The Association Between Use of Special Supplemental Nutrition Program for Women, Infants, and Children During Pregnancy and Low Birthweight Among Non-US Born Birthing People

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Abstract

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Background: Despite immense healthcare spending per capita, maternal and infant health outcomes remain poor compared to other developed nations. Between 2012 and 2022, the rate of infants born low birthweight (LBW), defined as birthweight less than 2,500 grams or 5 1⁄2 pounds, in the United States increased by 7%. Previous studies have found that maternal participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program during pregnancy is associated with lower risk of LBW infants among US born individuals, however, no studies examined this association among non-US born individuals. The current study examined the association between use of WIC benefits during pregnancy and LBW infants among non-US born birthing people. Secondly, this study assessed how the association between participation in WIC during pregnancy and LBW infants varied across different racial and ethnic groups among non-US born birthing people.

Methods: Data from the Pregnancy Risk Assessment Monitoring System (PRAMS) phase 8 core questionnaire between 2020-2022 was used to address the aims of this study. Participants (N=5,188 non-US born birthing people who had a recent singleton, live-birth and used Medicaid as a form of payment for the delivery) with information on exposure (WIC use during pregnancy) and outcome (LBW infant defined as birth weight less than 2,500g or 5 1⁄2 pounds) were included in the analyses. Unadjusted and adjusted (maternal age, maternal race and ethnicity, income, educational attainment, marital status, receipt of prenatal care, method of delivery, pre-pregnancy diabetes, gestational diabetes, previous preterm birth, prior pregnancies, maternal smoking, and cigarettes smoked daily during pregnancy) logistic regression models were used to estimate odds ratios (OR) and corresponding 95% confidence intervals (CIs). We also examined the associations across race and ethnic subgroups (White, Black, Asian, Other/Multiple Race, and Hispanic) using stratified models and models with interaction terms.

Results: The prevalence of pregnancies with a LBW infant was 17.9% among individuals who used WIC during pregnancy and 20.1% among non-users of WIC. In the adjusted model, the odds of LBW among non-US born birthing people who used WIC during pregnancy, compared to birthing people who were eligible but did not use WIC during pregnancy, was 10% lower (OR: 0.90; 95%CI: 0.74, 1.08; p-value = 0.27), though the difference was not statistically significant. In the race and ethnicity stratified analysis, a similar, inverse, non-statistically significant, relationship between use of WIC and having a LBW infant was observed among White, Black, Asian, Other/ Multiple Race, and Hispanic groups (ORs ranging from 0.75 to 0.98). We did not find statistically significant interactions between WIC use and Race/Ethnicity on having a LBW infant (interaction p-values> 0.05; Race= 0.80, Ethnicity = 0.72).

Conclusion: We found that use of WIC benefits during pregnancy was not associated with delivering a LBW infant among non-US born birthing people overall or among subgroups

defined by race and ethnicity. However, our findings suggest potential inverse relationships between WIC use and having a LBW infant. Our findings underscore the need for further epidemiological studies to examine how social and structural determinants of health including services such as WIC are associated with low birthweight outcomes among non-US born birthing people.

Introduction

Healthcare costs in the United States have increased dramatically over the past several decades, reaching $4.5 trillion annually in 2022.[1] Despite immense healthcare spending per capita, maternal and infant health outcomes remain poor compared to other developed nations.[1] Between 2012 and 2022, the rate of infants born low birthweight (LBW) (defined as birthweight less than 2,500 grams or 5 1⁄2 pounds) in the United States increased by 7%.[2] In 2022, 1 in 12 babies (8.6% of live births) was LBW.[2] Further, racial disparities persisted, with Black infants having two fold higher rates of being born with LBW compared to White infants.[2] LBW infants are more likely to experience adverse health outcomes across the life course than normal birthweight infants.[3] These include higher risk of chronic illnesses such as cardiovascular disease and high blood pressure.[3,4] Past studies have found associations between socioeconomic status and LBW.[4–8] A 2016 study found that in the United States, the rate of LBW in the bottom income quintile (8.0%) was 2.41 times the rate in the highest quintile (3.3%).[4]

