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Immigrant Generational Status and Developmental Problems among Prematurely Born Children

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Abstract

Background—Immigrants in the U.S. often have comparatively favorable health outcomes despite relative socioeconomic disadvantage- a phenomenon termed the Immigrant Paradox. This study examined the relationship between family immigrant status and developmental problems among children born preterm.

Methods—The 2011–2012 National Survey of Children’s Health data collected through a telephone based survey based on parental report of prematurity and other comorbidities were analyzed using multivariate logistic regression analysis to examine seven developmental outcomes.

Results—Preterm 1st/2nd generation children had fewer developmental problems than preterm 3rd generation children. Controlling for socioeconomic status and other covariates, 1st/2nd generation children had significantly lower odds of developmental delay, cerebral palsy, epilepsy, and hearing problems.

Discussion—Consistent with the Immigrant Paradox, prematurely born children of immigrants had comparable or better developmental outcomes than preterm children of US born parents despite socioeconomic disadvantage. Further research to explicate mechanisms responsible for the protective health effects observed is warranted.

INTRODUCTION

Preterm birth predisposes children to both short- and long-term developmental problems including impaired mental, emotional, social, behavioral, and physical functioning [1,2]. For example, compared to children who are born full-term, those who are born preterm have increased risk of cerebral palsy, sensory problems including blindness and deafness [3], epilepsy [4], autism [5–8], mental retardation [9,10], and developmental delay [11]. A study on long-term effects of preterm birth also found increased risk for psychiatric disorders, attention-deficit/hyperactivity disorder, serious cognitive impairment, neurosensory impairment, and conduct disorders, even at age 11 [6].

Although many characteristics are associated with the likelihood of preterm birth and the subsequent occurrence of chronic development problems, immigrant generation status is an understudied factor in this area of research. Some studies show that immigrants are less likely to experience preterm births compared to US-born individuals and new immigrants are at lower risk for preterm births than immigrants who have been in the US for longer periods of time [12–16], a pattern consistent with the phenomenon termed the Immigrant Paradox. This Paradox describes the tendency for newer, less acculturated immigrants to exhibit comparable or better health outcomes than more acculturated immigrants, their US-born peers, or White non-Hispanics (particularly for non-White immigrant groups) despite relative socioeconomic disadvantage [17]. The Healthy Migrant and migrant selectivity hypotheses posit that the strong health outcomes found among immigrants may be related to non-randomness in the predisposition to migrate. That is, those who are able to migrate tend to come from the healthier segments of the population because good health helps migrants survive the physical and other challenges that are often involved in the migration process. Furthermore, the greater the distance between the destination and origin countries, the more migrants are positively selected on health [17,18]. These hypotheses are often used to explain why immigrants to the US often have health outcomes that are comparable to or better than US-born populations despite often being of lower socioeconomic status and having less access to resources [18].

While research has shown that immigrants have lower rates of adverse birth outcomes including low birth weight, preterm birth, and infant mortality than US-born populations [19–22], less is known about whether this health advantage extends into childhood among children born to immigrants [23,24]. Several studies of Mexican-American children are consistent with the Immigrant Paradox in finding no significant differences in developmental conditions between children of Mexican immigrant mothers and children of White non-Hispanic US-born mothers [24,25]. There is limited research, however, about subsequent health outcomes among children of immigrants who are born preterm. We do not know whether the Immigrant Paradox holds for these children, whose birth timing put them at higher risk of later health problems. The purpose of this study was to investigate whether there is a relationship between immigrant generational status and the presence of chronic developmental problems among prematurely born children.

METHODS

Participants

The study analyzed the 2011–2012 National Survey of Children's Health (NSCH) to examine whether having at least one immigrant parent was associated with more favorable developmental outcomes among children born prematurely. In the NSCH, child's birth status (preterm or full-term) and immigrant generational status were based on retrospective parent report (discussed below). The analysis focused on prematurely born non-Hispanic White, non-Hispanic Black, and Hispanic children and excluded children with missing data on either birth status or immigrant generational status. Based on these criteria, we identified a sample of 8,871 preterm children, who comprised 11.3% of the total NSCH sample.

