Supplemental Table 1. Census SEP indicators used to calculate the SDI.

Candidate SEP variables (n = 20) Source: US Census American Communities Survey (2005-2009)	Retained in Spatially-Stratified PCA	Retained in City-wide PCA
Education (among adults aged > 25)		
% < High School		
% BA or more	X	
Employment (among adult labor force, aged 20-64)		
% unemployed	X	X
% males in labor force		
% females in labor force		
Housing		
% renter occupied (among occupied units)		
% vacant housing units (among total housing units)		
% crowded (> 1 occupant per room, among occupied housing units)	X	X
Occupation (among full-time, year-round civilian employed population)		
% adults in management or professional occupations	X	
Income		
% households in poverty (< 200% Federal Poverty Line)	X	
% Families w/ annual income < $35,000 (2009 inflation-adjusted)		
% female householders with children aged < 18		
% households w/ public assistance income	X	
% households w/ Food Stamp benefits (in past 12 months)		
Median household income (in the past 12 months)		
% renter or owner housing costs in excess of 30% household income (in past 12 months)		X
Racial composition		
% African American (non-Hispanic)		X
% non-White (calculated as 1 - % non-Hispanic White population)	X	
% Hispanic		
Language		
% speak English less than “very well” (among pop > 5 years old who speak a language other than English at home)		

Supplemental Table 2. Model 1 linear coefficient estimates for change in birth weight (g) for covariates.

Covariates	Change in birth weight (g)	95% CIs
Intercept	2773.4	2746.2, 2800.6
Ethnicity		
US-born White [REF]	--	--
Foreign-born White	5.7	-1.2, 12.6
US-born Black	-113.8	-121.2, -106.3
Foreign-born Black	-78.5	-86.3, -70.8
US-born Hispanic	-38.2	-45.4, -30.9
Foreign-born Hispanic	-1.4	-8.1, 5.3
US-born Asian	-104.5	-120.3, -88.6
Foreign-born Asian	-87.7	-94.5, -80.8
Maternal education		
< 9 yrs. [REF]	--	--
9 - 11 yrs.	12.2	10.1, 25.6
12 yrs. (High school)	17.5	41.0, 57.1
13 - 15 yrs.	34.7	57.2, 74.2
16 yrs. (BA)	36.9	66.1, 84.4
> 16 yrs.	36.1	50.8, 73.6
Medicaid status		
No [REF]	--	--
Yes	1.5	4.9, 19.5
Maternal age (years)		
< 20 [REF]	--	--
20 - < 25	17.8	10.4, 24.6
25 - < 30	49.0	27.3, 42.1
30 - < 35	65.7	28.6, 45.3
35 - < 40	75.2	27.0, 45.2
≥ 40	62.2	-3.0, 5.9
Pre-pregnancy BMI		
< 18.5 (Underweight) [REF]	--	--
18.5 - < 25 (Normal)	95.3	87.8, 102.8
25 - < 30 (Overweight)	159.7	151.6, 167.8
≥ 30 (Obese)	215.5	207.0, 224.0
Prenatal care received		
No [REF]	--	--
Yes	32.2	9.1, 55.2
Previous live births		
0 [REF]	--	--
1	68.4	64.3, 72.5
2	77.2	71.6, 82.8
≥ 3	76.9	70.3, 83.5
Gestational age (weeks)		
37 [REF]	--	--
38	198.8	191.7, 205.8
39	347.5	341.0, 354.0
40	454.8	448.2, 461.5
41	585.9	577.7, 594.1
42	648.5	627.6, 669.4
Conception season		
Dec - Feb [REF]	--	--
Mar - May	-11.7	-16.9, -6.5
Jun - Aug	-17.8	-23.4, -12.2
Sep - Nov	-30.4	-38.9, -22.0
Conception year		
2007 [REF]	--	--
2008	1.4	-3.6, 6.4

2009	4.4	-0.6, 9.3
2010	-2.3	-7.1, 2.4

Supplemental Table 3. Sensitivity analysis for modification of the NO_2-birth weight association by maternal SEP variables: educational attainment, Medicaid status, and ethnicity. Linear coefficient estimates for change in birth weight (g) of model covariates. Modification term coefficient estimates and 95% Cis shown have been combined to the referent category, reflecting the total estimate for each category.

