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# Description of Race and Preterm Birth in Six Ohio Counties from 2013-2018

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Description of Race and Preterm Birth in Six Ohio Counties from 2013-2018

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## Table of Contents

Abstract.....	4
Introduction.....	5
Literature Review.....	7
Methods.....	11
Results.....	12
Discussion.....	30
Conclusion .....	33
References.....	34
Appendices.....	37
Appendix A: Human Subjects Regulations Decision Chart .....	37
Appendix B: List of Competencies Met in Integrative Learning Experience .....	38

### Abstract

**Objective:** The purpose of this research was to describe preterm birth rates, and the risk of preterm birth among maternal race groups in Ohio, Cuyahoga County, Franklin County, Hamilton County, Lucas County, Montgomery County, and Summit County from 2013 to 2018. For the purpose of this study, preterm birth was defined as the live birth of a baby with a period of gestation less than 37 weeks. The maternal race groups were African American, White, and Other.

**Methods:** A descriptive analysis of retrospective data was conducted on 798,957 live births in Ohio over six years. The data was further divided by county and stratified by preterm birth and maternal race. Relative risks with 95% confidence intervals were calculated to determine the risk of preterm birth for each maternal race group.

**Results:** Preterm birth rates in each county in Ohio remain relatively unchanged overtime. Preterm birth has consistently been at increased risk for African-American mothers in each county. Risk for preterm birth is inconclusive for mothers in the ‘other’ race category.

**Conclusion:** Future interventions ought to target preterm birth in African-American mothers specifically to decrease preterm birth rates. If preterm birth is not addressed directly, rates will continue to remain unchanged.

*Keywords:* infant mortality, prematurity, health outcomes, population health, disparities

### Description of Race and Preterm Birth in Six Ohio Counties

Preterm birth is a public health problem in Ohio. The National Institute of Child Health and Human Development (2018) acknowledges that a ‘full term’ pregnancy should be 39 weeks; however, this paper will define preterm birth as birth before 37 weeks gestation in order to be consistent with existing literature. Specifically, preterm birth is a problem in Ohio’s most populated cities, where extreme racial disparities exist. March of Dimes reported that in 2017, the preterm birth rate among Black women in Ohio is 47% higher than the rate among all other women in Ohio (March of Dimes, 2018). Ohio is ranked sixth worst in the nation overall for poor birth outcomes (City of Columbus, 2017).

It is important to distinguish that preterm birth is not infant mortality; infant mortality is the death of an infant before his or her first birthday (Centers for Disease Control and Prevention, 2017), while preterm birth is a major factor that influences the infant mortality rate. Though preterm birth drives infant mortality, it also influences other health outcomes as even those babies who survive face ongoing challenges and complications that impact the community. Babies born prematurely have higher risk for poor health outcomes such as cerebral palsy, breathing and respiratory problems, vision problems, and digestive issues. These health issues can lead to increased health care costs to the community that are ten times higher than babies who are delivered full term. This can also lead money in lost productivity when those babies become working adults (Bhutta et al., 2002).

It is important to study preterm birth because a key predictor of infant survival and future health outcomes is period of gestation (Behrman & Butler, 2007). In the past, low birth weight has been used as an indicator of preterm birth; however, low birth weight is not preterm birth. An infant is deemed, ‘low birth weight’ when he or she is born weighing 2,499g (5.5lbs) or less,

according to the World Health Organization (2018). Just like infant mortality is not preterm birth; low birth weight is not preterm birth, it is a factor that results because a baby is born preterm.

Preterm birth is not only a problem to the state of Ohio, but also to the United States. According to the Centers for Disease Control and Prevention (2017), in 2016, one in ten babies born in the United States was born too early, or before 37 weeks gestation. Reducing preterm birth is a national public health priority. Preterm birth is the leading cause of infant mortality in the United States. Preterm birth also carries a large economic burden for families and society. It is estimated that the United States spends at least \$26.2 billion annually, or \$51,600 per infant born preterm each year (Behrman & Butler, 2007).

Despite significant improvements in the treatment and care for preterm infants, little success in understanding and preventing preterm birth has been made (Behrman & Butler, 2007); often, the specific cause of preterm birth is not clear. Some known risk factors include having a previous preterm birth, an interval of less than six months between pregnancies, smoking while pregnant, and stressful life events (Mayo Clinic, 2018). However, disparities still exist even after accounting for these risk factors (Manuck, 2017). Previous research has linked preterm birth with factors such as low socioeconomic status, maternal age, and chronic stress associated with African American race (Fuchs, Monet, Ducruet, Chaillet, & Audibert, 2018).

In this descriptive analysis, six Ohio counties with the greatest number of births were selected. Each county selected for study is home to a major city in Ohio. According to the latest Census data, the largest population of Ohio residents is found in Columbus with 850,106 citizens, followed by Cleveland with 388,072 citizens and Cincinnati with 301,301 citizens; therefore, Franklin County, Cuyahoga County, and Hamilton County respectively, were chosen

for study. Other notable cities in Ohio with populations of more than 100,000 include Toledo, Akron, and Dayton so Lucas County, Summit County, and Montgomery County respectively, were also included in the study (US Census, 2017). Due to data availability, this paper will focus on describing the association between race and preterm birth in the six most largely populated Ohio counties over a six-year period from 2013 to 2018, though 2018 data is preliminary.

### **Statement of Purpose**

Race has been identified as a major risk factor for preterm birth. Black women have a much greater risk for preterm birth compared to White women (Manuck, 2017). This research paper describes rates of preterm birth in the six most populated counties in Ohio stratified by race, and demonstrates how these rates changed from 2013 to 2018. Data was assessed retrospectively and analysis is descriptive. For the purposes of this study, preterm birth is defined as birth before 37 weeks gestation.