While there are a number of studies available on LBW outcomes among US born birthing people, there is sparsity of literature on LBW outcomes among non-US born birthing people. Previous studies have shown that despite risk of delayed initiation of prenatal care, low weight gains, and poor nutritional status, refugee birthing people (Hmong, Cambodian, and African) had lower prevalence of LBW infants compared to US born birthing people.[9] Another study found that foreign-born birthing people (Asian, non-Hispanic Black, and non-Hispanic White) had a lower risk of LBW infants compared to their U.S born racial/ethnic counterparts.[10]

Research on protective factors, such as use of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) during pregnancy are necessary to examine factors that influence perinatal health outcomes among immigrant communities and across their racial and ethnic subgroups. Previous studies have found that maternal WIC participation during pregnancy is associated with lower risk of LBW infants among US born individuals, however, no studies examined this association among non-US born individuals.[11,12] WIC provides low-income

birthing people, infants, and children up to age 5 with vouchers for nutritious foods, information on healthy eating, breastfeeding promotion and support, and referrals to health care.[13] Food benefits include juice, milk, breakfast cereal, eggs, fruit and vegetables, fish (canned), legumes and peanut butter.[14] To be eligible for WIC, applicants must meet categorical, residential, income, and nutritional risk requirements. The WIC program serves certain categories of people which include pregnant, postpartum, or breastfeeding people, in addition to infants and children. To be eligible for WIC applicants must live in the state they apply for. Applicants must meet the income level or standard set by the state agency or be automatically income-eligible based on certain requirements.[15] Automatic income eligibility is granted to persons who participate in various need-based programs such as SNAP benefits, Medicaid, or Temporary Assistance for Needy Families (TANF). To be determined nutritionally at risk, applicants must meet with a health professional (medically-based risk ie. underweight, history of pregnancy complications or diet-based risks such as inadequate dietary pattern).[15]

Given that immigrant mothers account for almost one-fourth (23%) of infants born in the US, research on the drivers of pregnancy-related health outcomes in this population is of significant public health importance.[16] For this study, we examined the association between use of WIC benefits during pregnancy and LBW infants among non-US born birthing people. In addition, we assessed whether the association between participation in WIC during pregnancy and delivering a LBW infant varied across different racial and ethnic groups of non-US born birthing people.

Methods

Study Design and Study Setting

This is a retrospective cohort study investigating associations between use of WIC benefits during pregnancy with LBW among non-US born birthing people. Data from the Pregnancy Risk Assessment Monitoring System (PRAMS) phase 8 core questionnaire between 2020-2022 was used to address the aims in this study. PRAMS is a population-based surveillance system designed to identify groups of women and infants at high risk for pregnancy complications and outcomes. The two modes of data collection for the phase 8 core questionnaire included mailed questionnaire or telephone interview. Currently, there are 50 United States jurisdictions that participate in the PRAMS survey including 46 states, the District of Columbia, New York City, Northern Mariana Islands, and Puerto Rico. The jurisdictions that participate in PRAMS represent approximately 81% of all live births in the United States.[17]

Study Participants

PRAMS samples women who have had a recent singleton live birth and are randomly selected from birth certificate registries to participate in the survey. PRAMS draws a stratified random sample of 100 to 250 new mothers every month from eligible birth certificates at participating sites. Each site samples between 1,000 and 3,000 women per year with mothers of LBW infants and racial/ethnic minority groups sampled at higher rates to ensure adequate representation of smaller groups in the data.[17] PRAMS identified birthing people as women, and this study uses this language when referring to the dataset. For this study, the term birthing people is used to describe the range of people with capacity for pregnancy. For the current study, the inclusion criteria included non-US born birthing people who had a birth between 2020-2022 and used Medicaid as their form of payment for the delivery. These individuals selected “No” when prompted “Mother US born?” and selected “Medicaid” as their form of payment for the delivery. The final analytic population consisted of 5,188 birthing people. This

study was determined to be exempt by the University of Washington Institutional Review Board (IRB) because deidentified data was used from a publicly available resource.

