

**SUPPLEMENTAL MATERIAL**

**Supplemental Table 1. General Characteristics of 1,818 Participants enrolled in the echocardiographic ancillary study of The Hispanic Community Health Study / Study of Latinos (ECHO-SOL) by diabetes status.**

Variable	Mean±SD or unweighted N (weighted%)		
	Non-Diabetic	Pre-diabetic	Diabetic
Age, Mean	52.7±0.4	57.3±0.6	58.9±0.5
Male	172 (36.67)	264 (45.44)	192 (44.75)
Hypertension	182 (33.76)	331 (49.94)	343 (67.20)
Renal disease§	331 (59.58)	461 (64.78)	271 (53.84)
Body Mass Index, mean	28.2±0.3	30.5±0.5	31.7±0.3
Body Mass Index ≥ 30 kg/m <sup>2</sup>	170 (32.10)	331 (44.03)	318 (57.94)
Current Alcohol Use	243 (46.94)	350 (46.65)	172 (35.09)
Current Tobacco Use	89 (17.45)	131 (18.72)	81 (15.93)
Health Insurance	276 (54.45)	408 (59.07)	350 (67.88)
Education, Less than high school	154 (27.96)	262 (33.96)	226 (43.14)
Income below 20,000 US Dollars	246 (49.73)	359 (52.45)	291 (62.79)
<b>Hispanic Subgroup Distribution</b>			
Dominican	89 (15.92)	149 (19.93)	88 (18.46)
Central American	52 (5.88)	79 (6.18)	44 (7.07)
Cuban American	114 (28.71)	149 (34.07)	92 (31.31)
Mexican American	148 (25.32)	174 (17.66)	131 (19.26)
Puerto Rican	79 (15.70)	140 (17.37)	124 (18.02)
South American	60 (8.48)	52 (4.80)	38 (5.89)
<b>Echocardiographic Variables</b>			
Left Atrial Volume Index >29 ml/m <sup>2</sup>	104 (17.21)	124 (17.30)	87 (16.60)
Left Atrial Volume Index >34 ml/m <sup>2</sup>	41 (6.6)	39 (6.4)	41 (8.0)
Early diastolic mitral annular velocity (E') < 8 cm/sec	199 (33.63)	371 (53.84)	331(69.54)
E/E' ratio > 10	158 (25.47)	300 (42.70)	285 (54.96)
No LV Diastolic Dysfunction	310 (63.66)	334 (42.87)	154 (28.70)
LV Diastolic Dysfunction, Grade 1	38 (6.60)	110 (17.97)	118 (27.99)
LV Diastolic Dysfunction, Grade 2	165 (26.78)	276 (38.00)	228 (41.82)
LV Diastolic Dysfunction, Grade 3	19 (2.96)	11 (1.17)	11 (1.49)
Ejection Fraction, %	60.1±0.3	60.2±0.3	58.9±0.4
End Systolic Volume, ml	33.7±0.7	33.8±0.4	34.0±0.8
End Diastolic Volume, ml	84.1±1.5	84.2±1.0	81.9±1.4

\*Data are presented as mean  $\pm$  SEM or N (%) using weighted row percentages; N's presented are unweighted counts of total participants in the HCHS-SOL with respective characteristic. It is HCHS/SOL publication policy to present weighted percents but unweighted percents can be calculated based on unweighted Ns presented. The number of participants with missing data for select variables are summarized as follows: renal disease, n=5; BMI, n=1; alcohol use, n=1; cigarette use, n=2; health insurance, n=20; educational status, n=39; income, n=131; LAVI, n=37; (E') < 8 cm/sec, n=10; E/E' ratio > 10 , n=21; diastolic dysfunction, n=32;

**Supplemental Table 2. General Characteristics of 1,818 Participants enrolled in the echocardiographic ancillary study of The Hispanic Community Health Study / Study of Latinos (ECHO-SOL) by controlled diabetes status.**