### **Literature Review**

In 2007, preterm birth was at an all-time high in the United States (10.4%). However, preterm birth rates fell from 2007 (10.4%) to 2014 (9.57%) before rising to 9.63% in 2015 (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017). A 2017 epidemiological review of more than forty articles attributes this escalation to the increasing rates of preterm birth among African-American women. Currently, there is a growing gap in the rate of preterm birth between non-Hispanic White and non-Hispanic Black women. Rates of preterm birth prior to 34 weeks gestation are significantly higher among Black women (3.09% in 2015) when compared to White women (1.27% in 2015) (Manuck, 2017). Even after decades of basic science research and publication, this disparity remains relatively unchanged (Culhane & Goldenberg, 2011). The association is consistent across most literature: Black women are at higher risk of preterm birth



than White women (Rosenberg, Palmer, Wise, Horton, & Corwin, 2002; Culhand & Goldenberg, 2011; Giurgescu, McFarlin, Lomax, Craddock, & Albrecht, 2011; Wallace et al., 2013; Manuck, 2017).

Multiple explanations for the underlying etiologies behind the association between African American race and preterm birth have been proposed throughout the existing literature. An education gradient seems to be a logical explanation for the association between preterm birth and race such that women with more education are at decreased risk for preterm birth. However, non-Hispanic Black women with 13 or more years of education have significantly greater risk of preterm birth compared with White women with less than 12 years of education (Culhand & Goldenberg, 2011). In Ohio, an infant born to an African-American mother who has five or more years of college education will still have a greater chance of dying when compared to an infant born to a White mother with a high school education or less (Ohio Department of Health, 2012). Education differentials alone do not explain the racial disparity in preterm birth.

Unlike education as an explanation, one viable explanation for the association between African American race and preterm birth is seen through maternal stress felt through experienced racial discrimination (Giurgescu et al., 2011). To examine this association, a cross sectional study was conducted using self-report questionnaire data taken from the Black Women's Health Study, a study of African-American women that begun in 1995. Women were asked about singleton births, including the child's birth weight, and if the child had been born less than 37 weeks gestation. The questionnaire included nine questions regarding experiences of racial discrimination. Racial discrimination was measured including questions about unfair treatment (on the job, in housing, and by police) and the frequency in daily life of unfair treatment (people acting afraid of the participant; the participant receiving poorer service, and people acting as

though she is inferior). Women who reported unfair treatment on the job showed a 30% increased odds for preterm birth compared to women who did not report unfair treatment on the job; and women who reported that people acted afraid of them at least once a week showed a 40% increased odds of preterm birth. Overall, this study showed that there is an increase in preterm birth among African-American women who report experiences of racism (Rosenberg et al., 2002). This is consistent with a 2003 study of maternal stress that identifies African-American women are at high risk of poor birth outcomes. This study showed a woman's reproductive potential could be viewed as the product of her developmental trajectory over her life course. Essentially, this study ascertained that African-American women experience poor birth outcomes because they have been under chronic stress throughout their entire lives, which takes a toll on the body. The chronic stress can be attributed to factors such as experienced racism, living conditions, and socioeconomic status (Lu & Halfon, 2003).

Although the association between preterm birth, race, and racial discrimination appears to be clear, the association between preterm birth, race, and neighborhood disadvantage is unclear and grounds for further study. African Americans are more likely to live in a disadvantaged neighborhood (Firebaugh & Acciai, 2016). Living in a disadvantaged economic and social environment can lead to relative deprivation, social disorder, increased exposure to crime, and decreased access to healthy foods, all of which can contribute to maternal stress. Maternal stress can release hormones that trigger contractions resulting in preterm birth (Wallace et al., 2013). A large meta-analysis examined the effect of living in disadvantaged neighborhoods with risk of poor birth outcomes and maternal race. More than 60 corresponding population-based studies were included in the meta-analysis. The objective was to calculate the odds of preterm birth related to living in disadvantaged neighborhoods, and then explore the differences among racial

groups. Overall, researchers found that women living in the most disadvantaged neighborhoods have a 27% increased risk for preterm birth (OR=1.27; 97% CI: 1.16-1.39) compared to those in the least disadvantaged neighborhoods. It would stand to reason that because African Americans are at higher risk of preterm birth and have more exposure to disadvantaged neighborhoods, then theoretically, African-American women living in disadvantaged neighborhoods would be at higher risk of preterm birth. However, this meta-analysis observed the opposite association. Interestingly, non-Hispanic White women living in the most disadvantaged neighborhoods had 48% higher risk of preterm birth compared with non-Hispanic White women in the least disadvantaged neighborhoods (OR: 1.48; 95% CI: 1.25-1.75), while non-Hispanic Black women in the most disadvantaged neighborhoods had 15% higher risk of preterm birth compared with non-Hispanic Black women in the least disadvantaged neighborhoods (OR: 1.15; 95% CI: 1.09-1.15). Although this study shows that non-Hispanic White and non-Hispanic Black women both have an increased risk of preterm birth based on neighborhood disadvantage, the study shows that non-Hispanic White women in disadvantaged neighborhoods are most at risk (Ncube, Enquobahric, Albert, Herrick, & Burke, 2016). However, this meta-analysis the study is limited because it only compares differences among racial groups, and not between them, so it is impossible to evaluate the disparity in preterm between races. Essentially, non-Hispanic Black women live in more disadvantaged neighborhoods (Firebaugh & Acciai, 2016) and neighborhood disadvantage is associated with increased risk of preterm birth (Ncube et al., 2016); however, further research is needed to establish the contribution of this exposure to the racial disparity in preterm birth.

