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Supplemental Material

Associations of Pre- and Postnatal Air Pollution Exposures with Child Blood Pressure and Modification by Maternal Nutrition: A Prospective Study in the CANDLE Cohort

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Reference

Table S1: Distributions of nutritional measurements by categories in the CANDLE cohort

	Healthy Eating Index[a]				
	N	Mean	Std.	Min	Max
Overall	725	59.94	11.31	26.16	88.42
Below median[b]	363	50.64	6.69	26.16	60.07
Median and above	362	69.26	6.13	60.10	88.42
	Plasma folate (ng/mL)[c]				
	N	Mean	Std.	Min	Max
Overall	822	23.00	11.10	2.56	80.48
1st Quartile	206	10.44	3.23	2.56	15.01
2nd Quartile	205	18.60	2.01	15.02	22.01
3rd Quartile	206	25.24	2.05	22.01	28.81
4th Quartile	205	37.78	8.60	28.86	80.48

a. The Healthy Eating Index was calculated based on mother's responses to the Block (2005) Food Frequency Questionnaires in the 2nd trimester. It comprises 12 nutrient density–adjusted components that sum to a total score ranging from 0 to 100.
b. The Healthy Eating Index was dichotomized at the median of the CANDLE analytic sample, and below median is defined as poor adherence to the Dietary Guidelines for Americans.
c. Maternal plasma folate was an average of the measurements in both the 2nd and 3rd trimester.

Table S2. Comparisons of baseline characteristics between the analytic sample and the full CANDLE cohort at enrollment

Variables	Analytic sample (N=822)		CANDLE mothers ever enrolled (N = 1503)	
	N	Mean (SD) /Percentage/ Median (25^{th}, 75^{th} percentile)	N	Mean (SD) /Percentage/ Median (25^{th}, 75^{th} percentile)
Child characteristics				
Age at age 4-6 visit (year)	822	4.4 (0.6)	1,157	4.4 (0.6)
Height at age 4-6 visit (cm)	822	106.5 (6.1)	1,069	106.2 (6.0)
Sex				
Male	410	49.9%	736	50.3%
Female	412	50.1%	726	49.7%
Missing	0	--	41	--
Birth weight (kg)	817	3.2 (0.5)	1,454	3.2 (0.6)
Gestational age at childbirth (week)	818	38.8 (1.8)	1,456	38.9 (1.9)
BMI at age 4-6 visit (kg/m^2)	821	16.5 (2.3)	1,064	16.5 (2.2)
BMI class at age 4-6 years visit[a]				
Underweight	17	2.2%	22	2.1%
Normal	524	66.3%	684	66.6%
Overweight	115	14.6%	150	14.6%
Obese	134	17.0%	171	16.7%
missing	32	--	476	--
Medication use potentially increasing blood pressure[b]				
No	758	92.2%	1,056	92.4%
Yes	64	7.8%	87	7.6%
Missing	0	--	360	--
Sleep score at age 4-6 years visit	816	46.9 (7.2)	1,078	46.6 (7.2)
Vigorous activity frequency at age 4-6 years visit[c]				
Never or occasionally	119	14.7%	144	12.6%
Once or twice per week	87	10.7%	111	9.7%
Three or more times per week	604	74.6%	888	77.7%
Missing	12	--	360	--
Second-hand smoking exposure age 4-6 years visit[d]				
No	540	66.2%	799	69.6%
Yes	276	33.8%	349	30.4%
missing	6	--	355	--
Maternal characteristics				
Age at childbirth (year)	822	26 (5.5)	1,503	26 (5.4)
Race				
Black	552	67.2%	936	62.4%
White	217	26.4%	467	31.1%
Asian	8	1.0%	13	0.9%
American Indian	0	0.0%	1	0.1%
Native Hawaiian/Pacific Islander	0	0.0%	1	0.1%
Other	1	0.1%	6	0.4%
Multiple race	44	5.4%	77	5.1%
Missing	0	--	2	--
Education at enrollment				
< High School	113	13.8%	184	12.3%
High School/GED	398	48.5%	709	47.2%
Technical School	84	10.2%	138	9.2%

College Degree	142	17.3%	299	19.9%
Grad/Professional Degree	84	10.2%	171	11.4%
missing	1	--	2	--
Marital status at enrollment				
Married/Living with partner	430	52.4%	848	56.5%
Widowed/Divorced/Separated	22	2.7%	40	2.7%
Never Married	369	44.9%	614	40.9%
missing	1		1	
Insurance status at enrollment				
No insurance	2	0.2%	2	0.1%
Medicaid or Medicare only	503	61.2%	859	57.2%
Medicaid/Medicare and private insurance	28	3.4%	42	2.8%
Private insurance only	289	35.2%	600	39.9%
Household income at enrollment				
$0-$19,999	303	40.5%	493	36.0%
$20,000-$44,999	197	26.3%	370	27.0%
$45,000-$74,999	138	18.4%	271	19.8%
$75,000 or over	110	14.7%	234	17.1%
missing	74	--	135	--
Income adjusted by household size (thousand)	817	10.9 (3.6, 23.8)	1356	13.0 (4.7, 28.6)
Urinary cotinine adjusted by specific gravity (ng/mL)	816	0.5 (0.1, 4.8)	1162	0.4 (0.1, 3.7)
Pre-pregnancy BMI class[e]				
Underweight	38	4.6%	66	4.4%
Normal	329	40.2%	633	42.3%
Overweight	180	22.0%	354	23.6%
Obese	272	33.2%	445	29.7%
missing	3	--	5	--
Breastfeeding				
No	312	38.4%	401	35.1%
Yes (6 months or less)	295	36.3%	434	37.9%
Yes (Above 6 months)	205	25.2%	309	27.0%
Missing	10	--	359	--
Pregnancy hypertensive disorder				
No	773	94.0%	1,408	93.7%
Yes	49	6.0%	95	6.3%
Pregnancy BSI Global Severity Index[f]	798	46.8 (10.9)	1,055	46.6 (10.6)
Prenatal plasma folate (ng/mL)	822	23 (11.1)	1,502	23.5 (11)
Healthy eating index in the 2nd trimester	725	60.1 (52.2, 68.4)	1,322	60.5 (52.1, 68.5)
Other characteristics				
Childhood Opportunity Index[g]				
Prenatal Educational index	818	-0.03 (0.5)	1,415	0.02 (0.5)
Prenatal Economics index	818	-0.1 (0.6)	1,415	-0.04 (0.6)
Postnatal Educational index	812	-0.03 (0.5)	1,080	0.01 (0.5)
Postnatal Economics index	812	-0.1 (0.6)	1,080	-0.04 (0.6)
Recruitment site				
General community	628	76.4%	1160	77.2%
Medical Group clinics	194	23.6%	343	22.8%

a. Child obesity was defined as a BMI at or above the 95th percentile for children of the same age and sex; overweight was defined as a BMI from the 85th to less than the 95th percentile; normal weight was defined as a BMI from the 5th to less than the 85th percentile; and underweight was defined as a BMI less than the 5th percentile.

b. Child current medication use was reported by the parents at age 4-6 years visit, and those who were taking medications that may increase blood pressure, such as albuterol, methylphenidate and prednisone were defined as positive.
c. Child vigorous activity frequency was reported by parents at age 4-6 years visit.
d. Child second-hand smoking was reported by parents at age 4-6 years visit, and those with any family members who smoked at home was defined as positive.
e. Maternal pre-pregnancy obesity was defined as a BMI 30.0 kg/m^2 or higher; overweight was defined as a BMI 25.0 kg/m^2 to less than 30.0 kg/m^2; normal weight was defined as a BMI 18.5 kg/m^2 to less than 25.0 kg/m^2; and underweight was defined as a BMI less than 18.5 kg/m^2.
f. Pregnancy maternal psychological distress was measured by the Global Severity Index from the Brief Symptom Inventory via self-report.
g. Childhood Opportunity Indices was calculated based on the overall address history in pre- and postnatal window.

Abbreviations: BMI: Body Mass Index; GED: Graduate Equivalency

Table S3. Distributions of blood pressure raw measurements and percentiles in the CANDLE children.

Blood pressure	Observations	Mean (SD)	Minimum	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Maximum
Raw SBP	822	92.3 (10.0)	62	82	87	92	98	102	168
Raw DBP	822	61.1 (9.2)	39	52	55	61	65	70	142
SBP percentile	822	48.6 (25.7)	1	13	28	48	70	83	99
DBP percentile	822	75.6 (19.3)	7	48	62	82	91	97	99

Abbreviations: DBP: diastolic blood pressure; SBP: systolic blood pressure

Table S4. Spearman correlations of air pollution exposures in different windows in the CANDLE cohort

	1st trimester $PM_{2.5}$	2nd trimester $PM_{2.5}$	3rd trimester $PM_{2.5}$	Prenatal $PM_{2.5}$	Postnatal $PM_{2.5}$	Prenatal NO_2	Postnatal NO_2
1st trimester $PM_{2.5}$	1						
2nd trimester $PM_{2.5}$	0.1514	1					
3rd trimester $PM_{2.5}$	-0.0978	0.0625	1				
Prenatal $PM_{2.5}$	0.5481	0.6353	0.4719	1			
Postnatal $PM_{2.5}$	0.0966	0.0229	0.1907	0.3414	1		
Prenatal NO_2	0.313	0.2396	0.3027	0.5104	0.5649	1	
Postnatal NO_2	0.1908	0.1222	0.2142	0.3554	0.6709	0.8229	1

Table S5. Distributions of air pollution exposures in different windows by maternal HEI levels (Median and above vs. Below Median), maternal plasma folate (1st quartile vs. > 1st quartile), child sex (female vs. male) and maternal race (Black vs. non-Black) in the CANDLE cohort