Model	NO_2 * Maternal Education		NO_2 * Medicaid Status		NO_2 * Maternal Ethnicity	
Covariates	Change in birth weight (g)	95% CIs	Change in birth weight (g)	95% CIs	Change in birth weight (g)	95% CIs
Intercept	2818.2	2767.9, 2868.4	2811.2	2780.3, 2842.1	2817.0	2784.2, 2849.8
NO_2 exposure (per 10 ppb) stratified by maternal SEP variables						
NO_2 * Maternal Education						
< 9 yrs.	-16.4	-31.9, -0.8	--	--	--	--
9 - 11 yrs.	-5.0	-25.5, 15.5	--	--	--	--
12 yrs. (High school)	-6.8	-24.3, 10.7	--	--	--	--
13 - 15 yrs.	-17.6	-33.6, -1.6	--	--	--	--
16 yrs. (BA)	-10.1	-23.7, 3.5	--	--	--	--
> 16 yrs.	-12.8	-24.6, -1.0	--	--	--	--
NO_2 * Medicaid status						
No	--	--	-14.0	-19.3, -8.7	--	--
Yes	--	--	-6.6	-13.1, -0.1 *	--	--
NO_2 * Ethnicity						
US-born White	--	--	--	--	-15.8	-22.4, -9.2
Foreign-born White	--	--	--	--	-4.9	-14.1, 4.3 *
US-born Black	--	--	--	--	-15.4	-28.5, -2.3
Foreign-born Black	--	--	--	--	-16.5	-30.1, -2.9
US-born Hispanic	--	--	--	--	-14.8	-25.8, -3.8
Foreign-born Hispanic	--	--	--	--	-11.6	-21.2, -2.0
US-born Asian	--	--	--	--	-11.9	-32.8, 9.0
Foreign-born Asian	--	--	--	--	-0.3	-9.6, 9.0 **
Covariate main effects						
Ethnicity						
US-born White [REF]	--	--	--	--	--	--
Foreign-born White	5.3	-1.6, 12.2	5.2	-1.7, 12.1	-24.4	-53.5, 4.7
US-born Black	-114.3	-121.8, -106.9	-114.4	-121.9, -107.0	-116.8	-152.1, -81.6
Foreign-born Black	-79.4	-87.1, -71.6	-79.4	-87.2, -71.7	-79.3	-118.3, -40.4
US-born Hispanic	-38.5	-45.8, -31.3	-38.7	-46.0, -31.5	-42.2	-75.8, -8.6
Foreign-born Hispanic	-1.8	-8.5, 4.9	-2.0	-8.7, 4.7	-14.0	-44.5, 16.5
US-born Asian	-105.0	-120.8, -89.1	-104.9	-120.8, -89.0	-116.0	-181.4, -50.7
Foreign-born Asian	-88.5	-95.4, -81.6	-88.7	-95.5, -81.8	-130.6	-160.1, -101.1
Maternal education						
< 9 yrs. [REF]	--	--	--	--	[REF]	[REF]
9 - 11 yrs.	-18.4	-66.6, 29.7	12.2	4.9, 19.5	12.1	4.8, 19.5
12 yrs. (High school)	-8.1	-54.1, 37.9	17.5	10.5, 24.6	17.4	10.3, 24.5
13 - 15 yrs.	37.0	-8.4, 82.4	34.7	27.3, 42.1	34.5	27.1, 42.0
16 yrs. (BA)	19.8	-25.3, 64.9	37.0	28.7, 45.4	37.1	28.7, 45.4
> 16 yrs.	26.6	-19.7, 72.8	36.3	27.1, 45.4	35.9	26.7, 45.0
Medicaid status						
No [REF]	--	--	--	--	--	--
Yes	1.4	-3.0, 5.9	-17.7	-37.4, 2.0	1.8	-2.7, 6.2
Maternal age (years)						
< 20 [REF]	--	--	--	--	--	--
20 - < 25	17.8	10.0, 25.6	17.8	10.0, 25.6	17.8	10.0, 25.6
25 - < 30	49.0	41.0, 57.1	49.0	41.0, 57.1	49.1	41.1, 57.2
30 - < 35	65.8	57.3, 74.3	65.8	57.3, 74.3	65.9	57.4, 74.4
35 - < 40	75.3	66.2, 84.5	75.4	66.3, 84.6	75.5	66.3, 84.6
≥ 40	62.4	51.0, 73.8	62.4	51.0, 73.8	62.6	51.2, 74.1
Pre-pregnancy BMI						
< 18.5 (Underweight) [REF]	--	--	--	--	--	--

