

Supplemental Table 1. Distribution of air pollutants by stillbirth status.

Exposure window	Pollutant ^a	No Stillbirth Mean (SD)	Stillbirth Mean(SD)	
Delivery day 0	CO	529.7 (246.9)	541.7 (236.5)	
	NO _x	29.7 (27.4)	29.5 (28.9)	
	O ₃	29.9 (11.8)	29.2 (11.7)	
	PM ₁₀	22.5 (11.1)	22.1 (11.1)	
	PM _{2.5}	11.8 (7.4)	11.7 (7.7)	
	SO ₂	3.9 (3.5)	3.8 (3.4)	
Days prior to delivery				
	1	CO	528 (245.3)	545.3 (235.2)
		NO _x	29.4 (27.2)	30.0 (29.5)
		O ₃	30.0 (11.8)	29.3 (11.6)
		PM ₁₀	22.4 (11.1)	22.6 (11.6)
		PM _{2.5}	11.8 (7.4)	11.9 (7.9)
SO ₂		3.9 (3.5)	3.8 (3.2)	
2	CO	526.0 (245.4)	534.5 (227.2)	
	NO _x	29.0 (27.0)	28.1 (25.7)	
	O ₃	30.1 (11.8)	29.7 (11.7)	
	PM ₁₀	22.3 (11.1)	22.7 (11.1)	
	PM _{2.5}	11.8 (7.4)	12.1 (7.7)	
	SO ₂	3.9 (3.5)	3.8 (3.3)	
3	CO	525.0 (243.8)	530.7 (221.9)	
	NO _x	28.7 (26.5)	27.5 (25.4)	
	O ₃	30.1 (11.8)	29.7 (12.0)	
	PM ₁₀	22.2 (11.0)	22.6 (11.1)	
	PM _{2.5}	11.8 (7.3)	12.2 (7.6)	
	SO ₂	3.9 (3.5)	3.8 (3.3)	
4	CO	525.3 (243.5)	542.1 (235)	
	NO _x	28.7 (26.4)	28.4 (27.6)	
	O ₃	30.1 (11.8)	29.6 (11.7)	
	PM ₁₀	22.2 (11.0)	22.2 (10.5)	
	PM _{2.5}	11.8 (7.3)	12.0 (7.3)	
	SO ₂	3.9 (3.5)	3.8 (3.1)	
5	CO	526.4 (243.6)	538 (232.9)	
	NO _x	28.9 (26.6)	27.9 (26.7)	
	O ₃	30.1 (11.8)	29.9 (11.5)	
	PM ₁₀	22.2 (11.0)	21.8 (10.7)	
	PM _{2.5}	11.8 (7.3)	11.9 (7.5)	
	SO ₂	3.9 (3.5)	3.8 (3.2)	

6	CO	528.6 (245.1)	545.7 (235.5)
	NO _x	29.4 (27.0)	29.0 (27.5)
	O ₃	30.0 (11.8)	29.7 (11.6)
	PM ₁₀	22.3 (11.1)	22.5 (11.0)
	PM _{2.5}	11.8 (7.3)	12.3 (7.7)
	SO ₂	3.9 (3.5)	3.9 (3.6)
7	CO	529.8 (246)	545.2 (228.1)
	NO _x	29.7 (27.2)	29.2 (27.3)
	O ₃	29.9 (11.8)	29.5 (11.7)
	PM ₁₀	22.4 (11.1)	22.6 (11.1)
	PM _{2.5}	11.9 (7.4)	12.1 (7.9)
	SO ₂	3.9 (3.5)	3.7 (3.2)
Trimester 1	CO	562.8 (180.3)	568.4 (158.9)
	NO _x	31.4 (19.9)	30.1 (20.2)
	O ₃	29.0 (8.6)	28.7 (8.5)
	PM ₁₀	22.2 (5.2)	22.0 (5.1)
	PM _{2.5}	11.9 (3.5)	11.9 (3.4)
	SO ₂	4.1 (2.8)	3.9 (2.4)
Whole pregnancy	CO	552.7 (140.4)	559.7 (134.7)
	NO _x	30.9 (16.4)	29.5 (17.9)
	O ₃	29.3 (6.2)	29.0 (6.4)
	PM ₁₀	22.1 (4.3)	22.1 (4.3)
	PM _{2.5}	11.8 (2.8)	11.9 (3.0)
	SO ₂	4.0 (2.4)	3.8 (2.2)

Abbreviations: CO, carbon monoxide; NO_x, nitric oxides; O₃, ozone; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide.

