



Baseline Life’s Essential 8 is associated with plasma biomarkers for Alzheimer’s disease and related dementias six years later: Findings from HCHS/SOL and SOL-INCA

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BACKGROUND

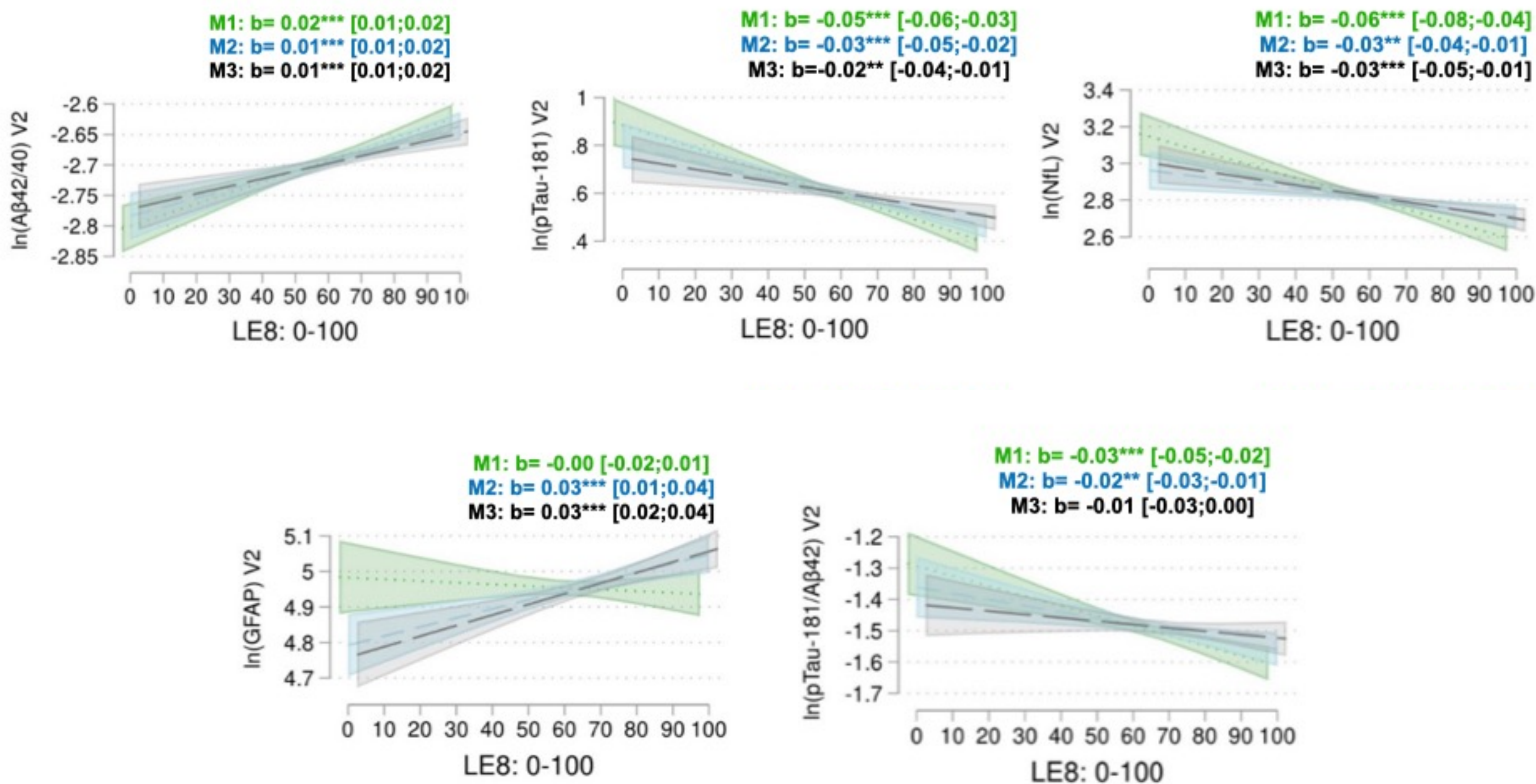
- Cardiovascular health (CVH) is increasingly recognized as an important modifiable factor for reducing risk of Alzheimer’s disease and related dementias (ADRD).
- The American Heart Association’s Life’s Essential 8 (LE8) integrates behavioral and clinical metrics to assess overall CVH.¹
- Our previous work found that higher LE8 is associated with reduced cerebrovascular disease burden, lower odds of infarcts and white matter hyperintensity (WMH) burden, and greater total and frontal gray volumes 10 years later.²
- Additionally, our work has also suggested that plasma ADRD biomarkers are associated with subjective cognitive decline and objective cognitive performance.^{3,4}
- Whether better CVH is associated with a more favorable profile of plasma ADRD biomarkers remains unclear, particularly among Hispanic/Latino adults, a population disproportionately affected by cardiovascular disease risk factors and dementia.

