

Understanding the impact of sleep on cardiovascular risk estimation: comparison of LS7 and LE8 performances in a European population.

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S1 CVD event identifiers and UK Biobank Data-Fields

We defined cardiovascular disease (CVD) events as fatal and non-fatal incidents based on the Multi-Ethnic Study of Atherosclerosis (MESA) protocol [Bild et al., 2002], covering both incident and prevalent cases. Non-fatal events included congestive heart failure (CHF), angina, myocardial infarction, resuscitated cardiac arrest, peripheral arterial disease, stroke, and transient ischaemic attack (TIA). Fatal events comprised fatal coronary heart disease (CHD), fatal stroke, and other fatal CVD events. Myocardial infarction is identified by UK Biobank (UKB) field IDs (42000, 131298, 131300, 131302, and 131304) and by the 10th revision of the International Classification of Diseases (ICD-10) codes (I21*-I25*). Congestive heart failure is identified by UKB field ID (131354) and ICD-10 codes (I50*, I11.0, I13.0, and I13.2). Angina is identified by UKB field ID (131296) and ICD-10 codes (I20*). Stroke is identified by UKB field IDs (42006, 131360, 131362, 131366, and 131368) and ICD-10 codes (G46*, I60*-I64*, I67.81, and I67.82). Transient ischaemic attack is identified by UKB field ID (131056) and ICD-10 codes (G45*). The corresponding UKB Data-Fields are the following:

- 42000 - Algorithmically-defined outcomes (Myocardial infarction)
- 131298 - First occurrences (Acute myocardial infarction)
- 131300 - First occurrences (Subsequent myocardial infarction)
- 131302 - First occurrences (Complications after myocardial infarction)
- 131304 - First occurrences (Acute ischaemic heart disease)
- 131354 - First occurrences (Heart failure)
- 131296 - First Occurrences (Angina Pectoris)
- 42006 - Algorithmically-defined outcomes (Stroke)
- 131360 - First occurrences (Subarachnoid haemorrhage)
- 131362 - First occurrences (Intracerebral haemorrhage)

- 131366 - First occurrences (Cerebral infarction)
- 131368 - First occurrences (Stroke unspecified)
- 131056 - First Occurrences (Transient Ischaemic Attack)

S2 Life’s Simple 7 score

S2.1 Score operationalization

The Life’s Simple 7 (LS7) [Lloyd-Jones et al., 2010], defined by the American Heart Association (AHA), assesses adherence to recommendations for body mass index (BMI), cholesterol, blood pressure, blood glucose, diet, physical activity, and smoking. Each parameter is scored 0, 1, or 2, with a total score ranging from 0 to 14, where higher scores indicate better cardiovascular health (CVH). Information on the operationalization of the score are reported in Table S1.

Table S1: Operationalization of the LS7 score.

CVH	Ideal (score = 2)	Intermediate (score = 1)	Poor (score = 0)
Smoking	Never smoker	Former smoker	Current smoker
Diet	Meets 4-5 recommendations	Meets 3-2 recommendations	Meets 0-1 recommendations
Physical Activity	150 min/wk moderate intensity or ≥ 75 min/wk vigorous intensity or ≥ 150 min/wk moderate + vigorous intensity	1–149 min/wk moderate intensity or 1–74 min/wk vigorous intensity or 1 to 149 min/wk moderate + vigorous intensity	No moderate or vigorous activity
BMI	$< 25 \text{ kg/m}^2$	$25\text{--}29.9 \text{ kg/m}^2$	$\geq 30 \text{ kg/m}^2$
Blood Pressure	SBP 120 mmHg and DBP 80 mmHg (untreated)	SBP 120–129 mmHg or DBP 80 mmHg (or treated to ideal level)	SBP ≥ 130 mmHg or DBP ≥ 80 mmHg
Total Cholesterol	200 mg/dL	200–239 mg/dL (or treated to ideal level)	≥ 240 mg/dL
Fasting Glucose	100 mg/dL	100–125 mg/dL (or treated to ideal level)	≥ 126 mg/dL
Sleep (subjective)	Sleep duration ≥ 7 h and < 9 h	Sleep duration ≥ 6 h and < 7 h	Sleep duration < 6 h or > 9 h

S2.2 AHA diet recommendations in Marakem et al.

