## **Supplemental Online Content**

Hauspurg A, Marsh DJ, McNeil RB, et al; NICHD nuMoM2b and NHLBI nuMoM2b Heart Health Study Networks. Association of N-terminal pro–brain natriuretic peptide concentration in early pregnancy with development of hypertensive disorders of pregnancy and future hypertension. *JAMA Cardiol*. Published online January 19, 2022. doi:10.1001/jamacardio.2021.5617

- eTable 1. Demographic characteristics by presence of hypertension at follow-up
- eTable 2. Demographic characteristics by presence of elevated NT-proBNP (>125 pg/mL)
- **eTable 3.** Association of NT-proBNP with development of hypertension at 2 to 7 years after delivery stratified by body mass index during index pregnancy
- **eTable 4.** Association of NT-proBNP with development of hypertension at 2 to 7 years after delivery stratified by race and ethnicity
- **eTable 5.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP<sup>c</sup> and blood pressure with adverse pregnancy outcome, including hypertensive disorders of pregnancy, spontaneous preterm birth, and small for gestational age among women with elevated NT-proBNP (>125 pg/mL)
- **eTable 6.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP<sup>c</sup> and blood pressure with development of hypertension at 2 to 7 years after delivery among women with elevated NT-proBNP (>125 pg/mL)
- **eTable 7.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP (upper vs lower quartile) and blood pressure with adverse pregnancy outcomes, including hypertensive disorders of pregnancy, spontaneous preterm birth, and small for gestational age
- **eTable 8.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP (upper vs lower quartile) and blood pressure with development of hypertension at 2 to 7 years after delivery

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Demographic characteristics by presence of hypertension at follow-up

	No hypertension N=3276	Hypertension N=817	P Value
Maternal age, mean (SD), years	26.9 (5.5)	27.4 (5.7)	.02
Maternal race: n (%)			
White Non-Hispanic	2119 (64.7)	497 (60.8)	
Black Non-Hispanic	386 (11.8)	131 (16.0)	
Hispanic	541 (16.5)	109 (13.3)	<i>P</i> <.001
Asian	93 (2.8)	29 (3.5)	
Other	137 (4.2)	51 (6.2)	
Early pregnancy BMI, median [IQR], kg/m <sup>2</sup>	24.1 [21.7-28.0]	27.2 [23.5-32.7]	<i>P</i> <.001
Early pregnancy waist circumference, mean (SD), cm	93.6 (13.3)	100.5 (15.7)	<i>P</i> <.001
Family history of hypertension: n / N (%)	1740/3133 (55.5)	541/782 (69.2)	<i>P</i> <.001
Systolic blood pressure, mean (SD), mmHg	107.9 (10.1)	113.4 (10.9)	<i>P</i> <.001
Diastolic blood pressure, mean (SD), mmHg	66.2 (7.9)	70.7 (8.3)	P<.001
Current smoker: n / N (%)	178/3261 (5.5)	44/811 (5.4)	.97
Early pregnancy aspirin use: n / N (%)	56/3273 (1.7)	16/816 (2.0)	.05

Abbreviations: SD, standard deviation; BMI, body mass index; IQR, interquartile range.

eTable 2. Demographic characteristics by presence of elevated NT-proBNP (>125 pg/mL)

	NT-proBNP ≤ 125 pg/mL	NT-proBNP > 125 pg/mL	P Value
	N=3624	N=479	
Maternal age, mean (SD), years	26.8 (5.6)	28.2 (5.3)	<i>P</i> <.001
Maternal race: n (%)			
White Non-Hispanic	2242 (61.9)	377 (78.7)	
Black Non-Hispanic	492 (13.6)	28 (5.8)	
Hispanic	602 (16.6)	49 (10.2)	<i>P</i> <.001
Asian	113 (3.1)	10 (2.1)	
Other	175 (4.8)	15 (3.1)	
Type of health insurance: n (%)			
Commercial	2495 (69.2)	392 (82.0)	
Government/military	985 (27.3)	72 (15.1)	<i>P</i> <.001
Self-pay/other	125 (3.5)	14 (2.9)	
Early pregnancy BMI, median [IQR], kg/m2	24.7 (22.1-29.3)	23.5 (21.2-26.9)	<i>P</i> <.001
Early pregnancy waist circumference, mean (SD), cm	95.3 (14.2)	92.4 (12.6)	P<.001
Family history of hypertension: n / N (%)	2013/3460 (58.2)	275/464 (59.3)	0.66
Systolic blood pressure, mean (SD), mmHg	109.2 (10.6)	107.1 (9.4)	<i>P</i> <.001
Diastolic blood pressure, mean (SD), mmHg	67.3 (8.2)	65.8 (7.6)	<i>P</i> <.001
Gestational diabetes: n / N (%)	153/3624 (4.2)	15/479 (3.1)	0.26
Current smoker: n / N (%)	200/3606 (5.5)	22/476 (4.6)	0.40
Early pregnancy aspirin use: n / N (%)	63/3620 (1.7)	9/479 (1.9)	0.83
Gestational age at delivery, median [IQR], weeks	39.7 (38.7-40.4)	39.6 (38.7-40.4)	0.72
Birthweight, mean (SD), grams	3280.7 (555.7)	3256.5 (547.5)	0.37

Abbreviations: SD, standard deviation; BMI, body mass index; IQR, interquartile range.

**eTable 3.** Association of NT-proBNP with development of hypertension at 2 to 7 years after delivery stratified by body mass index during index pregnancy

	NT-proBNP, per doubling in value OR (95% CI) <sup>a</sup>
Underweight (<18.5 kg/m²), n=87	0.52 (0.24, 1.12)
Normal weight (18.5 to <25 kg/m²), n=2071	0.77 (0.66, 0.89)
Overweight (25 to <30 kg/m <sup>2</sup> ), n=1006	0.85 (0.72, 1.00)^
Obese (≥30 kg/m²), n=891	0.84 (0.72, 0.97)

Abbreviations: NT-proBNP, N-terminal pro-B-type natriuretic peptide; OR, odds ratio; CI, confidence interval.