Variable	Mean±SD or unweighted N (weighted%)	
	Uncontrolled	Controlled
Age, Mean	57.87±0.78	59.73±0.69
Male	95 (45.15)	97 (44.04)
Hypertension	169 (71.40)	177 (63.94)
Renal disease§	120 (53.33)	154 (54.39)
Body Mass Index, mean	31.99±0.48	31.35±0.38
Body Mass Index ≥ kg/m <sup>2</sup>	160 (59.40)	159 (56.42)
Current Alcohol Use	80 (34.90)	94 (35.30)
Current Tobacco Use	44 (19.97)	38 (12.86)
Health Insurance	158 (64.83)	195 (70.18)
Education, Less than high school	110 (44.43)	118 (42.15)
Income below 20,000 US Dollars	149 (60.67)	143 (65.51)
<b>Hispanic Subgroup Distribution</b>		
Dominican	35 (18.37)	53 (18.37)
Central American	22 (9.67)	22 (5.00)
Cuban American	43 (25.86)	49 (35.24)
Mexican American	64 (17.13)	70 (21.25)
Puerto Rican	62 (22.73)	64 (14.59)
South American	18 (6.24)	20 (5.56)
<b>Echocardiographic Variables</b>		
Left Atrial Volume Index >29 ml/m <sup>2</sup>	45 (19.63)	44 (14.54)
Left Atrial Volume Index >34 ml/m <sup>2</sup>	20 (8.6)	22 (7.7)
Early diastolic mitral annular velocity (E') < 8 cm/sec	167 (73.65)	168 (66.44)
E/E' ratio > 10	144 (58.15)	144 (52.58)
No LV Diastolic Dysfunction	61 (23.65)	95 (32.59)
LV Diastolic Dysfunction, Grade 1	69 (34.92)	51 (22.94)
LV Diastolic Dysfunction, Grade 2	102 (39.36)	127 (43.43)
LV Diastolic Dysfunction, Grade 3	7 (2.07)	4 (1.04)
Ejection Fraction, %	58.21±0.62	59.36±0.39
End Systolic Volume, ml	34.43±1.34	33.55±0.96
End Diastolic Volume, ml	81.03±1.87	82.49±2.11

\*Data are presented as mean ± SEM or N (%) using weighted row percentages; N's presented are unweighted counts of total participants in the HCHS-SOL with respective characteristic.

**Supplemental Table 3. General Characteristics of 1,818 Participants enrolled in the echocardiographic ancillary study of The Hispanic Community Health Study / Study of Latinos (ECHO-SOL) by HOMA quintiles.**

Variable	Mean±SD or unweighted N (weighted%)				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Age, Mean	54.54±0.68	55.68±0.71	57.13±0.90	57.29±0.59	56.81±0.58
Male	102 (47.23)	104 (33.97)	144 (41.70)	125 (42.82)	149 (49.36)
Hypertension	98 (35.05)	154 (47.27)	172 (49.74)	192 (52.95)	235 (61.83)
Renal disease§	178 (65.11)	206 (54.86)	239 (64.61)	230 (65.65)	204 (51.80)
Body Mass Index, mean	25.67±0.28	28.41±0.30	30.21±0.74	31.16±0.29	34.20±0.37
Body Mass Index ≥30 kg/m <sup>2</sup>	37 (10.46)	97 (32.10)	176 (44.13)	213 (55.94)	293 (72.41)
Current Alcohol Use	149 (54.01)	159 (41.22)	168 (45.22)	140 (41.76)	144 (37.69)
Current Tobacco Use	67 (22.59)	67 (19.47)	50 (14.02)	56 (16.39)	59 (16.90)
Health Insurance	155 (54.88)	198 (58.13)	237 (65.97)	217 (58.95)	220 (60.66)
Education, Less than high school	100 (36.31)	124 (31.93)	129 (31.48)	134 (37.97)	151 (37.52)
Income below 20,000 US Dollars	136 (50.63)	166 (52.88)	191 (47.48)	195 (63.63)	202 (58.39)
<b>Echocardiographic Variables</b>					
Dominican	59 (19.93)	74 (16.86)	92 (27.96)	62 (17.45)	39 (9.17)
Central American	20 (5.09)	27 (3.85)	33 (4.63)	41 (9.25)	53 (8.87)
Cuban American	50 (28.98)	61 (27.93)	83 (31.51)	68 (32.55)	92 (37.39)
Mexican American	81 (27.22)	103 (27.27)	89 (14.26)	91 (16.69)	87 (18.42)
Puerto Rican	51 (12.54)	56 (18.34)	64 (15.95)	77 (16.05)	90 (20.77)
South American	28 (6.24)	33 (5.76)	32 (5.69)	29 (8.02)	27 (5.39)
<b>Echocardiographic Variables</b>					
Left Atrial Volume Index >29 ml/m <sup>2</sup>	59 (18.67)	71 (20.22)	74 (16.87)	64 (15.97)	47 (14.19)
Left Atrial Volume Index >34 ml/m <sup>2</sup>	21 (5.5)	29 (10.4)	23 (4.8)	25 (6.7)	23 (7.0)
Early diastolic mitral annular velocity (E') < 8 cm/sec	104 (36.34)	146 (40.74)	187 (54.92)	206 (57.91)	255 (68.73)
E/E' ratio > 10	90 (26.42)	134 (37.15)	149 (41.78)	173 (49.34)	193 (48.61)
No LV Diastolic Dysfunction	167 (63.92)	168 (51.72)	183 (42.21)	140 (37.27)	135 (33.33)
LV Diastolic Dysfunction, Grade 1	24 (7.18)	32 (9.32)	53 (18.44)	70 (23.85)	85 (26.81)
LV Diastolic Dysfunction, Grade 2	87 (27.17)	136 (35.90)	142 (38.08)	148 (38.04)	154 (38.00)
LV Diastolic Dysfunction, Grade 3	8 (1.74)	11 (3.06)	6 (1.26)	5 (0.83)	10 (1.87)
Ejection Fraction, %	59.94±0.39	60.71±0.40	59.95±0.36	59.44±0.38	58.89±0.35
End Systolic Volume, ml	33.59±0.87	33.67±0.89	33.81±0.62	33.40±0.73	34.60±0.82
End Diastolic Volume, ml	82.98±1.76	85.30±1.77	83.71±1.27	82.05±1.58	83.64±1.58

