

Supplementary Online Content

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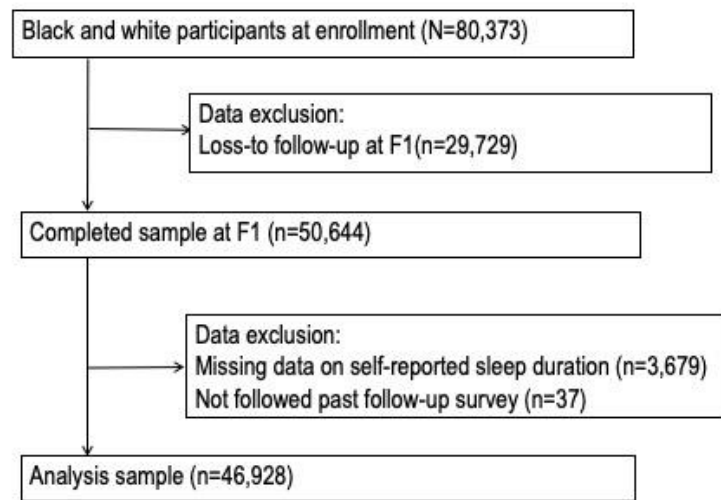
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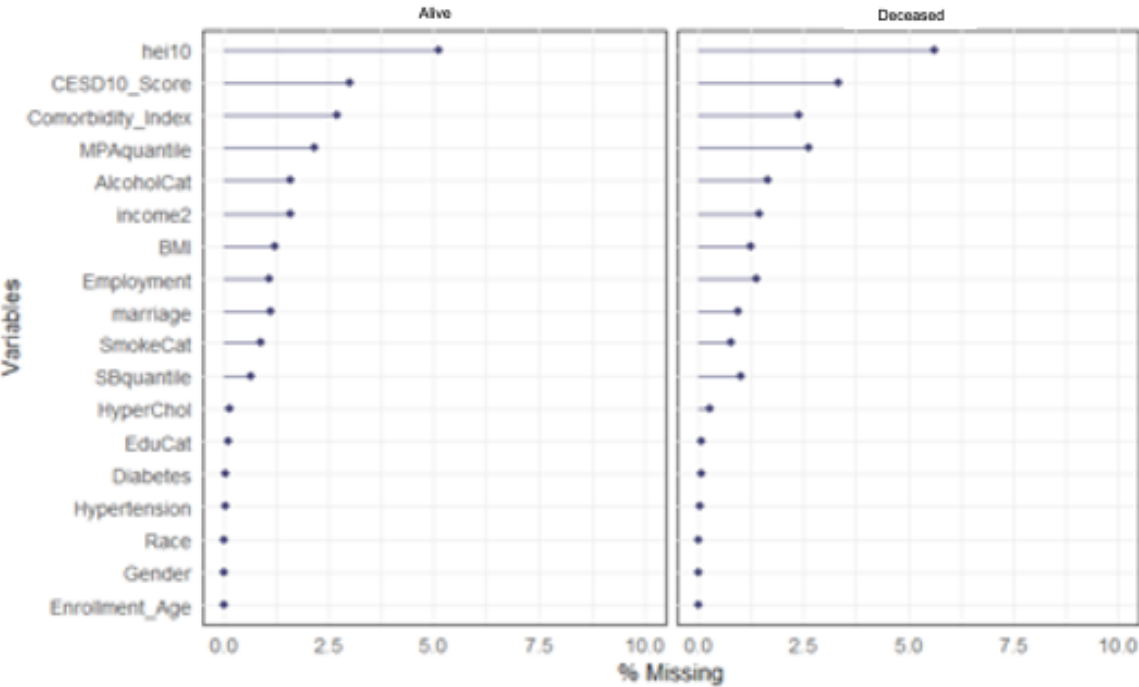
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This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1. SCCS Sleep Trajectory and Mortality Participant Flow Chart

