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Disparities in Birth Weight and Gestational Age by Ethnic Ancestry in South American countries

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Abstract

Objective—We examine disparities in birth weight and gestational age by ethnic ancestry in 2000–2011 in eight South American countries.

Methods—The sample included 60480 singleton live-births. Regression models were estimated to evaluate differences in birth outcomes by ethnic ancestry controlling for time trends.

Results—Significant disparities were found in seven countries. In four countries – Brazil, Ecuador, Uruguay, and Venezuela – we found significant disparities in both low birth weight and preterm birth. Disparities in preterm birth alone were observed in Argentina, Bolivia, and Colombia. Several differences in continuous birth weight, gestational age, and fetal growth rate were also observed. There were no systematic patterns of disparities between the evaluated ethnic ancestry groups across the study countries, in that no racial/ethnic group consistently had the best or worst outcomes in all countries.

Conclusions—Racial/ethnic disparities in infant health are common in several South American countries. Differences across countries suggest that racial/ethnic disparities are driven by social and economic mechanisms. Researchers and policymakers should acknowledge these disparities and develop research and policy programs to effectively target them.

Keywords

Health inequalities; racial disparities; ethnic disparities; birth weight; gestational age; South

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Conflict of interest

The authors have no conflicts of interest in this work.

Introduction

Racial and ethnic disparities in infant health are common worldwide and have been reported in several multiethnic countries such as the United States (US) and Brazil. For example, in Brazil, neonatal and infant mortality rates are more than double among black children than whites (Cardoso et al., 2005). Similarly, preterm birth (PTB) and low birth weight (LBW) rates are significantly higher among infants of African ancestry than those of European ancestry alone (Nyarko et al., 2013). These disparities have their roots in maternal health behaviors, physical, social and economic environments, and access to and quality of health care. For example, prenatal care use, socioeconomic factors, and geographic location explain most of the disparities in LBW and PTB birth between children of African and European ancestries in Brazil (Nyarko et al., 2013). Disparities in infant health outcomes by ancestry have also been reported in other settings such as between European and non-European ancestries in Italy (Chiavarini et al, 2012) and between different European ancestries in Canada (Auger et al, 2012).

Quantifying ethnic differences in infant health in South America is particularly interesting since most countries are highly ethnically admixed (Lopez Camelo et al., 1996; Salzano and Sans, 2014). Such research has paramount implications for understanding the need for and guiding policies and interventions to improve population health by reducing ethnic disparities in South American countries. This work has gained major research interest and policy focus in developed countries with disparities such as the United States. Despite its relevance, there is little literature about racial disparities in South American countries. This is partly because race and ethnicity are not routinely measured in surveys and datasets measuring population health in most of these countries.

LBW and PTB are prevalent adverse birth outcomes that are important predictors of child development and future health and mortality (Varvarigou, 2010; Lau et al., 2011; Salam et al., 2014). About 20 million babies are born at LBW worldwide (WHO, 2012). LBW and PTB are highly prevalent in South America but their prevalence varies between countries, though reliable estimates are scarce for several countries (Woodhouse et al., 2014). For example, among the eight study countries, recent estimates suggest that LBW rate ranges from as low as 6% in Chile and Bolivia to 9% in Uruguay (WHO, 2012).

Using unique child-level data that are similarly collected across countries, we examine disparities in birth weight and gestational age by ethnic ancestry in recent years (2000–2011) in eight South American countries. To the best of our knowledge, ours is the first study to evaluate ethnic disparities in infant health across many South American countries using the same data source and analytical model. Accurate assessment of these differences is an important first step for explaining ethnic disparities in infant and child health in these countries and devising cost-effective interventions to eliminate them. Our study is unique because it uses large datasets that were recently collected using the same design and procedures across the study countries with detailed and child-specific measures of ethnic ancestry and birth outcomes, which allows for systematic comparisons of disparities across countries.