	Maternal HEI <median (N=363)		Maternal HEI ≥Median (N=362)		Plasma folate 1st quartile (N=206)		Plasma folate 2nd-4th quartile (N=616)	
Measurements	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**
Prenatal exposures								
1st trimester $PM_{2.5}$ ($\mu g/m^3$)	361	10.8 (1.5)	362	10.4 (1.2)	205	10.8 (1.4)	613	10.7 (1.5)
2nd trimester $PM_{2.5}$ ($\mu g/m^3$)	361	10.8 (1.4)	362	10.5 (1.2)	205	10.8 (1.5)	613	10.7 (1.3)
3rd trimester $PM_{2.5}$ ($\mu g/m^3$)	360	11.2 (1.9)	360	10.7 (1.5)	204	11.4 (1.9)	611	10.9 (1.6)
Prenatal $PM_{2.5}$ ($\mu g/m^3$)	361	10.9 (1.0)	362	10.6 (0.8)	205	11.0 (1.0)	613	10.7 (0.9)
Prenatal NO_2 (ppb)	361	10.3 (2.5)	362	9.4 (2.2)	205	10.9 (2.3)	613	9.7 (2.4)
Distance to A1 roadway (m)	361	2321 (1699)	362	2664 (1972)	205	2180 (1646)	613	2593 (1891)
Distance to A2 roadway (m)	361	1838 (1632)	362	2042 (1655)	205	1942 (1605)	613	1912 (1640)
Distance to A3 roadway (m)	361	445 (614)	362	465 (501)	205	390 (361)	613	469 (590)
Proximity to major roadway								
<150 m	113	31.1%	90	24.9%	62	30.1%	168	27.3%
≥150 m	248	68.3%	272	75.1%	143	69.4%	445	72.2%
Missing	2	0.6%	0	0.0%	1	0.5%	3	0.5%
Postnatal exposures[a]								
Postnatal $PM_{2.5}$ ($\mu g/m^3$)	344	10 (0.6)	343	9.7 (0.5)	195	10.1 (0.6)	585	9.8 (0.5)
Postnatal NO_2 (ppb)	344	9.1 (1.8)	343	8.4 (1.8)	195	9.6 (1.7)	585	8.6 (1.8)
Distance to A1 roadway (m)	344	2432 (1976)	343	2667 (2074)	195	2365 (1976)	585	2584 (2024)
Distance to A2 roadway (m)	344	1822 (1546)	343	2103 (1710)	195	1967 (1547)	585	1920 (1630)
Distance to A3 roadway (m)	344	426 (450)	343	459 (477)	195	382 (310)	585	459 (490)
Proximity to major roadway								
<150 m	100	29.1%	86	25.1%	58	29.7%	154	26.3%
≥150 m	244	70.9%	257	74.9%	137	70.3%	431	73.7%

	Male children (N=410)		Female children (N=412)		Non-black mothers (N=270)		Black mothers (N=552)	
Measurements	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**	**n**	**Mean (SD)/%**
Prenatal exposures								
1st trimester $PM_{2.5}$ ($\mu g/m^3$)	409	10.7 (1.5)	409	10.7 (1.4)	269	10.4 (1.4)	549	10.8 (1.5)
2nd trimester $PM_{2.5}$ ($\mu g/m^3$)	409	10.71 (1.4)	409	10.7 (1.4)	269	10.6 (1.4)	549	10.8 (1.4)
3rd trimester $PM_{2.5}$ ($\mu g/m^3$)	407	11.0 (1.7)	408	11.0 (1.7)	269	10.8 (1.6)	546	11.1 (1.7)
Prenatal $PM_{2.5}$ ($\mu g/m^3$)	409	10.8 (0.9)	409	10.8 (0.9)	269	10.6 (0.9)	549	10.9 (0.9)
Prenatal NO_2 (ppb)	409	10.1 (2.4)	409	10.0 (2.4)	269	9.1 (2.4)	549	10.5 (2.3)
Distance to A1 roadway (m)	409	2463 (1768)	409	2516 (1912)	269	2771 (1999)	549	2352 (1743)
Distance to A2 roadway (m)	409	1982 (1683)	409	1857 (1577)	269	1909 (1664)	549	1925 (1612)

Distance to A3 roadway (m)	409	434 (526)	409	464 (559)	269	611 (784)	549	370 (345)
Proximity to major roadway								
<150 m	121	29.5%	109	26.5%	63	23.3%	167	30.3%
≥150 m	288	70.2%	300	72.8%	206	76.3%	382	69.2%
Missing	1	0.2%	3	0.7%	1	0.4%	3	0.5%
Postnatal exposures[a]								
Postnatal $PM_{2.5}$ ($\mu g/m^3$)	386	9.9 (0.6)	394	9.9 (0.5)	250	9.7 (0.5)	530	10 (0.5)
Postnatal NO_2 (ppb)	386	8.9 (1.8)	394	8.9 (1.9)	250	8.1 (1.9)	530	9.3 (1.7)
Distance to A1 roadway (m)	386	2467 (2065)	394	2589 (1962)	250	2798 (2232)	530	2402 (1890)
Distance to A2 roadway (m)	386	1937 (1602)	394	1926 (1617)	250	1802 (1525)	530	1993 (1644)
Distance to A3 roadway (m)	386	434 (459)	394	446 (447)	250	575 (585)	530	376 (357)
Proximity to major roadway								
<150 m	104	26.9%	108	27.4%	50	20.0%	162	30.6%
≥150 m	282	73.1%	286	72.6%	200	80.0%	368	69.4%

a. There were 42 families who moved out of Shelby County between childbirth and the age 4-6 years visit were excluded from the analysis with postnatal exposures.

Table S6. Estimated effects of air pollution exposures on BP percentiles by maternal HEI levels (Median and above vs. Below Median), maternal plasma folate (1st quartile vs. > 1st quartile), child sex (female vs. male) and maternal race (Black vs. non-Black) from the interaction models in the CANDLE cohort

		SBP percentile					DBP percentile				
		Maternal HEI < Median		Maternal HEI > Median			Maternal HEI < Median		Maternal HEI > Median		
Measurements[a]	N[b]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]
Prenatal exposures											
1st trimester $PM_{2.5}$	669	323	3.4 (-6.96, 13.76)	346	3.11 (-7.04, 13.26)	0.93	323	2.81 (-4.49, 10.12)	346	5.81 (-1.93, 13.55)	0.19
2nd trimester $PM_{2.5}$	669	323	14.9 (4.05, 25.75)	346	15.58 (3.96, 27.19)	0.83	323	8.92 (0.89, 16.94)	346	7.8 (-0.88, 16.48)	0.66
3rd trimester $PM_{2.5}$	666	322	-0.64 (-8.75, 7.47)	324	-0.72 (-9.75, 8.3)	0.98	322	5.17 (-1.12, 11.47)	324	7.24 (0.39, 14.09)	0.30
Prenatal $PM_{2.5}$	669	323	8.13 (-4.29, 20.55)	346	6.34 (-6.98, 19.65)	0.74	323	11.13 (1.49, 20.78)	346	13.18 (2.59, 23.77)	0.59
Prenatal NO_2	669	323	1.11 (-1.61, 3.83)	346	3.1 (0.43, 5.77)	0.25	323	0.17 (-1.84, 2.19)	346	1.09 (-1.01, 3.19)	0.49
Proximity to major roadway <150m[f]	670	323	2.47 (-3.52, 8.46)	347	1.74 (-4.28, 7.76)	0.86	323	0.35 (-4.19, 4.89)	347	0.57 (-4.16, 5.31)	0.95
Postnatal exposures											
Postnatal $PM_{2.5}$	632	304	8.12 (-12.41, 28.64)	328	18.15 (-2.34, 38.65)	0.22	304	6.89 (-8.5, 22.28)	328	10.89 (-4.25, 26.02)	0.55
Postnatal NO_2	632	304	-0.61 (-4.45, 3.24)	328	2.83 (-0.7, 6.36)	0.14	304	0.84 (-2, 3.68)	328	1.68 (-1.07, 4.43)	0.64
Proximity to major roadway <150m[f]	634	306	1.04 (-5.34, 7.41)	328	0.14 (-6.31, 6.59)	0.84	306	-1.08 (-5.95, 3.78)	328	0.37 (-4.68, 5.41)	0.68

		SBP percentile					DBP percentile				
		Plasma folate in the 1st quartile		Plasma folate in the 2nd-4th quartiles			Plasma folate in the 1st quartile		Plasma folate in the 2nd-4th quartiles		
	N[b]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]
Prenatal exposures											
1st trimester $PM_{2.5}$	756	182	0.46 (-10.39, 11.31)	574	2.33 (-7.04, 11.69)	0.60	182	3.54 (-4.43, 11.52)	574	3.92 (-2.86, 10.71)	0.87
2nd trimester $PM_{2.5}$	756	182	18.53 (7.85, 29.2)	574	12.89 (2.68, 23.09)	0.05	182	11.38 (3.66, 19.09)	574	7.43 (-0.03, 14.89)	0.07
3rd trimester $PM_{2.5}$	753	181	1.45 (-6.93, 9.84)	572	-2.44 (-10.11, 5.22)	0.16	181	5.64 (-0.51, 11.79)	572	3.84 (-2.01, 9.69)	0.34
Prenatal $PM_{2.5}$	756	182	13.72 (0.49, 26.96)	574	7.12 (-4.7, 18.95)	0.22	182	14.06 (4.14, 23.99)	574	10.6 (1.66, 19.54)	0.33
Prenatal NO_2	756	182	3.31 (-0.14, 6.76)	574	0.59 (-1.71, 2.89)	0.17	182	0.68 (-1.88, 3.23)	574	0.39 (-1.32, 2.11)	0.85
Proximity to major roadway <150m[f]	757	182	-1.91 (-10.13, 6.3)	575	1.31 (-3.47, 6.09)	0.50	182	-1.42 (-7.25, 4.42)	575	0.39 (-3.32, 4.11)	0.61
Postnatal exposures											
Postnatal $PM_{2.5}$	715	176	15.24 (-6.64, 37.12)	539	7.53 (-11.6, 26.65)	0.38	176	6.41 (-8.47, 21.3)	539	11.32 (-2.64, 25.29)	0.43
Postnatal NO_2	715	176	3.63 (-1.48, 8.73)	539	-0.93 (-4.01, 2.15)	0.11	176	1.88 (-1.58, 5.34)	539	0.71 (-1.67, 3.08)	0.55
Proximity to major roadway <150m[f]	719	177	8.11 (-0.05, 16.26)	542	-2.7 (-7.69, 2.28)	0.03	177	2.62 (-3.32, 8.57)	542	-2.7 (-6.68, 1.29)	0.15

