

Arterial Aging Trajectories Are Associated With Cognitive Decline Over 12 Years: The Multi-Ethnic Study Of Atherosclerosis (MESA)

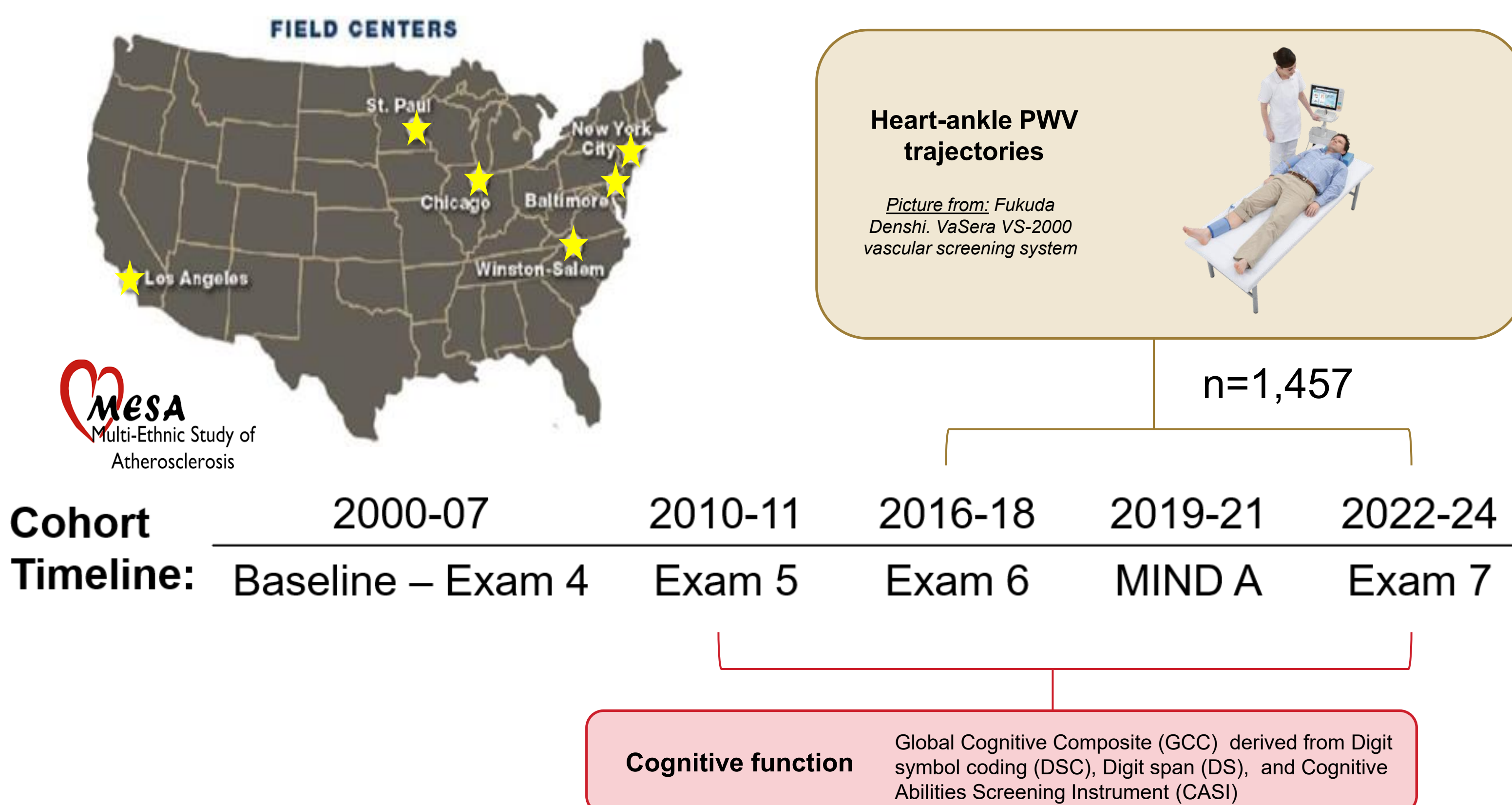
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Background

