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Secular trends in low birth weight and preterm birth disparity between infants born to teenage and adult mothers: An exploratory analysis

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ABSTRACT

Introduction. Increased risk of preterm birth and low birthweight for infants born to teenage mothers (15-19), when compared to infants born to adult mothers (20-29), is well documented in the United States. Trends in preterm birth and low birthweight are also well documented over time. Examination of the difference in incidence of preterm birth or low birthweight between infants born to teenage mothers and to adult mothers over time is not present in the literature. This study aimed to fill this gap in the literature and determine how preterm birth and low birthweight differences have changed over time.

Methods. Natality datasets originated from the National Center for Health Statistics. Seventeen years of data were combined into one dataset of summary statistics for each variable for each year. The samples for each year were restricted to singleton first births. Graphical analysis and simple and multiple linear regression analyses were performed.

Results. The gap in incidence between infants born to teenage mothers and infants born to adult mothers for both preterm birth and low birthweight decreased over time by an estimated 0.06% and 0.03% per year, respectively. Incidence difference and trends over time differed by race and marital status in graphical analyses. Year was a significant predictor for both preterm birth difference and low birthweight difference in simple linear regression models. Year remained significant in the preterm birth multiple linear regression model, but not in the low birthweight model.

Discussion. The gap in incidence of birth outcomes between infants born to teenage and to adult mothers has closed over time. Similar incidence of preterm birth or low birthweight between different race or marital status strata of mothers indicates that there were more important factors than maternal age that influenced preterm birth or low birthweight. The groups with the highest risk for preterm birth or low birthweight have experienced decreasing incidence over time.

Keywords: teenage births, preterm birth, low birthweight

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INTRODUCTION

Preterm birth and low birthweight are two of the most common adverse birth outcomes.[1] In 2020, 10.2% of all births were preterm in the United States[2] while in 2019, 8.3% of births were of low birthweight. [3] Preterm birth and low birthweight are important to study because of their prevalence and both immediate and long-term effects after birth.[4,5] The consequences of preterm birth in the days following birth include respiratory difficulty, feeding difficulties, and cerebral palsy.[4] Health issues caused by low birthweight immediately following birth include breathing problems, jaundice, and infections.[5] The long term effects that can result from preterm birth include behavioral problems, mental health conditions, asthma, and problems with hearing and vision.[6] Babies born at a low birthweight are at higher risk for chronic diseases later in life like obesity, heart disease, hypertension, and diabetes.[5]

While there are several factors that may predict preterm and low birthweight infants, maternal age is an important factor to consider when examining these outcomes. A U-shaped curve best represents differences in preterm birth and low birthweight incidence among maternal ages; the highest incidence of preterm birth and low birthweight is in babies born to mothers under 20 and over 40.[7,8] Teenage mothers' increased risk of delivering a baby preterm [9–11] or of low birthweight [9–12] is well documented in the literature in the United States and elsewhere. These previous studies have cited biological immaturity, minimal weight gain during pregnancy, and use of psychoactive drugs as biological factors tied to increased risk of adverse birth outcomes for infants born to teenage mothers. [10] However, Smajdor states that mothers under the age of 20 and their children do have worse health outcomes, but not necessarily for biological reasons.[13] Mothers under the age of 20 typically are of lower socioeconomic status and have a lower education level than mothers over the age of 20, which likely contributes to poorer health outcomes.[13] Race also seems to modify the effect of maternal age on adverse birth outcomes: in a previous study by Reichman and Pagnini, when compared with the 25-29 maternal age group, black women between the ages of 15 and 19 had significantly lower odds of delivering a baby of low birthweight when adjusting for medical and socioeconomic factors.[12] This finding suggests that factors other than maternal age are stronger determinants of low birthweight. This pattern was not found for white women in that study.[12] Other studies have found a significant difference in birth outcomes of babies born to teen and adult mothers even when removing the effect of socioeconomic factors in analysis. [10,11]

While previous literature has documented increased risk of adverse birth outcomes for infants born to teenage mothers, these studies have not examined how this disparity between infants born to teenage and to adult mothers changes over time. Additionally, a notable decrease in the proportion of births to teenage mothers over the time frames of data collection[14] has not been considered in these analyses. Changes in the incidence of preterm birth and low birthweight over time are well documented in several studies, [12,15–19] but only one of these analyses was stratified by maternal age. A study by Yang, Greenland, and Flanders acknowledged that changes in maternal age-specific low birthweight proportions had an impact on overall low birthweight trends between 1980 and 2000. [20] This study was designed to examine how the difference in birth outcomes between infants born to teenage mothers and infants born to adult mothers changed over time and address these gaps in the literature. This study also aims to determine the effect of time on these differences in birth outcomes while considering other covariates.