The diet score used in Makarem et al. [2022] was based on habitual dietary intake from a validated 120-item food frequency questionnaire, modified from the Insulin Resistance Atherosclerosis Study instrument [Mayer-Davis et al., 1999]. A healthy diet score was computed on the basis of meeting the AHA recommendations for intakes of fruits and vegetables, fish, whole grains, sodium, and sugar-sweetened beverages. The AHA diet recommendations are as follows: (1) fruits and vegetables: ≥ 4.5 cups per day; (2) fish: \geq two 3.5-oz servings per week (preferably oily fish); (3) fiber-rich whole grains (≥ 1.1 g of fiber per 10 g of carbohydrate): \geq three 1-oz-equivalent servings per day; (4) sodium: $< 1,500$ mg per day; (5) sugar-sweetened beverages: ≤ 450 kcal (36 oz) per week. The times spent

in vigorous and moderate physical activity were self-reported on the MESA Typical Week Physical Activity Survey [Bild et al., 2002].

S2.3 LS7 diet score in UK Biobank cohort

Given that the validated 120-item food frequency questionnaire used in Makarem et al. [2022] was not available for the UK Biobank cohort, we adapted the diet score described in Section S2.2 using data from the UK Biobank touchscreen questionnaire. The detailed description of such a score considering the available information is reported in Table S2.

Table S2: LS7 diet score calculation for the UK Biobank cohort.

Food intake	AHA recommendation	UK Biobank
fruits and vegetables	≥ 4.5 cups per day	Cooked vegetable intake and salad (raw) vegetable intake are reported as heaped tablespoons per day, which were converted back to cups per day, fresh fruit intake is reported as number of pieces per day, instead. We considered each piece as a cup
fish	\geq two 3.5-oz servings per week (preferably oily fish)	oily fish intake \geq two servings per week
fiber-rich whole grains	\geq three 1-oz-equivalent servings per day	We considered the “Bread type” (‘Wholemeal or wholegrain’) and “Bread intake” (portions per week) Data-Fields
sodium	$< 1,500$ mg per day	We considered the ‘Salt added to food’ Data-Fields. The recommendation is met if the value is ‘Never/rarely’ or ‘Sometimes’, not met otherwise (Usually, Always)
sugar-sweetened beverages	≤ 450 kcal (36 oz) per week	We considered the ‘Never eat eggs, dairy, wheat, sugar’ Data-Field. The recommendation is met if the value for this variable is not equal to ‘Sugar or foods/drinks containing sugar’

A list of the considered diet variables and corresponding UKB Data-Field is reported below:

- “Cooked vegetable intake” (UKB Data-Field 1289)
- “Salad / raw vegetable intake” (UKB Data-Field 1299)
- “Fresh fruit intake” (UKB Data-Field 1309)
- “Oily fish intake” (UKB Data-Field 1329)
- “Salt added to food” (UKB Data-Field 1478)
- “Bread type” (UKB Data-Field 1438)
- “Bread intake” (UKB Data-Field 1448)
- “Never eat eggs, dairy, wheat, sugar” (UKB Data-Field 6144)

S3 Life’s Essential 8

The Life’s Essential 8 (LE8) [Lloyd-Jones et al., 2022], also defined by the AHA, is an updated version of LS7 that incorporates sleep as an additional health metric. This improved scoring system also refines the assessment of all eight health components, replacing the previous three-level classification system with a more detailed, semicontinuous scoring approach.

S3.1 MEPA score for diet

The Mediterranean Eating Pattern for Americans (MEPA) screener [Cerwinske et al., 2017] is scored using a binary system (0 or 1) for each of its 16 dietary components, with a score of ‘1’ indicating adherence to Mediterranean dietary patterns. The total MEPA score ranges from 0 to 16, with higher scores reflecting greater accordance with Mediterranean dietary principles. Points are awarded for meeting the following consumption criteria (in bold those present in UK Biobank data):

- Olive oil: ≥ 2 servings per day
- **Other vegetables: ≥ 2 servings per day**
- **Other fruits: ≥ 1 serving per day**
- **Whole grains: ≥ 3 servings per day**
- **Green leafy vegetables: ≥ 7 servings per week**
- Berries: ≥ 2 servings per week
- **Fish: ≥ 1 serving per week**
- Beans: ≥ 3 servings per week
- **Nuts: ≥ 4 servings per week**
- **Red meat, hamburger, bacon, or sausage: ≤ 3 servings per week**
- **Chicken: ≤ 5 servings per week**
- **Full fat/regular cheese or cream cheese: ≤ 4 servings per week**
- Butter or cream: ≤ 5 servings per week
- Commercial sweets, candy bars, pastries, cookies, or cakes: ≤ 4 servings
- Fast food restaurant meals: ≤ 1 serving per week
- **Alcohol: Men (>0 but ≤ 2 servings per day), Women (>0 but ≤ 1 serving per day)**

Participants receive no points (score = 0) for items where these criteria were not met. The cumulative score is calculated as the sum of points across all 16 components.

