrictive pulmonary deficit	52	(2.14)	27	(3.34)	14	(1.73)	11	(1.36)	0.003
Retinopathy	27	(1.11)	10	(1.24)	10	(1.24)	7	(0.87)	0.239
Scoliosis	46	(1.90)	15	(1.85)	17	(2.10)	14	(1.73)	0.428
Seizure	125	(5.15)	38	(4.70)	46	(5.69)	41	(5.07)	0.368
Sinopulmonary infection (Sinusitis)	43	(1.77)	12	(1.48)	16	(1.98)	15	(1.85)	0.286
Soft tissue infection	53	(2.18)	15	(1.85)	20	(2.47)	18	(2.22)	0.305
Tonsillitis	114	(4.70)	37	(4.57)	36	(4.45)	41	(5.07)	0.319
Urinary tract calculi (Urolithiasis)	72	(2.97)	31	(3.83)	17	(2.10)	24	(2.97)	0.153
Uterine bleeding	94	(3.87)	32	(3.96)	30	(3.71)	32	(3.96)	0.500
Vascular disease	20	(0.82)	7	(0.87)	8	(0.99)	5	(0.62)	0.291
Subsequent neoplasms									
Meningioma (brain-RT) ^b	101	(12.67)	35	(13.16)	38	(14.34)	28	(10.53)	0.181
Breast cancer (chest-RT) ^c	36	(9.52)	10	(7.94)	12	(9.52)	14	(11.11)	0.195
Thyroid cancer (neck-RT) ^d	52	(4.62)	12	(3.20)	22	(5.87)	18	(4.79)	0.150
Non-melanoma skin cancer (any-RT) ^e	147	(10.55)	39	(8.39)	61	(13.15)	47	(10.11)	0.197
Sarcoma (any-RT)	14	(1.00)	5	(1.08)	3	(0.65)	6	(1.29)	0.371
Meningioma (out of RT field)	2	(0.08)	NA	NA	NA	NA	2	(0.25)	NA
Breast cancer (out of RT field)	12	(0.49)	3	(0.37)	6	(0.74)	3	(0.37)	0.500
Thyroid cancer (out of RT field)	15	(0.62)	2	(0.25)	4	(0.49)	9	(1.11)	0.013
Non-melanoma skin cancer (out of RT field)	55	(2.27)	17	(2.10)	24	(2.97)	14	(1.73)	0.306
Sarcoma (out of RT field)	13	(0.54)	4	(0.50)	3	(0.37)	6	(0.74)	0.249
Total mortality	76	(3.13)	29	(3.58)	28	(3.46)	19	(2.35)	0.077

Abbreviations: LTL (leukocyte telomere length), CHC (chronic health condition), GRS (genetic risk score), and FDR (false discovery rate).

^aCochran-Armitage Trend test was carried out for each 3x2 cross-tabulation of incidence of specific disease based on tertiles of residual of LTL regressed against age at DNA sampling, DNA extraction methods, GRS and treatment exposure.

^btotal number of survivors with brain-RT is 797.

^ctotal number of survivors with chest-RT is 378.

^dtotal number of survivors with neck-RT is 1126.

^etotal number of survivors with any-RT is 1395.

Supplementary Table S6. Mean of the number of any CHCs by tertiles of LTL

	The number of any CHCs		<i>P</i>
	Mean (SD)	95% CI	
LTL tertile			
1 st tertile	2.34 (2.33)	2.19-2.48	
2 nd tertile	2.25 (2.21)	2.11-2.40	0.45
3 rd tertile	1.99 (1.93)	1.84-2.14	0.001

Abbreviations: CHC (chronic health condition).

Supplementary Table S7. Associations of LTL with risk of non-neoplastic CHCs in multivariable analysis