		SBP percentile					DBP percentile				
		Male children		Female children			Male children		Female children		
	N[b]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]
Prenatal exposures											
1st trimester $PM_{2.5}$	756	372	3.17 (-6.45, 12.79)	384	1.47 (-8.13, 11.07)	0.50	372	5.8 (-1.4, 12.99)	384	2.71 (-4.2, 9.63)	0.12
2nd trimester $PM_{2.5}$	756	372	15.57 (5.2, 25.93)	384	13.78 (3.48, 24.08)	0.52	372	6.39 (-1.15, 13.93)	384	10.64 (3.03, 18.25)	0.05
3rd trimester $PM_{2.5}$	753	370	-1.94 (-9.89, 6.01)	383	-1.15 (-9.21, 6.91)	0.75	370	2.55 (-3.49, 8.59)	383	6.07 (0, 12.15)	0.06
Prenatal $PM_{2.5}$	756	372	9.81 (-1.8, 21.41)	384	7.8 (-4.69, 20.28)	0.64	372	9.46 (0.41, 18.51)	384	13.82 (4.49, 23.15)	0.18
Prenatal NO_2	756	372	2.04 (-0.41, 4.48)	384	0.58 (-2, 3.16)	0.34	372	0.14 (-1.67, 1.96)	384	0.77 (-1.21, 2.75)	0.60
Proximity to major roadway <150m[f]	757	373	1.16 (-4.41, 6.74)	384	-0.28 (-6.24, 5.67)	0.72	373	-0.65 (-5.1, 3.8)	384	0.48 (-3.89, 4.85)	0.72
Postnatal exposures											
Postnatal $PM_{2.5}$	715	350	13.59 (-5.85, 33.02)	365	5.17 (-14.67, 25.01)	0.24	350	8.5 (-5.03, 22.04)	365	11.5 (-3.23, 26.22)	0.58
Postnatal NO_2	715	350	2.27 (-1.22, 5.75)	365	-1.44 (-4.83, 1.95)	0.07	350	1.76 (-0.78, 4.3)	365	0.36 (-2.26, 2.98)	0.37
Proximity to major roadway <150m[f]	719	351	1.56 (-4.32, 7.43)	368	-1.07 (-7.19, 5.04)	0.54	351	0.82 (-3.8, 5.45)	368	-3.23 (-7.92, 1.46)	0.22

		SBP percentile					DBP percentile				
		Non-black mothers		Black mothers			Non-black mothers		Black mothers		
	N[b]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]	N[c]	β (95%CI)[d]	N[c]	β (95%CI)[d]	P value[e]

Prenatal exposures											
1st trimester $PM_{2.5}$	756	251	3.6 (-6.09, 13.29)	505	1.03 (-8.64, 10.69)	0.35	251	2.69 (-4.39, 9.76)	505	4.73 (-2.51, 11.98)	0.40
2nd trimester $PM_{2.5}$	756	251	12.49 (1.92, 23.05)	505	16.15 (6, 26.3)	0.20	251	7.68 (-0.26, 15.62)	505	9.35 (2, 16.7)	0.47
3rd trimester $PM_{2.5}$	753	251	-2.55 (-10.76, 5.66)	502	-1.14 (-9.04, 6.76)	0.60	251	4.68 (-1.58, 10.94)	502	4.12 (-1.8, 10.04)	0.78
Prenatal $PM_{2.5}$	756	251	5.99 (-6.92, 18.9)	505	10.29 (-1.45, 22.04)	0.38	251	8.96 (-1.13, 19.05)	505	12.93 (4.02, 21.84)	0.29
Prenatal NO_2	756	251	1.06 (-2.15, 4.27)	505	1.39 (-0.9, 3.67)	0.86	251	0.21 (-2.35, 2.77)	505	0.58 (-1.1, 2.27)	0.80
Proximity to major roadway <150m[f]	757	251	7.44 (-0.01, 14.88)	506	-2.38 (-7.24, 2.47)	0.03	251	4.54 (-1.24, 10.33)	506	-1.96 (-5.68, 1.75)	0.06
Postnatal exposures											
Postnatal $PM_{2.5}$	715	235	9.27 (-12.71, 31.25)	480	9.66 (-9.51, 28.83)	0.96	235	11.42 (-5.1, 27.95)	480	9.34 (-4.01, 22.69)	0.75
Postnatal NO_2	715	235	-2.73 (-7.05, 1.59)	480	1.72 (-1.46, 4.91)	0.07	235	-0.84 (-4.13, 2.45)	480	1.91 (-0.45, 4.26)	0.14
Proximity to major roadway <150m[f]	719	236	-2.72 (-10.92, 5.48)	483	1.21 (-3.79, 6.21)	0.42	236	-1.02 (-7.79, 5.74)	483	-1.35 (-5.16, 2.47)	0.94

a. $PM_{2.5}$ and NO_2 in each window were rescaled to two-unit increment.
b. N is the analytic sample size for each interaction model.
c. N is the analytic sample in each stratum.
d. In addition to effect modifiers and interaction terms, the linear regressions were controlled for child sex, child age and height at age 4-6 years visit, study site, maternal age at childbirth, maternal race, maternal education, income adjusted by household size, breastfeeding, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, maternal Global Severity Index, child sleeping scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Visit date was universally modeled with 1 degree of freedom (df)/year in all models. Conception date was modeled with 1 df/year for analyses with NO_2, and was modeled with varied df for $PM_{2.5}$ in different windows: 8 df/year of conception date for trimester specific $PM_{2.5}$, 4 df/year for prenatal $PM_{2.5}$ and 1 df/year for postnatal $PM_{2.5}$. There was no time adjustment for proximity to major roadway in all interaction models.
e. P values are for interaction terms.
f. Proximity to major roadway was estimated based on the single address with the longest residential history in the pre- and postnatal window and was dichotomized at 150 meters from any major roadway of A1, A2 or A3.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure

Table S7. Estimated effects of air pollution exposures on HBP by maternal HEI levels (Median and above vs. Below Median), maternal plasma folate (1st quartile vs. > 1st quartile), child sex (female vs. male) and maternal race (Black vs. non-Black) from the interaction models in the CANDLE cohort

		Maternal HEI <Median		Maternal HEI ≥Median		
	N[b]	N of HBP[c]	IRR (95%CI)[d]	N of HBP[c]	IRR (95%CI)[d]	P value[e]
Prenatal exposures						
1st trimester $PM_{2.5}$	669	98	1.01 (0.52, 1.96)	86	1.17 (0.59, 2.34)	0.48
2nd trimester $PM_{2.5}$	669	98	0.8 (0.38, 1.66)	86	0.9 (0.43, 1.91)	0.51
3rd trimester $PM_{2.5}$	666	98	1.14 (0.71, 1.86)	86	1.25 (0.76, 2.04)	0.57
Prenatal $PM_{2.5}$	669	98	1.38 (0.58, 3.33)	86	1.71 (0.68, 4.31)	0.51
Prenatal NO_2	669	98	1.01 (0.85, 1.2)	86	1.08 (0.89, 1.31)	0.56
Proximity to major roadway <150m[f]	670	98	1.03 (0.73, 1.47)	87	1.08 (0.72, 1.64)	0.87
Postnatal exposures						
Postnatal $PM_{2.5}$	632	90	1.99 (0.57, 6.98)	85	2.04 (0.54, 7.7)	0.97
Postnatal NO_2	632	90	1.15 (0.89, 1.47)	85	1.16 (0.92, 1.48)	0.92
Proximity to major roadway <150m[f]	634	91	0.86 (0.58, 1.29)	85	1.23 (0.83, 1.83)	0.21
		Plasma folate in the 1st quartile		**Plasma folate in the 2nd-4th quartile**		
	N[b]	N of HBP[c]	IRR (95%CI)[d]	N of HBP[c]	IRR (95%CI)[d]	P value[e]
Prenatal exposures						
1st trimester $PM_{2.5}$	756	60	0.71 (0.37, 1.36)	159	0.93 (0.53, 1.65)	0.14
2nd trimester $PM_{2.5}$	756	60	1.08 (0.57, 2.05)	159	0.91 (0.48, 1.72)	0.22
3rd trimester $PM_{2.5}$	753	60	1.33 (0.81, 2.17)	159	1.07 (0.69, 1.66)	0.14
Prenatal $PM_{2.5}$	756	60	1.61 (0.73, 3.52)	159	1.45 (0.67, 3.15)	0.68
Prenatal NO_2	756	60	0.99 (0.82, 1.2)	159	1.05 (0.9, 1.22)	0.62
Proximity to major roadway <150m[f]	757	60	0.86 (0.54, 1.38)	160	1.09 (0.82, 1.46)	0.40
Postnatal exposures						
Postnatal $PM_{2.5}$	715	58	1.94 (0.6, 6.29)	150	2.23 (0.68, 7.26)	0.80
Postnatal NO_2	715	58	1.13 (0.86, 1.47)	150	1.16 (0.94, 1.42)	0.86
Proximity to major roadway <150m[f]	719	58	1.1 (0.71, 1.71)	152	0.9 (0.65, 1.24)	0.46
		Male children		**Female children**		
measurements	N[b]	N of HBP[c]	IRR (95%CI)[d]	N of HBP[c]	IRR (95%CI)[d]	P value[e]
Prenatal exposures						
1st trimester $PM_{2.5}$	756	134	1 (0.56, 1.78)	85	0.81 (0.44, 1.48)	0.19
2nd trimester $PM_{2.5}$	756	134	0.97 (0.52, 1.83)	85	0.97 (0.51, 1.87)	1.00
3rd trimester $PM_{2.5}$	753	134	1.08 (0.7, 1.68)	85	1.15 (0.72, 1.84)	0.68
Prenatal $PM_{2.5}$	756	134	1.55 (0.73, 3.3)	85	1.4 (0.62, 3.17)	0.67
Prenatal NO_2	756	134	1.07 (0.93, 1.23)	85	0.98 (0.81, 1.19)	0.39
Proximity to major roadway <150m[f]	757	135	1.06 (0.78, 1.43)	85	0.97 (0.64, 1.46)	0.74
Postnatal exposures						
Postnatal $PM_{2.5}$	715	129	1.85 (0.61, 5.55)	79	2.68 (0.78, 9.19)	0.44
Postnatal NO_2	715	129	1.21 (1, 1.47)	79	1.06 (0.83, 1.35)	0.30
Proximity to major roadway <150m[f]	719	130	0.93 (0.67, 1.28)	80	1 (0.66, 1.52)	0.77
		Non-black mothers		**Black mothers**		
	N[b]	N of HBP[c]	IRR (95%CI)[d]	N of HBP[c]	IRR (95%CI)[d]	P value[e]
Prenatal exposures						
1st trimester $PM_{2.5}$	756	63	1.01 (0.55, 1.87)	156	0.83 (0.46, 1.49)	0.25
2nd trimester $PM_{2.5}$	756	63	0.94 (0.49, 1.8)	156	1 (0.52, 1.91)	0.68
3rd trimester $PM_{2.5}$	753	63	1.1 (0.67, 1.8)	156	1.11 (0.72, 1.72)	0.95
Prenatal $PM_{2.5}$	756	63	1.47 (0.61, 3.54)	156	1.51 (0.72, 3.17)	0.93
Prenatal NO_2	756	63	1.03 (0.8, 1.33)	156	1.03 (0.9, 1.19)	0.99
Proximity to major roadway <150m[f]	757	63	1.46 (0.91, 2.34)	157	0.91 (0.69, 1.2)	0.09
Postnatal exposures						
Postnatal $PM_{2.5}$	715	58	1.97 (0.44, 8.84)	150	2.16 (0.74, 6.35)	0.88
Postnatal NO_2	715	58	0.92 (0.69, 1.23)	150	1.24 (1.02, 1.51)	0.06
Proximity to major roadway <150m[f]	719	59	1.09 (0.61, 1.94)	151	0.92 (0.69, 1.23)	0.62