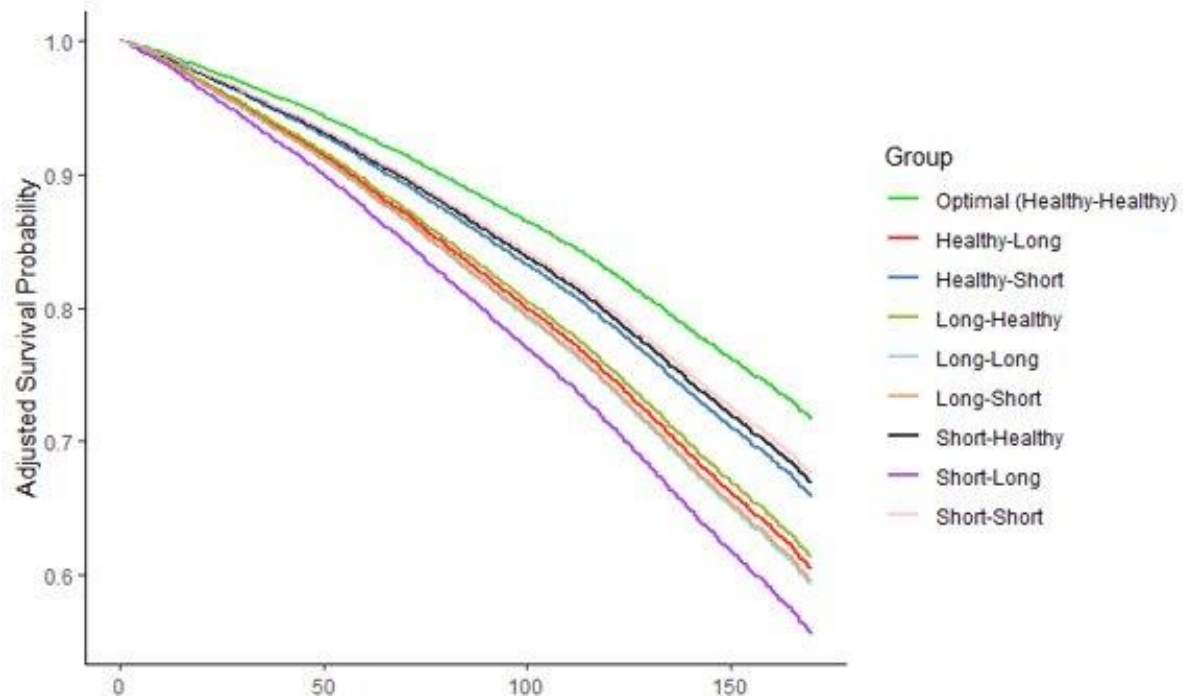


eFigure 2. SCCS Sleep Trajectory and Mortality Analysis: Missing Data Distribution

