SUPPLEMENTARY DATA

METHODS

Study design and participants

Participants were recruited between June 2008 and October 2010 through random stratified cluster sampling to ensure that the sample was representative of the noninstitutionalized adult population in Spain. The sample was first stratified by province and size of municipality. The clusters were randomly selected in 2 stages: municipalities and census sections. Participants in the households within each section were selected proportionally to the age and sex distribution of the Spanish population. All data were collected in 3 sequential stages by trained and certified staff: *a)* a telephone interview to obtain information on sociodemographic factors, lifestyle, health status, and morbidity; *b)* a first home visit to take blood and urine samples; and *c)* a second home visit to collect dietary information through a computerized diet history[1] and to perform a physical examination.

Study variables

Life's Essential 8 metrics

Dietary patterns were assessed through a validated computerized face-to-face diet history (DH-ENRICA), adapted from the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort study in Spain.[2] This tool collects usual food consumption throughout the day in the past year. Diet quality was summarized with the Alternate Healthy Eating Index 2010 (AHEI-2010).[3] Physical activity was assessed with the validated questionnaire used in the EPIC study.[4] Time spent in moderate-to-vigorous physical activity was estimated as the sum of weekly time spent in gardening, do-it-yourself activities, sports (aerobics, swimming, jogging, tennis, etc), and cycling (including cycling to and from work, and during leisure time). Nicotine exposure was assessed through self-reported use of cigarettes, categorized as current-, not daily-, former- and never-smoking. Sleep health was defined from the

reported average hours of sleep per night.[5] BMI was calculated as measured weight in kg divided by squared height in meters. Blood lipids, represented by nonhigh-density lipoprotein (HDL) cholesterol, were calculated by subtracting HDL cholesterol from total cholesterol.[6] Fasting blood glucose (FBG) was assessed by the glucose oxidase method on the ADVIA 2400 Chemistry System (Siemens, Erlange, Germany), and HbA1c by high performance liquid chromatography (ADAMS A1c HA-8160, Arkray, Kyoto, Japan). BP was measured using standardized procedures with validated automatic equipment (model Omron M6).[7] In the analyses, BP was calculated as the mean of at least 3 of the last 5 readings, excluding the first reading to reduce the alarm response to BP determination.

The laboratory measurements were performed centrally at the Center of Biological Diagnosis of Hospital Clinic in Barcelona, following standard methods and appropriate procedures.

Ascertainment of death

Vital status was ascertained through the Spanish National Death Index. The cause of death was determined by a nosologist from the death certificate and classified according to the International Classification of Disease, 10th Revision (ICD-10). CVD deaths were categorized as group l00-I99. Information on the date and cause of death was obtained from an agreement with the National Statistics Office (NSO), and has previously been shown to be complete, accurate, and reliable.[8–10] Follow-up duration was defined as the period between the telephone interview and either the date of death or administrative censoring, whichever occurred first. Administrative censoring was set to 31 January 2022, for all-cause mortality and to 31 December 2020, for CVD mortality. The difference between the censoring dates is due to the fact that the National Death Index provides more updated data than the NSO (which takes about 1-2 years to analyze and make accessible the information on cause of death).

RESULTS

Table 1 of the supplementary data.
American Heart Association's cardiovascular health (CVH) metrics for creating the Life's Essential 8 in the ENRICA cohort

Domain	CVH metric	Method of measurement	Life's Essential 8 score	
Health behaviors	*Diet*	Self-reported daily intake: The Alternate Healthy Eating Index-2010 (AHEI-2010)	Points	Scoring
			0	1st-24th percentile
			25	25th-49th percentile
			50	50th-74th percentile
			80	75th-94th percentile
			100	≥95th percentile
	Physical activity	Self-reported minutes of moderate or vigorous PA per week: EPIC Physical Activity Questionnaire	0	0
			40	1-30
			60	30-60
			80	60-90
			90	90-120
			100	>150
	Nicotine exposure[a]	Self-reported use of cigarettes: telephone interview	0	Current smoker
			25	Not daily smoker
			50	Former smoker
			100	Never smoker
	Sleep health[b]	Self-reported average hours of sleep per night: telephone interview	0	<4
			20	4 ≤ 5
			40	5 ≤ 6 or ≥ 10
			70	6 ≤ 7
			90	9 ≤ 10
			100	7 ≤ 9
Health factors	*Body mass index*	Body weight divided by height squared: Physical exam at second home visit	0	≥ 40.0
			15	35.0-39.9
			30	30.0-34.9
			70	25.0-29.9
			100	<25
	Blood lipids (non-HDL cholesterol)[b]	Plasma total and HDL cholesterol with calculation of non-HDL cholesterol at first home visit	0	≥220
			20	190-219
			40	160-189
			60	130-159

