

**Table S1—Participant Demographics from Interim Analysis with Indices of O<sub>2</sub> Saturation**

The SaO<sub>2</sub> data used in this analysis was collected 9.3 years ± 1.6 years prior to the ECHO data collection. This sample is slightly different from the sample used for the baseline AHI predicting later ECHO analysis as this cohort is now almost 10 years older. More participants were diagnosed with CVD at baseline (n=46). Also, n=22 were using PAP at the first visit. Thus, the sample size is 474.

<b>Characteristics</b>	<b>Baseline</b>	<b>Echocardiography visit</b>
n	474	474
Age, years	55 (7)	65 (7)
Female, n (%)	233 (49)	233 (49)
Body mass index, kg/m <sup>2</sup>	31.2 (6.6)	31.4 (7.3)
Waist circumference, cm	98 (15)	102 (16)
Apnea-hypopnea index, events/hour <sup>3</sup>	6.0 (8.0)	5.7 (7.8)
0–4.9 events/hour, n (%)	468 (78)	268 (64)
5–14.9 events/hour, n (%)	76 (13)	114 (27)
≥15 events/hour, n (%)	53 (9)	36 (9)
Positive airway pressure users, n (%)	22/496 (4.4)	56 (12)
Mean O <sub>2</sub> Saturation, % <sup>3</sup>	95.4 (1.5)	94.7 (2.1)
Minimum O <sub>2</sub> Saturation, % <sup>3</sup>	85.5 (7.1)	82.9 (9.5)
% Total Sleep Time < 90% O <sub>2</sub> Saturation <sup>3</sup>	1.7 (6.2)	4.2 (11.9)
Systolic blood pressure, mmHg	125 (15)	128 (14)
Diastolic blood pressure, mmHg	78 (9)	74 (10)
Diabetes mellitus <sup>1</sup> , n (%)	30 (6)	70 (15)
Current smoker, n (%)	48 (10)	27 (6)
History of pulmonary disease <sup>2</sup> , n (%)	81 (17)	100 (21)
Anti-hypertension medication use, n (%)	127 (27)	234 (49)
Lipid lowering medication use, n (%)	87 (18)	209 (44)

Values are mean (standard deviation) or n=count (percentage). No participants had cardiovascular disease at baseline.

<sup>1</sup> Self-report or use of anti-glycemic medications

<sup>2</sup> Asthma, obstructive lung disease, or other lung diseases/conditions

<sup>3</sup> PAP users were excluded

**Table S2—Echocardiographic Outcomes Stratified by Baseline Apnea-Hypopnea Index Category - Excluding those with Previous Use of Positive Airway Pressure Therapy (n=108)**

Echocardiographic Outcome	Baseline AHI category			Spearman Partial Correlation* with $\log_{10}(\text{AHI}+1)$	
	AHI <5	AHI 5–14.9	AHI ≥15	rho	P value*
n	420	54	19		
LV mass (corrected), g	145.5 (38.5)	155.9 (45.1)	161.7 (44.8)	0.122	<b>0.007</b>
LV wall thickness, cm	8.9 (1.2)	9.3 (1.3)	9.3 (1.0)	0.142	<b>0.002</b>
LV ejection fraction, %	61.7 (5.2)	59.7 (6.0)	60.0 (4.3)	-0.109	<b>0.017</b>
Left atrial volume, mL	67.0 (21.0)	75.6 (25.6)	67.9 (15.7)	0.061	0.18
Cardiac output, L/min	5.3 (1.2)	5.5 (1.1)	5.4 (0.8)	0.116	<b>0.012</b>
Systemic vascular resistance, dynes x sec/cm <sup>5</sup>	1367 (315)	1322 (307)	1350 (263)	-0.094	<b>0.041</b>
Mitral valve inflow E/A ratio	1.0 (0.3)	1.0 (0.3)	1.0 (0.3)	-0.052	0.25
Lateral mitral annulus E/e' ratio	6.4 (2.1)	6.5 (3.3)	6.6 (1.7)	0.069	0.13
Pulmonary vein systolic/diastolic ratio	1.3 (0.3)	1.3 (0.3)	1.4 (0.5)	0.001	0.99
Right atrial area, cm <sup>2</sup>	17.5 (4.0)	19.0 (4.6)	17.9 (2.7)	0.004	0.93
RV end-diastolic area, cm <sup>2</sup>	19.1 (5.1)	21.2 (5.2)	20.5 (4.4)	0.090	<b>0.050</b>
RV fractional area change, %	42.1 (7.3)	39.4 (6.1)	43.2 (6.3)	0.019	0.69
TAPSE (% ≤15 mm)	1.0	5.7	0	0.145	<b>0.002</b>
Pulmonary artery systolic pressure, mmHg	28.7 (6.6)	30.7 (7.3)	32.1 (5.3)	0.061	0.20
Pulmonary vascular resistance, Woods units	1.6 (0.3)	1.7 (0.4)	1.8 (0.2)	0.025	0.61