^aAll values are expressed in µg/m³ for particulate matter, and parts per billion for gaseous pollutants.

Supplemental Table 2. Distribution of air pollutants by exposure windows.

Exposure windows	Pollutant	Distribution ^a								
		Min	P25	P50	P75	Max	Mean	SD	IQR	
Delivery day 0	CO	82.4	354.2	481.5	651.7	2694.2	529.8	246.9	297.5	
	NO _x	1.8	11.3	19.6	39.0	258.3	29.7	27.4	27.7	
	O ₃	0.1	21.0	29.7	38.9	79.8	29.9	11.8	17.9	
	PM ₁₀	0.0	14.4	21.0	28.4	98.7	22.5	11.1	14.0	
	PM _{2.5}	0.0	6.4	10.0	15.5	63.9	11.8	7.4	9.1	
	SO ₂	0.0	1.8	2.8	4.8	40.5	3.9	3.5	2.9	
Days prior to delivery	1	CO	82.4	353.0	481.2	650.8	2694.2	528.1	245.3	297.8
		NO _x	1.8	11.0	19.4	38.8	258.3	29.4	27.2	27.8
		O ₃	0.1	21.1	29.8	38.9	79.8	30.0	11.8	17.8
		PM ₁₀	0.0	14.4	21.0	28.4	98.7	22.4	11.1	14.0
		PM _{2.5}	0.0	6.4	10.0	15.4	63.9	11.8	7.4	9.0
		SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.5	2.9
	2	CO	82.4	350.7	479.3	647.5	2694.2	526.1	245.3	296.7
		NO _x	1.8	10.8	19.0	38.0	258.3	29.0	27.0	27.2
		O ₃	0.1	21.3	29.9	39.0	79.8	30.1	11.8	17.7
		PM ₁₀	0.0	14.4	20.8	28.3	98.7	22.3	11.1	13.9
		PM _{2.5}	0.0	6.4	9.9	15.4	63.9	11.8	7.4	9.0
		SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.5	2.9
	3	CO	82.4	350.4	478.0	646.6	2694.2	525.0	243.7	296.2
		NO _x	1.8	10.7	18.9	37.6	258.3	28.7	26.5	26.9
		O ₃	0.1	21.3	29.9	39.0	79.8	30.1	11.8	17.7
		PM ₁₀	0.0	14.3	20.7	28.1	98.7	22.2	11.0	13.9
		PM _{2.5}	0.0	6.4	9.9	15.3	63.9	11.8	7.3	8.9
		SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.5	2.9
	4	CO	82.4	351.1	478.9	647.2	2694.2	525.4	243.5	296.1
		NO _x	1.8	10.7	18.9	37.7	258.3	28.7	26.4	27.0
		O ₃	0.1	21.3	29.9	39.0	79.8	30.1	11.8	17.7
		PM ₁₀	0.0	14.3	20.7	28.1	98.7	22.2	11.0	13.8
		PM _{2.5}	0.0	6.4	9.9	15.3	63.9	11.8	7.3	8.9
		SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.4	2.9
5	CO	82.4	352.3	479.4	647.7	2694.2	526.4	243.6	295.4	
	NO _x	1.8	10.8	19.0	38.0	258.3	28.9	26.6	27.1	
	O ₃	0.1	21.3	29.9	39.0	79.8	30.1	11.8	17.7	
	PM ₁₀	0.0	14.3	20.8	28.1	98.7	22.2	11.0	13.9	
	PM _{2.5}	0.0	6.4	9.9	15.4	63.9	11.8	7.3	8.9	

	SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.5	2.9
6	CO	82.4	353.8	481.4	650.6	2694.2	528.7	245.1	296.9
	NO _x	1.8	11.1	19.4	38.8	258.3	29.4	27.0	27.7
	O ₃	0.1	21.2	29.8	38.9	79.8	30.0	11.8	17.8
	PM ₁₀	0.0	14.4	20.9	28.3	98.7	22.3	11.1	13.9
	PM _{2.5}	0.0	6.5	10.0	15.5	63.9	11.8	7.3	9.0
	SO ₂	0.0	1.8	2.8	4.7	40.5	3.9	3.5	2.9
7	CO	82.4	354.2	482.1	652.9	2694.2	529.9	245.9	298.7
	NO _x	1.8	11.3	19.6	39.0	258.3	29.7	27.2	27.7
	O ₃	0.1	21.1	29.7	38.9	79.8	29.9	11.8	17.8
	PM ₁₀	0.0	14.4	21.0	28.4	98.7	22.4	11.1	14.0
	PM _{2.5}	0.0	6.5	10.0	15.5	63.9	11.9	7.4	9.0
	SO ₂	0.0	1.8	2.8	4.8	40.5	3.9	3.5	2.9
Trimester 1	CO	179.1	420.2	544.8	683.8	1102.4	562.8	180.2	263.6
	NO _x	5.5	14.9	25.1	45.1	89.6	31.4	19.9	30.2
	O ₃	8.1	22.8	29.2	35.1	48.7	29.0	8.6	12.3
	PM ₁₀	10.3	18.6	21.6	24.9	39.2	22.2	5.2	6.3
	PM _{2.5}	4.6	9.3	11.9	14.5	22.0	11.9	3.5	5.3
	SO ₂	0.8	2.0	3.3	5.3	18.7	4.1	2.8	3.3
Whole pregnancy	CO	224.9	449.0	547.9	655.3	1045.6	552.7	140.4	206.3
	NO _x	6.4	17.0	28.9	41.2	81.6	30.9	16.4	24.2
	O ₃	13.4	24.9	28.5	32.7	46.4	29.3	6.2	7.8
	PM ₁₀	10.7	19.5	22.0	23.9	39.8	22.1	4.3	4.4
	PM _{2.5}	5.7	9.4	11.9	14.1	19.6	11.8	2.8	4.7
	SO ₂	1.0	2.1	3.3	5.0	15.8	4.0	2.4	2.9

Abbreviations: CO, carbon monoxide; NO_x, nitric oxides; O₃, ozone; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide.

^aAll values are expressed in µg/m³ for particulate matter, and parts per billion for gaseous pollutants.

Supplemental Table 3. Spearman correlation coefficient among pollutants during the whole pregnancy period.

Exposure window	Pollutant	CO	NO _x	O ₃	PM ₁₀	PM _{2.5}	SO ₂	
Delivery day 0	CO	1.00						
	NO _x	0.74	1.00					
	O ₃	-0.31	-0.41	1.00				
	PM ₁₀	0.21	0.27	0.08	1.00			
	PM _{2.5}	0.35	0.39	-0.07	0.67	1.00		
	SO ₂	0.28	0.40	-0.25	0.06	0.34	1.00	
Days prior to delivery	1	CO	1.00					
		NO _x	0.74	1.00				
		O ₃	-0.31	-0.41	1.00			
		PM ₁₀	0.21	0.27	0.07	1.00		
		PM _{2.5}	0.35	0.39	-0.07	0.67	1.00	
		SO ₂	0.28	0.40	-0.25	0.06	0.33	1.00
	2	CO	1.00					
		NO _x	0.74	1.00				
		O ₃	-0.32	-0.41	1.00			
		PM ₁₀	0.21	0.27	0.07	1.00		
		PM _{2.5}	0.35	0.39	-0.06	0.68	1.00	
		SO ₂	0.28	0.40	-0.25	0.07	0.33	1.00
	3	CO	1.00					
		NO _x	0.73	1.00				
		O ₃	-0.31	-0.41	1.00			
		PM ₁₀	0.21	0.26	0.08	1.00		
		PM _{2.5}	0.35	0.38	-0.06	0.68	1.00	
		SO ₂	0.28	0.40	-0.25	0.06	0.33	1.00
4	CO	1.00						
	NO _x	0.73	1.00					
	O ₃	-0.31	-0.41	1.00				
	PM ₁₀	0.21	0.26	0.08	1.00			
	PM _{2.5}	0.35	0.38	-0.06	0.68	1.00		
	SO ₂	0.28	0.40	-0.25	0.06	0.33	1.00	
5	CO	1.00						
	NO _x	0.73	1.00					
	O ₃	-0.31	-0.41	1.00				
	PM ₁₀	0.21	0.26	0.08	1.00			