			100	< 130
	Blood glucose[b]	FBG and HbA1 at first home visit	0	Diabetes with HbA1c ≥ 10.0
			10	Diabetes with Hb A1c 9.0-9.9
			20	Diabetes with HbA1c 8.0-8.9
			30	Diabetes with HbA1c 7.0-7.9
			40	Diabetes with HbA1c < 7.0
			60	No diabetes history & FBG 100-125
			100	No diabetes history & FBG <100
	Blood pressure[b]	BP cuff at second home visit	0	≥ 160 or ≥ 100
			25	140-159 or 90-99
			50	130-139 or 80-89
			75	120-129/<80
			100	<120/<80

CVH, cardiovascular health; AHEI, Alternate Healthy Eating Index 2010; PA, physical activity; HDL, high density lipoprotein; FBG, fasting blood glucose.

[a] 20 points subtracted for living with an active indoor smoker at home.

[b] 20 points subtracted if drug-treated.

Table 2 of the supplementary data.

Geographical distribution of the Life's Essential 8 in Spain from 2008 to 2010

	Life's Essential 8 score (%)		
	Low (0-49)	Moderate (50-79)	High (80-100)
Whole country	13.2	70.0	16.8
Navarre	6.1	63.7	30.2
Basque Country	8.8	68.9	22.3
Madrid	11.9	67.6	20.5
La Rioja	10.6	72.3	17.1
Catalonia (Barcelona)	11.3	71.8	16.9
Castile and León	11.3	74.5	14.2
Balearic Islands	12.2	69.9	17.9
Valencian Community	13.4	67.9	18.7
Aragón	13.9	70.2	15.9
Murcia	13.0	71.6	15.4
Cantabria	12.6	72.0	15.4
Extremadura	13.1	72.0	14.9
Castile-La Mancha	12.5	74.3	13.2
Asturias	14.8	71.4	13.8
Canary Islands	15.6	70.2	14.2
Galicia	15.8	71.4	12.8
Andalusia	16.9	67.8	15.3

Life's Essential 8 was categorized in 3 levels (low, 0-49 points; moderate, 50-79 points; high, >80 points) proposed by the American Heart Association.
The data are expressed as percentages (%).

Table 3 of the supplementary data.

Geographical distribution of Life's Essential 8 individual metrics.

	Diet	Physical activity	Body mass index	Nicotine exposure	Sleep	Blood pressure	Blood lipids	Blood glucose
Navarre	50.7	67.9	75.6	62.3	88.7	67.6	62.6	97.0
Basque Country	50.6	57.7	75.6	62.5	85.0	62.3	60.8	96.4
Madrid	43.9	64.0	74.7	59.2	82.6	65.3	60.9	95.1
La Rioja	39.8	59.8	74.7	64.1	84.6	62.2	56.7	95.3
Catalonia (Barcelona)	35.3	67.6	71.9	59.6	82.2	64.4	58.2	94.1
Castile and León	45.8	57.5	70.4	62.4	84.4	61.2	57.2	93.9
Balearic Islands	30.9	69.8	72.5	60.9	82.4	58.0	64.2	93.8
Valencian Community	38.2	60.3	75.0	62.6	82.4	57.5	60.0	94.9
Aragón	45.1	57.2	71.9	61.3	84.4	58.5	56.6	94.9
Murcia	37.5	58.4	73.6	58.4	84.6	63.5	61.4	91.8
Cantabria	45.6	56.0	71.8	59.7	81.8	62.6	51.1	94.7
Extremadura	41.4	59.2	66.8	59.6	85.5	61.7	57.8	92.9
Castile-La Mancha	38.8	56.7	67.9	59.8	84.2	59.7	62.2	93.1
Asturias	50.4	53.0	70.6	63.3	83.0	51.4	54.8	94.7
Canary Islands	29.3	62.4	67.8	64.8	81.9	62.3	58.0	93.3
Galicia	32.2	59.2	67.3	67.4	83.4	60.1	52.4	94.1
Andalusia	37.5	58.1	68.5	58.9	81.7	57.1	60.4	94.1

Data are expressed as means of the score of each metric (0-100).

