Associations of Neighborhood Crime with Adverse Pregnancy Outcomes among Women in Chicago: Analysis of Electronic Health Records from 2009-2013

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<u>Supplemental Appendix- List of Tables:</u>

Supplemental Table 1. Distribution of Covariates and Adverse Pregnancy Outcomes among Included and Excluded Births (N=40,798 births, Chicago, IL, 2009-2013)[1]

	Included Births N (%)	Excluded Births N (%)
N	34383	6415
Mother's Age at Delivery- Mean (SD)	31.1 (5.4)	32.9 (4.9)
Race		
White	17063 (49.6)	3676 (58.5)
Hispanic/Latino	6193 (18.0)	943 (15.0)
Black/African American	3792 (11.0)	347 (7.0)
Asian/Pacific Islander	2338 (6.8)	406 (6.5)
Other Race	1600 (4.7)	264 (4.2)
Unknown Race	3397 (9.9)	553 (8.8)
Insurance Status		
Private	26344 (76.6)	5226 (83.3)
Public	7825 (22.8)	997 (15.9)
None	214 (0.6)	51 (0.8)
Multiparous	12285 (35.7)	5466 (91.5)
History of Asthma	3236 (9.4)	644 (10.3)
History of Mental Health Condition	2758 (8.0)	637 (10.1)
History of Sexually Transmitted Disease	3924 (11.4)	761 (12.1)
History of Substance Abuse[2]	683 (2.0)	148 (2.4)
Prevalent Hypertension	408 (1.2)	87 (1.4)
Prevalent Diabetes	305 (0.9)	43 (0.7)
Gestational Diabetes[3]	1596 (4.6)	338 (5.4)
Infant Sex		
Male	17543 (51.0)	3138 (50.5)
Female	16840 (49.0)	3073 (49.4)
Percent of census tract below poverty level- Mean (SD)[4]	17.3 (11.4)	15.5 (10.5)
Pregnancy Outcomes[6]		
Hypertensive Disease of Pregnancy	1748 (5.1)	228 (3.6)
Preterm Birth	2767 (8.1)	472 (7.5)
Spontaneous	1884 (5.5)	331 (5.3)
Induced	883 (2.6)	141 (2.2)
Small for Gestational Age	3573 (10.5)	414 (6.7)

[1]Included births were women's first births at Northwestern University's Prentice Women's Hospital between January 1, 2009 and December 31, 2013, with no missing covariate data. 514 births were excluded due to missing covariates, and 6261 were excluded because they were not the woman's first birth during the study period.

Supplemental Table 2. Neighborhood Crime Rates per 1000 Persons per Year by Adverse Pregnancy Outcome Status- Total Crime and Specific Categories (N=34,383 births, Chicago, IL, 2009-2013)[1,2,3]

