Life's 8 essentials

Miguel Mendes

CENTRO HOSPITALAR DE LISBOA OCIDENTAL, E.P.E.

Hospital de Santa Cruz
ULSLO

CUF

Clínica CUF Belém
Hospital CUF Tejo

Conflicts of interest

- None

Levels of prevention

1. **Primordial prevention** (Strasser, 1978)**:** reduce the burden of CV risk factors in society, *eg* reduce salt ingestion or increase physical activity).
    - *Very relevant and urgent in the high-income nations, given the substantial burden of obesity and adverse health behaviors beginning in childhood.*
2. **Primary prevention:** focused on preventing the 1st occurrence of a clinical event (*eg*, ACS or stroke) among individuals who are at risk, by controlling risk factors *eg*, blood pressure, diabetes, ...
3. **Secondary prevention:** aims to prevent recurrence of clinical events in pts with manifest clinical disease, *eg*, post - MI.

New Millennium | ESC prevention initiative

european
heart health
charter

"Every child born in the new millennium has the right to live until the age of at least 65 without suffering from avoidable cardiovascular disease"

Developed by
The European Society of Cardiology and
The European Heart Network

In collaboration with
The European Commission and the WHO European Regional office and endorsed by the signatories

Official launch by 12th June 2007
Brussels / EU parliament

EUROPE

Part II: Signatories recognise that

Article 3

Cardiovascular disease is a multi-factorial condition and that it is essential that all risk factors and determinants are addressed at societal and individual levels.

Characteristics associated with cardiovascular health include:

- No use of tobacco,
- Adequate physical activity – at least 30 minutes 5 times a week,
- Healthy eating habits,
- No overweight,
- Blood pressure below 140/90 mmHg,
- Blood cholesterol below 5 mmol/l (190 mg/dl),
- Normal glucose metabolism,
- Avoidance of excessive stress.

Article 4

Risk factors associated with risk of cardiovascular events can be divided into three categories:

Biological	Lifestyle determinants	Broader determinants	
		Fixed	Modifiable
Raised blood pressure	Tobacco use	Age	Income
Raised blood sugar	Unhealthy diet	Sex	Education
Raised blood cholesterol	Alcohol abuse	Genetics	Living conditions
Overweight/obesity	Physical inactivity	Ethnicity	Working conditions

New Millennium | WHO cardiovascular prevention initiative 25 x 25

Sidney C. Smith et al. JACC 2013; 62:2151-2153.

AHA Special Report

Defining and Setting National Goals for Cardiovascular Health Promotion and Disease Reduction

The American Heart Association's Strategic Impact Goal Through 2020 and Beyond

Donald M. Lloyd-Jones, MD, ScM, FAHA, Chair;
Yuling Hong, MD, MSc, PhD, FAHA*; Darwin Labarthe, MD, MPH, PhD, FAHA*;
Dariush Mozaffarian, MD, DrPH, FAHA; Lawrence J. Appel, MD, MPH, FAHA;
Linda Van Horn, PhD, RD, FAHA; Kurt Greenlund, PhD*; Stephen Daniels, MD, PhD, FAHA;
Graham Nichol, MD, MPH, FAHA; Gordon F. Tomaselli, MD, PhD, FAHA; Donna K. Arnett, PhD, FAHA;
Gregg C. Fonarow, MD, FAHA; P. Michael Ho, MD, PhD; Michael S. Lauer, MD, FAHA;
Frederick A. Masoudi, MD, MPH; Rose Marie Robertson, MD, FAHA; Véronique Roger, MD, FAHA;
Lee H. Schwamm, MD, FAHA; Paul Sorlie, PhD; Clyde W. Yancy, MD, FAHA;
Wayne D. Rosamond, PhD, FAHA; on behalf of the American Heart Association Strategic Planning Task Force and Statistics Committee

Abstract—This document details the procedures and recommendations of the Goals and Metrics Committee of the Strategic Planning Task Force of the American Heart Association, which developed the 2020 Impact Goals for the organization. The committee was charged with defining a new concept, *cardiovascular health*, and determining the metrics needed to monitor it over time. Ideal cardiovascular health, a concept well supported in the literature, is defined by the presence of both ideal health behaviors (nonsmoking, body mass index <25 kg/m^2, physical activity at goal levels, and pursuit of a diet consistent with current guideline recommendations) and ideal health factors (untreated total cholesterol <200 mg/dL, untreated blood pressure <120/<80 mm Hg, and fasting blood glucose <100 mg/dL). Appropriate levels for children are also provided. With the use of levels that span the entire range of the same metrics, cardiovascular health status for the whole population is defined as poor, intermediate, or ideal. These metrics will be monitored to determine the changing prevalence of cardiovascular health status and define achievement of the Impact Goal. In addition, the committee recommends goals for further reductions in cardiovascular disease and stroke mortality. Thus, the committee recommends the following Impact Goals: "By 2020, to improve the cardiovascular health of all Americans by 20% while reducing deaths from cardiovascular diseases and stroke by 20%." These goals will require new strategic directions for the American Heart Association in its research, clinical, public health, and advocacy programs for cardiovascular health promotion and disease prevention in the next decade and beyond. (***Circulation***. **2010;121:586-613.**)

1999 | AHA Board of Directors

- **25% relative reduction in CHD and stroke mortality and the prevalence of each RF.**

2010 – 2020 | AHA Special Report |Life 7 essentials

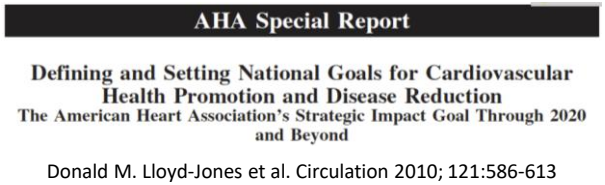
By 2020, **reduce CHD, stroke, and risk by 20%,** with the following indicators:

- Reduce death rate due to CHD and stroke by **20%**;
- Reduce the prevalence of smoking, high blood cholesterol, uncontrolled high blood pressure, and physical inactivity by **20%**;
- Eliminate the growth of obesity and diabetes **(0% increase).**

AHA 2010 – Life's Simple 7 | Ideal health factors and behaviors

- Ideal cardiovascular health behaviors = 4
  - Nonsmoking
  - Body mass index < 25 kg/m2
  - Physical activity at goal levels
  - Diet consistent with current guideline recommendations

- Ideal health factors = 3
  - untreated total cholesterol < 200 mg/dL
  - untreated blood pressure < 120/80 mmHg
  - fasting blood glucose < 100 mg/dL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Life 7 essentials | 3 levels of Health

