

## SUPPLEMENTARY DATA

The association of gestational diabetes mellitus with left ventricular structure and function: the CARDIA study

Duke Appiah, PhD, MPH; Pamela J. Schreiner, PhD; Erica P. Gunderson, PhD, MS, MPH; Suma H. Konety, MD; David R. Jacobs Jr, PhD; Chike C. Nwabuo, MD, MPH; Imo A. Ebong, MD, MS; Hilary K. Whitham, PhD, MPH; David C. Goff Jr, MD, PhD; Joao A. Lima, MD; Ivy A. Ku, MD; Samuel S. Gidding, MD

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**Supplementary Table S1.** Echocardiography measures (unadjusted) among women by gestational diabetes mellitus (GDM) status at year 5

Year 5	Year 25		P value
	GDM (n= 64)	No GDM (n=954)	
	Mean (SD)	Mean (SD)	
Left ventricular structure			
LV mass (g)	119.4 (30.4)	125.4 (33.7)	0.1716
LV mass index (g/m)	68.9 (13.6)	72.6 (15.9)	0.0775
LV mass/ volume ratio	1.0 (0.2)	1.2 (0.2)	0.0155
LV end systolic volume index (ml/m)	23.8 (6.8)	23.0 (6.6)	0.5397
Relative wall thickness	0.32 (0.1)	0.33 (0.1)	0.0571
Left ventricular systolic function			
Stroke Volume (ml)	70.6 (15.4)	70.7 (18.8)	0.9838
Cardiac Output (L/min)	4.7 (1.3)	4.7 (1.5)	0.8773
LV ejection fraction (%)	63.8 (6.9)	63.8 (6.5)	0.9540
Left ventricular Diastolic function			
E/A ratio	0.014 (0.11)	0.002 (0.04)	0.0670

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**Supplementary Table S2.** Adjusted mean difference in measures of LV function assessed at year 25 comparing women with GDM to non-GDM women.

	Model 1		Model 2 *		Model 3	
	$\beta$ (95% CI)	P value	$\beta$ (95% CI)	P value	$\beta$ (95% CI)	P value
Left ventricular systolic function						
Four chamber longitudinal peak strain	0.74 (0.09, 1.39)	0.025	0.68 (0.03, 1.33)	0.041	0.68 (0.01, 1.36)	0.048
Circumferential peak Strain	0.83 (0.09, 1.57)	0.028	0.76 (0.02, 1.51)	0.044	0.71 (-0.05, 1.47)	0.066
Radial peak Strain	0.81 (-2.59, 4.21)	0.640	1.25 (-2.16, 4.67)	0.472	1.54 (-1.96, 5.03)	0.388
Left ventricular Diastolic function						
E/e' ratio	0.29 (-0.20, 0.79)	0.242	0.14 (-0.34, 0.63)	0.559	0.12 (-0.39, 0.63)	0.634
Lateral e-wave prime velocity (cm/sec)	-0.83 (-1.48, -0.18)	0.012	-0.70 (-1.34, -0.06)	0.033	-0.76 (-1.44, -0.09)	0.026
Septal e-wave prime velocity (cm/sec)	-0.69 (-1.25, -0.13)	0.015	-0.59 (-1.15, -0.03)	0.038	-0.62 (-1.20, -0.04)	0.036
Left atrial volume index (ml/m <sup>2</sup> ) †	-1.60 (-3.49, 0.28)	0.095	-1.41 (-3.30, 0.48)	0.1443	-1.44 (-3.40, 0.52)	0.149

Model 1: adjusted for year 25 covariates (age, race, education, center, BMI, physical activity, parity, cigarette smoking, oral contraceptives, marijuana, alcohol intake, family history of CHD, systolic blood pressure and total cholesterol).

