Supplemental Material

Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas

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Table S1. Adverse birth outcomes by mother's characteristics, study sample population from Texas Eagle Ford Shale region, 2012-2015 (N=23,487)

	% PTB	P-value[a]	% SGA	P-value[a]
Maternal age				
< 20	11.36		13.40	
20-24	10.69		11.72	
25-29	9.18	<0.0005	9.38	<0.0005
30-34	10.86		8.31	
35+	12.88		8.32	
Education				
< high school or GED	12.26		11.58	
high school diploma/GED	11.29	<0.0005	11.60	<0.0005
≥ some college	9.12		8.52	
Race/ethnicity				
Hispanic	9.32		8.24	
non-Hispanic White	11.04	<0.0005	10.66	<0.0005
all others	13.13		16.77	
Foreign-born				
No	10.70	0.091	10.25	0.895
Yes	9.79		10.18	
BMI				
underweight/normal	10.50		12.11	
overweight	10.38	0.665	9.30	<0.0005
obese	10.84		8.26	
Prenatal care				
None	17.38		12.45	
Inadequate	9.84		13.34	
Intermediate	4.01	<0.0005	10.48	<0.0005
Adequate	3.25		9.92	
Adequate Plus	17.99		8.29	
Smoking				
No	10.38	<0.0005	9.87	<0.0005
Yes	14.12		16.75	
Insurance				
Private insurance	9.13	<0.0005	7.47	<0.0005
Medicaid/self-pay/other	11.25		11.60	
High risk pregnancy				
Yes	18.08	<0.0005	11.79	0.011
No	9.77		10.07	
Infant sex				
male	11.45	<0.0005	10.10	0.493
female	9.88		10.37	

Parity				
nulliparous	10.19	0.183	12.42	<0.0005
multiparous	10.75		9.05	
Year				
2012	19.77		9.03	
2013	11.03	<0.0005	10.07	<0.0005
2014	10.18		10.54	
2015	9.63		10.20	
Season				
Spring (MAM)	10.78		10.33	
Summer (JJA)	10.48	0.568	9.72	0.172
Fall (SON)	10.14		10.90	
Winter (DJF)	10.87		10.03	

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. PTB = preterm birth(<37 completed weeks). SGA = small-for-gestational age. SON = September, October, November.
[a] Chi-square test

Table S2. Logistic regression model results estimating the association between the number of flares within 5km during pregnancy, preterm birth, and small-for-gestational age birth

	Preterm birth N=23,158		Small-for-gestational age N=23,154	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Flares within 5km (ref: 0)				
low (1 -9)	0.82 (0.64, 1.04)	0.76 (0.60, 0.97)	0.88 (0.69, 1.11)	0.89 (0.71, 1.14)
high (≥10)	1.50 (1.23, 1.83)	1.41 (1.11, 1.69)	0.97 (0.78, 1.22)	1.02 (0.82, 1.29)
Wells within 5km (ref: 0)				
low	-	1.19 (1.06, 1.35)	-	0.95 (0.84, 1.07)
medium	-	1.35 (1.19, 1.53)	-	0.98 (0.87, 1.11)
high	-	1.31 (1.14, 1.49)	-	0.90 (0.79, 1.02)
Age (ref: 20-24)				
< 20	0.97 (0.83, 1.14)	0.97 (0.83, 1.14)	0.93 (0.80, 1.07)	0.93 (0.80, 1.07)
25-29	0.91 (0.81, 1.03)	0.91 (0.81, 1.03)	0.96 (0.86, 1.08)	0.97 (0.86, 1.08)
30-34	1.10 (0.96, 1.26)	1.10 (0.96, 1.26)	0.94 (0.82, 1.08)	0.94 (0.82, 1.08)
35+	1.26 (1.07, 1.48)	1.27 (1.08, 1.49)	0.91 (0.76, 1.10)	0.91 (0.76, 1.10)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.92 (0.83, 1.03)	0.91 (0.81, 1.02)	0.73 (0.65, 0.81)	0.73 (0.65, 0.82)
all others	1.28 (1.10, 1.50)	1.27 (1.19, 1.49)	1.60 (1.40, 1.84)	1.60 (1.39, 1.84)
Foreign-born (ref: no)	0.80 (0.70, 0.91)	0.81 (0.71, 0.93)	0.90 (0.79, 1.02)	0.89 (0.79, 1.02)
Education (ref: ≥ some college)				
< high school or GED	1.36 (1.19, 1.55)	1.35 (1.19, 1.54)	1.14 (1.00, 1.30)	1.1 4(1.00, 1.30)
high school or GED	1.22 (1.09, 1.36)	1.22 (1.09, 1.36)	1.17 (1.05, 1.31)	1.18 (1.05, 1.31)
BMI (ref: underweight or normal)				
overweight	0.91 (0.82, 1.01)	0.91 (0.82, 1.02)	0.74 (0.67, 0.83)	0.74 (0.67, 0.83)
obese	0.87 (0.78, 0.97)	0.87 (0.78, 0.97)	0.63 (0.56, 0.70)	0.62 (0.56, 0.70)
Smoking (ref: no)	1.40 (1.17, 1.69)	1.41 (1.17, 1.70)	1.83 (1.54, 2.16)	1.83 (1.54, 2.17)
Private insurance (ref: Medicaid/self-pay/other)	0.97 (0.86, 1.08)	0.96 (0.86, 1.07)	0.75 (0.67 0.84)	0.75 (0.67, 0.84)
Parity (ref: multiparous)	0.97 (0.87, 1.08)	0.97 (0.88, 1.08)	1.41 (1.27, 1.56)	1.41 (1.27, 1.56)
High-risk pregnancy (ref: no)	1.81 (1.60, 2.06)	1.79 (1.58, 2.03)	1.37 (1.18, 1.58)	1.37 (1.18, 1.58)

Infant sex (ref: female)	1.21 (1.10, 1.31)	1.20 (1.10, 1.31)	0.97 (0.89, 1.05)	0.97 (0.89, 1.05)
Prenatal care (ref: adequate)				
no care	5.61 (4.69, 6.71)	5.53 (4.62, 6.62)	1.18 (1.00, 1.39)	1.19 (1.01, 1.40)
inadequate	2.98 (2.52, 3.52)	2.95 (2.50, 3.49)	1.21 (1.07, 1.36)	1.21 (1.07, 1.36)
intermediate	1.21 (0.93, 1.58)	1.20 (0.92, 1.56)	1.04 (0.88, 1.23)	1.04 (0.88, 1.23)
adequate+	6.27 (5.44, 7.22)	6.4 1(5.56, 7.38)	0.79 (0.70, 0.88)	0.78 (0.70, 0.88)
Year (ref: 2015)				
2012	2.42 (1.94, 3.02)	2.41 (1.93, 3.01)	0.85 (0.64, 1.13)	0.85 (0.64, 1.13)
2013	1.19 (1.07, 1.33)	1.19 (1.06, 1.33)	0.97 (0.87, 1.08)	0.97 (0.87, 1.08)
2014	1.07 (0.95, 1.19)	1.06 (0.95, 1.18)	1.01 (0.91, 1.13)	1.02 (0.91, 1.13)
Season (ref: summer [JJA])				
spring (MAM)	1.03 (0.91, 1.16)	1.02 (0.91, 1.16)	1.08 (1.95, 1.22)	1.08 (1.95, 1.22)
fall (SON)	0.95 (0.84, 1.07)	0.94 (0.84, 1.07)	1.13 (1.00, 1.28)	1.13 (1.01, 1.28)
winter (DJF)	0.95 (0.84, 1.08)	0.95 (0.84, 1.08)	1.03 (0.91, 1.16)	1.03 (0.91, 1.17)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November

