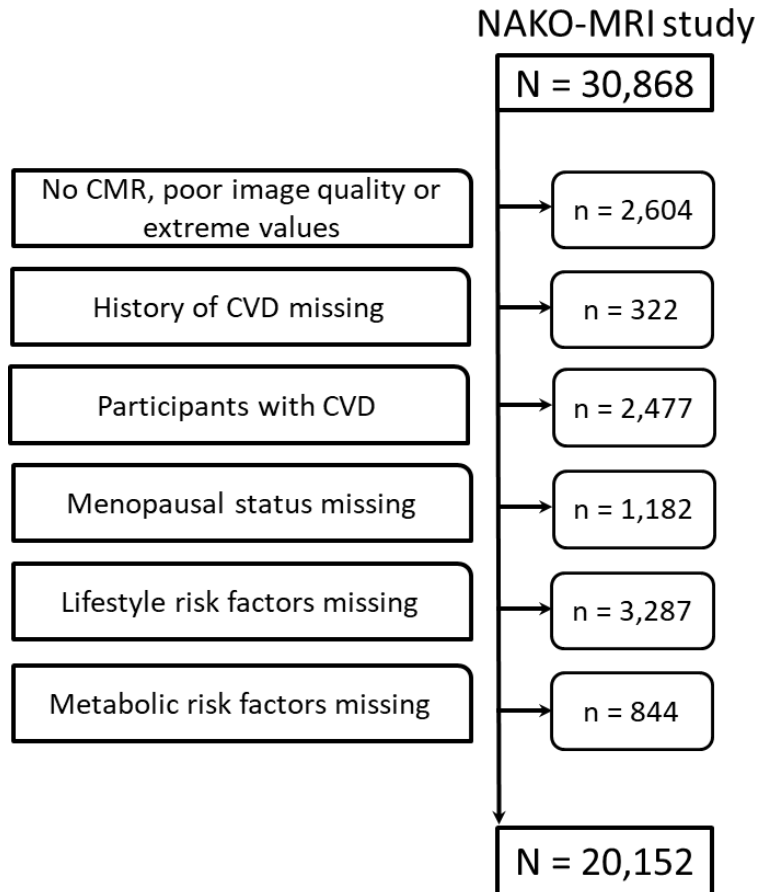


Supplementary Material to

Sex- and age-related cardiac remodelling and its association with risk factors – Results from Cardiovascular Magnetic Resonance Imaging in the German National Cohort (NAKO)

Flis et al.



Supplementary Figure 1. Participant flowchart. CMR, cardiac magnetic resonance; CVD, cardiovascular disease (defined as self-reported physician diagnosis of myocardial infarction, coronary heart disease, heart failure, arrhythmias, and peripheral arterial disease)

Supplementary Table 1. Association of body mass index with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.009	-0.036, 0.018	0.505	-0.090	-0.123, -0.057	<0.001	-0.048	-0.077, -0.019	0.001	-0.087	-0.126, -0.048	<0.001	0.005	0.316	0.206	0.946
LV End-diastolic Volume	0.306	0.283, 0.329	<0.001	0.241	0.214, 0.268	<0.001	0.274	0.245, 0.302	<0.001	0.230	0.193, 0.267	<0.001	0.006	0.236	0.263	0.809
LV End-systolic Volume	0.227	0.203, 0.250	<0.001	0.220	0.192, 0.247	<0.001	0.243	0.214, 0.272	<0.001	0.231	0.194, 0.269	<0.001	0.834	0.809	0.652	0.803
LV Stroke Volume	0.289	0.265, 0.314	<0.001	0.198	0.170, 0.227	<0.001	0.230	0.201, 0.259	<0.001	0.174	0.137, 0.211	<0.001	<0.001	0.109	0.030	0.566
LV Cardiac Output	0.215	0.188, 0.242	<0.001	0.174	0.143, 0.204	<0.001	0.186	0.156, 0.216	<0.001	0.135	0.097, 0.172	<0.001	0.183	0.158	0.381	0.322
RV Ejection Fraction	-0.064	-0.093, -0.036	<0.001	-0.043	-0.077, -0.010	0.011	-0.102	-0.131, -0.074	<0.001	-0.079	-0.115, -0.042	<0.001	0.612	0.584	0.236	0.386
RV End-diastolic Volume	0.284	0.261, 0.307	<0.001	0.207	0.182, 0.233	<0.001	0.280	0.252, 0.308	<0.001	0.232	0.197, 0.267	<0.001	<0.001	0.155	0.921	0.522
RV End-systolic Volume	0.235	0.211, 0.259	<0.001	0.162	0.137, 0.186	<0.001	0.279	0.249, 0.308	<0.001	0.216	0.182, 0.250	<0.001	<0.001	0.056	0.123	0.075
RV Stroke Volume	0.225	0.200, 0.251	<0.001	0.174	0.144, 0.205	<0.001	0.177	0.148, 0.207	<0.001	0.161	0.123, 0.199	<0.001	0.082	0.743	0.100	0.785
RV Cardiac Output	0.170	0.142, 0.197	<0.001	0.156	0.125, 0.187	<0.001	0.146	0.116, 0.177	<0.001	0.126	0.088, 0.165	<0.001	0.751	0.681	0.515	0.500
LV Concentricity Index	0.047	0.031, 0.063	<0.001	0.097	0.072, 0.121	<0.001	0.150	0.127, 0.174	<0.001	0.176	0.139, 0.213	<0.001	0.016	0.501	<0.001	0.008
LV Wall Thickness	0.272	0.254, 0.290	<0.001	0.310	0.284, 0.336	<0.001	0.346	0.324, 0.368	<0.001	0.391	0.359, 0.424	<0.001	0.109	0.123	<0.001	0.003
LV Mass	0.323	0.308, 0.338	<0.001	0.322	0.303, 0.341	<0.001	0.444	0.423, 0.465	<0.001	0.445	0.417, 0.473	<0.001	0.957	0.988	<0.001	<0.001