Model 2: model 1 plus metabolic syndrome

Model 3: model 1 plus type-2 diabetes

\*The metabolic syndrome was defined using the ATP-III criteria (abdominal obesity; waist circumference >88 cm), elevated blood pressure (systolic blood pressure  $\geq$ 130 mm Hg or diastolic blood pressure  $\geq$ 85 mm Hg or taking antihypertensive medication), low HDL cholesterol (HDL concentrations <50 mg/dL), high triglyceride concentrations ( $\geq$ 150 mg/dL), and high glucose concentrations [fasting glucose concentrations  $\geq$ 110 mg/dL or diagnosed with diabetes (ie, having blood glucose concentrations  $\geq$ 126 mg/dL or reported use of an oral hypoglycemic medication or insulin at examinations)].

† Models with Left atrial volume index to body surface area did not adjust for BMI

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**Supplementary Table S3.** Echocardiography measures (unadjusted) among women by type-2 diabetes status at year 25

	Year 25		P value
	Diabetes (n= 52)	No diabetes (n=557)	
	Mean (SD)	Mean (SD)	
Left ventricular structure			
LV mass (g)	169.1 (58.0)	142.1 (39.4)	0.0033
LV mass index (g/m)	83.9 (24.2)	77.3 (18.8)	0.0261
LV mass/ volume ratio	1.7 (0.7)	1.5 (0.4)	0.0833
LV end systolic volume index (ml/m)	20.5 (7.1)	19.0 (6.7)	0.1639
Relative wall thickness	0.38 (0.1)	0.34 (0.1)	0.0046
Left ventricular systolic function			
Stroke Volume (ml)	65.0 (17.7)	60.6 (13.9)	0.1057
Cardiac Output (L/min)	4.7 (1.1)	4.0 (1.0)	0.0001
LV ejection fraction (%)	60.4 (9.7)	61.8 (6.7)	0.2933
Left ventricular Diastolic function			
E/A ratio	1.19 (0.3)	1.34 (0.4)	0.0107

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**Supplementary Table S4.** Echocardiography measures assessed only at year 25 (unadjusted) among women by type-2 diabetes status

	Year 25		P value
	Diabetes (n= 52)	No Diabetes (n= 557)	
	Mean (SD)	Mean (SD)	
Left ventricular systolic function			
Four chamber longitudinal peak strain	-14.7 (3.0)	-15.8 (2.3)	0.0390
Circumferential peak Strain	-14.7 (2.7)	-15.7 (2.7)	0.0202
Radial peak Strain	35.7 (14.3)	36.6 (11.6)	0.6801
Left ventricular Diastolic function			
E/e' ratio	9.3 (2.4)	7.7 (2.0)	0.0001
Lateral e' wave velocity (cm/sec)	10.7 (3.0)	12.2 (2.7)	0.0003
Septal e' wave velocity (cm/sec)	8.6 (2.3)	9.9 (2.4)	0.0004
Left atrial volume index (ml/m <sup>2</sup> )	24.6 (6.9)	25.0 (7.0)	0.7323