	PM _{2.5}	0.34	0.38	-0.06	0.68	1.00	
	SO ₂	0.27	0.40	-0.25	0.07	0.33	1.00
6	CO	1.00					
	NO _x	0.74	1.00				
	O ₃	-0.31	-0.41	1.00			
	PM ₁₀	0.21	0.26	0.09	1.00		
	PM _{2.5}	0.35	0.39	-0.06	0.68	1.00	
	SO ₂	0.28	0.40	-0.25	0.07	0.33	1.00
7	CO	1.00					
	NO _x	0.73	1.00				
	O ₃	-0.30	-0.41	1.00			
	PM ₁₀	0.21	0.26	0.08	1.00		
	PM _{2.5}	0.35	0.39	-0.06	0.68	1.00	
	SO ₂	0.28	0.40	-0.25	0.06	0.33	1.00
Trimester 1	CO	1.00					
	NO _x	0.68	1.00				
	O ₃	-0.42	-0.48	1.00			
	PM ₁₀	0.02	0.10	0.06	1.00		
	PM _{2.5}	0.28	0.40	-0.38	0.47	1.00	
	SO ₂	0.27	0.38	-0.39	-0.25	0.39	1.00
Whole pregnancy	CO	1.00					
	NO _x	0.61	1.00				
	O ₃	-0.26	-0.33	1.00			
	PM ₁₀	0.10	0.25	-0.20	1.00		
	PM _{2.5}	0.25	0.47	-0.68	0.40	1.00	
	SO ₂	0.31	0.38	-0.45	-0.34	0.53	1.00

Abbreviations: CO, carbon monoxide; NO_x, nitric oxides; O₃, ozone; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide.

Supplemental Table 4. Associations between whole pregnancy exposures to criteria air pollutants and stillbirth risk by gestational week^a.

Gestational week	Stillbirth n	aRR (95% CI) ^b					
		Ozone	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂
23-26	292	1.91 (0.94, 3.87)	1.14 (0.81, 1.62)	1.01 (0.37, 2.74)	1.07 (0.73, 1.57)	1.12 (0.57, 2.20)	0.56 (0.28, 1.15)
27-30	163	0.92 (0.41, 2.10)	1.04 (0.68, 1.61)	1.74 (0.48, 6.37)	1.29 (0.81, 2.05)	1.53 (0.66, 3.52)	1.09 (0.43, 2.73)
31-36	301	1.16 (0.74, 1.83)	0.81 (0.62, 1.07)	1.10 (0.55, 2.19)	0.71 (0.54, 0.93)	0.71 (0.40, 1.28)	0.91 (0.47, 1.77)
37-42	236	1.42 (0.95, 2.13)	0.88 (0.65, 1.19)	0.74 (0.38, 1.42)	0.82 (0.61, 1.11)	0.84 (0.44, 1.59)	0.97 (0.51, 1.85)

Abbreviations: CO, carbon monoxide; NO_x, nitric oxides; O₃, ozone; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide; RR, relative risk; CI, confidence interval.