S3.2 LE8 diet score in UK Biobank

The MEPA scoring criteria outlined in Section S3.1 could not be fully replicated using the data available in the UK Biobank cohort. Of the 16 total MEPA components, only 10 were present in the questionnaires completed by UK Biobank participants (indicated in bold in Section S3.1). To compute the final MEPA score for this analysis, we considered only these 10 matching criteria and normalised the aggregate score to the standard 0-16 point range, as described for the original MEPA metric. Scoring for the included dietary components was assigned based on the thresholds detailed by Lloyd-Jones et al. [2022]. The corresponding UK Biobank Data-Fields are reported below:

- "Cooked vegetable intake" (UKB Data-Field 1289)
- "Salad / raw vegetable intake" (UKB Data-Field 1299)
- "Fresh fruit intake" (UKB Data-Field 1309)
- "Oily fish intake" (UKB Data-Field 1329)
- "Non-oily fish intake" (UKB Data-Field 1339)
- "Cheese intake" (UKB Data-Field 1408)
- "Dried fruit intake" (UKB Data-Field 1319)
- "Poultry intake" (UKB Data-Field 1359)
- "Beef intake" (UKB Data-Field 1369)
- "Pork intake" (UKB Data-Field 1389)
- "Bread type" (UKB Data-Field 1438)
- "Bread intake" (UKB Data-Field 1448)
- "Average weekly red wine intake" (UKB Data-Field 1568)
- "Average weekly champagne plus white wine intake" (UKB Data-Field 1578)
- "Average weekly beer plus cider intake" (UKB Data-Field 1588)
- "Average weekly spirits intake" (UKB Data-Field 1598)
- "Average weekly fortified wine intake" (UKB Data-Field 1608)

S4 CVH scores and Cohort Definition

S4.1 Final cohort derivation

We conducted a complete case analysis starting with the full UK Biobank cohort ($N = 502,233$), excluding all samples with missing data for any variables required to compute the LS7 and LE8 CVH metrics. An overview of exclusion criteria and resulting sample sizes for the analysis are reported in Table S3 and Table S4 for the LS7 and LE8, respectively. Cohorts for LS7 and LE8 were derived separately, with only shared samples included in the final analysis (106,724 participants). Since the final cohort represents approximately one-fifth of the original cohort's size, we also extracted descriptive statistics for the initial cohort of 501,905 participants, as shown in Table S5, to verify that the final cohort remains representative of the original.

S4.2 CVH scores

The LS7- and LE8-based scores were categorised as described in the main article Section 2.2 and Section 2.3. The flow transitions between CVH categories based on the different LS7 and LE8 metrics are shown in Figure 1 in the main article, whereas the detailed transition counts are provided in the Table S6 below.

S5 Additional results

Since the LS7 and LE8 metrics are primarily intended for use in primary prevention, we performed additional analyses focusing exclusively on individuals without any prevalent events prior to the baseline visit. To achieve this, we excluded all participants who had experienced such events, resulting in a refined cohort of 100,594 samples for this specific analysis.

Table S3: Exclusion criteria and corresponding counts of excluded and retained samples for the LS7.

Exclusion criterion	N. excluded	N. remaining
Starting Cohort	-	502,233
Missing Event Date	328	501,905
Missing Personal information	12,295	489,610
Missing BMI entry	2,522	487,088
Missing Cholesterol entry	27,379	459,709
Missing Glucose entry	39,356	420,353
Missing Blood Pressure measures	12,951	407,402
Missing Smoking Status	1,370	406,032
Missing Physical Activity information	202,919	203,113
Missing Medical information	9	203,104
Missing Diet information	9,428	193,676
Missing Sleep information	222	193,454

Table S4: Exclusion criteria and corresponding counts of excluded and retained samples for the LE8.

