Immigrant Enclaves and Perinatal Health: The Case of Black and Hispanic Women in New Jersey

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Short Abstract

Areas with high concentrations of foreign-born persons are believed to confer direct and indirect health benefits for its residents. This paper contributes to the neighborhood effects on immigrant health literature by expanding previous scholarship to include analysis of black immigrants in addition to the more well-known Hispanic immigrant population. Within these two populations, we further evaluate the effects of residence in immigrant enclaves on infant health for Hispanic and black immigrant women from specific sending countries/regions. We also improve on previous research by using a new measure of immigrant enclave that is more theoretically consistent with the immigrant enclave hypothesis; that is, contact with co-ethnic immigrants as opposed to all foreign born persons as the driving force behind the purported protective effects of residence in immigrant enclaves. Our results indicate that residence in immigrant enclaves neither protects nor harms the perinatal health of Hispanic and black women in New Jersey.

Extended Abstract

Areas with high concentrations of foreign-born persons are believed to confer direct and indirect health benefits for its residents. Immigrant enclaves provide immigrant women with cultural and social resources, which indirectly affect maternal health, and in turn, birth outcomes through psychosocial well-being, health related behaviors and stress level. The institutions within immigrant enclaves (e.g., ethnic churches, grocery stores, traditional medicinal distributors and acupuncture centers, etc.) can also have indirect and direct effects on maternal health. For example, churches may provide psychological counseling and social support to pregnant women, thereby easing their stress, while ethnic grocery stores may carry indigenous food products that are often more nutritious than the standard American diet (Landale et al. 1999). Finally, it is suggested that by slowing down the acculturation process, immigrant enclaves mediate the negative correlation between acculturation and poor health (Hochhausen, Perry, & Le 2010). The social and cultural isolation of immigrant enclaves from the rest of the city may shield immigrants from racial discrimination and thereby mitigate potential stress associated with racism (Becares, Nazroo, & Stafford 2008). Indeed, studies show that immigrants encounter more discrimination the longer they reside in the U.S., acculturate, and interact more with non-migrants outside of ethnic enclaves (Viruell-Fuentes 2007; Yoo, Chee, & Takeuchi 2008).

Most of the scholarship on immigrant enclaves and health have examined adult health only (Eschbach et al. 2004) and are also limited to specific ethnic groups such as Hispanics (Osypuk, Bates, & Garcia 2010) and certain Asian subgroups like the Chinese (Osypuk et al. 2009). Far fewer studies have systematically assessed the effects of immigrant enclaves on perinatal health for immigrant subgroups from diverse sending countries or regions.

This paper contributes to the literature on neighborhood effects on health in two ways. First, we expand previous scholarship by extending analysis to include black immigrants in addition to Hispanic immigrants. Second, within these two populations, we further evaluate the effects of residence in immigrant enclaves on infant health for Hispanic and black immigrant women from specific sending countries/regions. We also improve on previous research by using a new measure of immigrant enclave that is more theoretically consistent with the immigrant enclave hypothesis; that is, contact with co-ethnic immigrants as opposed to all foreign born persons.

Data and Methods

Vital statistics data (birth records) serve as the principal source of information on perinatal health. The data for the analysis is derived from geocoded birth records for infants born in 2002 through 2005 to black and Hispanic mothers residing in New Jersey. Detailed information on mother's country of birth was also provided, thus enabling us to assess country/region of origin effects. These data were provided to us by the New Jersey Department of Health. All analyses are based on singleton births only. Neighborhood-level data were generated from the 2000 census summary tape files (SF3). We use census tracts as proxies for neighborhoods and created demographic and socioeconomic variables from the SF3 data, which were then linked to the birth record data using census tract identifiers.

Dependent Variables. Our perinatal health outcomes are low birthweight and preterm birth. Babies weighing below 2,500 grams at birth are at a greater risk of dying before their first birthdays and having long-term impairments than are their heavier counterparts. Birth weight categorize as normal ($\geq$ 2,500 grams) or low ($<$ 2,500 grams) (Collins, Schulte & Drolet 1998). Preterm delivery is also linked to infant mortality and morbidity (Behrman & Butler 2001).