Data Collection

The PRAMS questionnaire has two parts. The core questions, asked by all sites, included questions regarding attitudes and feelings about the most recent pregnancy, preconception care, content of prenatal care, medicaid and WIC participation, breastfeeding, cigarette smoking during pregnancy, health insurance coverage, physical abuse, infant health care, and contraceptive use. The second part of the PRAMS questionnaire included standard questions which are developed by the CDC or by each site on their own. These standard questions consist of topics such as maternal COVID-19 experiences, disability, and social determinants of health. PRAMS collects data using two primary methods. First, selected participants are mailed the questionnaire two to four months after delivery. If selected participants do not respond after the third questionnaire packet is mailed, telephone follow up begins. Up to 15 call attempts are made for each viable telephone number. The data collection cycle from initial mailing to the end of telephone follow-up lasts approximately 60 to 95 days.[18] The current study used responses from the phase 8 core questionnaire between 2020-2022. This time period was selected because collection of several of the variables needed to conduct the analyses (nativity, pre pregnancy diabetes, and gestational diabetes) started being collected in 2020.

Exposure and Outcome

The primary exposure in this study was the use of WIC during pregnancy based on self-reported PRAMS phase 8 core questionnaire responses. The use of WIC during pregnancy was categorized as a binary variable, “Yes” or “No” to the question “Mother received WIC benefits during pregnancy?”. The primary outcome in this study was delivering a LBW infant.[2] In the phase 8 questionnaire, LBW is a numerical variable grouped into 250 gram intervals. The responses for birthweight include numerical weight ranges from 0227 - 8165 grams. In this

study, LBW was defined as a categorical binary variable “Yes" for birthweight less than 2,500 grams or “No” for birthweight greater than or equal to 2,500 grams.

Covariates

For this analysis, other covariates considered included maternal age, maternal race and ethnicity, income, educational attainment, marital status, receipt of prenatal care, method of delivery, pre-pregnancy diabetes, gestational diabetes, previous preterm birth, prior pregnancies, maternal smoking, and cigarettes smoked daily during pregnancy. Maternal age was categorized as <=19, 20-24, 25-29, 30-34, 35-39, 40+ years. Race was categorized as White, Black, Asian, and Other/ Multiple Race. Ethnicity was categorized as binary “Yes” or “No” if the mother self-identified as Hispanic. Income was grouped into various income ranges based on the national WIC Income Eligibility Guidelines (Effective from July 1, 2021 to June 30, 2022).[19] For family sizes of 8 people or smaller, the annual income limit for WIC eligibility in the majority of US states is $44,660.[15] The annual income limit in Alaska, however, is $55,850 (WIC Income Eligibility Guidelines).[15] Thus, income was categorized as $0-$16,000, $16,001-$20,000, $20,001- $24,000, $24,001-$28,000, $28,001-$32,000, $32,001-$40,000, $40,001-$48,000, $48,001-$57,000. Educational attainment was classified as “Less than High School”, “High School”, or “At least some college”. Marital Status was dichotomized into “Married or “Other”. Receipt of prenatal care was classified as “Yes” if the participant reported at least one prenatal care visit during their pregnancy or “No” if they reported no prenatal care visits. Pre-pregnancy diabetes, gestational diabetes, and previous preterm birth were categorized as “Yes” or “No”. Method of delivery was grouped into four types including, “Forcep Delivery”, “Cesarean Delivery”, “Vacuum Delivery”, or “Vaginal Delivery”. Number of prior pregnancies were categorized into groups as follows: 0 pregnancy, 1 pregnancy, 2 pregnancies, 3-5 pregnancies, or 6+ pregnancies. Maternal smoking was dichotomized into “Yes” or “No”, while cigarettes smoked daily during pregnancy were grouped into ranges from None, 1-7 cigarettes daily, 8-14 cigarettes daily, or 15+ cigarettes daily.