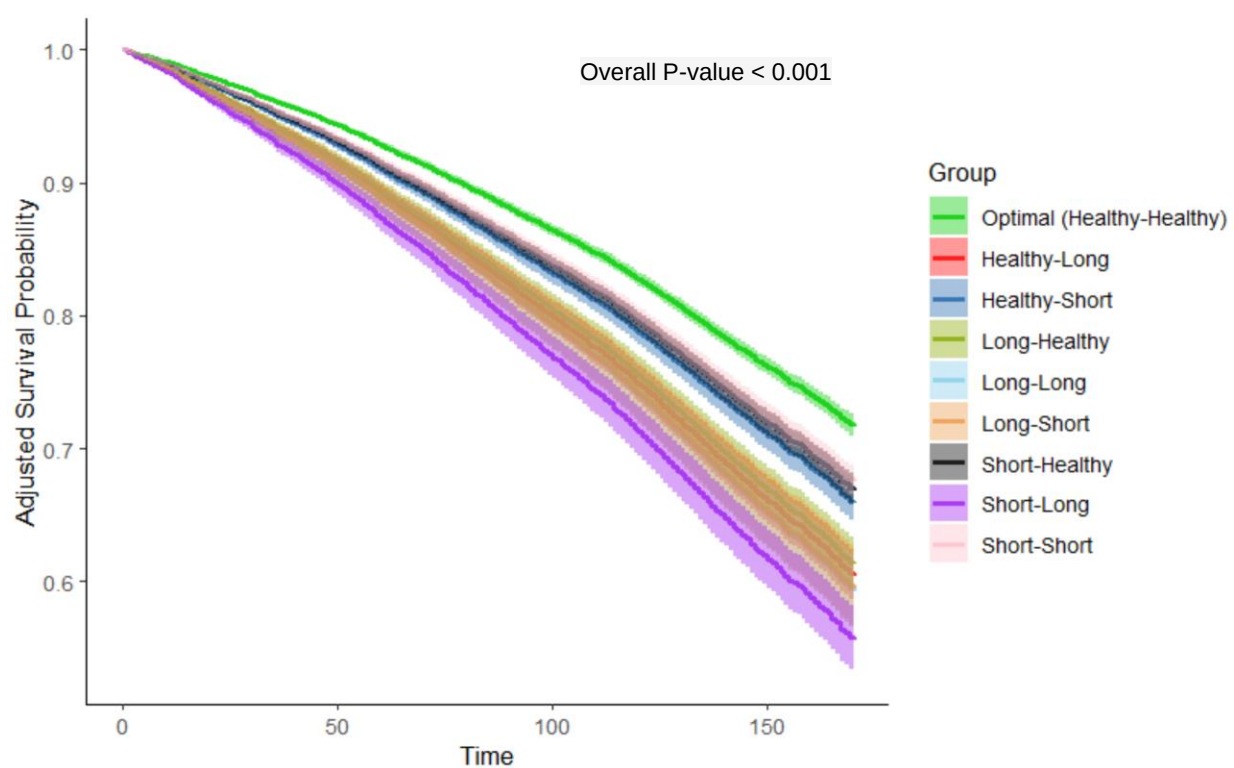


eFigure 3. Adjusted Survival Curves for All-Cause Mortality by Sleep Trajectory

A. Kaplan-Meier Plot without 95% Confidence Intervals

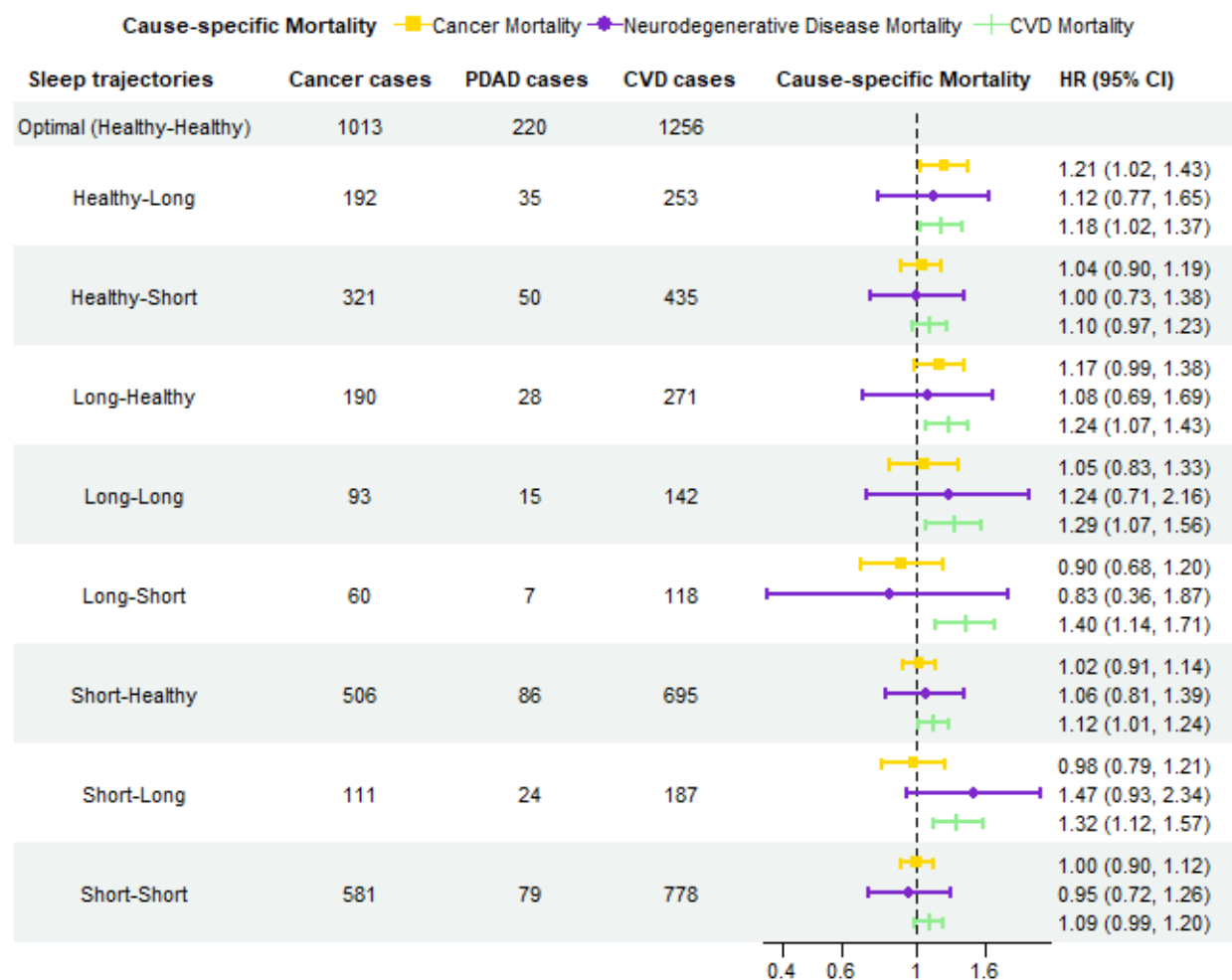


B. Kaplan-Meier Plot with 95% Confidence Intervals



Adjusted for age, sex, and race.

eFigure 4. Adjusted Hazard Ratios with 95% CIs for Each Cause-Specific Mortality by Sleep Trajectory Categories (Competing Risk Analysis)



Adjusted for age, sex, race, education, marital status, household income, employment status, smoking status, alcohol intake, HEI-2010, total moderate activity, sedentary time.

eTable 1. SCCS Participant Characteristics by Vital Status (N = 46 928)

	Overall N = 46,928	Alive N = 33,349	Deceased N = 13,579	p-value*
Age, years	53.0 ± 8.8	51.6 ± 8.0	56.5 ± 9.6	<0.001
Women	30,712 (65.4)	22,911 (68.7)	7,801 (57.4)	<0.001
Black adults	29,725 (63.3)	21,320 (63.9)	8,405 (61.9)	<0.001
Less than high school	11,129 (23.7)	6,838 (20.5)	4,291 (31.6)	<0.001
Married	18,969 (40.9)	14,116 (42.8)	4,853 (36.1)	<0.001
Household income > \$15k	23,911 (51.7)	18,505 (56.4)	5,406 (40.4)	<0.001
Unemployed	26,158 (56.4)	16,486 (50.0)	9,672 (72.2)	<0.001