a. $PM_{2.5}$ and NO_2 in each window were rescaled to two-unit increment.
b. N is the analytic sample size for each interaction model.
c. N is the cases of HBP in each stratum.
d. In addition to effect modifiers and interaction terms, the Poisson regressions were controlled for child sex, child age and height at age 4-6 years visit, study site, maternal age at childbirth, maternal race, maternal education, income adjusted by household size, breastfeeding, urinary cotinine adjusted by specific gravity in the 2^{nd} trimester, BMI class before pregnancy, insurance status, maternal Global Severity Index, child sleeping scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Visit date was universally modeled with 1 degree of freedom (df)/year in all models. Conception date was modeled with 1 df/year for analyses with NO_2, and was modeled with varied df for $PM_{2.5}$ in different windows: 8 df/year of conception date for trimester specific $PM_{2.5}$, 4 df/year for prenatal $PM_{2.5}$ and 1 df/year for postnatal $PM_{2.5}$. There was no time adjustment for proximity to major roadway in all interaction models.
e. P values are for interaction terms.
f. Proximity to major roadway was estimated based on the single address with the longest residential history in the pre- and postnatal window and was dichotomized at 150 meters from any major roadway of A1, A2 or A3.

Abbreviations: HBP: high blood pressure, IRR: incidence rate ratio

Table S8. Comparisons of estimates and 95% CI for $PM_{2.5}$ from multi-year spatio-temporal models and fixed-year spatio-temporal models in the CANDLE cohort

	Prenatal $PM_{2.5}$[a]				Postnatal $PM_{2.5}$[a]			
	Multi-year spatio-temporal models[c]		2006 fixed-year spatio-temporal models		Multi-year spatio-temporal models[c]		2011 fixed-year spatio-temporal models	
Models[b]	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)
SBP percentile								
Model 1	818	-1.96 (-6.75, 2.83)	818	9.3 (-0.16, 18.75)	780	16.99 (7.46, 26.51)	780	12.71 (-0.64, 26.07)
Model 2	817	9.06 (-0.16, 18.28)	817	10.54 (1.04, 20.05)	775	15.08 (1.42, 28.73)	775	13.88 (0.42, 27.33)
Model 3	756	8.83 (-2.45, 20.11)	756	8.96 (-2.63, 20.55)	715	9.55 (-8.85, 27.94)	715	9.05 (-9.26, 27.36)
Model 4	754	8.26 (-3.15, 19.66)	754	8.74 (-2.81, 20.3)	714	8.79 (-9.73, 27.31)	714	8.82 (-9.66, 27.31)
DBP percentile								
Model 1	818	-0.06 (-3.48, 3.36)	818	8.17 (1.15, 15.18)	780	6.7 (-0.25, 13.65)	780	8.95 (-1.01, 18.92)
Model 2	817	8.81 (1.77, 15.85)	817	9.56 (2.63, 16.49)	775	8.98 (-0.78, 18.74)	775	9.52 (-0.16, 19.19)
Model 3	756	11.58 (2.94, 20.22)	756	11.64 (3.47, 19.81)	715	9.94 (-3.15, 23.02)	715	11.45 (-1.57, 24.47)
Model 4	754	11.03 (2.54, 19.52)	754	11.58 (3.55, 19.61)	714	9.72 (-3.36, 22.81)	714	11.49 (-1.55, 24.53)
HBP								
Model 1	818	0.78 (0.59, 1.03)	818	0.99 (0.55, 1.79)	780	1.74 (0.98, 3.1)	780	1.65 (0.7, 3.89)
Model 2	817	1.26 (0.7, 2.28)	817	1.03 (0.57, 1.86)	775	1.78 (0.76, 4.17)	775	1.82 (0.75, 4.39)
Model 3	756	1.5 (0.71, 3.14)	756	1.09 (0.55, 2.15)	715	2.12 (0.73, 6.15)	715	2.16 (0.72, 6.5)
Model 4	754	1.39 (0.66, 2.94)	754	1.05 (0.53, 2.08)	714	2.1 (0.71, 6.17)	714	2.170.71, 6.63)

a. $PM_{2.5}$ in each window was rescaled to two-unit increment.

b. Multivariate linear regressions were used for BP percentiles and Poisson regressions were used for HBP based on complete data. Model 1 was adjusted for child sex, child age and height at age 4-6 years visit, and recruitment site. Model 2 was additionally adjusted for times splines for visit date and conception date. Visit date was universally modeled with 1 degree of freedom (df)/year in all models. Conception date was modeled with varied df for $PM_{2.5}$ in different windows: 8 df/year of conception date for trimester specific $PM_{2.5}$, 4 df/year for prenatal $PM_{2.5}$ and 1 df/year for postnatal $PM_{2.5}$. Model 3 (the fully adjusted model) was additionally adjusted for maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Model 4 (the extended model) was further controlled for maternal hypertensive disorder, gestational age, birthweight and child BMI at

the age 4-6 years visit for prenatal exposures, and was only additionally for child BMI at the age 4-6 years visit for postnatal exposures.

c. The spatio-temporal models correspond to the models used in the primary analysis, and the results are the same as those shown in Table 3.
d. N is the analytic sample size for each model.

Abbreviations: DBP: diastolic blood pressure, SBP: systolic blood pressure, HBP: high blood pressure, IRR: incidence rate ratio

Table S9. Comparisons of estimates and 95% CI for NO_2 from annual national models and fixed year national models in the CANDLE cohort

	Prenatal NO_2[a]				Postnatal NO_2[a]			
	Annual national models[c]		2006 national models		Annual national models[c]		2011 national models	
Models[b]	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)	N[d]	β/IRR (95% CI)
SBP percentile								
Model 1	818	0.79 (-0.92, 2.49)	818	0.85 (-0.64, 2.34)	780	1.55 (-0.66, 3.77)	780	0.82 (-1.26, 2.9)
Model 2	817	1.13 (-0.56, 2.82)	817	0.95 (-0.53, 2.43)	775	1.09 (-1.15, 3.32)	775	1.01 (-1.08, 3.1)
Model 3	756	1.28 (-0.74, 3.31)	756	1.07 (-0.7, 2.85)	715	0.25 (-2.53, 3.04)	715	0.2 (-2.4, 2.8)
Model 4	754	1 (-1.01, 3.02)	754	0.86 (-0.92, 2.63)	714	0.14 (-2.59, 2.88)	714	0.06 (-2.49, 2.62)
DBP percentile								
Model 1	818	-0.1 (-1.39, 1.19)	818	0.12 (-1.01, 1.25)	780	1.13 (-0.52, 2.77)	780	0.86 (-0.7, 2.42)
Model 2	817	0.29 (-0.99, 1.57)	817	0.18 (-0.94, 1.29)	775	0.86 (-0.79, 2.52)	775	0.83 (-0.73, 2.39)
Model 3	756	0.47 (-1.03, 1.97)	756	0.31 (-0.99, 1.62)	715	1 (-1.08, 3.07)	715	0.99 (-0.96, 2.94)
Model 4	754	0.36 (-1.1, 1.81)	754	0.24 (-1.04, 1.52)	714	0.94 (-1.11, 2.99)	714	0.91 (-1.01, 2.84)
HBP								
Model 1	818	0.97 (0.87, 1.08)	818	0.99 (0.9, 1.09)	780	1.13 (0.98, 1.3)	780	1.1 (0.96, 1.25)
Model 2	817	1 (0.9, 1.12)	817	1 (0.91, 1.1)	775	1.11 (0.96, 1.28)	775	1.11 (0.97, 1.27)
Model 3	756	1.03 (0.91, 1.18)	756	1.03 (0.92, 1.15)	715	1.15 (0.96, 1.37)	715	1.15 (0.97, 1.36)
Model 4	754	1.03 (0.9, 1.17)	754	1.02 (0.91, 1.14)	714	1.14 (0.95, 1.36)	714	1.140.96, 1.35)

a. NO_2 in each window was rescaled to two-unit increment.

b. Multivariate linear regressions were used for BP percentiles and Poisson regressions were used for HBP based on complete data. Model 1 was adjusted for child sex, child age and height at age 4-6 years visit, and recruitment site. Model 2 was additionally adjusted for times splines for visit date and conception date. Visit date and conception date were modeled with 1 degree of freedom (df)/year in all models. Model 3 (the fully adjusted model) was additionally adjusted for maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Model 4 (the extended model) was further controlled for maternal hypertensive disorder, gestational age, birthweight and child BMI at the age 4-6 years visit for prenatal exposures, and was only additionally for child BMI at the age 4-6 years visit for postnatal exposures.

c. The national annual models correspond to the models used in the primary analysis, and the results are the same as those shown in Table 3.

d. N is the analytic sample size for each model.

