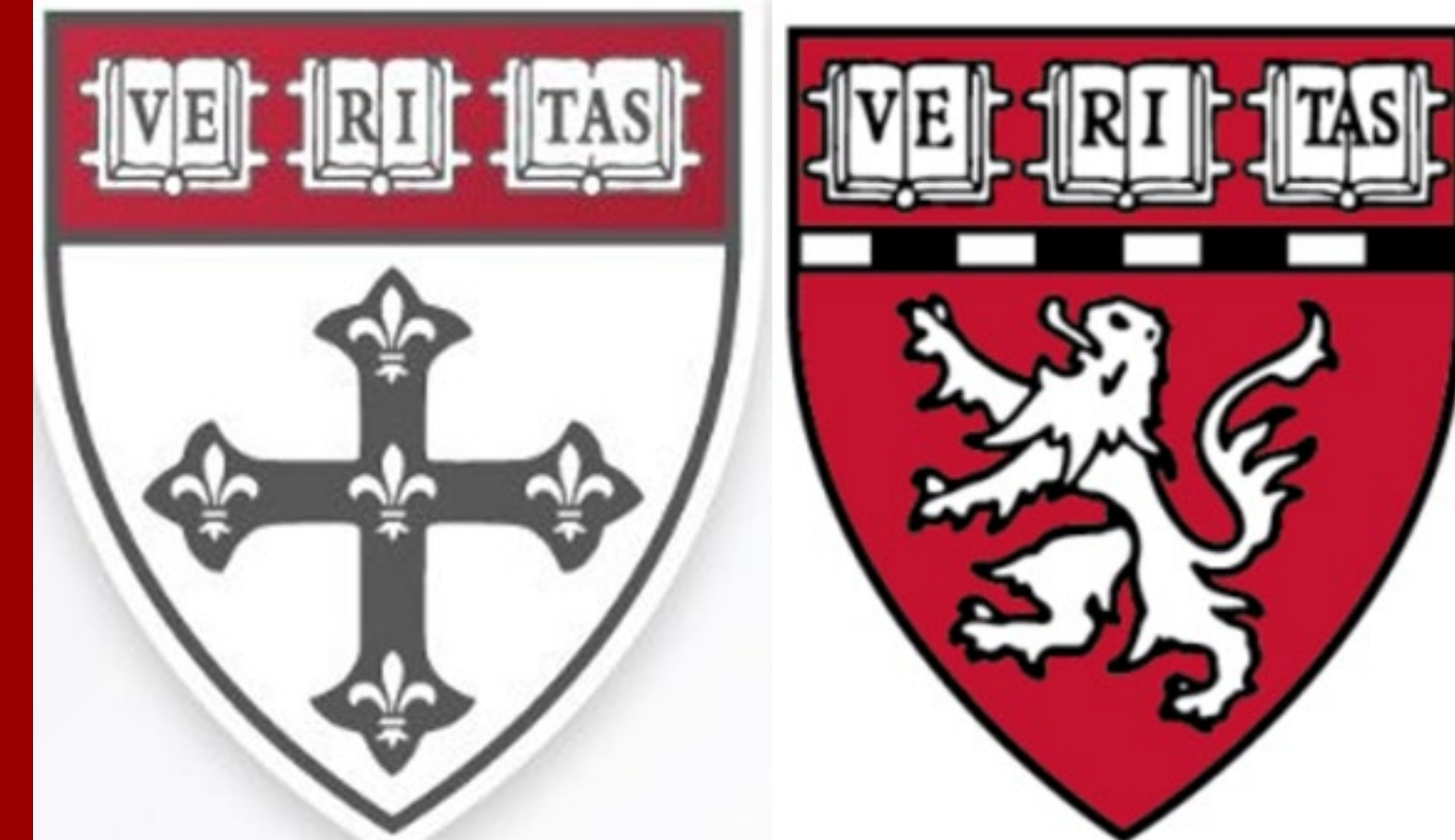




Pre- and Post-diagnostic Healthy Lifestyle and Cardiovascular Disease among Stage 0-III Breast Cancer Survivors

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Background: In non-metastatic breast cancer, two-thirds of deaths are due to non-cancer causes, most commonly cardiovascular disease (CVD)

Research Questions

1. What's the role of long-term **pre- and post-diagnostic healthy lifestyle** in risk of **CVD** among breast cancer survivors?
2. **Does the association** between post-diagnostic healthy lifestyle and CVD risk **vary** according to pre-diagnostic CVD risk profile, cancer characteristics and treatment?
3. **How would the CVD risk** be if people **change lifestyle** after a breast cancer diagnosis?