Data Collection

The NSCH is a cross-sectional telephone-based survey collecting data on the socio-demographic characteristics, health status, wellbeing, and healthcare access and utilization among US children [26,27]. The NSCH uses a complex survey design and provides stratification and clustering variables as well as sampling weights, which can be applied to produce nationally representative results. These variables were incorporated into the analyses and all subsequently reported statistics are based on the weighted and adjusted sample.

Measures

Chronic developmental problems were the outcomes of interest. Consistent with other research on developmental problems associated with prematurity, the conditions examined were autism, developmental delay, intellectual disability/mental retardation (IDMR), cerebral palsy, epilepsy, hearing problems, and vision problems [24]. In the NSCH, parent reports of children's developmental outcomes were based on their responses to two questions. The first question asked parents if a health care professional had ever told them that their child had each of the developmental conditions. If the parent responded yes, they were then asked if the child currently had the condition. In addition to the individual condition variables, a dichotomous "any chronic condition" variable was created that represented whether a child had one or more of the seven conditions.

The main independent variable was immigrant generational status. First generation children are foreign-born with two foreign-born parents; second generation children are US-born with at least one foreign-born parent; third generation children are US-born with two US-born parents [28–30]. Due to insufficient sample sizes for some of the conditions, we analyzed first and second-generation children together as children of immigrants. This strategy allowed us to examine how having at least one immigrant parent relates to developmental outcomes for preterm children. We used third generation children as the reference group.

The covariates were child's age, gender, race and ethnicity, insurance status, household educational achievement, family structure, primary household language, and household poverty level, and low birthweight status. Child's current age in years was recoded as infant (0–2 years), pre-school age (3–5 years), school age (6–12 years), and adolescent (13–17 years) [2,31,32], with school age children used as the reference group. Race and ethnicity was categorized into White non-Hispanic, Black non-Hispanic, or Hispanic; White non-Hispanic was the reference group. To estimate access to healthcare services, we used child's health insurance status, operationalized as whether or not the child currently had any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicaid. Research has shown that living in a two-parent family can be protective for children's developmental outcomes [24]. Family structure was categorized as two-parent family, single mother family, or other family type, with two-parent households as the reference group. Primary household language measured whether the family's primary language was English or non-English. As a proxy for socioeconomic status, which would be related to the family's ability to pay for healthcare services, we used

household educational achievement and poverty level. Household educational achievement, which represented the highest reported level of education in the household, was categorized into less than high school, high school, or more than high school; high school was used as the reference category. The NSCH poverty level variable incorporates respondent's household income and Department of Health and Human Services definitions of poverty and is categorized as <100% federal poverty level (FPL), 100–199% FPL, 200–399% FPL, and 400% or more FPL. The <100% FPL category was used as the reference group in our analyses. Children were considered low birthweight if they were born weighing 2,500 grams or less [27].

Analysis

Percent distributions were calculated for all categorical variables and tested for statistical significance using chi-square procedures. For non-categorical variables, we calculated means and standard errors by immigrant generational status. We then tested a series of multivariate logistic regression models to measure the relationships between immigrant generational status and the developmental outcomes. These models were used to estimate crude and adjusted odds ratios of each developmental outcome by immigrant generational status. Models were adjusted for the previously listed covariates. Analyses were conducted using SAS survey procedures in order to account for the complex survey design [33]. This research was reviewed and approved by the Pennsylvania State University Institutional Review Board.

RESULTS

A substantial portion (16.2%) of prematurely born children had at least one immigrant parent. Table I reports the prevalence of chronic conditions by immigrant generational status. 3rd generation children had significantly higher prevalence of developmental delay and hearing problems, and were significantly more likely to have at least one of the examined conditions than 1st/2nd generation children; prevalence of other conditions did not differ by immigrant generational status.