	Obesity		Hypertriglyceridemia		Restrictive pulmonary deficit		Cardiomyopathy	
	RR (95% CI)	P	RR (95% CI)	P	RR (95% CI)	P	RR (95% CI)	P
Age adjusted Telomere length		0.16		0.06		0.02		0.16
1st tertile	Ref		Ref		Ref		Ref	
2nd tertile	1.02 (0.88-1.21)	0.77	0.44 (0.20-0.99)	0.05	0.49 (0.24-0.96)	0.05	0.90 (0.54-1.48)	0.67
3rd tertile	0.88 (0.75-1.04)	0.14	0.51(0.23-1.10)	0.09	0.43 (0.20-0.88)	0.03	0.66 (0.39-1.18)	0.15
Sex								
Male	Ref		Ref		-		-	
Female	0.85 (0.74-0.98)	0.02	0.28 (0.13-0.62)	<0.01	-	-	-	-
Age at diagnosis								
0-4	Ref		-		Ref		-	
5-9	0.92 (0.76-1.12)	0.40	-	-	0.53 (0.25-1.14)	0.10	-	-
10-14	1.31 (1.06-1.61)	0.01	-	-	0.34 (0.14-0.76)	0.01	-	-
15+	1.63 (1.28-2.09)	<0.01	-	-	0.29 (0.11-0.73)	0.01	-	-
Brain RT								
None	Ref		Ref		-		-	
<25Gy	2.69 (2.18-3.35)	<0.01	2.57 (1.16-5.40)	0.02	-	-	-	-
≥25Gy	1.39 (1.08-1.80)	0.01	2.56 (1.04-6.06)	0.04	-	-	-	-
Chest RT								
None	-		-		Ref		Ref	
<25Gy	-	-	-	-	6.03 (2.01-16.78)	<0.01	1.36 (0.63-2.85)	0.42
≥25Gy	-	-	-	-	28.17 (12.18-65.46)	<0.01	2.22 (1.07-4.22)	0.02
Abdomen/Pelvic RT								
None	-		-		-		-	
<25Gy	-	-	-	-	-	-	-	-
≥25Gy	-	-	-	-	-	-	-	-
Anthracyclines								
None	-		-		Ref		Ref	
1st tertile	-	-	-	-	0.39 (0.12-1.20)	0.11	1.04 (0.36-3.24)	0.94
2nd tertile	-	-	-	-	0.20 (0.06-0.63)	0.01	2.19 (0.99-4.96)	0.06
3rd tertile	-	-	-	-	1.01 (0.51-2.01)	0.97	4.64 (2.23-9.77)	<0.01
Alkylating agents								
None	-		-		Ref		Ref	
1st tertile	-	-	-	-	6.12 (2.54-14.22)	<0.0001	2.05 (0.92-4.47)	0.07
2nd tertile	-	-	-	-	2.63 (0.88-7.26)	0.07	2.49 (1.15-5.16)	0.02
3rd tertile	-	-	-	-	3.73 (1.73-8.32)	<0.01	2.48 (1.14-5.16)	0.02

Glucocorticoids									
None	-								
1st tertile	-	-	-	-	-	-	-	-	-
2nd tertile	-	-	-	-	-	-	-	-	-
3rd tertile	-	-	-	-	-	-	-	-	-
Vincristine									
None	-								
1st tertile	-	-	-	-	-	-	-	-	-
2nd tertile	-	-	-	-	-	-	-	-	-
3rd tertile	-	-	-	-	-	-	-	-	-
Platinum									
None	-							Ref	
1st tertile	-	-	-	-	-	-	-	4.52 (2.01-9.84)	<0.01
2nd tertile	-	-	-	-	-	-	-	2.87 (1.07-7.82)	0.04
3rd tertile	-	-	-	-	-	-	-	1.45 (0.44-4.15)	0.51
Epipodophyllotoxins									
None		Ref							
1st tertile	0.71 (0.57-0.90)	<0.01							
2nd tertile	0.60 (0.48-0.76)	<0.01							
3rd tertile	0.50 (0.38-0.64)	<0.01							
Health behaviors									
Unfavorable		Ref		Ref					
Intermediate	0.98 (0.80-1.18)	0.82	1.56 (0.61-4.26)	0.37					
Favorable	0.71 (0.57-0.88)	<0.01	0.58 (0.17-1.87)	0.37					
Primary diagnosis									
Other		Ref						Ref	
CNS	0.70 (0.50-1.00)	0.05						0.16 (0.01-1.93)	0.18
Sarcoma	1.03 (0.77-1.40)	0.82						1.47 (0.52-4.20)	0.47
Hodgkin lymphoma	0.93 (0.67-1.27)	0.65						2.59 (0.89-8.41)	0.10
Non-Hodgkin lymphoma	1.03 (0.73-1.42)	0.88						2.05 (0.68-6.37)	0.21
Neuroblastoma	1.30 (0.90-1.95)	0.18						0.73 (0.15-3.28)	0.69
Wilms tumor	0.75 (0.51-1.13)	0.16						1.05 (0.21-5.33)	0.96
ALL	1.38 (1.02-1.81)	0.03						1.18 (0.40-3.44)	0.77

Abbreviations: leukocyte telomere length (LTL), chronic health condition (CHC), relative risk (RR), radiation therapy (RT), CNS (central nervous system), and ALL (Acute lymphocytic leukemia).

