SUPPLEMENT

Table S1: Unadjusted linear regression models showing associations of LA volume with cardiovascular disease risk factors in 2576 MESA participants

	β (ml)	95%CI	p
Age (per 10 years)	1.1	1.1 to 2.0	<0.05
Male gender	6.4	4.7 to 8.1	<0.0001
Ethnicity (vs. white)			
Chinese American	-12.9	-15.6 to -10.1	<0.0001
African American	1.7	-0.4 to 3.9	0.11
Hispanic	-0.4	-2.7 to 1.8	0.71
Obesity (BMI >30)	8.4	6.6 to 10.2	<0.0001
Systolic blood pressure (per mmHg)	0.09	0.04 to 0.13	<0.0001
Diastolic blood pressure (per mmHg)	-0.1	-0.1 to 0.08	0.82
Hypertension	5.4	3.7 to 7.1	<0.0001
Cigarette smoking (current and former)	3.1	1.3 to 4.8	<0.001
Diabetes	0.8	-1.5 to 3.1	0.49
Total cholesterol (mg/dl)	-0.09	-0.1 to -0.07	<0.0001
HDL (mg/dl)	-0.06	-0.11 to -0.007	<0.05
LDL (mg/dl)	-0.08	-0.1 to -0.05	<0.0001
Triglycerides (mg/dl)	-0.04	-0.06 to -0.03	<0.0001
Total cholesterol/HDL ratio	-1.35	-2.16 to -0.55	<0.01
Coronary heart disease	7.4	2.5 to 12.2	<0.01
Previous myocardial infarction	2.1	-4.9 to 9.2	0.55
Antihypertensive therapy	5.6	3.8 to 7.4	<0.0001
End-diastolic volume (per ml)	0.38	0.36 to 0.4	<0.0001
End-systolic volume (per ml)	0.51	0.46 to 0.55	<0.0001
Ejection fraction (per %)	-0.3	--0.4 to -0.2	<0.01
LV mass (per g)	0.3	0.25 to 0.3	<0.0001
LV hypertrophy*	18.5	15.2 to 21.8	<0.0001

*LV mass index >78 g/m^2 in women and >90 g/m^2 in men

Table S2: Adjusted linear regression models showing associations (β) of LA volume with exposure variables.

	Model 1 (ml)	**Model 2 (ml)**	**Model 3 (ml)**
Age (per year)	0.07	**0.4*** **	**0.4*** **
Male gender	**8.1*** **	**-5.7*** **	**-5.9*** **
Ethnicity (vs. white)			
Chinese American	**-11*** **	**-5.3*** **	**-5.2*** **
Black, African-American	0.2	-1.2	-1.1
Hispanic	-1.3	1.3	1.4
Obesity (BMI ≥ 30)	**7.9*** **	**4.4*** **	**4.3*** **
Smoking (log-transformed pack years)	-0.6	-0.2	-0.2
Hypertension	**3.8*** **	**3.2*** **	1.3
Diabetes	-1.8	-0.6	-0.9
Total cholesterol to HDL ratio (per 1 unit increase)	**-1.8*** **	-0.8#	-0.7
End-diastolic volume (per ml)		**0.4*** **	**0.4*** **
Coronary heart disease			2.9
Antihypertensive therapy			**2.3#**
R-square	0.10	0.36	0.36

- p<0.05, * - p<0.01, ** - p<0.001, *** - p<0.0001

Model 1: age, gender, ethnicity, smoking, hypertension, diabetes, total cholesterol to HDL ratio

Model 2: model 1 + end-diastolic volume index

Model 3: model 2 + history of coronary heart disease and antihypertensive therapy

Table S3: Adjusted linear regression models showing associations (β) of LA volume index with exposure variables (end-diastolic volume index as LV structural parameter). This model extended previous model 3 by education.

	β (ml/m²)
Age (per year)	**0.2*** **
Male gender	**-4.1*** **
Ethnicity (vs. white)	
Chinese American	**-2.8*** **
Black, African-American	-0.9
Hispanic	0.6
Obesity (BMI ≥ 30)	**1.3***
Smoking (log-transformed pack years)	-0.2
Hypertension	0.6
Diabetes	-0.6
Total cholesterol to HDL ratio (per 1 unit increase)	-0.4
End-diastolic volume index (per ml/m²)	**0.4*** **
Coronary heart disease	1.7
Antihypertensive therapy	**1.2#**
Education (vs. no school)	
Grades 1 - 8	1.0
Grades 9 - 11	1.6
Completed High School	0.1
Some College but no degree	-0.6
Technical School Certificate	-0.5
Associate Degree	0.7
Bachelor's Degree	-0.9
Graduate or Professional School	0.1
R-square	0.29

- p<0.05, * - p<0.01, ** - p<0.001, *** - p<0.0001

Table S4: Adjusted linear regression models showing associations (β) of LA volume index with exposure variables (end-systolic volume index as LV structural parameter).