All values are expressed as mean (standard deviation) unless otherwise noted.

LV=left ventricle, PAP=positive airway pressure, RV=right ventricle, TAPSE=tricuspid annular plane systolic excursion.

\*Partial Spearman correlation for  $\log_{10}(\text{AHI}+1)$  after adjustment for age and sex

**Table S3—Multivariate Regression Modeling Results for Baseline  $\log_{10}(\text{AHI}+1)$  Predicting Later Echocardiographic Outcomes - Excluding those with no Previous Use of Positive Airway Pressure Therapy (n=108)**

Echocardiographic Outcomes	n	Model 1			Model 2			Model 3			Model 4		
		Beta	SE	P value	Beta	SE	P value	Beta	SE	P value	Beta	SE	P value
LV mass (corrected), g	490	12.08	4.91	<b>0.014</b>	-0.88	4.70	0.85	-2.06	4.68	0.66	-2.99	4.61	0.52
LV wall thickness, cm	484	0.44	0.15	<b>0.005</b>	0.06	0.15	0.70	0.00	0.14	0.98	-0.02	0.14	0.87
LV ejection fraction, %	486	-1.77	0.71	<b>0.013</b>	-1.38	0.74	0.06	-1.42	0.74	0.056	-1.52	0.74	<b>0.041</b>
Left atrial volume, mL	491	2.85	2.73	0.30	-1.88	2.75	0.50	-2.02	2.76	0.46	-2.20	2.75	0.42
Cardiac output, L/min	479	0.30	0.15	0.051	-0.09	0.15	0.54	-0.11	0.14	0.44	-0.12	0.14	0.39
Systemic vascular resistance (dynes x sec/cm <sup>5</sup> )	479	-85.78	41.74	<b>0.041</b>	11.04	40.91	0.79	12.56	41.15	0.76	10.12	40.56	0.80
Mitral valve inflow E/A ratio	483	-0.03	0.04	0.40	-0.01	0.04	0.74	-0.01	0.04	0.79	-0.01	0.04	0.78
Lateral mitral annulus E/e' Ratio	486	0.51	0.29	0.08	0.12	0.29	0.67	-0.00	0.29	0.99	-0.07	0.29	0.81
Pulmonary vein systolic/diastolic ratio	467	-0.02	0.04	0.61	-0.02	0.04	0.66	-0.02	0.05	0.70	-0.02	0.05	0.74
Right atrial area, cm <sup>2</sup>	485	0.01	0.49	0.98	-0.50	0.40	0.32	-0.44	0.50	0.38	-0.46	0.50	0.36
RV end-diastolic area, cm <sup>2</sup>	481	0.80	0.61	0.19	-0.26	0.62	0.67	-0.23	0.62	0.71	-0.24	0.62	0.69
RV fractional area Change, %	481	0.17	0.97	0.86	0.35	1.01	0.73	0.31	1.02	0.76	0.31	1.02	0.76
TAPSE, mm	472	-1.32	0.50	<b>0.008</b>	-1.30	0.52	<b>0.013</b>	-1.16	0.52	<b>0.028</b>	-1.16	0.52	<b>0.027</b>
Pulmonary artery systolic pressure, mmHg	455	1.98	0.90	<b>0.029</b>	0.63	0.92	0.50	0.43	0.93	0.64	0.40	0.93	0.67
Pulmonary vascular resistance, Woods units	443	0.06	0.04	0.21	0.06	0.05	0.21	0.05	0.05	0.25	0.06	0.05	0.21

Model 1 includes: age at baseline, sex, and  $\log_{10}(\text{AHI}+1)$  at baseline. PAP users at any time point were excluded.