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Goal/Metric	Poor Health		Intermediate Health		Ideal Health	
	Definition	Prevalence, %	Definition	Prevalence, %	Definition	Prevalence, %
Current smoking						
Adults >20 y of age	Yes	24	Former ≤12 mo	3	Never or quit >12 mo	73 (51 never; 22 former >12 mo)
Children 12–19 y of age	Tried prior 30 days	17			Never tried; never smoked whole cigarette	83
Body mass index						
Adults >20 y of age	≥30 kg/m^2	34	25–29.9 kg/m^2	33	<25 kg/m^2	33
Children 2–19 y of age	>95th Percentile	17	85th–95th Percentile	15	<85th Percentile	69
Physical activity						
Adults >20 y of age	None	32	1–149 min/wk moderate intensity or 1–74 min/wk vigorous intensity or 1–149 min/wk moderate+vigorous	24	≥150 min/wk moderate intensity or ≥75 min/wk vigorous intensity or ≥150 min/wk moderate+vigorous	45
Children 12–19 y of age	None	10	>0 and <60 min of moderate or vigorous activity every day	46	≥60 min of moderate or vigorous activity every day	44
Healthy diet score						
Adults >20 y of age	0–1 Components	76	2–3 Components	24	4–5 Components	<0.5
Children 5–19 y of age	0–1 Components	91	2–3 Components	9	4–5 Components	<0.5
Total cholesterol						
Adults >20 y of age	≥240 mg/dL	16	200–239 mg/dL or treated to goal	38 (27; 12 treated to goal)	<200 mg/dL	45
Children 6–19 y of age	≥200 mg/dL	9	170–199 mg/dL	25	<170 mg/dL	67
Blood pressure						
Adults >20 y of age	SBP ≥140 or DBP ≥90 mm Hg	17	SBP 120–139 or DBP 80–89 mm Hg or treated to goal	41 (28; 13 treated to goal)	<120/<80 mm Hg	42
Children 8–19 y of age	>95th Percentile	5	90th–95th Percentile or SBP ≥120 or DBP ≥80 mm Hg	13	<90th Percentile	82
Fasting plasma glucose						
Adults >20 y of age	≥ 126 mg/dL	8	100–125 mg/dL or treated to goal	34 (32; 3 treated to goal)	<100 mg/dL	58
Children 12–19 y of age	≥126 mg/dL	0.5*	100–125 mg/dL	18	<100 mg/dL	81

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Ideal cardiovascular health metrics and risk of cardiovascular disease or mortality: A meta-analysis

Na Fang, Menglin Jiang, Yu Fan *

Institute of Molecular Biology & Translational Medicine, The Affiliated People's Hospital, Jiangsu University, Zhenjiang, Jiangsu 212002, PR China

Background: Inconsistent findings have reported regarding ideal cardiovascular health metrics and cardiovascular disease (CVD) and mortality.

Objective: To investigate whether achieving a greater number of ideal cardiovascular health metrics was associated with a lower risk of CVD and mortality in the general population by conducting a meta-analysis of data from available prospective cohort studies.

Methods: A comprehensive literature search was conducted in PubMed, Embase, and Web of Science from their inception to February 2016. Only prospective cohort studies investigating the association between the ideal cardiovascular health metrics and CVD or mortality were eligible. The most-fully adjusted risk ratio (RR) and corresponding 95% confidence intervals (CI) was pooled to estimate the association.

Results: Nine prospective cohort studies involving 12,878 participants were analyzed. Meta-analyses showed that achieving a greatest ideal cardiovascular health metrics was associated with lower risk of all-cause mortality (RR 0.55; 95% CI 0.37–0.80), cardiovascular mortality (RR 0.25; 95% CI 0.10–0.63), cardiovascular disease (RR 0.20; 95% CI 0.11–0.37),and stroke (RR 0.31; 95% CI 0.25–0.38).

Conclusions: Ideal cardiovascular health metrics are inversely associated with all-cause mortality and cardiovascular events, supporting the use of cardiovascular health metrics as a useful tool to predict mortality and cardiovascular disease risk.

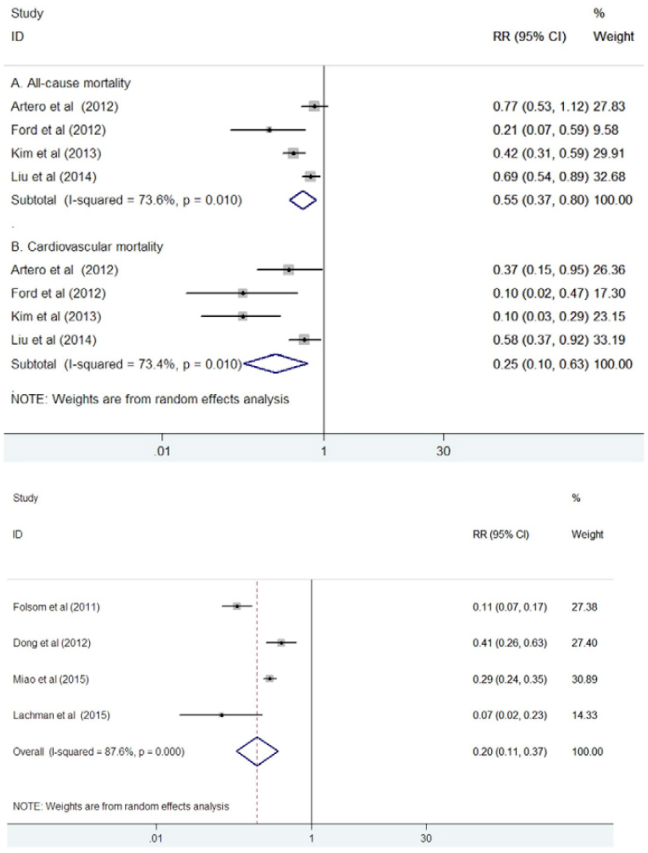

Fig. 3. Forest plots showing RR and 95% CI of cardiovascular disease comparing the greatest to the least number of ideal cardiovascular health metrics.

AHA PRESIDENTIAL ADVISORY

Life's Essential 8: Updating and Enhancing the American Heart Association's Construct of Cardiovascular Health: A Presidential Advisory From the American Heart Association

Donald M. Lloyd-Jones, MD, ScM, FAHA, Chair; Norrina B. Allen, PhD, MPH, FAHA; Cheryl A.M. Anderson, PhD, MPH, MS, FAHA; Terrie Black, DNP, MBA, CRRN, FAHA; LaPrincess C. Brewer, MD, MPH; Randi E. Foraker, PhD, MA, FAHA; Michael A. Grandner, PhD, MTR, FAHA; Helen Lavretsky, MD, MS; Amanda Marma Perak, MD, MS, FAHA; Garima Sharma, MD; Wayne Rosamond, PhD, MS, FAHA; on behalf of the American Heart Association

ABSTRACT: In 2010, the American Heart Association defined a novel construct of cardiovascular health to promote a paradigm shift from a focus solely on disease treatment to one inclusive of positive health promotion and preservation across the life course in populations and individuals. Extensive subsequent evidence has provided insights into strengths and limitations of the original approach to defining and quantifying cardiovascular health. In response, the American Heart Association convened a writing group to recommend enhancements and updates. The definition and quantification of each of the original metrics (Life's Simple 7) were evaluated for responsiveness to interindividual variation and intraindividual change. New metrics were considered, and the age spectrum was expanded to include the entire life course. The foundational contexts of social determinants of health and psychological health were addressed as crucial factors in optimizing and preserving cardiovascular health. This presidential advisory introduces an enhanced approach to assessing cardiovascular health: Life's Essential 8. The components of Life's Essential 8 include diet (updated), physical activity, nicotine exposure (updated), sleep health (new), body mass index, blood lipids (updated), blood glucose (updated), and blood pressure. Each metric has a new scoring algorithm ranging from 0 to 100 points, allowing generation of a new composite cardiovascular health score (the unweighted average of all components) that also varies from 0 to 100 points. Methods for implementing cardiovascular health assessment and longitudinal monitoring are discussed, as are potential data sources and tools to promote widespread adoption in policy, public health, clinical, institutional, and community settings.