METHODS

Dataset and Study Design

Data used for analyses originated from natality birth data sets available for public use from the National Center for Health Statistics on the National Bureau of Economic Research's website.[21] The birth data sets include live births in all 50 states of the United States and the District of Columbia. Descriptive analyses used data from 1968, 1973, 1978, 1983, 1988, 1993, 1998, 2003, 2008, 2013, and 2018. Data from 1990, 1995, 2000, 2005, 2010, and 2015 were later added to provide more observations for regression analyses. The 1968 dataset consists of a 50% sample of all live birth certificates from all 50 states. [22] Between 1973 and 1983, some states use a 100% sample while others use a 50% sample of all live birth certificates. [22] For 1988 and later, 100% of live birth certificates are included in the data set. [22]

The samples used in analyses were restricted to birth certificates for singleton pregnancies and where the mother was primiparous. Birth certificates for infants who were multiples (twins, triplets, etc.) and for infants who were second in the birth order or higher were excluded because multiple pregnancies and non-primiparous pregnancies potentially increase risk of preterm birth and low birthweight. [23] Analyses were restricted to two age groups: teenage mothers (15-19) and adult mothers (20-29). Birth certificates of infants whose mothers were less than 15 years old or older than 29 years old were not used in analyses because the risks for low birthweight and preterm birth are generally higher than mothers between the ages of 15 and 29 for different reasons than the 15-29 age group. [24,25]

Sample sizes for each year of analyses are included in Table 1. To achieve a final analytic dataset, proportions of mothers who met each variable's criteria were tabulated for each year. A total of 17 years were used in analysis, so the final dataset had a total of 17 observations. Missing observations for each variable were excluded from analysis.

Approval from an institutional review board for these analyses was not required because the data were de-identified and available for public use.

Measures

Year was the main independent variable of interest. Years were analyzed in the format (YYYY).

The preterm birth variable was derived from gestational age, which is reported in weeks on the birth certificate. A preterm birth is defined as an infant who is born before the 37th week of gestation.[26] This definition was used to create a dichotomous yes/no preterm birth variable: infants born at or after the 37th week of gestation were not preterm and infants born before the 37th week of gestation were preterm. In the final dataset, the proportion of all teenage and all adult mothers in the sample who delivered a preterm infant were listed as separate variables for each year.

The low birthweight variable was derived from birthweight, which is reported in grams on the birth certificate. Low birthweight is defined as a birthweight of less than 2,500 grams.[27] This definition was used to create a dichotomous (yes/no) low birthweight variable: infants born with a birthweight of 2500 grams or greater did not have low birthweight and infants born with a birthweight less than 2500 grams had low birthweight. In the final dataset, the proportion of all teenage and all adult mothers in the sample who delivered an infant with low birthweight were listed as separate variables for each year.

To calculate the difference in the proportion of infants born preterm or of low birthweight between infants born to teenage and to adult mothers, the adult preterm birth/low birthweight proportion was subtracted from the teenage mother preterm birth proportion. Difference variables were also calculated for all other variables except birth proportions to teenage mothers and adult mothers.

To capture the decrease in proportion of all births to teenage mothers, variables were created to indicate the proportion of all births to the two age groups (15-19, 20-29) with three different criteria for each year. All exclusions were made and the sample was final before creating the birth proportions within the sample variable. The proportion of the sample that consisted of births to teens was recorded for each year and stored as a variable. The proportion of births to adults was the reciprocal of births to teens and was stored as a different variable. Using the raw dataset downloaded from the NBER website, the proportion of all births that were to teens and to adults were recorded for each year and stored as two variables. The sample was not restricted on age, plurality, or order of birth to make the unrestricted birth proportions variables. After excluding multiple and non-first births from the raw dataset downloaded from the NBER website, the proportion of all births to teens and to adults were recorded for each year and stored as two restricted birth proportion variables.

In the 1968 and 1973 birth certificates, infant "legitimacy" was used as a proxy for maternal marital status, as marital status was not on the birth certificate during those years. "Legitimate" infants were coded as the mother being married; "illegitimate" infants were coded as the mother being unmarried at the time of birth. Starting in the 1978 data year, marital status was available for analysis; the married and unmarried options of that variable were used for analysis. In the final data set, proportion of teens who were married and proportion of adults who were married were stored as two separate variables.

Because maternal ethnicity was not available for all years, two versions of a maternal race variable were used: a maternal race only variable and a combined maternal race and ethnicity variable. The race only categories used were white, black, and other race. Other race includes mothers of races other than white or black and mothers of multiple races. The race and ethnicity categories used for analysis were white and non-Hispanic, black and non-Hispanic, other race and non-Hispanic, and Hispanic. Other race includes mothers of multiple races and mothers whose race was not white or black. Variables were stored as the proportion of teen and adult mothers of each race/ethnicity category.

Three levels of maternal education were used for analysis: less than high school, high school graduate, and greater than high school. On the birth certificate, maternal education is coded by number of years of school completed at the time of delivery. For this analysis, less than 12 years was classified as less than high school, 12 years was classified as high school graduate, and greater than 12 years was classified as greater than high school. Variables were stored as the proportions of teens or adults who had an education level consistent with each category each year.

Diabetes, chronic hypertension, gestational hypertension, and eclampsia are all medical risk factors for preterm birth, low birthweight, or both. The factor is classified as reported, not reported, not on the certificate, or not classifiable on the birth certificate. Only the reported classifications were used for analysis. The proportion of mothers who had each of these risk factors was calculated for both age groups and stored as an observation for each year of analysis.