The association between African American race and preterm birth is consistent across most literature; Black women seem to be at the greatest risk for preterm birth (Rosenberg et al.,

2002; Culhand & Goldenberg, 2011; Giurgescu et al., 2011; Wallace et al., 2013; Manuck, 2017). However, the majority of the existing literature only focuses on the association between non-Hispanic White and non-Hispanic Black women and fails to account for other races or ethnicities. While the risk of preterm birth associated with African American race is significant, and the risk associated with other ethnicities appears to be unclear. In agreement with previous literature, a systematic review of forty-five studies also found African-American women to have a two-fold increased risk for preterm birth (95% CI: 1.8-2.2) compared to White women.

However, despite the strong association found in when comparing preterm birth rates among White women and Black women, the study found mixed results when comparing White women to women of other races. Twelve studies comparing preterm birth rates among White women to Asian women found mixed results: five studies showed Asian women were at no significant increase in preterm birth risk, and seven studies showed that Asian women have an increased risk of preterm birth. Furthermore, among the seven studies of Asian women and preterm birth that showed an increased risk, the odds ratios for this association were wide, ranging from 2.3% to 16.3% increased risk, leading to uncertainty about whether or not a true association exists. When accounting for all twelve studies, the authors concluded that there is no significant association between Asian race and preterm birth (Schaaf, Liem, Mol, Abu-Hanna, & Ravelli, 2013). Further research is warranted to see if a true relationship exists among other races and ethnicities.

### **Methods**

For this analysis, data was obtained from the Ohio Public Health Data Warehouse within the website for the Ohio Department of Health. The dataset included information about preterm deliveries among Ohio resident live births obtained from birth records in the State of Ohio as a whole, and then broken down into county data for Franklin County, Cuyahoga County, Hamilton

County, Montgomery County, Lucas County, and Summit County. Data was analyzed over a six-year period from 2013 to 2018. Research need not be reviewed by IRB because Exemption 45 CFR part 46 does not apply. The variable ‘preterm birth’ was defined as live delivery of a baby with a gestational period of less than 37 weeks, while ‘full term birth’ was defined as a gestational period of 37 weeks or greater.

Due to availability, data were stratified by maternal race. The data was combined by hand from six strata (African American, Other, Native American, Pacific Islander/Hawaiian, Unknown/Not Reported, and White) to three categories (African American, White, and Other) to account for small numbers in some categories. Descriptive statistics were calculated using frequencies and percentages across the strata. Bivariate analyses were also conducted to examine differences in preterm delivery risk across maternal race. Relative risk with corresponding 95% confidence intervals were calculated to determine the risk of preterm delivery among each racial category and graphical representations were created to show the differences across each year. White mothers were used as the reference group. Microsoft Excel was used to analyze all data.

## **Results**

### **State of Ohio**

**Univariate analysis.** This data set included a total of 798,957 Ohio resident live births over a six-year period from 2013 to 2018 across the entire state of Ohio, among which 82,660 (10.34%) were considered preterm while 716,297 (89.65%) were considered term. The mean number of total births per year was 132,992 and the average rate of preterm birth was 10.34%. In 2014, the total rate of preterm birth was at its lowest at 10.27%, and then this percentage continued to climb to its peak at 10.54% in 2016, before falling again until 2018. Results can be viewed in Table 1.

Of the total number of births in the State of Ohio, 135,921 (17.01%) were to African-American mothers; 586,348 (73.3%) were to White mothers; and 76,697 (9.6%) were to mothers of the racial category, ‘other’. The mean preterm birth rate among African-American mothers was 23.1%; the mean preterm birth rate to White mothers was 67.75%; and the mean preterm birth rate to mothers of the racial category ‘other’ was 9.31%. Univariate analysis results can be viewed in Table 1.

Table 1

*Birth Outcomes and Maternal Race in Ohio from 2013 to 2018*

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018*</b>	<b>Mean</b>
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Preterm</b>	<b>14,900</b> <b>(10.31%)</b>	<b>14,804</b> <b>(10.27%)</b>	<b>14,841</b> <b>(10.31%)</b>	<b>14,887</b> <b>(10.54%)</b>	<b>14,620</b> <b>(10.38%)</b>	<b>8,608</b> <b>(10.32%)</b>	<b>13,776</b> <b>(10.34%)</b>
African American	3,351 (22.48%)	3,305 (22.32%)	3,429 (23.10%)	3,458 (23.22%)	3,541 (24.22%)	2,000 (23.23%)	3,180 (23.09%)
White	9,986 (67.02%)	10,114 (68.32%)	10,011 (67.45%)	10,095 (67.81%)	9,821 (67.17%)	5,834 (67.77%)	9,310 (67.75%)
Other	1,563 (10.48%)	1,385 (9.35%)	1,401 (9.44%)	1,334 (8.96%)	1,258 (8.61%)	774 (8.99%)	1,285 (9.31%)
<b>Term</b>	<b>129,502</b> <b>(89.87%)</b>	<b>129,328</b> <b>(89.71%)</b>	<b>129,123</b> <b>(89.69%)</b>	<b>127,480</b> <b>(89.54%)</b>	<b>126,120</b> <b>(89.61%)</b>	<b>74,744</b> <b>(89.72%)</b>	<b>112,382</b> <b>(89.69%)</b>
African American	20,710 (15.99%)	20,796 (16.08%)	20,836 (16.13%)	20,837 (16.34%)	20,983 (16.63%)	12,675 (16.95%)	20,710 (16.42%)
White	94,489 (72.96%)	96,087 (74.29%)	95,893 (74.26%)	94,770 (74.34%)	93,813 (74.38%)	55,435 (74.16%)	94,489 (74.07%)
Other	14,303 (11.04%)	12,445 (9.62%)	12,403 (9.61%)	11,873 (9.31%)	11,324 (8.98%)	6,634 (8.87%)	14,303 (9.57%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Ohio across each racial category. When compared to the White mothers, the risk of preterm birth among African-American mothers ranged from 38% increased risk in 2014 (RR: 1.38; 95% CI: 1.34-1.43) to 53% increased risk in 2017 (RR: 1.53; 95% CI: 1.47-1.58). Over the six-year period, the average relative risk for preterm birth

among African-American mothers was 1.44 times greater than White mothers. Generally, the risk for preterm birth among African Americans in Ohio gradually increased from 2013 to 2017, and then the risk in 2018 declined. This relationship can be observed in Figure 1.