\*Data are presented as mean ± SEM or N (%) using weighted row percentages; N's presented are unweighted counts of total participants in the HCHS-SOL with respective characteristic.

**Supplemental Table 4. HbA1C and change in cardiac structure and function adjusted for age, sex, site, smoking status, alcohol use, physical activity level, body mass index and hypertension. Results presented as estimated beta coefficients (SE) or odds ratio (95%CI) as appropriate. From echocardiographic ancillary study of The Hispanic Community Health Study / Study of Latinos (ECHO-SOL).**

<b>Cardiac Structure</b>	<b>p-value</b>	<b>Systolic Function</b>	<b>p-value</b>	<b>Diastolic Function</b>	<b>p-value</b>
<b>LV Mass Index 2.7</b>		<b>End Diastolic Volume, MOD-biplane(ml)</b>		<b>E/e' Lateral Ratio</b>	
0.60 (0.26)	0.02	-1.71 (0.53)	0.002	0.27 (0.07)	0.0002
<b>LV mass (grams/m<sup>2</sup>)</b>		<b>End Systolic Volume, MOD-biplane (ml)</b>		<b>E/e' Septal Ratio</b>	
1.51 (0.52)	0.004	-0.23 (0.35)	0.51	0.43 (0.08)	<0.0001
<b>LV Posterior Wall at diastole (cm)</b>		<b>Ejection Fraction (MOD-biplane)%</b>		<b>LA Volume Index</b>	
0.01 (0.005)	0.005	-0.45 (0.16)	0.01	-0.13 (0.15)	0.37
<b>Inter-ventricular Septal Diameter (cm)</b>		<b>Fractional Shortening (%)</b>		<b>Lateral Peak e' Velocity (cm/s)</b>	
0.02 (0.004)	<0.0001	-0.17 (0.18)	0.36	-0.25 (0.06)	<0.0001
<b>Relative Wall Thickness</b>		<b>Lateral Peak S Velocity (cm/s)</b>		<b>Medial Peak e' Velocity (cm/s)</b>	
0.01 (0.003)	0.0005	-0.08 (0.05)	0.11	-0.22 (0.04)	<0.0001
<b>LV Geometry (Odds Ratios for abnormal vs. normal)</b>		<b>Stroke Volume (LVOT) ml</b>		<b>Diastolic Dysfunction (Odds Ratios for grade I-III vs. normal)</b>	
1.13 (1.0-1.3)	0.03	-1.27 (0.38)	0.0008	1.24 (1.1-1.4)	<0.0001