Socio-demographic characteristics of the sample are presented in Table II. At birth, the two groups of children were similar in weight, with a non-significant difference of approximately 30 grams. The children ranged in age from 0 to 17 years old at the time of the survey. On average, 3rd generation children (8.25 years, se=0.12) were slightly older than 1st/2nd generation children (7.97 years, se=0.28). The majority of 3rd generation children were non-Hispanic White (67.4%) while most 1st/2nd generation children were Hispanic (71.8%). In comparison to 3rd generation children, 1st/2nd generation children were at a socioeconomic disadvantage. 1st/2nd generation children had lower insurance coverage rates and lived in households with lower levels of educational attainment and income than 3rd generation children. Nearly three times as many 1st/2nd generation children lived in a household that primarily spoke a non-English language than 3rd generation children. 1st/2nd generation children were advantaged, however, in that they were more likely to live in two-parent households than 3rd generation children (Table II).

Regression results

Any chronic condition—Immigrant generational status was associated with having at least one chronic condition (Table III). After adjusting for socio-demographic characteristics, 1st/2nd generation children had lower odds of having at least one chronic condition [AOR=0.58 (0.37–0.91)] than 3rd generation children. In addition to immigrant generational status, infancy and belonging to a 400%+ FPL household were negatively associated with having any chronic condition. Male gender and low birthweight were positively associated with having any chronic condition.

Autism—Immigrant generational status was not significantly associated with autism [AOR=1.24 (0.57–2.73)]. Males were more likely than females to have autism, and infants were less likely to have been identified with autism compared to school age children.

Developmental delay—Compared to 3rd generation children, 1st/2nd generation children had lower adjusted odds of developmental delay [AOR=0.54 (0.31–0.94)]. Living in a 400%+ FPL household was also negatively associated with developmental delay. English-speaking households, male gender, and low birthweight were positively associated with developmental delay.

Intellectual disability/mental retardation (IDMR)

Immigrant generational status was not significantly related to IDMR [AOR=1.02 (0.52, 2.01)]. Infancy and living in a 200%–399% FPL or 400%+ FPL household were negatively associated with IDMR. Factors that were significantly positively associated with IDMR risk were lower household educational attainment, male gender, insurance status, and birthweight.

Cerebral palsy—After adjusting for covariates, immigrant generational status was significantly associated with having cerebral palsy, with 1st/2nd generation children having reduced odds as compared to 3rd generation children [AOR=0.33 (0.13–0.85)]. Male gender was also negatively associated with cerebral palsy risk while low birthweight was positively associated with cerebral palsy risk.

Epilepsy—Compared to 3rd generation children, 1st/2nd generation children had significantly lower odds of epilepsy after adjusting for socio-demographic characteristics [(AOR=0.31 (0.13–0.71)]. Infancy and living in a 200%–399% FPL or 400%+ FPL household were both associated with decreased odds of epilepsy. Low birthweight was associated with increased odds of epilepsy.

Hearing problems—Compared to 3rd generation children, 1st/2nd generation children had significantly lower adjusted odds of hearing problems [(AOR=0.33 (0.14–0.79)]. In addition to immigrant generational status, Black race was negatively associated with hearing problems. High school educational attainment was associated with decreased odds of hearing problems compared to other household education levels.

Vision problems—Immigrant generational status was not significantly associated with having vision problems. Infancy, Hispanic ethnicity, and English as a primary household language were negatively associated with the odds of vision problems.

