

# CENTER FOR COMMUNITY HEALTH EQUITY



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Race/ethnic minority segregation and low birth weight:  
a comparative study of Chicago and Toronto community-level  
indicators

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# Background

- Relatively little work has compared community-level data from different cities, though some work has compared aggregate indicators across a large number of US cities (Hunt and Balachandran 2015; Hunt, Whitman, and Hurlbert 2014).
- We hypothesize that comparing Chicago – one of the most segregated cities in the United States – with Toronto, a city of comparable population size yet without the same legacy of concentrated disadvantage (Raphael 2011), will be useful in showing **how *variable* the relationship between social determinants and health outcomes can be.**
- “Maternal health inequalities should be explored in the context of historical segregation, social stratification, the dynamics of social support, and resource sharing among communities. Several community characteristics associated with poverty are negatively associated with low birthweight. The traditional focus on individual risk factors for low birthweight limits our understanding” (Roberts 1997)

# Methods

- Our study compares publicly available community health data from Chicago and Toronto. All data for Chicago were obtained from the City of Chicago's Open Data Portal. Toronto data were obtained from the Toronto Community Health Profiles Partnership.
- In both cities, the focal relationship pertains to the correlation between race/ethnic minority segregation and LBW deliveries in that community.
- Data analysis focused on bivariate correlations followed by a series of OLS regression models – first with an interaction effect (% minority x city) and then stratified by city

Table 1: Description of community-level indicators

	Low Birth Weight		% Minority		% Non-Hispanic Black		% Hispanic		% Unemployed		% With less than high school diploma	
	Chicago	Toronto	Chicago	Toronto	Chicago	Toronto	Chicago	Toronto	Chicago	Toronto	Chicago	Toronto
Mean	10.1	7.3	70.3	42.2	39.7	8.0	24.3	2.7	15.4	7.5	20.3	12.5
Standard deviation	3.9	1.4	28.4	22.1	40.5	6.9	27.1	2.8	7.5	2.0	11.8	8.0
Minimum	3.5	3.4	6.4	8.5	0	0	0	0	4.7	4.0	2.5	1.5
Maximum	19.7	11.0	99.8	94.0	98.5	30.7	85.7	16.2	35.9	15.5	54.8	36.6

Note: There are 77 community areas in Chicago, with an average population size of 35,008. Toronto has 140 neighborhoods, with an average population of 18,679.

