# Sleep, circadian rhythms, and cognitive frailty in older Chinese immigrants: protocol for an observational study

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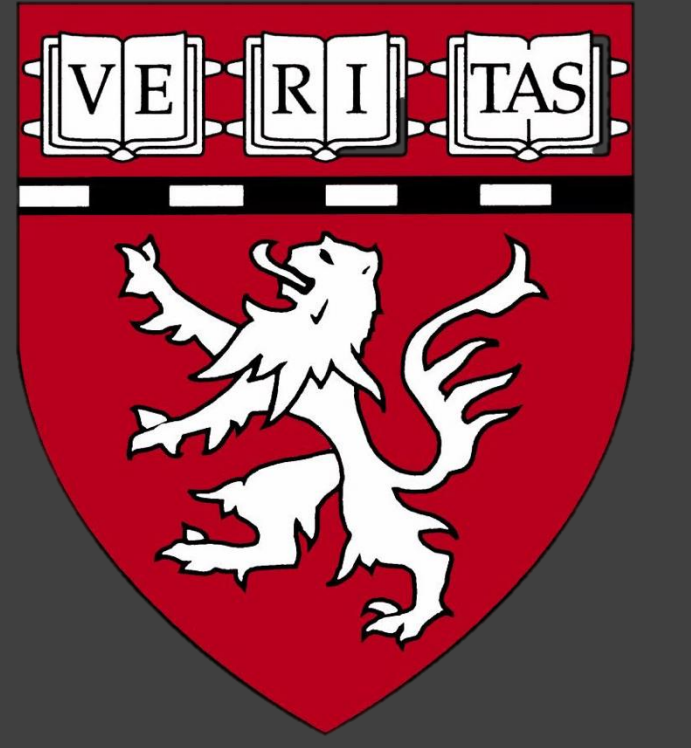
BACKGROUND

- Immigrant workers are vital to American society,[1] yet the challenges of caring for their aging parents—referred to hereafter the 'zeroth-generation' immigrants—are often overlooked.[2]
- **56%** Chinese immigrants speak English less than "very well" *(vs. 47% among all immigrants)*. Only **11%** Chinese immigrants speak English at home *(vs. 17% among all immigrants).*[3] **Unique experiences translate to poorer acculturation.**
- We proposed the ROOTS project—**Revealing cognitive Outcomes in 'zeroth gen' Older immigranTS**—to better profile the cognitive aging trajectory of this unique demographic and untangle the complex interplay among acculturation, sleep and circadian health, and cognitive function.

AIMS

Aim 1: Examine the relationships between acculturative stress with sleep & circadian health among older Chinese immigrants in the US.

Stress → Sleep & circadian rhythms
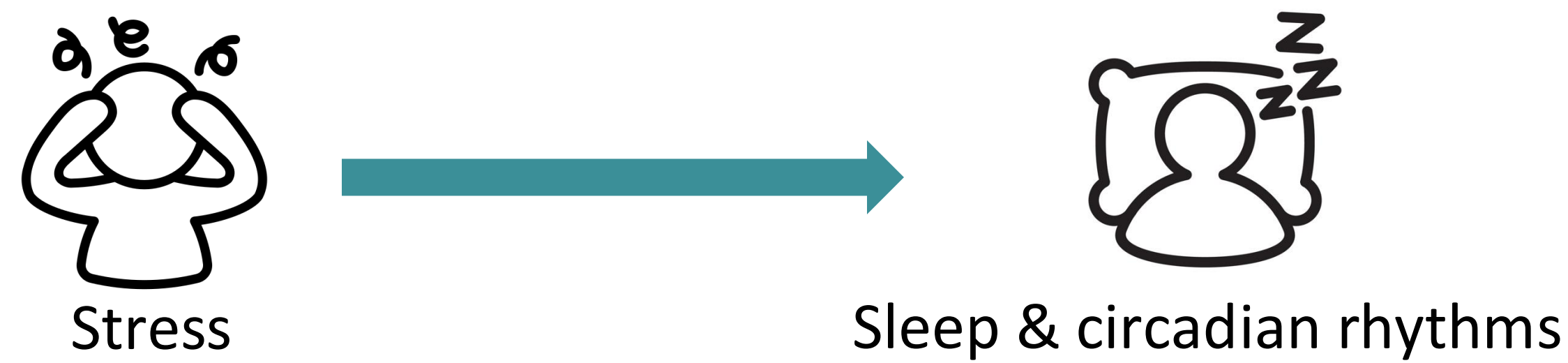
Aim 2: Examine the relations between acculturative stress, cognitive and physical performance, and whether these relationships are moderated by sleep & circadian health.