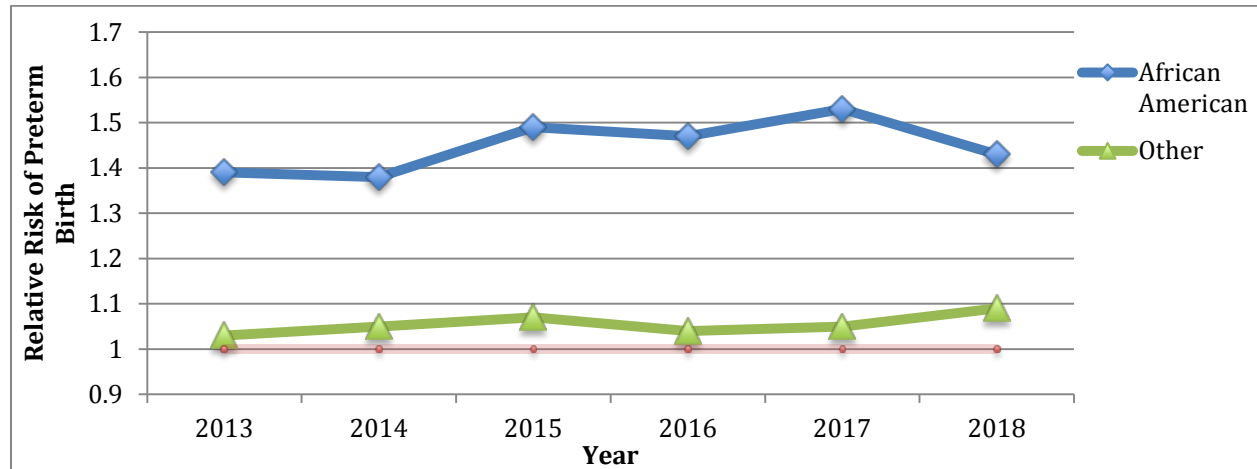


Figure 1. Relative risk of preterm birth among maternal racial categories in Ohio from 2013 to 2018. \*Note: relative risk for White mothers remains unchanged as ‘White’ was used as the reference category for risk calculations.

There was a very slight increased risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers. The risk of preterm birth for mothers in the category ‘other’ ranged from 3% greater risk in 2013 (RR: 1.03; 95% CI: 0.98-1.08) to 9% greater risk in 2018 (RR: 1.09; 95% CI: 1.02-1.17). Generally, the risk for mothers in the ‘other’ racial category remained fairly unchanged. This relationship can be observed in Figure 1.

### Cuyahoga County

**Univariate Analysis.** The data set for Cuyahoga County included a total of 82,388 resident live births from 2013 to 2018, of which 9,753 (11.83%) were considered preterm and 72,635 (88.16%) were considered term. The mean number of births per year was 13,731 and the average rate of preterm births was 11.83%. Throughout the six-year period, the percent of preterm births held a fairly steady rate of increase in Cuyahoga County. The lowest number of

preterm births was in 2013 at 1,697 (11.31%), and then increased until it peaked in 2017 at 1,799 (12.17%). This number dropped in 2018 to 981 (11.63%) preterm births, though the data for 2018 is preliminary.

Of the total births in Cuyahoga County from 2013 to 2018, 32,010 (38.85%) were to African-American mothers, 42,249 (52.49%) were to White mothers, and 7,129 (16.48%) were to mothers in the ‘other’ racial category. Among the 9,753 total preterm births in Cuyahoga County from 2013 to 2018, 4,918 (50.42%) were to African-American mothers, 4,101 (42.04%) were to White mothers, and 734 (7.52%) were to mothers of the ‘other’ racial category.

Univariate analysis results can be viewed in Table 2.

Table 2

*Birth Outcomes and Maternal Race in Cuyahoga County from 2013 to 2018*

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018*</b>	<b>Mean</b>
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Preterm</b>	<b>1,679</b> (11.31%)	<b>1,779</b> (11.82%)	<b>1,799</b> (12.15%)	<b>1,747</b> (11.86%)	<b>1,768</b> (12.17%)	<b>981</b> (11.63%)	<b>1,625</b> (11.83%)
African American	851 (50.68%)	854 (48.01%)	889 (49.41%)	915 (52.37%)	947 (53.56%)	462 (47.09%)	819 (50.18%)
White	695 (41.39%)	765 (43.01%)	732 (40.68%)	725 (41.49%)	725 (41.01%)	459 (46.78%)	683 (42.39%)
Other	133 (7.92%)	160 (8.98%)	178 (9.89%)	107 (6.12%)	96 (5.42%)	60 (6.11%)	122 (7.41%)
<b>Term</b>	<b>13,169</b> (88.69%)	<b>13,270</b> (88.18%)	<b>13,003</b> (87.85%)	<b>12,987</b> (88.14%)	<b>12,753</b> (88.83%)	<b>7,453</b> (88.37%)	<b>10,122</b> (88.34%)
African American	4,994 (37.92%)	4,893 (36.87%)	4,812 (37.01%)	4,788 (36.87%)	4,802 (37.65%)	2,803 (37.61%)	4,515 (37.33%)
White	6,934 (52.65%)	7,012 (52.84%)	6,939 (53.36%)	7,171 (55.21%)	6,974 (54.68%)	4,118 (55.25%)	6,524 (53.99%)
Other	1,241 (9.42%)	1,365 (10.28%)	1,252 (9.62%)	1,028 (7.91%)	977 (7.66%)	532 (7.13%)	1,065 (8.67%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Cuyahoga County across each racial category. When compared to White mothers, the risk of preterm birth among African-American mothers in