Information on gestational age was used to categorize births as either preterm (< 37 weeks) or normal (≥ 37 weeks).

Individual-level Characteristics. We categorized black and Hispanic women according to their birth place. For black women, we distinguished among US-born, Caribbean-born, and African-born mothers. For Hispanic women, we compared US-born, Mexico-born, Central-South American-born, and Caribbean-born women. We also include in our analyses, sociodemographic characteristics of the mother and infant that has been identified as strong predictors of adverse birth outcomes in prior studies: maternal age, education, marital status, and infant sex. We also include health behaviors during pregnancy and maternal health status as additional controls: weight gain, smoking, drinking, prenatal care, hypertension, previous preterm birth(s), and one more labor complications.

Neighborhood-level Characteristics. Our main neighborhood characteristic of interest is residence in an immigrant enclave. Immigrant enclave is defined as the degree of *potential contact* with coethnic immigrants and is measured with an index, C_i (Vang 2011), that borrows principles of spatial exposure and isolation from the residential segregation literature (Lieberson, 1980; Wong 2002) (See Appendix). We also include neighborhood socioeconomic deprivation (Messer et al. 2006) as a contextual control variable in the analysis. Neighborhood deprivation is a z-score transformed, factor-based index created from seven census tract socioeconomic variables (See Appendix).

Analytical Strategy. We assess the effects of immigrant contact on preterm birth and low birthweight for black and Hispanic women using multilevel random intercept models. We first begin with a model that only includes mother's birthplace to ascertain the baseline relationships between women's country/region of origin and adverse birth outcomes (Model 1). We then add our two neighborhood variables to examine the effects of coethnic immigrant contact, net of neighbourhood socioeconomic deprivation (Model 2). Model 3 is our full model, which includes individual-level controls for maternal and infant risk factors. All models were estimated separately for Hispanic and black women.

Results

Table 1 presents descriptive statistics of maternal, infant, and neighborhood characteristics for black and Hispanic women by birthplace.
Not surprisingly, foreign born black and Hispanic women live in neighborhoods with higher co-ethnic immigrant contact potential than their native born counterparts. Foreign born black women were less likely to live in socioeconomically deprived neighborhoods compared to native born black women. However, foreign born Hispanic women tend to live in more disadvantaged neighborhoods compared to their native born counterparts.

Table 2 shows the proportions of low birthweight and preterm births to black and Hispanic women by birthplace. Consistent with past scholarship, black women born in Africa and the Caribbean had lower rates of low birthweight and preterm birth compared to US-born black women (LBW: 6.7%, 9.1%, and 11.9%, $p < 0.001$; PTB: 8.9%, 11.3%, and 13.5%, $p < 0.001$). Among foreign-born black women, African-born mothers had significantly fewer low birthweight infants and preterm births. A similar foreign-born health advantage was observed for Hispanic women. Hispanic mothers from Mexico, the Caribbean, and Central/South America had significantly fewer low birthweight babies compared to US-born Hispanic mothers (5.0%, 5.7%, 4.9%, and 7.1 respectively, $p < 0.001$). Preterm births were likewise less prevalent among Mexico-, Caribbean-, and Central/South American-born women relative to US-born Hispanic women (7.2%, 7.8%, 7.2%, and 9.9% respectively, $p < 0.001$).

We also examined low birthweight and preterm birth for each maternal birthplace subgroup by low, medium, or high coethnic immigrant contact. High contact indicates scores in the 75th or higher percentile of the black/Hispanic C_i index distribution. Scores that fall within the 25th percentile and the 26th to 74th percentile range are categorized as low and medium contact respectively. Rates of low birthweight and preterm birth did not significantly differ across neighborhoods with low, medium, or high black immigrant contact for foreign-born black women. For US-born black women, however, living in neighborhoods with medium or high black immigrant contact was associated with higher rates of low birthweight and preterm birth. This unexpected finding may be due to the confounding of immigrant enclaves with poverty and other adverse neighborhood socioeconomic conditions. Thus, US-born blacks who live in neighborhoods with medium to large concentrations of black immigrants may be exposed to neighborhood SES factors that place them at higher risk for adverse birth outcomes. At the same time, they are also not benefitting directly from the ethnic social networks and organizations in the immigrant enclaves that are available to their foreign-born counterparts.