Stress → Cognitive & physical health
Sleep & circadian rhythms
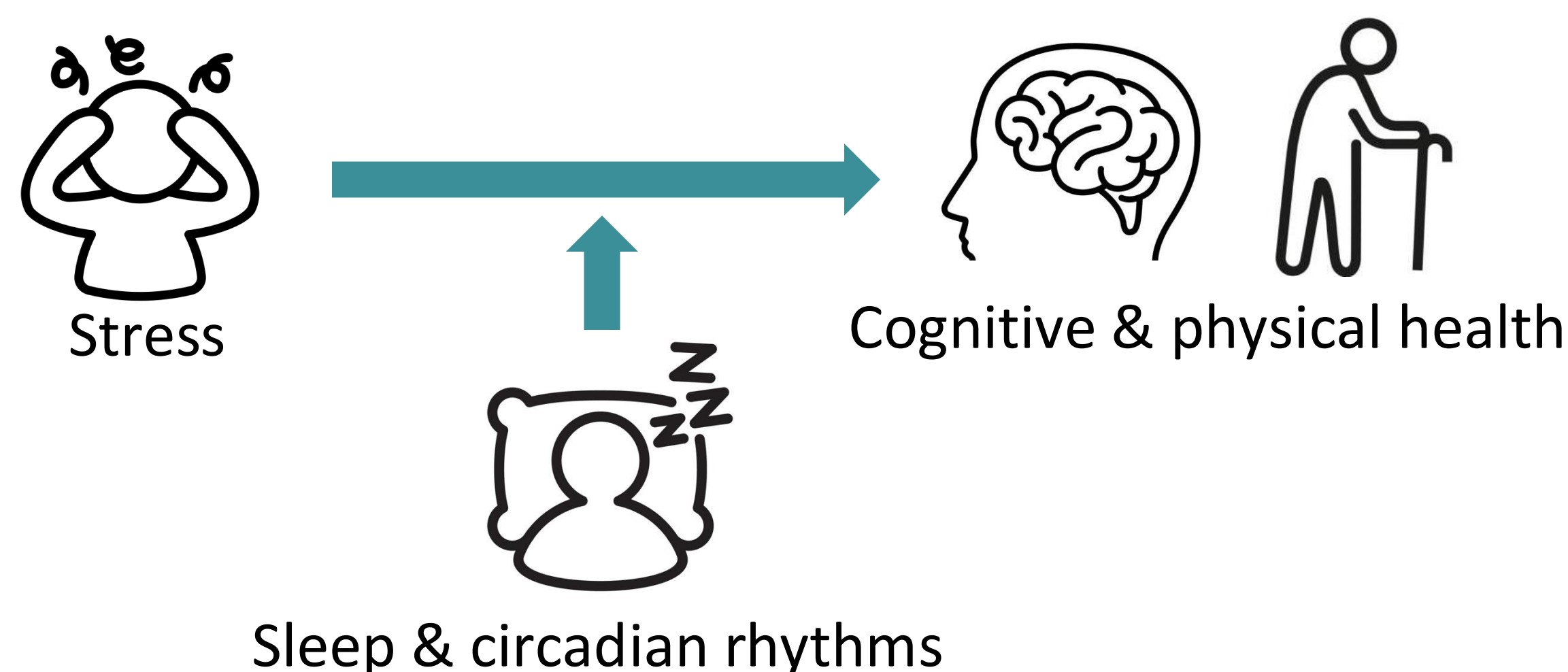
IMPACT

- This study will offer critical insights into cognitive aging of a vulnerable demographic, which will help inform public health initiatives.
- By capturing the heterogeneity of acculturation, this project will lay groundwork for the development of culturally tailored prevention strategies.