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Circulation

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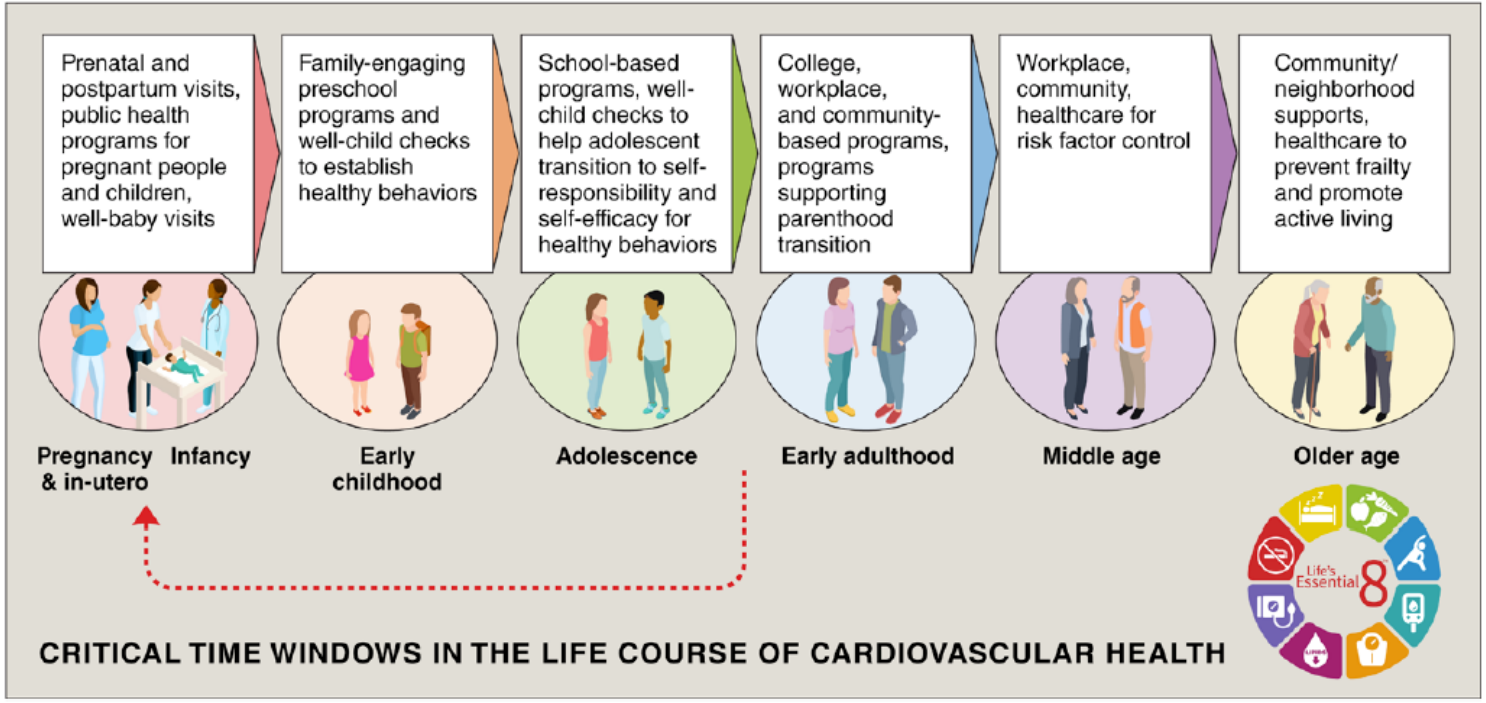

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What did change in 2022/L8E from L7E/2010?

- The **age** spectrum expanded to include the **entire life course**.
- Social determinants of health and psychological health were addressed as crucial factors in optimizing and preserving cardiovascular health, although not considered in the metrics
- A **new scoring algorithm for each metric** ranging from 0 to 100
- A new **composite cardiovascular health score**: from 0 to 100
- Enhanced and improved approach to assessing cardiovascular health:
  - Equal: physical activity, BMI and blood pressure
  - Updated: diet, nicotine exposure, blood lipids and glucose
  - **New: sleep health**
- Methods for implementing cardiovascular health assessment and longitudinal monitoring recognized as potential data sources and tools to promote widespread adoption in policy, public health, clinical, institutional, and community settings.

Importance of social determinants

Favorable psychological health characteristics

- optimism,
- purpose in life
- environmental mastery,
- perceived reward from social roles
- resilient coping

Bad psychological health characteristics

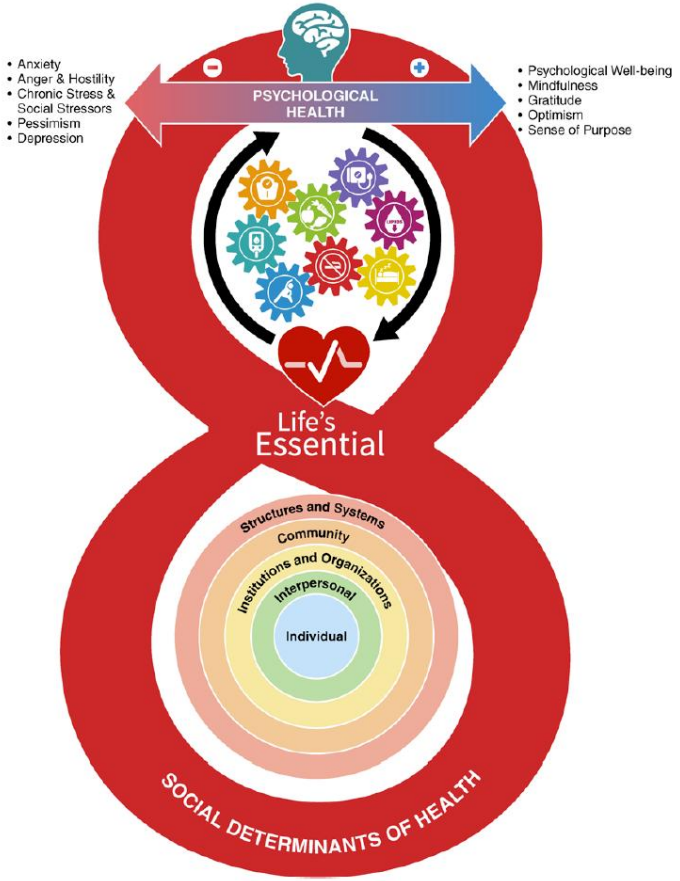
- psychosocial stress
- depression

Favorable individual, socioeconomic and social indicators

- higher income
- educational attainment
- occupational status
- subjective social status
- less social isolation
- lower racial discrimination experiences
- No incarceration

Favorable neighborhood-level factors

- greater resources
- social cohesion
- built environment



Donald M. Lloyd-Jones et al. Circulation 2010; 121:586-613

Psychological Health, Well-Being, and the Mind-Heart-Body Connection

A Scientific Statement From the American Heart Association

Positive psychological factors	Parameter/ end point	Effect estimates (95% CI)
Optimism	Incident CVD	RR, 0.65 (0.51–0.78)[66]
	Hospital readmission after ACS	HR, 0.92 (0.86–0.98)[68]
	All-cause mortality	RR, 0.86 (0.80–0.92)[66]
Sense of purpose	CVD risk	RR, 0.83 (0.75–0.92)[76]
	All-cause mortality	RR, 0.83 (0.75–0.91)[76]
Happiness/more positive affect*	Incident CHD	HR, 0.78 (0.63–0.96)[93]
Mindfulness†	Good cardiovascular health	PR, 1.83 (1.07–3.13)[86]
	Nonsmoking	PR, 1.37 (1.06–1.76)[86]
	Body mass index <25 kg/m^2	PR, 2.17 (1.16–4.07)[86]
	Fasting glucose <100 mg/dL	PR, 1.47 (1.06–2.04)[86]
	High level of physical activity	PR, 1.56 (1.04–2.35)[86]
Higher emotional vitality	Incident CHD	RR, 0.81 (0.69–0.94)[88]
Psychological well-being	Cardiovascular mortality	OR, 0.71 (0.59–0.84)[89]