Current smoker	15,739 (33.8)	10,150 (30.7)	5,589 (41.5)	<0.001
Alcohol consumption, ≥1 drink/day	8,252 (17.9)	5,736 (17.5)	2,516 (18.8)	<0.001
HEI-2010	58.8 (50.2, 67.7)	59.0 (50.3, 67.9)	58.4 (49.9, 67.1)	<0.001
physical activity, MET- hour/day	8.0 (4.0, 13.1)	8.0 (4.0, 13.7)	6.9 (2.9, 12.0)	<0.001
Sitting time, hrs/day	8.7 (6.0, 12.0)	9.0 (6.0, 12.0)	8.5 (6.0, 12.0)	<0.001
BMI, kg/m ²	29.6 (25.5, 35.0)	29.6 (25.6, 34.8)	29.6 (25.1, 35.4)	0.004
Hypertension	26,337 (56.1)	17,151 (51.4)	9,186 (67.7)	<0.001
Diabetes	10,072 (21.5)	5,571 (16.7)	4,501 (33.2)	<0.001
High cholesterol	17,598 (37.6)	11,829 (35.5)	5,769 (42.6)	<0.001
MI at enrollment	3,151 (6.7)	1,433 (4.3)	1,718 (12.7)	<0.001
MI at follow-up	1,926 (4.2)	922 (2.8)	1,004 (7.6)	<0.001
Sleep trajectory				<0.001
Optimal (healthy-healthy)	15,781 (33.6)	11,584 (34.7)	4,197 (30.9)	
Long-Long	1,283 (2.7)	826 (2.5)	457 (3.4)	
Long-Healthy	2,581 (5.5)	1,732 (5.2)	849 (6.3)	
Long-Short	990 (2.1)	655 (2.0)	335 (2.5)	
Healthy-Long	2,401 (5.1)	1,539 (4.6)	862 (6.3)	
Healthy-Short	4,900 (10.4)	3,461 (10.4)	1,439 (10.6)	
Short-Long	1,628 (3.5)	1,020 (3.1)	608 (4.5)	
Short-Healthy	7,878 (16.8)	5,597 (16.8)	2,281 (16.8)	
Short-Short	9,486 (20.2)	6,935 (20.8)	2,551 (18.7)	