Methods

Data and Sample

The study included a sample of 60480 singleton live births including 5895 low birth weight (birth weight <2500 grams, LBW) and 5614 preterm birth (gestational age<37 weeks, PTB) infants born between 2000 and 2011 in 118 hospitals in 71 cities in 8 South America countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela and Uruguay. The sample per country ranged from 1113 in Uruguay to 21121 in Brazil. The infants were enrolled in the Latin American Collaborative Study of Congenital Malformations (Castilla and Orioli 2004; ECLAMC web page). ECLAMC is an epidemiological research and surveillance program for birth defects in South America, since 1967, that involves a voluntary collaboration between a wide network of hospitals and health professionals (mostly pediatricians). The ECLAMC-affiliated health professionals evaluate newborns in their hospitals and enroll into ECLAMC infants born with birth defects before their discharge after birth and a sample of infants without birth defects matched one-to-one with affected infants by birth date, sex, and hospital of birth. All infants are recruited using the same criteria and data are systematically collected through interviews with the mothers before hospital discharge and through hospital record abstraction as needed using the same questionnaires across all ECLAMC-affiliated hospitals.

ECLAMC professionals obtain data on infant health including birth weight and gestational age calculated as the difference between birth date and date of last menstrual period, prenatal history and demographic and socioeconomic characteristics. All affiliated professionals receive the same standard training before data collection; annual group meetings for ECLAMC professionals are held where refresher training is provided as needed. As a result, data quality and consistency are thought to be high. ECLAMC data have been used in multiple previous studies of infant health in South America (Wehby et al., 2010; Nyarko et al., 2013; Wehby et al., 2014).

In our study, we only included infants *without* birth defects to reduce sample heterogeneity and enhance the generalizability of results. Infants without birth defects represent the majority of the infant population as only about 2 percent of infants are born with a detectable birth defect. Furthermore, LBW and PTB rates are higher among children with birth defects than the general population (Wehby et al., 2014). Also, the prevalence of certain birth defects may vary by ethnic ancestry. For all of these reasons, including birth defects may bias the extent of racial disparities in the general population. We also excluded infants whose birth weight is outside of the range of 500 to 6000 grams and gestational age is outside of 19.5 – 46.5 weeks. These are common in the literature to reduce the chance of data errors (e.g. Woodhouse et al., 2014).

Given that ECLAMC imposes no inclusion criteria into its program for unaffected infants that are related to birth weight and gestational age, the sample of unaffected children is unlikely to be systematically biased for examining ethnic disparities in these outcomes. Furthermore, ECLAMC-affiliated hospitals serve several communities that are highly geographically and socioeconomically diverse, which would enhance sample representativeness (Wehby et al., 2011; Woodhouse et al., 2014). Of course, the results may

still not be generalizable to the entire population of infants in the study countries since they are based on selective hospitals. We discuss the generalizability of the results in further detail below.

Outcome Measures

The main outcomes were binary indicators for LBW (<2500 grams) and PTB (<37 weeks of gestation). We also evaluated differences in continuous birth weight in grams (BW) and gestational age in weeks (GA). Since BW is a function of both GA and fetal growth rate (FGR), i.e. birth weight conditional on gestational age, and that FGR may be more sensitive to maternal nutrition and other prenatal risk factors such as smoking and stress than growth due to a change in gestational age, we also studied BW divided by GA as a measure of average FGR (grams per gestational week) throughout pregnancy.

Ethnic Ancestry

During the interviews with the mothers, ECLAMC professionals inquired about the *ethnic ancestry* of the child, including all the ethnicities the child has through both parents and their family lineages (parents, grandparents, great grandparents, etc.) as far as the mother could remember. Ethnic ancestry was systematically measured under 8 defined categories, considered alone or in combinations (a total of 256 possible combinations). This approach innovated by ECLAMC for systematically measuring ethnic ancestry across multiple populations and countries is especially relevant for highly ethnically admixed populations such as South American populations (Salzano and Sans, 2014). The most commonly reported ancestries were Native, defined as having ancestry from Latin America as far as the mother can remember, European, and African; other measured ethnic ancestries (such as Asian or Arabic) were much less frequently reported. Following this definition, Native ancestry does not necessarily mean that the person self-identifies as having indigenous ancestry and for the majority of cases it does not represent having indigenous ancestry alone. Instead, Native ancestry means that all the family ancestors (for both parents of the child) were born in Latin America as far as the child's mother can remember or the mother does not know of a specific ancestor who was born outside of South America. In contrast, European ancestry indicates that the mother reports that a specific ancestor of the child (on either parent side) such as a grandparent, great grandparent, or great-great-grandparent was born in Europe according to her knowledge of family lineages. Similarly, African ancestry implies that a specific ancestor of the child is known to have been born in Africa. Obviously, most of the individuals reporting Native ancestry alone may also have some European ancestry but their European ancestors likely migrated to Latin America much earlier than those who identify specific ancestors to have come from Europe. Therefore, in most cases, reporting Native ancestry only represents some admixture between indigenous and European ancestries and individuals classified into this group likely differ in their ethnic ancestry from those reporting European only ancestry. This measure of ethnic ancestry has been used in several previous studies (Wehby et al., 2011; Wehby and McCarthy, 2013, Nyarko et al., 2013).