Table S3. Linear regression model results estimating the association between the number of flares within 5km during pregnancy and gestational age (in days) and term birth weight (in grams)

	Gestational age N=23,158		Term birthweight (≥ 37 completed weeks) N=20,716	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Flares within 5km (ref: 0)				
low (1 -9)	0.1 (-0.9, 1.0)	0.5 (-0.5, 1.4)	-10.5 (-40.4, 19.4)	-5.9 (-36.0, 24.3)
high (≥10)	-1.9 (-2.8, -0.9)	-1.5 (-2.4, -0.5)	-19.0 (-49.5, 11.5)	-9.2 (-40.9, 22.5)
Wells within 5km (ref: 0)				
low	-	-1.0 (-1.5, -0.5)	-	0.4 (-15.7, 16.6)
medium	-	-1.8 (-2.3, -1.2)	-	-18.6 (-35.5, -1.7)
high	-	-1.3 (-1.9, -0.8)	-	-19.4 (-36.7, -2.0)
Age (ref: 20-24)				
< 20	-0.5 (-1.2, 0.2)	-0.5 (-1.2, 0.2)	-0.5 (-21.4, 22.4)	0.4 (-21.5, 22.3)
25-29	0.1 (-0.4, 0.6)	0.1 (-0.4, 0.6)	24.6 (8.8, 40.4)	24.8 (8.9, 40.6)
30-34	-0.5 (-1.1, 0.1)	-0.5 (-1.1, 0.1)	47.9 (29.3, 66.4)	47.9 (29.4, 66.5)
35+	-1.8 (-2.5, -1.1)	-1.9 (-2.6, -1.1)	50.5 (27.2, 73.9)	50.3 (26.9, 73.6)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.3 (-0.1, 0.8)	0.4 (-0.1, 0.8)	84.2 (69.6, 98.7)	85.3 (70.7, 99.8)
all others	-2.1 (-2.8, -1.4)	-2.1 (-2.8, -1.4)	-104.0 (-126.9, -81.1)	-104.8 (-127.7, -81.9)
Foreign-born (ref: no)	1.4 (0.8, 1.9)	1.2 (0.7, 1.7)	50.6 (32.9, 68.3)	48.9 (31.2, 66.6)
Education (ref: ≥ some college)				
< high school or GED	-1.1 (-1.7, -0.6)	-1.1 (-1.7, -0.6)	-37.6 (-55.8, -19.5)	-37.1 (-55.3, -19.0)
high school or GED	-0.6 (-1.0, -0.1)	-0.6 (-1.0, -0.1)	-31.7 (-46.4, -17.0)	-31.2 (-45.9, -16.5)
BMI (ref: underweight or normal)				
overweight	0.5 (0.0, 1.0)	0.5 (0.0, 0.9)	73.7 (59.2, 88.2)	73.7 (59.2, 88.2)
obese	0.6 (0.2, 1.1)	0.6 (0.1, 1.0)	136.9 (122.6, 151.3)	137.0 (122.7, 151.3)
Smoking (ref: no)	-1.6 (-2.5, -0.7)	-1.6 (-2.5, -0.8)	-142.4 (-170.4, -114.4)	-142.9 (-170.9, -114.9)
Private insurance (ref: Medicaid/self-pay/other)	-0.2 (-0.7, 0.2)	-0.2 (-0.6, 0.3)	47.0 (32.2, 61.7)	47.3 (32.5, 62.0)
Parity (ref: multiparous)	1.7 (1.3, 2.1)	1.7 (1.2, 2.1)	-62.8 (-76.7, -48.8)	-63.1 (-77.0, -49.1)

High-risk pregnancy (ref: no)	-4.9 (-5.5, -4.3)	-4.8 (-5.5, -4.2)	-12.4 (-33.5, 8.7)	-12.1 (-33.3, 9.0)
Infant sex (ref: female)	-1.0 (-1.4, -0.7)	-1.0 (-1.4, -0.7)	133.8 (122.2, 145.5)	133.9 (122.3, 145.6)
Prenatal care (ref: adequate)				
no care	-7.0 (-7.8, -6.3)	-7.0 (-7.7, -6.2)	-45.5 (-69.5, -21.4)	-44.7 (-68.7, -20.6)
inadequate	-1.7 (-2.3, -1.2)	-1.7 (-2.2, -1.1)	-44.1 (-61.4, -26.8)	-43.6 (-60.9, -26.2)
intermediate	2.3 (1.6, 3.0)	2.4 (1.7, 3.1)	-18.3 (-40.1, 3.5)	-16.9 (-38.7, 4.9)
adequate+	-8.5 (-9.0, -8.1)	-8.6 (-9.1, -8.2)	5.8 (-9.1, 20.7)	4.0 (-10.9, 19.0)
Year (ref: 2015)				
2012	-7.4 (-8.6, -6.3)	-7.4 (-8.5, -6.3)	9.2 (-29.3, 47.7)	8.7 (-29.8, 47.1)
2013	-0.9 (-1.4, -0.4)	-0.9 (-1.3, -0.4)	-5.4 (-9.4, 20.2)	5.3 (-9.6, 20.1)
2014	-0.5 (-1.0, -0.1)	-0.5 (-0.9, 0.0)	-2.8 (-11.7, 17.2)	3.0 (-11.4, 17.5)
Season (ref: summer [JJA])				
spring (MAM)	0.2 (-0.3, 0.7)	0.2 (-0.3, 0.7)	3.0 (-13.6, 19.6)	3.1 (-13.5, 19.7)
fall (SON)	0.5 (0.0, 1.0)	0.5 (0.0, 1.0)	-6.5 (-22.7, 9.6)	-6.5 (-22.7, 9.7)
winter (DJF)	1.3 (0.8, 1.8)	1.3 (0.8, 1.8)	-2.5 (-19.2, 14.2)	-2.7 (-19.4, 14.0)
Gestational age (completed weeks)	--	--	67.5 (62.8, 72.3)	67.2 (62.4, 71.9)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Table S4. Logistic regression model results estimating the association between flared area within 5km during pregnancy, preterm birth, and small-for-gestational age birth