- Structural arterial stiffness (S), measured by arterial pulse wave velocity (PWV) is associated with dementia pathology, cognitive decline, and Alzheimer's disease and related dementias. Yet, arterial stiffness caused by load-dependent (LD) or blood pressure-dependent stiffness is not.
- S-PWV represents age-related stiffening that may progress non-linearly and earlier for some individuals, which may increase risk for cognitive decline.
- The purpose of this analysis was to examine how S-PWV and LD-PWV trajectories relate to risk for cognitive decline over 12-years.
- We hypothesized that we would identify distinct S-PWV and LD-PWV trajectories, and that only S-PWV trajectories would be associated with cognitive decline.

Methods

Figure 1. Study design

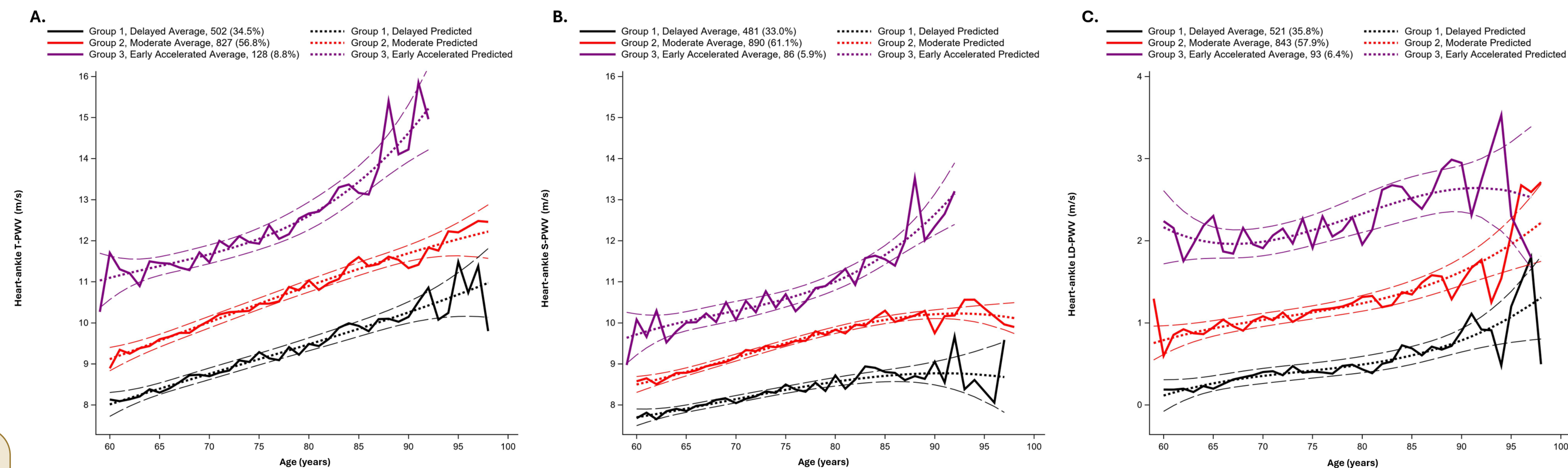


Conclusions

- Contrary to our hypothesis and prior studies, both S-PWV and LD-PWV trajectories were associated with risk for cognitive decline over 7-years. This could be because heart-ankle PWV includes the large muscular arteries, which are not present in our prior analyses with carotid artery PWV
- We have previously demonstrated in the Systolic Blood Pressure Intervention Trial (SPRINT) that blood pressure control reduces LD-PWV but does not slow S-PWV (DOI: 10.1002/alz.71444).
- Interventions are needed in older adults with moderate and early structural stiffening to prevent or slow declining global cognitive function and executive function.