We focused on the three most commonly reported ancestries reported in this sample including Native, European, and African, whenever they were reported alone or with other

ancestries. The numbers of children who only had other ancestries than these three were insufficient to be analyzed as separate categories and were therefore not included in the analytical sample. We only compared ancestral groups that had at least 100 infants in each group during the study period. The final ancestral categories included in outcome comparisons were any African ancestry (alone or with other ancestries), Native ancestry alone, Native with European ancestry, and European ancestry alone. However, the number of groups and the specific group comparisons varied between some countries depending on the ethnic ancestry composition of each country's sample.

Statistical Analysis

We first calculated the rates of LBW and PTB and means (and standard deviations) of birth weight and gestational age by ethnic ancestry. Next, a logistic regression was estimated to evaluate differences in LBW and PTB by ethnic ancestry controlling for time trends using dummy variables for birth year as follows:

$$\text{logit}(outcome)=\alpha+\sum bi\ Ancestryi+\sum di\ Yeari+e.$$

where *Ancestry* includes the ethnicity ancestry indicator(s), and *Year* is a vector of dummy variables for birth year. The standard errors were clustered at the birth hospital. Since the population distribution by ethnic ancestry varies geographically within the study countries with some ancestries having greater proportions in some areas than others, we did not include dummies for birth hospital as covariates in the above-described regression. Our goal is to estimate overall differences in the birth outcomes by ethnic ancestry, and including birth-hospital dummies results in estimation of partial disparities not explained through differences in geographic location by ethnicity. Previous work has shown that geographic variation in ethnic ancestry may explain an important fraction of the observed disparities in infant health by ancestry in countries like Brazil (Nyarko et al., 2013). We also estimated the above regression model for LBW and PTB using a log-binomial model and find a similar pattern of results to those of the logistic regression (details available upon request). In addition to the binary outcomes, we evaluated differences in means of continuous birth weight and gestational age and birth weight divided by gestational age by ethnic ancestry using OLS adjusting for time trends and within-hospital clustering.

Results

Table 1 reports the sample size and the distribution of child's ethnic ancestry for each country. Brazil had the highest rate of African ancestry (alone or admixed with other ancestries) at about 62%. The rate of Native ancestry alone was highest in Colombia at around 90%; the rate of having both Native and European ancestries was highest in Argentina at 34%. The rate of European ancestry alone was highest in Uruguay at 59%.

Table 2 reports the rate of LBW and the mean (and standard deviation) of birth weight in grams by ancestry for each country. Similarly, Table 3 reports the rate of PTB and the mean (and standard deviation) for gestational age in weeks by ancestry and country.

Next, we report in Table 4 the odds ratios and 95% confidence intervals (CI) for the ethnic ancestral groups from the logistic regression for LBW by country. Table 5 reports the results for the PTB regressions. The differences in means in birth weight, gestational age, and birth weight divided by gestational age from the OLS regressions adjusting for year of birth fixed effects are shown in Supplementary Table S1 online and summarized below.

All of the study countries had prominent disparities by ethnic ancestry in at least one of the outcome measures except for Chile which had no significant disparities. Brazil, Ecuador, Uruguay, and Venezuela had significant disparities by ancestry in LBW and PTB. In contrast, Argentina, Bolivia, and Colombia had significant disparities only in PTB but not in LBW. Interestingly, the direction of disparities were not consistent across all study countries, in that no single ancestry had the best or worst outcomes across countries, providing further support that these disparities are economic and social in nature. For example, infants who had European ancestry had the lowest rates of PTB and/or LBW in Argentina, Brazil, Ecuador, and Uruguay but not in Chile and Venezuela. Similarly, infants of Native ancestry alone had the highest rates of PTB in Argentina, Ecuador, and Uruguay compared to the other evaluated ancestral group(s) in these countries but the lowest in Bolivia, Colombia and Venezuela. Also, infants of African ancestry in Venezuela had a lower PTB rate than those of both European and Native ancestries, unlike in Brazil, where infants of African ancestry had significantly higher rates of LBW and PTB compared to those of European ancestry alone.

