Supplementary Table 1: LBC1936 descriptive data on complete cases split by number of
waves attended. mean (SD) or n (%)

Wave	n visits	n	Age (yrs)	Sex (F)	Telomere Length (bp)	Hannum Age (yrs)
1	1	624	69.8 (0.8)	315 (50)	4200 (579)	66.5 (6.3)
	2	46	69.1 (0.6)	18 (39)	4240 (614)	64.7 (9.6)
	3	219	69.0 (0.6)	112 (51)	4176 (491)	64.6 (6.3)
2	2	46	72.1 (0.5)	18 (39)	4224 (1192)	67.4 (6.8)
	3	219	72.0 (0.5)	112 (51)	3909 (681)	69.1 (6.5)
3	3	219	75.8 (0.5)	112 (51)	3663 (678)	71.4 (6.2)

6 individuals had one visit at wave 2; 4 individuals had one visit at wave 3; 21 individuals had 2 visits, one of which was at wave 3.

 Wave	n visits	n	Age (yrs)	Sex (F)	Telomere Length (bp)	Hannum Age (yrs)	
1	1	299	79.1 (0.6)	188 (63)	4064 (385)	74.3 (7.3)	
	2	61	79.2 (0.6)	33 (54)	4110 (457)	72.6 (5.5)	
	3	50	79.2 (0.6)	26 (52)	4231 (335)	74.2 (6.3)	
3	2	61	86.7 (0.4)	33 (54)	4205 (571)	77.9 (5.1)	
	3	50	86.7 (0.4)	26 (52)	4240 (353)	78.4 (6.6)	
4	3	50	90.1 (0.1)	26 (52)	3194 (659)	80.2 (6.4)	

Supplementary Table 2: LBC1921 descriptive data on complete cases split by number of waves attended. mean (SD) or n (%)

10 individuals had one visit at wave 3; 18 individuals had one visit at wave 4; 14 individuals had two visits, one of which was at wave 4.

Supplementary Table 3: Survival model output for age- and sex-adjusted methylation age and telomere length.

LBC1936 (n = 920, $n_{events} = 135$)								
Hazard Ratio	95% CI	P-Value						
0.92	[0.78, 1.09]	0.34						
		0.036						
LBC1921 ($n = 414$, $n_{events} = 280$)								
Hazard Ratio	95% CI	P-Value						
0.86	[0.76, 0.97]	0.017						
	[1.11, 1.41]	3x10 ⁻⁴						
LBC1921 + LBC1936 ($n_{telo/Hannum} = 1,484/1,366, n_{events} = 437/427$)								
Hazard Ratio	95% CI							
0.88	[0.79, 0.99]	0.027						
1.25	[1.12, 1.39]	$4x10^{-4}$						
	Hazard Ratio 0.92 1.18 events = 280) Hazard Ratio 0.86 1.25 ín _{telo/Hannum} = 1,484 Hazard Ratio 0.88	Hazard Ratio 95% CI 0.92 $[0.78, 1.09]$ 1.18 $[1.01, 1.39]$ events = 280) Hazard Ratio 95% CI 0.86 $[0.76, 0.97]$ 1.25 $1.11, 1.41]$ 1.25 $[1.11, 1.41]$						

Effect sizes for telomere length and Hannum age are estimated in independent models and are reported per standard deviation.

Supplementary Table 4: Regression output for the age prediction models. The linear model takes a random sample of the population at each wave, such that each individual can only be included at a single wave. The linear mixed model includes a random intercept for participant ID to account for the clustering. The top half of the table shows the univariate results, the bottom half shows the multivariate results. All models adjust for sex.

Univariate Output		LBC1921		LBC1936		LBC1921 + LBC1936	
	Std. Beta	SE	Std. Beta	SE	Std. Beta	SE	
Telomere	-0.37	0.06	-0.26	0.03	-0.15	0.03	
Hannum age	0.33	0.06	0.28	0.04	0.58	0.03	
Telomere	-0.33	0.03	-0.25	0.02	-0.28	0.01	
Hannum age	0.31	0.03	0.29	0.02	0.59	0.02	
Multivariate Output		21	LBC1930	5	LBC1921 + L	BC1936	
	Std. Beta	SE	Std. Beta	SE	Std. Beta	SE	
Telomere	-0.31	0.07	-0.25	0.04	-0.14	0.04	
Hannum age	0.30	0.06	0.26	0.04	0.55	0.03	
Telomere	-0.33	0.03	-0.21	0.02	-0.21	0.02	
Hannum age	0.29	0.03	0.27	0.02	0.55	0.02	
	Hannum age Telomere Hannum age Telomere Hannum age Telomere	Std. BetaTelomere-0.37Hannum age0.33Telomere-0.33Hannum age0.31LBC19Std. BetaTelomere-0.31Hannum age0.30Telomere-0.33	Std. Beta SE Telomere -0.37 0.06 Hannum age 0.33 0.06 Telomere -0.33 0.03 Hannum age 0.31 0.03 Hannum age 0.31 0.03 Hannum age 0.31 0.03 Telomere -0.31 0.07 Hannum age 0.30 0.06 Telomere -0.33 0.03	Std. Beta SE Std. Beta Telomere -0.37 0.06 -0.26 Hannum age 0.33 0.06 0.28 Telomere -0.33 0.03 -0.25 Hannum age 0.31 0.03 0.29 LBC1921 LBC1930 Std. Beta SE Std. Beta Telomere -0.31 0.07 -0.25 Hannum age 0.30 0.06 0.28 Telomere -0.31 0.07 -0.25 Hannum age 0.30 0.06 0.26 Telomere -0.33 0.03 -0.21	Std. Beta SE Std. Beta SE Telomere -0.37 0.06 -0.26 0.03 Hannum age 0.33 0.06 0.28 0.04 Telomere -0.33 0.03 -0.25 0.02 Hannum age 0.31 0.03 -0.29 0.02 Hannum age 0.31 0.03 0.29 0.02 Keta SE Std. Beta SE Std. Beta SE Telomere -0.31 0.07 -0.25 0.04 Hannum age 0.30 0.06 0.28 0.04 Telomere -0.31 0.07 -0.25 0.04 Hannum age 0.30 0.06 0.26 0.04	Std. Beta SE Std. Beta SE Std. Beta SE Std. Beta Telomere -0.37 0.06 -0.26 0.03 -0.15 Hannum age 0.33 0.06 0.28 0.04 0.58 Telomere -0.33 0.03 -0.25 0.02 -0.28 Hannum age 0.31 0.03 0.29 0.02 0.59 Hannum age 0.31 0.03 0.29 0.02 0.59 Ktd. Beta SE Std. Beta SE Std. Beta SE Std. Beta SE Telomere -0.31 0.07 -0.25 0.04 -0.14 Hannum age 0.30 0.06 0.26 0.04 0.55 Telomere -0.33 0.03 -0.21 0.02 -0.21	