Abbreviations: DBP: diastolic blood pressure, SBP: systolic blood pressure, HBP: high blood pressure, IRR: incidence rate ratio

Table S10. Estimated effects of $PM_{2.5}$ in the 2nd trimester and during the whole prenatal period on BP percentiles from the full model (Model 3) adjusted for time splines of date of conception with varied degree of freedom in the CANDLE cohort

	$PM_{2.5}$ in the 2nd trimester[a] (N[b] = 756)		Prenatal $PM_{2.5}$[a] (N[b] = 756)	
Degree of freedom for conception date[c]	**SBP percentile β/IRR (95% CI)[d]**	**DBP percentile β/IRR (95% CI)[d]**	**SBP percentile β/IRR (95% CI)[d]**	**DBP percentile β/IRR (95% CI)[d]**
No adjustment	1.03 (-1.63, 3.69)	0.75 (-1.32, 2.82)	1.04 (-4.3, 6.37)	2.37 (-1.85, 6.59)
1	2.02 (-0.9, 4.94)	1.59 (-0.6, 3.78)	3.29 (-3.2, 9.78)	6 (1.05, 10.95)
2	3.48 (-0.18, 7.13)	1.98 (-0.61, 4.57)	6.4 (-1.66, 14.46)	7.88 (2.01, 13.75)
3	6.26 (0.94, 11.59)	2.78 (-1, 6.56)	10.45 (-0.83, 21.73)	11.88 (3.28, 20.48)
4	8.46 (1.99, 14.94)	5.46 (0.99, 9.92)	8.83 (-2.45, 20.11)	11.58 (2.94, 20.22)
5	13.76 (4.97, 22.54)	7.9 (1.35, 14.45)	12.68 (0.49, 24.87)	15.75 (6.46, 25.04)
6	14.9 (5.39, 24.4)	9.09 (2.13, 16.04)	13.05 (0.62, 25.48)	15.51 (6.05, 24.96)
7	14.88 (5.06, 24.71)	9.21 (1.99, 16.44)	13.25 (0.83, 25.67)	15.64 (6.3, 24.97)
8	14.61 (4.62, 24.6)	8.65 (1.38, 15.92)	12.78 (0.25, 25.31)	14.7 (5.2, 24.2)
9	15.05 (5.07, 25.02)	8.46 (1.05, 15.86)	14.03 (1.4, 26.67)	15.26 (5.66, 24.86)
10	14.41 (4.29, 24.53)	7.69 (0.09, 15.3)	13.74 (0.92, 26.56)	14.99 (5.22, 24.76)
11	15.21 (4.56, 25.85)	10 (1.95, 18.06)	12.46 (-0.42, 25.33)	15.23 (5.44, 25.01)
12	14.81 (3.92, 25.7)	10.01 (1.47, 18.55)	13.04 (0.03, 26.06)	14.88 (5.01, 24.76)

a. $PM_{2.5}$ in each window was rescaled to two-unit increment.
b. N is the analytic sample size for each model.
c. Conception date was modeled with 8 degrees of freedom per year (df/year) for 2nd trimester $PM_{2.5}$ and 4 df/year for $PM_{2.5}$ averaged over the whole pregnancy period in the primary analysis.
d. The results were obtained from linear regressions with conception date modeled with varied df/year. Models were adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date and conception date (except for the model without conception date adjustment), maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, pre-pregnancy BMI class, pregnancy insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure

Table S11. Estimated effects of trimester specific $PM_{2.5}$ on child BP from the fully adjusted models (Model 3) simultaneously controlled for $PM_{2.5}$ in the other two trimesters in the CANDLE cohort

	SBP percentile		DBP percentile		HBP	
Measurements[a]	**N[b]**	**β (95% CI)[c]**	**N[b]**	**β (95% CI)[c]**	**N[b]**	**IRR (95% CI)[c]**
1st trimester $PM_{2.5}$	753	-2.4 (-12.12, 7.33)	753	1.43 (-5.75, 8.61)	753	0.91 (0.51, 1.61)
2nd trimester $PM_{2.5}$	753	17.16 (6.19, 28.13)	753	7.55 (-0.33, 15.42)	753	0.98 (0.52, 1.87)
3rd trimester $PM_{2.5}$	753	-4.47 (-12.24, 3.29)	753	2.79 (-3.02, 8.61)	753	1.12 (0.72, 1.74)

a. $PM_{2.5}$ in each window was rescaled to two-unit increment.
b. N is the analytic sample size for each model.
c. Linear regression models based on complete data were adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date with 1 degree of freedom per year (df/year), time splines for conception date with 8 df/year, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, pre-pregnancy BMI class, pregnancy insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. All three trimester-specific $PM_{2.5}$ were included simultaneously in the models.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure, HBP: high blood pressure, IRR: incidence rate ratio

Table S12. Estimated effects of prenatal air pollution exposures on child BP from the fully adjusted models (Model 3) additionally controlled for postnatal exposures in the CANDLE cohort

	SBP percentile		DBP percentile		HBP	
Measurements[a]	**N[b]**	**β (95% CI)[c]**	**N[b]**	**β (95% CI)[c]**	**N[b]**	**IRR (95% CI)[c]**
1st trimester $PM_{2.5}$	756	-0.44 (-10.61, 9.72)	756	2.52 (-5.05, 10.1)	756	0.68 (0.37, 1.23)
2nd trimester $PM_{2.5}$	756	14.77 (3.64, 25.89)	756	8.28 (-0.04, 16.6)	756	0.71 (0.36, 1.41)
3rd trimester $PM_{2.5}$	753	-3.17 (-11.01, 4.67)	753	3.5 (-2.42, 9.43)	753	0.99 (0.64, 1.53)
Prenatal $PM_{2.5}$	756	6.4 (-6.21, 19)	756	11.06 (1.02, 21.11)	756	1.16 (0.52, 2.57)
Prenatal NO_2	756	1.64 (-1.39, 4.67)	756	0.03 (-2.44, 2.5)	756	0.91 (0.75, 1.11)
Prenatal proximity to major roadway (<150m)[d]	757	0.43 (-4.23, 5.09)	757	1.01 (-2.59, 4.6)	757	1.06 0.81, 1.39)

a. $PM_{2.5}$ and NO_2 in each window were rescaled to two-unit increment.
b. N is the analytic sample size for each model.
c. Linear regressions were used for BP percentiles and Poisson regressions were used for HBP based on complete data. Models were adjusted for prenatal exposures, child sex, child age and height at age 4-6 years visit, recruitment site, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, pre-pregnancy BMI class, pregnancy insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. For $PM_{2.5}$ and NO_2, time splines for visit date with 1 degree of freedom per year (1df/year) were universally adjusted. In addition, time splines for conception date with 8 df/year were controlled for trimester specific $PM_{2.5}$, and 4 df/year were used for $PM_{2.5}$ and NO_2 over the prenatal period. There was no time adjustment for proximity to major roadway in all models.
d. Proximity to major roadway was estimated based on the single address with the longest residential history in the prenatal window and was dichotomized at 150 meters from any major roadway of A1, A2 or A3.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure, HBP: high blood pressure, IRR: incidence rate ratio

Table S13. Estimated effects of $PM_{2.5}$ in the 2nd trimester and during prenatal period on BP percentiles and raw BP from the full model (Model 3) adjusted for thin-plate regression splines (TPRS) of child height and age with varied degree of freedom in the CANDLE cohort

	2nd trimester $PM_{2.5}$ (N = 756)[a]			
degree of freedom for TPRS	SBP percentile β (95% CI)[b]	DBP percentile β (95% CI)[b]	Raw SBP β (95% CI)[b]	Raw DBP β (95% CI)[b]
5	14.07 (4.25, 23.89)	7.86 (0.5, 15.21)	5.22 (1.4, 9.04)	3.51 (-0.11, 7.13)
6	14.01 (4.18, 23.83)	7.83 (0.46, 15.19)	5.22 (1.4, 9.04)	3.54 (-0.08, 7.16)
7	14.01 (4.17, 23.84)	7.83 (0.46, 15.2)	5.22 (1.4, 9.05)	3.54 (-0.08, 7.16)
8	14.06 (4.23, 23.89)	7.85 (0.48, 15.23)	5.24 (1.41, 9.06)	3.54 (-0.09, 7.16)
9	14.06 (4.22, 23.9)	7.85 (0.48, 15.23)	5.24 (1.41, 9.06)	3.54 (-0.09, 7.16)
10	14.3 (4.43, 24.17)	7.82 (0.42, 15.21)	5.25 (1.42, 9.09)	3.5 (-0.14, 7.14)
11	14.68 (4.82, 24.53)	7.86 (0.46, 15.27)	5.41 (1.58, 9.25)	3.57 (-0.07, 7.21)
12	14.68 (4.82, 24.54)	7.9 (0.49, 15.31)	5.44 (1.6, 9.27)	3.61 (-0.03, 7.25)
	Prenatal $PM_{2.5}$ (N = 756)[a]			
degree of freedom for TPRS	SBP percentile β (95% CI)[b]	DBP percentile β (95% CI)[b]	Raw SBP β (95% CI)[b]	Raw DBP β (95% CI)[b]
5	7.71 (-3.6, 19.02)	10.22 (1.86, 18.59)	2.55 (-1.85, 6.95)	3.96 (-0.16, 8.07)
6	7.68 (-3.63, 18.99)	10.22 (1.85, 18.6)	2.55 (-1.85, 6.95)	3.97 (-0.14, 8.08)
7	7.78 (-3.56, 19.11)	10.2 (1.81, 18.59)	2.7 (-1.71, 7.1)	4.09 (-0.03, 8.21)
8	7.77 (-3.56, 19.1)	10.19 (1.8, 18.59)	2.69 (-1.71, 7.1)	4.09 (-0.04, 8.21)
9	7.77 (-3.57, 19.11)	10.19 (1.8, 18.58)	2.7 (-1.71, 7.1)	4.09 (-0.04, 8.21)
10	7.96 (-3.42, 19.33)	10.18 (1.76, 18.6)	2.7 (-1.72, 7.12)	4.06 (-0.08, 8.2)
11	8.83 (-2.57, 20.23)	10.33 (1.88, 18.79)	3.09 (-1.34, 7.52)	4.25 (0.1, 8.41)
12	8.83 (-2.58, 20.23)	10.36 (1.9, 18.82)	3.11 (-1.32, 7.54)	4.28 (0.13, 8.43)

a. $PM_{2.5}$ in each window were rescaled to two-unit increment.

b. Linear regression models based on complete data were adjusted for child sex, thin-plate regression splines for child age and height at age 4-6 years visit with varied degrees of freedom from 5-12, recruitment site, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, pre-pregnancy BMI class, pregnancy insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Time splines for visit date with 1 degree of freedom per year (df/year) was adjusted in all models. Time splines for conception date with 8 df/year and 4 df/year were included in the models with 2nd trimester $PM_{2.5}$ and prenatal $PM_{2.5}$, respectively.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure, TRPS: thin-plate regression splines

Table S14. Estimated effects of air pollution exposures on BP percentiles and HBP from the fully adjusted model with linear restricted cubic splines of all continuous variables in the CANDLE cohort