18.5 - < 25 (Normal)	95.3	87.8, 102.8	95.3	87.8, 102.8	95.5	88.0, 103.0
25 - < 30 (Overweight)	159.7	151.6, 167.8	159.7	151.6, 167.7	159.9	151.8, 167.9
≥ 30 (Obese)	215.6	207.1, 224.1	215.5	207.0, 224.0	215.6	207.1, 224.1
Prenatal care received						
No [REF]	--	--	--	--	--	--
Yes	31.9	8.9, 55.0	32.0	8.9, 55.0	32.0	8.9, 55.0
Previous live births						
0 [REF]	--	--	--	--	--	--
1	68.4	64.3, 72.5	68.3	64.2, 72.4	68.4	64.3, 72.5
2	77.2	71.6, 82.8	77.1	71.6, 82.7	77.2	71.7, 82.8
≥ 3	76.8	70.1, 83.4	76.7	70.1, 83.4	76.7	70.0, 83.3
Gestational age (weeks)						
37 [REF]	--	--	--	--	--	--
38	198.8	191.7, 205.8	198.8	191.7, 205.8	198.7	191.7, 205.7
39	347.5	341.0, 354.0	347.5	341.0, 354.0	347.5	341.0, 354.0
40	454.8	448.1, 461.4	454.8	448.2, 461.5	454.7	448.1, 461.4
41	585.9	577.7, 594.1	585.9	577.7, 594.1	585.8	577.6, 594.0
42	648.4	627.5, 669.3	648.4	627.5, 669.4	648.3	627.4, 669.2
Conception season						
Dec - Feb [REF]	--	--	--	--	--	--
Mar - May	1.4	-3.6, 6.4	1.4	-3.6, 6.4	1.3	-3.6, 6.3
Jun - Aug	4.5	-0.4, 9.5	4.4	-0.5, 9.4	4.6	-0.4, 9.5
Sep - Nov	-2.2	-6.9, 2.5	-2.3	-7.0, 2.4	-2.1	-6.9, 2.6
Conception year						
2007 [REF]	--	--	--	--	--	--
2008	-12.0	-17.2, -6.9	-11.8	-17.0, -6.6	-12.1	-17.3, -6.9
2009	-18.6	-24.1, -13.0	-18.0	-23.5, -12.4	-18.8	-24.4, -13.3
2010	-31.0	-39.5, -22.6	-30.3	-38.7, -21.8	-31.4	-39.8, -23.0