Model 2 includes: model 1 plus BMI at baseline.

Model 3 includes: model 2 plus change in BMI, ever diabetes mellitus (self-report or use of anti-glycemic medications) status through ECHO visit, lipid lowering medications at baseline, current smoker at baseline, and any history of lung disease through baseline.

Model 4 includes: model 3 plus systolic blood pressure, change in SBP, blood pressure medication use (never, at baseline, use started after baseline)

AHI=apnea-hypopnea index, BMI=Body-Mass Index, SE= Standard Error, LV=left ventricle, PAP=continuous positive airway pressure, RV=right ventricle, TAPSE= tricuspid annular plane systolic excursion

**Table S4—Predictors of Left Ventricular Ejection Fraction (%) - Excluding those with no Previous Use of Positive Airway Pressure Therapy (n=108)**

Model Variables	Model Excluding Blood Pressure Covariates		Model Including Blood Pressure Covariates	
	beta (SE)	P value	beta (SE)	P value
Age at baseline	-0.02 (0.03)	0.56	-0.03 (0.03)	0.41
<b>Sex (Female)</b>	1.45 (0.52)	<b>0.006</b>	1.67 (0.53)	<b>0.002</b>
<b>Log<sub>10</sub>(AHI+1) at baseline</b>	-1.42 (0.74)	<b>0.056</b>	-1.52 (0.74)	<b>0.041</b>
BMI at baseline	-0.08 (0.05)	0.10	-0.11 (0.05)	<b>0.038</b>
Change in BMI	-0.14 (0.06)	<b>0.030</b>	-0.15 (0.06)	<b>0.025</b>
Systolic blood pressure at baseline			0.05 (0.02)	<b>0.031</b>
Change in systolic blood pressure			0.01 (0.02)	0.77
Baseline anti-hypertensive medication use			-1.01 (0.92)	0.27
Added anti-hypertensive medication since baseline			-0.21 (0.55)	0.70
Polysomnogram				
Current smoking at baseline	-0.44 (0.70)	0.53	-0.49 (0.70)	0.49
History of pulmonary disease through baseline	-0.62 (0.74)	0.41	-0.66 (0.74)	0.37
Lipid-lowering medication use at baseline	-1.66 (1.33)	0.21	-1.60 (1.33)	0.23
Ever diabetes mellitus <sup>1</sup> through echo visit	-0.18 (0.76)	0.81	-0.16 (0.78)	0.84

<sup>1</sup> Self-report or use of anti-glycemic medications

AHI=apnea-hypopnea index, BMI=Body-Mass Index, SE= Standard Error

**Table S5—Multivariate Regression Modeling Results for Mean SaO<sub>2</sub> saturation (%) Predicting Later Echocardiographic Outcomes - Excluding those with Cardiovascular Disease at Baseline (n=46) and no Previous Use of Positive Airway Pressure Therapy (n=22)**