<sup>&</sup>lt;sup>a</sup> When the confidence interval shown includes 1.00 due to rounding, the  $^{\wedge}$  symbol indicates that the precise CI includes 1 (i.e., is not statistically significant at p < 0.05).

**eTable 4.** Association of NT-proBNP with development of hypertension at 2 to 7 years after delivery stratified by race and ethnicity

	NT-proBNP, per doubling in value OR (95% CI)		
Non-Hispanic White, n=2595	0.80 (0.71, 0.90)		
Non-Hispanic Black, n=509	0.87 (0.70, 1.08)		
Hispanic, n=644	0.85 (0.68, 1.06)		
Asian, n=122	0.76 (0.47, 1.24)		
Other, n=185	0.76 (0.54, 1.08)		

Abbreviations: NT-proBNP, N-terminal pro-B-type natriuretic peptide; OR, odds ratio; CI, confidence interval.

**eTable 5.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP<sup>c</sup> and blood pressure with adverse pregnancy outcome, including hypertensive disorders of pregnancy, spontaneous preterm birth, and small for gestational age among women with elevated NT-proBNP (>125 pg/mL)

	No APO	Any APO	HDP	sPTB	SGA
	N=382	N=96	N=49	N=31	N=15
NT-proBNP, median [IQR], pg/mL	157.0 [140.0-184.0]	153.5 [140.0-188.0]	153.0 [137.0-188.0]	161.0 [135.0-192.0]	150.0 [142.0-176.0]
NT-proBNP, per doubling in value	Ref	1.03 (0.58, 1.83)	0.72 (0.30, 1.70)	1.35 (0.60, 3.00)	1.80 (0.39, 8.30)
NT-proBNP, per doubling in value, controlling for systolic blood pressure	Ref	1.03 (0.58, 1.83)	0.70 (0.30, 1.66)	1.43 (0.64, 3.23)	1.94 (0.42, 8.99)

Abbreviations: NT-proBNP, N-terminal pro-B-type natriuretic peptide; APO, adverse pregnancy outcome; HDP, hypertensive disorders of pregnancy; sPTB, spontaneous preterm birth; SGA, small for gestational age; IQR, interquartile range; OR, odds ratio; CI, confidence interval.

<sup>&</sup>lt;sup>a</sup> OR (95%CI).

<sup>&</sup>lt;sup>b</sup> Adjusted for age, race, body mass index, smoking, and aspirin use.

<sup>°</sup>This characteristic is included in statistical models after a log2 (logarithm with base 2) transformation. Odds ratios for log-transformed quantities are interpreted on the multiplicative scale.

**eTable 6.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP<sup>c</sup> and blood pressure with development of hypertension at 2 to 7 years after delivery among women with elevated NT-proBNP (>125 pg/mL)

	No Hypertension	Hypertension	
	N=410	N=69	
NT-proBNP, median [IQR], pg/mL	156.0 [139.0-186.0]	156.0 [142.0-188.0]	
NT-proBNP, per doubling in value	Ref	1.01 (0.51, 1.99)	
NT-proBNP, per doubling in value, controlling for systolic blood pressure	Ref	1.02 (0.52, 2.01)	

Abbreviations: NT-proBNP, N-terminal pro-B-type natriuretic peptide; IQR, interquartile range; OR, odds ratio; CI, confidence interval.

<sup>&</sup>lt;sup>a</sup> OR (95%CI).

<sup>&</sup>lt;sup>b</sup> Adjusted for age, race, body mass index, smoking, and aspirin use.

<sup>&</sup>lt;sup>c</sup> This characteristic is included in statistical models after a log2 (logarithm with base 2) transformation. Odds ratios for log-transformed quantities are interpreted on the multiplicative scale.

**eTable 7.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP (upper vs lower quartile) and blood pressure with adverse pregnancy outcomes, including hypertensive disorders of pregnancy, spontaneous preterm birth, and small for gestational age

	Any APO	HDP	sPTB	SGA
	N=909	N=544	N=199	N=170
NT-proBNP, upper vs. lower quartile, adjusted <sup>b</sup>	0.81 (0.65, 1.01)	0.63 (0.48, 0.84)	0.99 (0.66, 1.48)	1.25 (0.79, 1.98)
NT-proBNP, upper vs. lower quartile, controlling for systolic blood pressure, adjusted <sup>b</sup>	0.85 (0.68, 1.06)	0.68 (0.51, 0.90)	0.99 (0.66, 1.48)	1.27 (0.80, 2.01)

<sup>&</sup>lt;sup>a</sup> OR (95%CI).

<sup>&</sup>lt;sup>b</sup> Adjusted for age, race, body mass index, smoking, and aspirin use.

**eTable 8.** Adjusted association<sup>a,b</sup> of baseline NT-proBNP (upper vs lower quartile) and blood pressure with development of hypertension at 2 to 7 years after delivery

	No Hypertension N=3276	Hypertension N=817
NT-proBNP, upper vs. lower quartile, adjusted <sup>b</sup>	Ref	0.66 (0.52, 0.84)
NT-proBNP, upper vs. lower quartile, controlling for systolic blood pressure, adjusted <sup>b</sup>	Ref	0.71 (0.56, 0.90)

<sup>&</sup>lt;sup>a</sup> OR (95%CI).

<sup>&</sup>lt;sup>b</sup> Adjusted for age, race, body mass index, smoking, and aspirin use.