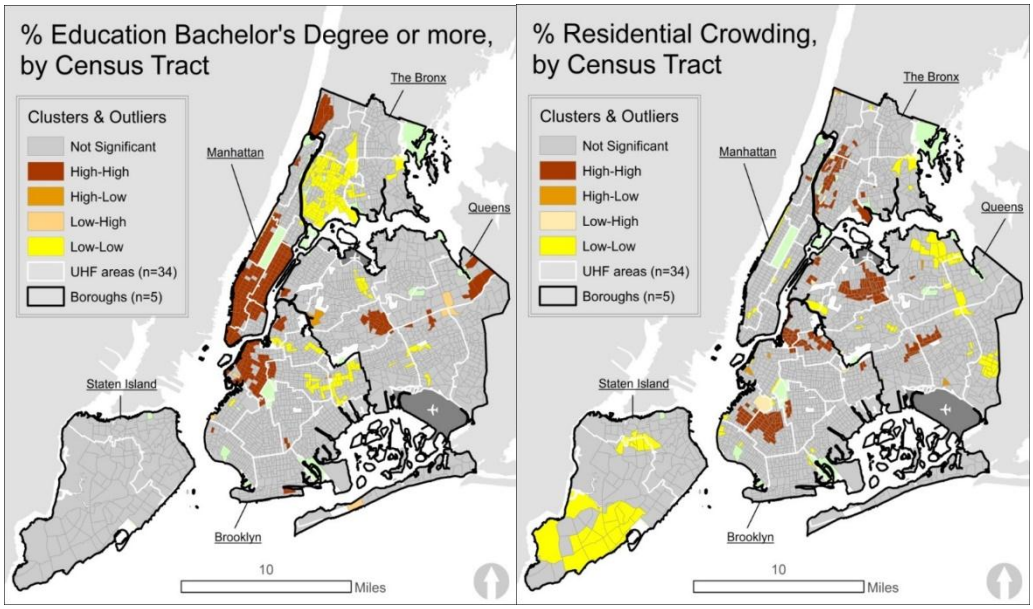
* $p < 0.05$; ** $p < 0.01$ for statistical difference from referent category

Supplemental Table 4: Sensitivity analysis for co-pollutant adjustment. Coefficient estimates for change in birth weight (g) for covariates with adjustment for $PM_{2.5}$ exposure in Models 1, 2 and 3.