Echocardiographic Outcomes	n	Model 1			Model 2			Model 3			Model 4		
		Beta	SE	P value	Beta	SE	P value	Beta	SE	P value	Beta	SE	P value
LV mass (corrected), g	468	-10.04	1.19	<0.001	-4.89	1.27	<0.001	-4.06	1.29	0.002	-4.38	1.28	<b>0.001</b>
LV wall thickness, cm	461	-0.30	0.04	<0.001	-0.16	0.04	<0.001	-0.13	0.04	0.001	-0.14	0.04	<b>&lt;0.001</b>
LV ejection fraction, %	462	0.12	0.16	0.461	-0.01	0.18	0.969	-0.01	0.19	0.942	-0.04	0.19	0.839
Left atrial volume, mL	470	-2.57	0.67	<0.001	-0.67	0.75	0.372	-0.82	0.77	0.289	-0.79	0.78	0.313
Cardiac output, L/min	456	-0.24	0.04	<0.001	-0.08	0.04	0.034	-0.08	0.04	0.054	-0.09	0.04	<b>0.026</b>
Systemic vascular resistance (dynes x sec/cm <sup>5</sup> )	456	57.21	9.77	<0.001	26.14	10.82	0.016	25.69	11.19	0.022	22.66	11.22	<b>0.044</b>
Mitral valve inflow E/A ratio	463	0.02	0.01	0.022	0.01	0.01	0.442	0.01	0.01	0.41	0.01	0.01	0.378
Lateral mitral annulus E/e' Ratio	464	-0.09	0.07	0.207	0.10	0.08	0.213	0.17	0.08	0.037	0.16	0.08	<b>0.043</b>
Pulmonary vein systolic/diastolic ratio	446	0.02	0.01	0.171	0.02	0.01	0.109	0.02	0.01	0.198	0.01	0.01	0.306
Right atrial area, cm <sup>2</sup>	462	-0.36	0.12	0.002	-0.13	0.13	0.330	-0.17	0.14	0.214	-0.15	0.14	0.259
RV end-diastolic area, cm <sup>2</sup>	457	-0.79	0.15	<0.001	-0.32	0.17	0.052	-0.40	0.17	0.019	-0.40	0.17	<b>0.021</b>
RV fractional area Change, %	457	-0.03	0.23	0.910	-0.14	0.27	0.606	-0.08	0.28	0.774	-0.11	0.28	0.692
TAPSE, mm	451	0.16	0.12	0.165	0.14	0.14	0.289	0.13	0.14	0.349	0.14	0.14	0.344
Pulmonary artery systolic pressure, mmHg	424	-0.81	0.23	<0.001	-0.41	0.26	0.110	-0.38	0.26	0.153	-0.45	0.27	0.093
Pulmonary vascular resistance, Woods units	411	-0.01	0.01	0.219	-0.02	0.01	0.136	-0.02	0.01	0.092	-0.02	0.01	0.118

Model 1 includes: age at baseline, sex, and mean SaO<sub>2</sub> at baseline.

Model 2 includes: model 1 plus BMI at baseline.

Model 3 includes: model 2 plus change in BMI, ever diabetes mellitus (self-report or use of anti-glycemic medications) status through ECHO visit, lipid lowering medications at baseline, current smoker at baseline, and any history of lung disease through baseline.

Model 4 includes: model 3 plus systolic blood pressure, change in SBP, blood pressure medication use (never, at baseline, use started after baseline)

AHI=apnea-hypopnea index, BMI=Body-Mass Index, SE= Standard Error, LV=left ventricle, RV=right ventricle, TAPSE= tricuspid annular plane systolic excursion

**Table S6—Echocardiographic Outcomes Stratified by Baseline Apnea-Hypopnea Index Category and by Baseline Body-Mass Index Category**