^a Exposures for ongoing pregnancies were truncated to ensure comparable exposure length as stillbirth cases (e.g., average exposure up to 23 weeks as “whole pregnancy”).

^b Models adjusted for maternal age, maternal race, parity, smoking during pregnancy, alcohol, insurance, marital status, hypertension, diabetes, season, birth year, site, and temperature. Estimates are for an IQR increase in each pollutant.

Supplemental Table 5. Multipollutant associations between whole pregnancy exposures to criteria air pollutants and stillbirth risk.

Exposure windows	aRR (95% CI) ^a					
	Ozone	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂
Days before delivery						
0 (delivery day)	1.14 (1.00 ,1.30)	0.99 (0.91 ,1.08)	0.94 (0.82 ,1.08)	0.93 (0.81 ,1.06)	1.13 (0.99 ,1.28)	1.00 (0.87 ,1.16)
1	1.14 (1.00 ,1.30)	0.97 (0.90 ,1.06)	0.92 (0.80 ,1.06)	0.93 (0.81 ,1.06)	1.15 (1.01 ,1.31)	1.09 (0.95 ,1.26)
2	1.13 (0.98 ,1.30)	1.01 (0.93 ,1.09)	0.98 (0.86 ,1.12)	0.93 (0.81 ,1.06)	1.00 (0.88 ,1.14)	1.09 (0.95 ,1.25)
3	1.08 (0.94 ,1.25)	1.01 (0.93 ,1.10)	1.04 (0.92 ,1.18)	0.90 (0.78 ,1.03)	0.98 (0.85 ,1.12)	1.08 (0.94 ,1.24)
4	1.13 (0.99 ,1.30)	0.99 (0.91 ,1.06)	1.02 (0.90 ,1.15)	1.00 (0.87 ,1.13)	1.04 (0.92 ,1.19)	0.99 (0.86 ,1.13)
5	1.25 (1.09 ,1.43)	1.01 (0.93 ,1.10)	1.04 (0.92 ,1.18)	0.99 (0.87 ,1.13)	1.04 (0.91 ,1.19)	0.89 (0.78 ,1.03)
6	1.19 (1.04 ,1.36)	1.04 (0.95 ,1.13)	1.07 (0.95 ,1.22)	1.00 (0.88 ,1.14)	1.02 (0.90 ,1.17)	0.95 (0.83 ,1.08)
7	1.15 (1.00 ,1.31)	0.95 (0.87 ,1.03)	1.04 (0.91 ,1.19)	0.97 (0.85 ,1.12)	1.06 (0.92 ,1.21)	1.01 (0.88 ,1.16)
First trimester	1.12 (0.92 ,1.37)	0.76 (0.62 ,0.92)	1.34 (0.95 ,1.88)	1.11 (0.93 ,1.33)	0.86 (0.69 ,1.06)	0.74 (0.61 ,0.91)
Whole pregnancy	1.32 (1.00 ,1.76)	0.89 (0.70 ,1.13)	1.50 (0.84 ,2.68)	1.03 (0.79 ,1.33)	1.02 (0.62 ,1.68)	0.75 (0.47 ,1.21)

Abbreviations: RR, relative risk; CI, confidence interval; CO, carbon monoxide; NO_x, nitric oxides; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide.

Bold face indicates statistical significance at p<0.05.

^aModels adjusted for maternal age, maternal race, parity, smoking during pregnancy, alcohol, insurance, marital status, hypertension, diabetes, season, birth year, site, and temperature. Estimates are for an IQR increase in each pollutant.

Supplemental Table 6. Adjusted^a relative risk (and 95% confidence intervals) for stillbirth per IQR unit increase in pollutant by exposure window and asthma status.