# Results

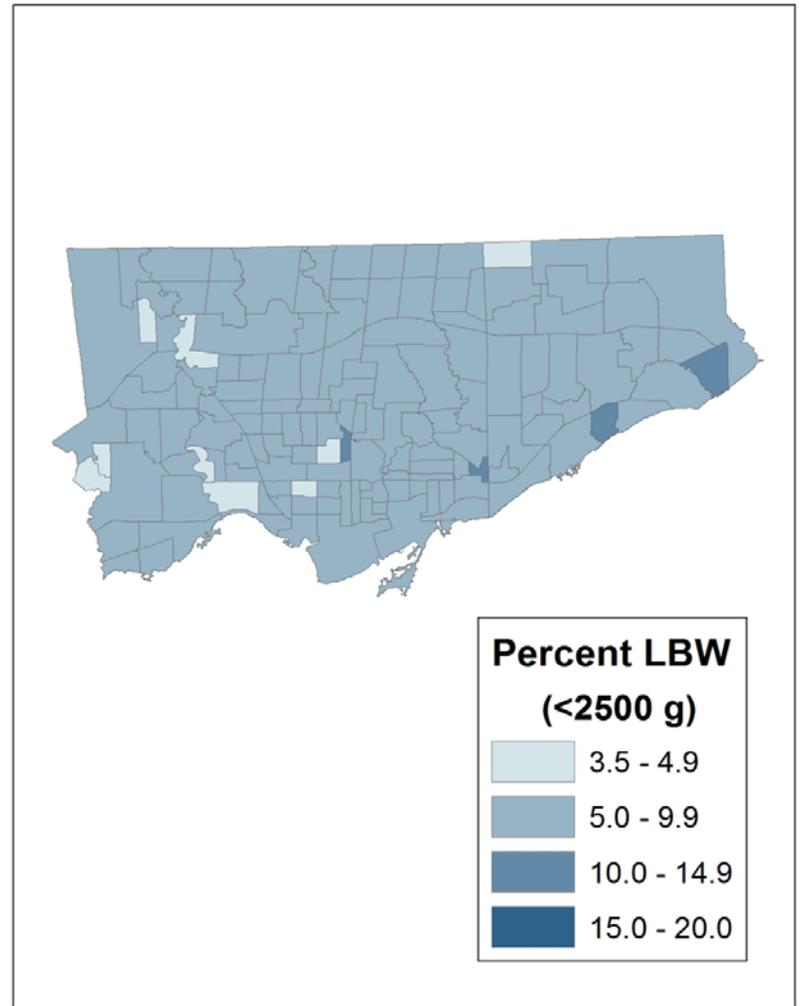
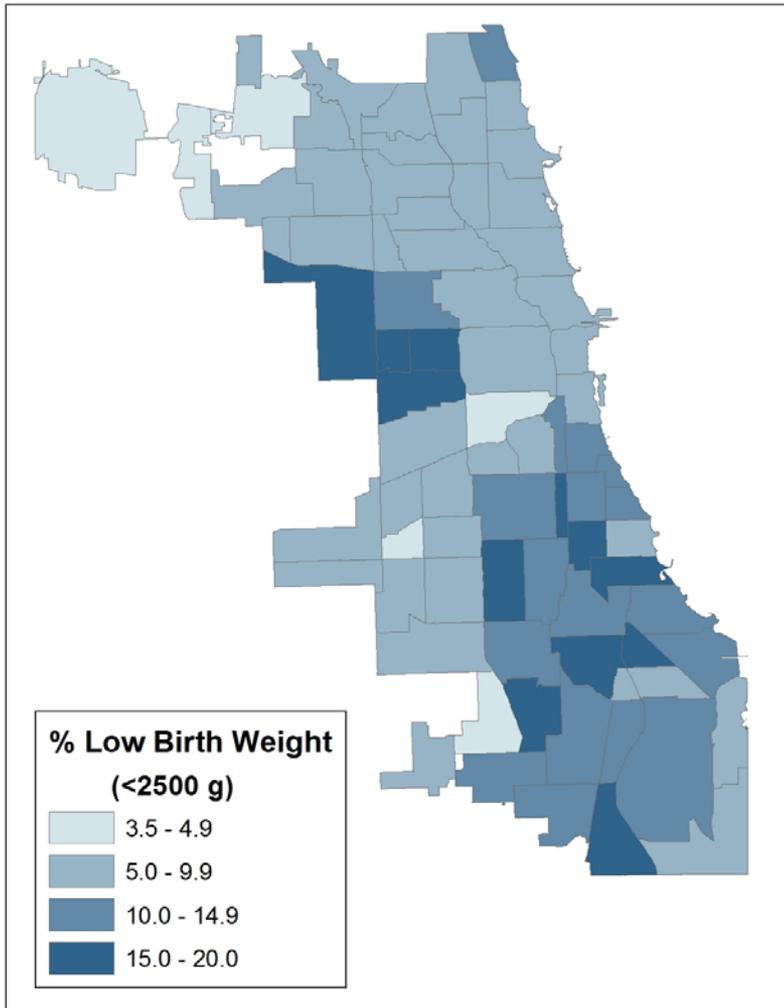
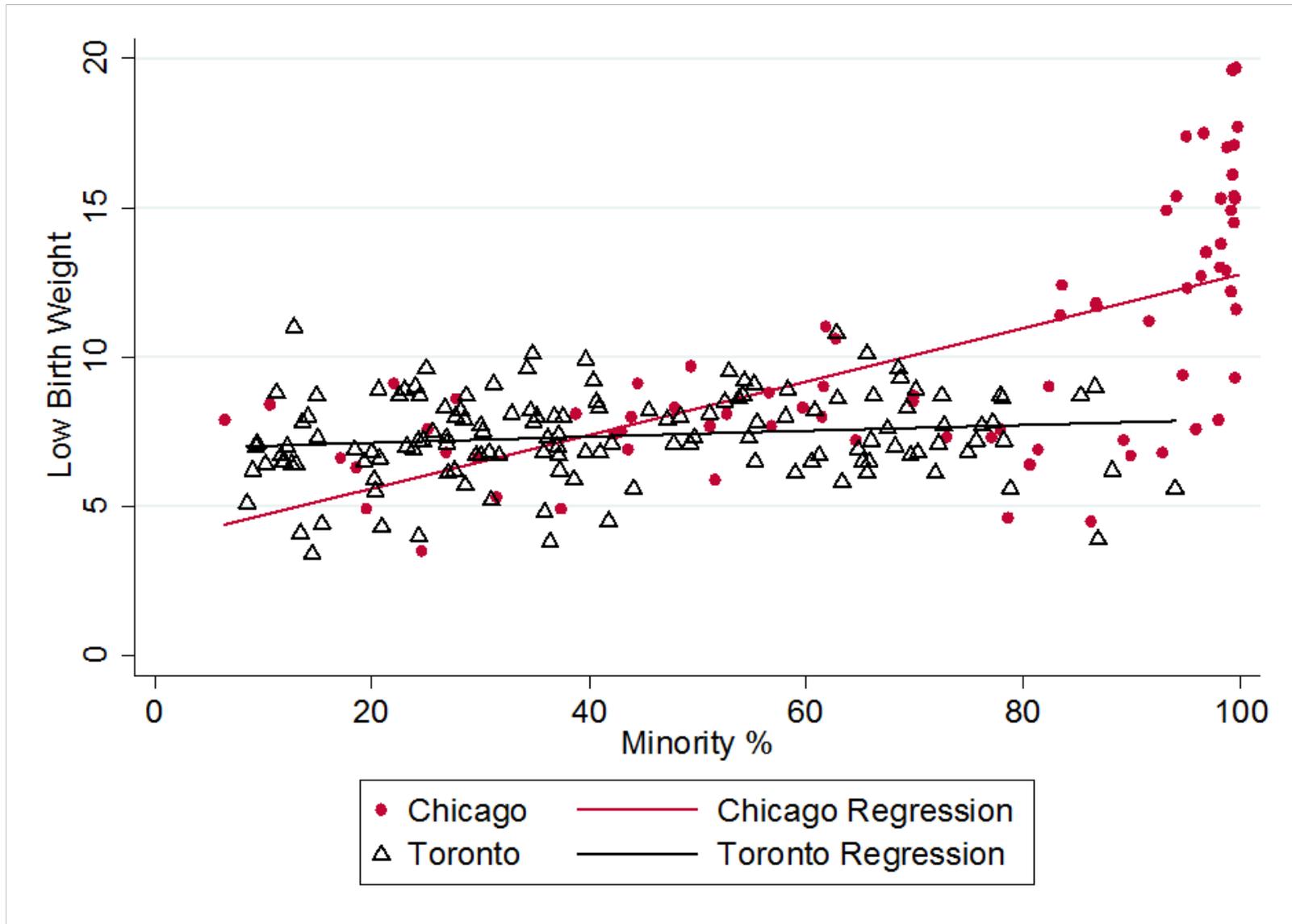