Tobacco use during pregnancy is coded on the birth certificate as yes, no, or unknown/not stated. Only the yes responses were used for analysis. Proportion of teens and adults who used tobacco during pregnancy were stored as observations for each year.

The weight gain variable becomes available on the birth certificate in 1990. Between 1990 and 2008, weight gain in only reported in number of pounds gained during pregnancy. Starting in the 2013 dataset, pre-pregnancy BMI is available in addition to number of pounds gained during pregnancy. Additionally, weight gain recommendations changed in 2012, before the 2013 data year. Up until 2012, the ACOG had not endorsed a BMI-specific weight gain recommendation [28] and the general recommendation for weight gain during pregnancy was 20-25 pounds. [29] Starting in 2013, the ACOG's recommendation for weight gain varied by pre-pregnancy BMI. [28] To account for this change in recommendation, for each year of analysis, the proportion of mothers who gained an appropriate amount of weight based on the recommendations in that year was recorded. The proportion of mothers who gained an insufficient amount of weight based on the recommendations in that year was also recorded for every year of analysis.

Between 1990 and 2008, before the recommendation change, if mothers gained between 20 and 25 pounds during pregnancy, they were coded as appropriate weight gain. Mothers who gained less than 20 pounds were coded as insufficient weight gain. For the 2013, 2015, and 2018 data years, the less than appropriate and appropriate weight gain categories were classified by pre-pregnancy BMI and weight gain during pregnancy.

For all but one year of analysis (1968), the month of gestation that prenatal care started is available on the birth certificate. Mothers were classified as initiating prenatal care in the first trimester (months 1-3), second trimester (months 4-6), third trimester (months 7-9), never, or unknown. First trimester initiation and no prenatal care were used in analysis. The proportion of mothers who initiated prenatal care in the first trimester and the proportion of mothers who did not receive prenatal care at any point in their pregnancy was calculated separately for teens and adults and stored as separate variables.

Prenatal care adequacy was determined by a ratio comparing actual number of prenatal care visits recorded on the birth certificate to expected number of prenatal care visits based on length of gestation as recommended by the American College of Obstetricians and Gynecologists. [30] If the ratio of actual number of visits to expected number of visits was less than .8, prenatal care was deemed inadequate in terms of quantity of visits. If the ratio was equal to or greater than .8, prenatal care was deemed adequate.

Graphical Representations

The proportion of mothers who delivered a preterm or low birthweight infant was plotted for every 5th year between 1973 and 2018 or 1968 and 2018, respectively, by age group to show the difference in proportions between teen and adult mothers and trends over time. This analysis was then stratified by maternal race, maternal marital status, and then maternal race and marital status together.

Model Analysis

Simple linear regression analyses were performed for all data years and then again for the 1990-2018 data years. Difference in preterm birth proportions between teens and adults and difference in low birthweight proportions between teens and adults were the dependent variables in separate analyses. Year was the sole independent variable in all simple linear regression analyses.

To determine if variables in addition to year had an effect on low birthweight difference or preterm birth difference, all independent variables were included in a multiple linear regression selection model. The 1968 data year was dropped from the preterm birth analysis due to change in gestational estimate technology, specifically ultrasound technology, between 1968 and 1973. [31] Variables were entered into the model in order of hypothesized theoretical significance: proportion of all births to teens (3 different variables), difference variables, teen variables, and then adult variables. Using forward selection, only variables with p-values below 0.05 were added to the model. Year was forced into each model, regardless of its significance. After models were selected, multiple linear regression models were performed to determine the effect of year on low birthweight or preterm birth difference when adjusting for other variables which were also significant based on the selection models.

Microsoft Excel was used to create all graphs. SAS and Excel were used to create the final analytic dataset. SAS was used to run all statistical analyses.

RESULTS

The number of births to teenage mothers ranged from 388,275 in 1990 to 150,222 in 2018, while the number of births to adult mothers ranged from 390,151 in 1968 to 971,076 in 1990 (see Table 1).

<u>Low birthweight</u>

Between 1968 and 2018, teenage mothers experienced a higher proportion of births that were of low birthweight than adult mothers (see Figure 1a). The difference in low birthweight proportions between teenage mothers and adult mothers decreased over time. Year was a significant predictor of low birthweight difference (see Table 2). For every year that passed, the difference in low birthweight incidence between infants born to teenage and to adult mothers decreased by an estimated 0.03%.

Black mothers had the highest incidence of low birthweight among all of the races regardless of age group. Black teenage mothers and black adult mothers had similar incidence of infants with low birthweight, especially in later years (see Figure 1b). Over time, black teenage mothers had the highest incidence of infants with low birthweight while white adult mothers had the lowest incidence of infants with low birthweight. In 1968 and 2013, teenage mothers of a race other than white or black had a lower incidence of infants with low birthweight than adult mothers of race other than white or black.

Unmarried mothers had a higher incidence of infants with low birthweight than married mothers (see Figure 1c). Incidence of low birthweight for unmarried teenage and unmarried adult mothers was similar and decreased over time.

When stratifying by race, marital status, and age group, black unmarried teenage mothers and black unmarried adult mothers had the highest incidence of low birthweight out of all groups (see Figure 1d). White married adult mothers had the lowest incidence of low birthweight and less than half of the incidence of the highest risk groups. Although order of incidence by age group and marital status may have changed within each race group over time, for most years, unmarried teenage mothers had the highest incidence of low birthweight followed by unmarried adult mothers, married teenage mothers, and married adult mothers.