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 2. Association of systolic blood pressure with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	0.070	0.019, 0.120	0.007	0.100	0.055, 0.144	<0.001	0.161	0.121, 0.202	<0.001	0.165	0.124, 0.206	<0.001	0.630	0.946	0.052	0.152
LV End-diastolic Volume	0.143	0.100, 0.185	<0.001	0.140	0.104, 0.176	<0.001	0.231	0.190, 0.271	<0.001	0.207	0.168, 0.246	<0.001	0.950	0.662	0.037	0.088
LV End-systolic Volume	0.066	0.023, 0.109	0.003	0.052	0.016, 0.089	0.005	0.082	0.041, 0.124	<0.001	0.066	0.026, 0.105	0.001	0.809	0.782	0.793	0.806
LV Stroke Volume	0.164	0.118, 0.209	<0.001	0.169	0.131, 0.207	<0.001	0.282	0.241, 0.324	<0.001	0.259	0.220, 0.299	<0.001	0.926	0.681	0.003	0.020
LV Cardiac Output	0.119	0.068, 0.169	<0.001	0.124	0.083, 0.165	<0.001	0.218	0.176, 0.261	<0.001	0.202	0.162, 0.241	<0.001	0.939	0.783	0.036	0.063
RV Ejection Fraction	0.173	0.120, 0.227	<0.001	0.134	0.090, 0.179	<0.001	0.156	0.116, 0.197	<0.001	0.175	0.137, 0.214	<0.001	0.517	0.746	0.803	0.399
RV End-diastolic Volume	0.089	0.047, 0.132	<0.001	0.065	0.031, 0.100	<0.001	0.174	0.135, 0.214	<0.001	0.113	0.076, 0.151	<0.001	0.640	0.140	0.046	0.230
RV End-systolic Volume	-0.034	-0.079, 0.010	0.130	-0.025	-0.057, 0.007	0.127	0.039	-0.002, 0.080	0.066	-0.022	-0.058, 0.014	0.231	0.858	0.140	0.108	0.944
RV Stroke Volume	0.175	0.128, 0.223	<0.001	0.128	0.088, 0.168	<0.001	0.240	0.199, 0.282	<0.001	0.201	0.161, 0.242	<0.001	0.357	0.428	0.176	0.082
RV Cardiac Output	0.130	0.079, 0.180	<0.001	0.091	0.050, 0.133	<0.001	0.191	0.148, 0.234	<0.001	0.158	0.117, 0.199	<0.001	0.505	0.544	0.240	0.124
LV Concentricity Index	0.105	0.075, 0.135	<0.001	0.040	0.007, 0.072	0.017	0.097	0.064, 0.130	<0.001	0.072	0.032, 0.111	<0.001	0.040	0.602	0.845	0.457
LV Wall Thickness	0.164	0.129, 0.198	<0.001	0.142	0.108, 0.177	<0.001	0.183	0.152, 0.215	<0.001	0.194	0.160, 0.229	<0.001	0.640	0.809	0.666	0.155
LV Mass	0.229	0.201, 0.258	<0.001	0.175	0.149, 0.201	<0.001	0.351	0.322, 0.381	<0.001	0.301	0.271, 0.331	<0.001	0.051	0.108	<0.001	<0.001

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 3. Association of diastolic blood pressure with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.053	-0.098, -0.007	0.023	-0.103	-0.152, -0.054	<0.001	-0.126	-0.162, -0.089	<0.001	-0.194	-0.236, -0.151	<0.001	0.359	0.105	0.090	0.058
LV End-diastolic Volume	-0.181	-0.219, -0.143	<0.001	-0.159	-0.199, -0.119	<0.001	-0.316	-0.353, -0.280	<0.001	-0.237	-0.277, -0.197	<0.001	0.686	0.043	<0.001	0.061
LV End-systolic Volume	-0.102	-0.141, -0.063	<0.001	-0.061	-0.102, -0.021	0.003	-0.169	-0.206, -0.131	<0.001	-0.071	-0.112, -0.030	<0.001	0.385	0.011	0.097	0.853
LV Stroke Volume	-0.195	-0.235, -0.154	<0.001	-0.191	-0.233, -0.149	<0.001	-0.347	-0.384, -0.310	<0.001	-0.299	-0.340, -0.259	<0.001	0.947	0.273	<0.001	0.006
LV Cardiac Output	-0.112	-0.157, -0.066	<0.001	-0.108	-0.153, -0.062	<0.001	-0.249	-0.287, -0.211	<0.001	-0.236	-0.277, -0.195	<0.001	0.946	0.809	<0.001	<0.001
RV Ejection Fraction	-0.053	-0.101, -0.005	0.029	-0.039	-0.088, 0.011	0.128	-0.069	-0.105, -0.032	<0.001	-0.113	-0.153, -0.074	<0.001	0.820	0.301	0.803	0.116
RV End-diastolic Volume	-0.180	-0.218, -0.141	<0.001	-0.119	-0.157, -0.081	<0.001	-0.271	-0.307, -0.236	<0.001	-0.212	-0.251, -0.173	<0.001	0.140	0.135	0.011	0.014
RV End-systolic Volume	-0.097	-0.137, -0.057	<0.001	-0.063	-0.099, -0.027	<0.001	-0.168	-0.205, -0.131	<0.001	-0.089	-0.126, -0.052	<0.001	0.455	0.036	0.077	0.585
RV Stroke Volume	-0.193	-0.236, -0.150	<0.001	-0.129	-0.173, -0.084	<0.001	-0.270	-0.307, -0.233	<0.001	-0.252	-0.293, -0.210	<0.001	0.173	0.751	0.063	0.003
RV Cardiac Output	-0.117	-0.162, -0.071	<0.001	-0.058	-0.104, -0.012	0.014	-0.196	-0.234, -0.158	<0.001	-0.201	-0.244, -0.159	<0.001	0.249	0.926	0.073	<0.001
LV Concentricity Index	0.092	0.065, 0.119	<0.001	0.114	0.077, 0.150	<0.001	0.153	0.124, 0.183	<0.001	0.160	0.119, 0.201	<0.001	0.613	0.896	0.036	0.283
LV Wall Thickness	0.057	0.026, 0.087	<0.001	0.068	0.030, 0.106	<0.001	0.063	0.035, 0.091	<0.001	0.053	0.018, 0.089	0.003	0.810	0.821	0.875	0.785
LV Mass	-0.062	-0.087, -0.036	<0.001	-0.044	-0.072, -0.015	0.003	-0.155	-0.182, -0.129	<0.001	-0.089	-0.120, -0.058	<0.001	0.613	0.022	<0.001	0.148