Exclusion criterion	N. excluded	N. remaining
Starting Cohort	-	502,233
Missing Event Date	328	501,905
Missing Personal information	12,295	489,610
Missing BMI entry	2,522	487,088
Missing Cholesterol entry	27,379	459,709
Missing HDL Cholesterol	39,009	420,700
Missing Glucose entry	486	420,214
Missing HbA1c entry	22,210	398,490
Missing Blood Pressure measures	12,344	386,146
Missing Smoking Status	1,307	384,839
Missing Other Smoking information	44,663	340,176
Missing Smoke Exposure information	37,144	303,032
Missing Physical Activity information	148,279	154,753
Missing Medical information	4	154,749
Missing Diabetes information	232	154,517
Missing Diet information	47,617	106,900
Missing Sleep information	75	106,825

Table S5: Description of a larger initial cohort and corresponding components of the LS7 and LE8 CVH metrics.

Age, years (mean \pm sd)		56.5 \pm 8.1
Gender (N, %)	Female	273,071 (56%)
	Male	228,834 (44%)
Ethnicity (N, %)	White	472,158 (94.6%)
	Asian	11,433 (2.3%)
	Black	8,042 (1.6%)
	Mixed	4,549 (0.9%)
	Other	2,951 (0.6%)
Smoking (N, %)	Never	273,260 (54.8%)
	Previous	172,829 (34.6%)
	Current	52,871 (10.6%)
Body mass index (mean \pm sd)		27.4 \pm 4.8
Cholesterol (mg/dL, mean \pm sd)		102.5 \pm 20.6
Glucose (mg/dL, mean \pm sd)		92.2 \pm 22.3
Diabetes (N, %)	Yes	26,333 (5.3%)
	No	472,969 (94.7%)
Systolic blood pressure (mmHg, mean \pm sd)		137.8 \pm 18.8
Diastolic blood pressure (mmHg, mean \pm sd)		82.2 \pm 10.2
Number of hours of sleep (hours, mean \pm sd)		7.2 \pm 1.1
Follow-up (years, mean \pm sd)		12.7 \pm 3.0

Descriptive statistics were calculated for each variable independently, excluding missing data.

Table S6: Transitions between score categories comparing the CVH metrics not including and including subjectively derived sleep information.

Pair	Start group	End group	Counts
LS7 -LS7 (subjective sleep)	Poor	Intermediate	7,108
	Intermediate	Poor	2,232
	Intermediate	Ideal	0
	Ideal	Intermediate	560
LS7 - LE8*	Poor	Intermediate	5,163
	Intermediate	Poor	7,444
	Intermediate	Ideal	3,190
LE8* - LE8 (subjective sleep)	Ideal	Intermediate	1,300
	Poor	Intermediate	8,596
	Intermediate	Poor	230
	Intermediate	Ideal	0
	Ideal	Intermediate	1,990

LS7: Life's Simple 7; LE8: Life's Essential 8.

* Modified LE8 score that does not include sleep.

S5.1 Cohort details

Comprehensive details and information regarding this additional cohort are outlined below. Descriptive statistics for the cohort are reported in Table S7, providing a detailed overview of the cohort’s characteristics. Such a cohort included 9,861 incident CVD events with a mean follow-up of 13.0 years (± 2.6 years). Furthermore, Table S8 presents the number of participants and incident events within each score category for the different CVH metrics. Data on the flow transitions between CVH categories are depicted in Figure S1 and summarised in Table S9.

Table S7: Description of the cohort and components of the LS7 and LE8 CVH metrics considering only incident events.

Age, years (mean \pm sd)		55.6 \pm 8.0
Gender (N, %)	Female	45,874 (46%)
	Male	54,720 (54%)
Ethnicity (N, %)	White	98,409 (97.8%)
	Asian	819 (0.8%)
	Black	586 (0.6%)
	Mixed	424 (0.4%)
	Other	356 (0.4%)
Smoking (N, %)	Never	67,471 (67%)
	Previous	29,202 (29%)
	Current	3,921 (4%)
Body mass index (mean \pm sd)		26.6 \pm 4.0
Cholesterol (mg/dL, mean \pm sd)		104.1 \pm 19.3
Glucose (mg/dL, mean \pm sd)		90.6 \pm 17.6
Diabetes (N, %)	Yes	2,729 (3%)
	No	97,865 (97%)
Systolic blood pressure (mmHg, mean \pm sd)		138.0 \pm 18.3
Diastolic blood pressure (mmHg, mean \pm sd)		82.5 \pm 10.0
Number of hours of sleep (hours, mean \pm sd)		7.2 \pm 1.0
Follow-up (years, mean \pm sd)		13.0 \pm 2.6

Table S8: Number of participants (incident events; percentage %) in each score category for the considered CVH metrics.