For both sets of data years (1968-2018 and 1990-2018), year was a significant predictor of low-birth-weight incidence difference between infants born to teenage mothers and infants born to adult mothers. For each set of data years, for every year that passed, low birthweight incidence difference decreased by 0.03%. When adjusting for other factors which were significant predictors of low birthweight difference as determined by the selection model, year did not remain a significant predictor of low birthweight difference (see Table 2).

Preterm Birth

Teenage mothers had a higher incidence of infants born preterm than adult mothers over time (see Figure 2a). The preterm birth incidence difference between infants born to teenage mothers and infants born to adult mothers decreased over time. Year is a significant predictor of preterm birth difference for 1973-2018 data years. For every year that passed, preterm birth difference decreased by 0.06% (SE: 0.01%) (see Table 3).

Black teenage mothers had the highest incidence of preterm infants, while white adults and adults of race other than white or black had the lowest incidence of preterm infants (see Figure 2b). Teenage mothers of other race had similar incidence of preterm infants as black adults. White teenage mothers had lower incidence of preterm infants than black adult mothers. The groups with the highest incidence initially had decreasing incidence of preterm infants over time, while groups with the lowest incidence initially had slightly increasing incidence of preterm infants over time.

Unmarried mothers had a higher incidence of preterm birth infants than married mothers regardless of age (see Figure 2c). Preterm birth incidence among infants born to unmarried mothers decreased over time but stayed about the same or increased slightly over time among married mothers.

When stratifying by age group, race, and marital status, black unmarried teenage mothers had the highest incidence of preterm infants and white and other married adult mothers had the lowest incidence of preterm infants (see Figure 2d). The marital status group of highest risk among white mothers, unmarried teen mothers, had similar incidence of preterm infants as black married adult mothers. A decrease in preterm infant incidence happened over time for the groups with highest incidence initially, while the groups with lowest incidence initially had little change or slight increase in incidence over time.

Year was a significant predictor of preterm birth incidence difference for both sets of data years. As one year passed, preterm birth incidence difference decreased by 0.06% and 0.04% for the 1973-2018 and 1990-2018 data years, respectively. When adjusting for the proportion of teens who were married, difference in proportion of teenage mothers who were black and non-Hispanic and proportion of adult mothers who were black and non-Hispanic, difference in proportion of teenage mothers who initiated prenatal care in the first trimester and proportion of adult mothers who initiated prenatal care in the first trimester, and difference in proportion of teenage mothers who received adequate prenatal care and proportion of adult mothers who received prenatal care, year was still a significant predictor of preterm birth difference. In the multivariate linear regression model, for every year that passed, preterm birth difference increased by 0.07% (SE: 0.01%). Effect estimates for other variables in the multivariate linear regression model are displayed in Table 3.

DISCUSSION

Between 1968 and 2018, difference in low birthweight incidence between infants born to teenage and to adult mothers decreased over time by an estimated 0.03% per year. Between 1973 and 2018, difference in preterm birth incidence between infants born to teenage and to adult mothers decreases over time by an estimated 0.06% per year. When stratifying by race, marital status, or both, the difference in birth outcomes between infants born to teenage mothers and to adult mothers exhibits a different temporal pattern. Year remained a significant predictor of the difference in preterm birth between infants born to teenage and to adult mothers, but not for low birthweight difference, when adjusting for significant covariates. For both outcomes, the decrease in incidence difference over time seems to be driven by increase in incidence of the outcome for adult mothers rather than changes in teenage mothers' incidence. Stratification by race and age group for low birthweight incidence showed the disparity between black mothers and white and other race mothers regardless of age group. There are some years where low birthweight incidence rates are very similar for infants born to teenage mothers and infants born to adult mothers for black mothers and for mothers of other race. This suggests that there is another factor other than age group that influences low birthweight incidence for black mothers, as Reichman and Pagnini suggested[12], and mothers of other race. The incidence difference for preterm birth between infants born to teenage and to adult mothers is consistent when stratifying by maternal race.

Incidence of low birthweight is very similar between unmarried teenage and unmarried adult mothers, and incidence declines over time for both groups. This finding suggests that maternal marital status is a more important determinant of low birthweight than age group. Unmarried mothers also had higher incidence of preterm birth than married mothers, although there was still a disparity between teen and adult mothers in the unmarried strata. It is interesting to note that when considering age, race, and marital status at the same time, for preterm birth incidence, the highest risk group of one race has the same preterm birth incidence of the lowest risk group of another race. For low birthweight incidence, the highest risk group of white mothers, unmarried teens, has lower incidence than the lowest risk group of black mothers, married adults.

The literature has demonstrated that overall, teenage mothers are at an increased risk for delivering preterm or delivering a baby of low birthweight. [9–12] This finding is somewhat confirmed by our analysis: when only examining low birthweight incidence or preterm birth incidence by age group, teens do have a higher incidence of infants with both low birthweight or preterm. However, there are some years in which teenage mothers and adult mothers have nearly identical incidence rates of either infant low birthweight or preterm birth when stratifying by race, marital status, or both. These findings suggest that other factors like race, marital status, and other factors not considered in this analysis are more important determinants of low birthweight and preterm birth than age group status.