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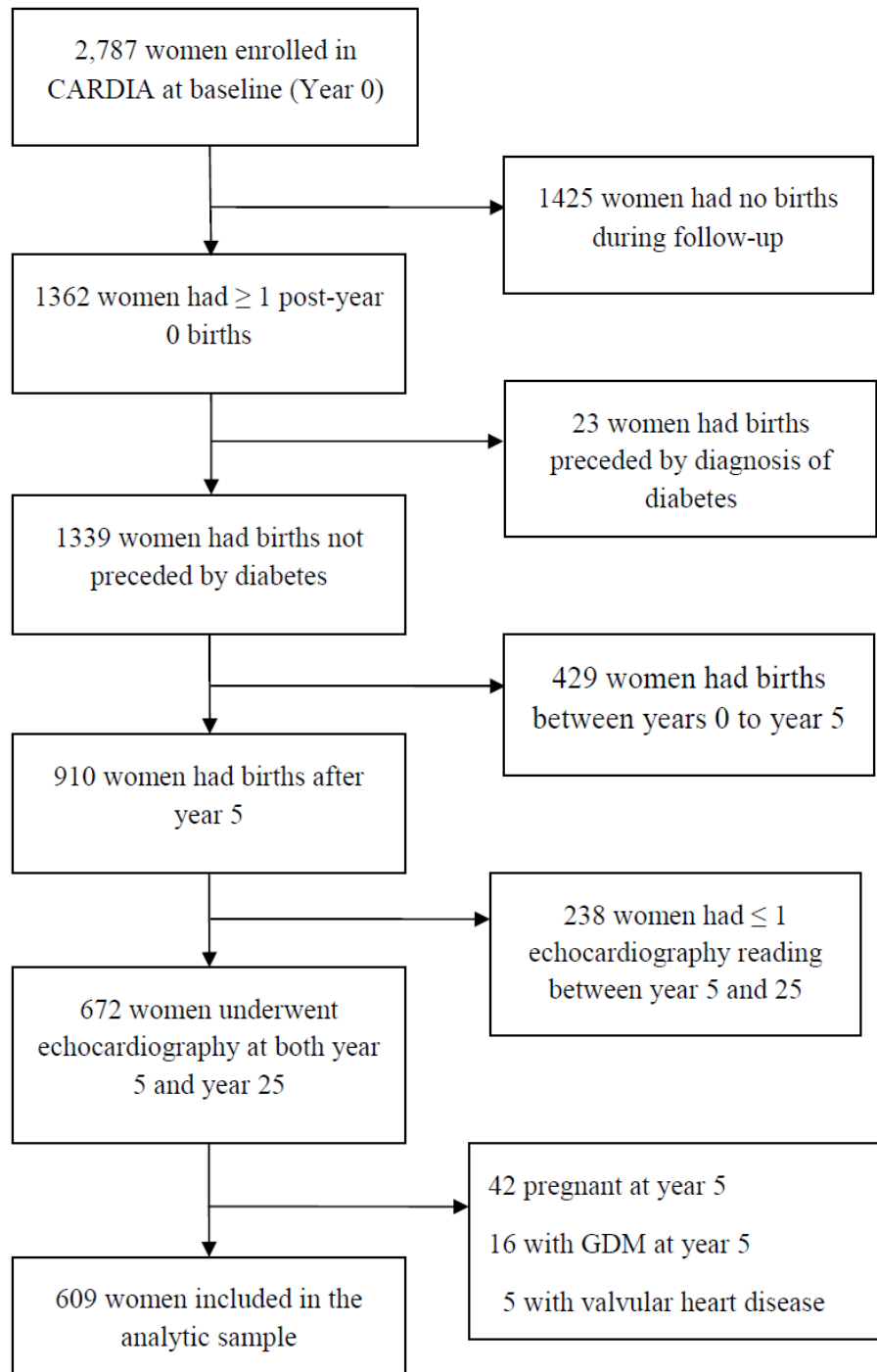
**Supplementary Table S5.** Mean 20-year change in echocardiographic measures of left ventricular structure and function according to gestational diabetes and incident type-2 diabetes status

	Unadjusted					Adjusted				
	No GDM, No T2DM (N=512)	GDM, No T2DM (N=45)	No GDM, T2DM (N=33)	GDM, T2DM (N=19)	P	No GDM, No T2DM (N=512)	GDM, No T2DM (N=45)	No GDM, T2DM (N=33)	GDM, T2DM (N=19)	P
Left ventricular structure										
LV mass (g)	18.2	30.8	30.8	49.5	0.002	18.7	30.7	17.6	44.9	0.018
LV mass index (g/m <sup>2</sup> )	4.6	12.4	9.5	19.3	0.003	5.3	12.5	4.9	16.3	0.032
LV mass/ volume ratio	0.32	0.42	0.32	0.70	0.192	0.30	0.23	0.19	0.67	0.232
LV end-systolic volume index (ml/m <sup>2</sup> )	-4.0	-5.9	-4.2	-1.2	0.604	-7.5	-8.3	-8.2	-6.0	0.932
Relative wall thickness	0.006	0.030	0.049	0.034	0.010	0.007	0.023	0.041	0.040	0.075
Left ventricular systolic function										
Stroke Volume (ml)	-9.3	-5.0	-2.2	-18.7	0.322	-9.1	-3.6	-5.3	-22.5	0.271
Cardiac Output (L/min)	-0.70	-0.29	0.29	-1.10	0.202	-0.72	-0.48	-0.02	-1.48	0.384
LV ejection fraction (%)	-1.8	-2.6	-2.0	-4.7	0.828	-0.66	-3.46	-0.76	-3.16	0.654
Left ventricular Diastolic function										
E/A ratio	1.4	1.3	1.2	1.2	0.048	1.3	1.3	1.3	1.2	0.757