All regression models adjusted for attained age as cubic splines and significant eigenvectors.

Supplementary Table S7. Associations of LTL with risk of non-neoplastic CHCs in multivariable analysis (continued)

	Chronic Hepatitis C		Headache		Hypertension		Obstructive pulmonary deficit	
	RR (95% CI)	P	RR (95% CI)	P	RR (95% CI)	P	RR (95% CI)	P
Age adjusted Telomere length		0.23		0.07		0.24		0.06
1st tertile	Ref		Ref		Ref		Ref	
2nd tertile	0.96 (0.54-1.85)	0.90	0.84 (0.44-1.59)	0.60	0.77 (0.49-1.18)	0.24	0.71 (0.43-1.15)	0.18
3rd tertile	0.63 (0.30-1.28)	0.22	0.51 (0.25-1.06)	0.07	0.76 (0.48-1.18)	0.23	0.63 (0.37-1.06)	0.08
Sex								
Male	-		Ref		-		-	
Female	-	-	5.09 (2.46-10.88)	<0.01	-	-	-	-
Age at diagnosis								
0-4	-		-		-		Ref	
5-9	-	-	-	-	-	-	0.67 (0.38-1.18)	0.16
10-14	-	-	-	-	-	-	0.57 (0.33-1.02)	0.05
15+	-	-	-	-	-	-	0.35 (0.18-0.68)	<0.01
Brain RT								
None	Ref		Ref		-		-	
<25Gy	3.22 (1.52-6.53)	<0.01	4.01 (1.60-11.54)	<0.01	-	-	-	-
≥25Gy	0.16 (0.01-1.33)	0.13	1.69 (0.58-4.40)	0.31	-	-	-	-
Chest RT								
None	-		-		-		Ref	
<25Gy	-	-	-	-	-	-	4.63 (2.41-9.40)	<0.01
≥25Gy	-	-	-	-	-	-	16.75 (9.93-30.02)	<0.01
Abdomen/Pelvic RT								
None	-		-		-		-	
<25Gy	-	-	-	-	-	-	-	-
≥25Gy	-	-	-	-	-	-	-	-
Anthracyclines								
None	-		Ref		-		-	
1st tertile	-	-	0.29 (0.09-0.88)	0.03	-	-	-	-
2nd tertile	-	-	0.63 (0.27-1.46)	0.29	-	-	-	-
3rd tertile	-	-	0.70 (0.26-1.76)	0.47	-	-	-	-
Alkylating agents								
None	Ref		-		-		Ref	
1st tertile	1.03 (0.41-2.46)	0.95	-	-	-	-	2.74 (1.36-5.22)	<0.01
2nd tertile	2.04 (0.84-4.96)	0.11	-	-	-	-	2.62 (1.28-5.46)	0.01
3rd tertile	2.54 (1.16-5.51)	0.02	-	-	-	-	3.56 (1.97-6.11)	<0.01