Low birthweight incidence in this analysis, even when stratifying by age group, follows the patterns that previous literature[19] has reported. However, preterm birth incidence in this analysis does not follow the same trends previously found over time. According to previous literature, preterm birth incidence increased between 1981 and 2006 and remained constant between 2006 and 2014[15,16] Preterm birth incidence for infants born to teenage mothers declined between 1981 and 2006; incidence of preterm birth for infants to adult mothers did increase during this time. Additionally, singleton preterm birth incidence differed between black and white mothers[18], which is what was found in our study.

A strength of this study is the examination of the incidence difference between infants born to teenage mothers and infants born to adult mothers over time. Previous literature has not shown the trends of this gap over time. Stratification of this difference in incidence analysis over time also shows where improvements have been made and which factors other than age alone are related to incidence. Limitations of this study include variable availability and variable expression. Because many variables did not become available until later data years, they could not be used in analysis of all years. Even between the 1990 and 2018 data years, there were several variables which were only available for less than 4 years and could not be used.

Population size of city or county of residence, STIs, alcohol use, and paternity acknowledgement were variables that were available for some years, but not all years, and therefore were not included in analysis. Due to the combination of summary statistics from each data year into one dataset, there were limitations with variable expression that affected analysis, especially with creating difference variables for the maternal race/ethnicity and maternal education variables. Obstetric recommendations or practices changed over time,[28] which likely influenced the effects the weight gain, prenatal care initiation, and no prenatal care variables had on preterm birth or low birthweight difference. Additionally, because every 5th data year was analyzed, subtle changes in incidence from year to year were not displayed, but the graphs do show general trends over time.

In conclusion, year is a significant predictor of low birthweight incidence difference and preterm birth incidence difference. Low birthweight incidence difference and preterm birth incidence difference decrease an estimated 0.03% and 0.06% each year, respectively. Year remains significant after controlling for other variables for preterm birth incidence difference but not for low birthweight incidence difference. Low birthweight and preterm birth incidence have different patterns over time when stratifying by age group, race, and marital status. This study fills a gap in the literature as other studies have not examined the disparity in birth outcomes between infants born to teenage mothers and infants born to adult mothers. The findings of this analysis provide context to low birthweight and preterm birth incidence over time by age group and other factors and build on other findings which suggest that factors other than age may be more determinant of low birthweight or preterm birth than age.

Table 1. Sample sizes and covariates available for analysis for each year

Year		Sample Size	Legitimacy/paternity acknowledgement[1]	Maternal Education	Month PNC began	# PNC Visits	Marital status	Maternal Ethnicity	Alcohol use	STIs, including herpes	Chronic Hypertension, Gestational Hypertension, or Eclampsia	Tobacco Use	Maternal Diabetes (chronic or gestational)	Maternal weight gain	Pre-pregnancy BMI	Source of Payment
1968	15-19	225,919	X													
	20-29	390,151														
1973	15-19	264,094	X	X	X	X										
	20-29	418,551														
1978	15-19	359,926		X	X	X	X	X								
	20-29	739,237														
1983	15-19	345,786		X	X	X	X	X								
	20-29	875,638														
1988	15-19	361,838		X	X	X	X	X								
	20-29	943,999														
1990	15-19	388,275		X	X	X	X	X	X	X	X	X	X	X		
	20-29	971,076														
1993	15-19	377,157		X	X	X	X	X	X	X	X	X	X	X		
	20-29	889,733														
1995	15-19	387,074		X	X	X	X	X	X	X	X	X	X	X		
	20-29	851,672														
1998	15-19	372,625		X	X	X	X	X	X	X	X	X	X	X		
	20-29	821,654														
2000	15-19	364,004		X	X	X	X	X	X	X	X	X	X	X		
	20-29	848,979														
2003	15-19	327,982		X	X	X	X	X	X	X	X	X	X	X		
	20-29	864,994														
2005	15-19	329,200		X	X	X	X	X	X	X	X	X	X	X		
	20-29	884,114														
2008	15-19	346,821		X	X	X	X	X			X	X	X	X		
	20-29	930,732														
2010	15-19	295,999		X	X	X	X	X			X	X	X	X		
	20-29	880,068														
2013	15-19	223,850	X	X	X	X	X	X			X	X	X	X	X	X
	20-29	861,148														
2015	15-19	189,197	X	X	X	X	X	X		X	X	X	X	X	X	X
	20-29	847,995														
2018	15-19	150,222	X	X	X	X	X	X		X	X	X	X	X	X	X
	20-29	782,817														

Table 2. Results of Low Birthweight Difference Simple and Multiple Linear Regression Models

	1968-2018	**1990-2018**	**1990-2018**
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Intercept	.5471 (.0445)	.6827 (.0811)	-.1915 (.3169)
Year	-.0003 (.0000)*	-.0003 (.0000)*	.0001 (.0002)
Δ Hispanic**			-.1463 (.0330)*
Δ Gestational hypertension**			-.5549 (.1791)*
Δ Appropriate Weight Gain**			.1107 (.0467)*
R^2	.9029	.8698	.9927
Number of observations	17	12	12