Negative psychological factors	Parameter/ end point	Effect estimates (95% CI)
Depression	Incident MI	RR, 1.30 (1.22–1.40)[42]
	Incident CHD	RR, 1.30 (1.18–1.44)[42]
	Stroke	RR, 1.45 (1.31–1.61)[45]
	Obesity	RR, 1.37 (1.17–1.48)[49]
	Hypertension	RR, 1.42 (1.09–1.86)[51]
	Diabetes	RR, 1.32 (1.18–1.47)[52]
Anxiety	CVD mortality	RR, 1.41 (1.13–1.76)[39]
	Incident CHD	RR, 1.41 (1.23–1.61)[39]
	Coronary artery spasm	RR, 5.20 (4.72–5.40)[40]
	Incident stroke	RR, 1.71 (1.18–2.50)[39]
	Heart failure	RR, 1.35 (1.11–1.64)[39]
Work-related stress	Incident CVD events	RR, 1.4 (1.2–1.8)[18]
Any-cause stress	Incident CHD/CHD mortality	RR, 1.27 (1.12–1.45)[19]
PTSD	Incident CHD	RR, 1.61 (1.46–1.77)[22]
Social isolation and loneliness	Incident CVD events	RR, 1.5 (1.2–1.9)[18]
Pessimism	CHD mortality	OR, 2.17 (1.21–3.89)[50] (highest vs lowest quartile)
Anger and hostility	Incident CHD	HR, 1.19 (1.05–1.35)[33]
	Recurrent CHD	HR, 1.24 (1.08–1.42)[33]

CHD indicates coronary heart disease; CVD, cardiovascular disease; HR, hazard ratio; MI, myocardial infarction; OR, odds ratio; PTSD, posttraumatic stress disorder; and RR, risk ratio.

Levine GN et al, Circulation. 2021; 143: e763–e783.

SLEEP HEALTH A NEW COMPONENT OF CVH

- Population studies have shown that inappropriate sleep duration (< / > 7 - 8 hours) is associated with CAD.
- Laboratory studies show that experimentally manipulated sleep affects BP, inflammation, glucose homeostasis, and other relevant CVD risk factors.
- A limited number of studies demonstrate that real-world sleep manipulation is associated with changes in CVD risk factors.

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Measuring and Quantitative Assessment

Domain	CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y)	Quantification of CVH metric: children (up to 19 y)
Health factors	BMI	Measurement: Body weight (kilograms) divided by height squared (meters squared) Example tools for measurement: Objective measurement of height and weight	Metric: BMI (kg/m²) Scoring: Points / Level 100 / <25 70 / 25.0–29.9 30 / 30.0–34.9 15 / 35.0–39.9 0 / ≥40.0	Metric: BMI percentiles for age and sex, starting in infancy; see Supplemental Material for suggestions for age <2 y Scoring: Points / Level 100 / 5th–<85th percentile 70 / 85th–<95th percentile 30 / 95th percentile–<120% of the 95th percentile 15 / 120% of the 95th percentile–<140% of the 95th percentile 0 / ≥140% of the 95th percentile
	Blood lipids	Measurement: Plasma total and HDL cholesterol with calculation of non–HDL cholesterol Example tools for measurement: Fasting or nonfasting blood sample	Metric: Non–HDL cholesterol (mg/dL) Scoring: Points / Level 100 / <130 60 / 130–159 40 / 160–189 20 / 190–219 0 / ≥220 If drug-treated level, subtract 20 points	Metric: Non–HDL cholesterol (mg/dL), starting no later than age 9–11 y and earlier per clinician discretion Scoring: Points / Level 100 / <100 60 / 100–119 40 / 120–144 20 / 145–189 0 / ≥190 If drug-treated level, subtract 20 points
	Blood glucose	Measurement: FBG or casual HbA1c Example tools for measurement: Fasting (FBG, HbA1c) or nonfasting (HbA1c) blood sample	Metric: FBG (mg/dL) or HbA1c (%) Scoring: Points / Level 100 / No history of diabetes and FBG <100 (or HbA1c <5.7) 60 / No diabetes and FBG 100–125 (or HbA1c 5.7–6.4) (prediabetes) 40 / Diabetes with HbA1c <7.0 30 / Diabetes with HbA1c 7.0–7.9 20 / Diabetes with HbA1c 8.0–8.9 10 / Diabetes with Hb A1c 9.0–9.9 0 / Diabetes with HbA1c ≥10.0	Metric: FBG (mg/dL) or HbA1c (%), symptom-based screening at any age or risk-based screening starting at age ≥10 y of age or onset of puberty per clinician discretion Scoring: Points / Level 100 / No history of diabetes and FBG <100 (or HbA1c < 5.7) 60 / No diabetes and FBG 100–125 (or HbA1c 5.7–6.4) (prediabetes) 40 / Diabetes with HbA1c <7.0 30 / Diabetes with HbA1c 7.0–7.9 20 / Diabetes with HbA1c 8.0–8.9 10 / Diabetes with Hb A1c 9.0–9.9 0 / Diabetes with HbA1c ≥10.0
	BP	Measurement: Appropriately measured systolic and diastolic BPs Example tools for measurement: Appropriately sized BP cuff	Metric: Systolic and diastolic BPs (mm Hg) Scoring: Points / Level 100 / <120/<80 (optimal) 75 / 120–129/<80 (elevated) 50 / 130–139 or 80–89 (stage 1 hypertension) 25 / 140–159 or 90–99 0 / ≥160 or ≥100 Subtract 20 points if treated level	Metric: Systolic and diastolic BP (mm Hg) percentiles for age through 12 y. For age ≥13 y, use adult scoring. Screening should start no later than age 3 y and earlier per clinician discretion Scoring: Points / Level 100 / Optimal (<90th percentile) 75 / Elevated (≥90th–<95th percentile or ≥120/80 mm Hg to <95th percentile, whichever is lower) 50 / Stage 1 hypertension (≥95th–<95th percentile+12 mm Hg, or 130/80 to 139/89 mm Hg, whichever is lower) 25 / Stage 2 hypertension (≥95th percentile+12 mm Hg, or ≥140/90 mm Hg, whichever is lower) 0 / Systolic BP ≥160 or ≥95th percentile+30 mm Hg systolic BP, whichever is lower; and/or diastolic BP ≥100 or ≥90th percentile+20 mm Hg diastolic BP Subtract 20 points if treated level

