

**Multimedia Appendix 5.** Effects of rest-activity rhythm (RAR) measures on risk of developing dementia/mild cognitive impairment (MCI) in participants with lower polygenic risk score (PRS) for Alzheimer’s disease (<median PRS) and participants with higher PRS (>median PRS).

RAR characteristics		Lower PRS	Higher PRS	P for interaction
	Number of participants	45,759	45,758	
	Events of dementia/MCI	207	348	
Relative Amplitude	Q1	2.06 (1.36-3.12)	1.80 (1.32-2.47)	0.276
	Q2	1.25 (0.80-1.97)	1.32 (0.96-1.83)	
	Q3	1.25 (0.79-1.97)	0.79 (0.54-1.15)	
	Q4	Ref.	Ref.	
	Per 1-SD Decrease	1.27 (1.17-1.38)	1.20 (1.12-1.28)	
M10	Q1	2.16 (1.39-3.35)	1.46 (1.05-2.02)	0.164
	Q2	1.03 (0.62-1.68)	1.15 (0.81-1.63)	
	Q3	1.14 (0.69-1.87)	0.98 (0.68-1.41)	
	Q4	Ref.	Ref.	
	Per 1-SD Decrease	1.42 (1.16-1.74)	1.20 (1.08-1.25)	
M10 midpoint	Earlier	1.02 (0.74-1.42)	1.15 (0.90-1.47)	0.588
	Middle	Ref.	Ref.	
	Later	1.07 (0.76-1.51)	0.99 (0.75-1.31)	
	Per 1-SD Increase	0.91 (0.77-1.08)	0.93 (0.82-1.06)	
L5	Q1	Ref.	Ref.	0.706
	Q2	1.02 (0.69-1.51)	1.38 (1.01-1.88)	
	Q3	0.89 (0.59-1.35)	1.09 (0.79-1.52)	
	Q4	1.38 (0.95-2.01)	1.63 (1.20-2.21)	
	Per 1-SD Increase	1.16 (1.06-1.28)	1.15 (1.08-1.22)	
L5 midpoint	Earlier	1.35 (0.95-1.90)	0.93 (0.73-1.20)	0.111
	Middle	Ref.	Ref.	
	Later	1.15 (0.81-1.62)	0.74 (0.57-0.96)	
	Per 1-SD Increase	0.94 (0.82-1.07)	0.90 (0.82-0.99)	
IV	Q1	Ref.	Ref.	0.542
	Q2	1.58 (1.02-2.44)	1.68 (1.22-2.31)	
	Q3	1.42 (0.91-2.21)	1.33 (0.95-1.85)	
	Q4	1.81 (1.18-2.76)	1.40 (1.01-1.95)	
	Per 1-SD Increase	1.20 (1.05-1.37)	1.10 (0.99-1.23)	
IS	Q1	0.66 (0.43-1.01)	1.25 (0.92-1.69)	0.246
	Q2	0.75 (0.51-1.11)	0.86 (0.63-1.19)	
	Q3	0.86 (0.60-1.22)	1.12 (0.84-1.49)	
	Q4	Ref.	Ref.	
	Per 1-SD Decrease	0.87 (0.75-1.01)	1.05 (0.94-1.17)	
Amplitude	Q1	2.25 (1.43-3.52)	1.68 (1.20-2.33)	0.786
	Q2	1.41 (0.87-2.28)	1.23 (0.87-1.75)	
	Q3	1.37 (0.84-2.23)	1.17 (0.81-1.67)	
	Q4	Ref.	Ref.	
	Per 1-SD Decrease	1.45 (1.18-1.78)	1.25 (1.08-1.45)	
Acrophase	Earlier	0.85 (0.62-1.18)	1.08 (0.84-1.38)	0.557
	Middle	Ref.	Ref.	
	Later	0.84 (0.59-1.20)	0.94 (0.71-1.25)	
	Per 1-SD Increase	0.94 (0.81-1.09)	0.92 (0.82-1.04)	

Models are adjusted for age at the time of actigraphy, sex, education, Townsend Deprivation Index, ethnic background, obesity, sleep apnea, morbidity burdens, circulatory disorders, night shiftwork status, alcohol intake, and smoking status.