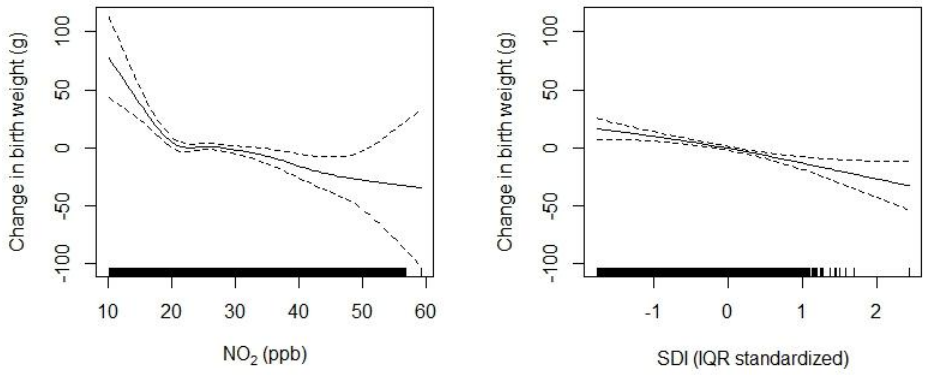
	Model 1		Model 2		Model 3	
Covariates	Effect estimate (g)	95% CIs	Effect estimate (g)	95% CIs	Effect estimate (g)	95% CIs
Intercept	2773.6	2746.1, 2801.0	2773.3	2745.8, 2800.8	2770.0	2731.6, 2808.3
Ethnicity						
US-born White [REF]	--	--	--	--	--	--
Foreign-born White	5.7	-1.2, 12.6	5.8	-1.1, 12.7	5.3	-1.5, 12.0
US-born Black	-113.8	-121.2, -106.3	-113.2	-120.7, -105.8	-113.7	-121.0, -106.4
Foreign-born Black	-78.6	-86.3, -70.8	-77.8	-85.6, -70.1	-7805	-86.2, -70.9
US-born Hispanic	-38.2	-45.4, -30.9	-37.8	-45.1, -30.6	-38.3	-45.4, -31.2
Foreign-born Hispanic	-1.4	-8.1, 5.3	-1.0	-7.7, 5.7	-1.6	-8.2, 5.0
US-born Asian	-104.4	-120.3, -88.6	-104.2	-120.1, -88.4	-104.8	-120.4, -89.2
Foreign-born Asian	-87.7	-94.6, -80.8	-87.5	-94.3, -80.6	-88.4	-95.2, -81.7
Maternal education						
< 9 yrs. [REF]	--	--	--	--	--	--
9 - 11 yrs.	12.2	4.9, 19.5	12.2	4.9, 19.5	12.2	5.0, 19.4
12 yrs. (High school)	17.5	10.4, 24.6	17.6	10.5, 24.6	17.5	10.5, 24.4
13 - 15 yrs.	34.7	27.3, 42.1	34.7	27.3, 42.2	34.6	27.4, 41.9
16 yrs. (BA)	36.9	28.6, 45.3	37.1	28.7, 45.4	37.0	28.9, 45.2
> 16 yrs.	36.1	27.0, 45.3	36.2	27.0, 45.3	36.2	27.3, 45.2
Medicaid status						
No [REF]	--	--	--	--	--	--
Yes	1.4	-3.0, 5.9	1.5	-3.0, 5.9	1.3	-3.1, 5.6
Maternal age (years)						
< 20 [REF]	--	--	--	--	--	--
20 - < 25	17.8	10.0, 25.6	17.8	10.0, 25.5	17.7	10.1, 25.3
25 - < 30	49.0	40.9, 57.1	48.9	40.8, 57.0	48.9	41.0, 56.8
30 - < 35	65.7	57.2, 74.1	65.6	57.1, 74.0	65.6	57.3, 73.9
35 - < 40	75.2	66.0, 84.4	75.1	65.9, 84.2	75.2	66.2, 84.2
≥ 40	62.2	50.7, 73.6	62.0	50.6, 73.5	62.2	51.0, 73.4
Pre-pregnancy BMI						
< 18.5 (Underweight) [REF]	--	--	--	--	--	--
18.5 - < 25 (Normal)	95.3	87.8, 102.8	95.3	87.8, 102.8	95.3	87.9, 102.6
25 - < 30 (Overweight)	159.7	151.7, 167.8	159.7	151.6, 167.8	159.7	151.8, 167.6
≥ 30 (Obese)	215.5	207.0, 224.0	215.6	207.1, 224.1	215.6	207.2, 223.9
Prenatal care received						
No [REF]	--	--	--	--	--	--
Yes	32.1	9.1, 55.2	32.2	9.2, 55.3	32.0	9.4, 54.7
Previous live births						
0 [REF]	--	--	--	--	--	--
1	68.4	64.3, 72.5	68.4	64.3, 72.5	68.4	64.3, 72.4
2	77.2	71.6, 82.8	77.3	71.7, 82.8	77.2	71.7, 82.7
≥ 3	76.9	70.3, 83.6	77.0	70.3, 83.6	76.8	70.3, 83.3
Gestational age (weeks)						
37 [REF]	--	--	--	--	--	--
38	198.8	191.7, 205.8	198.8	191.8, 205.8	198.8	191.9, 205.7
39	347.5	341.0, 354.0	347.5	341.0, 354.1	347.6	341.2, 353.9
40	454.8	448.2, 461.5	454.9	448.3, 461.6	454.9	448.4, 461.4
41	585.9	577.7, 594.1	585.9	577.7, 594.1	585.9	577.9, 593.9
42	648.5	627.6, 669.4	648.7	627.8, 669.6	648.5	628.0, 669.0
Conception season						
Dec – Feb [REF]	--	--	--	--	--	--
Mar - May	1.4	-3.6, 6.4	1.3	-3.6, 6.3	1.5	-3.4, 6.4
Jun - Aug	4.3	-1.2, 9.7	4.2	-1.2, 9.7	4.7	0.7, 9.9
Sep - Nov	-2.4	-7.4, 2.6	-2.5	-7.5, 2.5	-2.2	-7.1, 2.7