Cuyahoga County ranged from 41% increased risk (RR: 1.41; 95% CI: 1.25-1.59) in 2018 to 75% increased risk (RR: 1.75; 95% CI: 1.59-1.91) in 2016. The mean risk of preterm birth among African-American mothers was 1.60 times greater than White mothers. From 2014 to 2016, the risk of preterm birth for African-American mothers gradually increased before falling from 2017 to 2018. This trend can be seen in Figure 2.

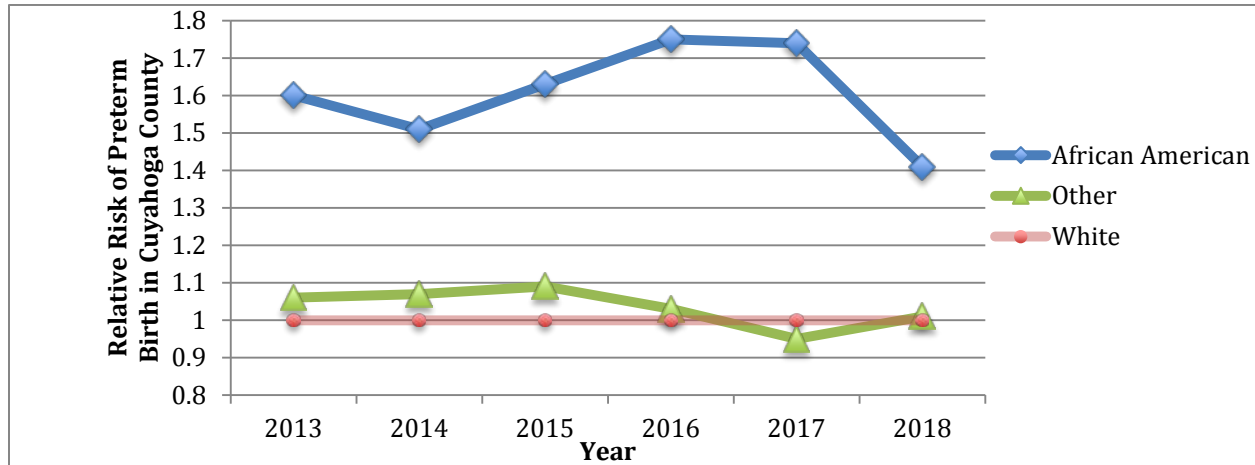


Figure 2. Relative risk of preterm birth among Cuyahoga County resident live births across maternal racial categories in Ohio from 2013 to 2018.

Mostly from 2013 to 2018 there was a very slight increased risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Cuyahoga County for every year except 2017. The risk of preterm birth for mothers in the category ‘other’ ranged from 5% decreased risk in 2017 (RR: 0.95; 95% CI: 0.77-1.16) to 9% increased risk in 2015 (RR: 1.09; 95% CI: 1.01-1.24). The mean risk for preterm birth among ‘other’ mothers was 1.03, and generally the risk of preterm birth for mothers in the ‘other’ racial category stayed about the mean. This trend can be viewed in Figure 2.

### Franklin County

**Univariate analysis.** The data set for Franklin County included a total of 105,231 resident live births from 2013 to 2018, of which 11,298 (10.73%) were considered preterm while

93,833 (89.26%) were considered term. The mean number of births per year was 17,538 and the average rate of preterm birth was 10.74%. Throughout 2013 to 2018, the rate of preterm births per year gradually decreased. The highest rate of preterm births was in 2013 at 11.41% and continually decreased to the lowest rate in 2018 at 10.57%.

Of the total births in Franklin County from 2013 to 2018, 31,957 (30.36%) were to African-American mothers, 69,340 (57.34%) were to White mothers, and 12,934 (12.29%) were to mothers in the ‘other’ racial category. Among the 11,298 total preterm births in Franklin County from 2013 to 2018, 4,107 (36.35%) were to African-American mothers, 5,978 (52.91%) were to White mothers, and 1,231 (10.73%) were to mothers of the ‘other’ racial category. Univariate analysis results can be viewed in Table 3.