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 4. Association of low-density lipoprotein with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.008	-0.041, 0.025	0.638	-0.004	-0.039, 0.030	0.803	0.012	-0.013, 0.038	0.339	-0.004	-0.036, 0.028	0.818	0.939	0.686	0.600	0.991
LV End-diastolic Volume	-0.050	-0.077, -0.022	<0.001	-0.044	-0.072, -0.016	0.002	-0.096	-0.121, -0.070	<0.001	-0.075	-0.105, -0.045	<0.001	0.888	0.573	0.101	0.359
LV End-systolic Volume	-0.035	-0.063, -0.007	0.015	-0.028	-0.057, 0.000	0.054	-0.081	-0.107, -0.055	<0.001	-0.052	-0.083, -0.022	<0.001	0.857	0.388	0.112	0.515
LV Stroke Volume	-0.048	-0.078, -0.019	0.001	-0.045	-0.075, -0.015	0.003	-0.083	-0.109, -0.057	<0.001	-0.074	-0.104, -0.044	<0.001	0.939	0.809	0.255	0.418
LV Cardiac Output	-0.023	-0.057, 0.010	0.166	-0.047	-0.079, -0.014	0.005	-0.050	-0.077, -0.024	<0.001	-0.047	-0.077, -0.016	0.003	0.590	0.928	0.456	0.998
RV Ejection Fraction	0.011	-0.024, 0.046	0.533	-0.020	-0.054, 0.015	0.274	0.009	-0.017, 0.034	0.512	-0.021	-0.051, 0.009	0.167	0.466	0.359	0.948	0.971
RV End-diastolic Volume	-0.025	-0.053, 0.003	0.078	-0.053	-0.080, -0.026	<0.001	-0.067	-0.092, -0.042	<0.001	-0.050	-0.079, -0.021	<0.001	0.381	0.630	0.139	0.936
RV End-systolic Volume	-0.026	-0.055, 0.003	0.083	-0.030	-0.055, -0.004	0.022	-0.057	-0.082, -0.031	<0.001	-0.023	-0.050, 0.005	0.107	0.921	0.255	0.322	0.845
RV Stroke Volume	-0.015	-0.046, 0.016	0.330	-0.056	-0.088, -0.025	<0.001	-0.053	-0.079, -0.026	<0.001	-0.058	-0.089, -0.027	<0.001	0.237	0.899	0.244	0.971
RV Cardiac Output	0.000	-0.033, 0.033	0.983	-0.056	-0.088, -0.023	<0.001	-0.029	-0.057, -0.002	0.033	-0.036	-0.067, -0.004	0.028	0.109	0.881	0.417	0.632
LV Concentricity Index	0.012	-0.008, 0.031	0.244	0.027	0.001, 0.052	0.040	0.026	0.005, 0.047	0.017	0.016	-0.014, 0.046	0.301	0.613	0.803	0.602	0.793
LV Wall Thickness	0.009	-0.013, 0.031	0.426	0.010	-0.017, 0.037	0.484	0.001	-0.019, 0.020	0.951	-0.015	-0.041, 0.012	0.278	0.990	0.619	0.785	0.443
LV Mass	-0.034	-0.052, -0.015	<0.001	-0.017	-0.037, 0.004	0.106	-0.071	-0.090, -0.052	<0.001	-0.064	-0.087, -0.041	<0.001	0.466	0.809	0.052	0.033

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 5. Association of triglycerides with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	0.008	-0.039, 0.055	0.739	0.047	-0.005, 0.098	0.076	-0.003	-0.028, 0.022	0.813	0.015	-0.015, 0.046	0.320	0.530	0.613	0.829	0.567
LV End-diastolic Volume	-0.171	-0.211, -0.131	<0.001	-0.120	-0.162, -0.078	<0.001	-0.086	-0.111, -0.061	<0.001	-0.071	-0.100, -0.042	<0.001	0.261	0.697	0.008	0.226
LV End-systolic Volume	-0.127	-0.168, -0.086	<0.001	-0.111	-0.154, -0.069	<0.001	-0.063	-0.089, -0.038	<0.001	-0.062	-0.091, -0.033	<0.001	0.798	0.971	0.075	0.226
LV Stroke Volume	-0.162	-0.204, -0.119	<0.001	-0.097	-0.141, -0.053	<0.001	-0.082	-0.107, -0.056	<0.001	-0.061	-0.090, -0.032	<0.001	0.164	0.546	0.023	0.414
LV Cardiac Output	-0.106	-0.154, -0.058	<0.001	-0.092	-0.140, -0.043	<0.001	-0.048	-0.074, -0.022	<0.001	-0.020	-0.050, 0.009	0.174	0.825	0.405	0.158	0.090
RV Ejection Fraction	0.054	0.004, 0.104	0.035	0.063	0.011, 0.115	0.018	0.001	-0.024, 0.026	0.937	0.008	-0.021, 0.036	0.599	0.901	0.852	0.230	0.236
RV End-diastolic Volume	-0.173	-0.213, -0.132	<0.001	-0.112	-0.152, -0.072	<0.001	-0.064	-0.088, -0.039	<0.001	-0.050	-0.078, -0.022	<0.001	0.155	0.707	<0.001	0.090
RV End-systolic Volume	-0.153	-0.195, -0.112	<0.001	-0.106	-0.144, -0.068	<0.001	-0.050	-0.075, -0.024	<0.001	-0.042	-0.069, -0.016	0.002	0.288	0.830	<0.001	0.060
RV Stroke Volume	-0.127	-0.172, -0.082	<0.001	-0.076	-0.123, -0.029	0.002	-0.054	-0.080, -0.028	<0.001	-0.039	-0.069, -0.009	0.010	0.324	0.707	0.052	0.434
RV Cardiac Output	-0.080	-0.128, -0.033	<0.001	-0.078	-0.126, -0.029	0.002	-0.029	-0.056, -0.003	0.031	-0.007	-0.038, 0.023	0.633	0.968	0.544	0.233	0.100
LV Concentricity Index	0.084	0.056, 0.112	<0.001	0.076	0.038, 0.114	<0.001	0.052	0.031, 0.073	<0.001	0.071	0.041, 0.100	<0.001	0.857	0.572	0.244	0.91
LV Wall Thickness	0.034	0.002, 0.066	0.038	0.009	-0.031, 0.049	0.655	0.025	0.006, 0.045	0.011	0.040	0.015, 0.066	0.002	0.602	0.613	0.809	0.434
LV Mass	-0.065	-0.091, -0.038	<0.001	-0.052	-0.082, -0.022	<0.001	-0.037	-0.055, -0.019	<0.001	-0.011	-0.033, 0.011	0.340	0.758	0.241	0.285	0.146