Data presented as mean ±SD, Median (IQR) or Frequency (%).

*Wilcoxon rank sum test; Pearson's Chi-squared test

eTable 2. SCCS Sleep Trajectory and Mortality Analysis: Model Fit Metrics

Model	AIC	BIC	C-Index	χ^2 (p value)
Model 1	282128.3	282211.0	0.6484145	
Model 2	268706.9	268819.1	0.6855002	M1- M2: 1701.1 (<0.005)
Model 3	241995.1	242172.4	0.6979306	M2 – M3: 707.53 (<0.005)
Model 4	230338.6	230536.9	0.7103986	M3 – M4: 749.15 (<0.005)

eTable 3. Associations Between Sleep Duration Trajectory and All-Cause Mortality in the Southern Community Cohort Study (MICE Imputed Dataset)

Sleep trajectory	Model 1 ^a HR (95% CI)	Model 2 ^b HR (95% CI)	Model 3 ^c HR (95% CI)	Model 4 ^d HR (95% CI)
Optimal (Healthy-Healthy)	—	—	—	—
Long-Long	1.61 (1.44, 1.80)	1.35 (1.21, 1.51)	1.28 (1.14, 1.43)	1.23 (1.11, 1.35)
Long-Healthy	1.50 (1.40, 1.62)	1.31 (1.21, 1.41)	1.24 (1.15, 1.34)	1.21 (1.12, 1.30)
Long-Short	1.61 (1.44, 1.80)	1.35 (1.21, 1.51)	1.27 (1.14, 1.43)	1.21 (1.08, 1.36)
Healthy-Long	1.56 (1.45, 1.67)	1.33 (1.23, 1.43)	1.30 (1.20, 1.40)	1.26 (1.16, 1.36)
Healthy-Short	1.27 (1.20, 1.35)	1.16 (1.09, 1.24)	1.15 (1.08, 1.22)	1.13 (1.06, 1.20)
Short-Long	1.83 (1.68, 2.00)	1.48 (1.36, 1.62)	1.44 (1.32, 1.57)	1.35 (1.23, 1.48)
Short-Healthy	1.22 (1.16, 1.29)	1.16 (1.10, 1.22)	1.14 (1.08, 1.20)	1.09 (1.04, 1.16)
Short-Short	1.23 (1.13, 1.25)	1.12 (1.06, 1.18)	1.10 (1.04, 1.15)	1.04 (0.98, 1.09)

HR = Hazard Ratio, CI = Confidence Interval; ^aModel 1: adjusted for age, sex, race; ^bModel 2: model 1 + adjustment for education, marital status, household income, employment status; ^cModel 3: model 2 + adjustment for smoking status, alcohol intake, HEI-2010, total moderate activity, sedentary time; ^dModel 4: model 3 + adjustment for BMI, CCI, CES-D Score

eTable 4. Sleep Duration Trajectory and All-Cause Mortality in the SCCS Excluding Deaths Within the First 2 Years of Follow-Up