Domain	CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y of age)	Quantification of CVH metric: children (up to 19 y of age)
Health behaviors	Diet	Measurement: Self-reported daily intake of a DASH-style eating pattern Example tools for measurement: DASH diet score[130,131] (populations); MEPA[132] (individuals)	Quantiles of DASH-style diet adherence or HEI-2015 (population) Scoring (population): Points / Quantile 100 / ≥95th percentile (top/ideal diet) 80 / 75th–94th percentile 50 / 50th–74th percentile 25 / 25th–49th percentile 0 / 1st–24th percentile (bottom/least ideal quartile) Scoring (individual): Points / MEPA score (points) 100 / 15–16 80 / 12–14 50 / 8–11 25 / 4–7 0 / 0–3	Quantiles of DASH-style diet adherence or HEI-2015 (population) or MEPA (individuals)*; ages 2–19 y (see Supplemental Material for younger ages) Scoring (population): Points / Quantile 100 / ≥95th percentile (top/ideal diet) 80 / 75th–94th percentile 50 / 50th–74th percentile 25 / 25th–49th percentile 0 / 1st–24th percentile (bottom/least ideal quartile) Scoring (individual): Points / MEPA score (points) 100 / 9–10 80 / 7–8 50 / 5–6 25 / 3–4 0 / 0–2
	PA	Measurement: Self-reported minutes of moderate or vigorous PA per week Example tools for measurement: NHANES PAQ-K questionnaire[133]	Metric: Minutes of moderate- (or greater) intensity activity per week Scoring: Points / Minutes 100 / ≥150 90 / 120–149 80 / 90–119 60 / 60–89 40 / 30–59 20 / 1–29 0 / 0	Metric: Minutes of moderate- (or greater) intensity activity per week; ages 6–19 y (see notes and Supplemental Material for younger ages) Scoring: Points / Minutes 100 / ≥420 90 / 360–419 80 / 300–359 60 / 240–299 40 / 120–239 20 / 1–119 0 / 0
	Nicotine exposure	Measurement: Self-reported use of cigarettes or inhaled NDS Example tools for measurement: NHANES SMQ[134]	Metric: Combustible tobacco use or inhaled NDS use; or secondhand smoke exposure Scoring: Points / Status 100 / Never smoker 75 / Former smoker, quit ≥5 y 50 / Former smoker, quit 1–<5 y 25 / Former smoker, quit <1 y, or currently using inhaled NDS 0 / Current smoker Subtract 20 points (unless score is 0) for living with active indoor smoker in home	Metric: Combustible tobacco use or inhaled NDS use at any age (per clinician discretion); or secondhand smoke exposure Scoring: Points / Status 100 / Never tried 50 / Tried any nicotine product, but >30 d ago 25 / Currently using inhaled NDS 0 / Current combustible use (any within 30 d) Subtract 20 points (unless score is 0) for living with active indoor smoker in home
	Sleep health	Measurement: Self-reported average hours of sleep per night Example tools for measurement: "On average, how many hours of sleep do you get per night?" Consider objective sleep/actigraphy data from wearable technology if available	Metric: Average hours of sleep per night Scoring: Points / Level 100 / 7–<9 90 / 9–<10 70 / 6–<7 40 / 5–<6 or ≥10 20 / 4–<5 0 / <4	Metric: Average hours of sleep per night (or per 24 h for age ≤5 y; see notes for age-appropriate ranges) Scoring: Points / Level 100 / Age-appropriate optimal range 90 / <1 h above optimal range 70 / <1 h below optimal range 40 / 1–<2 h below or ≥1 h above optimal 20 / 2–<3 h below optimal range 0 / ≥3 h below optimal range

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CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y)	Quantification of CVH metric: children (up to 19 y)
BP	Measurement: Appropriately measured systolic and diastolic BPs Example tools for measurement: Appropriately sized BP cuff	Metric: Systolic and diastolic BPs (mm Hg) Scoring: Points — Level 100 — <120/<80 (optimal) 75 — 120–129/<80 (elevated) 50 — 130–139 or 80–89 (stage 1 hypertension) 25 — 140–159 or 90–99 0 — ≥160 or ≥100 Subtract 20 points if treated level	Metric: Systolic and diastolic BP (mm Hg) percentiles for age through 12 y. For age ≥13 y, use adult scoring. Screening should start no later than age 3 y and earlier per clinician discretion Scoring: Points — Level 100 — Optimal (<90th percentile) 75 — Elevated (≥90th–<95th percentile or ≥120/80 mm Hg to <95th percentile, whichever is lower) 50 — Stage 1 hypertension (≥95th–<95th percentile+12 mm Hg, or 130/80 to 139/89 mm Hg, whichever is lower) 25 — Stage 2 hypertension (≥95th percentile+12 mm Hg, or ≥140/90 mm Hg, whichever is lower) 0 — Systolic BP ≥160 or ≥95th percentile+30 mm Hg systolic BP, whichever is lower; and/or diastolic BP ≥100 or ≥95th percentile+20 mm Hg diastolic BP Subtract 20 points if treated level

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CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y of age)	Quantification of CVH metric: children (up to 19 y of age)
Diet	Measurement: Self-reported daily intake of a DASH-style eating pattern Example tools for measurement: DASH diet score[130,131] (populations); MEPA[132] (individuals)	Quantiles of DASH-style diet adherence or HEI-2015 (population) Scoring (population): Points — Quantile 100 — ≥95th percentile (top/ideal diet) 80 — 75th–94th percentile 50 — 50th–74th percentile 25 — 25th–49th percentile 0 — 1st–24th percentile (bottom/least ideal quartile) Scoring (individual): Points — MEPA score (points) 100 — 15–16 80 — 12–14 50 — 8–11 25 — 4–7 0 — 0–3	Quantiles of DASH-style diet adherence or HEI-2015 (population) or MEPA (individuals)*; ages 2–19 y (see Supplemental Material for younger ages) Scoring (population): Points — Quantile 100 — ≥95th percentile (top/ideal diet) 80 — 75th–94th percentile 50 — 50th–74th percentile 25 — 25th–49th percentile 0 — 1st–24th percentile (bottom/least ideal quartile) Scoring (individual): Points — MEPA score (points) 100 — 9–10 80 — 7–8 50 — 5–6 25 — 3–4 0 — 0–2

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CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y)	Quantification of CVH metric: children (up to 19 y)
Nicotine exposure	Measurement: Self-reported use of cigarettes or inhaled NDS Example tools for measurement: NHANES SMQ[134]	Metric: Combustible tobacco use or inhaled NDS use; or secondhand smoke exposure Scoring: Points — Status 100 — Never smoker 75 — Former smoker, quit ≥5 y 50 — Former smoker, quit 1–<5 y 25 — Former smoker, quit <1 y, or currently using inhaled NDS 0 — Current smoker Subtract 20 points (unless score is 0) for living with active indoor smoker in home	Metric: Combustible tobacco use or inhaled NDS use at any age (per clinician discretion); or secondhand smoke exposure Scoring: Points — Status 100 — Never tried 50 — Tried any nicotine product, but >30 d ago 25 — Currently using inhaled NDS 0 — Current combustible use (any within 30 d) Subtract 20 points (unless score is 0) for living with active indoor smoker in home

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		Quantification of CVH metric: adults	Quantification of CVH metric: children
PA	Measurement: Self-reported minutes of moderate or vigorous PA per week Example tools for measurement: NHANES PAQ-K questionnaire[133]	Metric: Minutes of moderate- (or greater) intensity activity per week Scoring: Points — Minutes 100 — ≥150 90 — 120–149 80 — 90–119 60 — 60–89 40 — 30–59 20 — 1–29 0 — 0	Metric: Minutes of moderate- (or greater) intensity activity per week; ages 6–19 y (see notes and Supplemental Material for younger ages) Scoring: Points — Minutes 100 — ≥420 90 — 360–419 80 — 300–359 60 — 240–299 40 — 120–239 20 — 1–119 0 — 0

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CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y)	Quantification of CVH metric: children (up to 19 y)
Sleep health	Measurement: Self-reported average hours of sleep per night Example tools for measurement: "On average, how many hours of sleep do you get per night?" Consider objective sleep/actigraphy data from wearable technology if available	Metric: Average hours of sleep per night Scoring: Points — Level 100 — 7–<9 90 — 9–<10 70 — 6–<7 40 — 5–<6 or ≥10 20 — 4–<5 0 — <4	Metric: Average hours of sleep per night (or per 24 h for age ≤5 y; see notes for age-appropriate ranges) Scoring: Points — Level 100 — Age-appropriate optimal range 90 — <1 h above optimal range 70 — <1 h below optimal range 40 — 1–<2 h below or ≥1 h above optimal 20 — 2–<3 h below optimal range 0 — ≥3 h below optimal range