DISCUSSION

In this study, we used the 2011–2012 National Survey of Children’s Health to understand whether evidence suggestive of the Immigrant Paradox was found among prematurely born children. In order to do this, we measured the association between immigrant generational status and developmental outcomes for children who were born prematurely. Our results provide evidence consistent with the Immigrant Paradox, with details depending on the condition. As in previous studies, the children of immigrants had more socioeconomic disadvantage compared to children of two US-born parents but had outcomes that were either comparable to or better than those of children of two US-born parents [24,25]. 1st/2nd generation children were significantly less likely to have at least one developmental condition than 3rd generation children. In terms of individual conditions, the lower prevalence of developmental delay, cerebral palsy, epilepsy, and hearing problems among 1st/2nd generation children compared to 3rd generation children were significant and substantial. The prevalence of other developmental conditions did not differ significantly by immigrant generational status.

The outcomes studied exhibited variability in the types of factors that significantly predicted them. Birthweight was consistently a risk factor in developing adverse chronic conditions. Living in poverty, male gender, and lower household educational attainment were associated with increased risk of several of the conditions. The only socio-demographic advantage that 1st/2nd generation children seemed to have compared to 3rd generation children was in family/household composition, but family composition did not have any significant associations with any of the examined conditions. After controlling for socio-demographic characteristics, having immigrant parents remained significantly associated with reduced odds of experiencing any chronic condition, developmental delay, cerebral palsy, epilepsy, and hearing problems for this sample of prematurely born children. The lower risk of hearing problems associated with Black race and fewer vision problems among Hispanic children were unexpected considering much of the health disparities literature noting that minority children are usually at a disadvantage in health risk. A potential explanation for these findings, as well as for our main findings related to lower prevalence of developmental conditions among children of immigrants, could relate to disparities in diagnosis. Research suggests that minority parents are less likely to seek health care for their children than White parents and therefore minority children are less likely to be diagnosed than White children. Thus, the lower odds of developmental problems seen among minorities could reflect a lower diagnostic rate rather than lower prevalence [34,35]. Further research is needed to investigate these competing explanations.

This study had several limitations. The study relies on parent’s reports of children’s preterm status, immigrant generational status, and developmental outcomes. In the NSCH data, parents are not asked to report a specific gestational age at birth and instead indicate whether their child was born prematurely or not. This meant that we could not distinguish between

babies that had low birthweight due to prematurity and those that were born at term but small for gestational age. We also could not examine how the degree of prematurity related to developmental outcomes at a detailed level [36–39]. However, we were able to use birthweight data in conjunction with the prematurity indicator as a proxy for gestational age. The lack of a significant difference in birthweight between the immigrant generation groups of children identified as preterm provided some reassurance that different average levels of prematurity did not account for the findings. Future research might use physician adjudicated criteria for prematurity as opposed to parental self-report. In the NSCH, parent's reports of developmental outcomes were based on a combination of professional diagnosis and parents' own concerns about their child's development. Even for the reports that are based on professional diagnosis, some limitations include whether parents were seeking an appropriate amount of healthcare, asked their provider about their child's development, or were willing to accept the diagnoses that their child received. Other studies mention that healthcare professionals are not completely consistent in their criteria for diagnosing different neurodevelopmental outcomes [2,3].

Another limitation is related to understanding the circumstances of the pregnancy or childrearing that might be related to developmental outcomes. For example, we were not able to look at the prevalence or effect of behaviors like prenatal care utilization, smoking, or drinking during pregnancy on either birth or developmental outcomes. Previous research has found that behaviors such as substance use during pregnancy are less prevalent among foreign-born populations as compared to US-born populations [40–43]. Furthermore, previous research suggests that factors like parenting style, the quality of parent-child interactions, and enrollment in formal child care may be associated with children's cognitive development [44] as well, but these factors are not incorporated in the models tested. Future research could further explore differences in these factors and behaviors between immigrant and US-born parents of premature children to provide additional insight into how or why having immigrant parents is associated with decreased odds of chronic developmental conditions.