Q1: Better lifestyle after cancer diagnosis in relation to lower risk of CVD

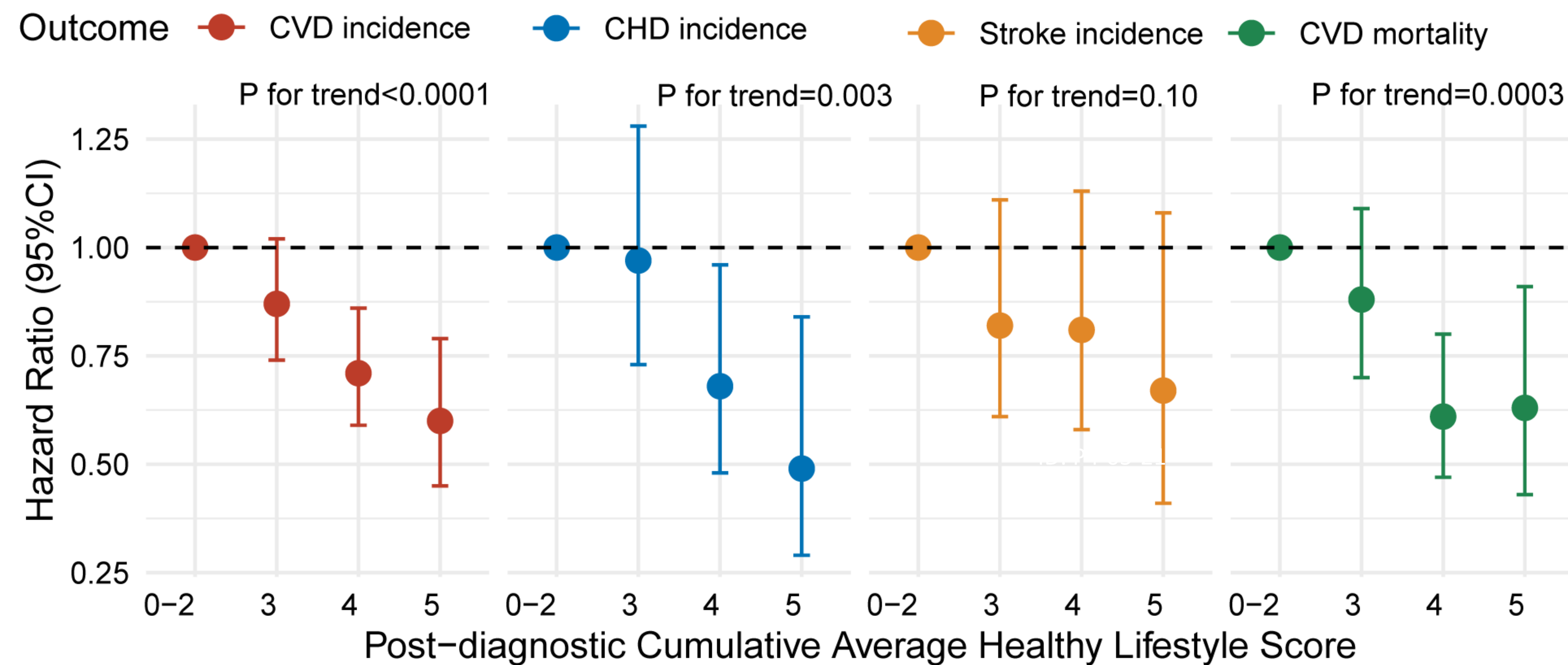


Figure 1. Multivariable-adjusted HRs and 95% CIs for the associations between cumulative averaged post-diagnostic healthy lifestyle score (HLS) and CVD outcomes among breast cancer survivors

Q3: Change in healthy lifestyle after cancer diagnosis in relation to lower risk of CVD