Statistical Analysis

Descriptive analyses were conducted to summarize overall demographic, socioeconomic, and health characteristics of study participants by exposure status (use of WIC benefits during pregnancy) using number (percentage) for categorical variables. Logistic regression was used to examine the association between use of WIC benefits during pregnancy and LBW among non-US born birthing people. Sampling weight and adjustments for non-response and non-coverage were included in all analyses. Unadjusted and adjusted odds ratios (ORs) were obtained along with 95% confidence intervals (CIs) with robust standard errors. The adjusted model included maternal age, maternal race and ethnicity, income, educational attainment, marital status, receipt of prenatal care, method of delivery, pre-pregnancy diabetes, gestational diabetes, previous preterm birth, prior pregnancies, maternal smoking, and cigarettes smoked daily during pregnancy. To examine if the association between use of WIC benefits during pregnancy and LBW differed by race and ethnicity groups of non-US born birthing people, we fitted the previously described adjusted logistic regression model stratified by race and ethnicity groups including White, Black, Asian, Other/ Multiple Race, and Hispanic. In addition, we fitted an adjusted logistic regression model that included exposure, outcome, adjustment variables, as well as interaction terms between exposure and race and ethnicity (in separate models). The p-values of the interaction terms were used to determine statistical significance of multiplicative interactions. Statistical significance was determined using the p-value < 0.05 cutoff. All statistical analyses were performed using the Rstudio Statistical Software version 2023.03.0 + 386.

Results

The number of non-US born birthing people eligible for WIC during pregnancy between 2020 and 2022 totaled 5,188 **(Table 1)**. Among these participants, 62% (N=3,217) reported using WIC benefits during pregnancy, while 38% (N=1,971) did not use WIC benefits during pregnancy. Among participants 28.6% of WIC users and 29.1% of non-users were 30-34 years old. The highest proportion of participants in the study self-identified as White (31.6% of WIC users and 33.5% of WIC non-users). Among specified income ranges, most participants were in the $0-$16,000 income range (21.8%). Among WIC users 49% attained a High School education compared to 44.4% of WIC non-users. Overall, 55.7% of participants in the study were married (WIC users: 53.6% vs. WIC non-users: 59.2%). Participants who were WIC-users and non-users in the study sample had substantially high proportions of prenatal care use (95.4% vs 94.4%). Users and non-users of WIC had similar proportions of nulliparous birthing people (29.7% vs 28.9%, respectively) and birthing people who did not smoke (98.6% vs 99.1%, respectively).

The prevalence of a LBW infant was 17.9% among individuals who used WIC during pregnancy and 20.1% among non-users of WIC. In the unadjusted model, the odds of LBW among non-US born birthing people who used WIC during pregnancy, compared to birthing people who were eligible but did not use WIC during pregnancy, was 10% lower (OR: 0.90; 95% CI: 0.75, 1.09; p-value = 0.30), though the difference was not statistically significant **(Table 2)**. In the adjusted model, the odds of LBW among non-US born birthing people who used WIC during pregnancy, compared to birthing people who were eligible but did not use WIC during pregnancy, was also 10% lower (OR: 0.90; 95%CI: 0.74, 1.08; p-value = 0.27), though the difference was not statistically significant, similar to the unadjusted model.

In the stratified analysis, the odds of LBW among specified racial and ethnic groups of non-US born birthing people who used WIC during pregnancy compared to birthing people who were eligible but did not use WIC during pregnancy was 5% lower (OR: 0.95; 95%CI: 0.68, 1.33;

p-value = 0.77) among White people, 2% lower (OR: 0.98; 95%CI: 0.64, 1.52; p-value = 0.94) among Black people, 25% lower (OR: 0.75; 95%CI: 0.48, 1.10; p-value = 0.21) among Asian people, 5% lower (OR: 0.95; 95%CI: 0.65, 1.40; p-value = 0.80) among Other/ Multiple Race people, and 6% lower (OR: 0.94; 95%CI: 0.72, 1.23; p-value = 0.66) among Hispanic people, though none of the estimates were statistically significant **(Table 3).** The p-values for the interaction between WIC use and race and ethnicity were not statistically significant (interaction p-values>0.05; Race= 0.80, Ethnicity = 0.72).

Discussion

In an analysis of mothers who took part in the PRAMS phase 8 core questionnaire in 2020-2022, we found that use of WIC benefits during pregnancy was not associated with delivering a LBW infant among non-US born birthing people. In the adjusted model, the OR comparing birthing people who used WIC benefits and those who did not was 0.90 (95%CI: 0.74-1.08). Similarly, we did not find associations between use of WIC benefits during pregnancy and delivering a LBW infant among subgroups defined by race and ethnicity.