OBJECTIVE

To determine whether cardiovascular health, assessed using LE8, is prospectively associated with plasma ADRD biomarkers among middle-aged and older Hispanic/Latino adults 6 years later.

RESULTS

Figure 1. Associations between baseline cardiovascular health (Visit 1) and plasma biomarkers 6 years later (Visit 2).



Note: b estimates represent a 10-point increase in LE8 score.

- Higher baseline LE8 scores were associated with
 - higher Aβ_{42/40} (b: 0.01, 95% CI: 0.01,0.02)
 - lower pTau-181 (b: -0.02, 95% CI: -0.04,-0.01),
 - lower NfL (b: -0.03, 95% CI: -0.05,-0.01), and
 - higher GFAP (b: 0.03, 95% CI: 0.02,0.04) six years later.
- Associations with pTau-181/Aβ₄₂ were attenuated after adjustment.

METHOD

Study Population

- Study of Latinos–Investigation of Neurocognitive Aging (SOL-INCA; Unweighted analytic sample: n = 5,439), an ancillary study of the Hispanic Community Health Study/Study of Latinos (HCHS/SOL).

Exposure

- Life’s Essential 8 (LE8) measured at HCHS/SOL Visit 1 (2008–2011; Range: 0–100 points)

Behavioral Factors	Health Factors
Diet	Blood lipids
Physical activity	Blood glucose
Nicotine exposure	Blood pressure
Sleep health	Body mass index (BMI)

Outcomes

- Plasma ADRD biomarkers measured approximately six years later (2014–2017) using Simoa (Quanterix HD-X):

Plasma ADRD Biomarkers	Pathophysiological Domain
Aβ _{42/40}	Amyloid pathology*
pTau-181	Tau and amyloid pathology
pTau-181/Aβ ₄₂ ratio	Combined tau/amyloid pathology
Neurofilament light chain (NfL)	Neuroaxonal injury
Glial fibrillary acidic protein (GFAP)	Astrocytic activation / astrogliosis

*Lower ratio = higher pathology

Statistical Analysis

- Survey-weighted linear regression estimated associations between baseline LE8 scores and plasma ADRD biomarkers measured approximately 6 years later.
- Biomarkers were natural log-transformed to improve normality.
- b coefficients represent the expected difference in biomarker concentration associated with a 10-point higher LE8 score.
- Model 1 (M1):** unadjusted
- Model 2 (M2):** adjusted for age, age², sex,
- Model 3 (M3):** additionally adjusted for Hispanic/Latino background, education, income, language preference, and field center.

Participant Characteristics:

Table 1. Descriptive statistics for the target population (unweighted N=5,439).

	LE8 Score				
	Low (< 50) (N=804)	Moderate (50 to < 80) (N=3980)	High (≥80) (N=655)	All (N=5439)	
Covariates					P-value
Age, Mean (SD)	57.91 (7.57)	56.77 (8.03)	53.70 (8.17)	56.62 (8.05)	<0.001
Sex, % (SE)					
Female	56.20 (2.25)	53.25 (1.09)	56.82 (2.88)	54.09 (0.93)	0.307
Male	43.80 (2.25)	46.75 (1.09)	43.18 (2.88)	45.91 (0.93)	

DISCUSSION

- Better cardiovascular health was associated with higher Aβ_{42/40} and higher GFAP, lower pTau-181 and lower NfL, suggesting cardiovascular health may influence the circulating levels of these ADRD biomarkers.
- This extends prior findings showing that (1) higher LE8 is associated with lower cerebrovascular disease burden and greater gray matter volumes.² and (2) pTau-181 and NfL are associated with poorer global cognitive performance in this population.³
- Circulating biomarker concentrations may be influenced by blood volume independent of underlying neuropathology.⁵
- Additional studies are needed to determine whether CVH and brain health associations are mediated by plasma biomarkers.
- Limitations: additional confounders (e.g. kidney function).

Conclusion

- Better cardiovascular health in midlife and older adulthood was associated with a more favorable plasma ADRD biomarker profile approximately six years later.
- Findings support cardiovascular health optimization as a promising strategy for ADRD prevention among Hispanic/Latino adults.

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