	Preterm birth N=23,158		Small-for-gestational age N=23,154	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Flared area within 5km (ref: 0)				
low (0.1 – 24.0 m^2)	0.85 (0.67, 1.08)	0.79 (0.62, 1.00)	0.90 (0.71, 1.14)	0.92 (0.73, 1.16)
high (24.2 – 1,563.6 m^2)	1.47 (1.20, 1.79)	1.34 (1.08, 1.65)	0.95 (0.76, 1.19)	1.00 (0.79, 1.26)
Wells within 5km (ref: 0)				
low	--	1.19 (1.06, 1.35)	--	0.95 (0.85, 1.07)
medium	--	1.35 (1.19, 1.53)	--	0.98 (0.87, 1.11)
high	--	1.31 (1.14, 1.49)	--	0.90 (0.79, 1.02)
Age (ref: 20-24)				
< 20	0.97 (0.83, 1.14)	0.97 (0.8,3 1.14)	0.93 (0.80, 1.07)	0.93 (0.80, 1.07)
25-29	0.91 (0.81, 1.03)	0.92 (0.81, 1.03)	0.96 (0.86, 1.08)	0.96 (0.86, 1.08)
30-34	1.10 (0.96, 1.26)	1.10 (0.96, 1.26)	0.94 (0.82, 1.08)	0.94 (0.82, 1.08)
35+	1.26 (1.07, 1.48)	1.27 (1.08, 1.49)	0.91 (0.76, 1.10)	0.91 (0.76, 1.10)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.92 (0.82, 1.03)	0.91 (0.81, 1.01)	0.73 (0.65, 0.81)	0.73 (0.65, 0.81)
all others	1.28 (1.09, 1.50)	1.27 (1.08, 1.49)	1.60 (1.40, 1.84)	1.60 (1.39, 1.84)
Foreign-born (ref: no)	0.79 (0.70, 0.91)	0.81 (0.71, 0.92)	0.90 (0.79, 1.02)	0.89 (0.79, 1.02)
Education (ref: ≥ some college)				
< high school or GED	1.36 (1.19, 1.55)	1.35 (1.19, 1.54)	1.14 (1.00, 1.30)	1.14 (1.00, 1.30)
high school or GED	1.22 (1.09, 1.36)	1.22 (1.09, 1.36)	1.17 (1.05, 1.31)	1.18 (1.05, 1.31)
BMI (ref: underweight or normal)				
overweight	0.91 (0.82, 1.01)	0.91 (0.82, 1.02)	0.74 (0.67, 0.83)	0.74 (0.67, 0.83)
obese	0.87 (0.78, 0.97)	0.87 (0.78, 0.97	0.63 (0.56, 0.70)	0.62 (0.56, 0.70)
Smoking (ref: no)	1.40 (1.17, 1.69)	1.41 (1.17, 1.70)	1.83 (1.54, 2.17)	1.83 (1.54, 2.17)
Private insurance (ref: Medicaid/self-pay/other)	0.97 (0.86, 1.08)	0.96 (0.87, 1.07)	0.75 (0.67, 0.84)	0.75 (0.67, 0.84)
Parity (ref: multiparous)	0.97 (0.87, 1.07)	0.97 (0.88, 1.08)	1.41 (1.28, 1.56)	1.41 (1.27, 1.56)
High-risk pregnancy (ref: no)	1.81 (1.60, 2.06)	1.79 (1.58, 2.03)	1.37 (1.18, 1.58)	1.47 (1.19, 1.60)

Infant sex (ref: female)	1.21 (1.11, 1.31)	1.20 (1.10, 1.31)	0.97 (0.89, 1.05)	0.97 (0.89, 1.05)
Prenatal care (ref: adequate)				
no care	5.60 (4.68, 6.70)	5.53 (4.62, 6.61)	1.18 (1.00, 1.39)	1.19 (1.01, 1.40)
inadequate	3.00 (2.52, 3.52)	2.95 (2.50, 3.50)	1.21 (1.07, 1.36)	1.21 (1.07, 1.36)
intermediate	1.21 (0.93, 1.58)	1.20 (0.92, 1.56)	1.04 (0.88, 1.23)	1.04 (0.88, 1.22)
adequate+	6.26 (5.43, 7.21)	6.40 (5.55, 7.37)	0.79 (0.70, 0.88)	0.78 (0.70, 0.88)
Year (ref: 2015)				
2012	2.42 (1.94, 3.02)	2.41 (1.93, 3.01)	0.85 (0.64, 1.13)	0.85 (0.64, 1.13)
2013	1.19 (1.07, 1.33)	1.19 (1.06, 1.33)	0.97 (0.87, 1.08)	0.97 (0.87, 1.08)
2014	1.06 (0.95, 1.19)	1.05 (0.94, 1.18)	1.01 (0.91, 1.13)	1.01 (0.91, 1.13)
Season (ref: summer [JJA])				
spring (MAM)	1.02 (0.91, 1.16)	1.02 (0.90, 1.15)	1.08 (0.95, 1.22)	1.08 (0.95, 1.22)
fall (SON)	0.95 (0.84, 1.07)	0.94 (0.84, 1.07)	1.13 (1.00, 1.28)	1.13 (1.00, 1.28)
winter (DJF)	0.95 (0.84, 1.08)	0.95 (0.84, 1.08)	1.03 (0.91, 1.16)	1.03 (0.91, 1.17)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Table S5. Linear regression model results estimating the association between flared area within 5km during pregnancy and gestational age (in days) and term birth weight (in grams)

	Gestational age N=23,158		Term birthweight (≥ 37 completed weeks) N=20,716	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Flared area within 5km (ref: 0)				
low (0.1 – 24.0 m^2)	0.2 (-0.7, 1.2)	0.6 (0.3, 1.6)	-12.0 (-41.9, 17.9)	-7.5 (-37.6, 22.7)
high (24.2 – 1,563.6 m^2)	-2.0 (-3.0, -1.1)	-1.7 (-2.6, -0.7)	-17.4 (-47.9, 13.1)	-7.5 (-39.2, 24.3)
Wells within 5km (ref: 0)				
low	--	-1.0 (-1.5, -0.5)	--	0.5 (-15.7, 16.6)
medium	--	-1.8 (-2.3, -1.2)	--	-18.5 (-35.4, -1.7)
high	--	-1.3 (-1.9, -0.8)	--	-19.5 (-36.8, -2.2)
Age (ref: 20-24)				
< 20	-0.5 (-1.2, 0.2)	-0.5 (-1.2, 0.2)	0.5 (-21.4, 22.4)	0.4 (-21.5, 22.3)
25-29	0.1 (-0.4, 0.6)	0.1 (-0.4, 0.6)	24.6 (8.8, 40.4)	24.8 (9.0, 40.6)
30-34	-0.5 (-1.1, 0.1)	-0.5 (-1.1, 0.1)	47.9 (29.3, 66.4)	47.9 (29.4, 66.5)
35+	-1.8 (-2.5, -1.1)	-1.9 (-2.6, -1.1)	50.5 (27.2, 73.9)	50.3 (27.0, 73.6)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.3 (-0.1, 0.8)	0.4 (-0.1, 0.8)	84.2 (69.7, 98.8)	85.3 (70.7, 99.9)
all others	-2.1 (-2.8, -1.4)	-2.1 (-2.8, -1.4)	-104.0 (-126.9, -81.1)	-104.8 (-127.7, -81.9)
Foreign-born (ref: no)	1.3 (0.8, 1.9)	1.2 (0.7, 1.8)	50.6 (33.0, 68.3)	48.9 (31.2, 66.6)
Education (ref: ≥ some college)				
< high school or GED	-1.1 (-1.7, -0.6)	-1.1 (-1.7, -0.6)	-37.6 (-55.8, -19.5)	-37.1 (-55.3, -19.0)
high school or GED	-0.6 (-1.0, -0.1)	-0.6 (-1.0, -0.1)	-31.7 (-46.4, 17.0)	-31.2 (-45.9, -16.5)
BMI (ref: underweight or normal)				
overweight	0.5 (0.0, 0.9)	0.5 (0.0, 0.9)	73.7 (59.2, 88.2)	73.7 (59.2, 88.2)
obese	0.6 (0.2, 1.1)	0.6 (0.1, 1.0)	136.9 (122.6, 151.3)	137.0 (122.7, 151.3)
Smoking (ref: no)	-1.6 (-2.5, -0.7)	-1.6 (-2.5, -0.8)	-142.4 (-170.4, -114.4)	-142.9 (-170.9, -114.9)
Private insurance (ref: Medicaid/self-pay/other)	-0.2 (-0.7, 0.2)	-0.2 (-0.6, 0.3)	46.9 (32.2, 61.7)	47.2 (32.5, 62.0)
Parity (ref: multiparous)	1.7 (1.3, 2.1)	1.7 (1.2, 2.1)	-62.8 (-76.7, -48.8)	-63.1 (-77.0, -49.1)

