

Online Table 1. Conventional Echocardiographic Parameters and Speckle Tracking Echocardiographic Parameters at the Year-25 Examination

Variable	n	Mean $\pm$ SD
<b>Conventional Echocardiography</b>		
LV ejection fraction, %	3,023	61.3 $\pm$ 7.2
LV end-diastolic volume, ml	3,024	112.1 $\pm$ 30.2
LV end-diastolic volume/height, ml/m	3,024	65.4 $\pm$ 16.1
LV end-systolic volume, ml	3,023	44.0 $\pm$ 18.1
LV end-systolic volume/height, ml/m	3,023	25.7 $\pm$ 10.0
LV stroke volume, ml	3,023	68.1 $\pm$ 17.1
LV stroke volume /height, ml/m	3,023	39.8 $\pm$ 9.2
Posterior wall thickness, mm	2,937	8.9 $\pm$ 1.7
Interventricular septum thickness, mm	2,939	9.1 $\pm$ 1.7
LV mass, g	2,935	168.1 $\pm$ 52.4
LV mass/height, g/m	2,935	98.4 $\pm$ 29.0
Relative wall thickness	2,931	0.35 $\pm$ 0.07
LV mass/LV end-diastolic volume ratio	2,763	1.56 $\pm$ 0.49
E, cm/s	3,214	78.8 $\pm$ 16.0
A, cm/s	3,214	63.7 $\pm$ 16.5
E/A ratio	3,214	1.30 $\pm$ 0.36
Deceleration time, ms	3,200	178 $\pm$ 39.6
Isovolumic relaxation time, ms	3,226	73.7 $\pm$ 9.3
Left atrium volume, ml	3,226	49.7 $\pm$ 15.9
Left atrium volume/height, ml/m	3,226	29.1 $\pm$ 9.0
e', cm/s	3,202	10.5 $\pm$ 2.3

E/e' ratio	3,178	7.8 ± 2.3
<b>Speckle Tracking Echocardiography</b>		
EII, %	2,855	-15.11 ± 2.43
Ecc, %	2,914	-15.32 ± 2.81
EII_SRs, sec <sup>-1</sup>	2,855	-0.66 ± 0.12
Ecc_SRs, sec <sup>-1</sup>	2,914	-0.69 ± 0.15
EII_SRe, sec <sup>-1</sup>	2,843	0.82 ± 0.25
Ecc_SRe, sec <sup>-1</sup>	2,909	0.80 ± 0.32

---

LV end-diastolic volume, LV end-systolic volume, LV stroke volume, Left atrium volume, and LV mass were indexed to body height (m).

A = late peak diastolic mitral flow velocity; E = early peak diastolic mitral velocity; e' = peak early diastolic mitral annular velocity; E/A = early to late peak diastolic mitral flow velocity ratio; Ecc = circumferential peak systolic strain; Ecc\_SRe = circumferential peak early diastolic strain rate; Ecc\_SRs = circumferential peak systolic strain rate; E/e' = ratio of early peak diastolic mitral velocity/peak early diastolic mitral annular velocity; EII = longitudinal peak systolic strain; EII\_SRe = longitudinal peak early diastolic strain rate; EII\_SRs = longitudinal peak systolic strain rate; LV = left ventricular.

Online Table 2. Cross-Sectional Relationships of BMI to LV Structural and Functional Indices at Year-25

Conventional/STE parameters		Year-25 BMI (kg/m <sup>2</sup> )			
Structural indices	n	r	Unadjusted	partial r <sup>¶</sup>	Multiple
			$\beta$ -coefficients (SE)		regression <sup>‡</sup>
LV end-diastolic volume/height, ml/m	3,024	0.26	0.61 (0.04) <sup>§</sup>	0.28	0.69 (0.04) <sup>§</sup>
LV end-systolic volume/height, ml/m	3,023	0.18	0.27 (0.03) <sup>§</sup>	0.18	0.29 (0.03) <sup>§</sup>
LV stroke volume /height, ml/m	3,023	0.25	0.34 (0.02) <sup>§</sup>	0.28	0.40 (0.03) <sup>§</sup>
LV mass/height, g/m	2,935	0.45	1.90 (0.07) <sup>§</sup>	0.40	1.74 (0.07) <sup>§</sup>
LV mass/ LV end-diastolic volume ratio*	2,763	0.22	2.00 (0.10) <sup>§</sup>	0.14	1.00 (0.20) <sup>§</sup>
Systolic functional indices	n	r	Unadjusted	partial r <sup>¶</sup>	Multiple
			$\beta$ -coefficients (SE)		regression <sup>‡</sup>
LV ejection fraction, %	3,023	-0.03	-0.03 (0.02)	-0.02	-0.03 (0.02)
EII, %	2,855	0.20	0.07 (0.01) <sup>§</sup>	0.08	0.03 (0.01) <sup>§</sup>
Ecc, %	2,914	0.09	0.04 (0.01) <sup>§</sup>	0.04	0.02 (0.01) <sup>†</sup>
Diastolic functional indices	n	r	Unadjusted	partial r <sup>¶</sup>	Multiple
			$\beta$ -coefficients (SE)		regression <sup>‡</sup>
E/A ratio	3,214	-0.22	-0.01 (0.001) <sup>§</sup>	-0.11	-0.01 (0.001) <sup>§</sup>
e', cm/s	3,202	-0.23	-0.08 (0.01) <sup>§</sup>	-0.09	-0.03 (0.01) <sup>§</sup>
E/e' ratio	3,178	0.25	0.08 (0.01) <sup>§</sup>	0.10	0.03 (0.01) <sup>§</sup>
Left atrium volume/height, ml/m	3,226	0.38	0.49 (0.02) <sup>§</sup>	0.36	0.52 (0.02) <sup>§</sup>
EII_SRe, sec <sup>-1</sup>	2,843	-0.10	-0.004 (0.001) <sup>§</sup>	-0.03	-0.001 (0.001)