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 6. Association of haemoglobin A1c with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test (p-value)			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.019	-0.056, 0.018	0.315	-0.008	-0.051, 0.035	0.718	-0.047	-0.078, -0.016	0.003	-0.026	-0.057, 0.006	0.107	0.834	0.613	0.512	0.746
LV End-diastolic Volume	-0.019	-0.050, 0.012	0.237	-0.034	-0.069, 0.001	0.057	-0.041	-0.072, -0.010	0.009	-0.063	-0.093, -0.033	<0.001	0.759	0.572	0.585	0.443
LV End-systolic Volume	-0.002	-0.034, 0.030	0.924	-0.025	-0.061, 0.010	0.162	-0.004	-0.035, 0.027	0.804	-0.036	-0.066, -0.005	0.021	0.593	0.381	0.949	0.814
LV Stroke Volume	-0.027	-0.060, 0.007	0.117	-0.032	-0.068, 0.005	0.088	-0.058	-0.089, -0.027	<0.001	-0.068	-0.098, -0.038	<0.001	0.921	0.809	0.421	0.353
LV Cardiac Output	-0.030	-0.068, 0.007	0.116	-0.014	-0.054, 0.025	0.476	-0.028	-0.060, 0.005	0.092	-0.048	-0.078, -0.018	0.002	0.783	0.619	0.954	0.425
RV Ejection Fraction	-0.071	-0.110, -0.032	<0.001	-0.071	-0.114, -0.028	0.001	-0.013	-0.044, 0.018	0.399	-0.018	-0.047, 0.012	0.237	0.998	0.919	0.123	0.179
RV End-diastolic Volume	-0.007	-0.038, 0.025	0.684	-0.015	-0.048, 0.018	0.377	-0.036	-0.066, -0.006	0.019	-0.052	-0.080, -0.023	<0.001	0.845	0.708	0.422	0.295
RV End-systolic Volume	0.038	0.005, 0.070	0.024	0.023	-0.008, 0.055	0.142	-0.018	-0.049, 0.013	0.249	-0.030	-0.057, -0.003	0.032	0.764	0.785	0.098	0.082
RV Stroke Volume	-0.047	-0.082, -0.012	0.009	-0.046	-0.085, -0.008	0.019	-0.040	-0.072, -0.008	0.013	-0.053	-0.084, -0.022	<0.001	0.996	0.780	0.881	0.888
RV Cardiac Output	-0.049	-0.087, -0.012	0.009	-0.024	-0.064, 0.016	0.236	-0.017	-0.050, 0.016	0.306	-0.034	-0.065, -0.003	0.034	0.619	0.707	0.434	0.839
LV Concentricity Index	0.025	0.003, 0.047	0.029	0.068	0.037, 0.100	<0.001	0.044	0.019, 0.070	<0.001	0.056	0.026, 0.086	<0.001	0.134	0.781	0.505	0.785
LV Wall Thickness	0.025	0.000, 0.051	0.049	0.060	0.027, 0.093	<0.001	0.041	0.017, 0.065	<0.001	0.032	0.006, 0.058	0.017	0.302	0.803	0.632	0.434
LV Mass	0.010	-0.011, 0.031	0.348	0.028	0.003, 0.053	0.027	0.000	-0.022, 0.022	0.993	-0.019	-0.041, 0.004	0.111	0.527	0.510	0.751	0.060

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 7. Association of smoking status: current (compared to never) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.104	-0.175, -0.032	0.004	-0.068	-0.161, 0.024	0.146	-0.103	-0.162, -0.043	<0.001	-0.157	-0.244, -0.070	<0.001	0.780	0.571	0.992	0.399
LV End-diastolic Volume	0.034	-0.026, 0.095	0.262	-0.101	-0.176, -0.026	0.008	-0.084	-0.144, -0.025	0.005	-0.110	-0.191, -0.028	0.009	0.053	0.803	0.055	0.939
LV End-systolic Volume	0.089	0.027, 0.150	0.005	-0.033	-0.109, 0.043	0.396	0.007	-0.054, 0.067	0.829	0.012	-0.071, 0.096	0.768	0.097	0.948	0.228	0.681
LV Stroke Volume	-0.013	-0.077, 0.052	0.697	-0.126	-0.205, -0.047	0.002	-0.13	-0.190, -0.069	<0.001	-0.171	-0.253, -0.089	<0.001	0.140	0.681	0.074	0.687
LV Cardiac Output	-0.027	-0.099, 0.045	0.459	-0.101	-0.187, -0.016	0.021	-0.084	-0.146, -0.021	0.008	-0.110	-0.194, -0.027	0.010	0.433	0.803	0.501	0.939
RV Ejection Fraction	0.002	-0.074, 0.078	0.959	0.009	-0.084, 0.102	0.845	0.013	-0.047, 0.073	0.670	-0.014	-0.095, 0.067	0.731	0.947	0.793	0.910	0.839
RV End-diastolic Volume	0.003	-0.058, 0.064	0.916	-0.120	-0.191, -0.048	0.001	-0.141	-0.199, -0.083	<0.001	-0.238	-0.316, -0.159	<0.001	0.077	0.198	0.014	0.140
RV End-systolic Volume	-0.005	-0.068, 0.058	0.881	-0.089	-0.156, -0.022	0.010	-0.106	-0.166, -0.046	<0.001	-0.174	-0.249, -0.099	<0.001	0.244	0.388	0.123	0.288
RV Stroke Volume	0.010	-0.058, 0.077	0.775	-0.105	-0.189, -0.021	0.014	-0.123	-0.184, -0.062	<0.001	-0.211	-0.296, -0.126	<0.001	0.156	0.288	0.044	0.261
RV Cardiac Output	0.005	-0.067, 0.077	0.891	-0.077	-0.164, 0.009	0.080	-0.077	-0.140, -0.014	0.016	-0.148	-0.234, -0.062	<0.001	0.377	0.428	0.276	0.508
LV Concentricity Index	0.166	0.124, 0.209	<0.001	0.342	0.274, 0.409	<0.001	0.252	0.204, 0.301	<0.001	0.325	0.243, 0.408	<0.001	<0.001	0.353	0.074	0.876
LV Wall Thickness	0.224	0.175, 0.272	<0.001	0.341	0.269, 0.412	<0.001	0.249	0.203, 0.295	<0.001	0.317	0.246, 0.389	<0.001	0.067	0.322	0.700	0.810
LV Mass	0.187	0.147, 0.227	<0.001	0.206	0.153, 0.260	<0.001	0.170	0.127, 0.213	<0.001	0.188	0.125, 0.250	<0.001	0.782	0.809	0.782	0.810