Type	LS7	LS7 sleep	LE8 no sleep	LE8
Poor	13,099 (1,970; 15)	8,808 (1,426; 16)	15,682 (2,526; 16)	8,092 (1,441; 18)
Intermediate	85,457 (7,733; 9)	90,289 (8,313; 9)	81,030 (7,182; 9)	90,558 (8,344; 9)
Ideal	2,038 (158; 8)	1,497 (122; 8)	3,882 (153; 4)	1,944 (76; 4)

LS7: Life’s Simple 7; LE8: Life’s Essential 8.

S5.2 Statistical analysis

As described in the main article Section 2.5, we used Cox proportional hazards models to evaluate how the different CVH metrics would predict new CVD events (incident events). All models were adjusted for age (years), sex (male, female), race and ethnicity (White, Black, Hispanic, and Chinese-American), education (college or greater, less than college). Results from these analyses are reported in Table S10.

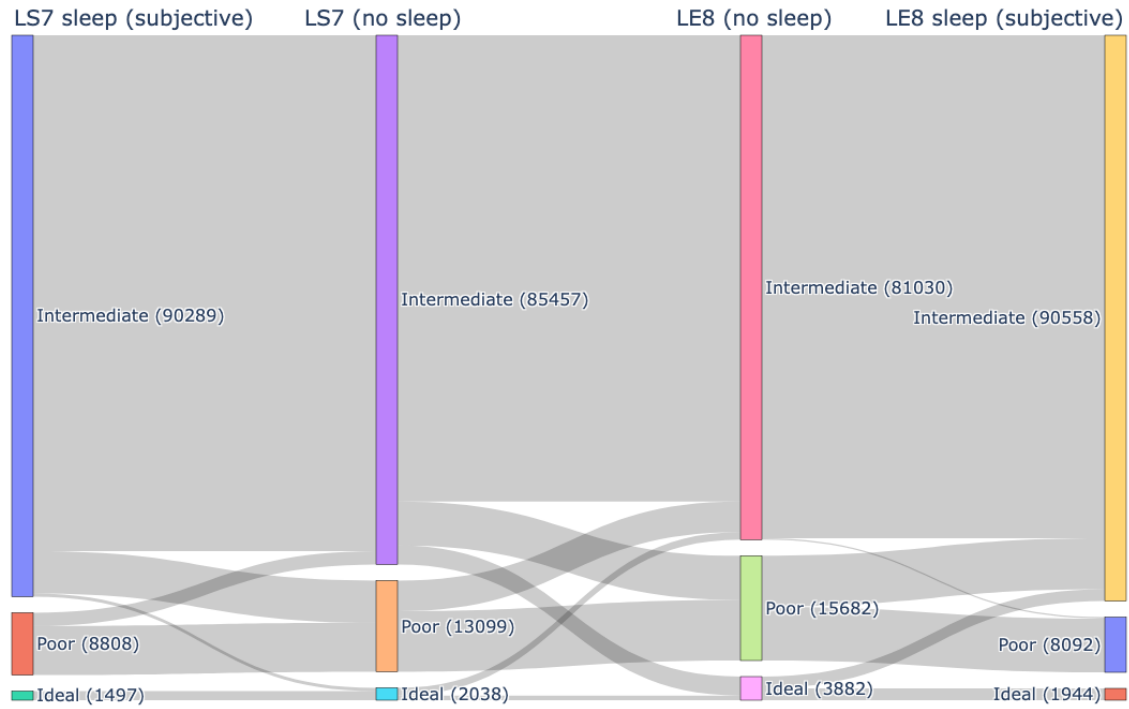


Figure S1: Visual representation of flow transitions between CVH categories for the LS7- and LE8-based metrics on the refined cohort, displaying the relative contributions and connections among categories. For additional information of transition counts see Supplementary Table S9.