High-risk pregnancy (ref: no)	-4.9 (-5.5, -4.3)	-4.8 (-5.5, -4.2)	-12.4 (-33.5, 8.7)	-12.1 (-33.3, 9.0)
Infant sex (ref: female)	-1.0 (-1.4, -0.7)	-1.0 (-1.4, -0.7)	133.8 (122.2, 145.5)	133.9 (122.3, 145.6)
Prenatal care (ref: adequate)				
no care	-7.0 (-7.7, -6.3)	-6.9 (-7.7, -6.2)	-45.5 (-69.5, -21.5)	-44.7 (-68.7, -20.7)
inadequate	-1.7 (-2.3, -1.2)	-1.7 (-2.2, -1.1)	-44.1 (-61.4, -26.8)	-43.6 (-60.9, -26.2)
intermediate	2.3 (1.6, 3.0)	2.4 (1.7, 3.1)	-18.3 (-40.1, 3.5)	-16.9 (-38.7, 4.9)
adequate+	-8.5 (-9.0, -8.1)	-8.6 (-9.1, -8.2)	5.8 (-9.1, 20.8)	4.1 (-10.9, 19.0)
Year (ref: 2015)				
2012	-7.4 (-8.6, -6.3)	-7.4 (-8.5, -6.3)	9.2 (-29.3, 47.7)	8.7 (-29.8, 47.1)
2013	-0.9 (-1.4, -0.5)	-0.9 (-1.3, -0.4)	5.5 (-9.4, 20.3)	5.3 (-9.5, 20.2)
2014	-0.5 (-1.0, -0.1)	-0.5 (-0.9, 0.0)	2.8 (-11.6, 17.3)	3.1 (-11.4, 17.5)
Season (ref: summer [JJA])				
spring (MAM)	0.2 (-0.3, 0.7)	0.2 (-0.3, 0.7)	3.0 (-13.6, 19.6)	3.1 (-13.5, 19.7)
fall (SON)	0.5 (0.0, 1.0)	0.5 (0.0, 1.0)	-6.5 (-22.7, 9.6)	-6.5 (-22.7, 9.6)
winter (DJF)	1.3 (0.8, 1.8)	1.3 (0.8, 1.8)	-2.5 (-19.2, 14.2)	-2.7 (-19.4, 14.0)
Gestational age (completed weeks)	--	--	67.5 (62.8, 72.3)	67.2 (62.4, 71.9)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Table S6. Logistic regression model results estimating the association between the inverse squared distance-weighted number of flares within 5km during pregnancy, preterm birth, and small-for-gestational age birth

	Preterm birth N=23,158		Small-for-gestational age N=23,154	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Distance weighted sum of flares within 5km (ref: 0)				
low $(4.0 \times 10^{-8} - 1.0 \times 10^{-6}$ flares/m^2)	0.88 (0.70, 1.12)	0.82 (0.65, 1.04)	0.96 (0.76, 1.20)	0.98 (0.78, 1.23)
high $(1.0 \times 10^{-6} - 1.0 \times 10^{-3}$ flares/m^2)	1.42 (1.16, 1.74)	1.30 (1.05, 1.60)	0.90 (0.71, 1.13)	0.94 (0.74, 1.20)
Wells within 5km (ref: 0)				
low	--	1.19 (1.05, 1.35)	--	0.95 (0.84, 1.07)
medium	--	1.35 (1.19, 1.53)	--	0.98 (0.87, 1.11)
high	--	1.31 (1.15, 1.49)	--	0.90 (0.79, 1.03)
Age (ref: 20-24)				
< 20	0.97 (0.83, 1.14)	0.97 (0.83, 1.14)	0.93 (0.80, 1.07)	0.93 (0.80, 1.07)
25-29	0.91 (0.81, 1.03)	0.91 (0.81, 1.03)	0.96 (0.86, 1.08)	0.96 (0.86, 1.08)
30-34	1.10 (0.96, 1.26)	1.10 (0.96, 1.26)	0.94 (0.82, 1.08)	0.94 (0.82, 1.08)
35+	1.26 (1.07, 1.48)	1.27 (1.07, 1.49)	0.91 (0.76, 1.10)	0.91 (0.76, 1.10)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.92 (0.82, 1.03)	0.91 (0.81, 1.01)	0.73 (0.65, 0.81)	0.73 (0.65, 0.81)
all others	1.28 (1.09, 1.49)	1.27 (1.09, 1.49)	1.60 (1.39, 1.84)	1.60 (1.39, 1.84)
Foreign-born (ref: no)	0.80 (0.70, 0.91)	0.81 (0.71, 0.93)	0.90 (0.79, 1.02)	0.90 (0.79, 1.02)
Education (ref: ≥ some college)				
< high school or GED	1.36 (1.19, 1.55)	1.35 (1.19, 1.54)	1.14 (1.00, 1.30)	1.14 (1.00, 1.30)
high school or GED	1.22 (1.09, 1.36)	1.22 (1.09, 1.36)	1.17 (1.05, 1.31)	1.17 (1.05, 1.31)
BMI (ref: underweight or normal)				
overweight	0.91 (0.82, 1.01)	0.91 (0.82, 1.02)	0.74 (0.67, 0.83)	0.74 (0.67, 0.83)
obese	0.87 (0.78, 0.97)	0.87 (0.78, 0.97)	0.63 (0.56, 0.70)	0.63 (0.56, 0.70)
Smoking (ref: no)	1.41 (1.17, 1.69)	1.41 (1.18, 1.70)	1.83 (1.54, 2.17)	1.83 (1.54, 2.17)
Private insurance (ref: Medicaid/self-pay/other)	0.97 (0.86, 1.08)	0.96 (0.86, 1.07)	0.75 (0.67, 0.84)	0.75 (0.67, 0.84)