Sleep trajectory	N	Events N	Model 1 ^a HR (95% CI)	Model 2 ^b HR (95% CI)	Model 3 ^c HR (95% CI)	Model 4 ^d HR (95% CI)
Optimal (Healthy-Healthy)	15,387	3,803	—	—	—	—
Long-Long	1,226	400	1.58 (1.43, 1.75)	1.29 (1.17, 1.44)	1.28 (1.15, 1.44)	1.25 (1.12, 1.40)
Long-Healthy	2,512	780	1.54 (1.43, 1.67)	1.33 (1.23, 1.44)	1.29 (1.19, 1.41)	1.23 (1.13, 1.34)
Long-Short	951	296	1.58 (1.40, 1.78)	1.31 (1.16, 1.48)	1.23 (1.08, 1.40)	1.16 (1.02, 1.33)
Healthy-Long	2,281	742	1.50 (1.38, 1.62)	1.28 (1.18, 1.38)	1.22 (1.12, 1.33)	1.17 (1.07, 1.27)
Healthy-Short	4,737	1,276	1.25 (1.17, 1.33)	1.14 (1.06, 1.21)	1.12 (1.04, 1.20)	1.09 (1.02, 1.17)
Short-Long	1,548	528	1.79 (1.63, 1.96)	1.44 (1.31, 1.58)	1.38 (1.25, 1.52)	1.27 (1.15, 1.40)
Short-Healthy	7,640	2,043	1.21 (1.15, 1.28)	1.14 (1.08, 1.20)	1.12 (1.06, 1.19)	1.07 (1.01, 1.14)
Short-Short	9,215	2,280	1.18 (1.12, 1.24)	1.11 (1.05, 1.17)	1.08 (1.02, 1.14)	1.01 (0.95, 1.07)

HR = Hazard Ratio, CI = Confidence Interval; ^aModel 1: adjusted for age, sex, race; ^bModel 2: model 1 + adjustment for education, marital status, household income, employment status; ^cModel 3: model 2 + adjustment for smoking status, alcohol intake, HEI-2010, total moderate activity, sedentary time; ^dModel 4: model 3 + adjustment for BMI, CCI, CES-D Score

eTable 5. Sleep Duration Trajectory and Cause-Specific Mortality in the SCCS Excluding Deaths Within the First 2 Years of Follow-Up

	Event	Model 1 HR (95% CI)		Model 2 HR (95% CI)		Model 3 HR (95% CI)		Model 4 HR (95% CI)	
CVD Mortality									
	3,693								
Healthy-Healthy	1,129	—	—	—	—	—	—	—	—
Long-Long	122	1.51	1.25, 1.83	1.27	1.05, 1.54	1.26	1.03, 1.54	1.18	0.96, 1.46
Long-Healthy	246	1.49	1.29, 1.72	1.28	1.11, 1.48	1.26	1.08, 1.47	1.17	1.00, 1.37
Long-Short	100	1.61	1.31, 1.97	1.35	1.10, 1.67	1.31	1.05, 1.63	1.22	0.97, 1.53
Healthy-Long	215	1.31	1.13, 1.52	1.15	0.99, 1.34	1.13	0.96, 1.32	1.09	0.93, 1.28
Healthy-Short	393	1.22	1.09, 1.37	1.12	0.99, 1.26	1.11	0.98, 1.26	1.07	0.94, 1.21
Short-Long	162	1.65	1.39, 1.95	1.37	1.15, 1.62	1.32	1.11, 1.58	1.22	1.02, 1.47
Short-Healthy	626	1.21	1.10, 1.34	1.14	1.03, 1.26	1.12	1.01, 1.25	1.08	0.97, 1.20
Short-Short	700	1.18	1.08, 1.30	1.11	1.01, 1.23	1.10	0.99, 1.21	1.02	0.92, 1.13
Cancer Mortality									
	2,655								
Healthy-Healthy	889	—	—	—	—	—	—	—	—
Healthy-Long	148	1.16	0.97, 1.38	1.08	0.90, 1.29	1.07	0.89, 1.30	1.01	0.83, 1.24
Healthy-Short	279	1.11	0.97, 1.27	1.05	0.91, 1.20	1.02	0.88, 1.19	1.02	0.88, 1.18
Long-Healthy	172	1.31	1.11, 1.54	1.23	1.04, 1.46	1.20	1.00, 1.43	1.19	1.00, 1.43
Long-Long	75	1.15	0.91, 1.46	1.05	0.82, 1.33	1.00	0.77, 1.29	0.99	0.76, 1.28
Long-Short	53	1.08	0.82, 1.44	1.00	0.75, 1.33	0.95	0.70, 1.28	0.95	0.70, 1.30
Short-Healthy	437	1.06	0.95, 1.19	1.03	0.92, 1.16	1.02	0.90, 1.15	1.01	0.89, 1.14
Short-Long	93	1.16	0.93, 1.44	1.01	0.81, 1.26	0.97	0.76, 1.22	0.94	0.74, 1.20
Short-Short	509	1.07	0.96, 1.20	1.06	0.94, 1.18	1.02	0.90, 1.15	1.01	0.89, 1.14
Neurodegenerative Disease Mortality									
	530								
Healthy-Healthy	214	—	—	—	—	—	—	—	—
Healthy-Long	33	1.10	0.76, 1.60	1.07	0.73, 1.58	1.12	0.75, 1.67	1.04	0.68, 1.58
Healthy-Short	49	0.97	0.71, 1.32	0.98	0.71, 1.34	1.03	0.74, 1.42	1.02	0.73, 1.42
Long-Healthy	27	1.19	0.79, 1.79	1.07	0.70, 1.65	1.04	0.66, 1.65	1.06	0.67, 1.69
Long-Long	--	1.28	0.75, 2.17	1.30	0.76, 2.22	1.33	0.76, 2.33	1.31	0.73, 2.34
Long-Short	--	--	--	--	--	--	--	--	--
Short-Healthy	83	1.02	0.79, 1.32	1.00	0.77, 1.31	1.06	0.81, 1.39	1.02	0.77, 1.37
Short-Long	24	1.73	1.12, 2.67	1.59	1.01, 2.50	1.60	1.01, 2.55	1.59	0.99, 2.54
Short-Short	78	0.93	0.72, 1.21	0.96	0.74, 1.26	0.97	0.73, 1.28	0.97	0.72, 1.30