Conception year						
2007 [REF]	--	--	--	--	--	--
2008	-11.7	-17.5, -5.9	-11.2	-17.1, -5.4	-10.7	-16.4, -5.0
2009	-17.9	-25.1, -10.8	-17.4	-24.6, -10.2	-15.8	-22.8, -8.8
2010	-30.5	-40.1, -21.0	-29.8	-39.5, -20.2	-27.7	-37.1, -18.2

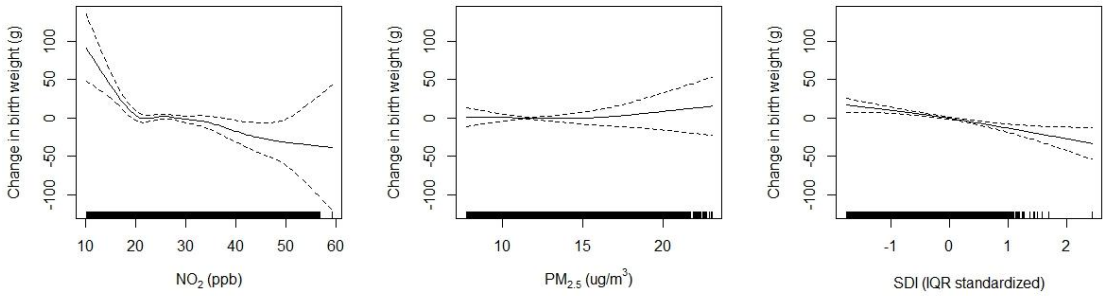
Supplemental Figure 1. Local indicators of spatial association (LISA) to identify spatial regime boundaries which minimize spill-over – LISA maps of tract-level educational attainment and residential crowding. The LISA statistic quantifies the contribution of each tract-level observation to the global spatial pattern, and identifies statistically significant 'clusters' and 'outliers' (Anselin 1995). The LISA term L_i for a given indicator y, at observation i, is expressed as: $L_i = f(y_i, y_{Ji})$, where y_J are 'neighboring' areas J_i of i. Neighbors were defined using a matrix of first-order contiguous areas. Area i can thus be characterized as part of a spatial cluster (i.e., areas surrounded by empirically similar areas), or as an outlier (i.e., areas surrounded by empirically different areas), with 95% statistical confidence. We mapped tract-level LISA terms to visualize areas of spatial non-stationarity (i.e., non-random heterogeneity in spatial trend) for each SEP indicator. We then overlaid candidate spatial strata – administrative neighborhood areas (n = 34), borough boundaries (n = 5), and waterway boundaries – on LISA maps to identify the strata which minimized spill-over (i.e., local cluster boundaries best corresponded with the candidate strata boundaries). Geostatistical analyses and visualization were implemented in ESRI ArcInfo v10 (Redlands, CA).