Parity (ref: multiparous)	0.97 (0.87, 1.07)	0.97 (0.88, 1.08)	1.41 (1.27, 1.56)	1.41 (1.27, 1.56)
High-risk pregnancy (ref: no)	1.81 (1.60, 2.06)	1.97 (1.58, 2.03)	1.36 (1.18, 1.58)	1.37 (1.19, 1.58)
Infant sex (ref: female)	1.20 (1.10, 1.31)	1.20 (1.10, 1.31)	0.97 (0.89, 1.05)	0.97 (0.89, 1.05)
Prenatal care (ref: adequate)				
no care	5.61 (4.69, 6.71)	5.53 (4.62, 6.72)	1.18 (1.01, 1.39)	1.19 (1.01, 1.40)
inadequate	2.98 (2.52, 3.52)	2.95 (2.50, 3.49)	1.21 (1.07, 1.36)	1.21 (1.07, 1.36)
intermediate	1.21 (0.94, 1.58)	1.20 (0.92, 1.56)	1.04 (0.88, 1.23)	1.04 (0.88, 1.23)
adequate+	6.25 (5.43, 7.21)	6.39 (5.55, 7.73)	0.79 (0.70, 0.88)	0.78 (0.70, 0.88)
Year (ref: 2015)				
2012	2.42 (1.94, 3.02)	2.41 (1.93, 3.01)	0.85 (0.64, 1.13)	0.85 (0.64, 1.13)
2013	1.19 (1.06, 1.33)	1.19 (1.06, 1.33)	0.96 (0.86, 1.08)	0.96 (0.86, 1.08)
2014	1.06 (0.95, 1.19)	1.05 (0.94, 1.18)	1.01 (0.91, 1.12)	1.01 (0.91, 1.13)
Season (ref: summer [JJA])				
spring (MAM)	1.03 (0.91, 1.16)	1.02 (0.91, 1.16)	1.08 (0.95, 1.22)	1.08 (0.95, 1.22)
fall (SON)	0.95 (0.84, 1.07)	0.94 (0.84, 1.06)	1.13 (1.01, 1.28)	1.13 (1.01, 1.28)
winter (DJF)	0.95 (0.84, 1.08)	0.95 (0.84, 1.07)	1.03 (0.91, 1.16)	1.03 (0.91, 1.17)

Note: BMI = body mass index. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SD = standard deviation. SON = September, October, November.

Table S7. Linear regression model results estimating the association between the inverse squared distance weighted number of flares within 5km during pregnancy and gestational age (in days) and term birth weight (in grams)

	Gestational age N=23,158		Term birthweight (≥ 37 completed weeks) N=20,716	
	Model 1 β (95% CI)	**Model 2** β (95% CI)	**Model 1** β (95% CI)	**Model 2** β (95% CI)
Distance weighted sum of flares within 5km (ref: 0)				
low ($4.0 \times 10^{-8} - 1.0 \times 10^{-6}$ flares/m^2)	0.1 (-0.8, 1.1)	0.5 (-0.4, 1.5)	-25.0 (-54.9, 4.8)	-20.2 (-50.3, 9.9)
high ($1.0 \times 10^{-6} - 1.0 \times 10^{-3}$ flares/m^2)	-1.9 (-2.9, -1.0)	-1.5 (-2.5, -0.6)	-3.8 (-34.4, 26.7)	6.8 (-24.9, 38.5)
Wells within 5km (ref: 0)				
low	--	-1.0 (-1.5, -0.5)	--	1.0 (-15.2, 17.1)
medium	--	-1.8 (-2.3, -1.2)	--	-18.2 (-35.1, -1.3)
high	--	-1.3 (-1.9, -0.8)	--	-20.5 (-37.9, -3.2)
Age (ref: 20-24)				
< 20	-0.5 (-1.2, 0.2)	-0.5 (-1.2, 0.2)	0.5 (-21.3, 22.4)	0.5 (-21.4, 22.3)
25-29	0.1 (-0.4, 0.6)	0.1 (-0.4, 0.6)	24.7 (8.9, 40.5)	24.9 (9.1, 40.7)
30-34	-0.5 (-1.1, 0.1)	-0.5 (-1.1, 0.1)	48.0 (29.5, 66.6)	48.1 (29.6, 66.7)
35+	-1.8 (-2.5, -1.1)	-1.9 (-2.6, -1.1)	50.7 (33.1, 68.4)	50.4 (27.1, 73.8)
Race/ethnicity (ref: Hispanic)				
non-Hispanic White	0.3 (-0.1, 0.8)	0.4 (-0.1, 0.9)	84.3 (69.8, 98.9)	85.4 (70.9, 100.0)
all others	-2.1 (-2.8, -1.4)	-2.1 (-2.8, -1.4)	-103.9 (-126.7, -81.0)	-104.7 (-127.6, -81.8)
Foreign-born (ref: no)	1.3 (0.8, 1.9)	1.2 (0.7, 1.8)	50.7 (33.1, 68.4)	49.0 (31.3, 66.7)
Education (ref: ≥ some college)				
< high school or GED	-1.1 (-1.7, -0.6)	-1.1 (-1.7, -0.6)	-37.7 (-55.8, -19.5)	-37.1 (-55.3, -18.9)
high school or GED	-0.6 (-1.0, -0.1)	-0.5 (-1.0, -0.1)	-31.8 (-46.5, -17.1)	-31.3 (-46.0, -16.6)
BMI (ref: underweight or normal)				
overweight	0.5 (0.0, 0.9)	0.5 (0.0, 0.9)	73.6 (59.1, 88.1)	73.7 (59.2, 88.2)
obese	0.6 (0.2, 1.1)	0.6 (0.1, 1.0)	136.9 (122.6, 151.2)	137.0 (122.7, 151.3)
Smoking (ref: no)	-1.6 (-2.5, -0.8)	-1.6 (-2.5, -0.8)	-142.4 (-170.4, -114.4)	-142.8 (-170.8, -114.9)
Private insurance (ref: Medicaid/self-pay/other)	-0.2 (-0.7, 0.2)	-0.2 (-0.6, 0.3)	46.8 (32.0, 61.5)	47.1 (32.4, 61.8)