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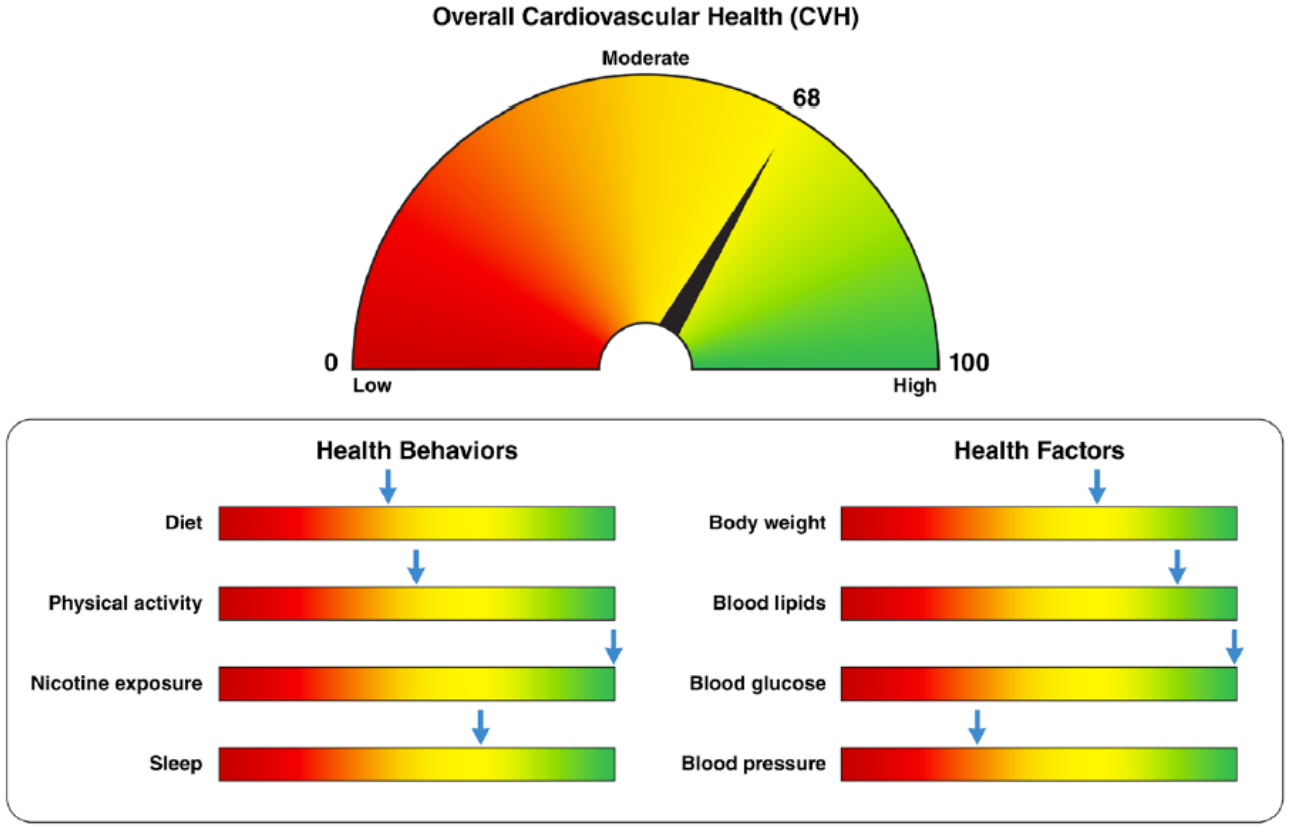

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Circulation: Cardiovascular Quality and Outcomes

ORIGINAL ARTICLE

Association Between Life's Essential 8 Cardiovascular Health Metrics With Cardiovascular Events in the Cardiovascular Disease Lifetime Risk Pooling Project

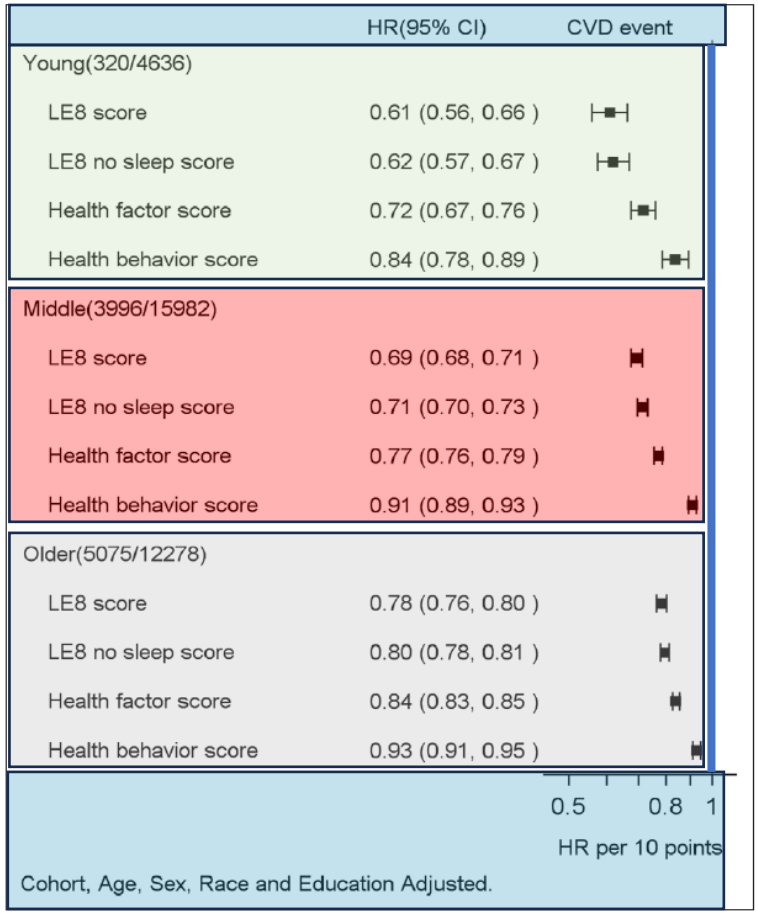
Hongyan Ning, MD, MS; Amanda M. Perak, MD, MS; Juned Siddique, PhD; John T. Wilkins, MD, MS; Donald M. Lloyd-Jones, MD, ScM; Norrina B. Allen, PhD, MPH

BACKGROUND: The American Heart Association recently launched updated cardiovascular health metrics, termed Life's Essential 8 (LE8). Compared with Life's Simple 7 (LS7), the new approach added sleep health as an eighth metric and updated the remaining 7 health factors and behaviors. The association of the updated LE8 score with long-term cardiovascular disease (CVD) outcomes and death is unknown.

METHODS: We pooled individual-level data from 6 contemporary US-based cohorts from the Cardiovascular Lifetime Risk Pooling Project. Total LE8 score (0–100 points), LE8 score without sleep (0–100 points), and prior LS7 scores (0–14 points) were calculated separately. We used multivariable-adjusted Cox models to evaluate the association of LE8 with CVD, CVD subtypes, and all-cause mortality among younger, middle, and older adult participants. Net reclassification improvement analysis was used to measure the improvement in CVD risk classification with the addition of LS7 and LE8 recategorization based on score quartile rankings.

RESULTS: Our sample consisted of 32 896 US adults (7836 [23.8%] Black; 14 941 [45.4%] men) followed for 642 000 person-years, of whom 9391 developed CVD events. Each 10-point higher overall LE8 score was associated with lower risk by 22% to 40% for CVD, 24% to 43% for congenital heart disease, 17% to 34% for stroke, 23% to 38% for heart failure, and 17% to 21% for all causes of mortality events across age strata. LE8 score provided more granular differentiation of the related CVD risk than LS7. Overall, 19.5% and 15.5% of the study participants were recategorized upward and downward based on LE8 versus LS7 categories, respectively, and the recategorization was significantly associated with CVD risk in addition to LS7 score. The addition of recategorization between LE8 and LS7 categories improved CVD risk reclassification across age groups (clinical net reclassification improvement, 0.06–0.12; $P<0.01$).

CONCLUSIONS: These findings support the improved utility of the LE8 algorithm for assessing overall cardiovascular health and future CVD risk.