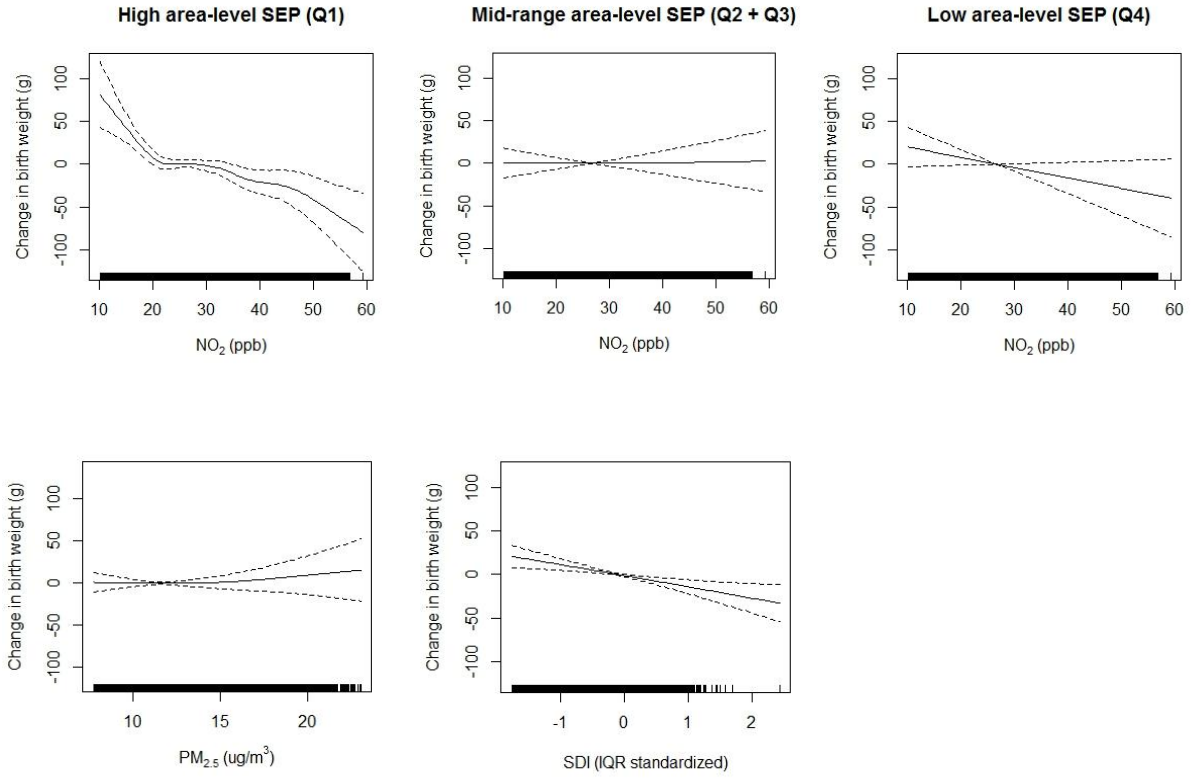
Supplemental Figure 2. Exposure-response functions for NO_2- and SDI-birth weight associations, adjusted for maternal SEP and covariates (Model 1). Dashed lines indicate 95% confidence intervals.



Supplemental Figure 3. Sensitivity analysis for Model 1 co-pollutant adjustment. Exposure-response functions for NO_2- and SDI-birth weight associations, adjusted for maternal SEP and covariates and for $PM_{2.5}$ exposure. Dashed lines indicate 95% confidence intervals.



Supplemental Figure 4: Sensitivity analysis for $PM_{2.5}$ co-pollutant adjustment (Models 2). Non-linear exposure-response functions for the NO_2-birth weight association, by SDI levels, adjusted for maternal SEP and covariates (Model 2) and for $PM_{2.5}$ exposure. Dashed lines indicate 95% confidence intervals for non-linear association. For comparison, linear NO_2-birth weight slopes (Model 3) with co-pollutant adjustment for were: -16.8 g (95% CI: -24.1, -8.0), -0.8 g (95% CI: -10.5, 9.0), and -11.7 g (95% CI: -24.3, 2.4) per 10 ppb increase in NO_2, for the lowest, middle, and highest SDI groups (SDI Q1, SDI Q2 + Q3, and SDI Q4), respectively.



Highlights

We examined prenatal NO2 exposure, socioeconomic context and term birth weight.

We observed highest air pollution levels in least-deprived areas of NYC.

NO2 was associated with lower birth weight in the least- and most-deprived areas.

Complex pattern of exposure complicates interpretation of interaction models.