While no significant associations were found in our study, among non-US born birthing people, we observed suggestive inverse relationships between WIC use and having a LBW infant overall, and in subgroups defined by race and ethnicity. To our knowledge, there is no published study that has examined the association between WIC use during pregnancy and LBW among non-US born birthing people. However, several studies have examined this association (WIC use and delivering a LBW infant) among US born birthing people.[12,20–23] For instance, a study using a national sample (PRAMS) of mothers from 2009 to 2017 explored relationships between WIC participation, race and ethnicity, and LBW. Results from the adjusted analysis indicated that participation in WIC is associated with a reduced risk of LBW (adjusted OR, 0.94; 95%CI: 0.88-0.99). This association was significant among Hispanic (adjusted OR, 0.86; 95% CI: 0.77-0.95) and Black (adjusted OR, 0.09; 95%CI: 0.82-0.99) birthing people.[20] Further, in 2016, Sonchak et al. conducted a study (N= 237,533) using South Carolina birth certificate data to assess the association between WIC participation and the probability of delivering a LBW infant. Study results revealed that WIC participation reduced the probability of having a LBW infant by 2.5 % points in the overall sample, a 1.4% point decline for Whites, and a 3.4% points decline for Blacks.[21] Lastly, a 2017 study examined the association between WIC and LBW using a fetuses-at-risk approach to address gestational age bias. Among California WIC participants (N=236,546), researchers found that WIC enrollment was associated with

lower risk of LBW for infants born from week 26-40 (HR 26 = 0.77; HR 40 = 0.64) after adjusting for maternal socio-demographic and health characteristics.[23]

Previously, other studies have found significant relationships between nativity, race, socio-economic status, and LBW infants among US-born and non-US born birthing people.[24–27] For instance, a nationally representative study among 2,436,890 participants examined associations of nativity with LBW across racial/ethnic groups and by education level.[24] Study findings indicated that the protective effect of foreign-born status varied across race/ethnicity groups and by education. For example, among Black and Hispanic women, foreign-born status reduced the risk of LBW across all education groups. The effect of foreign-born status was stronger among women with lower education (43% and 33% reduction among Black and Hispanic women, respectively) than among women with higher education (18% and 1% reduction among Black and Hispanic women, respectively).[24] Findings from this nationally representative study indicate the potential impacts of nativity and education on LBW outcomes among non-US born birthing people.

While this study uses data from a nationally representative sample of birthing people who have had a recent singleton live birth, there are also several limitations to consider. First, the variable “Nativity” which was used to determine the study sample of non-US born birthing people does not contain robust information on the birthing person’s country of origin. Instead, self-identified race and ethnicity were used to categorize non-US born birthing people into subgroups. Information on country of origin would have provided a more accurate representation of non US-born subgroups given the varying experiences of birthing people from various parts of the world. Additionally, immigrants are eligible to receive non-cash government benefits without it negatively impacting their immigration status. A public charge policy in 2019 led many non-US citizens to fear WIC participation would negatively impact their future ability to stay in the country. This may have caused selection bias by causing lower WIC participation by non-U.S born mothers and/or non-U.S born mothers to underreport being born outside of the

US.[28,29] Unknown length of residency in the United States is another limitation of the study. The PRAMS dataset does not contain information on length of US residency, and thus we are unable to control for this variable in the study. Length of stay is an important attribute to our study as previous studies have shown that acculturation to American lifestyle and values may be associated with poor perinatal health outcomes.[30–32] The language barrier of the PRAMS survey may also impact the generalizability of our findings. PRAMS is only available in English and Spanish, therefore if a participant's native language is not fluent in either of these languages, they may be less likely to take the survey resulting in a lack of representation of certain groups. Additionally, there is no way to fully characterize the use of WIC services (e.g. actual use or duration) among participants. While a participant may have checked "Yes" to the use of WIC services during pregnancy, this may not equate to the actual use of all services provided and length of use. Lastly, the food benefits covered by WIC may not be culturally appropriate for non-US born birthing people which may impact subsequent utilization and duration of benefits.