*significant at .05 level
**difference between teen and adult proportions

Table 3. Results of Preterm Birth Difference Simple and Multiple Linear Regression Models

	1973-2018	**1990-2018**	**1990-2018**
Intercept	1.3215 (.1557)	.7694 (.1839)	-1.4855 (.1797)
Year	-.0006 (.0001)*	-.0004 (.0001)*	.0007 (.0001)*
Proportion of teens who were married			.0822 (.0089)*
Δ Non-Hispanic Black**			.1064 (.0161)*
Δ First Trimester Prenatal Care Initiation**			-.0548 (.0060)*
Δ Adequate Prenatal Care**			-.0321 (.0122)*
R^2	.6348	.6168	.9987
Number of observations	17	12	12

*significant at .05 level
**difference between teen and adult proportions

Figure 1a. Low birthweight incidence by age group

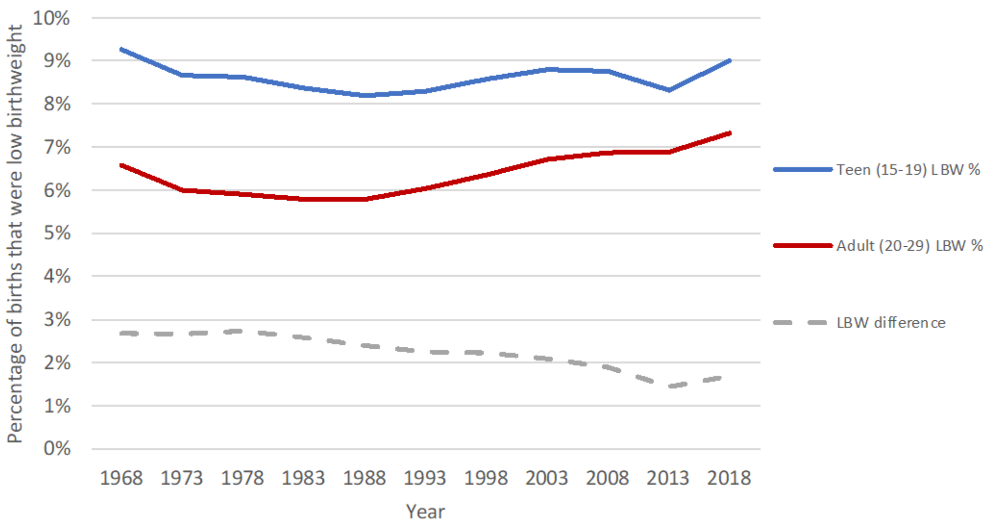


Figure 1b. Low birthweight incidence by age group and race

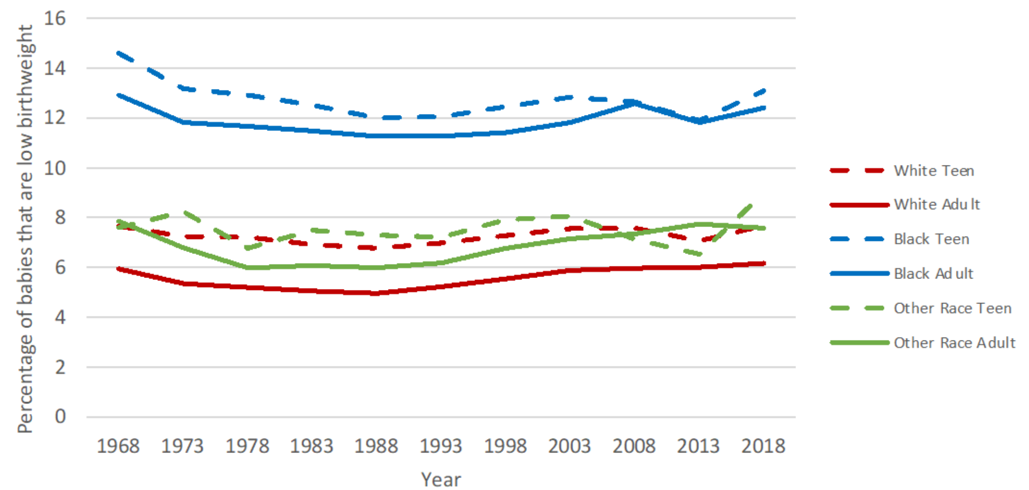


Figure 1c. Low birthweight incidence by age group and marital status

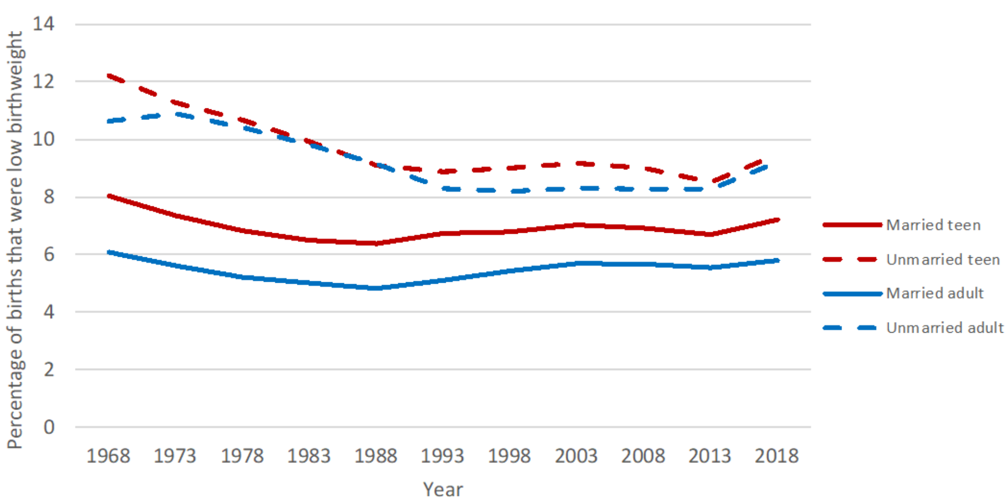


Figure 1d. Low birthweight incidence by age group, race, and marital status

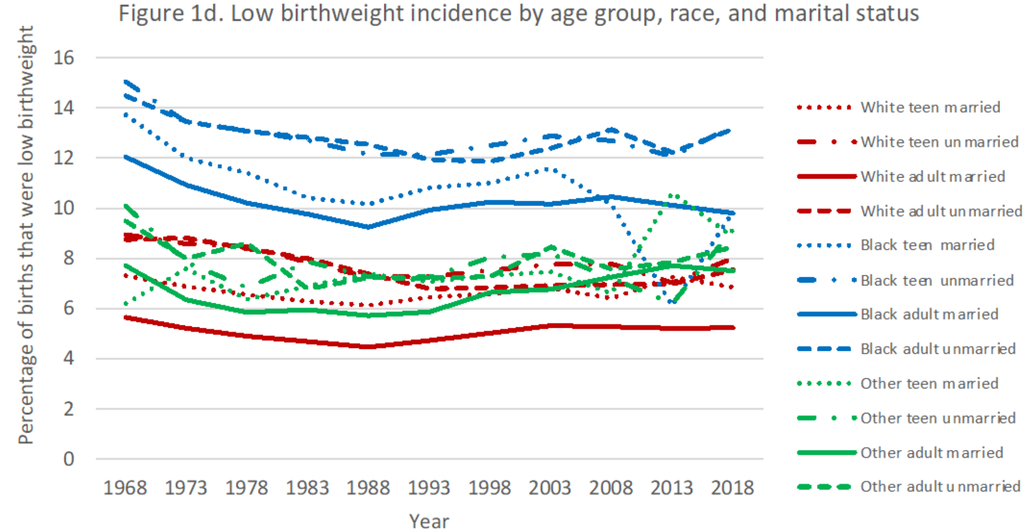


Figure 2a. Preterm birth incidence by age group

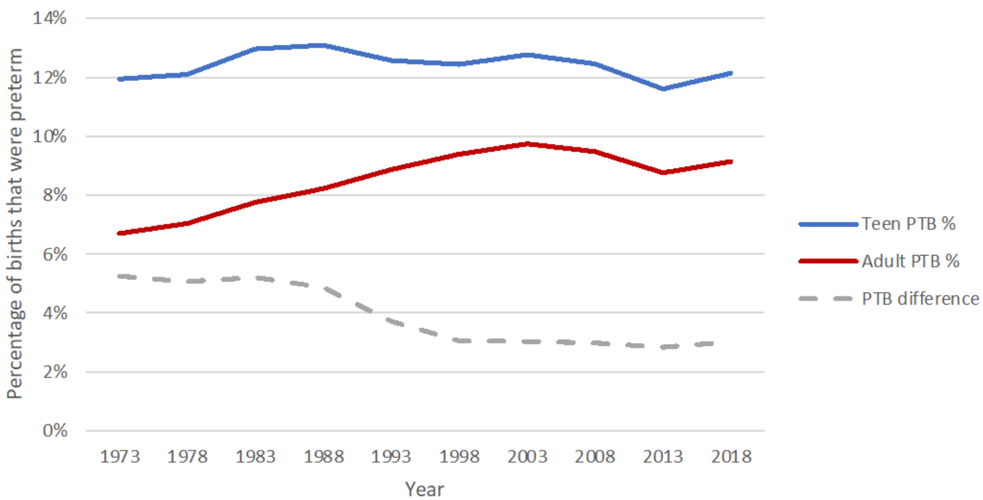


Figure 2b. Preterm birth incidence by age group and race

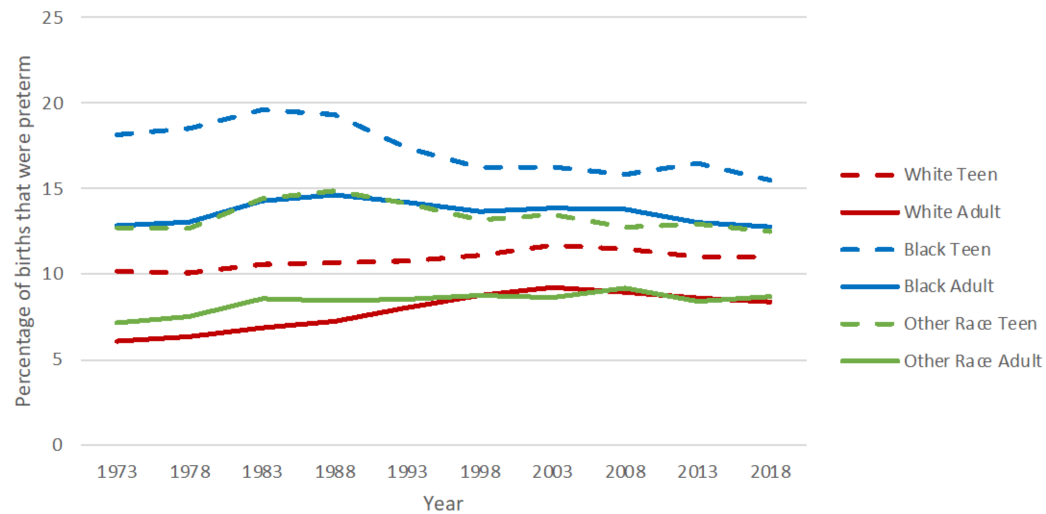


