

## **Higher intraindividual variability of body mass index associated with elevated risk of COVID-19 related hospitalization and post-COVID conditions**

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### ***Online Supplemental Materials***

Supplemental Table 1: Comparison of cardiometabolic health variability by COVID-19 hospitalization and PCC

Supplemental Table 2: Univariable and multivariable binomial regressions between cardiometabolic health variability and COVID-19 hospitalization risk

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Supplemental Figure 1: Study participant flowchart

**Supplemental Table 1: Comparison of cardiometabolic health variability by COVID-19 hospitalization and PCC**

Cardiometabolic health variability	COVID-19 hospitalization				P <sup>a</sup>	PCC				P <sup>a</sup>
	Y		N			Y		N		
	Median	IQR	Median	IQR		Median	IQR	Median	IQR	
<b>BMI (kg/m<sup>2</sup>) CV</b>	3.4	2.4, 4.9	2.9	1.9, 4.3	0.06	3.1	2.1, 4.8	2.8	1.8, 4.3	<0.01
<b>SBP (mm Hg) CV</b>	7.1	5.5, 8.7	6.8	5.4, 8.4	0.74	6.8	5.4, 8.5	6.8	5.4, 8.4	0.92
<b>DBP (mm Hg) CV</b>	6.5	5.3, 8.5	7.0	5.6, 8.4	0.43	7.1	5.7, 8.5	7.0	5.5, 8.4	0.14
<b>Total cholesterol (mg/dL) CV</b>	9.3	7.3, 12.7	8.4	6.3, 10.9	0.04	8.6	6.5, 11.0	8.4	6.3, 10.9	0.32

<sup>a</sup> P value from Kruskal-Wallis test statistic.

Abbreviations: body mass index (BMI), coronavirus disease 2019 (COVID-19), diastolic blood pressure (DBP), post-COVID conditions (PCC), systolic blood pressure (SBP)

**Supplemental Table 2: Univariable and multivariable binomial regressions between cardiometabolic health variability and COVID-19 hospitalization risk**

Independent variable	Units or category	Bivariable regressions			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			
		RR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	
BMI (kg/m <sup>2</sup> ) CV	Quartiles	1 (low)	Ref														
		2	3.00	0.97, 9.26	0.01	Ref	1.00, 9.64	0.05									
		3	3.00	0.97, 9.26	0.01	3.41	1.09, 10.69	0.04									
		4 (high)	3.00	0.97, 9.26	0.01	4.15	1.31, 13.11	0.02									
SBP (mm Hg) CV	Quartiles	1 (low)	Ref					Ref									
		2	1.11	0.45, 2.72	0.82				0.94	0.37, 2.36	0.89						
		3	0.78	0.29, 2.08	0.62				0.60	0.22, 1.67	0.33						
		4 (high)	1.56	0.68, 3.57	0.30				1.14	0.48, 2.71	0.77						
DBP (mm Hg) CV	Quartiles	1 (low)	Ref								Ref						
		2	0.77	0.34, 1.74	0.53							0.55	0.23, 1.31	0.18			
		3	0.54	0.22, 1.34	0.18							0.38	0.15, <1.00	0.05			
		4 (high)	0.77	0.34, 1.74	0.53							0.57	0.24, 1.32	0.19			
Total cholesterol (mg/dL) CV	Quartiles	1 (low)	Ref											Ref			
		2	1.00	0.35, 2.84	1.00										0.93	0.32, 2.66	0.89
		3	1.43	0.55, 3.74	0.47										1.37	0.51, 3.66	0.53
		4 (high)	2.29	0.95, 5.53	0.08										2.03	0.83, 5.01	0.12
Male		2.69	1.41, 5.13	<0.01	2.51	1.30, 4.85	<0.01	2.29	1.19, 4.41	0.01	2.23	1.16, 4.29	0.02	2.25	1.17, 4.32	0.02	
Age (years)		1.04	1.01, 1.07	<0.01	1.05	1.02, 1.08	<0.01	1.04	1.01, 1.07	0.01	1.04	1.01, 1.08	<0.01	1.04	1.01, 1.07	<0.01	
Geographic region	Mountain		3.28	1.05, 10.25	0.04	3.35	1.05, 10.69	0.04	3.76	1.18, 11.97	0.03	3.76	1.18, 11.97	0.03	3.38	1.05, 10.85	0.04
	South		2.19	0.66, 7.23	0.20	2.08	0.62, 6.96	0.23	2.48	0.74, 8.32	0.14	2.60	0.77, 8.74	0.12	2.12	0.63, 7.17	0.23
	Southwest		3.67	1.24, 10.87	0.02	3.62	1.21, 10.83	0.02	3.92	1.31, 11.77	0.01	4.32	1.43, 13.00	0.01	3.68	1.22, 11.05	0.02
	West		Ref			Ref			Ref			Ref			Ref		
Number of donations		1.02	1.00, 1.05	0.08	1.00	0.98, 1.03	0.79	1.01	0.99, 1.04	0.34	1.02	0.99, 1.04	0.17	1.01	0.98, 1.03	0.53	

<sup>a</sup> All regressions in this table were among 3,344 donors with 42,090 donations.