Adjusted for for year 5 covariates (age, race, education, center, BMI, physical activity, parity, cigarette smoking, oral contraceptives, marijuana, alcohol intake, family history of CHD, systolic blood pressure and total cholesterol).and change in weight and systolic blood pressure during follow-u

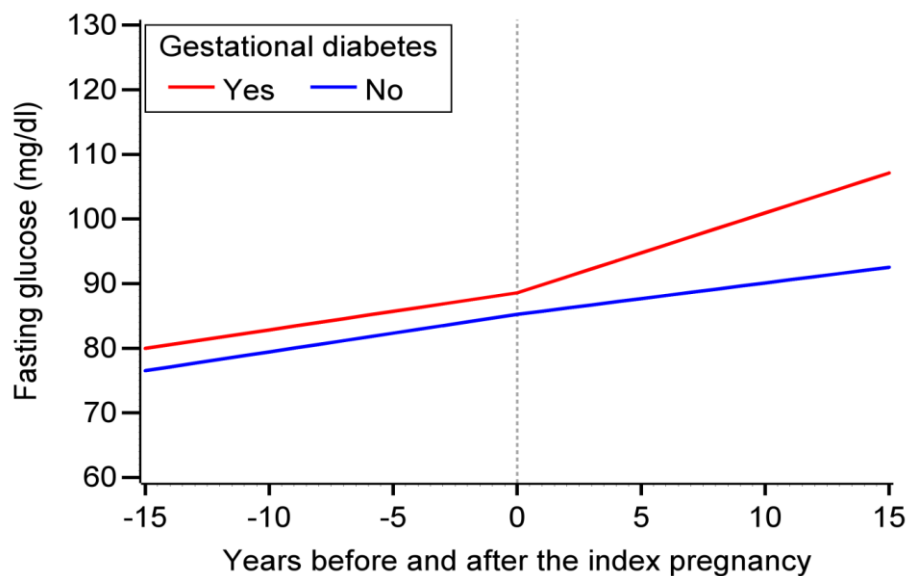
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**Supplementary Figure S1.** Flow chart of study sample selection; CARDIA: Coronary Artery Risk Development in Young Adults study



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**Supplementary Figure S2.** Estimated mean fasting glucose levels before and after the index pregnancy (first GDM or non GDM pregnancy)





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### APPENDIX

#### FIELD CENTERS

University of Alabama at Birmingham: Cora E. Lewis, MD, MSPH

Northwestern University: Donald M. Lloyd-Jones, MD, ScM, Kiang Liu, PhD, Mercedes R. Carnethon, PhD

University of Minnesota: Pamela J. Schreiner, PhD, MS, MS, David R. Jacobs, Jr., PhD  
Kaiser Permanente Stephen Sidney, MD, MPH

#### COORDINATING CENTER

University of Alabama at Birmingham: James M. Shikany, DrPH, Sejong Bae, PhD

#### STEERING COMMITTEE

Colorado School of Public Health: David C. Goff, Jr., MD, PhD

#### READING CENTERS

Johns Hopkins University, School of Medicine Echocardiography Reading Center: Joao A.C. Lima, MD, MBA

#### LABORATORIES

Institute of Molecular Medicine, DNA Laboratory: Myriam Fornage, PhD

Solomon Park Research Laboratories, Central Blood and Urine Repository : Patric A. Clapshaw, PhD

Northwest Lipid Metabolism and Diabetes Research Laboratories: Santica M. Marcovina, PhD, ScD

Molecular Epidemiology and Biomarker Research Laboratory, Blood and Urine Chemistries Laboratory: Myron Gross, PhD, MS