Table 3

*Birth Outcomes and Maternal Race in Franklin County from 2013 to 2018*

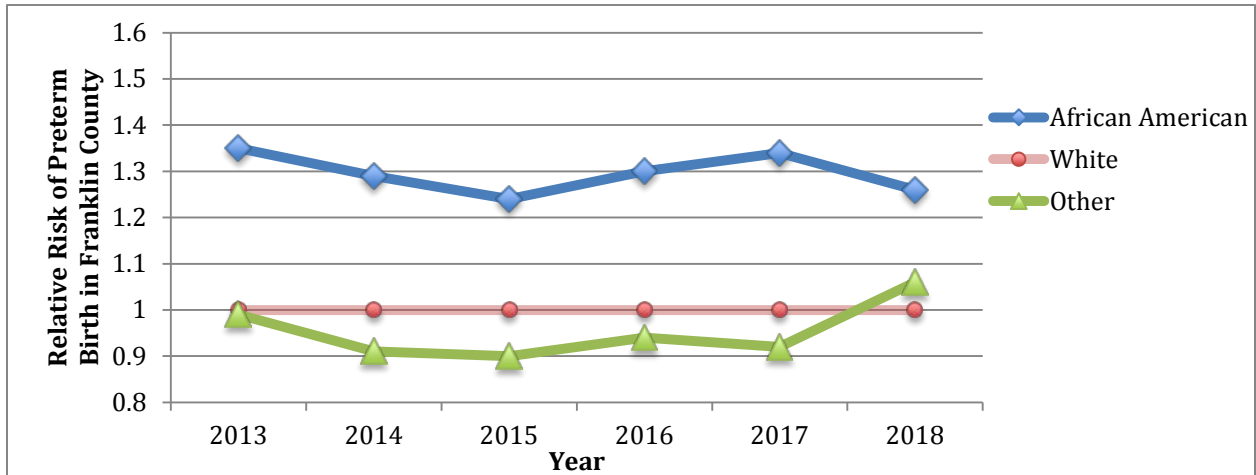
	2013 N (%)	2014 N (%)	2015 N (%)	2016 N (%)	2017 N (%)	2018* N (%)	Mean N (%)
<b>Preterm</b>	<b>2,136</b> <b>(11.41%)</b>	<b>1,965</b> <b>(10.54%)</b>	<b>2,022</b> <b>(10.62%)</b>	<b>2,031</b> <b>(10.72%)</b>	<b>1,989</b> <b>(10.58%)</b>	<b>1,155</b> <b>(10.57%)</b>	<b>1,883</b> <b>(10.57%)</b>
African American	768 (35.95%)	703 (35.77%)	708 (35.01%)	755 (37.17%)	748 (37.60%)	425 (36.79%)	689 (37.05%)
White	1,152 (53.93%)	1,059 (53.89%)	1,097 (54.25%)	1,056 (51.99%)	1,027 (51.63%)	587 (50.82%)	996 (52.75%)
Other	216 (10.11%)	203 (10.33%)	217 (10.73%)	220 (10.83%)	214 (10.76%)	143 (12.38%)	202 (10.85%)
<b>Term</b>	<b>16,572</b> <b>(88.59%)</b>	<b>16,880</b> <b>(89.57%)</b>	<b>17,012</b> <b>(89.37%)</b>	<b>16,900</b> <b>(89.27%)</b>	<b>16,799</b> <b>(89.41%)</b>	<b>9,770</b> <b>(89.47%)</b>	<b>15,655</b> <b>(89.28%)</b>
African American	4739 (28.59%)	4,920 (29.15%)	4,989 (29.32%)	5,109 (30.23%)	5,030 (29.94%)	3,063 (31.35%)	4,641 (29.76%)
White	9,958 (60.08%)	9,850 (58.35%)	9,844 (57.86%)	9,653 (57.11%)	9,590 (57.08%)	5,467 (55.95%)	9,060 (57.73%)
Other	1,875 (11.30%)	2,110 (12.50%)	2,179 (12.81%)	2,138 (12.63%)	2,179 (12.97%)	1,240 (12.68%)	1,953 (12.48%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Franklin County across each racial category. When compared to White mothers, the risk of preterm birth among African-American mothers in

Franklin County ranged from 24% increased risk in 2015 (RR: 1.24; 95% CI: 1.13-1.35) to 35% increased risk in 2013 (RR: 1.35; 95% CI: 1.24-1.46). The average risk for preterm birth among African-American mothers in Franklin County was 1.29 times greater than White mothers. From 2013 to 2015, the risk of preterm birth among African-American mothers decreased; then from 2015 to 2017, the risk began to fall from 2017 to 2018. This trend can be seen in Figure 3.



*Figure 3.* Relative risk of preterm birth among Franklin County resident live births across maternal racial categories in Ohio from 2013 to 2018.

From 2013 to 2018 there was a very slight decreased risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Franklin County for every year except 2018. The risk of preterm birth for mothers in the category ‘other’ ranged from 10% decreased risk in 2015 (RR: 0.90; 95% CI: 0.78-1.03) to 6% increased risk in 2018 (RR: 1.06; 95% CI: 0.89-1.26). The average risk of preterm birth for mothers in the ‘other’ category from 2013 to 2018 was 0.95.

### **Hamilton County**

**Univariate analysis.** The data set for Hamilton County included a total of 60,343 resident live births from 2013 to 2018, of which 6,551 (10.85%) were considered preterm and

53,792 (89.14%) were considered term. The mean number of births per year was 10,057 and the average rate of preterm births per year was 10.98%. Throughout 2013 to 2018, the rate of preterm births in Hamilton County continuously increased. The lowest rate of preterm births was in 2013 at 10.61%, and then continued to increase until 2018 at 11.22%.

Of the total births in Hamilton County from 2013 to 2018, 20,184 (33.45%) were to African-American mothers, 35,551 (58.91%) were to White mothers, and 4,608 (7.63%) were to mothers in the ‘other’ racial category. Among the 6,551 total preterm births in Hamilton County from 2013 to 2018, 2,830 (43.19%) were to African-American mothers, 3,286 (50.16%) were to White mothers, and 435 (6.64%) were to mothers of the ‘other’ racial category. Univariate analyses can be viewed in Table 4.