Figure 2c. Preterm birth incidence by age group and marital status

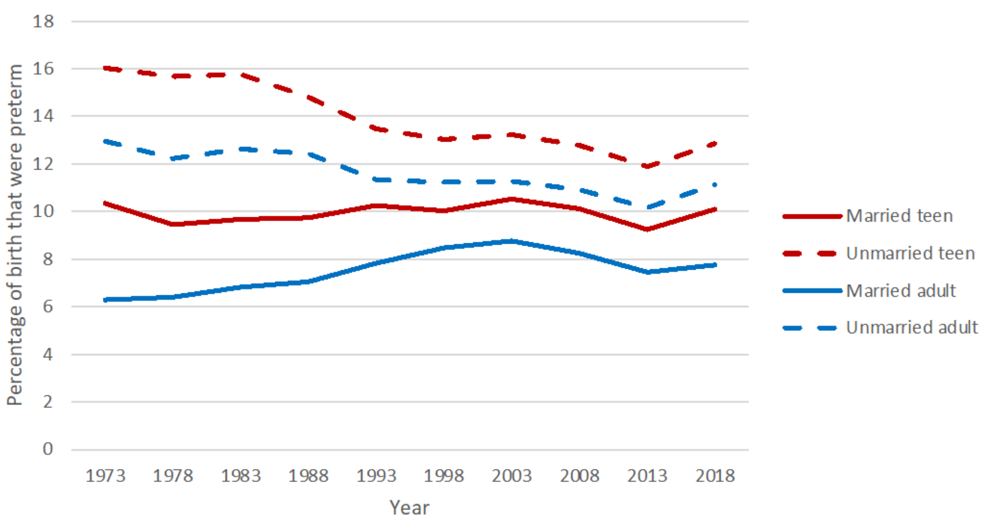
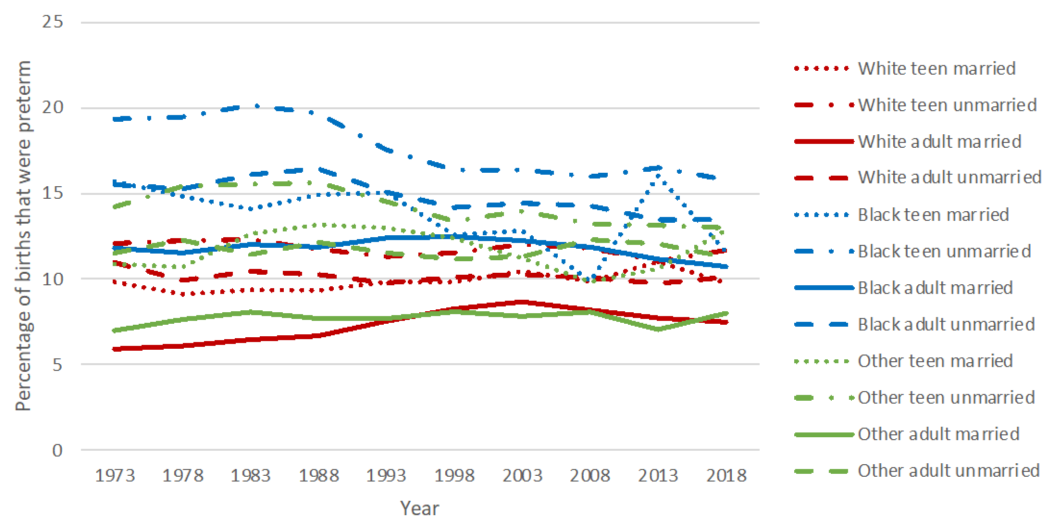


Figure 2d. Preterm birth incidence by age group, race, and marital status



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Vita

I was born and raised in Sanford, Michigan and attended the University of Kentucky for my Bachelor of Public Health degree. I graduated with my Bachelor of Public Health degree Summa Cum Laude. I recently held a COVID-19 Disease Investigator position in Jessamine County, Kentucky and I have worked as a library student worker and research assistant at the University of Kentucky.