Ecc_SRe, sec <sup>-1</sup>	2,909	-0.05	-0.002 (0.001)†	-0.02	-0.001 (0.001)
----------------------------	-------	-------	-----------------	-------	----------------

\*LV mass/ LV end-diastolic volume ratio was multiplied by 100.

†p < 0.05; ‡p < 0.01; §p < 0.001

∫Year-25 BMI was adjusted for Year-25 age, sex, race + diabetes, systolic blood pressure, heart rate, total cholesterol, high-density lipoprotein cholesterol, alcohol consumption/day, activity level, use of anti-hypertensive medications, educational level, and number of cigarettes/day.

¶Partial r is the square root of the partial r<sup>2</sup> in the multiple regression models, corresponding to the β-coefficient.

LV end-diastolic volume, LV end-systolic volume, LV stroke volume, Left atrium volume, and LV mass were indexed to body height (m).

BMI = body mass index; e' = peak early diastolic mitral annular velocity; E/A= early to late peak diastolic mitral flow velocity ratio; E/e' = ratio of early peak diastolic mitral velocity/peak early diastolic mitral annular velocity; Ell = longitudinal peak systolic strain; Ecc = circumferential peak systolic strain; Ell\_SRe = longitudinal peak early diastolic strain rate; Ecc\_SRe = circumferential peak early diastolic strain rate; LV = left ventricular; SE = standard error; STE = speckle tracking echocardiography.

Online Table 3. Relationship of Year-0 BMI and Year-25 BMI to Year-25 LV Structural and Functional Indices

Conventional/STE Parameters	Year-0 BMI (kg/m <sup>2</sup> )			Year-25 BMI (kg/m <sup>2</sup> )	
	n	partial r <sup>¶</sup>	β-coefficients (SE)	partial r <sup>¶</sup>	β-coefficients (SE)
<b>Structural indices</b>					
LV end-diastolic volume/height, ml/m	3,024	0.09	0.44 (0.09)§	0.14	0.47 (0.06)§
LV end-systolic volume/height, ml/m	3,023	0.09	0.29 (0.06)§	0.07	0.15 (0.04)§
LV stroke volume /height, ml/m	3,023	0.05	0.15 (0.05)‡	0.17	0.32 (0.03)§
LV mass/height, g/m	2,935	0.12	0.95 (0.15)§	0.23	1.26 (0.10)§
LV mass/ LV end-diastolic volume ratio*	2,763	0.04	1.00 (0.30)	0.08	1.00 (0.20)§
<b>Systolic functional indices</b>	n	partial r <sup>¶</sup>	β-coefficients (SE)	partial r <sup>¶</sup>	β-coefficients (SE)
LV ejection fraction, %	3,023	-0.05	-0.11 (0.04)†	0.02	0.03 (0.03)
Ell, %	2,855	0.0001	0.0001 (0.014)	0.06	0.033 (0.010) ‡
Ecc, %	2,914	0.05	0.04 (0.017)†	-0.004	-0.002 (0.012)
<b>Diastolic functional indices</b>	n	partial r <sup>¶</sup>	β-coefficients (SE)	partial r <sup>¶</sup>	β-coefficients (SE)
E/A ratio	3,214	-0.04	-0.004 (0.002)†	-0.06	-0.004 (0.001)‡
e', cm/s	3,202	-0.03	-0.02 (0.01)	-0.05	-0.02 (0.01)‡
E/e' ratio	3,178	-0.002	-0.002 (0.012)	0.07	0.04 (0.008)§
Left atrium volume/height, ml/m	3,226	0.09	0.25 (0.05)§	0.21	0.39 (0.03)§
Ell_SRe, sec <sup>-1</sup>	2,843	-0.04	-0.003 (0.002)†	0.009	0.001 (0.001)
Ecc_SRe, sec <sup>-1</sup>	2,909	-0.068	-0.007 (0.002)§	0.029	0.002 (0.001)

\* LV mass/ LV end-diastolic volume ratio was multiplied by 100.