Parity (ref: multiparous)	1.7 (1.3, 2.1)	1.7 (1.2, 2.1)	-62.8 (-76.7, -48.8)	-63.0 (-77.0, -49.1)
High-risk pregnancy (ref: no)	-4.9 (-5.5, -4.3)	-4.8 (-5.5, -4.2)	-12.2 (-33.4, 8.9)	-12.0 (-33.1, 9.2)
Infant sex (ref: female)	-1.0 (-1.4, -0.7)	-1.0 (-1.4, -0.7)	133.8 (122.1, 145.4)	133.9 (122.2, 145.5)
Prenatal care (ref: adequate)				
no care	-7.0 (-7.7, -6.3)	-6.9 (-7.7, -6.2)	-45.6 (-69.6, -21.6)	-44.8 (-68.8, -20.8)
inadequate	-1.7 (-2.3, -1.2)	-1.7 (-2.2, -1.1)	-44.1 (-61.4, -26.8)	-43.6 (-60.9, -26.3)
intermediate	2.3 (1.6, 3.0)	2.4 (1.7, 3.1)	-18.4 (-40.1, 3.4)	-16.9 (-38.7, 4,9)
adequate+	-8.5 (-9.0, -8.1)	-8.6 (-9.1, -8.2)	5.9 (-9.0, 20.9)	4.1 (-10.9, 19.1)
Year (ref: 2015)				
2012	-7.4 (-8.6, -6.3)	-7.4 (-8.5, -6.3)	9.3 (-29.1, 47.8)	8.7 (-29.7, 47.2)
2013	-0.9 (-1.4, -0.4)	-0.9 (-1.3, -0.4)	6.2 (-8.6, 21.0)	6.0 (-8.8, 20.8)
2014	-0.5 (-1.0, -0.1)	-0.5 (-0.9, 0.0)	3.2 (-11.3, 17.7)	3.4 (-11.0, 17.9)
Season (ref: summer [JJA])				
spring (MAM)	0.2 (-0.3, 0.7)	0.2 (-0.3, 0.7)	2.9 (-13.7, 19.5)	3.0 (-13.6, 19.6)
fall (SON)	0.5 (0.0, 1.0)	0.5 (0.0, 1.0)	-6.7 (-22.9, 9.5)	-6.7 (-22.8, 9.5)
winter (DJF)	1.3 (0.8, 1.8)	1.3 (0.8, 1.8)	-2.6 (-19.3, 14.1)	-2.8 (-19.5, 13.9)
Gestational age (completed weeks)	--	--	67.5 (62.8, 72.8)	67.2 (62.5, 72.0)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Table S8. Stratified logistic regression model results estimating the association between the number of flares within 5km during pregnancy, preterm birth, and small-for-gestational age birth among Hispanic and non-Hispanic White women

	Preterm birth		Small-for-gestational age	
	Hispanic (N=12,781) β (95% CI)	**Non-Hispanic White** (N=8,566) β (95% CI)	**Hispanic** (N=12,780) β (95% CI)	**Non-Hispanic White** (N=8,565) β (95% CI)
Flares within 5km (ref: 0)				
low (1 -9)	0.72 [0.52, 0.99]	0.75 [0.50, 1.12]	0.99 [0.73, 1.34]	0.92 [0.62, 1.37]
high (≥10)	1.61 [1.25, 2.08]	0.78 [0.50, 1.20]	1.09 [0.81, 1.45]	1.04 [0.69, 1.57]
Wells within 5km (ref: 0)				
low	1.14 [0.97, 1.34]	1.27 [1.02, 1.58]	0.94 [0.81, 1.10]	1.03 [0.82, 1.29]
medium	1.47 [1.24, 1.73]	1.17 [0.93, 1.46]	1.01 [0.86, 1.19]	0.92 [0.73, 1.17]
high	1.40 [1.17, 1.66]	1.24 [0.99, 1.55]	0.83 [0.69, 0.98]	1.06 [0.84, 1.34]
Age (ref: 20-24)				
< 20	0.96 [0.79, 1.17]	0.95 [0.68, 1.32]	0.9` [0.76, 1.09]	0.95 [0.69, 1.30]
25-29	0.90 [0.76, 1.05]	0.96 [0.77, 1.18]	0.87 [0.74, 1.01]	1.19 [0.96, 1.47]
30-34	1.09 [0.91, 1.30]	1.18 [0.93, 1.50]	0.88 [0.73, 1.06]	1.04 [0.80, 1.34]
35+	1.11 [0.90, 1.39]	1.54 [1.16, 2.04]	0.89 [0.70, 1.13]	1.03 [0.74, 1.43]
Foreign-born (ref: no)	0.80 [0.69, 0.93]	1.11 [0.61, 2.03]	0.9 [0.8, 1.0]	1.39 [0.77, 2.51]
Education (ref: ≥ some college)				
< high school or GED	1.28 [1.09, 1.51]	1.56 [1.17, 2.08]	1.09 [0.92, 1.28]	1.59 [1.20, 2.11]
high school or GED	1.16 [1.00, 1.35]	1.24 [1.03, 1.50]	1.09 [0.94, 1.26]	1.44 [1.18, 1.74]
BMI (ref: underweight or normal)				
overweight	0.82 [0.71, 0.95]	1.02 [0.85, 1.23]	0.83 [0.72, 0.95]	0.67 [0.55, 0.82]
obese	0.80 [0.70, 0.91]	0.92 [0.76, 1.11]	0.67 [0.58, 0.78]	0.61 [0.50, 0.75]
Smoking (ref: no)	1.36 [0.92, 2.00]	1.35 [1.07, 1.71]	1.50 [1.04, 2.18]	2.03 [1.63, 2.53]
Private insurance (ref: Medicaid/self-pay/other)	0.96 [0.82, 1.13]	0.90 [0.75, 1.08]	0.84 [0.71, 0.98]	0.71 [0.59, 0.86]
Parity (ref: multiparous)	0.90 [0.78, 1.04]	1.16 [0.97, 1.37]	1.53 [1.34, 1.76]	1.29 [1.08, 1.54]
High-risk pregnancy (ref: no)	1.89 [1.60, 2.24]	1.56 [1.25, 1.94]	1.30 [1.08, 1.58]	1.46 [1.14, 1.88]
Infant sex (ref: female)	1.19 [1.06, 1.33]	1.22 [1.06, 1.43]	1.10 [0.98, 1.23]	0.83 [0.71, 0.97]
Prenatal care (ref: adequate)				

no care	6.16 [4.82, 7.88]	5.05 [3.74, 6.81]	1.08 [0.87, 1.34]	1.33 [1.00, 1.79]
inadequate	3.25 [2.60, 4.08]	2.53 [1.90, 3.38]	1.24 [1.06, 1.45]	1.21 [0.96, 1.53]
intermediate	1.24 [0.85, 1.80]	1.11 [0.73, 1.68]	1.04 [0.83, 1.31]	0.99 [0.74, 1.32]
adequate+	6.79 [5.54, 8.31]	6.23 [4.99, 7.78]	0.75 [0.64, 0.87]	0.84 [0.69, 1.03]
Year (ref: 2015)				
2012	2.76 [2.07, 3.69]	1.97 [1.32, 2.95]	0.76 [0.51, 1.14]	1.18 [0.75, 1.86]
2013	1.22 [1.06, 1.42]	1.20 [0.99, 1.46]	1.01 [0.87, 1.17]	0.88 [0.72, 1.08]
2014	1.08 [0.94, 1.26]	1.11 [0.92, 1.35]	1.06 [0.92, 1.22]	1.00 [0.82, 1.21]
Season (ref: summer [JJA])				
spring (MAM)	1.06 [0.91, 1.25]	1.00 [0.81, 1.24]	1.15 [0.98, 1.35]	1.01 [0.81, 1.27]
fall (SON)	0.90 [0.76, 1.05]	0.96 [0.78, 1.19]	1.13 [0.96, 1.32]	1.13 [0.91, 1.41]
winter (DJF)	0.98 [0.83, 1.15]	0.95 [0.76, 1.18]	1.01 [0.86, 1.19]	1.08 [0.86, 1.36]

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Table S9. Stratified linear regression model results estimating the association between the number of flares within 5km during pregnancy and gestational age (in days) and term birth weight (in grams) among Hispanic and non-Hispanic White women