In sum, we did not find statistically significant associations between WIC use and risk of low birth weight among WIC-eligible non-US born birthing people in the current study. While the estimates were not statistically significant, an overall inverse relationship is suggested by the estimates. This body of work can contribute to the growing literature on health outcomes of non-US born mothers and their infants. Future studies with larger sample sizes and better characterization of WIC use is warranted to better understand determinants of perinatal health outcomes among non-US born birthing people. Lastly, policy efforts should prioritize actions aimed at reducing barriers to accessing the WIC program among immigrant groups, while also enhancing the quality of services provided to specific targeted populations.

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Table 1: Selected Demographic, Socioeconomic, and Health Characteristics of the Study Population

Variable	WIC Usage (2020-2022)		
	Used WIC Benefits During Pregnancy	**Did not Use WIC Benefits During Pregnancy**	**Overall Population**
	N= 3217 (62%)	**N= 1971 (38%)**	**N= 5188 (100%)**
Maternal Age Category (year)			
<=19	148 (4.6%)	54 (2.7%)	202 (3.9%)
20-24	521 (16.2%)	279 (14.2%)	800 (15.4%)
25-29	830 (25.8%)	552 (28.0%)	1382 (26.6%)
30-34	920 (28.6%)	574 (29.1%)	1494 (28.8%)
35-39	586 (18.2%)	380 (19.3%)	966 (18.6%)
40+	205 (6.4%)	124 (6.3%)	329 (6.3%)
Maternal Race			
White	1016 (31.6%)	660 (33.5%)	1676 (32.3%)
Black	771 (24.0%)	354 (18.0%)	1125 (21.7%)
Asian	454 (14.1%)	326 (16.5%)	780 (15.0%)
Other/ Multiple Race	838 (26.0%)	520 (26.4%)	1358 (26.2%)
Mother Hispanic			
Yes	1747 (54.3%)	995 (50.5%)	2742 (52.9%)
No	1449 (45.0%)	970 (49.2%)	2419 (46.6%)
Income			
$0-$16,000	747 (23.2%)	384 (19.5%)	1131 (21.8%)
$16,001-$20,000	346 (10.8%)	175 (8.9%)	521 (10.0%)
$20,001-$24,000	267 (8.3%)	124 (6.3%)	391 (7.5%)
$24,001-$28,000	187 (5.8%)	110 (5.6%)	297 (5.7%)
$28,001-$32,000	252 (7.8%)	124 (6.3%)	376 (7.2%)
$32,001-$40,000	244 (7.6%)	161 (8.2%)	405 (7.8%)
$40,001-$48,000	151 (4.7%)	107 (5.4%)	258 (5.0%)
48,001-$57,000	100 (3.1%)	105 (5.3%)	205 (4.0%)
Educational Attainment			
<High School	565 (17.6%)	266 (13.5%)	831 (16.0%)
High School	1575 (49.0%)	875 (44.4%)	2450 (47.2%)
At least some college	1024 (31.8%)	808 (41.0%)	1832 (35.3%)
Marital Status			
Married	1724 (53.6%)	1166 (59.2%)	2890 (55.7%)
Other	1491 (46.3%)	804 (40.8%)	2295 (44.2%)