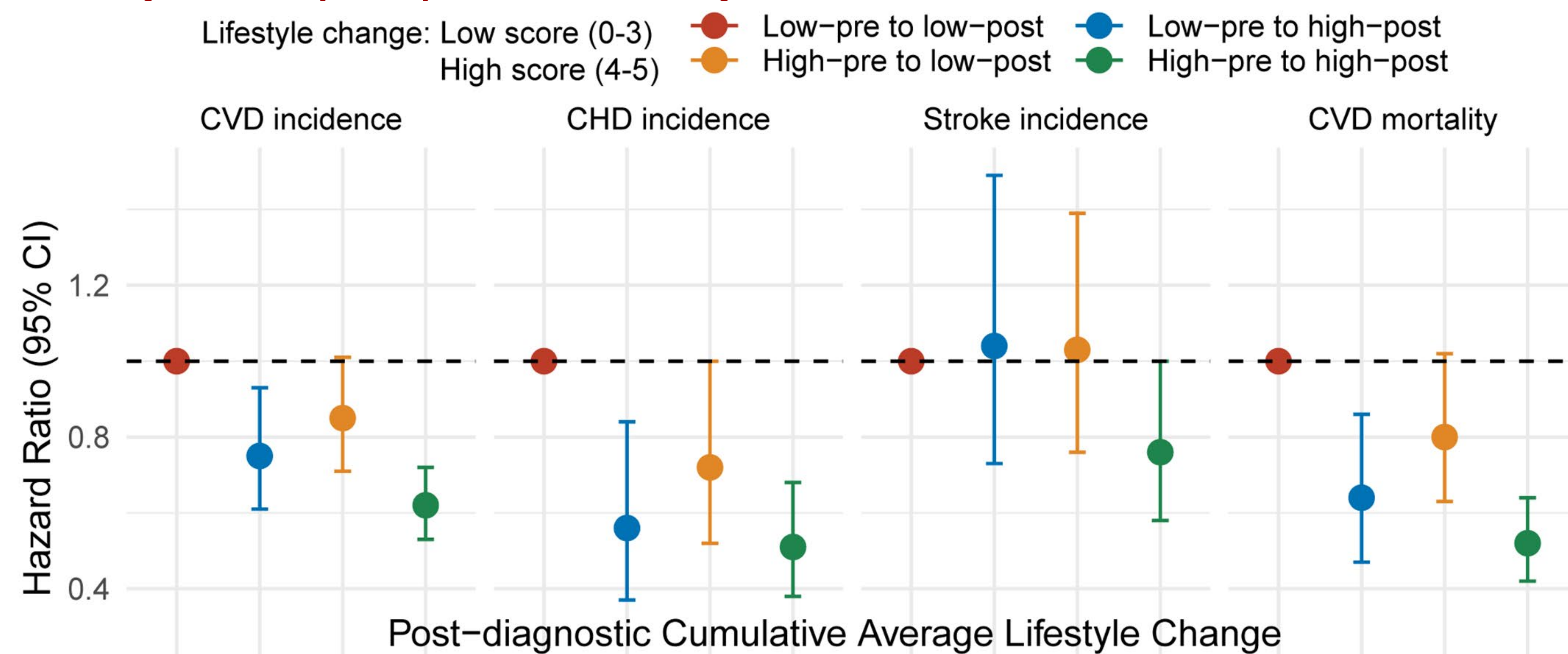


Figure 2. Multivariable-adjusted HRs and 95% CIs for the association between cross-classified changes of cumulative averaged healthy lifestyle score before or after diagnosis and CVD

Study design: Prospective cohort

Exposures :

Healthy lifestyle score	Criteria	Total (0-5)
Diet	Top 40% AHEI-2010	0 or 1
Alcohol intake	0 to 14g/day	0 or 1
Physical activity	≥7.5 MET-hours/week	0 or 1
BMI	≥18.5 to <25.0 kg/m ²	0 or 1
Smoking status	Noncurrent smoker	0 or 1

Measured every 2-4 years

Outcome: Incidence of CVD, CHD, stroke; CVD mortality

Study population:

13,436 women with stage 0-III breast cancer
Nurses' Health Study (NHS) (1984-2020) and **NHSII** (1991-2019)

Median Follow-up: 15.5 years

Q2: No significant effect modification by subgroups

Subgroup	Events	CVD incidence	P for interaction	Events	CVD mortality	P for interaction
Overall	1,048			558		
Age at diagnosis, yrs			0.20			0.11
>=60	729			474		
<60	319			84		
Tumor stage			0.08			0.36
Stage (0)	226			98		
Stage (I)	453			252		
Stage (II/III)	227			137		
ER			0.85			0.29
ER positive	752			393		
ER negative	154			71		
Tumor grade			0.21			0.93
Grade (II)	538			310		
Grade (III)	160			76		
Hormone therapy			0.86			0.27
Yes	516			353		
No	147			130		
Chemotherapy			0.68			0.57
Yes	339			143		
No	587			237		
Radiation therapy			0.24			0.85
Yes	568			272		
No	389			190		
Pre-HLS			0.99			0.58
Low (0-2)	280			407		
High (3-5)	768			151		

Figure 3. Subgroup analyses of the multivariable-adjusted association of CVD incidence and mortality with per 1-number increment in cumulative averaged post-diagnostic HLS

Conclusions

1. A post-diagnostic healthy lifestyle is associated with a **substantial lower** risk of CVD incidence and CVD mortality among breast cancer survivors
2. Our findings underscore the importance for **clinicians to consistently promote** adherence to healthy lifestyle behaviors, and to leverage the **changeable moment** even for those with an **unhealthy pre-diagnostic lifestyle**