	Gestational age		Term birthweight (≥ 37 completed weeks)	
	Hispanic (N=12,781) β (95% CI)	Non-Hispanic White (N=8,566) β (95% CI)	Hispanic (N=11,369) β (95% CI)	Non-Hispanic White (N=7,770) β (95% CI)
Flares within 5km (ref: 0)				
low (1 -9)	0.6 [-0.7, 12.0]	0.4 [-1.0, 1.7]	-25.6 [-67.0, 15.8]	6.6 [-39.8, 53.1]
high (≥10)	-2.2 [-3.4, -0.9]	-0.0 [-1.5, 1.5]	-24.8 [-66.6, 16.9]	4.0 [-47.5, 55.5]
Wells within 5km (ref: 0)				
low	-0.8 [-1.4, -0.1]	-1.4 [-2.2, 0.5]	-0.5 [-21.8, 20.7]	-1.3 [-29.0, 26.5]
medium	-1.8 [-2.5, -1.1]	-1.6 [-2.4, -0.8]	-23.5 [-46.4, -0.65]	-10.6 [-38.4, 17.1]
high	-1.4 [-2.2, -0.7]	-1.3 [-2.1, -0.5]	5.1 [-18.2, 28.5]	-43.4 [-71.6, -15.2]
Age (ref: 20-24)				
< 20	-0.7 [-1.6, 0.1]	0.1 [-1.1, 1.4]	-13.8 [-40.9, 13.3]	32.6 [-11.2, 76.4]
25-29	-2.0 [-2.7, -1.3]	0.2 [-0.5, 1.0]	44.4 [23.3, 65.6]	-1.9 [-28.4, 24.6]
30-34	2.4 [1.4, 3.4]	-0.6 [-1.4, 0.3]	58.2 [33.0, 83.4]	31.5 [1.0, 62.0]
35+	-8.7 [-9.3, -8.0]	-1.9 [-3.0, -0.8]	56.4 [25.2, 87.7]	29.8 [-8.4, 68.1]
Foreign-born (ref: no)	1.3 [0.7, 1.9]	-0.5 [-2.8, 1.9]	44.9 [25.5, 64.2]	55.6 [-24.3, 135.5]
Education (ref: ≥ some college)				
< high school or GED	-0.8 [-1.4, -0.1]	-2.0 [-3.2, -0.8]	-21.7 [-43.8, 0.4]	-102.8 [-143.6, -62.0]
high school or GED	-0.2 [-0.9, 0.4]	-0.6 [-1.3, 0.1]	-17.2 [-37.4, 2.9]	-59.4 [-83.7, -35.2]
BMI (ref: underweight or normal)				
overweight	0.9 [0.3, 1.5]	-0.1 [-0.8, 0.6]	61.9 [42.3, 81.5]	93.0 [69.3, 116.6]
obese	0.9 [0.3, 1.5]	0.5 [-0.2, 1.2]	135.8 [116.5, 155.1]	134.3 [110.5, 158.0]
Smoking (ref: no)	-1.7 [-3.6, 0.2]	-1.2 [-2.2, -0.2]	-126.5 [-188.1, -64.9]	-151.7 [-186.2, -117.3]
Private insurance (ref: Medicaid/self-pay/other)	0.2 [-0.5, 0.9]	-0.3 [-1.0, 0.4]	49.7 [28.6, 70.8]	30.0 [7.3, 52.7]
Parity (ref: multiparous)	1.8 [1.2, 2.4]	1.4 [0.7, 2.0]	-56.4 [-76.0, -36.9]	-72.1 [-93.9, -50.3]
High-risk pregnancy (ref: no)	-4.9 [-5.7, -4.0]	-4.2 [-5.1, -3.2]	8.0 [-20.8, 36.9]	-29.6 [-63.4, 4.1]
Infant sex (ref: female)	-0.8 [-1.3, -0.3]	-1.3 [-1.8, -0.7]	118.7 [103.0, 134.3]	154.6 [135.5, 173.7]

Prenatal care (ref: adequate)				
no care	-7.7 [-8.7, -6.8]	-6.0 [-7.2, -4.9]	-25.6 [-57.6, 6.3]	-81.1 [-121.5, -40.8]
inadequate	-2.0 [-2.7, -1.3]	-1.4 [-2.3, -0.5]	-34.1 [-57.0, -11.3]	-59.8 [-90.2, -29.3]
intermediate	2.4 [1.4, 3.7]	2.7 [1.7, 3.7]	-18.0 [-48.9, 13.0]	-17.7 [-51.1, 15.8]
adequate+	-8.7 [-9.3, -8.0]	-8.6 [-9.3, -7.9]	16.6 [-3.7, 36.9]	-9.2 [-33.4, 15.1]
Year (ref: 2015)				
2012	-7.1 [-8.7, -5.6]	-1.3 [-8.6, -5.1]	10.2 [-42.4, 62.9]	-6.0 [-67.8, 55.8]
2013	-1.0 [-1.6, -0.4]	-0.9 [-1.6, 0.1]	4.2 [-15.8, 24.2]	-0.9 [-25.1, 23.3]
2014	-0.6 [-1.2, 0.0]	-0.4 [-1.1, 0.3]	-7.5 [-27.0, 12.0]	6.4 [-17.2, 29.9]
Season (ref: summer [JJA])				
spring (MAM)	0.4 [-0.3, 1.1]	-0.4 [-1.2, 0.4]	14.0 [-8.5, 36.5]	-18.0 [-44.8, 8.8]
fall (SON)	-2.0 [-2.7, -1.3]	0.5 [-0.2, 1.3]	3.7 [-18.0, 25.4]	-19.5 [-46.0, 6.9]
winter (DJF)	1.1 [0.4, 1.8]	1.3 [0.5, 2.1]	-0.5 [-22.9, 21.8]	-11.9 [-39.6, 15.9]
Gestational age (completed weeks)	--	--	55.8 [49.4, 62.1]	80.9 [73.0, 88.7]