We summarize below the observed disparities for the seven countries with significant disparities (excluding Chile).

Argentina

There were no significant differences in LBW risk by ancestry in Argentina between the three evaluated ancestral groups: Native ancestry alone, Native with European ancestry, and European ancestry alone (the reference group in the outcome regressions). In contrast, PTB risk was significantly higher among infants of Native ancestry alone than those of European ancestry alone (OR=1.39; 95% CI: 1.09–1.79). However, no significant differences in means of BW, GA, and FGR in OLS regressions adjusting for time trends were observed (Table S1).

Bolivia

The difference in LBW risk was not significant between the two evaluated ancestral groups – Native ancestry alone and Native with European ancestry (the reference group in the outcome regressions) – in Bolivia. In contrast, PTB risk was slightly lower among those of Native ancestry alone compared to those of both Native and European ancestries (OR=0.87; 95% CI: 0.77–0.99). However, differences in BW, GA, and FGR were insignificant.

Brazil

Among the four evaluated ancestral groups in Brazil – Native ancestry alone, Native with European ancestry, African ancestry (alone or admixed with other ancestries), and European ancestry alone (the reference group in the outcome regressions) – infants of Native ancestry

alone had higher LBW risk compared to those of European ancestry alone (OR=1.45: 95% CI: 1.10–1.91) as did those of African ancestry (OR=1.69; 95% CI: 1.39–2.06). A small and insignificant difference in LBW risk was observed between those of European with Native ancestry and those of European ancestry alone. Similarly, infants of Native ancestry alone (OR=1.27; 95% CI: 0.96 –1.66, marginally significant) and those of African ancestry (OR= 1.34: 1.15–1.56) had higher PTB risk compared to those of European ancestry alone. However, infants of European with Native ancestry had no significant difference from those with European ancestry alone. In additional analyses, we separated the group of any African ancestry into three groups: African ancestry alone, African with Native ancestry, and African with European ancestry. These three groups had comparable differences in LBW and PTB rates from the group of European ancestry alone (details available upon request), consistent with previous research (Nyarko et al, 2013).

Infants of Native ancestry alone, European with Native ancestry, and African ancestry had lower means of BW and FGR compared to those of European ancestry alone, by up to 130 grams and 2.6 grams per week for African ancestry. In contrast, only infants of African ancestry had a significantly lower GA mean (by about 0.4 weeks) than those of European ancestry alone.

Colombia

There was no significant difference in LBW risk between the two evaluated ancestral groups –infants of African ancestry (alone or with other ancestries) and those of Native ancestry alone (the reference group in the outcome regressions) – in Colombia. However, LBW risk was nearly twice as high (marginally significant) among infants of African ancestry (OR=1.99; 95% CI: 0.93 – 4.27).

In the OLS regressions, infants of African ancestry had lower mean gestational age by about 0.8 weeks and lower FGR by about 2.6 grams per week. There was no significant difference in mean BW between the two ancestral groups.

Ecuador

In Ecuador, LBW risk was significantly higher among infants of Native with European ancestry than the reference group including those of European ancestry alone (OR=1.3: 95% CI: 1.06–1.59). However, there was no significant difference in LBW risk between those of Native ancestry alone and those of European ancestry alone. In contrast, PTB risk was significant higher in both infants of Native ancestry alone (OR=2.01; 95% CI: 1.16–3.51) and those of Native with European ancestry (OR-1.39; 95% CI: 0.96–2.02, marginally significant) compared to infants of European ancestry alone. None of the differences in means of BW, GA, and FGR were significant.

Uruguay

The risks of LBW (OR=1.78; 95% CI: 1.15–2.74) and PTB (OR=2.01; 95% CI: 1.16– 3.51) were nearly twice as high among infants of Native ancestry alone compared to the reference group including those of European ancestry alone, which were the only two groups evaluated in Uruguay. Similarly, the means of BW and FGR were also significantly lower in

the OLS regressions among infants of Native ancestry alone, by about 189 grams and 4 grams per week, respectively; the difference in mean gestational age was insignificant.