Table 4 of the supplementary data.

Association of Life's Essential 8 (LE8) score quartiles with all-cause mortality excluding participants with previous cardiovascular disease or cancer

	All-cause mortality		
LE8 score	Death/N	HR (95%CI)	*P*
Q1 (least healthy)	366/2805	1 [Reference]	-
Q2	228/2774	0.70 (0.57 – 0.86)	.001
Q3	136/2918	0.59 (0.47 – 0.75)	< .001
Q4 (healthiest)	58/2761	0.54 (0.38 – 0.76)	< .001

HR, hazard ratio; 95%CI, 95 % confidence interval.
Analyses were adjusted for age (as a continuous variable), sex, social class, and education level.

Table 5 of the supplementary data

Correlation between the Life's Essential 8 (LE8) score from 2008 to 2010 and age- and sex-adjusted all-cause and cardiovascular mortality in 2018 across the 17 autonomous communities in Spain

	All-cause mortality		Cardiovascular mortality	
	LE8, mean[a]	Low LE8 score (0-49 points)[b]	LE8, mean[a]	Low LE8 score (0-49 points)[b]
Pearson	−0.72	0.70	−0.66	0.70
P	< .001	< .001	< .001	< .001

[a] Pearson correlations were calculated between the mean LE8 score (0-100 points) in each autonomous community from 2018 to 2010 estimated with the ENRICA study and the mortality rates of each autonomous community in 2018.
[b] Pearson correlations were calculated between the percentage of people with low cardiovascular health (LE8 score 0-49 points) in each autonomous community from 2018 to 2010 estimated with the ENRICA study and the mortality rates of each autonomous community in 2018.

Figure 1 of the supplementary data. Flowchart of eligible participants in the ENRICA cohort.
CVD, cardiovascular disease

