

SUPPLEMENTAL MATERIAL

Assessing disparity using measures of racial and educational isolation

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SM Table S1. Urbanicity classification based on Rural-Urban Commuting Area (RUCA) codes

Classification	Primary codes	Secondary codes
Urban	1.0 Metropolitan area core: primary flow within an urbanized area (UA)	1.1 Secondary flow 30% to 50% to a larger UA
		2.1 Secondary flow 30% to 50% to a larger UA
	2.0 Metropolitan area high commuting: primary flow 30% or more to a UA	4.1 Secondary flow 30% to 50% to a UA
		5.1 Secondary flow 30% to 50% to a UA
	3.0 Metropolitan area low commuting: primary flow 10% to 30% to a UA	7.1 Secondary flow 30% to 50% to a UA
		8.1 Secondary flow 30% to 50% to a UA
		10.1 Secondary flow 30% to 50% to a UA
Suburban	4.0 Micropolitan area core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)	
	5.0 Micropolitan high commuting: primary flow 30% or more to a large UC	
	6.0 Micropolitan low commuting: primary flow 10% to 30% to a large UC	

Rural	7.0 Small town core: primary flow	7.2 Secondary flow 30% to 50% to a UA
	within an urban cluster of 2,500 to	
	9,999 (small UC)	8.2 Secondary flow 30% to 50% to a large UC
	8.0 Small town high commuting:	10.2 Secondary flow 30% to 50% to a large UC
	primary flow 30% or more to a small	10.3 Secondary flow 30% to 50% to a small UC
	UC	
	9.0 Small town low commuting:	
	primary flow 10% to 30% to a small UC	
	10.0 Rural areas: primary flow to a	
	tract outside a UA or UC	

SM Table S2. Sensitivity Analysis of R_i for different w_{ii} .			
w_{ii} weight	w_{ij} weight – first order neighbor	w_{ij} weight – second order neighbor	Mean (Median) of R_i
1.0	1.0	0.5	0.701 (0.761)
1.5	1.0	0.5	0.705 (0.793)
3.0	1.0	0.5	0.862 (0.963)
5.0	1.0	0.5	0.951 (0.994)
10.0	1.0	0.5	0.991 (0.999)
50.0	1.0	0.5	0.998 (1)
100.0	1.0	0.5	0.999 (1)
The row of values highlighted in bold correspond to the weighting scheme presented in the main analysis ($w_{ii} = 1.5$ for the index tract).			

SM Table S3. Sensitivity Analysis of R_i for different w_{ij} of first order neighbors.			
w_{ii} weight	w_{ij} weight – first order neighbor	w_{ij} weight – second order neighbor	Mean (Median) of R_i
1.5	0.5	0.5	0.845 (0.908)
1.5	0.75	0.5	0.786 (0.860)
1.5	1.0	0.5	0.705 (0.793)
1.5	1.25	0.5	0.683 (0.773)
1.5	1.50	0.5	0.722 (0.805)
The row of values highlighted in bold correspond to the weighting scheme presented in the main analysis ($w_{ij} = 1.0$ for first order neighbors).			

SM Table S4. Sensitivity Analysis of R_i for different w_{ij} of second order neighbors.			
w_{ii} weight	w_{ij} weight – first order neighbor	w_{ij} weight – second order neighbor	Mean (Median) of R_i
1.5	1.0	0.01	0.622 (0.716)
1.5	1.0	0.1	0.756 (0.833)
1.5	1.0	0.25	0.785 (0.759)
1.5	1.0	0.5	0.705 (0.793)
1.5	1.0	1.0	0.271 (0.288)
The row of values highlighted in bold correspond to the weighting scheme presented in the main analysis ($w_{ij} = 0.5$ for second order neighbors).			