Venezuela

Among the three evaluated ancestral groups in Venezuela, infants with Native ancestry alone had a lower LBW risk (OR=0.53; 95% CI: 0.3–0.94) compared to the reference group including those of Native with European ancestry. A similar but insignificant difference was observed between those of African ancestry and those of Native with European ancestry. Also, both infants of Native ancestry alone (OR=0.44; 95% CI: 0.31–0.64) and those of African ancestry (OR=0.49; 95% CI: 0.34–0.68) had lower PTB risk compared to those of European with Native ancestry.

Similar results were observed in the OLS regressions for BW, GA, and FGR, with a higher BW mean by up to 142 grams and FGR mean by 2.7 grams per week among infants of African ancestry compared to those of Native with European ancestry. GA mean was higher by about 0.4 weeks among infants of Native ancestry alone compared to those of Native with European ancestry.

Discussion

In the first study to evaluate disparities in birth weight and gestational age by ethnic ancestry across eight South American countries using the same analytical models and recent and similarly collected large datasets across the study countries, we found significant disparities in seven countries. In four of the countries – Brazil, Ecuador, Uruguay, and Venezuela - we found significant disparities in both LBW and PTB. Disparities in PTB alone were observed in Argentina, Bolivia, and Colombia. Since LBW is a function of both GA and FGR, it is not surprising that not all disparities in PTB extend to LBW. When we directly evaluated FGR (BW/GA), we found significant differences in three (Brazil, Uruguay and Venezuela) of the four countries with disparities in both LBW and PTB (except Ecuador), indicating that disparities in both GA and FGR contributed to the disparities in LBW.

One aspect of our findings that is worth emphasizing is that there were no systematic patterns of disparities between the evaluated ancestral groups across the study countries, in that no ancestral group had consistently the best or worst outcomes across countries. This suggests that the observed disparities may be driven by social and economic mechanisms with noticeable variation between the included countries. This conclusion is consistent with previous work indicating that most of the disparities in LBW and PTB between infants of African and European ancestries in Brazil are explained by use of prenatal care, socioeconomic differences (e.g. maternal education), and differences in geographic location by ethnicity (Nyarko et al., 2013).

Investigating the mechanisms underlying the observed disparities in future studies is of major importance to identify pathways that are amenable to economic and health policy interventions in order to reduce and ultimately eliminate the observed disparities. Exploring how these disparities vary by demographic and socioeconomic indicators such as maternal age and education or by use of prenatal care in future research is important for

understanding interactions between these factors and ancestry and identifying groups that experience the largest disparities. This work may also help in understanding some of the observed country differences in disparities. One implication of our results is that researchers and policymakers should acknowledge the importance of ethnic disparities in South America and develop research and funding programs to understand and effectively target these disparities. A first order action item that can be easily implemented in the study countries to advance research on ethnic disparities is adding measures of ethnic ancestry to all national surveys of population health, especially those including children.

Our study has several strengths including large datasets collected across eight South American countries using the same approach and detailed measures of ethnic ancestry and birth outcomes for socioeconomically (Woodhouse et al., 2014) and ethnically diverse samples from multiple geographic areas (118 hospitals in 71 cities). In the absence of nationally representative datasets from the study countries with measures on ethnicity and infant health, the data source we employ provides an excellent alternative to explore ethnic differences in infant health in these countries. However, it is important to acknowledge that despite the geographic and socioeconomic diversity of our sample, it is still based on a selective sample of hospitals, and therefore, may not be fully representative of the infant population in each country. Given that ECLAMC hospitals serve diverse communities and that no criteria are used for selecting infants without birth defects into ECLAMC that would systematically bias their health and ancestry characteristics, the study sample is expected to represent a large proportion of infant populations in the study countries. Furthermore, since the vast majority of infants in the study countries are delivered at healthcare institutions, no major biases are expected from the lack of data on at-home births (Woodhouse et al., 2014). Nonetheless, the degree of representativeness certainly varies between countries since the number of cities where study hospitals are located varies dramatically between countries (ranging from 3 cities in Venezuela to 30 cities in Argentina). Therefore, employing nationally representative data (when they become available) in future studies is important to study disparities on a national scale. Another limitation is the lack of sufficient samples on all ethnic groups within each country. This is not due to a biased representation of ancestry in the study samples compared to country populations but rather due to the ancestry distributions in the study countries. Examining the health outcomes for unrepresented ethnicities in this study is important for future research.