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 8. Association of smoking status: former (compared to never) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.007	-0.070, 0.056	0.831	-0.013	-0.086, 0.059	0.718	0.015	-0.040, 0.070	0.590	-0.086	-0.150, -0.021	0.009	0.943	0.109	0.798	0.366
LV End-diastolic Volume	0.049	-0.004, 0.102	0.070	-0.032	-0.091, 0.027	0.290	-0.093	-0.148, -0.039	<0.001	-0.066	-0.127, -0.006	0.032	0.181	0.751	0.005	0.681
LV End-systolic Volume	0.041	-0.013, 0.096	0.134	-0.018	-0.078, 0.042	0.566	-0.078	-0.133, -0.022	0.006	0.000	-0.062, 0.061	0.994	0.378	0.236	0.033	0.832
LV Stroke Volume	0.042	-0.014, 0.099	0.141	-0.034	-0.097, 0.028	0.276	-0.082	-0.137, -0.026	0.004	-0.098	-0.159, -0.037	0.002	0.244	0.834	0.028	0.378
LV Cardiac Output	0.061	-0.002, 0.124	0.059	-0.023	-0.090, 0.044	0.503	-0.039	-0.096, 0.018	0.178	-0.059	-0.121, 0.002	0.060	0.246	0.809	0.116	0.686
RV Ejection Fraction	-0.027	-0.094, 0.039	0.423	-0.044	-0.117, 0.029	0.239	0.101	0.046, 0.156	<0.001	-0.020	-0.081, 0.040	0.505	0.857	0.038	0.038	0.803
RV End-diastolic Volume	0.003	-0.051, 0.056	0.923	-0.051	-0.108, 0.005	0.074	-0.100	-0.153, -0.047	<0.001	-0.087	-0.145, -0.029	0.003	0.404	0.858	0.065	0.640
RV End-systolic Volume	0.012	-0.043, 0.068	0.664	-0.009	-0.062, 0.044	0.741	-0.141	-0.196, -0.085	<0.001	-0.06	-0.116, -0.005	0.034	0.788	0.176	0.003	0.429
RV Stroke Volume	-0.008	-0.067, 0.052	0.801	-0.073	-0.139, -0.007	0.029	-0.024	-0.080, 0.032	0.404	-0.080	-0.143, -0.018	0.012	0.370	0.424	0.834	0.939
RV Cardiac Output	0.025	-0.038, 0.088	0.433	-0.057	-0.125, 0.011	0.101	0.009	-0.049, 0.067	0.759	-0.046	-0.109, 0.018	0.160	0.261	0.452	0.839	0.903
LV Concentricity Index	-0.002	-0.039, 0.036	0.924	0.047	-0.007, 0.100	0.086	0.106	0.061, 0.151	<0.001	0.079	0.018, 0.140	0.011	0.366	0.728	0.006	0.686
LV Wall Thickness	0.008	-0.034, 0.051	0.698	0.015	-0.041, 0.072	0.592	0.056	0.014, 0.099	0.009	0.032	-0.021, 0.085	0.240	0.922	0.722	0.322	0.824
LV Mass	0.038	0.002, 0.073	0.036	0.013	-0.029, 0.056	0.533	0.007	-0.032, 0.047	0.713	-0.011	-0.057, 0.036	0.652	0.640	0.780	0.515	0.697

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men ≥ 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men ≥ 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 9. Association of smoking status with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients.

Outcome		Women						Men						Wald Test			
		Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
		Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	Former	-0.021	-0.392, 0.350	0.912	-0.068	-0.516, 0.379	0.764	0.173	-0.162, 0.508	0.310	-0.248	-0.652, 0.157	0.230	0.995	0.560	0.835	0.937
	Current	-0.516	-0.974, -0.058	0.027	-0.315	-0.947, 0.318	0.329	-0.412	-0.794, -0.030	0.035	-0.739	-1.323, -0.155	0.013	0.968	0.797	0.986	0.797
LV End-diastolic Volume	Former	0.583	-0.022, 1.188	0.059	0.604	-0.097, 1.305	0.091	-0.493	-1.141, 0.154	0.135	0.435	-0.302, 1.172	0.247	0.999	0.472	0.222	0.986
	Current	0.502	-0.245, 1.249	0.188	0.850	-0.141, 1.841	0.093	-0.137	-0.876, 0.602	0.716	0.519	-0.545, 1.584	0.339	0.947	0.797	0.727	0.982
LV End-systolic Volume	Former	0.237	-0.065, 0.539	0.125	0.239	-0.108, 0.587	0.177	-0.264	-0.586, 0.057	0.107	0.312	-0.053, 0.677	0.094	0.999	0.222	0.234	0.986
	Current	0.479	0.106, 0.852	0.012	0.467	-0.023, 0.958	0.062	0.238	-0.128, 0.605	0.202	0.634	0.107, 1.162	0.018	0.999	0.722	0.797	0.982
LV Stroke Volume	Former	0.347	-0.091, 0.784	0.120	0.365	-0.133, 0.863	0.151	-0.229	-0.675, 0.216	0.313	0.123	-0.378, 0.625	0.630	0.999	0.797	0.478	0.891
	Current	0.023	-0.517, 0.563	0.933	0.382	-0.321, 1.086	0.287	-0.375	-0.883, 0.133	0.147	-0.115	-0.839, 0.609	0.756	0.835	0.937	0.797	0.797
LV Cardiac Output	Former	31.014	-8.452, 70.480	0.123	21.749	-22.176, 65.674	0.332	-10.570	-47.628, 26.487	0.576	10.136	-31.188, 51.459	0.631	0.986	0.843	0.560	0.986
	Current	-21.079	-69.847, 27.689	0.397	16.579	-45.527, 78.685	0.601	-23.680	-65.957, 18.598	0.272	-8.761	-68.659, 51.137	0.774	0.797	0.986	0.999	0.937
RV Ejection Fraction	Former	-0.305	-0.815, 0.206	0.243	-0.44	-1.026, 0.145	0.140	0.454	0.019, 0.890	0.041	0.106	-0.385, 0.598	0.671	0.986	0.797	0.234	0.597
	Current	-0.190	-0.821, 0.441	0.555	-0.314	-1.141, 0.514	0.458	-0.197	-0.693, 0.299	0.437	0.127	-0.582, 0.837	0.725	0.986	0.843	0.999	0.835
RV End-diastolic Volume	Former	0.252	-0.468, 0.972	0.493	0.334	-0.453, 1.121	0.406	-0.432	-1.174, 0.309	0.253	0.303	-0.524, 1.130	0.473	0.995	0.659	0.659	0.999
	Current	0.429	-0.460, 1.317	0.344	0.326	-0.787, 1.438	0.566	-0.579	-1.425, 0.266	0.179	-0.936	-2.131, 0.258	0.125	0.996	0.977	0.557	0.560
RV End-systolic Volume	Former	0.251	-0.200, 0.702	0.276	0.417	-0.031, 0.865	0.068	-0.508	-0.971, -0.045	0.031	0.061	-0.420, 0.542	0.803	0.968	0.531	0.222	0.797
	Current	0.238	-0.318, 0.795	0.401	0.306	-0.326, 0.939	0.342	-0.063	-0.591, 0.464	0.814	-0.485	-1.180, 0.210	0.171	0.995	0.797	0.835	0.531
RV Stroke Volume	Former	0.001	-0.498, 0.500	0.996	-0.083	-0.664, 0.497	0.778	0.076	-0.413, 0.564	0.762	0.242	-0.319, 0.802	0.398	0.986	0.982	0.986	0.835
	Current	0.190	-0.426, 0.806	0.545	0.019	-0.801, 0.839	0.963	-0.516	-1.073, 0.041	0.069	-0.451	-1.261, 0.359	0.275	0.986	0.999	0.531	0.835
RV Cardiac Output	Former	12.181	-29.273, 53.634	0.565	-6.365	-53.496, 40.766	0.791	11.794	-27.761, 51.349	0.559	18.749	-26.144, 63.642	0.413	0.937	0.986	0.999	0.835
	Current	-3.537	-54.760, 47.687	0.892	0.384	-66.255, 67.023	0.991	-29.908	-75.034, 15.218	0.194	-29.966	-95.038, 35.106	0.367	0.999	0.999	0.835	0.917