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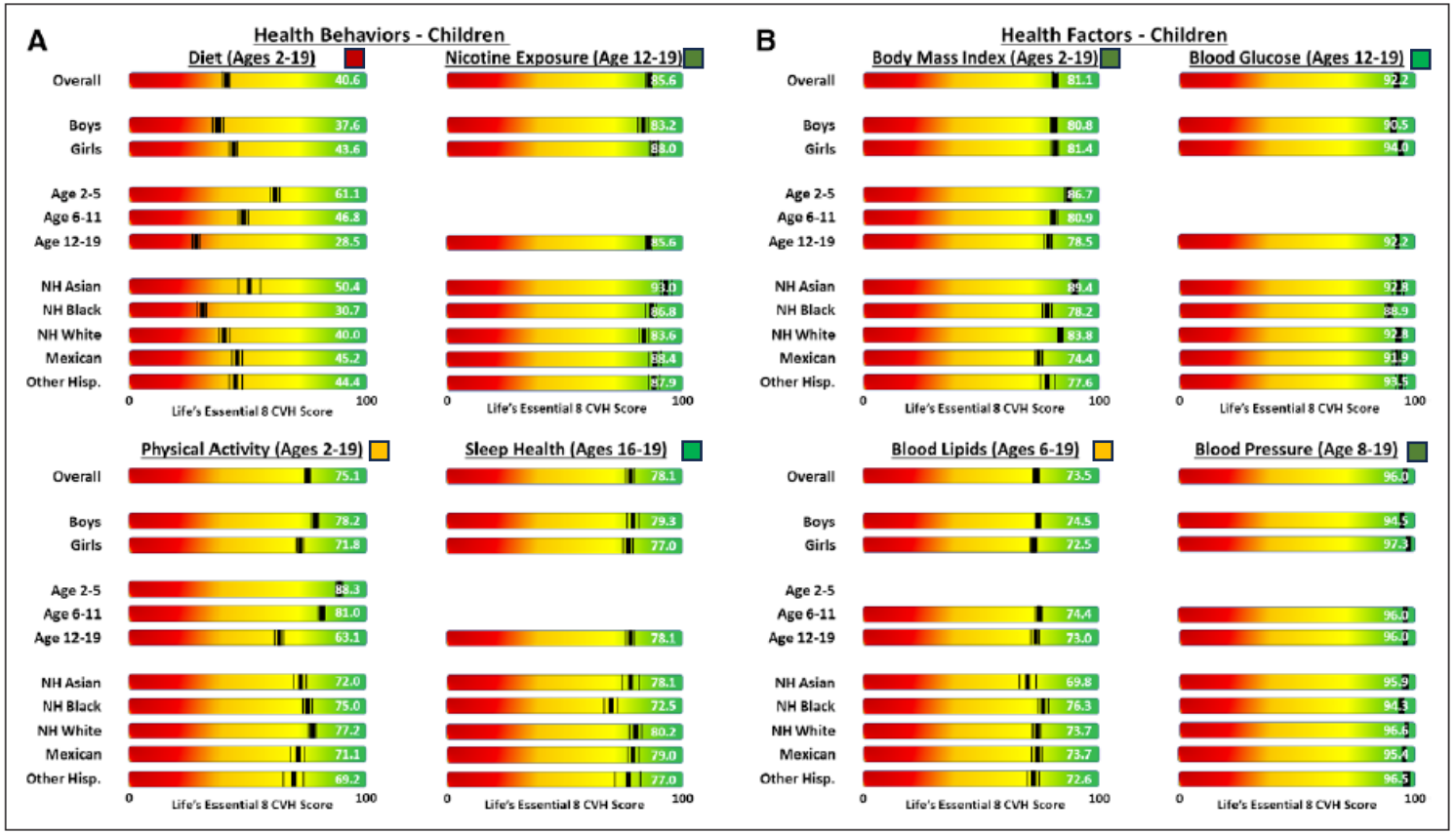

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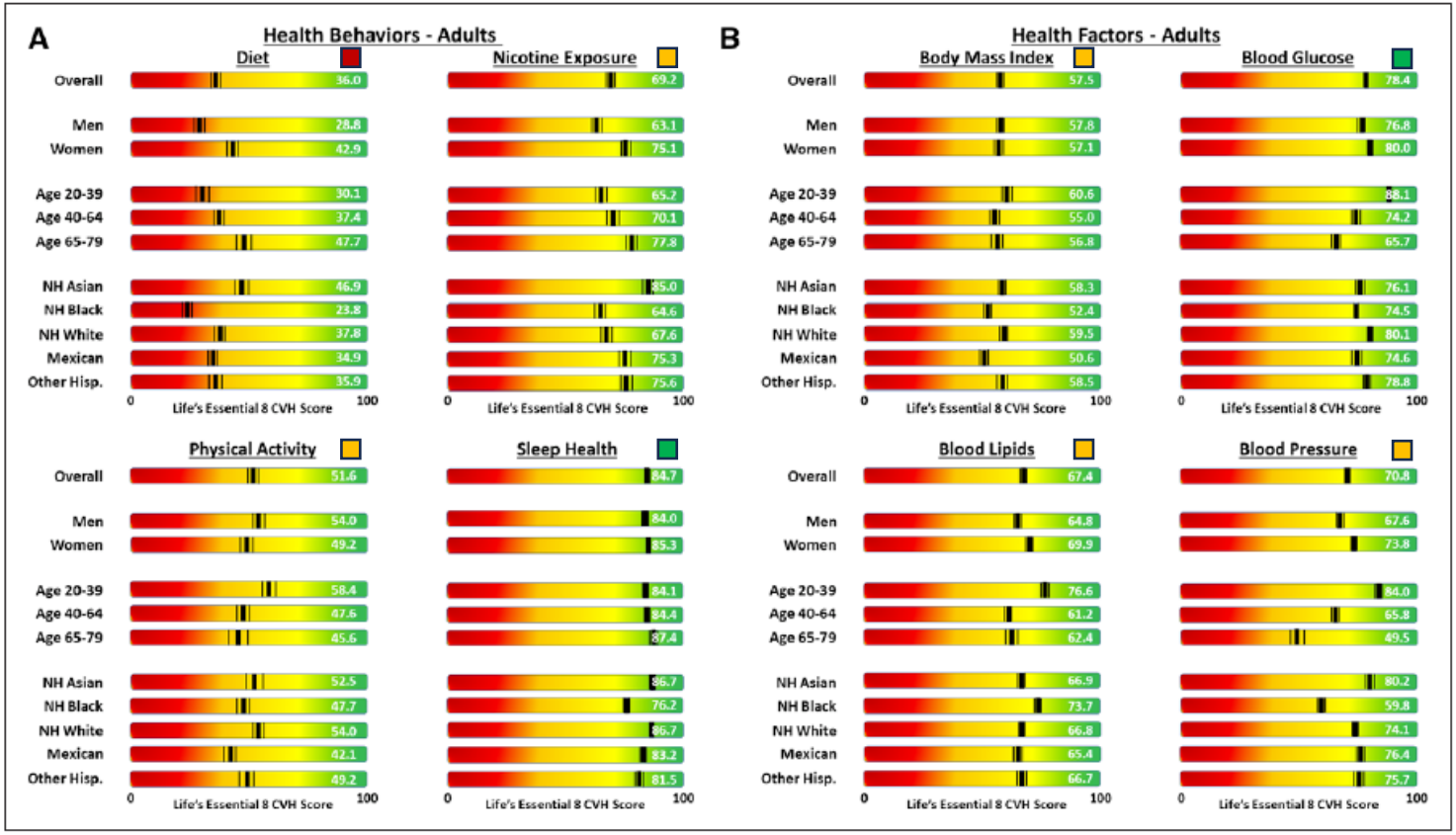

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AHA Life's essential 8 and ideal cardiovascular health among young adults