We employ an innovative measure of ethnic ancestry in order to systematically capture as much as possible variation in ethnicity and ancestry both within and between countries. This measure is flexible which on the one hand, is needed for identifying large-enough groups for outcome comparisons both within and between countries, but on the other hand may be considered a weakness because both the ancestry definition and the period over which it is measured depend mainly on maternal knowledge of family history. Clearly, self-knowledge and report of family history may not always be accurate and could vary with socioeconomic status which indicates some potential error in measuring ancestry. Furthermore, this measure does not specifically capture the extent of indigenous ancestry and could reflect different degrees of ancestry from early European migrations and indigenous ancestries in the “Native” group as mentioned above, which could complicate country comparisons. For example, individuals reporting Native ancestry alone in Argentina likely have more

European and less Indigenous ancestry (at least on average) than those reporting Native ancestry alone in Bolivia or Ecuador. However, these are challenges for any comparison of ethnic variation between countries using other measures including census-based measures which in many cases are very specific to each country (for example, the census in Brazil asks about skin color). Exploring other measures of ancestry and their relationships to infant health outcomes in future work could be a useful endeavor.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Ethnic Ancestry Distribution in Samples of Children born in 2000–2011 in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela, and Uruguay

Country	N	Native only	Native + European	Any African	European only	Other Ancestry
		%	%	%	%	%
Argentina	11846	*47.39*	*34.23*	0.32	*14.59*	3.47
Bolivia	1690	*69.38*	*29.90*	0.42	0.18	0.12
Brazil	22121	*12.24*	*9.15*	*61.78*	*14.94*	1.89
Chile	12882	*71.88*	*23.80*	0.14	2.70	1.48
Colombia	3411	*90.11*	2.27	*4.35*	2.03	1.24
Ecuador	3230	*32.41*	*23.56*	3.28	*35.72*	5.03
Venezuela	4187	*45.43*	*31.12*	*22.79*	0.36	0.30
Uruguay	1113	*29.39*	4.91	4.00	*58.60*	3.10

Notes: The Table shows the percentage distribution of the sample from each country by ethnic ancestry (row percentages sum to 100%). The sample size (N) from each country is based on the number of children with complete data on birth weight. The cells of the ancestral groups being compared within each country are in bold italic.

Table 2

Distribution of Birth Weight (BW) and Low Birth Weight (LBW) by Ethnic Ancestry in Samples of Children born in 2000–2011 in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela, and Uruguay

Ancestry	Native Only		Native + European		Any African		European only	
Country	**Mean (SD) of BW**	**% LBW**	**Mean (SD) of BW**	**% LBW**	**Mean (SD) of BW**	**% LBW**	**Mean (SD) of BW**	**% LBW**
Argentina	3265.1 (560.1)	7.85	3252.1 (562.4)	8.87	-	-	3262.7 (564.7)	6.99
Bolivia	3236.3 (481.7)	4.88	3191.7 (468.2)	5.77	-	-	-	-
Brazil	3127.5 (604.1)	12.37	3157.2 (587.2)	10.41	3122.7 (582.7)	13.98	3208.0 (575.1)	8.90
Chile	3367.3 (553.2)	5.73	3392.0 (514.5)	4.49	-	-	-	-
Colombia	3003.3 (447.2)	17.11	-	-	2968.7 (554.4)	21.53	-	-
Ecuador	3073.7 (460.6)	9.16	3054.6 (471.2)	9.95	-	-	3063.7 (463.5)	9.19
Venezuela	3178.0 (465.4)	8.03	3046.1 (546.5)	14.27	3222.6 (480.9)	7.69	-	-
Uruguay	3152.3 (614.8)	10.84	-	-	-	-	3331.7 (530.1)	5.12

Notes: Sample sizes for groups are as defined in Table 1.