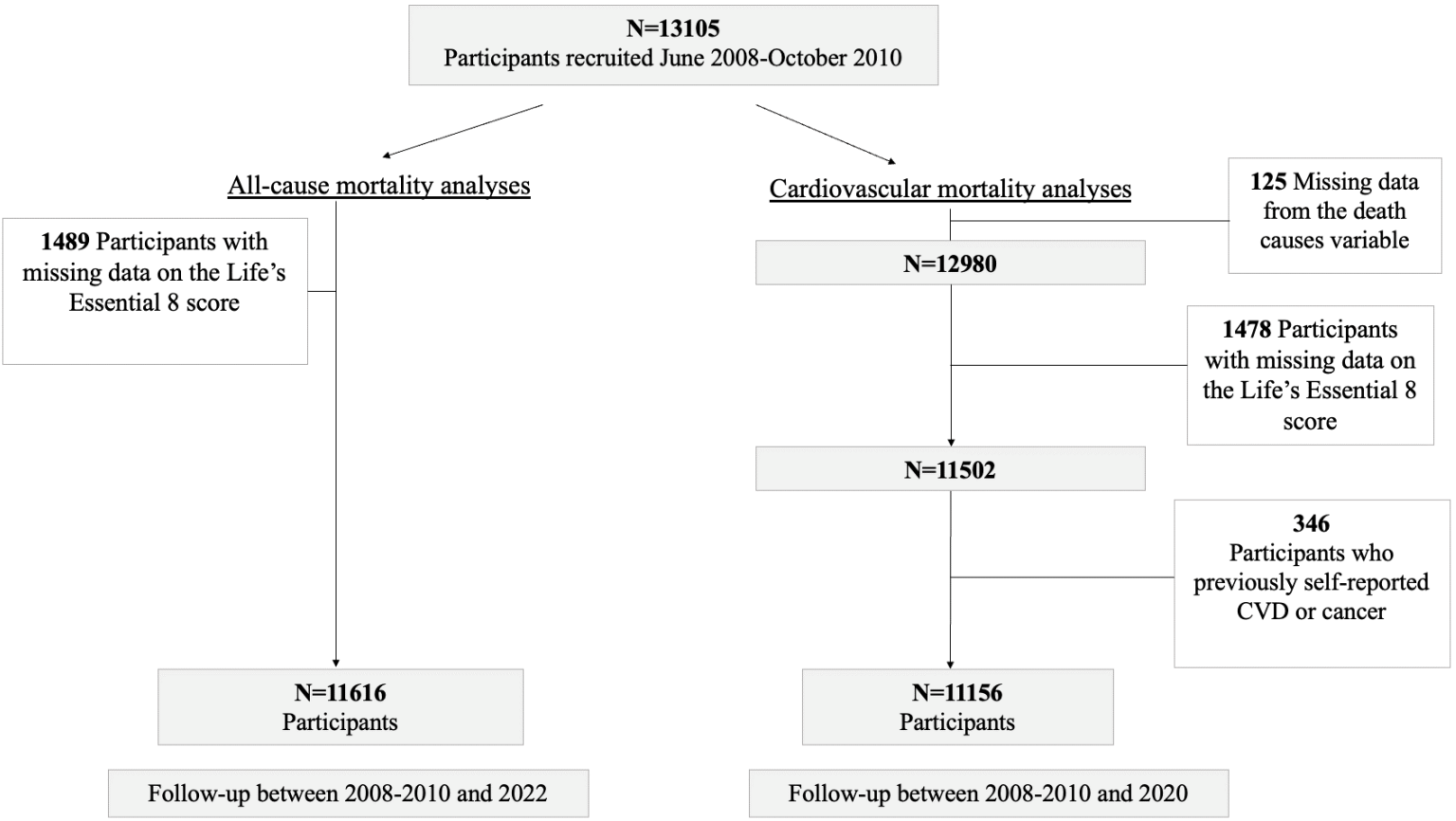


Figure 2 of the supplementary data. Association of each metric of the Life's Essential 8 score with all-cause and cardiovascular mortality. CI, confidence interval.
Hazard ratios for mortality for the highest vs lowest category of each LE8 metric score, adjusted for age, sex, social class, and educational level. The comparison in each metric (based on points) was made as follows: Ahei DIET: 0 vs 80-100; physical activity: 0 vs 100; nicotine: 0 vs 100; sleep: 0-40 vs 100; body mass index: 0-30 vs 100; blood lipids: 0-20 vs 100; blood glucose: 0-60 vs 100; blood pressure: 0-25 vs 100.