(continued)

Supplementary Table 9. Continued

Outcome		Women						Men						Wald test			
		Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
		Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Concentricity Index	Former	-0.005	-0.012, 0.001	0.112	-0.007	-0.017, 0.003	0.160	0.003	-0.006, 0.011	0.540	-0.005	-0.017, 0.006	0.369	0.986	0.797	0.560	0.986
	Current	0.018	0.010, 0.026	<0.001	0.028	0.014, 0.042	<0.001	0.021	0.012, 0.031	<0.001	0.028	0.012, 0.045	<0.001	0.675	0.845	0.947	0.999
LV Wall Thickness	Former	-0.010	-0.027, 0.007	0.263	-0.008	-0.032, 0.016	0.492	-0.013	-0.031, 0.005	0.157	-0.010	-0.033, 0.013	0.412	0.999	0.986	0.986	0.999
	Current	0.063	0.042, 0.085	<0.001	0.101	0.067, 0.135	<0.001	0.052	0.031, 0.072	<0.001	0.099	0.066, 0.133	<0.001	0.472	0.222	0.835	0.999
LV Mass	Former	0.119	-0.202, 0.441	0.467	0.214	-0.190, 0.618	0.300	-0.252	-0.627, 0.124	0.190	0.195	-0.258, 0.647	0.399	0.986	0.560	0.560	0.999
	Current	1.226	0.829, 1.623	<0.001	2.055	1.484, 2.626	<0.001	1.099	0.671, 1.528	<0.001	2.144	1.490, 2.798	<0.001	0.222	0.196	0.986	0.986

Results from fully adjusted models with additional adjustment for smoking exposure (pack-years). β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR).^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men ≥ 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men ≥ 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 10. Association of alcohol use (units/day) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	0.018	-0.008, 0.043	0.169	0.011	-0.016, 0.037	0.438	-0.014	-0.028, 0.000	0.054	0.006	-0.008, 0.020	0.395	0.839	0.183	0.146	0.875
LV End-diastolic Volume	0.008	-0.013, 0.030	0.438	0.023	0.001, 0.044	0.042	0.012	-0.002, 0.027	0.092	-0.002	-0.015, 0.011	0.807	0.613	0.381	0.875	0.226
LV End-systolic Volume	-0.004	-0.026, 0.018	0.717	0.010	-0.012, 0.032	0.385	0.017	0.002, 0.031	0.024	-0.004	-0.017, 0.009	0.548	0.632	0.159	0.324	0.547
LV Stroke Volume	0.015	-0.007, 0.038	0.187	0.026	0.003, 0.049	0.024	0.006	-0.008, 0.021	0.410	0.001	-0.013, 0.014	0.938	0.744	0.783	0.745	0.205
LV Cardiac Output	0.033	0.007, 0.058	0.012	0.023	-0.002, 0.048	0.074	0.014	-0.001, 0.029	0.061	0.004	-0.009, 0.017	0.526	0.785	0.588	0.465	0.434
RV Ejection Fraction	0.003	-0.023, 0.030	0.800	0.016	-0.011, 0.043	0.259	-0.009	-0.024, 0.005	0.196	0.008	-0.005, 0.021	0.216	0.759	0.244	0.655	0.803
RV End-diastolic Volume	0.007	-0.015, 0.028	0.549	0.029	0.008, 0.050	0.006	0.010	-0.004, 0.024	0.153	-0.002	-0.015, 0.010	0.728	0.360	0.431	0.885	0.082
RV End-systolic Volume	0.003	-0.019, 0.025	0.778	0.013	-0.006, 0.033	0.190	0.012	-0.002, 0.027	0.095	-0.007	-0.019, 0.005	0.271	0.751	0.182	0.743	0.273
RV Stroke Volume	0.007	-0.016, 0.031	0.543	0.034	0.009, 0.058	0.007	0.004	-0.010, 0.019	0.558	0.003	-0.010, 0.016	0.668	0.349	0.939	0.918	0.143
RV Cardiac Output	0.022	-0.003, 0.047	0.090	0.030	0.004, 0.055	0.022	0.014	-0.001, 0.029	0.070	0.006	-0.008, 0.020	0.386	0.820	0.687	0.797	0.303
LV Concentricity Index	0.003	-0.012, 0.018	0.707	-0.006	-0.026, 0.013	0.526	0.005	-0.006, 0.017	0.374	0.010	-0.003, 0.023	0.130	0.707	0.793	0.898	0.404
LV Wall Thickness	-0.004	-0.021, 0.013	0.647	-0.014	-0.035, 0.007	0.181	0.012	0.001, 0.024	0.028	0.004	-0.007, 0.015	0.486	0.704	0.558	0.318	0.349
LV Mass	0.011	-0.003, 0.026	0.112	0.017	0.001, 0.032	0.036	0.019	0.009, 0.029	<0.001	0.012	0.002, 0.022	0.020	0.803	0.589	0.655	0.793