The findings for Hispanic women are more complicated. In general, there is an overall pattern of worsening birth outcomes as the exposure to Hispanic immigrants in the neighborhood increases. Neighborhoods with medium and high Hispanic immigrant contact are associated with higher rates of low birthweight and preterm birth compared to neighborhoods with low Hispanic immigrant contact. These results suggest that residence in immigrant enclaves does not protect against adverse birth outcomes. Yet the findings are consistent and statistically significant for only Mexican women. We find no statistically significant differences in either preterm birth or low birthweight across neighborhood-level immigrant contact for Hispanic women from the Caribbean. For Central/South American women, the findings are statistically significant for low birthweight but not preterm birth. Statistically significant differences across neighborhood-level immigrant contact are observed only for preterm birth among US-born Hispanic women.

Tables 3 and 4 show the odds ratios and 95% confidence intervals from multilevel random intercept regressions predicting the odds of low birthweight and preterm birth for black and Hispanic women, respectively. For the sake of simplicity, we only present odds ratios and 95% confidence intervals for maternal birthplace, coethnic immigrant contact, and neighborhood socioeconomic deprivation. Turning to the results in Table 3 we see that both African-born and Caribbean-born black women had lower odds of LBW and PTB than US-born black women. Among the black immigrant women, the risk of a preterm birth or low birthweight was significantly higher for Caribbean-born mothers compared to African-born mothers. These maternal birthplace differences are consistent and remain statistically significant even after adjusting for black immigrant contact, neighborhood deprivation, and maternal and child risk factors. Interestingly, black immigrant contact was not a statistically significant predictor of adverse birth outcomes in the multivariate analysis. We suspected that any statistically significant findings might be washed out by aggregating US-born mothers with foreign-born mothers given the black subgroup differences observed in Table 2. In results now shown here we ran separate regressions models for US-born and foreign-born black women. In models where black immigrant contact is regressed on the birth outcomes without any additional neighborhood, maternal, or infant covariates we found that residence in immigrant enclaves did elevate the risk of preterm birth and low birthweight for US-born black women. However, the effect of black immigrant contact on US-born black women's risk of adverse birth outcomes disappears once we introduced neighborhood SES deprivation into the model. The effect of black immigrant contact on adverse birth outcomes for foreign-born black women is statistically

non-significant with and without covariates. Overall, the results indicate that black immigrant contact neither harms nor protects against adverse birth outcomes for black women, irrespective of maternal birthplace.

The multivariate results for Hispanic women are similar. The odds of low birthweight and preterm birth are significantly lower for Hispanic mothers from Mexico, the Caribbean, and Central/South America compared to US-born mothers. We also find evidence of a greater health advantage for Mexico-born women compared to their foreign-born counterparts from the Caribbean and Central/South America. Hispanic immigrant contact was not a statistically significant predictor of adverse birth outcomes. In additional analyses not shown here, we ran a cross-level interaction model to see if the effect of Hispanic immigrant contact might vary by Hispanic subgroup. However, no statistically significant cross-level interactions were observed. The results indicate that residence in Hispanic immigrant enclaves does not confer health benefits to Hispanic women.

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Table 1. TABLE 1 --Maternal, Infant, and Neighborhood Characteristics by Mother's Race/Ethnicity and Birthplace