†p < 0.05; ‡p < 0.01; §p < 0.001

LV end-diastolic volume, LV end-systolic volume, LV stroke volume, Left atrium volume, and LV mass were indexed to body height (m).

¶Partial  $r$  is the square root of the partial  $r^2$  in the multiple regression models, corresponding to the  $\beta$ -coefficient.

Model: Both Year-0 BMI and Year-25 BMI were included as covariates and were adjusted for baseline age, sex, race + both Year-0 and 25 years change in diabetes, systolic blood pressure, heart rate, total cholesterol, high-density lipoprotein cholesterol, alcohol consumption/day, activity level, use of anti-hypertensive medications, educational level, and number of cigarettes/day.

Abbreviations are the same as in Online Table 2.

Online Table 4. Relationship between change in BMI from young adulthood to middle age and Year-25

LV Structural and Functional Indices

:  $\beta$ -coefficients represent the difference between the group listed and the Low-Low group after adjustment for co-variates structural and functional Indices

<b>Conventional/STE Parameters</b>		High-High (n=338)	Low-High (n=1,068)	High-Low (n=23)
<b>Structural indices</b>	n	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)
LV end-diastolic volume/height, ml/m	3,024	10.61 (1.03)§	5.73 (0.62)§	7.94 (3.06)‡
LV end-systolic volume/height, ml/m	3,023	4.94 (0.67)§	2.12 (0.40)§	3.60 (2.01)
LV stroke volume /height, ml/m	3,023	5.64 (0.60)§	3.59 (0.36)§	4.31 (1.78)†
LV mass/height, g/m	2,935	27.99 (1.76)§	13.95 (1.04)§	26.58 (5.47)§
LV mass/ LV end-diastolic volume ratio*	2,763	20.94 (3.78)§	10.16 (2.19)§	23.44 (11.10)†
<b>Systolic functional indices</b>	n	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)
LV ejection fraction, %	3,023	-0.80 (0.51)	0.06 (0.31)	-0.17 (1.53)
Ell, %	2,855	0.75 (0.166)§	0.45 (0.100)§	-0.01 (0.495)
Ecc, %	2,914	0.32 (0.204)	0.12 (0.122)	0.22 (0.625)
<b>Diastolic functional indices</b>	n	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)	$\beta$ -coefficients (SE)
E/A ratio	3,214	-0.11 (0.022)§	-0.06 (0.014)§	-0.12 (0.069)
e', cm/s	3,202	-0.66 (0.139)§	-0.51 (0.085)§	-1.20 (0.440)‡
E/e' ratio	3,178	0.54 (0.142)§	0.57 (0.088)§	2.13 (0.449)§
Left atrium volume/height, ml/m	3,226	8.29 (0.56)§	4.64 (0.35)§	2.12 (1.78)§
Ell_SRe, sec <sup>-1</sup>	2,843	-0.03 (0.018)	-0.01 (0.011)	-0.08 (0.054)
Ecc_SRe, sec <sup>-1</sup>	2,909	-0.04 (0.024)	-0.005 (0.014)	-0.117 (0.073)

\*LV mass/LV end-diastolic volume ratio was multiplied by 100.

† $p < 0.05$ ; ‡ $p < 0.01$ ; § $p < 0.001$ : vs. Low-Low ( $n = 1,836$ ) as the reference among four BMI groups.

LV end-diastolic volume, LV end-systolic volume, LV stroke volume, Left atrium volume, and LV mass were indexed to body height (m).

High-High = Year-0 BMI  $\geq 30$  and Year-25BMI  $\geq 30$ ; High-Low = Year-0 BMI  $\geq 30$  and Year-25BMI  $< 30$ ; Low-High = Year-0 BMI  $< 30$  and Year-25BMI  $\geq 30$ .

Model: Categorical BMI groups were included as covariates and were adjusted for baseline age, sex, race + both Year-0 and 25 year change in diabetes, systolic blood pressure, heart rate, total-cholesterol, high-density lipoprotein cholesterol, alcohol consumption/day, activity level, use of anti-hypertensive medication, educational level, and number of cigarettes/day.

Abbreviations are the same as in Online Table 2.