METHODS

Study Design: Observational Study
Study Registration: This study is approved by the Institutional Review Board (IRB) at Mass General Brigham. IRB#: 2024P002936.
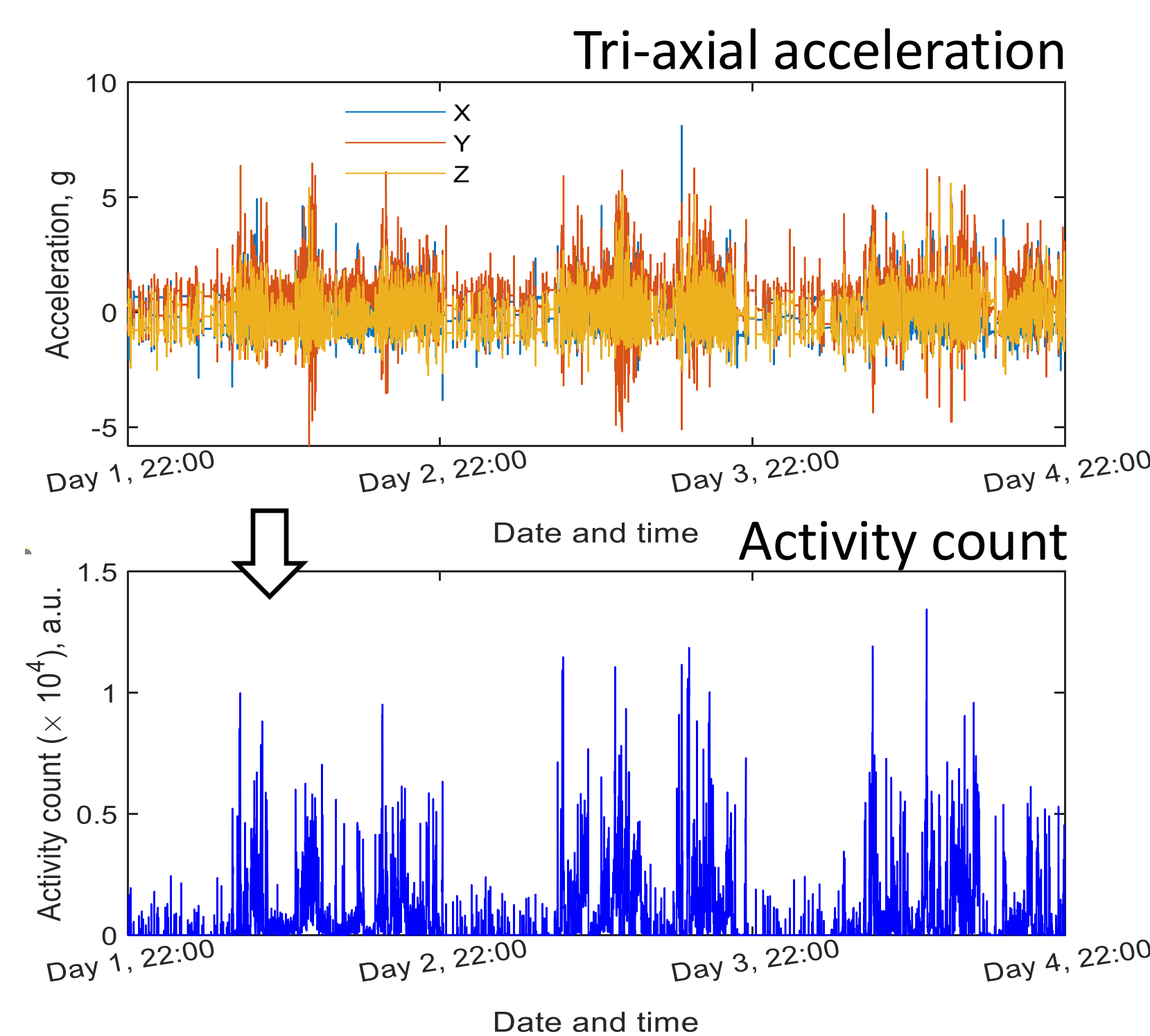**Participants:** Chinese immigrants aged 65+
Primary outcome variables:
- **Acculturative stress:**
  Migration-acculturative Stressor Scale (MASS)
- **Sleep and rest-activity rhythms:**
  Sleep quality (Pittsburgh Sleep Quality Index, PSQI)
  Daytime Sleepiness (Epworth Sleepiness Scale, ESS)