	SBP percentile		DBP percentile		HBP	
Measurements[a]	**N[b]**	**β (95% CI)[c]**	**N[b]**	**β (95% CI)[c]**	**N[b]**	**IRR (95% CI)[c]**
Prenatal exposures						
1st trimester $PM_{2.5}$	756	2.05 (-7.39, 11.49)	756	4.27 (-2.53, 11.06)	756	0.93 (0.53, 1.66)
2nd trimester $PM_{2.5}$	756	14.42 (4.45, 24.39)	756	8.41 (1.23, 15.59)	756	0.93 (0.5, 1.73)
3rd trimester $PM_{2.5}$	753	-1.98 (-9.59, 5.64)	753	4.14 (-1.66, 9.95)	753	1.04 (0.68, 1.59)
Prenatal $PM_{2.5}$	756	8.5 (-2.8, 19.81)	756	12 (3.45, 20.54)	756	1.59 (0.76, 3.31)
Prenatal NO_2	756	1.22 (-0.83, 3.27)	756	0.46 (-1.06, 1.97)	756	1.03 (0.9, 1.17)
Proximity to major roadway (<150m)[d]	757	0.38 (-3.82, 4.59)	757	0.03 (-3.09, 3.15)	757	1.03 (0.81, 1.31)
Postnatal exposures						
Postnatal $PM_{2.5}$	715	8.46 (-9.7, 26.62)	715	9.12 (-3.68, 21.92)	715	1.84 (0.65, 5.2)
Postnatal NO_2	715	0.17 (-2.68, 3.02)	715	1.01 (-1.11, 3.13)	715	1.14 (0.95, 1.36)
Proximity to major roadway (<150m)[d]	719	0.06 (-4.33, 4.46)	719	-1.28 (-4.61, 2.06)	719	0.96 (0.74, 1.25)

a. $PM_{2.5}$ and NO_2 in each window were rescaled to two-unit increment.
b. N is the analytic sample size for each model.
c. Multivariate linear regressions were used for BP percentiles and Poisson regressions were used for HBP based on complete data. Models were adjusted for adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date and date of conception, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Visit date was universally modeled with 1 degree of freedom (df)/year in all models. Conception date was modeled with 1 df/year for analyses with NO_2, and was modeled with varied df for $PM_{2.5}$ in different windows: 8 df/year of conception date for trimester specific $PM_{2.5}$, 4 df/year for prenatal $PM_{2.5}$ and 1 df/year for postnatal $PM_{2.5}$. There was no time adjustment for proximity to major roadway in all models. All continuous variables, including child age and height at age 4-6 years visit, maternal age at childbirth, income adjusted by household size, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, child sleep scores and Child Opportunity Indices, were modeled as linear restricted cubic splines.
d. Proximity to major roadway was estimated based on the single address with the longest residential history in the pre- and postnatal window and was dichotomized at 150 meters from any major roadway of A1, A2 or A3.

Abbreviations: SBP: systolic blood pressure, DBP: diastolic blood pressure, HBP: high blood pressure, IRR: incidence rate ratio

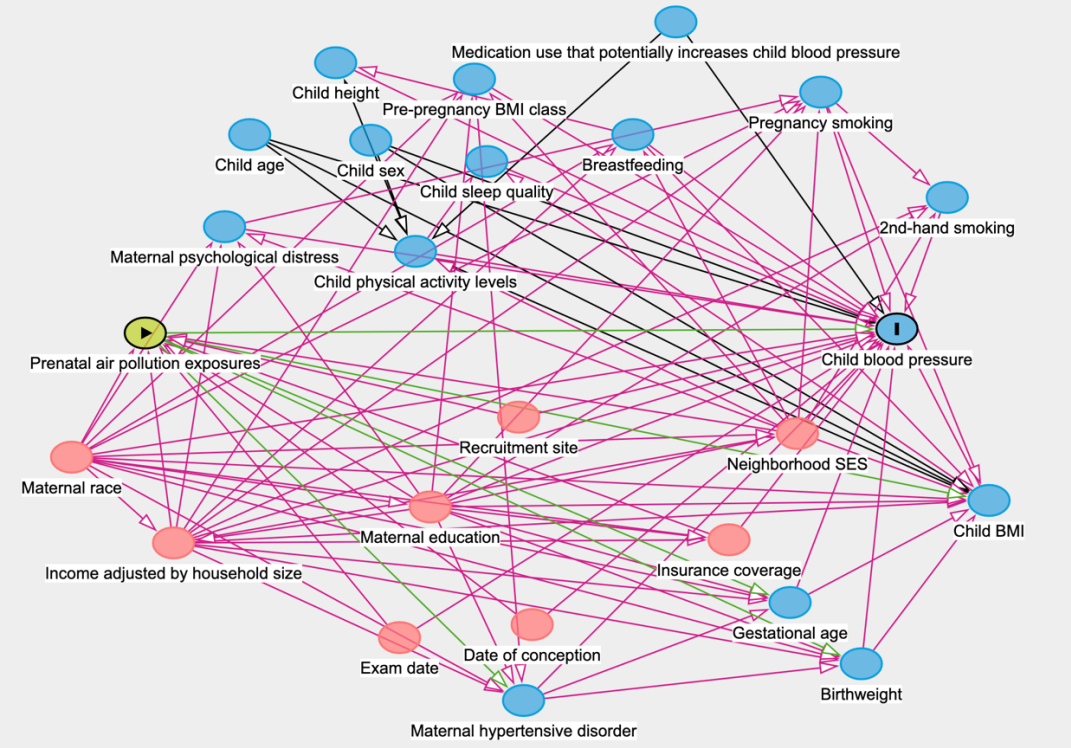
Table S15. Estimated effects of air pollution exposures on log transformed DBP percentile from the fully adjusted model in the CANDLE cohort

Measurements[a]	N[b]	β (95%CI)[c]
Prenatal period		
1st trimester $PM_{2.5}$	756	0.07 (-0.04, 0.18))
2nd trimester $PM_{2.5}$	756	0.14 (0.02, 0.25))
3rd trimester $PM_{2.5}$	753	0.06 (-0.04, 0.16))
Prenatal $PM_{2.5}$	756	0.18 (0.03, 0.33))
Prenatal NO_2	756	0.002 (-0.02, 0.03)
Proximity to major roadway (<150m)[d]	757	-0.01 (-0.07, 0.04)
Postnatal period		
Postnatal $PM_{2.5}$	715	0.11 (-0.1, 0.33))
Postnatal NO_2	715	0.01 (-0.03, 0.04)
Proximity to major roadway (<150m)[d]	719	-0.02 (-0.08, 0.03)

a. $PM_{2.5}$ and NO_2 in each window were rescaled to two-unit increment.
b. N is the analytic sample size for each model.
c. The dependent variable is the log transformed DBP percentile. Linear regression models based on complete data were adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date and conception date for $PM_{2.5}$ and NO_2, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, pre-pregnancy BMI class, pregnancy insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. Time splines for visit date with 1 degree of freedom per year (df/year) was adjusted in all models. Conception date was modeled with 1 df/year for analyses with NO_2, and was modeled with varied df for $PM_{2.5}$ in different windows: 8 df/year of conception date for trimester specific $PM_{2.5}$, 4 df/year for prenatal $PM_{2.5}$ and 1 df/year for postnatal $PM_{2.5}$. There was no time adjustment for proximity to major roadway.
d. Proximity to major roadway was estimated based on the single address with the longest residential history in the pre- and postnatal window and was dichotomized at 150 meters from any major roadway of A1, A2 or A3.

Figure S1: Directed acyclic graphs for the associations of pre- (A) and postnatal natal air pollution exposures (B) with child blood pressure (Textor et al. 2016)

A. Prenatal air pollution exposures and child blood pressure



B. Postnatal air pollution exposures and child blood pressure

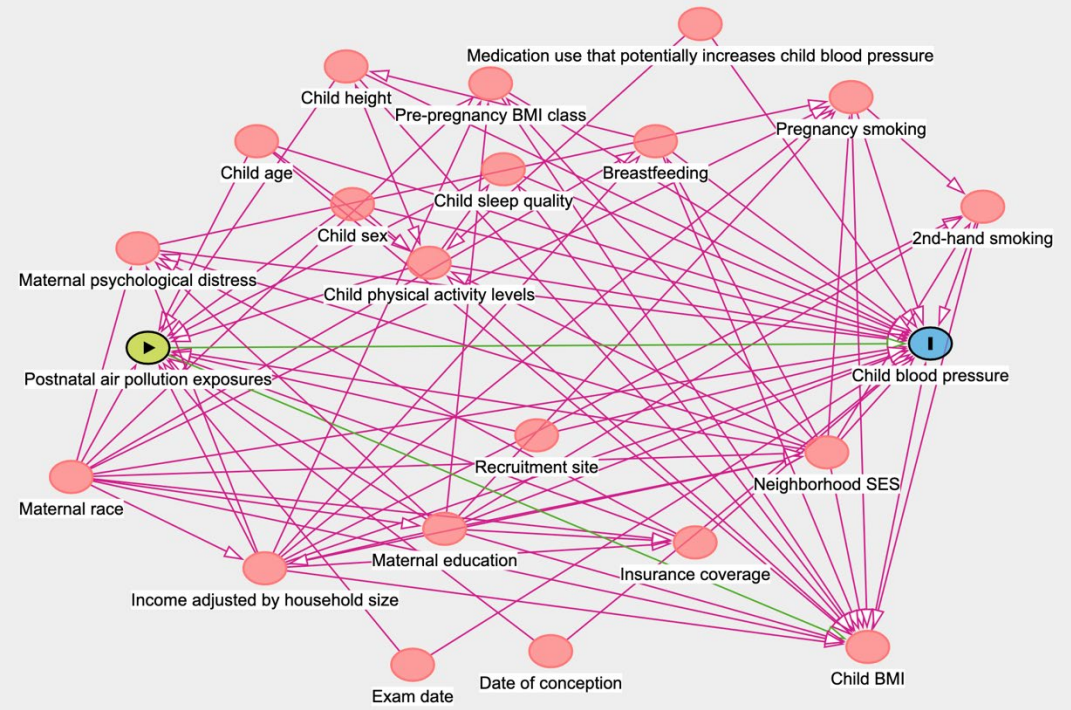


Figure captions:

Shown are the directed acyclic graphs for the associations of pre- and postnatal natal air pollution exposures with child blood pressure.

Reference:

Textor J, van der Zander B, Gilthorpe MS, Liskiewicz M, Ellison GT. 2016. Robust causal inference using directed acyclic graphs: the R package "dagitty." Int J Epidemiol 45:1887–1894; doi:10.1093/ije/dyw341.