Echocardiographic Outcome	Baseline AHI category			Baseline BMI category		
	AHI <5	AHI 5–14.9	AHI ≥15 or PAP use	BMI < 5	BMI 25-29.9	BMI ≥30
n	468	76	57	140	230	231
LV mass (corrected), g	149.8 (40.9)	164.2 (51.0)	183.6 (52.5)	128.6 (32.5)	151.5 (35.9)	174.3 (49.8)
LV wall thickness, cm	9.0 (1.2)	9.3 (1.3)	9.8 (1.2)	8.3 (1.0)	9.0 (1.1)	9.6 (1.2)
LV ejection fraction, %	61.6 (5.3)	59.8 (6.0)	60.6 (5.3)	62.0 (5.0)	61.1 (5.3)	61.1 (5.7)
Left atrial volume (mL)	67.8 (21.1)	77.1 (27.4)	79.8 (28.7)	61.1 (19.4)	68.2 (20.5)	77.5 (25.4)
Cardiac output, L/min	5.4 (1.2)	5.5 (1.2)	5.8 (1.1)	4.8 (1.0)	5.3 (1.1)	5.9 (1.2)
Systemic vascular resistance, dynes x sec/cm <sup>5</sup>	1355 (311)	1314 (305)	1263 (274)	1476 (342)	1388 (303)	1207 (230)
Mitral valve inflow E/A ratio	1.0 (0.3)	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	1.0 (0.3)	1.0 (0.3)
Lateral mitral annulus E/e' ratio	6.5 (2.4)	7.2 (3.5)	6.7 (2.0)	6.3 (2.7)	6.3 (2.3)	7.2 (2.4)
Pulmonary vein systolic/diastolic ratio	1.3 (0.3)	1.3 (0.3)	1.2 (0.5)	1.3 (0.3)	1.4 (0.4)	1.3 (0.3)
Right atrial area, cm <sup>2</sup>	17.6 (3.9)	19.2 (5.0)	19.2 (4.4)	16.5 (3.9)	18.1 (3.8)	18.6 (4.4)
RV end-diastolic area, cm <sup>2</sup>	19.3 (5.1)	21.3 (5.3)	21.9 (5.5)	17.7 (4.6)	19.6 (4.6)	21.3 (5.8)
RV fractional area change, %	42.1 (7.3)	40.1 (6.5)	41.2 (7.1)	41.8 (7.8)	42.2 (6.9)	41.2 (7.2)
TAPSE (% ≤15 mm)	1.1	5.6	3.5	0	1.3	3.7
Pulmonary artery systolic pressure, mmHg	29.0 (6.6)	30.9 (8.1)	31.1 (6.7)	27.3 (6.0)	29.4 (6.4)	30.9 (7.5)
Pulmonary vascular resistance, Woods units	1.6 (0.3)	1.7 (0.3)	1.7 (0.3)	1.6 (0.3)	1.7 (0.3)	1.6 (0.4)

All values are expressed as mean (standard deviation) unless otherwise noted. No participants had cardiovascular disease at baseline. AHI = apnea-hypopnea index (events/hour), BMI = body-mass index (kg/m<sup>2</sup>), LV=left ventricle, PAP=positive airway pressure, RV=right ventricle, TAPSE=tricuspid annular plane systolic excursion.

**Table S7—Baseline BMI \*  $\log_{10}(\text{AHI}+1)$  Interactions Predicting Later Echocardiographic Outcomes<sup>1,2</sup> Excluding those with Cardiovascular Disease at Baseline (n=17)**

Echocardiographic Outcome	$\log_{10}(\text{AHI}+1)$		BMI <sup>1</sup> * $\log_{10}(\text{AHI}+1)$		"Effect" (beta) of $\log_{10}(\text{AHI}+1)$ on outcome at a BMI of...			
	beta	P-value	beta	P-value	25	30	35	40
Left atrial volume, mL	-1.84	0.44	0.80	0.008	-5.83	-1.84	2.16	6.15
Pulmonary vein systolic/diastolic ratio	-0.03	0.48	-0.02	0.001	0.06	-0.03	-0.11	-0.20
Right atrial area, cm <sup>2</sup>	0.32	0.45	0.01	0.009	-0.37	0.32	1.01	1.70

Additional covariates in the model are: age at baseline, sex, BMI at baseline, change in BMI, ever diabetes mellitus (self-report or use of anti-glycemic medications) status through echo visit, lipid lowering medications at baseline, current smoker at baseline, any history of lung disease through baseline, "ever used PAP" through echo visit, systolic blood pressure, change in systolic blood pressure, blood pressure medication use (never, at baseline, use started after baseline).

<sup>1</sup>BMI was centered at 25, 30, 35 and 40 kg/m<sup>2</sup> to demonstrate the "effect" of AHI on echo outcomes at different levels of obesity

<sup>2</sup>PAP users at baseline are excluded