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men ≥ 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men ≥ 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 11. Association of physical activity (per 10 MET-h/ week) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.001	-0.008, 0.006	0.799	0.005	-0.003, 0.013	0.196	-0.004	-0.010, 0.002	0.243	0.002	-0.004, 0.009	0.503	0.510	0.434	0.782	0.780
LV End-diastolic Volume	0.018	0.012, 0.024	<0.001	0.010	0.004, 0.016	0.002	0.032	0.026, 0.038	<0.001	0.018	0.012, 0.024	<0.001	0.244	0.023	0.023	0.249
LV End-systolic Volume	0.014	0.008, 0.020	<0.001	0.005	-0.002, 0.011	0.145	0.027	0.021, 0.033	<0.001	0.013	0.007, 0.019	<0.001	0.188	0.022	0.036	0.263
LV Stroke Volume	0.017	0.010, 0.023	<0.001	0.011	0.005, 0.018	<0.001	0.028	0.021, 0.034	<0.001	0.018	0.011, 0.024	<0.001	0.508	0.119	0.105	0.424
LV Cardiac Output	0.013	0.006, 0.020	<0.001	0.010	0.003, 0.017	0.008	0.020	0.014, 0.027	<0.001	0.013	0.007, 0.019	<0.001	0.780	0.286	0.353	0.778
RV Ejection Fraction	-0.009	-0.017, -0.001	0.019	-0.006	-0.014, 0.002	0.154	0.002	-0.004, 0.008	0.546	-0.006	-0.012, 0.000	0.057	0.780	0.253	0.138	0.998
RV End-diastolic Volume	0.022	0.015, 0.028	<0.001	0.013	0.006, 0.019	<0.001	0.035	0.029, 0.041	<0.001	0.019	0.014, 0.025	<0.001	0.163	0.005	0.023	0.317
RV End-systolic Volume	0.021	0.014, 0.027	<0.001	0.012	0.007, 0.018	<0.001	0.026	0.020, 0.032	<0.001	0.019	0.013, 0.024	<0.001	0.196	0.284	0.517	0.322
RV Stroke Volume	0.014	0.008, 0.021	<0.001	0.008	0.001, 0.015	0.026	0.031	0.025, 0.037	<0.001	0.013	0.007, 0.019	<0.001	0.443	<0.001	0.006	0.596
RV Cardiac Output	0.012	0.005, 0.019	0.001	0.008	0.000, 0.015	0.043	0.024	0.018, 0.031	<0.001	0.009	0.003, 0.015	0.005	0.687	0.019	0.081	0.877
LV Concentricity Index	0.005	0.001, 0.009	0.020	0.002	-0.003, 0.008	0.412	0.003	-0.002, 0.008	0.255	0.002	-0.004, 0.009	0.432	0.713	0.948	0.751	0.998
LV Wall Thickness	0.012	0.007, 0.017	<0.001	0.008	0.002, 0.014	0.01	0.019	0.014, 0.023	<0.001	0.013	0.007, 0.018	<0.001	0.613	0.269	0.165	0.516
LV Mass	0.020	0.016, 0.024	<0.001	0.012	0.007, 0.016	<0.001	0.035	0.031, 0.039	<0.001	0.022	0.018, 0.027	<0.001	0.074	0.003	<0.001	0.023

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 12. Association of sleep duration shorter than 6.5 h (compared to 6.5-8.5h) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test (p-value)			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.043	-0.150, 0.063	0.426	0.101	-0.037, 0.239	0.153	-0.002	-0.075, 0.072	0.961	0.016	-0.081, 0.114	0.743	0.302	0.877	0.759	0.590
LV End-diastolic Volume	0.046	-0.043, 0.136	0.311	-0.062	-0.175, 0.050	0.277	-0.088	-0.161, -0.014	0.019	0.044	-0.049, 0.136	0.353	0.358	0.140	0.123	0.378
LV End-systolic Volume	0.057	-0.036, 0.149	0.228	-0.097	-0.211, 0.017	0.096	-0.073	-0.148, 0.002	0.057	0.025	-0.069, 0.118	0.608	0.165	0.315	0.148	0.303
LV Stroke Volume	0.028	-0.068, 0.124	0.569	-0.022	-0.140, 0.096	0.709	-0.078	-0.152, -0.003	0.041	0.047	-0.046, 0.140	0.321	0.751	0.165	0.272	0.619
LV Cardiac Output	-0.010	-0.118, 0.098	0.850	-0.054	-0.182, 0.074	0.407	-0.039	-0.116, 0.038	0.319	0.031	-0.063, 0.126	0.515	0.798	0.510	0.820	0.547
RV Ejection Fraction	0.014	-0.099, 0.127	0.807	0.005	-0.134, 0.144	0.940	-0.048	-0.121, 0.026	0.204	-0.104	-0.195, -0.012	0.027	0.954	0.613	0.620	0.434
RV End-diastolic Volume	0.048	-0.043, 0.139	0.301	-0.076	-0.183, 0.031	0.164	-0.070	-0.141, 0.002	0.058	0.053	-0.035, 0.142	0.239	0.261	0.153	0.182	0.236
RV End-systolic Volume	0.024	-0.070, 0.118	0.619	-0.058	-0.159, 0.043	0.258	-0.027	-0.101, 0.047	0.474	0.106	0.021, 0.190	0.015	0.500	0.116	0.656	0.097
RV Stroke Volume	0.054	-0.047, 0.155	0.298	-0.065	-0.191, 0.060	0.310	-0.085	-0.160, -0.009	0.027	-0.017	-0.113, 0.079	0.728	0.373	0.527	0.146	0.778
RV Cardiac Output	0.008	-0.099, 0.115	0.881	-0.084	-0.213, 0.046	0.205	-0.046	-0.123, 0.032	0.246	-0.017	-0.114, 0.080	0.733	0.541	0.809	0.680	0.673
LV Concentricity Index	0.013	-0.051, 0.076	0.699	0.133	0.031, 0.234	0.010	0.097	0.037, 0.157	0.002	0.042	-0.052, 0.135	0.381	0.187	0.592	0.220	0.431
LV Wall Thickness	0.077	0.004, 0.149	0.039	0.161	0.054, 0.268	0.003	0.107	0.050, 0.164	<0.001	0.117	0.036, 0.198	0.005	0.436	0.921	0.751	0.751
LV Mass	0.058	-0.002, 0.118	0.057	0.068	-0.012, 0.149	0.096	-0.004	-0.057, 0.050	0.890	0.093	0.022, 0.163	0.010	0.921	0.148	0.345	0.813