	Distribution of Neighborhood Crime Rates by Adverse Pregnancy Outcome Status							
	Mean (SD)	Median	Range	IQR	Mean (SD)	Median	Range	IQR
	Hypertensive Disease of Pregnancy (N=1748)				Not Hypertensive Disease of Pregnancy (N=32635)			
Total Crime Rate	70.1 (48.8)	52.4	14.4-294.4	37.4-77.1	61.0 (39.7)	48.4	11.6-303.5	35.4-68.8
Homicide	0.12 (0.16)	0.05	0.00-1.19	0.02-0.15	0.10 (0.14)	0.05	0.00-1.71	0.02-0.11
Assault and Battery	27.3 (19.7)	20.5	4.0-133.1	13.9-31.6	23.5 (16.3)	19.6	3.4-132.5	12.6-25.1
Criminal Offenses	15.3 (8.5)	12.7	2.1-52.6	9.8-17.7	14.2 (7.3)	12.3	1.4-66.8	9.7-16.8
Incivilities	27.3 (22.2)	19.8	4.9-160.0	13.3-27.8	23.2 (17.7)	18.3	4.2-160.2	12.9-25.6
	Preterm Birth (N=2767)				No Preterm Birth (N=31484)			
Total Crime Rate	71.8 (51.2)	52.6	13.5-303.5	36.3-78.5	60.6 (39.1)	48.3	11.6-294.4	35.4-68.6
Homicide	0.13 (0.17)	0.05	0.00-1.06	0.02-0.16	0.09 (0.13)	0.05	0.00-1.71	0.02-0.11
Assault and Battery	27.7 (20.4)	20.6	3.7-121.3	13.1-32.2	23.3 (16.1)	19.5	3.4-133.1	12.6-25.1
Criminal Offenses	15.7 (8.7)	12.8	1.5-60.8	10.0-18.2	14.1 (7.2)	12.3	1.4-66.8	9.7-16.6
Incivilities	28.2 (23.7)	19.7	4.6-160.0	13.0-29.4	23.0 (17.3)	18.2	4.2-160.2	12.9-25.4
	Spontaneous Preterm Birth (N=1884)				Not Spontaneous Preterm Birth (N=32367)			
Total Crime Rate	70.4 (50.6)	51.5	13.9-303.5	36.1-77.6	60.9 (39.5)	48.4	11.6-294.4	35.4-68.8
Homicide	0.12 (0.17)	0.05	0.00-1.04	0.02-0.15	0.09 (0.14)	0.05	0.00-1.71	0.02-0.11
Assault and Battery	27.1 (20.3)	20.5	3.7-121.3	12.9-30.7	23.5 (16.3)	19.6	3.4-133.1	12.7-25.2
Criminal Offenses	15.6 (8.5)	12.8	2.1-60.8	10.1-18.0	14.2 (7.3)	12.3	1.4-66.8	9.7-16.7
Incivilities	27.5 (23.4)	19.3	4.6-139.3	12.9-28.7	23.2 (17.6)	18.3	4.2-160.2	12.9-25.5
	Small for Gestational Age (N=3573)				Not Small for Gestational Age (N=30554)			
Total Crime Rate	67.5 (46.7)	50.4	13.5-293.7	36.9-76.8	60.7 (39.3)	48.4	11.6-303.5	35.3-68.6
Homicide	0.11 (0.16)	0.05	0.00-1.71	0.02-0.13	0.09 (0.14)	0.05	0.00-1.19	0.02-0.11
Assault and Battery	26.3 (19.0)	20.4	3.9-132.5	13.5-30.2	23.3 (16.2)	19.5	3.4-133.1	12.6-25.1
Criminal Offenses	15.3 (8.4)	12.7	1.5-52.7	10.0-17.6	14.1 (7.2)	12.3	1.4-66.8	9.7-16.7
Incivilities	25.7 (21.0)	18.7	4.8-158.0	12.9-26.8	23.1 (17.5)	18.3	4.2-160.2	12.9-25.6

SD=standard deviation; IQR=interquartile range

[1]Neighborhood was defined as the Chicago Community Area (n=77) of residence during pregnancy.

[2]Crime rates were calculated for each birth by totaling the number of crime incidents in their neighborhood in the 12 months preceding the birth, dividing by the community area population as of the 2010 American Community Survey, and multiplying by 1,000.

[3]Crimes were categorized as: homicide, assault and battery, criminal offenses (e.g. robbery, sexual assault, arson), and incivilities (e.g. drugs, prostitution, vandalism) using the Illinois Uniform Crime Reporting codes.

Supplemental Table 3. Associations of Neighborhood Crime Rates (Total and by Crime Category) with Adverse Pregnancy Outcomes- Using Census Tract as an Alternative Neighborhood Definition (N=34,383 births, Chicago, IL, 2009-2013)[1,2,3,4,5]

	Hypertensive Disease of Pregnancy	Preterm Birth-All	Preterm Birth-Spontaneous	Small for Gestational Age
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Total Crime Rate	1.04 (0.98, 1.10)	1.09 (1.05, 1.14)	1.08 (1.03, 1.14)	1.03 (0.99, 1.08)
Crime Categories				
Homicide	1.00 (0.95, 1.05)	1.04 (1.00, 1.08)	1.05 (1.00, 1.09)	1.00 (0.96, 1.03)
Assault/Battery	1.04 (0.98, 1.11)	1.08 (1.03, 1.13)	1.07 (1.02, 1.13)	1.03 (0.99, 1.08)
Criminal Offenses	0.98 (0.92, 1.03)	1.04 (0.99, 1.08)	1.05 (1.01, 1.08)	1.05 (1.01, 1.08)
Incivilities	1.05 (1.00, 1.11)	1.10 (1.06, 1.15)	1.10 (1.05, 1.15)	1.01 (0.97, 1.05)

[1]Neighborhood was defined as the Chicago census tract (N=791) of residence during pregnancy.
[2]Crime rates indicate the total number of crime incidents in the year preceding each birth in the mother's neighborhood of residence per 1000 persons in the neighborhood.
[3]Results are from hierarchical logistic regression models with a neighborhood random intercept. Odds ratios reflect the relative increase in odds of adverse pregnancy outcomes with each standard deviation increase in neighborhood crime rate.
[4]Models were adjusted for maternal age at delivery, race/ethnicity, insurance status, multiparity, gestational diabetes, prevalent hypertension, prevalent diabetes, history of: asthma, mental health condition, sexually transmitted disease, or substance abuse; infant sex, and census tract-level percent living below the poverty line.
[5]N varied by model due to missing outcome data. Hypertensive disease of pregnancy: N=34,383; Preterm birth: N=34,251; Small for gestational age: N=34,127.