In the 2011–2012 wave, the NSCH collected data on prematurity, intellectual disability/mental retardation, and cerebral palsy for the first time. The lack of related data in previous waves prevented us from pooling multiple waves of NSCH data, which resulted in analyses based on small numbers of children for some conditions. Future waves of NSCH may allow for the pooling of multiple years of data to increase sample sizes. Larger sample sizes may allow for more focused analyses of immigrant subgroups or specific age groups to get a better understanding of how various subpopulations are affected by these developmental issues. Additionally, because the NSCH data is not longitudinal, we could not assess a causal relationship between immigrant generational status and developmental outcomes. We also could not test the applicability of other hypotheses related to the Immigrant Paradox, such as the Healthy Migrant Hypothesis or migrant selectivity hypothesis, because the data is neither bi-national nor multi-national.

Data limitations also prevented the detailed examination of immigrant parentage on developmental outcomes. For example, we did not have information on parent's country of origin, length of stay in the US, or documentation status. These factors may be associated

with children's developmental outcomes, for example, through healthcare utilization behaviors.

CONCLUSION

Studies on the Immigrant Paradox suggest that children of immigrants are more likely to be born full term and, when born at term, children of immigrants are less likely to experience developmental problems. Although Immigrant Paradox research shows that foreign-born status protects against preterm birth, less is known about what happens to those children of immigrants who are born prematurely. In this study, having immigrant parents was associated with reduced risk of developmental delay, cerebral palsy, epilepsy, and hearing problems. These findings, especially when combined with the socio-demographic disadvantage among children of immigrants, are consistent with the Immigrant Paradox. Some aspect of immigrant families may protect children from developmental problems despite the increased risks associated with low socioeconomic status and prematurity. Understanding protective mechanisms that appear to be associated with immigrant generational status can potentially inform programs addressing the healthy development of all children in the US, regardless of prematurity, socioeconomic, or immigrant generational status.

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Table I

Prevalence of Chronic Developmental Problems by Family Immigrant Status

Generation n (%)	All 8,871	1st/2nd 1,241 (20.29)	3rd 7,630 (79.71)	p-value
Any chronic condition (%)	18.88%	11.86%	20.67%	0.0003
Autism (%)	3.99%	4.15%	3.95%	0.8895
Developmental delay (%)	13.64%	6.12%	15.51%	<.0001
IDMR (%)	2.77%	3.15%	2.67%	0.6792
Cerebral palsy (%)	1.22%	0.72%	1.34%	0.2873
Epilepsy (%)	2.27%	1.88%	2.37%	0.6153
Hearing problems (%)	5.74%	2.60%	6.54%	0.0133
Vision problems (%)	3.69%	4.31%	3.53%	0.5716

All estimates shown are based on the weighted sample.

Table II

Socio-demographic Characteristics by Family Immigrant Status

Generation <i>n</i> (%)	All 8,871	1 st /2 nd 1,241 (20.29)	3 rd 7,630 (79.71)
Child's current age (%) ¹			
Infant (0–2 years)	17.00	18.49	16.62
Pre-school age (3–5 years)	19.03	20.36	18.69
School age (6–12 years)	38.47	34.53	39.48
Adolescent (13–17 years)	25.50	26.62	25.21
Mean(se) age in years ²	8.26 (0.12)	7.97 (0.28)	8.25 (0.12)
Male (%) ³	52.07	48.10	53.08
Race and Ethnicity (%)			
Non-Hispanic White	57.21	17.38	67.35
Non-Hispanic Black	18.25	10.85	20.14
Hispanic	24.54	71.77	12.51
Insured (%)	93.53	86.13	95.41
Household educational achievement (%)			
Less than HS	20.33	50.89	13.02
HS	32.85	21.75	35.50
More than HS	46.82	27.36	51.48
Family structure (%)			
Two-parent family	73.62	80.73	71.81
Single mother	23.16	17.34	24.64
Other family structure	3.22	1.92	3.55
Primary HH language (%)			
English	86.73	39.40	98.77
Not English	13.27	60.60	1.23
Poverty level (%)			
<100% FPL	24.86	37.77	21.83
100%–199% FPL	20.81	30.18	18.61
200%–399% FPL	28.44	17.82	30.94
400% FPL	25.88	14.22	28.62
Child's birthweight (%) ⁴			
Not low birthweight	50.00	47.55	49.48
Low birthweight	50.00	52.45	50.52
Mean(se) birthweight in grams ⁵	2484.27 (16.44)	2468.96 (45.64)	2499.29 (17.58)

All estimates shown are based on the weighted sample.