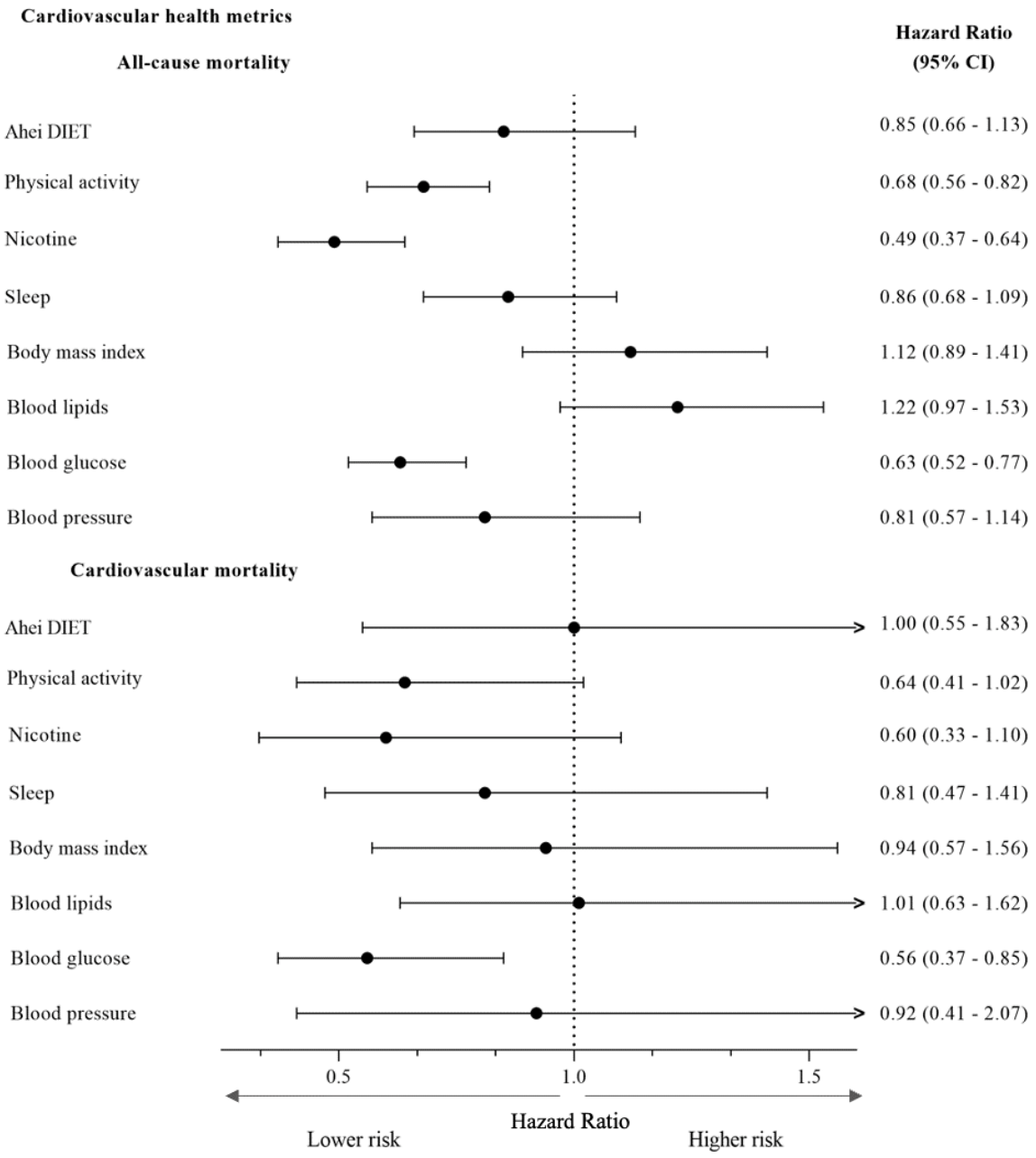
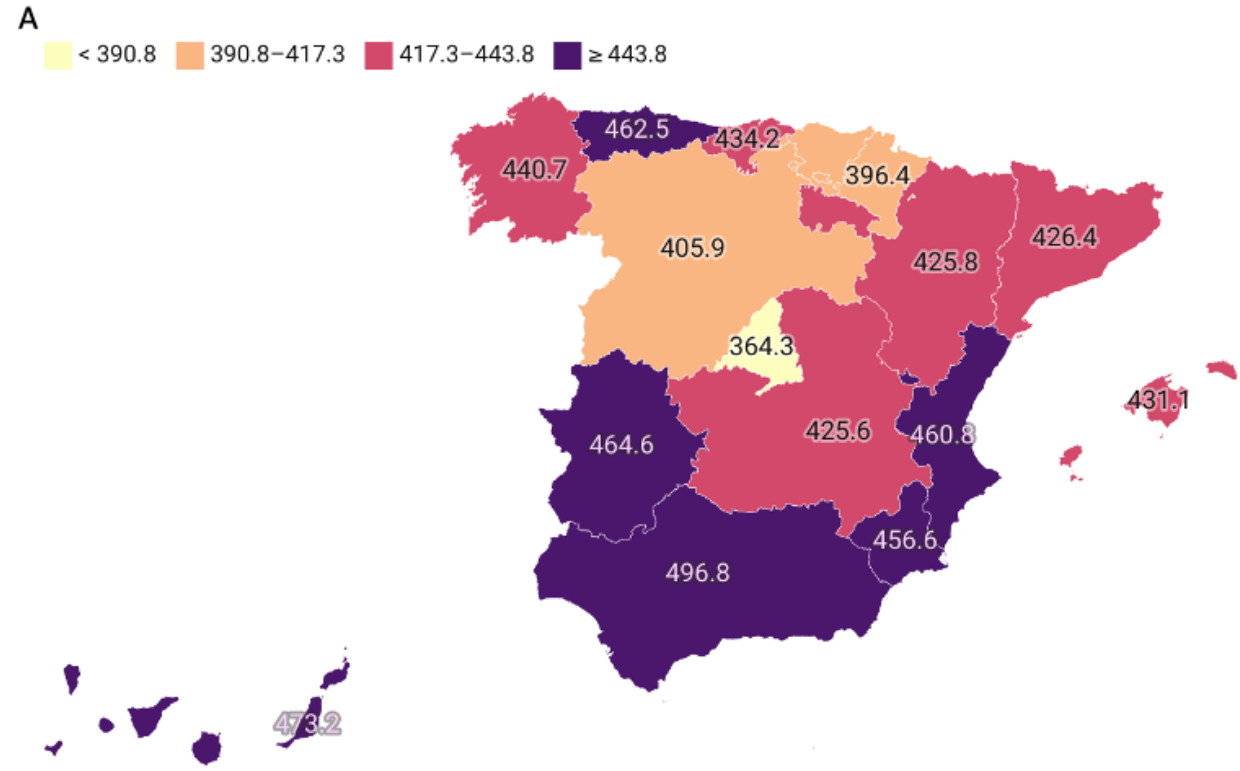
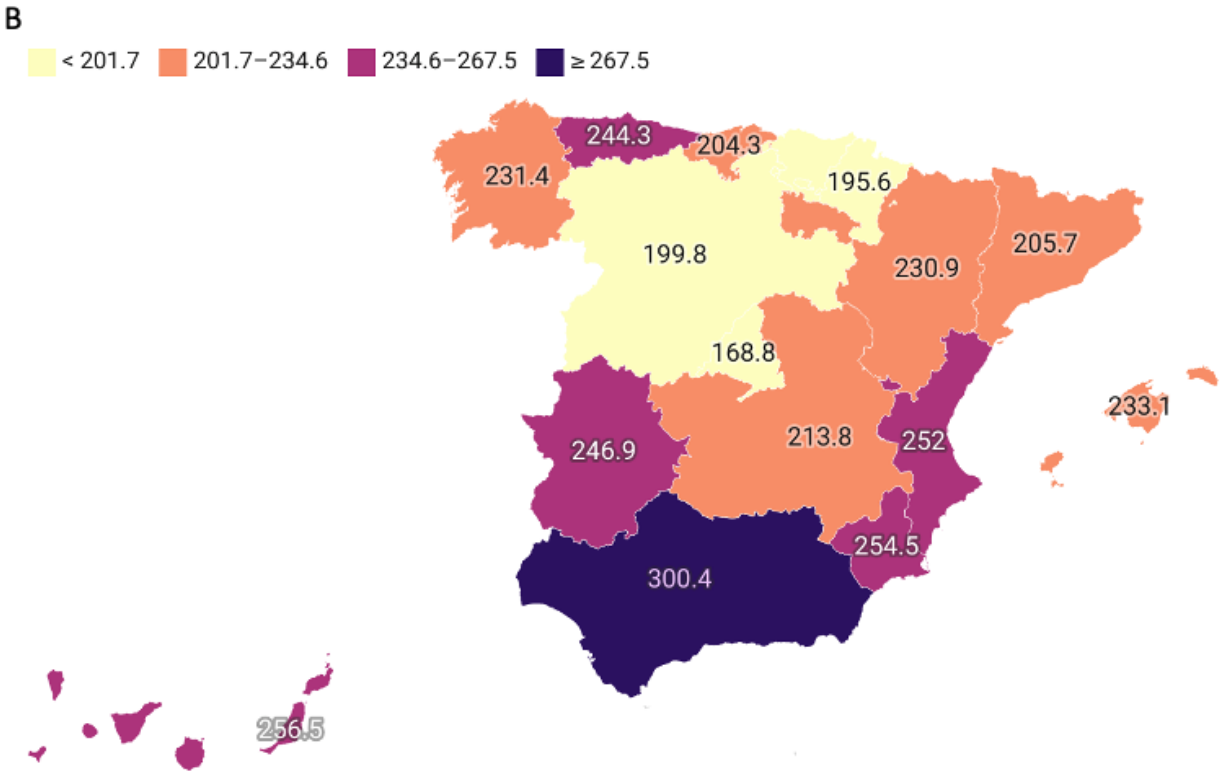


Figure 3 of the supplementary data. Age- and sex-adjusted rates of mortality from all-causes (A) and from cardiovascular causes (B) by autonomous communities in Spain in 2018.

The rates are expressed per 100 000 inhabitants. These data were obtained from the Spanish Ministry of Health and the National Statistics Office.





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