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men ≥ 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men ≥ 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 13. Association of sleep duration longer than 8.5 h (compared to 6.5-8.5h) with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test (p-value)			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value				
LV Ejection Fraction	-0.055	-0.122, 0.012	0.107	-0.082	-0.158, -0.007	0.032	-0.046	-0.111, 0.020	0.172	-0.092	-0.172, -0.012	0.024	0.793	0.630	0.921	0.928
LV End-diastolic Volume	-0.040	-0.097, 0.016	0.164	-0.092	-0.153, -0.031	0.003	-0.059	-0.125, 0.006	0.074	-0.094	-0.169, -0.019	0.014	0.461	0.743	0.813	0.990
LV End-systolic Volume	0.006	-0.052, 0.064	0.844	-0.027	-0.090, 0.035	0.391	-0.024	-0.090, 0.043	0.486	-0.014	-0.091, 0.062	0.712	0.692	0.927	0.751	0.896
LV Stroke Volume	-0.064	-0.124, -0.003	0.040	-0.117	-0.181, -0.053	<0.001	-0.071	-0.137, -0.005	0.036	-0.129	-0.204, -0.053	<0.001	0.488	0.515	0.935	0.909
LV Cardiac Output	-0.053	-0.121, 0.015	0.125	-0.050	-0.120, 0.020	0.160	-0.062	-0.130, 0.007	0.077	-0.111	-0.188, -0.034	0.005	0.972	0.612	0.928	0.506
RV Ejection Fraction	-0.039	-0.110, 0.032	0.281	0.037	-0.039, 0.112	0.344	-0.035	-0.100, 0.031	0.299	0.012	-0.062, 0.087	0.748	0.378	0.613	0.957	0.810
RV End-diastolic Volume	-0.068	-0.126, -0.011	0.020	-0.133	-0.192, -0.075	<0.001	-0.063	-0.127, 0.001	0.053	-0.096	-0.169, -0.024	0.009	0.324	0.743	0.947	0.686
RV End-systolic Volume	-0.022	-0.081, 0.038	0.471	-0.110	-0.165, -0.055	<0.001	-0.032	-0.098, 0.034	0.341	-0.077	-0.146, -0.008	0.029	0.148	0.613	0.909	0.707
RV Stroke Volume	-0.088	-0.151, -0.024	0.007	-0.106	-0.175, -0.038	0.002	-0.070	-0.136, -0.003	0.042	-0.079	-0.157, -0.001	0.046	0.834	0.925	0.834	0.800
RV Cardiac Output	-0.082	-0.149, -0.015	0.017	-0.053	-0.123, 0.018	0.142	-0.070	-0.140, -0.001	0.046	-0.076	-0.155, 0.003	0.059	0.780	0.949	0.903	0.819
LV Concentricity Index	0.015	-0.026, 0.055	0.478	0.051	-0.005, 0.106	0.073	0.061	0.007, 0.114	0.027	0.087	0.011, 0.163	0.025	0.558	0.785	0.411	0.697
LV Wall Thickness	-0.026	-0.072, 0.019	0.259	0.022	-0.037, 0.080	0.463	0.064	0.013, 0.115	0.013	0.015	-0.051, 0.081	0.647	0.436	0.506	0.074	0.939
LV Mass	-0.026	-0.064, 0.012	0.177	-0.045	-0.089, -0.001	0.045	-0.004	-0.051, 0.044	0.873	-0.058	-0.116, -0.000	0.049	0.751	0.381	0.715	0.845

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men \geq 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men \geq 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle

Supplementary Table 14. Association of sleep problems with cardiac parameters, and FDR-adjusted Wald test p-values for differences in regression coefficients

Outcome	Women						Men						Wald test			
	Premenopausal			Postmenopausal			Age<50			Age≥50			p-value ^a	p-value ^b	p-value ^c	p-value ^d
Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value	Beta	95% CI	p-value					
LV Ejection Fraction	-0.039	-0.098, 0.020	0.197	0.003	-0.068, 0.074	0.939	-0.038	-0.092, 0.016	0.171	-0.019	-0.094, 0.056	0.620	0.630	0.830	0.991	0.825
LV End-diastolic Volume	-0.003	-0.053, 0.046	0.897	0.043	-0.015, 0.101	0.143	-0.093	-0.147, -0.040	<0.001	-0.105	-0.175, -0.034	0.004	0.481	0.899	0.099	0.023
LV End-systolic Volume	0.021	-0.030, 0.072	0.414	0.032	-0.027, 0.091	0.287	-0.048	-0.103, 0.007	0.085	-0.071	-0.143, 0.001	0.052	0.888	0.803	0.237	0.140
LV Stroke Volume	-0.020	-0.073, 0.033	0.458	0.041	-0.020, 0.101	0.187	-0.104	-0.158, -0.049	<0.001	-0.104	-0.175, -0.033	0.004	0.358	0.998	0.146	0.031
LV Cardiac Output	0.012	-0.047, 0.072	0.680	0.036	-0.030, 0.102	0.281	-0.086	-0.143, -0.030	0.003	-0.087	-0.159, -0.015	0.018	0.793	0.998	0.107	0.090
RV Ejection Fraction	0.017	-0.046, 0.079	0.603	0.002	-0.069, 0.074	0.954	-0.042	-0.096, 0.012	0.129	-0.016	-0.086, 0.054	0.652	0.875	0.782	0.392	0.845
RV End-diastolic Volume	-0.020	-0.070, 0.030	0.438	0.016	-0.039, 0.072	0.559	-0.102	-0.155, -0.049	<0.001	-0.086	-0.154, -0.018	0.013	0.602	0.845	0.138	0.116
RV End-systolic Volume	-0.029	-0.081, 0.023	0.272	0.011	-0.041, 0.062	0.688	-0.052	-0.107, 0.002	0.059	-0.055	-0.120, 0.010	0.096	0.544	0.971	0.775	0.325
RV Stroke Volume	-0.004	-0.059, 0.052	0.899	0.016	-0.049, 0.080	0.629	-0.112	-0.167, -0.056	<0.001	-0.084	-0.157, -0.011	0.024	0.810	0.780	0.061	0.176
RV Cardiac Output	0.024	-0.035, 0.083	0.420	0.017	-0.050, 0.083	0.627	-0.098	-0.155, -0.041	<0.001	-0.071	-0.145, 0.003	0.061	0.928	0.782	0.038	0.264
LV Concentricity Index	0.005	-0.031, 0.040	0.802	-0.041	-0.093, 0.011	0.125	0.055	0.011, 0.099	0.015	0.075	0.004, 0.147	0.039	0.381	0.809	0.254	0.075
LV Wall Thickness	0.015	-0.025, 0.055	0.475	-0.011	-0.066, 0.044	0.702	0.049	0.007, 0.090	0.023	0.062	0.000, 0.124	0.050	0.707	0.845	0.505	0.263
LV Mass	-0.004	-0.037, 0.029	0.823	0.007	-0.035, 0.048	0.755	-0.034	-0.073, 0.005	0.086	-0.050	-0.104, 0.004	0.071	0.834	0.809	0.500	0.301

Results from fully adjusted models. β coefficients are reported per 1-SD increase in continuous exposures, with outcomes standardized. P-values were obtained from Wald tests and adjusted using the false discovery rate (FDR). ^aPremenopausal women vs Postmenopausal women; ^bMen < 50 years vs Men ≥ 50 years; ^cPremenopausal Women vs Men < 50 years; ^dPostmenopausal women vs Men ≥ 50 years. CI, confidence interval; LV, left ventricle; RV, right ventricle