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.
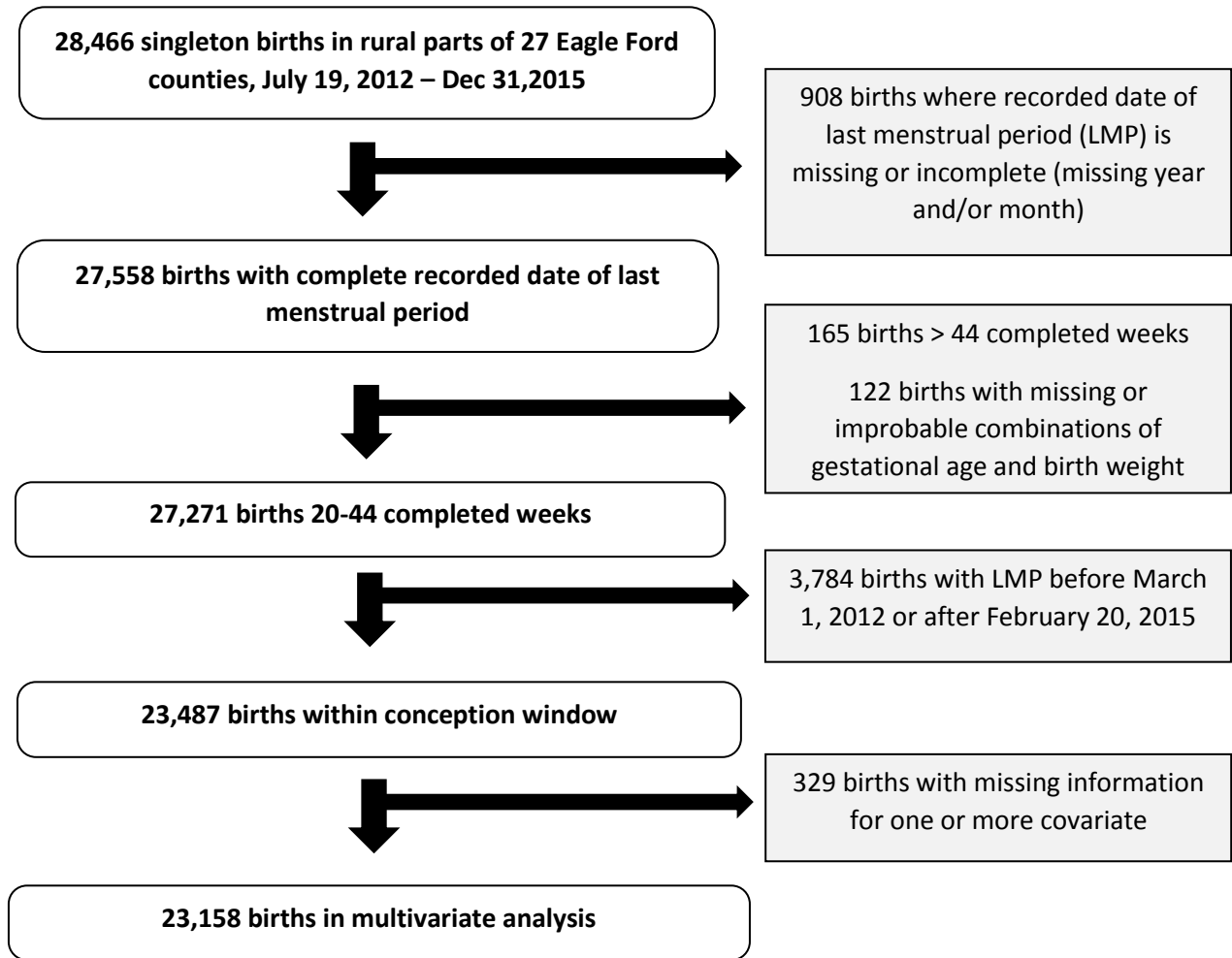
Table S10. Logistic regression model results estimating the association between the number of flares within 5km during pregnancy and preterm birth, controlling for rurality (residence in a census-designated place)

	Preterm birth N=23,158	
	Model 1 β (95% CI)	**Model 2** β (95% CI)
Flares within 5km (ref: 0)		
low (1 -9)	0.82 (0.64, 1.04)	0.76 (0.60, 0.97)
high (≥10)	1.48 (1.21, 1.81)	1.36 (1.11, 1.68)
Wells within 5km (ref: 0)		
low	--	1.19 (1.05, 1.34)
medium	--	1.34 (1.18, 1.52)
high	--	1.30 (1.14, 1.48)
Age (ref: 20-24)		
< 20	0.97 (0.83, 1.14)	0.97 (0.83, 1.14)
25-29	0.91 (0.81, 1.03)	0.91 (0.81, 1.03)
30-34	1.10 (0.96, 1.26)	1.10 (0.96, 1.26)
35+	1.27 (1.07, 1.49)	1.27 (1.08, 1.50)
Race/ethnicity (ref: Hispanic)		
non-Hispanic White	0.93 (0.84, 1.04)	0.92 (0.82, 1.02)
all others	1.27 (1.08, 1.48)	1.27 (1.09, 1.49)
Foreign-born (ref: no)	0.80 (0.70, 0.91)	0.81 (0.71, 0.93)
Education (ref: ≥ some college)		
< high school or GED	1.36 (1.19, 1.55)	1.35 (1.19, 1.54)
high school or GED	1.22 (1.09, 1.36)	1.22 (1.09, 1.36)
BMI (ref: underweight or normal)		
overweight	0.91 (0.81, 1.01)	0.91 (0.82, 1.01)
obese	0.87 (0.78, 0.97)	0.87 (0.78, 0.97)
Smoking (ref: no)	1.40 (1.17, 1.69)	1.41 (1.17, 1.70)
Private insurance (ref: Medicaid/self-pay/other)	0.97 (0.87, 1.08)	0.96 (0.86, 1.07)
Parity (ref: multiparous)	0.97 (0.87, 1.08)	0.97 (0.88, 1.08)
High-risk pregnancy (ref: no)	1.81 (1.60, 2.05)	1.79 (1.58, 2.03)
Infant sex (ref: female)	1.21 (1.11, 1.32)	1.20 (1.10, 1.31)
Prenatal care (ref: adequate)		
no care	5.60 (4.68, 6.70)	5.53 (4.62, 6.62)
inadequate	2.98 (2.52, 3.52)	2.95 (2.50, 3.49)
intermediate	1.21 (0.93, 1.58)	1.20 (0.92, 1.56)
adequate+	6.27 (5.44, 7.23)	6.40 (5.56, 7.38)
Year (ref: 2015)		
2012	2.42 (1.94, 3.03)	2.41 (1.93, 3.02)
2013	1.19 (1.07, 1.33)	1.19 (1.06, 1.33)
2014	1.07 (0.95, 1.19)	1.06 (0.95, 1.18)
Season (ref: summer [JJA])		

spring (MAM)	1.02 (0.91, 1.16)	1.02 (0.90, 1.16)
fall (SON)	0.95 (0.84, 1.07)	0.94 (0.84, 1.07)
winter (DJF)	0.95 (0.84, 1.07)	0.95 (0.84, 1.08)
Residence in a Census-designated place (Ref: No)	1.07 (0.98, 1.17)	1.03 (0.94, 1.13)

Note: See main text for the definition of variables. BMI = body mass index. CI = Confidence Interval. DJF = December, January, February. GED = general education development. JJA = June, July August. MAM = March, April, May. SON = September, October, November.

Figure S1. Construction of the dataset

28,466 singleton births in rural parts of 27 Eagle Ford counties, July 19, 2012 – Dec 31,2015

→ 908 births where recorded date of last menstrual period (LMP) is missing or incomplete (missing year and/or month)

27,558 births with complete recorded date of last menstrual period

→ 165 births > 44 completed weeks

122 births with missing or improbable combinations of gestational age and birth weight

27,271 births 20-44 completed weeks

→ 3,784 births with LMP before March 1, 2012 or after February 20, 2015

23,487 births within conception window

→ 329 births with missing information for one or more covariate

23,158 births in multivariate analysis

Note: Numbers may not sum because criteria were not mutually exclusive.

Figure S2. Spearman's correlation coefficients between the total number of flares within 5km during pregnancy, and the number of flares by trimester.