  Sleep Insomnia (Insomnia Severity Index, ISI)
  Sleep Regularity Index (Sleep Diary)
  Rest-activity rhythms
- **Cognitive test battery:**
  Subjective Cognitive Decline (SCD-Q)
  General Cognitive Abilities (Mini Mental State Exam, MMSE)
  Episodic Memory (Word List Recall and Story Recall Task)
  Working Memory (Digit Span Test)
  Executive Function (Trail Making Task and Stroop Test)
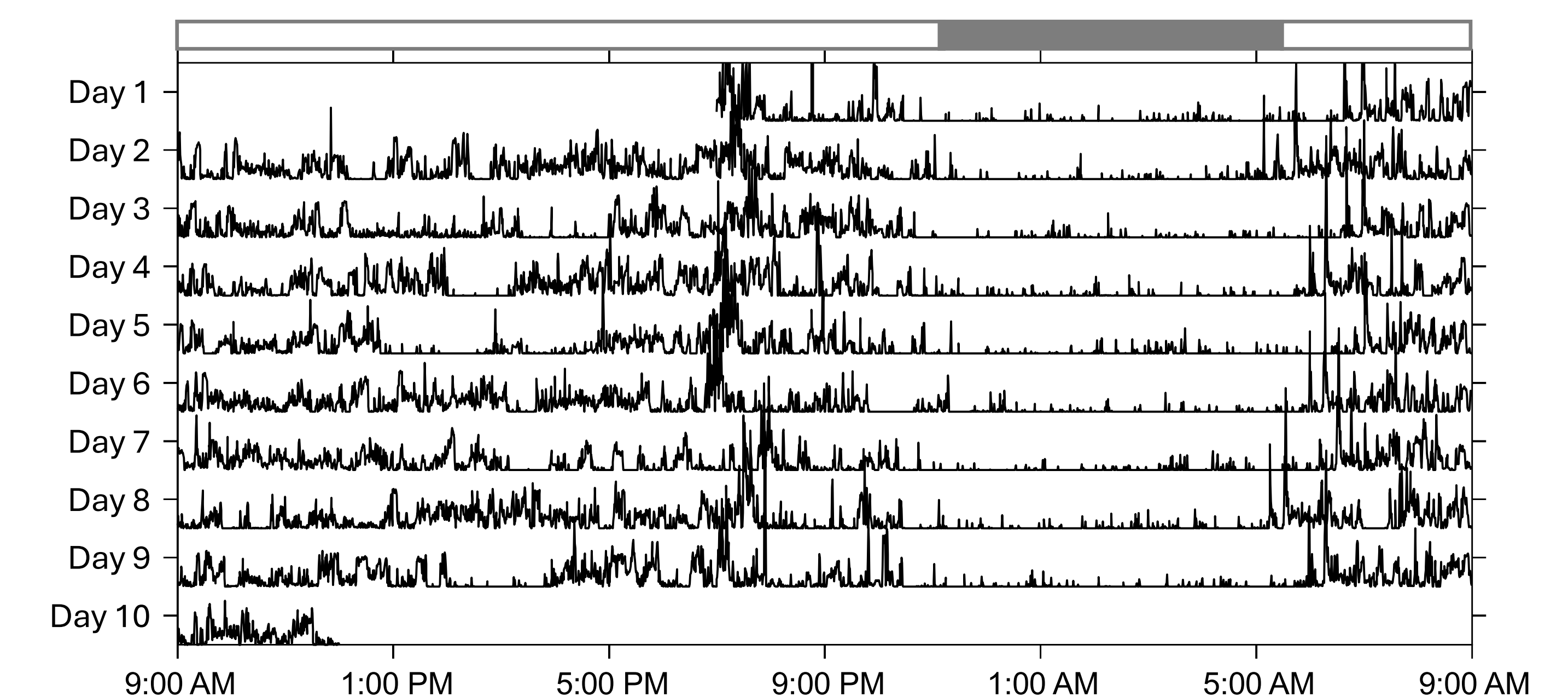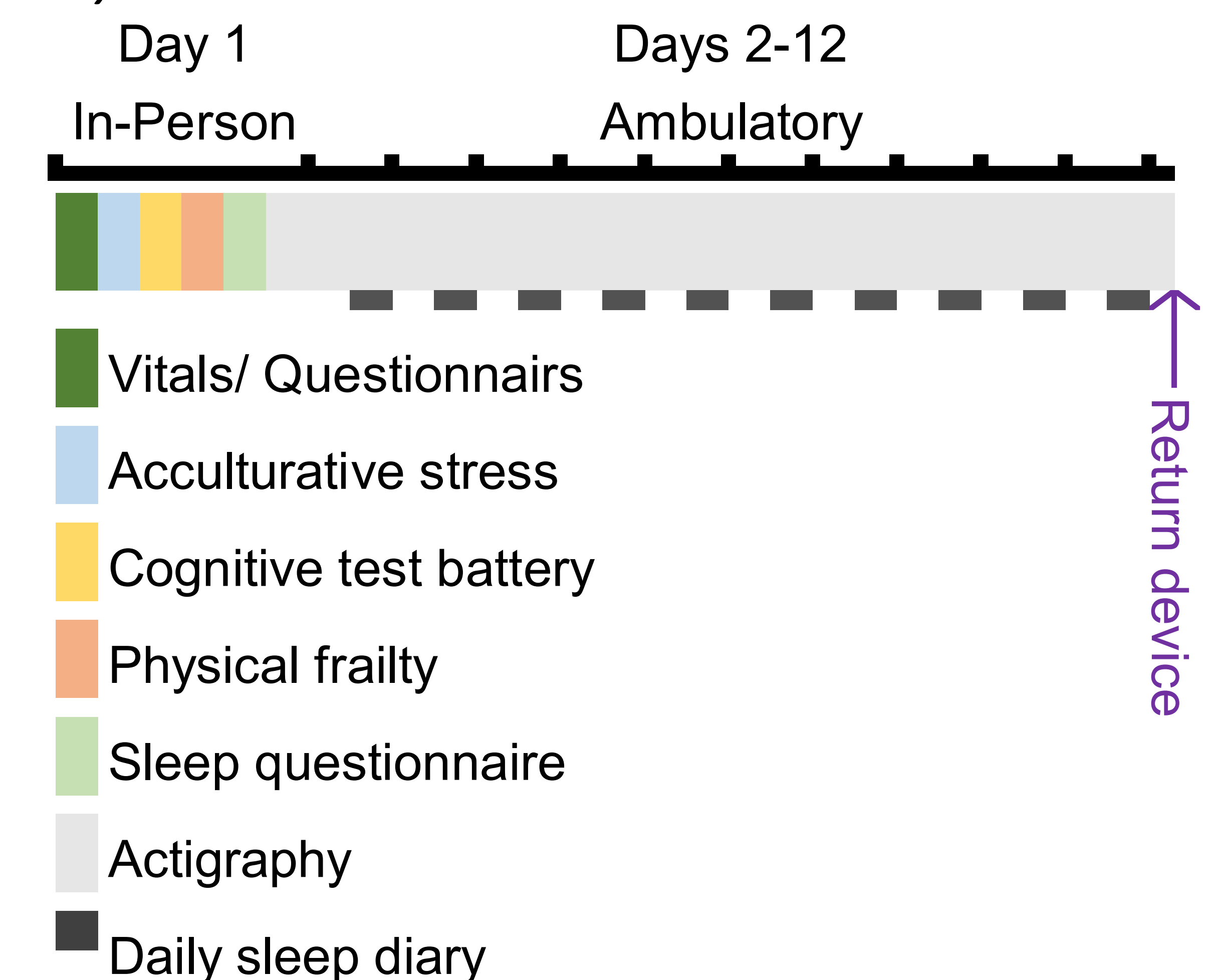- **Frailty status:**
  Physical Frailty Phenotype