Table S9: Transitions between score categories comparing the CVH metrics not including and including subjectively derived sleep information on the refined cohort.

Pair	Start group	End group	Counts
LS7 -LS7 (subjective sleep)	Poor	Intermediate	6,278
	Intermediate	Poor	1,987
	Intermediate	Ideal	0
	Ideal	Intermediate	541
LS7 - LE8*	Poor	Intermediate	4,400
	Intermediate	Poor	6,983
	Intermediate	Ideal	3,113
LE8* - LE8 (subjective sleep)	Ideal	Intermediate	769
	Poor	Intermediate	7,794
	Intermediate	Poor	204
	Intermediate	Ideal	0
	Ideal	Intermediate	1,938

LS7: Life's Simple 7; LE8: Life's Essential 8.

* Modified LE8 score that does not include sleep.

Table S10: Association of LS7 and LE8 scores and their alternative modifications.

Type	LS7 CVD incidence no sleep	LS7 CVD incidence subjective	LE8 CVD incidence no sleep	LE8 CVD incidence subjective
Poor	1.00	1.00	1.00	1.00
Intermediate	0.75 (0.72-0.79)	0.72* (0.68-0.76)	0.69 (0.66-0.72)	0.66* (0.62-0.70)
Ideal	0.66 (0.56-0.78)	0.66 (0.55-0.80)	0.42 (0.36-0.50)	0.40 (0.31-0.50)

incidence: hazard ratio (95% confidence interval).

* significant coefficients with respect to the no-sleep model (p-value < 0.05), using bootstrap resampling with 1,000 iterations to calculate the standard error of this difference (Wald test).

LS7: Life's Simple 7; LE8: Life's Essential 8.

Consistently with the findings presented in Tables 4 and 5 of the main article, the refined cohort analysis also revealed significant associations for Cox proportional hazards models. Individuals in the ideal tertile of LS7-based CVH metrics demonstrated significantly reduced risks of incident CVD by 34% (no sleep: hazard ratio [HR] 0.66; 95% confidence interval [CI]: 0.56–0.78) and 34% (subjective sleep: HR 0.66; 95% CI: 0.55–0.80), respectively. Those in the intermediate tertile showed 25% and 28% reductions in risk, respectively (no sleep: HR 0.75; 95% CI: 0.72–0.79, and subjective sleep: HR 0.72; 95% CI: 0.68–0.76, respectively). For LE8-based scores, individuals in the ideal tertile experienced even greater reductions in incident CVD risk, with a 58% reduction for no sleep (OR 0.42; 95% CI: 0.36–0.50) and 60% for subjective sleep (HR 0.40; 95% CI: 0.31–0.50), respectively. Similarly, participants in the intermediate tertile had significantly lower risks of incident CVD, with reductions of 31% (no sleep: HR 0.69; 95% CI: 0.66–0.72) and 36% (subjective sleep: HR 0.66; 95% CI: 0.62–0.70), respectively.

S6 Sensitivity Analysis on subsets of outcomes

We performed additional sensitivity analyses considering only a subset of events with respects to ones considered in Section S1. In particular, we separately considered myocardial infarction-related and stroke-related outcomes.

S6.1 Myocardial Infarction-related outcomes

The considered myocardial infarction-related events are the following:

- 42000 - Algorithmically-defined outcomes (Myocardial infarction)
- 131298 - First occurrences (Acute myocardial infarction)
- 131300 - First occurrences (Subsequent myocardial infarction)
- 131302 - First occurrences (Complications after myocardial infarction)
- 131304 - First occurrences (Acute ischaemic heart disease)
- 131296 - First Occurrences (Angina Pectoris)

The number of myocardial infarction-related events is provided in Table S11, while the results of the statistical analysis are detailed in Tables S12 and S13.

Table S11: Number of Myocardial Infarction-related events (prevalent/incident) in each score category for CVH metrics

Type	LS7	LS7 sleep	LE8 no sleep	LE8
Poor	1,742/1,502	1,298/1,093	1,474/1,757	907/1,035
Intermediate	2,191/4,475	2,640 /4,907	2,447/4,243	3,028/4,998
Ideal	14/88	9/65	26/65	12/32

LS7: Life's Simple 7; LE8: Life's Essential 8.

Table S12: Association of LS7 score and an alternative LS7 modification that includes subjective sleep. for Myocardial Infarction related outcomes.