		Black Immigrants				Hispanic Immigrants			
	US-born	Africa	Caribbean		US-born	Mexico	Caribbean	C-S America	
	(N=47,895)	(N = 4,989)	(N =8,531)	p-value[a]	(N=26,665)	(N=20,892)	(N=10,372)	(N=34,433)	p-value[a]
Sociodemographic Characteristics									
Age, %				0.000					0.000
Less than 20	17.5	2.2	4.1		18.0	15.5	7.5	6.3	
20-24 (referent)	29.5	9.4	16.7		29.0	35.6	24.4	23.1	
25-29	23.2	27.2	26.3		24.3	28.2	27.5	28.8	
30-34	17.9	34.4	27.2		19.2	14.7	22.9	24.3	
35+	11.9	26.9	25.8		9.6	6.1	17.8	17.6	
Education, %				0.000					0.000
Less than high school degree	20.8	10.1	13.3		23.7	68.0	24.3	33.1	
HS degree/GED (referent)	42.0	31.5	39.0		36.1	24.6	40.8	36.1	
Some college	23.7	20.3	23.4		23.5	4.3	18.9	16.3	
College grad	13.6	38.1	24.3		16.7	3.1	16.0	14.5	
Married, %	26.0	68.3	56.8	0.000	43.6	34.8	50.9	51.7	0.000
Maternal Health Behaviors & Risks									
Weight gain, %				0.000					0.000
0-15 lbs	22.9	19.1	20.5		15.5	23.0	12.6	14.1	
16-25 lbs	26.3	31.1	28.4		25.5	36.7	27.2	30.1	
26-35 lbs	24.6	27.6	27.7		28.6	26.3	30.6	31.7	
36 lbs+ (referent)	26.2	22.3	23.4		30.4	14.0	29.6	24.2	
Prenatal care, %				0.000					0.000
No care	4.1	1.7	1.5		1.5	1.5	0.7	0.9	
Began 1st to 3rd month (referent)	61.6	63.1	67.6		72.7	56.0	70.3	67.9	
Began after 3rd month	34.4	35.1	30.9		25.8	42.5	29.1	31.2	
Smoke, %	14.6	0.5	1.4	0.000	10.5	0.7	2.1	1.9	0.000
Drink, %	2.1	0.5	0.6	0.000	1.2	0.3	0.5	0.5	0.000
Medical risks, %									
Hypertension	4.1	3.4	3.7	0.017	2.7	1.8	2.7	2.1	0.000
Previous preterm birth	2.0	1.0	1.1	0.000	1.7	1.3	1.0	1.1	0.000
Other medical risk factors, %				0.000					0.000
No other med risk (referent)	48.3	52.9	54.1		57.6	61.9	60.0	63.9	
1 or more other med risk	47.2	44.4	43.1		39.3	35.5	37.4	33.7	
Unknown or not stated	4.5	2.8	2.8		3.1	2.6	2.6	2.4	
Labor & delivery complications (1 or more), %	52.9	56.3	51.9	0.000	49.1	53.3	50.6	50.8	0.000
Infant characteristics									
Female infant, %	49.0	49.5	49.4	0.652	48.9	49.8	49.8	48.7	0.024
Neighborhood characteristics									
Neighborhood deprivation (mean)	1.0	0.6	0.7	0.000	0.7	1.1	1.1	0.6	0.000
Black immigrant contact (mean)	8.7	21.2	28.4	0.000					
Hispanic immigrant contact (mean)					3.0	6.5	7.6	5.4	0.000

Note. Percentages reported unless otherwise noted. Reference category for dichotomous predictor variables: unmarried, non-smoker, non-drinker, no labor complications, and male infant.

Table 2. Unadjusted prevalence of preterm birth and low birthweight by mother's race/ethnicity, birthplace, and degree of coethnic immigrant contact

	Black Women				Hispanic Women				
	US-born	Africa	Caribbean		US-born	Mexico	Caribbean	C-S America	
	(N=47,895)	(N = 4,989)	(N =8,531)	p-value[a]	(N=26,665)	(N=20,892)	(N=10,372)	(N=34,433)	p-value[a]
% Low Birthweight	11.9	6.7	9.1	0.000	7.1	5.0	5.7	4.9	0.000
By immigrant contact									
Low	10.9	6.5	9.5		6.7	4.1	6.4	4.3	
Med	12.3	6.8	9.6		7.5	5.5	5.5	4.8	
High	12.3	6.7	8.5		6.9	4.9	5.7	5.4	
p-value (column)[b]	0.000	0.960	0.222		0.058	0.002	0.467	0.013	
% Preterm Birth	13.6	8.9	11.3	0.000	9.9	7.2	7.8	7.2	0.000
By immigrant contact									
Low	12.1	9.0	9.5		9.2	5.9	8.9	6.8	
Med	14.1	8.6	11.7		10.4	7.4	7.7	7.2	
High	14.4	9.2	11.5		10.0	7.6	7.5	7.4	
p-value (column)[b]	0.000	0.847	0.093		0.021	0.001	0.241	0.406	

[a]P-value from chi-square test comparing differences in black or Hispanic subgroup proportions.