Receipt of Prenatal Care			
Yes	3069 (95.4%)	1861 (94.4%)	4930 (95.0%)
No	54 (1.7%)	39 (2.0%)	93 (1.8%)
Method of Delivery			
Forcep Delivery	3190 (24.8%)	1961 (24.9%)	5151 (24.8%)
Cesarean Delivery	3213 (25.0%)	1971 (25.0%)	5184 (25.0%)
Vacuum Delivery	3130 (24.4%)	1923 (24.4%)	5053 (24.4%)
Vaginal Delivery	3213 (25.0%)	1971 (25.0%)	5184 (25.0%)
Pre-pregnancy Diabetes			
Yes	62 (1.9%)	33 (1.7%)	95 (1.8%)
No	3152 (98.0%)	1937 (98.3%)	5089 (98.1%)
Gestational Diabetes			
Yes	406 (12.6%)	242 (12.3%)	648 (12.5%)
No	2808 (87.3%)	1728 (87.7%)	4536 (87.4%)
Previous Preterm Birth			
Yes	160 (5.0%)	99 (5.0%)	259 (5.0%)
No	3051 (94.8%)	1869 (94.8%)	4920 (94.8%)
Low Birthweight			
Yes (<2,500g)	577 (17.9%)	396 (20.1%)	973 (18.8%)
No (>=2,500g)	2639 (82.0%)	1575 (79.9%)	4214 (81.2%)
Prior Pregnancies			
0	957 (29.7%)	570 (28.9%)	1527 (29.4%)
1	949 (29.5%)	601 (30.5%)	1550 (29.9%)
2	646 (20.1%)	432 (21.9%)	1078 (20.8%)
3-5	599 (18.6%)	336 (17.0%)	935 (18.0%)
6+	60 (1.9%)	28 (1.4%)	88 (1.7%)
Maternal Smoking			
Yes	32 (1.0%)	13 (0.7%)	45 (0.9%)
No	3172 (98.6%)	1954 (99.1%)	5126 (98.8%)
Cigarettes smoked daily during pregnancy			
None	3172 (98.6%)	1955 (99.2%)	5127 (98.8%)
1-7 cigarettes	15 (0.5%)	9 (0.5%)	24 (0.5%)
8-14 cigarettes	9 (0.3%)	1 (0.1%)	10 (0.2%)
15+ cigarettes	8 (0.2%)	2 (0.1%)	10 (0.2%)

Note: Numbers may not add up to 100% due to missing data

Table 2: Association between use of WIC during pregnancy and low birthweight among non-US born birthing people

	Low Birthweight*	Unadjusted		Adjusted**	
	Yes (<2,500g) N=3217 (100%)	**OR (95%CI)**	**P-value**	**OR (95%CI)**	**P-value**
Used WIC benefits During Pregnancy	577 (17.9%)	0.90 (0.75, 1.09)	0.30	0.90 (0.74, 1.08)	0.27
Did not use WIC during pregnancy	396 (20.1%)	Reference		Reference	

OR(Odds Ratio), CI(Confidence Interval)
*LBW defined as an infant born weighing less than 2,500 grams or 5 ½ pounds
** Adjusted for maternal age, maternal race and ethnicity, income, educational attainment, marital status, receipt of prenatal care, method of delivery, pre-pregnancy diabetes, gestational diabetes, previous preterm birth, prior pregnancies, maternal smoking, and cigarettes smoked daily during pregnancy

Table 3: Association of WIC use with Low birthweight among Groups defined by Race and Ethnicity

	Low Birthweight*	Adjusted**	
Race and Ethnicity Group		**OR (95%CI)**	**P-value**
White	186 (100%)		
Used WIC benefits during pregnancy	115 (61.8%)	0.95 (0.68,1.33)	0.77
Did not use WIC benefits during pregnancy	71 (38.2%)	Reference	
Black	129 (100%)		
Used WIC benefits during pregnancy	91 (70.5%)	0.98 (0.64,1.52)	0.94
Did not use WIC benefits during pregnancy	38 (29.5%)	Reference	
Asian	117 (100%)		
Used WIC benefits during pregnancy	66 (56.4%)	0.75 (0.48,1.10)	0.21
Did not use WIC benefits during pregnancy	51 (43.6%)	Reference	
Other/ Multiple Race	143 (100%)		
Used WIC benefits during pregnancy	86 (60.1%)	0.95 (0.65, 1.40)	0.80
Did not use WIC benefits during pregnancy	57 (39.9%)	Reference	
Hispanic	288 (100%)		
Used WIC benefits during pregnancy	178 (61.8%)	0.94 (0.72,1.23)	0.66
Did not use WIC benefits during pregnancy	105 (36.5%)	Reference	

OR(Odds Ratio), CI(Confidence Interval)

*LBW defined as an infant born weighing less than 2,500 grams or 5 ½ pounds
** Adjusted for maternal age, income, educational attainment, marital status, receipt of prenatal care, method of delivery, pre-pregnancy diabetes, gestational diabetes, previous preterm birth, prior pregnancies, maternal smoking, and cigarettes smoked daily during pregnancy
Note: Interaction p-values for WIC use during pregnancy and LBW infant by maternal race and ethnicity (Race= 0.80, Ethnicity= 0.72)