Glucocorticoids									
None	Ref		-		-			Ref	
1st tertile	2.64 (1.05-6.63)	0.04	-	-	-	-	-	0.89 (0.49-1.55)	0.70
2nd tertile	2.32 (0.93-6.03)	0.08	-	-	-	-	-	0.43 (0.22-0.81)	0.01
3rd tertile	1.00 (0.33-3.23)	1.00	-	-	-	-	-	0.17 (0.03-0.76)	0.03
Vincristine									
None	-		-		-			-	
1st tertile	-	-	-	-	-	-	-	-	-
2nd tertile	-	-	-	-	-	-	-	-	-
3rd tertile	-	-	-	-	-	-	-	-	-
Platinum									
None	-		-		Ref			-	
1st tertile	-	-	-	-	1.11 (0.43-2.75)	0.83	-	-	-
2nd tertile	-	-	-	-	2.58 (1.03-5.89)	0.03	-	-	-
3rd tertile	-	-	-	-	0.26 (0.02-1.98)	0.25	-	-	-
Epipodophyllotoxins									
None	-		Ref		Ref			-	
1st tertile	-	-	1.28 (0.57-2.85)	0.54	0.91 (0.48-1.61)	0.75	-	-	-
2nd tertile	-	-	0.17 (0.03-0.86)	0.03	0.28 (0.10-0.72)	<0.01	-	-	-
3rd tertile	-	-	0.31 (0.08-1.05)	0.07	0.65 (0.31-1.27)	0.23	-	-	-
Health behaviors									
Unfavorable	-		-		Ref			-	
Intermediate	-	-	-	-	1.24 (0.76-2.06)	0.40	-	-	-
Favorable	-	-	-	-	0.66 (0.37-1.24)	0.18	-	-	-
Primary diagnosis									
Other	-		Ref		-			-	
CNS	-	-	1.26 (0.29-5.34)	0.76	-	-	-	-	-
Sarcoma	-	-	1.14 (0.21-6.39)	0.88	-	-	-	-	-
Hodgkin lymphoma	-	-	5.97 (1.60-22.01)	0.01	-	-	-	-	-
Non-Hodgkin lymphoma	-	-	1.54 (0.23-11.55)	0.67	-	-	-	-	-
Neuroblastoma	-	-	1.54 (0.20-9.95)	0.66	-	-	-	-	-
Wilms tumor	-	-	1.62 (0.25-8.32)	0.59	-	-	-	-	-
ALL	-	-	2.12 (0.52-8.04)	0.28	-	-	-	-	-

Abbreviations: leukocyte telomere length (LTL), chronic health condition (CHC), relative risk (RR), radiation therapy (RT), CNS (central nervous system), and ALL (Acute lymphocytic leukemia).

All regression models adjusted for attained age as cubic splines and significant eigenvectors.

Supplementary Table S8. Associations of LTL with non-neoplastic CHCs present prior to the measurement of LTL with statistical significance

	Total (N=2,427, 100%)		1st Tertile (N=809, 100%)		2nd Tertile (N=809, 100%)		3rd Tertile (N=809, 100%)		<i>P</i> _{trend}
	N	(%)	N	(%)	N	(%)	N	(%)	
<i>Non-neoplastic CHCs</i>									
Hypertriglyceridemia	20	(0.8)	11	(1.4)	8	(1.0)	1	(0.1)	0.006
Gastritis/Duodenitis	43	(1.8)	19	(2.3)	16	(2.0)	8	(1.0)	0.038
Headaches	63	(2.6)	31	(3.8)	17	(2.1)	15	(1.9)	0.012
Obesity	288	(11.9)	112	(13.8)	99	(12.2)	77	(9.5)	0.007
Obstructive pulmonary deficit	33	(1.4)	16	(2.0)	12	(1.5)	5	(0.6)	0.018

Abbreviations: LTL (leukocyte telomere length), CHC (chronic health condition), and GRS (genetic risk score).

Supplementary Table S9. Adjusted least square mean of LTL among younger and older survivors by individual health behaviors

Health behavior	Adjusted LS mean of LTL	(95% CI)	P
Younger age group (18-35 years)			
Physical activity			0.87
≥150min/week	6.14	(5.94-6.34)	
<150min/week	6.12	(5.93-6.31)	
Strength			0.08
Normal	6.23	(6.03-6.44)	
Abnormal	6.06	(5.87-6.25)	
Smoking status			0.09
Never	6.14	(5.97-6.32)	
Ever	5.95	(5.71-6.20)	
Healthy eating index			0.26
Normal	6.15	(5.97-6.33)	
Abnormal	6.03	(5.79-6.26)	
Alcohol intake			0.39
Moderate drinking	6.15	(5.96-6.34)	
Not moderate drinking	6.07	(5.87-6.26)	
Older age group (>35 years)			
Physical activity			0.63
≥150min/week	5.60	(5.45-5.76)	
<150min/week	5.65	(5.50-5.79)	
Strength			0.84
Normal	5.64	(5.44-5.83)	
Abnormal	5.62	(5.48-5.75)	
Smoking status			0.98
Never	5.62	(5.48-5.76)	
Ever	5.62	(5.46-5.79)	
Healthy eating index			0.12
Normal	5.65	(5.52-5.78)	
Abnormal	5.47	(5.24-5.69)	
Alcohol intake			0.34
Moderate drinking	5.56	(5.40-5.72)	
Not moderate drinking	5.65	(5.51-5.80)	

Abbreviations: LS (least square) and LTL (leukocyte telomere length)