Supplemental Table 4. Associations of Neighborhood Crime Rates (Total and by Crime Category) with Adverse Pregnancy Outcomes- Adjusting for Season of Delivery (N=34,383 births, Chicago, IL, 2009-2013)[1,2,3,4,5]

	Hypertensive Disease of Pregnancy	Preterm Birth- All	Preterm Birth- Spontaneous	Small for Gestational Age
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Total Crime Rate	1.05 (0.99, 1.11)	1.09 (1.04, 1.15)	1.09 (1.03, 1.16)	1.05 (1.01, 1.10)
Crime Categories				
Homicide	1.00 (0.94, 1.06)	1.05 (0.99, 1.10)	1.06 (1.00, 1.12)	1.04 (1.00, 1.09)
Assault/Battery	1.05 (0.98, 1.11)	1.08 (1.02, 1.14)	1.08 (1.02, 1.15)	1.06 (1.02, 1.11)
Criminal Offenses	1.01 (0.95, 1.07)	1.07 (1.02, 1.13)	1.07 (1.01, 1.13)	1.06 (1.02, 1.10)
Incivilities	1.06 (1.00, 1.13)	1.10 (1.05, 1.16)	1.10 (1.04, 1.16)	1.04 (0.99, 1.08)

OR=odds ratio; CI=confidence interval

[1]Neighborhood was defined as the Chicago community area (n=77) of residence during pregnancy.

[2]Crime rates indicate the total number of crime incidents in the year preceding each birth in the mother's community area of residence per 1000 persons in the community area.

[3]Results are from multilevel logistic regression models with a random intercept for community area (neighborhood). Odds ratios reflect the relative increase in odds of adverse pregnancy outcomes with each standard deviation increase in neighborhood crime rate.

[4]Models were adjusted for maternal age at delivery, race/ethnicity, insurance status, multiparity, gestational diabetes, prevalent hypertension, prevalent diabetes, history of: asthma, mental health condition, sexually transmitted disease, or substance abuse; infant sex, season of delivery, and census tract-level percent of population with household incomes below the poverty line.

[5]N varied by model due to missing outcome data. Hypertensive disease of pregnancy: N=34,383; Preterm birth: N=34,251; Small for gestational age: N=34,127.

Supplemental Table 5. Assessing Sensitivity to Fixed-Cohort Bias- Associations of Neighborhood Crime Rates (Total and by Crime Category) with Adverse Pregnancy Outcomes (N=31,129 births, Chicago, IL, 2009-2013)[1,2,3,4,5,6]

	Hypertensive Disease of Pregnancy	Preterm Birth-All	Preterm Birth-Spontaneous	Small for Gestational Age
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Total Crime Rate	1.07 (1.00, 1.15)	1.12 (1.05, 1.18)	1.12 (1.05, 1.20)	1.05 (1.00, 1.10)
Crime Categories				
Homicide	1.03 (0.97, 1.10)	1.05 (0.99, 1.10)	1.06 (0.99, 1.12)	1.03 (0.98, 1.08)
Assault/Battery	1.08 (1.01, 1.15)	1.10 (1.04, 1.17)	1.11 (1.03, 1.18)	1.06 (1.01, 1.11)
Criminal Offenses	1.02 (0.96, 1.09)	1.09 (1.03, 1.16)	1.10 (1.03, 1.17)	1.05 (1.01, 1.10)
Incivilities	1.08 (1.02, 1.16)	1.13 (1.07, 1.19)	1.13 (1.06, 1.20)	1.04 (0.99, 1.09)

OR=odds ratio; CI=confidence interval

[1]Neighborhood was defined as the Chicago community area (n=77) of residence during pregnancy.

[2]Crime rates indicate the total number of crime incidents in the year preceding each birth in the mother's community area of residence per 1000 persons in the community area.

[3]Results are from multilevel logistic regression models with a random intercept for community area (neighborhood). Odds ratios reflect the relative increase in odds of adverse pregnancy outcomes with each standard deviation increase in neighborhood crime rate.

[4]Models were adjusted for maternal age at delivery, race/ethnicity, insurance status, multiparity, gestational diabetes, prevalent hypertension, prevalent diabetes, history of: asthma, mental health condition, sexually transmitted disease, or substance abuse; infant sex, and census tract-level percent of population with household incomes below the poverty line.

[5]To assess sensitivity to fixed-cohort bias, we excluded participants with an estimated date of conception at least 20 weeks prior to the study start date (January 1, 2009) or within 43 weeks of the study end date (December 31, 2013). A total of 3,254 births were excluded.

[6]N varied by model due to missing outcome data. Hypertensive disease of pregnancy: N=31,129; Preterm birth: N=30,997; Small for gestational age: N=30,883.