Figure S2: Scatterplots of air pollution exposures in each window by splines of conception date

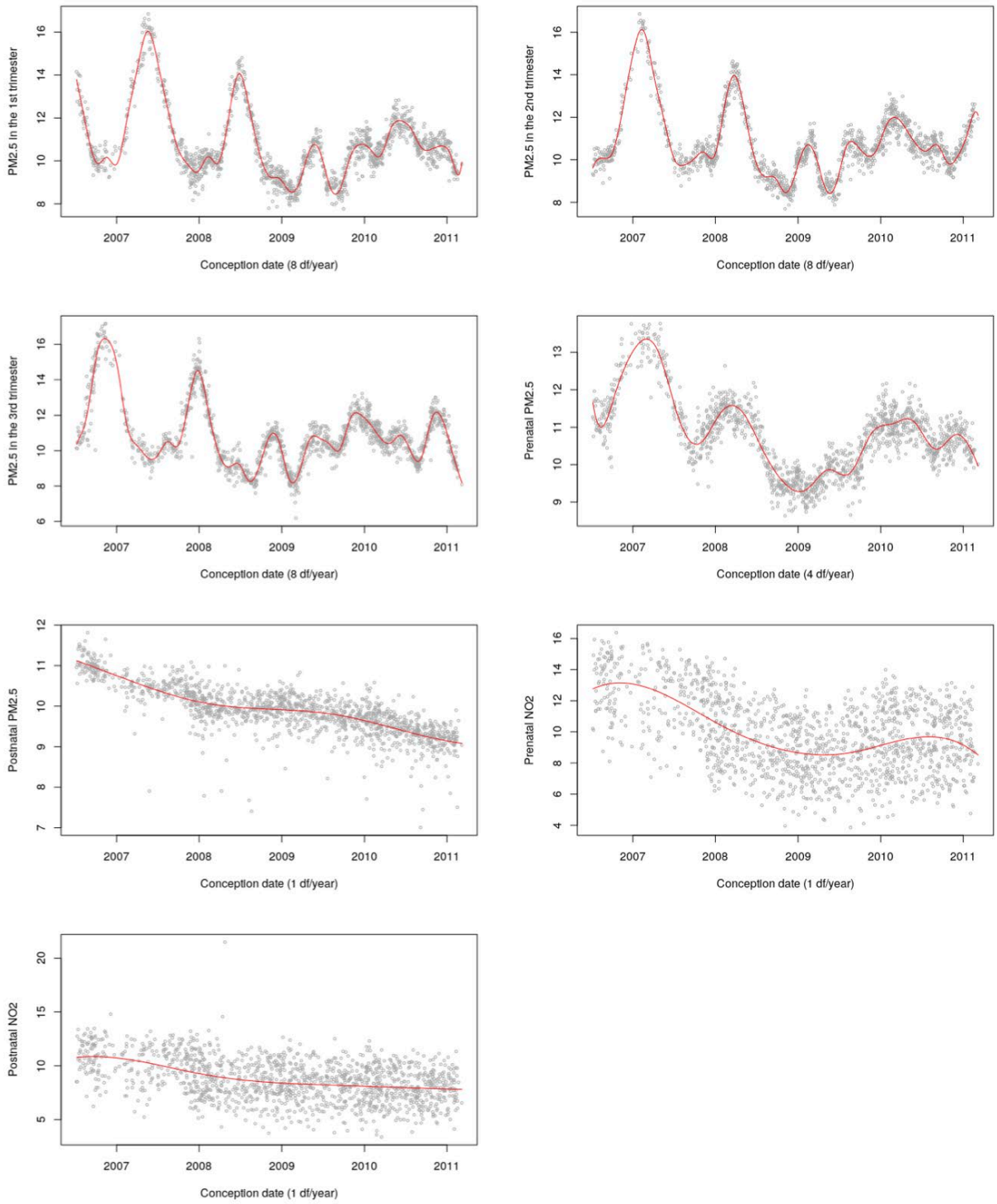


Figure captions:

Shown are scatterplots of $PM_{2.5}$ and NO_2 in each window by splines of conception date with varied degree(s) of freedom per year. The red line indicates the fitted curve between the observed values and the predicted values.

Figure S3. Distributions of systolic and diastolic blood pressure percentiles and raw measurements in the CANDEL cohort

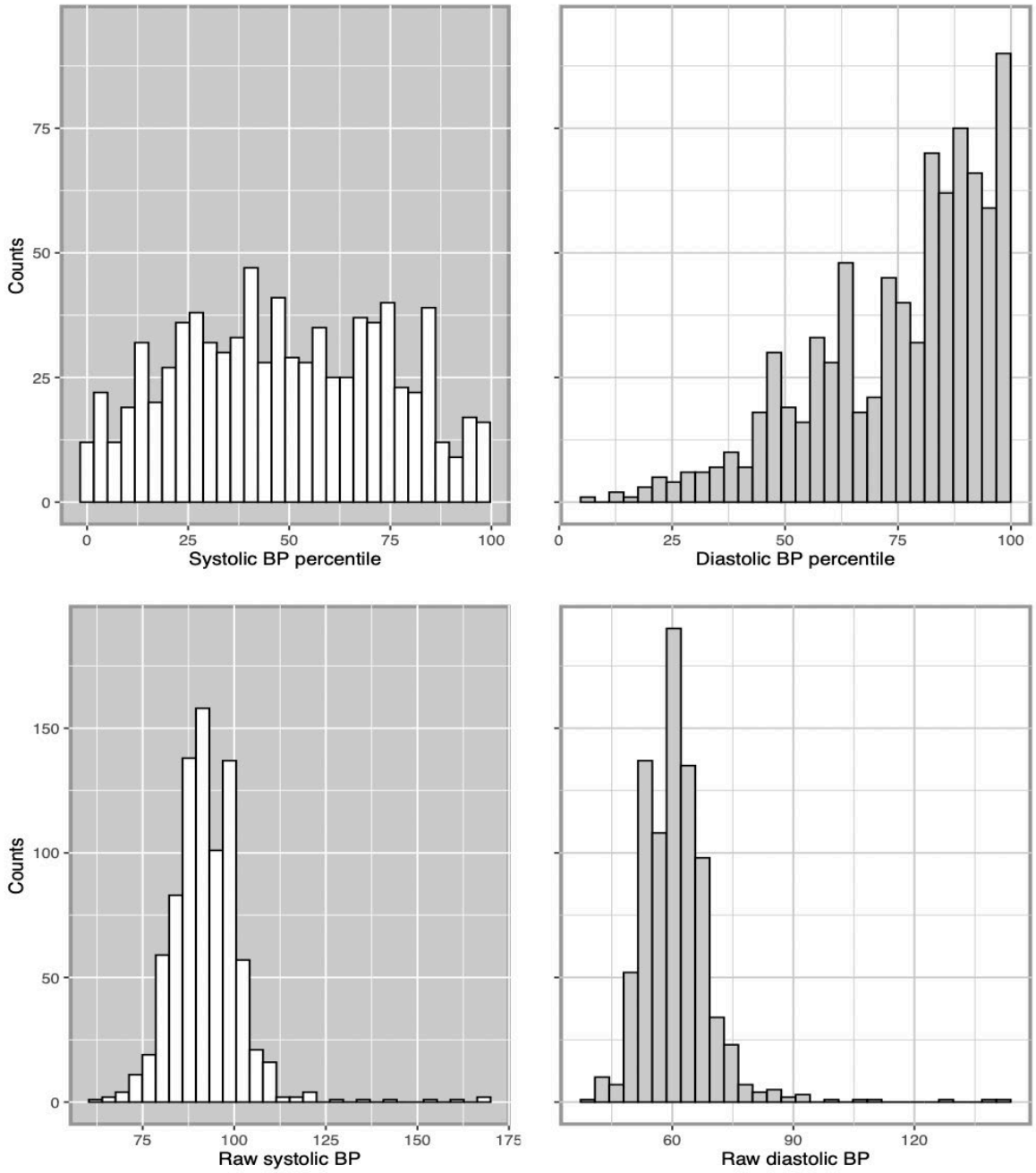


Figure captions:

Shown are histograms of systolic and diastolic blood pressure percentiles and raw measurements in the CANDEL cohort.

Figure S4. Boxplots of air pollution exposures in different windows in the CANDEL cohort

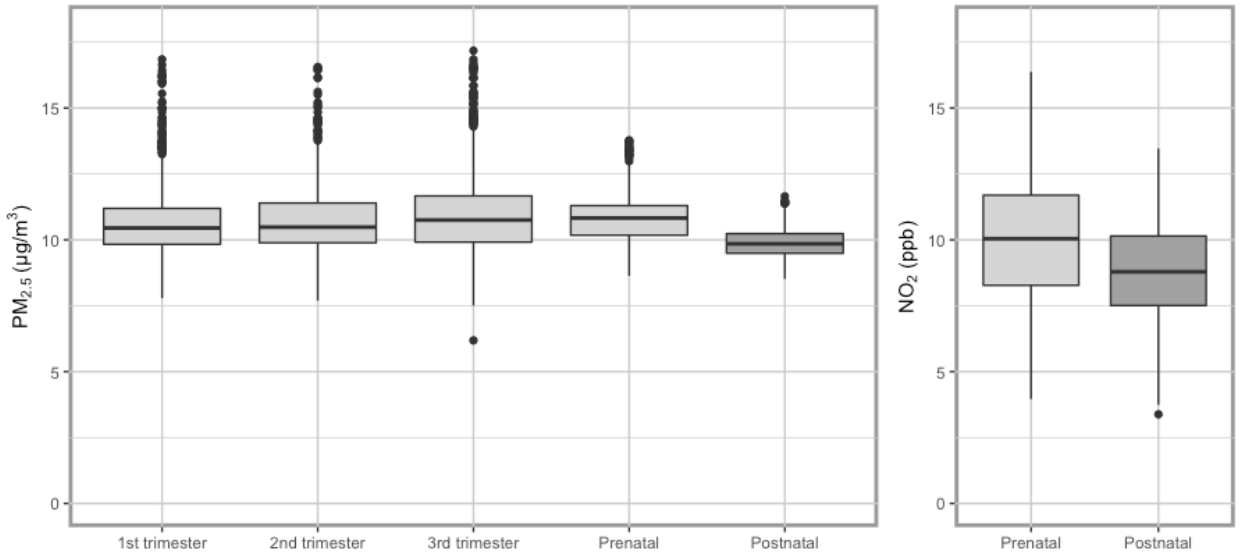


Figure captions:

Shown are boxplots of $PM_{2.5}$ and NO_2 in each pre- and postnatal window in the CANDLE cohort. The upper and lower boundaries of the boxes indicate the 75th and 25th percentiles, respectively. The horizontal lines inside the boxes show the medians. The vertical lines below the boxes show the 25th percentile – 1.5×interquartile range, and the vertical lines above the boxes show the 75th percentile + 1.5×interquartile range. The black dots indicate potential outliers.