Pollutant and asthma status		Days before delivery							
		0	1	2	3	4	5	6	7
CO	Asthma	0.85 (0.63,1.16)	0.97 (0.74,1.26)	0.81 (0.64,1.03)	0.92 (0.73,1.16)	0.88 (0.70,1.12)	0.92 (0.67,1.25)	0.96 (0.76,1.22)	0.90 (0.67,1.21)
	No asthma	0.91 (0.77,1.07)	0.98 (0.85,1.13)	0.87 (0.77,1.00)	0.91 (0.80,1.04)	0.94 (0.82,1.08)	0.94 (0.80,1.11)	0.98 (0.86,1.12)	0.95 (0.81,1.11)
NO _x	Asthma	0.98 (0.76,1.27)	1.13 (0.89,1.43)	0.88 (0.70,1.09)	0.91 (0.72,1.15)	0.87 (0.67,1.14)	0.98 (0.75,1.28)	0.98 (0.79,1.22)	0.93 (0.74,1.18)
	No asthma	1.00 (0.87,1.16)	1.09 (0.95,1.24)	0.92 (0.81,1.04)	0.93 (0.81,1.06)	0.94 (0.81,1.10)	0.97 (0.83,1.13)	0.99 (0.88,1.13)	0.97 (0.85,1.11)
O ₃	Asthma	0.99 (0.70,1.40)	0.94 (0.69,1.28)	1.01 (0.73,1.39)	1.02 (0.75,1.38)	0.96 (0.70,1.30)	1.09 (0.77,1.55)	1.20 (0.84,1.70)	1.30 (0.94,1.81)
	No asthma	1.04 (0.86,1.27)	1.02 (0.85,1.22)	1.09 (0.91,1.31)	1.08 (0.91,1.29)	1.04 (0.87,1.24)	1.16 (0.95,1.40)	1.19 (0.97,1.44)	1.21 (1.00,1.46)
SO ₂	Asthma	0.97 (0.82,1.16)	1.04 (0.86,1.25)	1.06 (0.89,1.26)	1.03 (0.86,1.22)	1.00 (0.84,1.19)	1.10 (0.93,1.30)	1.14 (0.95,1.37)	0.96 (0.78,1.18)
	No asthma	0.98 (0.89,1.09)	1.02 (0.92,1.13)	1.03 (0.94,1.14)	1.02 (0.93,1.13)	1.00 (0.90,1.10)	1.04 (0.95,1.15)	1.09 (0.98,1.21)	0.96 (0.86,1.08)
PM ₁₀	Asthma	0.85 (0.67,1.08)	0.96 (0.75,1.24)	1.01 (0.77,1.31)	1.05 (0.81,1.35)	1.00 (0.78,1.29)	1.03 (0.78,1.37)	1.14 (0.87,1.49)	0.98 (0.71,1.35)
	No asthma	0.92 (0.81,1.05)	1.01 (0.88,1.16)	1.04 (0.90,1.20)	1.07 (0.93,1.22)	1.01 (0.88,1.16)	0.99 (0.85,1.16)	1.08 (0.94,1.25)	1.01 (0.85,1.20)
PM _{2.5}	Asthma	0.96 (0.77,1.21)	0.96 (0.75,1.23)	1.02 (0.81,1.29)	1.12 (0.91,1.39)	1.10 (0.90,1.34)	1.10 (0.87,1.40)	1.17 (0.93,1.48)	1.02 (0.77,1.34)
	No asthma	0.97 (0.85,1.10)	0.99 (0.87,1.13)	1.03 (0.91,1.17)	1.09 (0.97,1.22)	1.06 (0.95,1.18)	1.05 (0.92,1.19)	1.12 (0.98,1.27)	1.04 (0.90,1.20)

Abbreviations: RR, relative risk; CI, confidence interval; CO, carbon monoxide; NO_x, nitric oxides; PM₁₀, particulate matter with diameter <10 microns; PM_{2.5}, particulate matter with diameter <2.5 microns; SO₂, sulfur dioxide.

^aModels adjusted for maternal age, maternal race, parity, smoking during pregnancy, alcohol, insurance, marital status, hypertension, diabetes, season, birth year, site, and temperature. Estimates are for an IQR increase in each pollutant.