HR = Hazard Ratio, CI = Confidence Interval; Model 1: adjusted for age, sex, race; Model 2: model 1 + adjustment for education, marital status, household income, employment status; Model 3: model 2 + adjustment for smoking status, alcohol intake, HEI-2010, total moderate activity, sedentary time; Model 4: model 3 + adjustment for BMI, CCI, CES-D Score

eTable 6. Sleep Trajectory and All-Cause Mortality Excluding Participants With History of Myocardial Infarction (N = 41 555)

Sleep trajectory	N	Events N	Model 1 ^a HR (95% CI)	Model 2 ^b HR (95% CI)	Model 3 ^c HR (95% CI)	Model 4 ^d HR (95% CI)
Optimal (Healthy-Healthy)	14,231	3,424	—	—	—	—
Long-Long	1,124	375	1.66 (1.49, 1.85)	1.34 (1.20, 1.50)	1.35 (1.20, 1.51)	1.30 (1.16, 1.47)
Long-Healthy	2,243	674	1.50 (1.38, 1.63)	1.30 (1.20, 1.42)	1.26 (1.15, 1.38)	1.22 (1.11, 1.33)
Long-Short	865	264	1.57 (1.38, 1.78)	1.30 (1.14, 1.48)	1.23 (1.07, 1.40)	1.18 (1.02, 1.35)
Healthy-Long	2,077	683	1.57 (1.45, 1.71)	1.33 (1.22, 1.44)	1.28 (1.17, 1.40)	1.23 (1.12, 1.35)
Healthy-Short	4,382	1,182	1.27 (1.19, 1.36)	1.17 (1.09, 1.25)	1.14 (1.06, 1.22)	1.11 (1.04, 1.20)
Short-Long	1,379	474	1.84 (1.67, 2.02)	1.46 (1.33, 1.62)	1.40 (1.26, 1.55)	1.30 (1.17, 1.45)
Short-Healthy	6,946	1,814	1.20 (1.13, 1.27)	1.13 (1.07, 1.20)	1.12 (1.06, 1.19)	1.08 (1.02, 1.15)
Short-Short	8,308	2,010	1.17 (1.10, 1.23)	1.10 (1.04, 1.17)	1.07 (1.01, 1.13)	1.02 (0.95, 1.08)

HR = Hazard Ratio, CI = Confidence Interval; ^aModel 1: adjusted for age, sex, race; ^bModel 2: model 1 + adjustment for education, marital status, household income, employment status; ^cModel 3: model 2 + adjustment for smoking status, alcohol intake, HEI-2010, total moderate activity, sedentary time; ^dModel 4: model 3 + adjustment for BMI, CCI, CES-D Score