<sup>b</sup> Final multivariable binomial regression results shown. We selected covariates based on an *a priori* review of literature. We did not include three covariates (race-ethnicity, educational attainment, COVID-19 vaccination) due to model instability and small sample cell size.

Abbreviations: adjusted risk ratio (aRR), body mass index (BMI), coronavirus disease 2019 (COVID-19), diastolic blood pressure (DBP), post-COVID conditions (PCC), systolic blood pressure (SBP)

**Supplemental Table 3: Univariable and multivariable binomial regressions between cardiometabolic health variability and PCC risk**

Independent variable	Units or category	Bivariable regressions			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			Multivariable regression <sup>b</sup>			
		RR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	
BMI (kg/m <sup>2</sup> ) CV	Quartiles	1 (low)	Ref			Ref											
		2	1.20	0.94, 1.54	0.13	1.15	0.90, 1.47	0.26									
		3	1.34	1.06, 1.70	0.02	1.23	0.97, 1.56	0.09									
		4 (high)	1.50	1.19, 1.88	<0.01	1.29	1.02, 1.64	0.04									
SBP (mm Hg) CV	Quartiles	1 (low)	Ref						Ref								
		2	0.98	0.79, 1.23	0.89				0.99	0.79, 1.25	0.95						
		3	0.95	0.76, 1.20	0.68				0.92	0.73, 1.16	0.49						
		4 (high)	1.09	0.87, 1.35	0.46				1.04	0.83, 1.30	0.74						
DBP (mm Hg) CV	Quartiles	1 (low)	Ref								Ref						
		2	0.98	0.77, 1.23	0.84						0.98	0.77, 1.23	0.84				
		3	1.10	0.88, 1.38	0.38						1.08	0.86, 1.36	0.50				
		4 (high)	1.10	0.88, 1.38	0.38						1.05	0.83, 1.31	0.69				
Total cholesterol (mg/dL) CV	Quartiles	1 (low)	Ref											Ref			
		2	1.08	0.85, 1.35	0.54									1.05	0.83, 1.32	0.68	
		3	1.15	0.92, 1.44	0.22									1.06	0.84, 1.34	0.61	
		4 (high)	1.10	0.88, 1.38	0.41									1.01	0.80, 1.27	0.94	
Male		0.74	0.63, 0.88	<0.01	0.76	0.64, 0.91	<0.01	0.75	0.63, 0.89	<0.01	0.75	0.63, 0.89	<0.01	0.75	0.63, 0.89	<0.01	
Age (years)		1.00	0.99, 1.00	0.17	1.00	1.00, 1.01	0.23	1.00	1.00, 1.01	0.43	1.00	1.00, 1.01	0.38	1.00	1.00, 1.01	0.36	
Race-ethnicity	White (non-Hispanic)	Ref			Ref			Ref			Ref			Ref			
	Black (non-Hispanic)	1.67	0.87, 3.19	0.12	1.79	0.94, 3.41	0.08	1.75	0.91, 3.35	0.09	1.77	0.92, 3.38	0.09	1.75	0.92, 3.35	0.09	
	Other	1.25	1.00, 1.57	<0.05	1.20	0.95, 1.52	0.13	1.20	0.95, 1.52	0.13	1.20	0.95, 1.53	0.13	1.20	0.94, 1.52	0.14	
Educational attainment	< High school	1.61	0.72, 3.61	0.24	1.39	0.62, 3.10	0.42	1.41	0.63, 3.14	0.41	1.43	0.64, 3.19	0.38	1.42	0.64, 3.17	0.39	
	High school diploma <sup>c</sup>	1.49	1.20, 1.84	<0.01	1.34	1.07, 1.67	0.01	1.35	1.08, 1.69	<0.01	1.36	1.09, 1.69	0.01	1.36	1.09, 1.70	0.01	
	Bachelor's degree	1.18	0.94, 1.47	0.16	1.15	0.91, 1.44	0.24	1.14	0.91, 1.43	0.27	1.14	0.91, 1.43	0.26	1.14	0.91, 1.43	0.26	
	Graduate degree	Ref			Ref			Ref			Ref			Ref			
Geographic region	Mountain	1.77	1.37, 2.28	<0.01	1.74	1.34, 2.26	<0.01	1.79	1.38, 2.32	<0.01	1.78	1.37, 2.31	<0.01	1.78	1.37, 2.31	<0.01	
	South	1.70	1.32, 2.18	<0.01	1.60	1.23, 2.08	<0.01	1.66	1.28, 2.15	<0.01	1.64	1.26, 2.12	<0.01	1.65	1.27, 2.15	<0.01	
	Southwest	1.67	1.31, 2.12	<0.01	1.64	1.28, 2.09	<0.01	1.67	1.31, 2.14	<0.01	1.66	1.30, 2.12	<0.01	1.67	1.31, 2.13	<0.01	
	West	Ref			Ref			Ref			Ref			Ref			
COVID-19 vaccination		0.81	0.67, 0.99	0.04	0.88	0.72, 1.08	0.22	0.88	0.72, 1.08	0.22	0.88	0.72, 1.07	0.20	0.88	0.72, 1.08	0.23	
Number of donations		1.00	0.99, 1.01	0.91	1.00	0.99, 1.00	0.36	1.00	0.99, 1.01	0.66	1.00	0.99, 1.01	0.53	1.00	0.99, 1.01	0.53	