	Model 1 (ml/m^2)	**Model 2b (ml/m^2)**	**Model 3b (ml/m^2)**
Age (per year)	**0.1*** **	**0.2*** **	**0.2*** **
Male gender	-0.4	**-3.4*** **	**-3.5*** **
Ethnicity (vs. white)			
Chinese American	**-3.1*** **	**-1.6#**	**-1.5#**
Black, African-American	-0.4	-0.9	-0.9
Hispanic	1.1	**1.3#**	**1.4#**
Obesity (BMI ≥ 30)	0.3	1.0	0.9
Smoking (log-transformed pack years)	**-0.4#**	-0.3	**-0.3#**
Hypertension	**1.8*** **	**2.0*** **	1.0
Diabetes	**-1.3#**	-1.0	-1.2#
Total cholesterol to HDL ratio (per 1 unit increase)	**-1.2*** **	**-0.9*** **	**-0.8*** **
End-systolic volume index (per ml/m^2)		**0.5*** **	**0.5*** **
Coronary heart disease			1.7
Antihypertensive therapy			1.2
R-square	0.055	0.16	0.16

- p<0.05, * - p<0.01, ** - p<0.001, *** - p<0.0001

Model 1: age, gender, ethnicity, obesity, smoking, hypertension, diabetes, total cholesterol to HDL ratio

Model 2: model 1 + end-systolic volume index

Model 3: model 2 + history of coronary heart disease and antihypertensive therapy

Table S5: Adjusted linear regression models showing associations (β) of LA volume index with exposure variables (end-diastolic LV mass index as LV structural parameter).

	Model 1 (ml/m^2)	**Model 2c (ml/m^2)**	**Model 3c (ml/m^2)**
Age (per year)	**0.1*** **	**0.1*** **	**0.1*** **
Male gender	-0.4	**-5.2*** **	**-5.4*** **
Ethnicity (vs. white)			
Chinese American	**-3.1*** **	**-2.9*** **	**-2.8*** **
Black, African-American	-0.4	**-1.8***	**-1.7***
Hispanic	1.1	0.4	0.5
Obesity (BMI ≥ 30)	0.3	0.1	0.04
Smoking (log-transformed pack years)	**-0.4**$^{\#}$	**-0.4***	**-0.4***
Hypertension	**1.8*** **	0.4	-1.0
Diabetes	**-1.3**$^{\#}$	**-1.4**$^{\#}$	**-1.6***
Total cholesterol to HDL ratio (per 1 unit increase)	**-1.2*** **	**-1.2*** **	**-1.2*** **
End-diastolic LV mass index (per g/m^2)		**0.3*** **	**0.3*** **
Coronary heart disease			1.5
Antihypertensive therapy			**1.7**$^{\#}$
R-square	0.055	0.15	0.15

- p<0.05, * - p<0.01, ** - p<0.001, *** - p<0.0001

Model 1: age, gender, ethnicity, obesity, smoking, hypertension, diabetes, total cholesterol to HDL ratio

Model 2: model 1 + end-diastolic LV mass index

Model 3: model 2 + history of coronary heart disease and antihypertensive therapy

Table S6: Adjusted linear regression models showing associations (β) of LA volume with weight, height, body surface area and body mass index as exposure variables in the reference group of participants without risk factors.

	Model 1 (ml)	**Model 2 (ml)**	**Model 3 (ml)**	**Model 4 (ml)**
Age (per year)	**0.4****	**0.4****	**0.4****	**0.4****
Male gender	**-6.8#**	**-7.7***	**-7.1#**	**-7.2***
Ethnicity (vs. white)				
Chinese American	**-6.2#**	**-5.7#**	**-6.1#**	**-5.9#**
Black, African-American	-3.0	-3.0	-3.0	-3.0
Hispanic	-2.0	-1.7	-2.0	-1.8
End-diastolic volume (per ml)	**0.5*****	**0.4*****	**0.4*****	**0.4*****
Weight (per kg)	-0.1			
Height (per cm)		0.04		
Body surface area (per m^2)			-1.4	
Body mass index (per 1 kg/m^2)				-0.2
R-square	0.32	0.31	0.32	0.32

- p<0.05, * - p<0.01, ** - p<0.001, *** - p<0.0001

Model 1: age, gender, ethnicity, LV end-diastolic volume and weight

Model 2: age, gender, ethnicity, LV end-diastolic volume and height

Model 3: age, gender, ethnicity, LV end-diastolic volume and body surface area

Model 4: age, gender, ethnicity, LV end-diastolic volume and body mass index

Table S7: LA volume index (ml/m^2) in study participants without cardiovascular risk factors and in four ethnicities in MESA: mean and 95% confidence intervals.

	n	Mean	95% CI
All	283	35.5	34.3 to 36.7
Caucasian	164	36.7	35.1 to 38.4
Chinese American	62	31.9	29.8 to 34.0
Black, African-American	26	35.5	31.7 to 39.4
Hispanic	31	36.0	32.2 to 39.7

Table S8: LA volume index (ml/m^2) in study participants without cardiovascular risk factors by age categories: mean and 95% confidence interval.

Age group	n	Mean	95% CI
<60 years	87	34.6	32.8 to 36.3
60-69 years	110	34.7	33.1 to 36.4
70-79 years	65	37.5	34.1 to 40.9
≥80 years	21	37.0	32.6 to 41.3

Figure S1: Left atrial (LA) volume (panel A) and its allometric indices (panel B – to body surface area, panel C - to height, panel D – to height$^{1.7}$) in four ethnicities of MESA. Boxes represent the interquartile range (IQR) and whiskers are within 1.5 *IQR, outliers are plotted as points. The line within the box represents the median.