SM Table S5. Summary statistics of initial and analysis dataset of Michigan births^a		
	All births data (n=1,608,537)	Analysis data set (n=807,991)
Born between 2005-2012	954,455 (59.3)	807,991 (100.0)
Geocoded	1,583,214 (98.4)	807,991 (100.0)
Neighborhood characteristics		
RI of non-Hispanic Blacks, mean (SD)	0.17 (0.26)	0.17 (0.26)
EI of non-college educated individuals, mean (SD)	0.76 (0.14)	0.76 (0.13)
Infant characteristics		
Gestational age, weeks, mean (SD)	38.6 (2.3)	38.5 (2.2)
Preterm birth	164,995 (10.3)	83,304 (10.3)
Male	824,368 (51.2)	413,727 (51.2)
Maternal characteristics^b		
Race/ethnicity		
Non-Hispanic Black	286,722 (17.8)	166,720 (20.6)
Non-Hispanic White	1,121,014 (69.7)	641,271 (79.4)
Hispanic	103,447 (6.43)	0 (0)
Non-Hispanic Asian/Pacific Islander	52,301 (3.25)	0 (0)
Non-Hispanic other	23,633 (1.47)	0 (0)
Reported smoking during pregnancy (1=smoker)	271,111 (16.9)	155,649 (19.3)
Age at birth (years)		
15-19	153,118 (9.52)	73,976 (9.16)
20-24	391,230 (24.3)	197,730 (24.5)
25-29	463,868 (28.8)	239,448 (29.6)
30-34	388,431 (24.1)	192,654 (23.8)
35-39	172,318 (10.7)	85,858 (10.6)
40-44	35,126 (2.18)	18,325 (2.27)
Educational attainment		
Less than high school	263,321 (16.4)	112,499 (13.9)
High school diploma	893,630 (55.6)	471,467 (58.3)
College diploma or higher	427,007 (26.5)	224,025 (27.8)
Unmarried at time of birth (1=unmarried)	613,859 (38.2)	326,837 (40.5)
^a The cell count and percent are presented except in the case of RI, EI, and gestation length, for which the mean and standard deviation are given as indicated next to the variable name. ^b Maternal variables are based on reported maternal characteristics at time of the neonate's birth.		

SM Table S6. Associations between gestational age in weeks and racial isolation and educational isolation		
	non-Hispanic Black	non-Hispanic White
Neighborhood characteristics		
RI of non-Hispanic Blacks	-0.069 (-0.10, -0.034)	-0.10 (-0.14, -0.065)
EI of non-college educated individuals	-0.066 (-0.12, -0.047)	-0.067 (-0.087, -0.018)
Individual characteristics		
Male infant	-0.007 (-0.033, 0.020)	-0.076 (-0.086, -0.066)
Reported smoking during pregnancy (1=smoker)	-0.14 (-0.18, -0.10)	-0.10 (-0.12, -0.087)
Age at birth (years)		
15-19	0.32 (0.27, 0.36)	0.15 (0.13, 0.18)
20-24	0.19 (0.15, 0.22)	0.10 (0.087, 0.12)
25-29	Reference	Reference
30-34	-0.18 (-0.23, -0.14)	-0.13 (-0.15, -0.12)
35-39	-0.44 (-0.50, -0.39)	-0.28 (-0.30, 0.26)
40-44	-0.46 (-0.56, -0.35)	-0.38 (-0.42, -0.35)
Educational attainment		
Less than high school	-0.040 (-0.074, -0.0071)	-0.079 (-0.097, -0.061)
High school diploma	Reference	Reference
College diploma or higher	0.11 (0.055, 0.16)	0.081 (0.069, 0.094)
Unmarried at time of birth (1=unmarried)	-0.12 (-0.15, -0.078)	-0.030 (-0.044, -0.017)

SM Table S7. Associations between preterm birth and racial isolation and educational isolation		
	Odds ratios (95% confidence intervals)	
	non-Hispanic Black	non-Hispanic White
Neighborhood characteristics		
RI of non-Hispanic Blacks	1.11 (1.07, 1.15)	1.16 (1.10, 1.22)
EI of non-college educated individuals	1.07 (1.02, 1.12)	1.03 (1.00, 1.05)
Individual characteristics		
Male infant	1.02 (0.99, 1.05)	1.11 (1.09, 1.13)
Reported smoking during pregnancy	1.16 (1.12, 1.20)	1.12 (1.09, 1.14)
Age at birth (years)		
15-19	0.79 (0.75, 0.82)	0.92 (0.88, 0.96)
20-24	0.85 (0.82, 0.89)	0.92 (0.90, 0.95)
25-29	Reference	Reference
30-34	1.17 (1.12, 1.23)	1.14 (1.12, 1.17)
35-39	1.47 (1.39, 1.54)	1.35 (1.31, 1.39)
40-44	1.59 (1.44, 1.75)	1.47 (1.39, 1.54)
Educational attainment		
Less than high school	1.09 (1.05, 1.12)	1.11 (1.08, 1.15)
High school diploma	Reference	Reference
College diploma or higher	0.91 (0.87, 0.96)	0.94 (0.93, 0.97)
Unmarried at time of birth (1=unmarried)	1.18 (1.13, 1.23)	1.12 (1.09, 1.14)