Naman S. Shetty [a], Vibhu Parcha [a], Nirav Patel [a], Ishant Yadav [b], Chandan Basetty [b], Cynthia Li [c,d], Ambarish Pandey [e], Rajat Kalra [f], Peng Li [g], Garima Arora [a], Pankaj Arora [a,h,*]

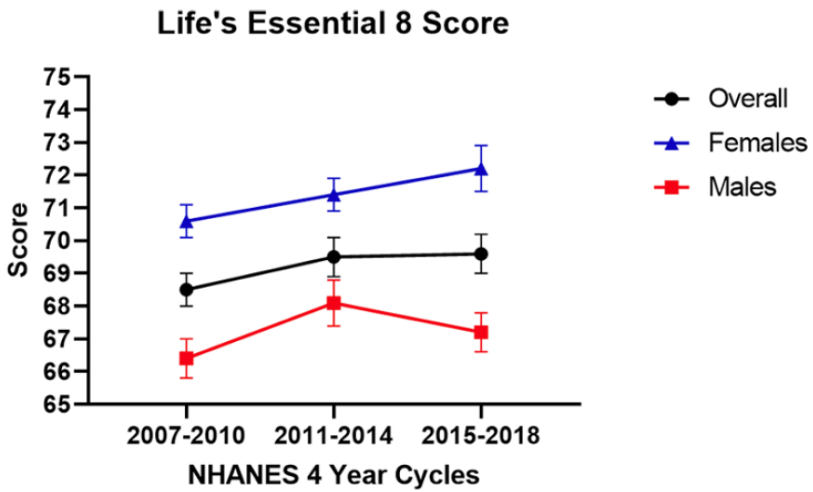
A B S T R A C T

Objective: This study assessed cardiovascular health (CVH) in young adults using the 2022 AHA Life's Essential 8 (LE8) score and compared it with the Life's Simple 7 (LS7) score.

Methods: Individuals aged 18 to 44 years without a history of cardiovascular disease in the National Health and Nutrition Examination Survey (NHANES) cycles were included. Data from 2007-2008 to 2017-2018 were combined to create 3 groups (2007-2010, 2011-2014, and 2015-2018) for analysis. The LE8 score and its components were computed in the overall population and stratified by sex and race/ethnicity. Trends for the LE8 score were analyzed using adjusted linear regression models.

Results: Among 12,197 young adults, representing an estimated 89.4 million individuals, from the NHANES 2007-2018, the CVH in the overall population and across all subgroups was stable (P_{trend} >0.05). The blood lipid score improved across all subgroups (P_{trend}:<0.05). The mean LE8 score was 69.2±0.3. Females (71.4±0.4) had better CVH compared with males (67.2±0.4). Non-Hispanic Black individuals (65.1± 0.3) had the lowest CVH compared with Non-Hispanic White individuals (69.9±0.5), Mexican American individuals (67.3±0.3), and other race individuals (71.2±0.4). Of the 46.1 million individuals categorized as intermediate CVH by the LS7 score, 8.1 million (17.6%) and 2.3 million (5.0%) were reclassified to poor and ideal CVH by the LE8 score, respectively. Of the 40.1 million individuals categorized as ideal CVH by the LS7 score, 18.9 million (47.1%) and 0.1 million (0.2%) were reclassified to poor CVH and intermediate CVH by the LE8 score, respectively.

Conclusion: Among US young adults, there has been no improvement in CVH over the last decade with notable sex and race/ethnicity-associated differences in the LE8 score. Nearly 1 in 4 young adults had ideal CVH using the LE8 score compared with 1 in 2 individuals using the LS7 score.



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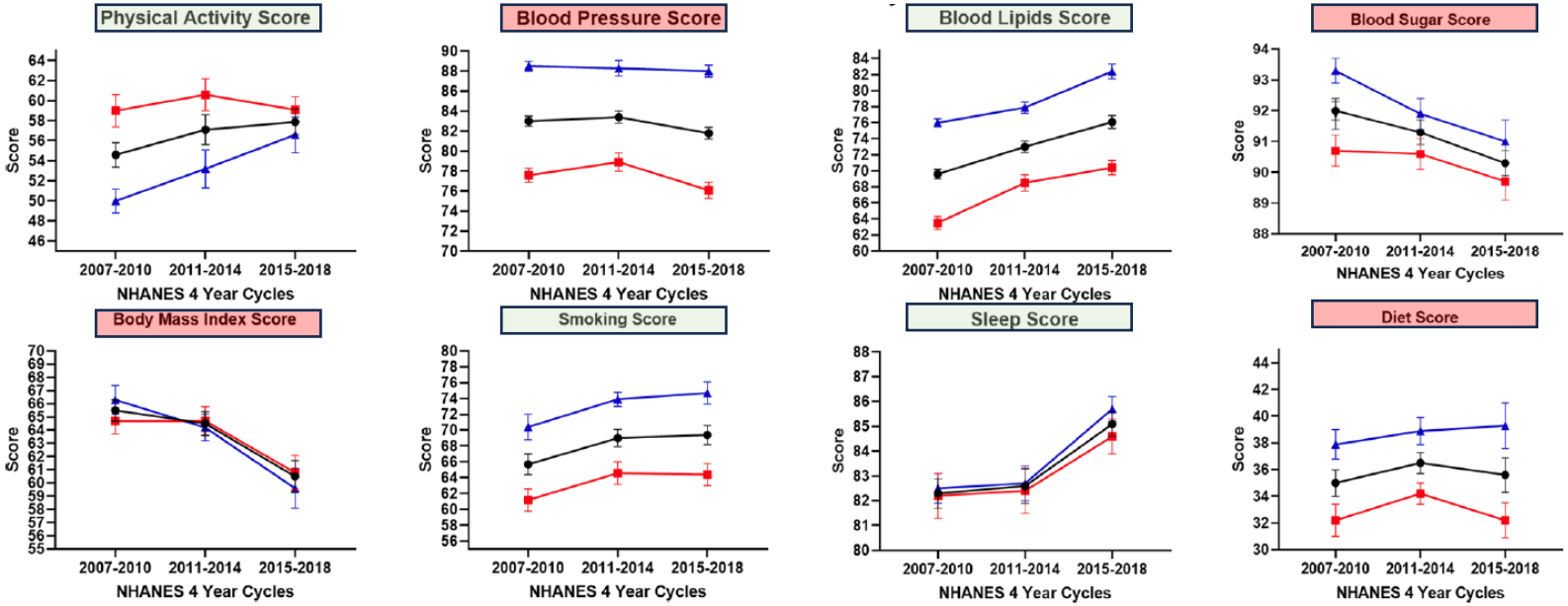

Life’8 Essentials | Take home messages #1

- Primordial prevention metrics are below optimal in adults and children
- Cardiovascular health assessment and health promotion strategies are mandatory for all ages, namely in children and young adults, for whom the benefits may be large over the life course.
- Life’s 8 Essential score is a good tool for this purpose and can be used by clinicians and patients:
  - to assess and monitor cardiovascular risk over time
  - to identify the targets for intervention to improve long-term outcomes
- Routine measurement of each health component must be performed by:
  - biological measurements (BP, glucose, lipids, BMI)
  - specific questionnaires (diet, physical activity, nicotine, sleep habits).

Life'8 Essentials | Take home messages #2

- Communication strategies in the community should be tailored for diverse cultural settings and demographic groups in order "to create healthier parents of healthier babies in future generations".
- A good connection between health technology (apps, sensors, online tools) and electronic medical records is crucial to collect CVH data for population health monitoring and risk prediction, and to motivate behavior changes.
- The responsibility for monitoring CVH trajectories lies with individuals, families, clinicians, other health professionals, and the health system.
  - *"if you cannot measure it, you cannot improve it."*
- Communities must provide resources to promote social and psychological well-being in order to improve CVH.