Table 4

*Birth Outcomes and Maternal Race in Hamilton County from 2013 to 2018*

	2013	2014	2015	2016	2017	2018*	Mean
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Preterm</b>	<b>1,139</b> <b>(10.61%)</b>	<b>1,179</b> <b>(10.78%)</b>	<b>1,150</b> <b>(10.99%)</b>	<b>1,159</b> <b>(11.01%)</b>	<b>1,200</b> <b>(11.16%)</b>	<b>706</b> <b>(11.22%)</b>	<b>1,088</b> <b>(10.98%)</b>
African American	499 (43.81%)	517 (43.19%)	501 (43.56%)	484 (41.76%)	506 (42.16%)	323 (45.75%)	471 (43.83%)
White	573 (50.30%)	591 (49.37%)	569 (47.47%)	579 (49.95%)	633 (52.75%)	341 (48.30%)	547 (49.96%)
Other	67 (5.88%)	89 (7.43%)	80 (6.95%)	96 (8.28%)	61 (5.08%)	42 (5.94%)	73 (6.59%)
<b>Term</b>	<b>9,597</b> <b>(89.39%)</b>	<b>9,825</b> <b>(89.22%)</b>	<b>9,694</b> <b>(89.01%)</b>	<b>9,547</b> <b>(88.99%)</b>	<b>9,545</b> <b>(88.84%)</b>	<b>5,584</b> <b>(88.78%)</b>	<b>9,010</b> <b>(88.34%)</b>
African American	3,253 (33.89%)	3,159 (32.15%)	3,106 (32.04%)	3,004 (31.46%)	3,059 (32.04%)	1,773 (31.75%)	2,998 (32.01%)
White	5,625 (58.61%)	5,878 (59.82%)	5,868 (60.53%)	5,730 (60.01%)	5,774 (60.49%)	3,390 (60.71%)	4,975 (60.02%)
Other	719 (7.49%)	788 (8.02%)	720 (7.42%)	813 (8.51%)	712 (7.45%)	421 (7.53%)	698 (7.40%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Hamilton County across each racial category. When

compared to White mothers, the risk of preterm birth among African-American mothers in Hamilton County ranged from 44% increased risk in 2013 (RR: 1.44; 95% CI: 1.28-1.61) to 68% increased risk in 2018 (RR: 1.68; 95% CI: 1.46-1.88). The mean risk for preterm birth among African-American mothers in Hamilton County was 1.53. From 2013 to 2015, the risk of preterm birth among African-American mothers increased; then from 2015 to 2017, the risk decreased before increasing again from 2017 to 2018. This trend can be seen in Figure 4.

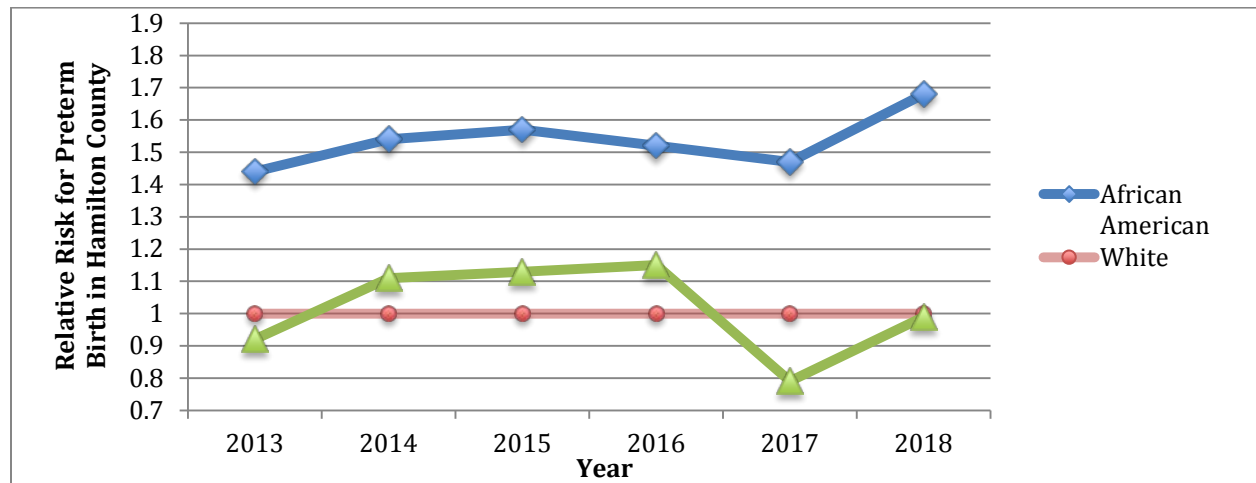


Figure 4. Relative risk of preterm birth among Hamilton County resident live births across maternal racial categories in Ohio from 2013 to 2018.

From 2013 to 2018 there was a very slight increased risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Hamilton County, however, this trend fluctuated. The risk of preterm birth for mothers in the category ‘other’ ranged from 21% decreased risk in 2017 (RR: 0.78; 95% CI: 0.62-0.99) to 15% increased risk in 2016 (RR: 1.15; 95% CI: 0.93-1.41). The mean risk for preterm birth among mothers in the ‘other’ racial category from 2013 to 2018 was 1.02. Mothers in the racial category ‘other’ in Hamilton County were at increased risk for preterm birth from 2013 to 2016; then, from 2017 to 2018 these mothers had a decreased risk. This trend can be seen in Figure 4.

**Lucas County**

**Univariate analysis.** The data set for Lucas County included a total of 31,238 resident live births from 2013 to 2018, of which 3,434 (10.99%) were considered preterm and 27,804 (89.01%) were considered term. The mean number of total births per year was 5,206 and the average rate of preterm births per year was 10.99%. Throughout 2013 to 2018, the preterm birth rate in Lucas County fluctuated. The lowest rate of preterm births was in 2013 at 9.89%, and the highest rate of preterm births was in 2017 at 11.68%. The preterm birth rate in Lucas County began at its lowest point in 2013, and then spiked in 2014 to 11.62%. From 2015-2016, the preterm birth rate gradually declined before seeing another sharp increase in 2017 to 11.68%.