Table 2: Associations between community-level LBW, race/ethnic concentration, and socio-economic indicators (*r* values)

	LBW	% minority	% non-Hispanic Black	% Hispanic	% unemployed	% without a high school diploma
LBW	1.00	0.15	0.28 **	0.06	0.11	0.14
% minority	0.65 ***	1.00	0.56 ***	0.13	0.73 ***	0.39 ***
% non-Hispanic Black	0.83 ***	0.73 ***	1.00	0.57 ***	0.56 ***	0.58 ***
% Hispanic	-0.50 ***	0.06	-0.60 ***	1.00	0.12	0.64 ***
% unemployed	0.75 ***	0.81 ***	0.81 ***	-0.25 *	1.00	0.39 *
% without a high school diploma	0.03	0.56 ***	-0.08	0.73 ***	0.36 **	1.00

Note: Chicago correlations are shaded, below the diagonal. Toronto correlations are unshaded, above the diagonal. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Figure 3: Association between community level minority (% of population) and low birth weight delivery (% of live births), Chicago and Toronto



**Table 3: Predictors of community-level LBW (OLS regression), combined and stratified by city**

	Intercept	% Minority	City dummy (Toronto = 1, Chicago = 0)	Interaction between city (Toronto=1) and % minority	% Unemployed	% w/out HS diploma	% non- Hispanic Black	% Hispanic	R-squared
<i>Combined models</i>									
1	5.2**	0.6**							0.33
2	6.7**	0.5**	-1.4**						0.37
3	3.8**	0.9**	3.1**	-0.8**					0.48
4	4.0**	0.5**	2.1*	-0.4**	2.7**	-0.6**			0.59
<i>Stratified by city</i>									
<i>Toronto</i>									
1	6.9**	.1							0.02
2	6.9**	.1			0				0.02
3	6.9**	.1			-0.2	0.2	-	-	0.03
4	7.2**	-			-0.5	0	0.7*	-	0.08
5	6.8**	-			0.4	0.3	-	-0.2	0.02
<i>Chicago</i>									
1	3.8 **	0.9**							0.42
2	3.7 **	0.2			3.4**				0.57
3	4.3 **	0.6**			2.8**	-1.4**			0.68
4	5.8**	-			1.2	0	0.6 **	-	0.71
5	6.1 **	-			2.9 **	0.7	-	-0.7 *	0.68

- Our comparative analysis of community-level data from Chicago and Toronto highlights the variability in the association between community-level social determinants of health and LBW.
- We found that race/ethnic minority segregation, unemployment, and low educational attainment were not associated with LBW in Toronto, while these indicators had strong and significant associations with LBW in Chicago.
- In a combined model with data from both cities, **a 10% increase in minority composition is associated with a 0.5% increase in LBW, controlling for the effects of unemployment and low educational attainment.** Stratified models show that this effect is only significant in Chicago, and subsequent models revealed opposite effects for percentage non-Hispanic Black and percentage Hispanic.
- In Chicago, race/ethnic minority segregation, unemployment, and low educational attainment explain approximately 70% of the variance in LBW across communities, while these indicators are not significant predictors of LBW in Toronto.