[b]P-values from chi-square test comparing proportions across categories of black/Hispanic immigrant contact for each black/Hispanic subgroup.

Table 3. Estimated ORs and 95% CIs from Models Predicting LBW & PTB, Black Women

	Low Birthweight			Pretern Birth		
	Model 1 (birthplace)	Model 2 (neighborhood)	Model 3 (full)	Model 1 (birthplace)	Model 2 (neighborhood)	Model 3 (full)
Birthplace (Ref:US-born)						
Africa	0.53	0.55	0.62	0.62	0.64	0.68
	(0.48, 0.60)	(0.49, 0.62)	(0.55, 0.70)	(0.56, 0.68)	(0.58, 0.71)	(0.61, 0.76)
Caribbean	0.75	0.76	0.84	0.81	0.83	0.88
	(0.69, 0.81)	(0.71, 0.83)	(0.77, 0.92)	(0.75, 0.87)	(0.77, 0.89)	(0.81, 0.95)
Neighborhood Characteristics						
Black immigrant contact		1.00	1.00		1.00	1.00
		(1.00, 1.00)	(1.00, 1.00)		(1.00, 1.00)	(1.00, 1.00)
Neighborhood deprivation		1.10	1.04		1.10	1.05
		(1.07, 1.12)	(1.01, 1.07)		(1.08, 1.13)	(1.03, 1.08)
Random effect						
Variance	0.03	0.02	0.03	0.02	0.01	0.14
	(0.02, 0.05)	(0.01, 0.04)	(0.02, 0.05)	(0.01, 0.04)	(0.01, 0.03)	(0.10, 0.19)
Rho	0.01	0.00	0.01	0.01	0.00	0.01

Notes. 95% confidence interval in parenthesis. Model 3 adjusts for mother's age, education, marital status, weight gain, prenatal care, smoking, drinking, hypertension, other medical risks, labor complications, infant sex, and previous preterm birth. Higher scores on the black immigrant contact index means more exposure to in-group members.

Table 4. Estimated ORs and 95% CIs from Models Predicting LBW & PTB, Hispanic Women:

	Low Birthweight			Pretern Birth		
	Model 1 (birthplace)	Model 2 (neighborhood)	Model 3 (full)	Model 1 (birthplace)	Model 2 (neighborhood)	Model 3 (full)
Birthplace (Ref:US-born)						
Mexico	0.68	0.67	0.65	0.68	0.67	0.66
	(0.63, 0.74)	(0.62, 0.72)	(0.60, 0.71)	(0.63, 0.73)	(0.62, 0.72)	(0.61, 0.72)
Caribbean	0.78	0.76	0.87	0.75	0.74	0.79
	(0.71, 0.86)	(0.69, 0.84)	(0.79, 0.97)	(0.69, 0.82)	(0.68, 0.80)	(0.72, 0.86)
C/S America	0.67	0.68	0.76	0.70	0.71	0.75
	(0.63, 0.72)	(0.64, 0.73)	(0.70, 0.82)	(0.66, 0.75)	(0.67, 0.75)	(0.70, 0.79)
Neighborhood Characteristics						
Hispanic immigrant contact		0.99	1.00		1.00	1.00
		(0.99, 1.00)	(1.00, 1.00)		(1.00, 1.00)	(1.00, 1.00)
Neighborhood deprivation		1.11	1.04		1.08	1.04
		(1.08, 1.14)	(1.00, 1.07)		(1.05, 1.11)	(1.01, 1.07)
Random effect						
Variance	0.01	0.00	0.01	0.03	0.03	0.04
	(0.00, 0.05)	(0.00, 1.04)	(0.00, 0.05)	(0.02, 0.05)	(0.02, 0.05)	(0.02, 0.06)
Rho	0.00	0.00	0.00	0.01	0.01	0.01

Notes. 95% confidence interval in parenthesis. Model 3 adjusts for mother's age, education, marital status, weight gain, prenatal care, smoking, drinking, hypertension, other medical risks, labor complications, infant sex, and previous preterm birth. Higher scores on the Hispanic immigrant contact index means more exposure to in-group members.