Table 3

Distribution of Gestational Age (GA) in Weeks and Preterm Birth (PTB) by Ethnic Ancestry in Samples of Children born in 2000–2011 in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela, and Uruguay

Country	N	Native Only		Native + European		Any African		European only	
		Mean (SD) of GA	% PTB	Mean (SD) of GA	% PTB	Mean (SD) of GA	% PTB	Mean (SD)	% PTB
Argentina	9655	38.8 (2.5)	11.09	38.9 (2.4)	10.38	-	-	39.0 (2.3)	8.21
Bolivia	1617	38.9 (2.6)	11.15	38.8 (2.6)	12.35	-	-	-	-
Brazil	18633	38.9 (3.0)	13.02	39.1 (2.8)	11.35	38.9 (2.7)	13.60	39.1 (2.8)	10.36
Chile	12246	39.0 (2.3)	6.99	39.1 (2.3)	7.38	-	-	-	-
Colombia	2747	38.3 (2.9)	15.79	-	-	37.3 (3.3)	27.59	-	-
Ecuador	2859	38.7 (2.5)	11.49	39.1 (2.2)	8.18	-	-	39.0 (2.0)	6.38
Venezuela	3575	38.8 (2.2)	8.47	38.5 (2.5)	14.66	38.3 (2.0)	11.46	-	-
Uruguay	884	39.1 (3.2)	9.12	-	-	-	-	39.5 (2.2)	4.98

Notes: N = Number of observations with complete data on gestational age for ancestry groups being compared.

Table 4

Odds Ratios (OR) and 95% Confidence Intervals (CI) for Differences in Low Birth Weight by Ethnic Ancestry in Samples of Children born in 2000–2011 in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela, and Uruguay

	Native only		Native + European		Any African		Reference Group
Country	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	
Argentina	1.16	0.88 – 1.52	1.30	0.82 – 2.06	--	--	European only
Bolivia	1.02	0.70 – 1.47	1.00	--	--	--	Native + European
Brazil	1.45 ***	1.10 – 1.91	1.17 *	0.97 – 1.42	1.69 ***	1.39 – 2.06	European only
Chile	1.24	0.82 – 1.87	1.00	--	--	--	Native + European
Colombia	1.00	--	--	--	1.14	0.75 – 1.73	Native only
Ecuador	1.11	0.92 – 1.32	1.32 ***	1.06 – 1.59	--	--	European only
Venezuela	0.53 ***	0.30 – 0.94	1.00	-	0.55 *	0.30 – 1.00	Native + European
Uruguay	1.78 ***	1.15 – 2.74	--	--	--	--	European only

Notes: OR are estimated from logistic regressions of low birth weight on the ancestry indicator(s) controlling for year of birth; separate regressions are estimated per country. The Reference Group is the omitted category in each country analysis, which had to vary between some countries depending on the ancestry composition of each country's sample and group sizes. Ancestry groups not included in analyses are noted by "--".

* *and* *** indicate $p < 0.1$ and $p < 0.01$, respectively.

Table 5

Odds Ratios (OR) and 95% Confidence Intervals (CI) for Differences in Preterm Birth by Ethnic Ancestry in Samples of Children born in 2000–2011 in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Venezuela, and Uruguay

	Native only		Native + European		Any African		Reference Group
Country	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	
Argentina	1.37 **	1.09 – 1.79	1.28	0.92 – 1.80	-	-	European only
Bolivia	0.87 **	0.77 – 0.99	1.00	-	-	-	Native + European
Brazil	1.27 *	0.96 – 1.66	1.08	0.91 – 1.28	1.34 ***	1.15 – 1.56	European only
Chile	0.97	0.79 – 1.19	1.00	-	-	-	Native + European
Colombia	1.00	-	-	-	1.77 ***	1.38 – 2.27	Native only
Ecuador	2.01 **	1.16 – 3.51	1.39 *	0.96 – 2.02	-	-	European only
Venezuela	0.44 ***	0.31 – 0.64	1.00	-	0.49 ***	0.34 –0.68	Native + European
Uruguay	1.49 *	0.92 – 2.43	-	-	-	-	European only

Notes: OR are estimated from logistic regressions of preterm birth on the ancestry indicator(s) controlling for year of birth; separate regressions are estimated per country. The Reference Group is the omitted category in each country analysis, which had to vary between some countries depending on the ancestry composition of each country's sample and group sizes. Ancestry groups not included in analyses are noted by "--".

*, **, *and* *** indicate p <0.1, p<0.05, and p <0.01, respectively.