Type	CVD prevalence no sleep	CVD incidence no sleep	CVD prevalence subjective	CVD incidence subjective
Poor	1.00	1.00	1.00	1.00
Intermediate	0.29 (0.27-0.31)	0.62 (0.58-0.65)	0.30 (0.28-0.32)	0.59 (0.56-0.63)
Ideal	0.08 (0.05-0.14)	0.54 (0.43-0.67)	0.06 (0.04-0.13)	0.52 (0.40-0.67)

prevalence: odds ratio (95% confidence interval).

incidence: hazard ratio (95% confidence interval).

* significant coefficients with respect to the no-sleep model (p-value < 0.05), using bootstrap resampling with 1,000 iterations to calculate the standard error of this difference (Wald test).

Table S13: Association of LE8 score (including subjective sleep) and an alternative LE8 score that does not include sleep for Myocardial Infarction related outcomes.

Type	CVD prevalence no sleep	CVD incidence no sleep	CVD prevalence subjective	CVD incidence subjective
Poor	1.00	1.00	1.00	1.00
Intermediate	0.49 (0.45-0.52)	0.63 (0.60-0.77)	0.46 (0.43-0.50)	0.59 (0.59-0.64)
Ideal	0.19 (0.13-0.28)	0.30 (0.23-0.38)	0.16 (0.09-0.28)	0.28 (0.19-0.39)

prevalence: odds ratio (95% confidence interval).

incidence: hazard ratio (95% confidence interval).

* significant coefficients with respect to the no-sleep model (p-value < 0.05), using bootstrap resampling with 1,000 iterations to calculate the standard error of this difference (Wald test).

S6.2 Stroke-related outcomes

The selected stroke-related outcomes are:

- 42006 - Algorithmically-defined outcomes (Stroke)
- 131360 - First occurrences (Subarachnoid haemorrhage)
- 131362 - First occurrences (Intracerebral haemorrhage)
- 131366 - First occurrences (Cerebral infarction)
- 131368 - First occurrences (Stroke unspecified)
- 131056 - First Occurrences (Transient Ischaemic Attack)

Table S14 summarises the number of stroke-related events, while the results of the statistical analysis are presented in Tables S15 and S16.

Table S14: Number of stroke-related events (prevalent/incident) in each score category for CVH metrics

Type	LS7	LS7 sleep	LE8 no sleep	LE8
Poor	493/814	359/608	461/970	275/571
Intermediate	1,010/2,888	1,149/3,110	1,037/2,738	1,234/3,168
Ideal	10/60	5/44	15/54	4/23

LS7: Life's Simple 7; LE8: Life's Essential 8.

Table S15: Association of LE8 score (including subjective sleep) and an alternative LE8 score that does not include sleep for stroke-related outcomes.

Type	CVD prevalence no sleep	CVD incidence no sleep	CVD prevalence subjective	CVD incidence subjective
Poor	1.00	1.00	1.00	1.00
Intermediate	0.47 (0.22-0.52)	0.80 (0.74-0.86)	0.48 (0.42-0.54)	0.75 (0.68-0.82)
Ideal	0.19 (0.11-0.37)	0.72 (0.55-0.94)	0.13 (0.06-0.32)	0.68 (0.50-0.93)

prevalence: odds ratio (95% confidence interval).

incidence: hazard ratio (95% confidence interval).

* significant coefficients with respect to the no-sleep model (p-value < 0.05), using bootstrap resampling with 1,000 iterations to calculate the standard error of this difference (Wald test).

Table S16: Association of LE8 score (including subjective sleep) and an alternative LE8 score that does not include sleep for stroke-related outcomes.

Type	CVD prevalence no sleep	CVD incidence no sleep	CVD prevalence subjective	CVD incidence subjective
Poor	1.00	1.00	1.00	1.00
Intermediate	0.61 (0.55-0.69)	0.76 (0.71-0.82)	0.58 (0.51-0.67)	0.71 (0.64-0.77)
Ideal	0.27 (0.16-0.45)	0.45 (0.34-0.60)	0.13 (0.05-0.36)	0.36 (0.24-0.55)

prevalence: odds ratio (95% confidence interval).

incidence: hazard ratio (95% confidence interval).

* significant coefficients with respect to the no-sleep model (p-value < 0.05), using bootstrap resampling with 1,000 iterations to calculate the standard error of this difference (Wald test).

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