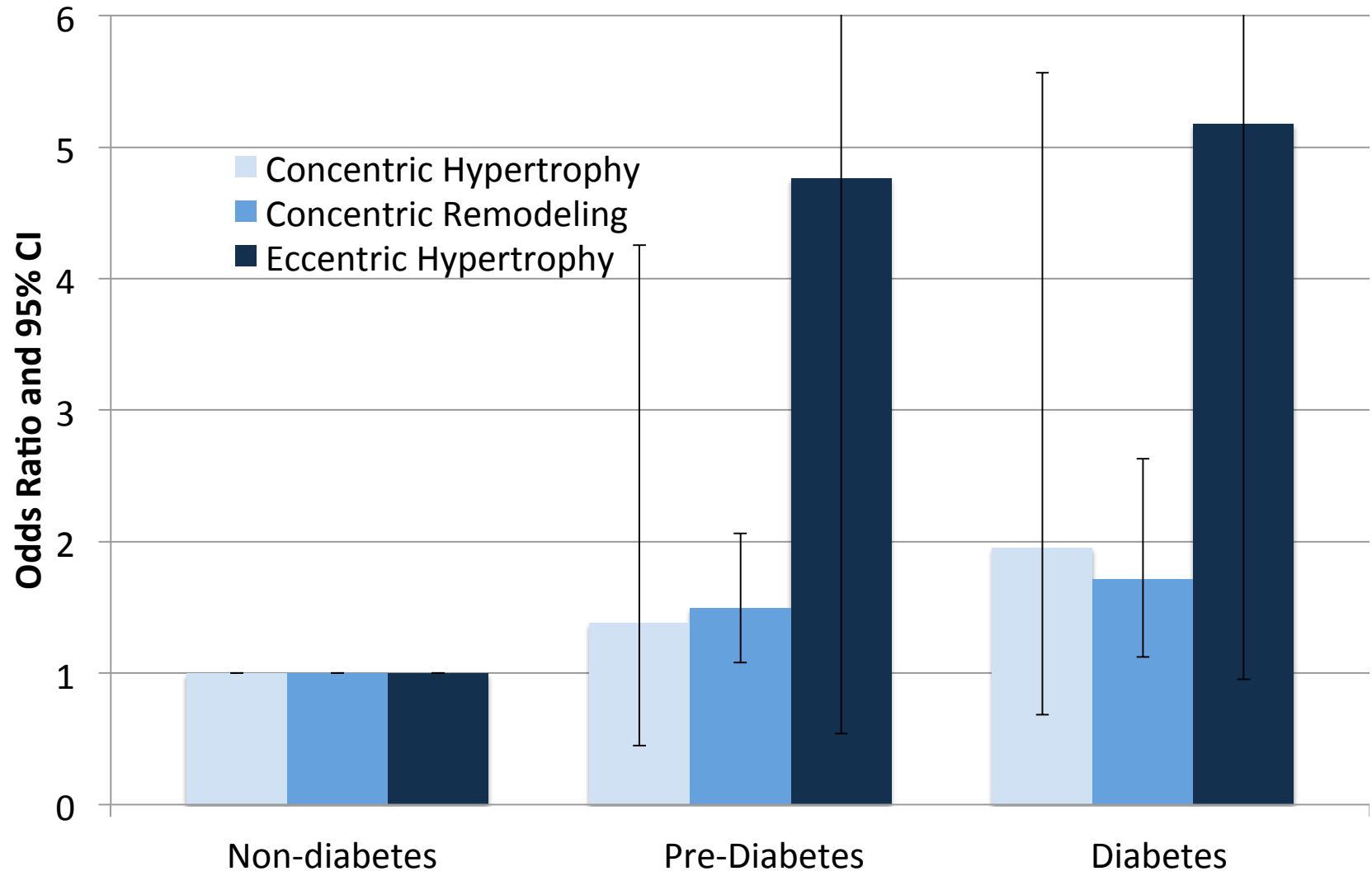
**Supplemental Table 5. Measures of cardiac structure and function according to HOMA-IR quintiles excluding participants with cardiovascular disease and kidney disease, adjusted for age, sex, site, smoking status, alcohol use, physical activity level, body mass index and hypertension. Results presented as mean(SE) or odds ratio(95%CI) as appropriate. From echocardiographic ancillary study of The Hispanic Community Health Study / Study of Latinos (ECHO-SOL).**