Garmin Enduro 2

Signal pre-processing

Study Protocol

Day 1 — In-Person   Days 2-12 — Ambulatory

Return device

- Vitals/ Questionnairs
- Acculturative stress
- Cognitive test battery
- Physical frailty
- Sleep questionnaire
- Actigraphy
- Daily sleep diary

10-day actigraphy using Enduro 2 obtained from a ROOTS participant (gray bar indicates habitual sleep time)

EXPECTED RESULTS

- We anticipate enrolling 100 participants, balanced by biological sex.
- We expect that higher acculturative stress is associated with poorer sleep quality, shorter subjective and/or objective sleep duration, more daytime sleepiness, and more disrupted rest-activity rhythms (RAR).
- We expect that increased acculturative stress is associated with worse cognitive and physical performance, exacerbated by poorer sleep & circadian health.

REFERENCES

1. Blau FD et al. The Economic and Fiscal Consequences of Immigration [Internet]. 2017.
2. Miyawaki CE et al. A systematic review of the literature on transnational caregiving: immigrant adult children to ageing parents in home country. 2023.
3. Batalova JBRR et al. Chinese Immigrants in the United States [Internet]. 2023.

Study website: lsdh.mgh.harvard.edu/roots/
Contact: MGHROOTSProject@mgh.harvard.edu
We are now recruiting participants!