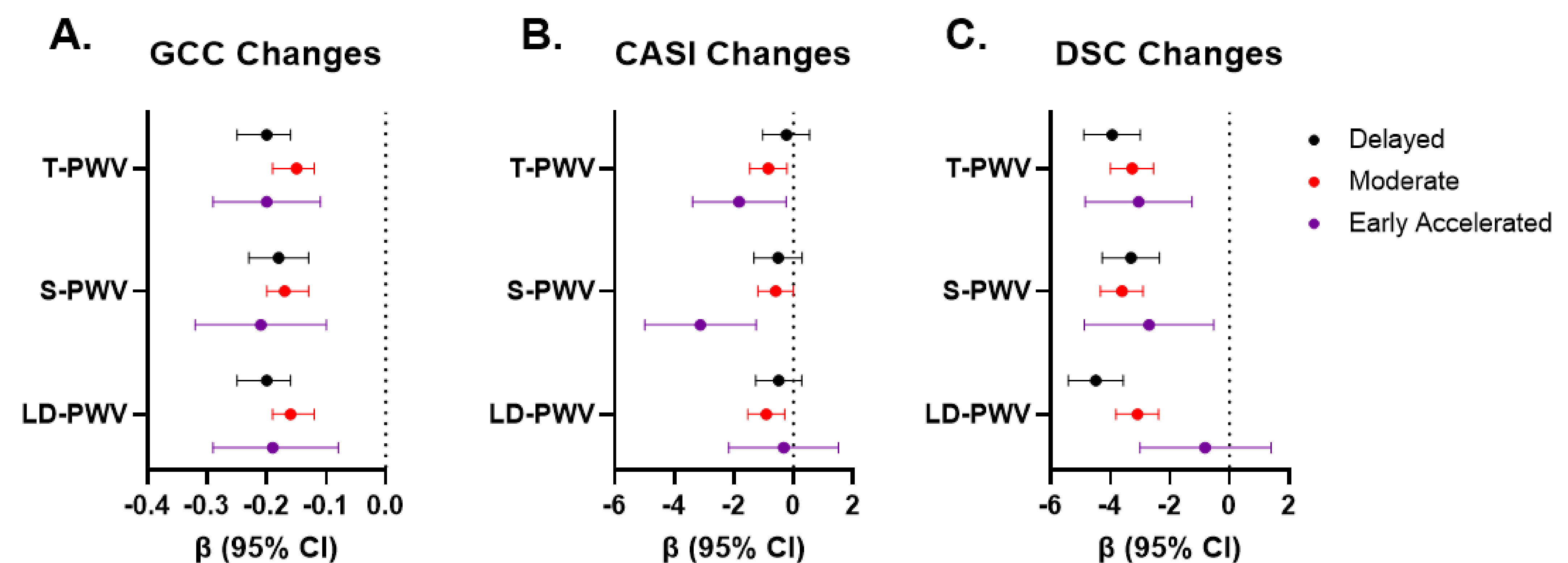
Results

Figure 2. Generating Heart-ankle PWV trajectories over 7-years



S-PWV and LD-PWV were calculated using participant-specific exponential models from T-PWV and mean arterial pressure. Group-based trajectory modeling defined groups with similar aging patterns of T (A), S-(B), and LD-PWV (C) changes.

Figure 3. Associations between arterial stiffness trajectories and cognitive decline



Change in GCC (A), CASI (B) and DSC (C) were calculated over 6 years from Exam 6 to Exam 7. Models were adjusted for BMI, gender, race, education, smoking status, and alcohol consumption. Associations with DS were not significant and are not displayed (all $P < 0.05$). Abbreviations: PWV = pulse wave velocity; T-PWV = total PWV; S-PWV = structural PWV; LD-PWV = load-dependent PWV; GCC = global cognitive composite; CASI = Cognitive Abilities Screening Instrument; DSC = digit symbol coding; DS = digit span; and body mass index = BMI. Statistical significance was set at $p < 0.05$ and are displayed in bolded text.

MESA Funding

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