Figure S5. Estimated effects of $PM_{2.5}$ in the 2nd trimester and during prenatal period on BP percentiles from the full model (Model 3) adjusted for time splines of date of conception with varied degree of freedom in the CANDEL cohort

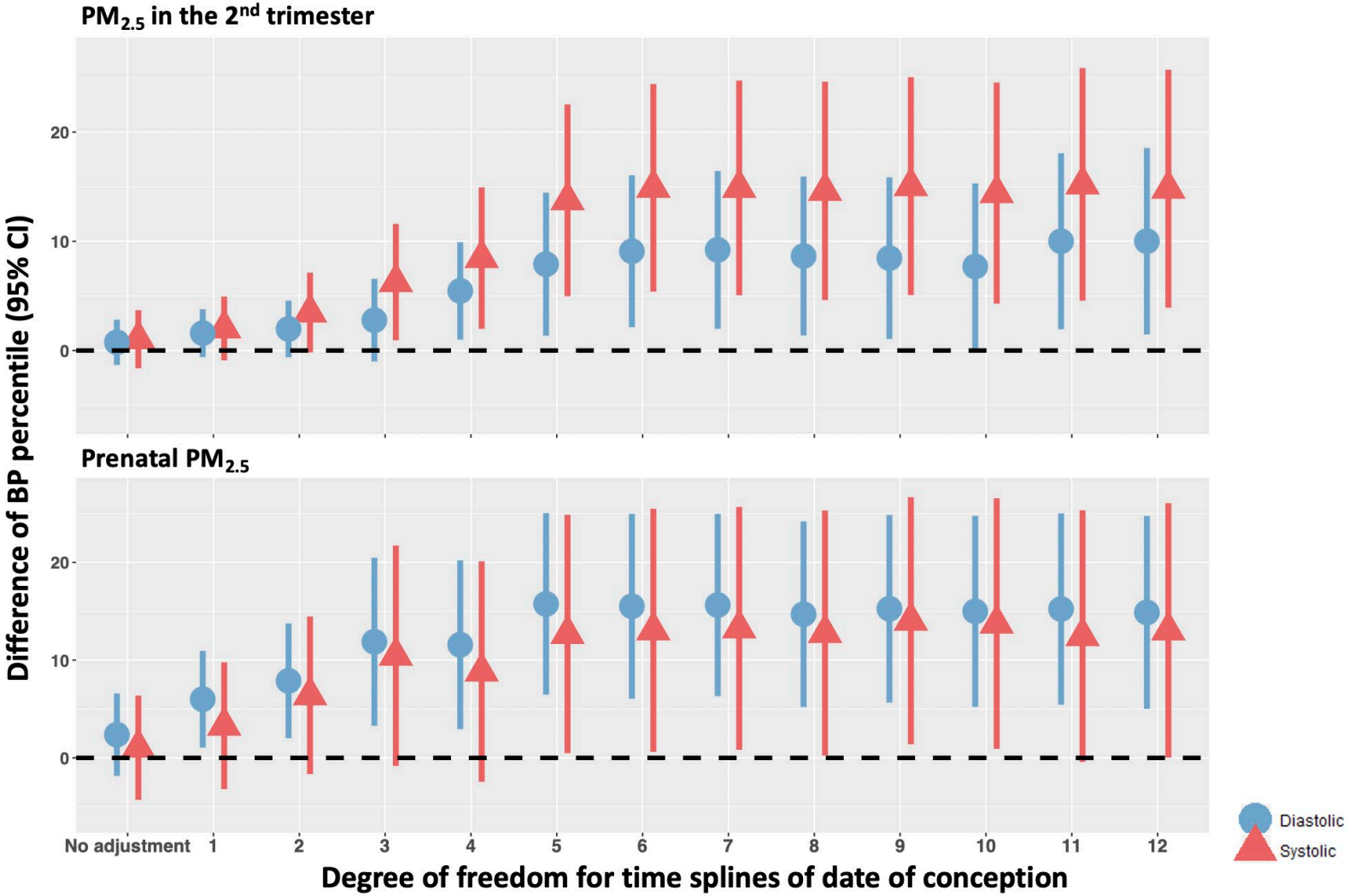


Figure captions:

Shown are estimated effects of $PM_{2.5}$ in the 2nd trimester and during prenatal period on BP percentiles from the full model (Model 3) adjusted for time splines of date of conception with varied degree of freedom in the CANDEL cohort. Conception date was modeled with 8 degrees of freedom per year (df/year) for 2nd trimester $PM_{2.5}$ and 4 df/year for $PM_{2.5}$ averaged over the whole pregnancy period in the primary analysis. Linear regressions was adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date (1 df/year) and date of conception (except for the model without conception date adjustment), maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. The degree of freedom for date of conception varied from zero (no adjustment) to twelve. The symbols of triangles and circles indicate the effect estimate, the error bars show 95% confidence intervals, and the dot lines show the null value of zero. Please refer to Table S10 for numeric data for this analysis.

Figure 6S: Estimated effects of $PM_{2.5}$ in the 2nd trimester and during prenatal period on BP percentiles and raw BP from the full model (Model 3) adjusted for thin-plate regression splines (TPRS) of child height and age with varied degree of freedom in the CANDEL cohort

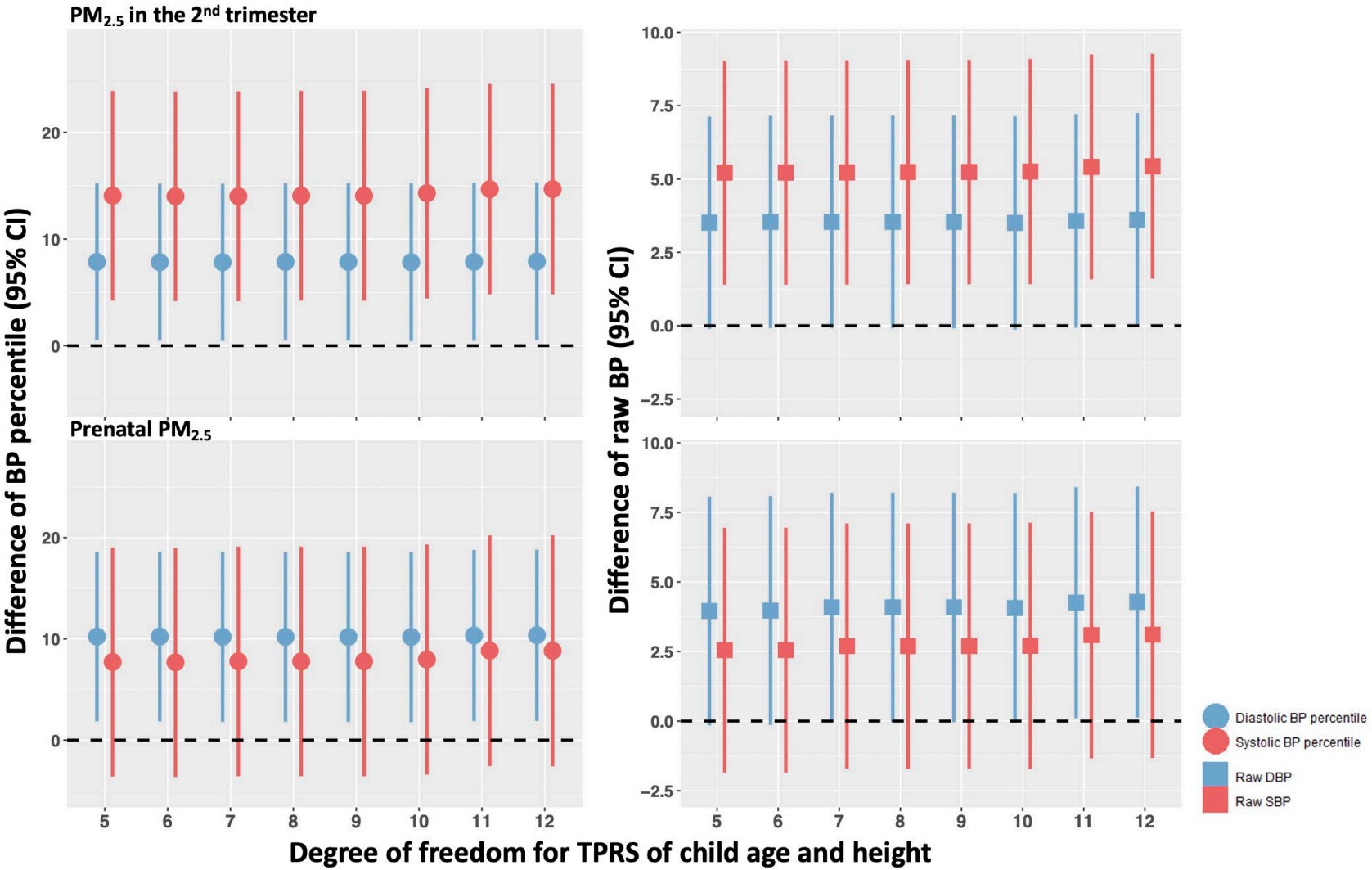


Figure captions:

Figure 7S: Shown are estimated effects of $PM_{2.5}$ in the 2nd trimester and during prenatal period on BP percentiles and raw BP from the full model (Model 3) adjusted for thin-plate regression splines (TPRS) of child height and age with varied degree of freedom in the CANDEL cohort. Model 3 was adjusted for adjusted for child sex, child age and height at age 4-6 years visit, recruitment site, times splines for visit date and date of conception, maternal race, maternal age at childbirth, maternal education, income adjusted by household size, breastfeeding, maternal Global Severity Index, urinary cotinine adjusted by specific gravity in the 2nd trimester, BMI class before pregnancy, insurance status, child sleep scores, child physical activity levels, child second-hand smoking exposures, child use of medication that potentially increased blood pressure and Child Opportunity Indices. The degree of freedom for TPRS varied from five to twelve. The symbols of squares and circles indicate the effect estimate, the error bars show 95% confidence intervals, and the dot lines show the null value of zero. Please refer to Table S13 for numeric data for this analysis.