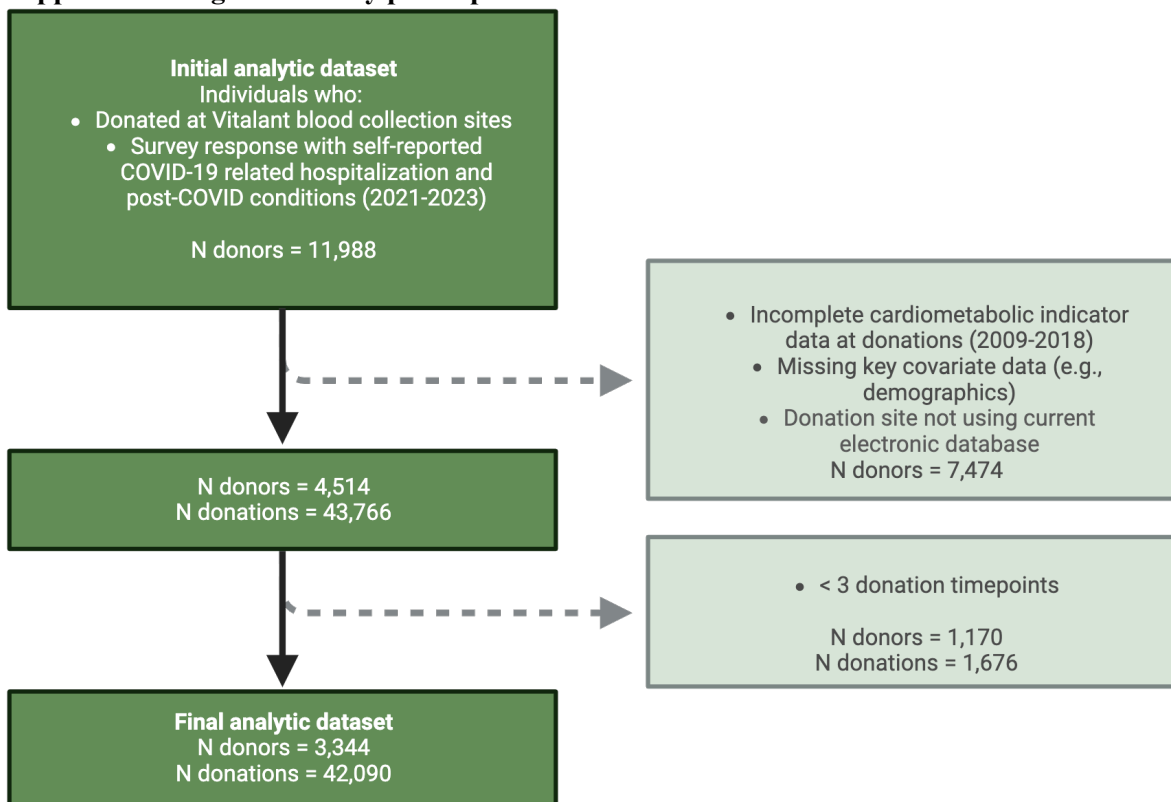
<sup>a</sup> All regressions in this table were among 3,344 donors with 42,090 donations.

<sup>b</sup> Final multivariable binomial regression results shown. We selected covariates based on an *a priori* review of literature.

<sup>c</sup> Includes participants with an associate's degree or some college coursework without completion of a degree

Abbreviations: adjusted risk ratio (aRR), body mass index (BMI), coronavirus disease 2019 (COVID-19), diastolic blood pressure (DBP), post-COVID conditions (PCC), systolic blood pressure (SBP), reference group (Ref), risk ratio (RR)

**Supplemental Figure 1: Study participant flowchart<sup>a</sup>**



<sup>a</sup>This study included a subset of the donors from a larger COVID-19 research program. A total of 294,408 donors were sent as invitations for survey participation between December 2021 and February 2023. Among these donors, 33,610 (11.4%) voluntarily provided consent to participate and responses to the survey.