APPENDIX

Measure of Immigrant Enclave. The C_i index is adapted from Lieberson's (1980) widely known aspatial P* index. The index is defined as:

$$C_i = \frac{1}{A_i}\left[\left(\frac{x_i^s}{X}\right)\left(\frac{x_i^s}{t_i}\right)\right] * \left[\sum_{j=i}^{m} \omega\left(\frac{x_j^s}{t_j}\right)\right] \qquad \text{(Eq. 1)}$$

where

x_i^s is the number of immigrant subpopulation *s* in tract *i*,

x_j^s is the number of immigrant subpopulation *s* in neighboring tract *j*,

X is the total number of immigrant subpopulation *s* in the study area,

t_i and t_i are the total number of residents in tracts *i* and *j* respectively,

A_i is the total area of tract *i*,

ω is a neighborhood spatial weight matrix that defines how the tracts are connected to one another, and

m is the total number of neighbors for tract *i*.

The *Ci* index is highly correlated with tract-level immigrant density; however, it is not a straightforward measure of foreign-born concentration per se. Raw scores on the C_i index can be scaled so that values range from 0 to 100, with 0 representing no contact (i.e., non-immigrant enclave where residents have no interaction at all with fellow immigrants) and 100 representing complete contact (a pure immigrant neighborhood where residents always have the potential to interact with fellow immigrants).

The second term in Eq. 1 is the same product term that is used to calculate the P* index for residential isolation at the aggregate level.[1] It is also what distinguishes the C_i index as a measure of immigrant contact as opposed to just a proximity-weighted measure of immigrant concentration. The first and third terms in Eq.1 make the C_i index local and spatial. The third term incorporates information about the proportion of fellow immigrants in neighboring tract *j* with whom immigrants in focal tract *i* can potentially socialize and rely upon for support. The neighborhood spatial weight matrix ω can be defined as a distance decay function, an adjacency function, a *n*-nearest neighbor function, or any other kind of neighborhood definition. The first term $\frac{1}{A_i}$ reflects the idea that if immigrants live in large census tracts, they will need to travel further in order to interact with fellow immigrants in neighboring tracts (Wong 2002); therefore, their C_i score should be lower than similarly situated immigrants who live in smaller tracts. In essence, immigrant isolation is weighted by the size of the census tract.

Neighborhood Deprivation. Messer and colleagues (2006) identified key contextual socioeconomic variables as important risk factors for perinatal health. Principal component analysis showed that only seven out of the original nine contextual variables used by Messer and colleagues map onto one unique factor for NJ census tracts. The neighborhood deprivation index used in the present analysis was created from the following seven items: (1) % households with more than one person per room, (2) % households with incomes less than $30,000 per year, (3) % households in receipt of public assistance, (4) % of individuals whose 1999 income was below

[1] Lieberson's (1980) P* index for residential isolation is defined as $_xP_x^* = \sum_{i=1}^{n}\left(\frac{x_i}{X}\right)\left(\frac{x_i}{t_i}\right)$ where x_i, t_i, and X are defined the same as in Equation 1 above. Alternatively, the second term can be replaced with $\frac{y_i}{t_i}$, where y_i is the proportion of out-group members in tract *i*, to assess the degree of exposure to a particular reference group as opposed to spatial isolation (or exposure to in-group members).

the federal poverty level, (5) % females without high school diploma/GED, (6) % female headed households with children under 18, and (7) % unemployed (civilian) men and women (alpha cronbach = 0.86). Items were transformed into z-scores and then combined to create a factor-based neighborhood deprivation index.