All differences significant at $p < 0.05$ except as noted:

¹
 $p = 0.48$;

²
 $p = 0.38$;

³
p=0.12;

⁴
p=0.56;

⁵
p= 0.53

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Table III
Regression Results: Effect of Family Immigrant Status on Chronic Developmental Conditions, Unadjusted and Adjusted ORs and 95% CIs

	Any Chronic Condition	Autism	Development al Delay	IDMR	Cerebral Palsy	Epilepsy	Hearing Problems	Vision Problems
UNADJUSTED								
Generation								
(3 rd)	-	-	-	-	-	-	-	-
1 st /2 nd	0.51 (0.36, 0.74) ***	1.04 (0.50, 2.16)	0.33 (0.23, 0.47) ***	1.14 (0.51, 2.55)	0.57 (0.23, 1.45)	0.76 (0.31, 1.91)	0.38 (0.17, 0.84) *	1.19 (0.58, 2.44)
ADJUSTED								
Generation								
(3 rd)	-	-	-	-	-	-	-	-
1 st /2 nd	0.58 (0.37, 0.91) *	1.24 (0.57, 2.73)	0.54 (0.31, 0.94) *	1.02 (0.52, 2.01)	0.33 (0.13, 0.85) *	0.31 (0.13, 0.71) **	0.33 (0.14, 0.79) *	0.80 (0.37, 1.69)
Child's age								
(School age)	-	-	-	-	-	-	-	-
Infant	0.36 (0.24, 0.55) ***	0.08 (0.02, 0.28) ***	0.64 (0.31, 1.31)	0.08 (0.02, 0.28) ***	0.14 (0.02, 1.05)	0.63 (0.25, 1.61)	0.79 (0.44, 1.41)	0.17 (0.08, 0.35) ***
Pre- school age	1.00 (0.71, 1.40)	0.88 (0.35, 2.25)	1.22 (0.82, 1.79)	0.73 (0.40, 1.34)	1.13 (0.37, 3.45)	0.42 (0.19, 0.96) *	1.08 (0.61, 1.94)	0.86 (0.44, 1.66)
Adolescent	1.08 (0.82, 1.42)	1.51 (0.85, 2.67)	1.00 (0.73, 1.37)	1.64 (0.98, 2.75)	1.12 (0.56, 2.25)	1.37 (0.67, 2.82)	0.88 (0.53, 1.45)	0.93 (0.54, 1.60)
Child's gender								
(Female)	-	-	-	-	-	-	-	-
Male	1.49 (1.18, 1.88) ***	3.32 (1.89, 5.84) ***	1.59 (1.21, 2.09) **	1.87 (1.15, 3.05) *	0.32 (0.17, 0.60) ***	0.93 (0.52, 1.68)	1.10 (0.74, 1.64)	1.23 (0.76, 1.99)
Race/Ethnicity								
(White)	-	-	-	-	-	-	-	-
Black	0.76 (0.55, 1.06)	0.89 (0.36, 2.21)	0.94 (0.65, 1.36)	0.78 (0.45, 1.36)	1.25 (0.59, 2.67)	1.12 (0.49, 2.55)	0.56 (0.33, 0.96) *	0.60 (0.28, 1.26)
Hispanic	0.90 (0.56, 1.44)	2.07 (0.81, 5.31)	1.16 (0.64, 2.08)	0.92 (0.47, 1.81)	1.14 (0.38, 3.45)	1.23 (0.39, 3.87)	0.64 (0.35, 1.16)	0.41 (0.24, 0.71) **
Insurance status								
(Not insured)	-	-	-	-	-	-	-	-
Insured	1.23 (0.65, 2.30)	1.58 (0.40, 6.29)	1.14 (0.51, 2.55)	11.00 (2.82, 42.96) ***	1.77 (0.36, 8.65)	3.54 (0.92, 13.70)	1.05 (0.36, 3.11)	1.74 (0.52, 5.80)
Household educational achievement								
(HS)	-	-	-	-	-	-	-	-
Less than HS	1.25 (0.88, 1.77)	1.26 (0.63, 2.51)	0.96 (0.64, 1.45)	2.31 (1.33, 4.02) **	1.61 (0.75, 3.41)	1.56 (0.74, 3.29)	1.91 (1.06, 3.45) *	1.60 (0.87, 2.91)
More than HS	1.06 (0.81, 1.38)	0.80 (0.41, 1.55)	0.88 (0.64, 1.21)	0.90 (0.54, 1.53)	0.97 (0.45, 2.09)	1.41 (0.75, 2.66)	1.54 (1.01, 2.33) *	1.29 (0.77, 2.17)
Family structure								