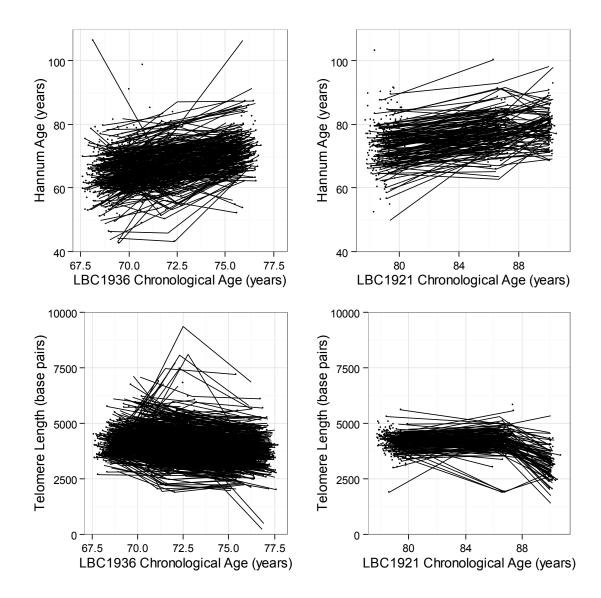
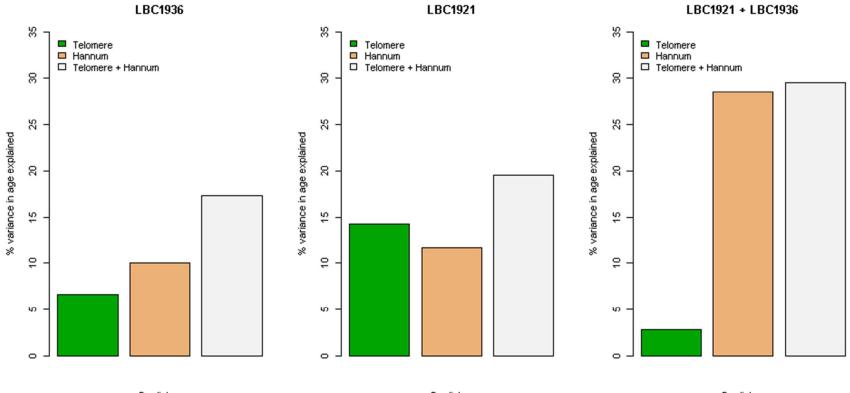


Figure 1: Spaghetti plots for change in Hannum age and telomere length over time in LBC1936 and LBC1921.

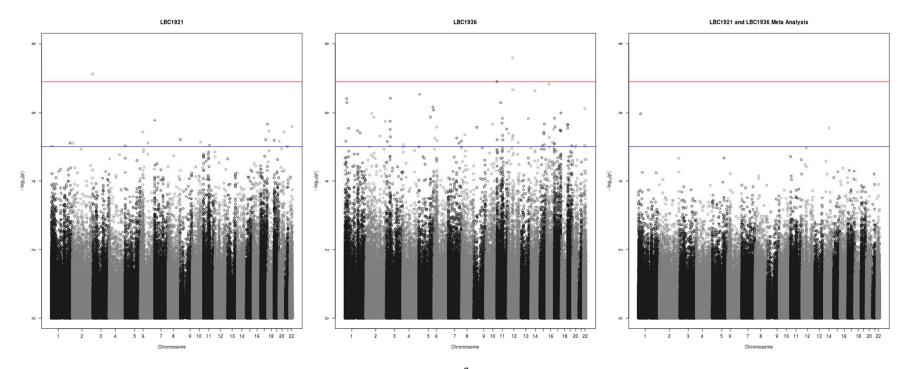
Figure 2: Proportion of variance in age explained by Hannum age and telomere length.



Predictor

Predictor

Predictor



Supplementary Figure 1: EWAS of Telomere Length in LBC1921, LBC1936, and meta analysis.

The red line represents the Bonferroni significant threshold of $P = 1.2 \times 10^{-7}$; the blue line represents the nominal significance threshold of $P = 1 \times 10^{-5}$.