Cardiac Structure						Systolic Function						Diastolic Function					
Q1	Q2	Q3	Q4	Q5	P-Value	Q1	Q2	Q3	Q4	Q5	P-Value	Q1	Q2	Q3	Q4	Q5	P-Value
<b>Left Ventricular Mass Index(2.7)</b>						<b>Ejection Fraction (MOD- biplane)%</b>						<b>E/e' Lateral Ratio</b>					
41.45 (1.33)	40.03 (0.72)	39.65 (0.82)	39.31 (0.79)	40.16 (1.03)	0.58	59.63 (0.61)	61.00 (0.52)	59.93 (0.39)	60.60 (0.51)	60.07 (0.52)	0.20	8.67 (0.27)	8.97 (0.18)	8.85 (0.20)	8.51 (0.23)	8.85 (0.44)	0.42
<b>LV mass grams/m<sup>2</sup></b>						<b>Fractional Shortening (%)</b>						<b>E/e' Septal Ratio</b>					
83.56 (0.90) <sup>1,2,3,4</sup>	80.91 (0.47) <sup>3</sup>	79.73 (0.73)	79.36 (0.68)	81.25 (0.91)	0.001	29.25 (0.59) <sup>3</sup>	29.81 (0.63)	29.91 (0.42)	30.86 (0.57)	30.74 (0.70)	0.27	10.63 (0.25) <sup>1,2,4</sup>	11.29 (0.26)	11.49 (0.22)	11.19 (0.24)	11.58 (0.34)	0.09
<b>Left Ventricular Posterior Wall(diastole) Thickness (cm)</b>						<b>Lateral Peak S Vel cm/sec</b>						<b>Left Atrial Volume Index</b>					
0.85 (0.02)	0.85 (0.01)	0.86 (0.02)	0.86 (0.02)	0.88 (0.02)	0.75	7.90 (0.23) <sup>1,2,4</sup>	8.82 (0.25)	8.49 (0.18)	8.49 (0.23)	8.69 (0.21)	0.004	23.46 (0.23) <sup>1,4</sup>	24.63 (0.29) <sup>2,3,4</sup>	23.19 (0.29) <sup>4</sup>	23.24 (0.43) <sup>4</sup>	21.94 (0.36)	<0.0001
<b>Inter-ventricular Septum (diastole) Thickness (cm)</b>						<b>Stroke Volume (LVOT)ml</b>						<b>Lateral Peak e' Vel cm/sec</b>					
1.04 (0.02)	1.06 (0.01)	1.06 (0.02)	1.05 (0.02)	1.07 (0.02)	0.83	76.00 (2.01) <sup>3,4</sup>	73.29 (1.70)	71.98 (1.48)	69.89 (1.81)	68.99 (1.66)	0.06	9.54 (0.21)	9.59 (0.22) <sup>4</sup>	9.39 (0.21)	9.19 (0.21)	8.92 (0.24)	0.32
<b>Relative Wall Thickness</b>						<b>End Diastolic Volume(MOD-biplane) ml</b>						<b>Medial Peak e' Vel cm/sec</b>					
0.36 (0.01) <sup>2,4</sup>	0.38 (0.01)	0.39 (0.01)	0.38 (0.01)	0.40 (0.01)	0.12	88.64 (1.93) <sup>3,4</sup>	90.29 (1.81) <sup>2,3,4</sup>	84.59 (1.53) <sup>4</sup>	82.16 (1.91)	79.00 (1.99)	0.0002	7.56 (0.18) <sup>2,3,4</sup>	7.47 (0.15) <sup>2,3,4</sup>	6.93 (0.12)	6.93 (0.14)	6.64 (0.15)	<0.001
<b>LV Geometry (Odds Ratios for abnormal vs. normal)</b>						<b>End Systolic Volume(MOD-biplane) ml</b>						<b>Diastolic Dysfunction(Odds Ratios for grade I-III vs. normal)</b>					
0.69 (0.3-1.4)	0.66 (0.3-1.3)	0.63 (0.3-1.2)	1.03 (0.6-1.8)	1.00	0.46	36.30 (1.01) <sup>3,4</sup>	35.66 (1.01) <sup>3,4</sup>	34.05 (0.72) <sup>4</sup>	32.54 (0.80)	31.48 (0.81)	0.0006	0.63 (0.3-1.3)	0.98 (0.5-1.9)	1.21 (0.7-2.0)	1.46 (0.9-2.5)	1.00	0.10

- 1: p<0.05 for comparison with HOMA 2.
- 2: p<0.05 for comparison with HOMA 3.
- 3: p<0.05 for comparison with HOMA 4.
- 4: p<0.05 for comparison with HOMA 5.

**SUPPLEMENTAL FIGURE 1:** Relationship between diabetes status (a) or diabetes control (b) and LV geometry. Adjusted for age, sex, site, smoking status, alcohol use, physical activity level, body mass index, hypertension and chronic kidney disease.

**Supplemental Figure 1A**





Supplemental Figure 1B