	Any Chronic Condition	Autism	Development al Delay	IDMR	Cerebral Palsy	Epilepsy	Hearing Problems	Vision Problems
(2-parent)	-	-	-	-	-	-	-	-
Single mother	1.06 (0.77, 1.45)	1.07 (0.46, 2.50)	1.05 (0.73, 1.50)	1.80 (0.93, 3.47)	1.12 (0.52, 2.42)	0.76 (0.35, 1.66)	1.49 (0.88, 2.50)	1.05 (0.46, 2.37)
Other family	0.93 (0.61, 1.43)	1.16 (0.52, 2.56)	0.87 (0.53, 1.41)	1.90 (0.91, 3.93)	1.78 (0.61, 5.18)	0.84 (0.28, 2.47)	1.07 (0.50, 2.27)	1.26 (0.59, 2.67)
Primary household language								
(Not English)	-	-	-	-	-	-	-	-
English	1.50 (0.76, 2.99)	2.91 (0.63, 13.45)	2.62 (1.11, 6.21) *	1.16 (0.36, 3.73)	1.85 (0.26, 13.15)	0.79 (0.23, 2.67)	0.58 (0.19, 1.74)	0.34 (0.15, 0.79) *
Poverty level								
(100% FPL)	-	-	-	-	-	-	-	-
100%–199% FPL	0.87 (0.60, 1.25)	1.60 (0.73, 3.51)	0.72 (0.48, 1.07)	0.99 (0.51, 1.92)	0.92 (0.34, 2.48)	0.65 (0.30, 1.41)	1.33 (0.66, 2.71)	1.04 (0.46, 2.33)
200%–399% FPL	0.76 (0.52, 1.11)	1.65 (0.68, 4.03)	0.71 (0.46, 1.09)	0.35 (0.18, 0.68) **	0.55 (0.20, 1.48)	0.24 (0.10, 0.58) **	0.94 (0.46, 1.92)	0.69 (0.32, 1.48)
400%+ FPL	0.53 (0.36, 0.76) ***	1.3 (0.55, 3.05)	0.58 (0.39, 0.88) *	0.33 (0.15, 0.73) **	0.81 (0.28, 2.32)	0.22 (0.08, 0.60) **	0.70 (0.34, 1.46)	0.58 (0.26, 1.28)
Birthweight								
(Not LBW)	-	-	-	-	-	-	-	-
LBW	1.47 (1.16, 1.86) **	1.10 (0.64, 1.87)	1.71 (1.29, 2.26) ***	1.80 (1.14, 2.85) *	12.31 (5.16, 29.37) ***	2.26 (1.34, 3.79) **	1.12 (0.75, 1.68)	1.49 (0.92, 2.41)

All estimates shown are based on the weighted sample.

* p<0.05

** p<0.01

*** p<0.001