Of the total births in Lucas County from 2013 to 2018, 8,751 (28.01%) were to African-American mothers, 21,228 (67.95%) were to White mothers, and 1,258 (4.03%) were to mothers in the 'other' racial category. Among the 3,434 total preterm births in Lucas County from 2013 to 2018, 1,255 (36.54%) were to African-American mothers, 2,059 (59.95%) were to White mothers, and 120 (3.49%) were to mothers of the 'other' racial category. Univariate analysis can be viewed in Table 5.

Table 5

*Birth Outcomes and Maternal Race in Lucas County from 2013 to 2018*

	2013 N (%)	2014 N (%)	2015 N (%)	2016 N (%)	2017 N (%)	2018* N (%)	Mean N (%)
<b>Preterm</b>	<b>559</b> <b>(9.89%)</b>	<b>661</b> <b>(11.62%)</b>	<b>625</b> <b>(11.26%)</b>	<b>593</b> <b>(10.55%)</b>	<b>636</b> <b>(11.68%)</b>	<b>360</b> <b>(10.94%)</b>	<b>572</b> <b>(10.99%)</b>
African American	171 (30.59%)	246 (37.21%)	263 (42.08%)	215 (36.25%)	220 (34.59%)	140 (38.88%)	209 (36.26%)
White	368 (65.83%)	377 (57.03%)	349 (55.84%)	360 (60.70%)	399 (62.73%)	206 (57.22%)	343 (59.33%)
Other	20 (3.57%)	38 (5.74%)	13 (2.08%)	18 (3.03%)	17 (2.67%)	14 (3.88%)	20 (3.49%)
<b>Term</b>	<b>5,093</b> <b>(90.11%)</b>	<b>5,027</b> <b>(88.38%)</b>	<b>4,925</b> <b>(88.74%)</b>	<b>5,024</b> <b>(89.45%)</b>	<b>4,806</b> <b>(88.32%)</b>	<b>2,929</b> <b>(89.06%)</b>	<b>4,634</b> <b>(88.34%)</b>
African American	1,351 (26.52%)	1,332 (26.49%)	1,338 (27.16%)	1,333 (26.53%)	1,319 (27.44%)	823 (28.09%)	1,249 (27.04%)
White	3,559 (69.88%)	3,479 (69.20%)	3,395 (68.93%)	3,463 (68.92%)	3,310 (68.87%)	1,963 (67.01%)	3,208 (68.67%)
Other	183 (3.59%)	216 (4.29%)	192 (7.42%)	228 (4.53%)	177 (3.68%)	143 (4.88%)	182 (4.60%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Lucas County across each racial category. When compared to White mothers, the risk of preterm birth among African-American mothers in Lucas County ranged from 20% increased risk in 2013 (RR: 1.20; 95% CI: 1.10-1.42) to 76% increased risk in 2015 (RR: 1.76; 95% CI: 1.52-1.98). The mean risk for preterm birth among African-American mothers in Lucas County was 1.48. From 2013 to 2015, the risk of preterm birth among African-American mothers increased; then from 2015 to 2017, the risk of preterm birth decreased and then began to rise again from 2017 to 2018. This trend can be seen in Figure 5.

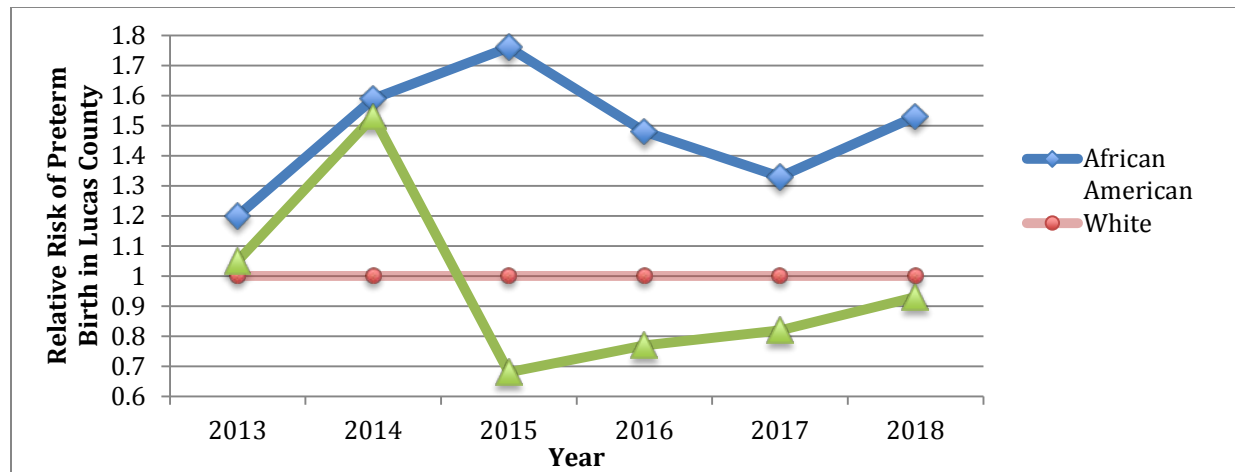


Figure 5. Relative risk of preterm birth among Lucas County resident live births across maternal racial categories in Ohio from 2013 to 2018.

From 2013 to 2018 the risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Lucas County fluctuated. The risk of preterm birth for mothers in the category ‘other’ ranged from 32% decreased risk in 2015 (RR: 0.68; 95% CI: 0.40-1.08) to 53% increased risk in 2014 (RR: 1.53; 95% CI: 1.21-1.89). The mean risk of preterm birth among mothers in the ‘other’ racial category was 0.96. Mothers in the racial category ‘other’ in Lucas County had an increased risk for preterm birth from 2013 to 2014; then, from 2015 to 2018 these mothers had a decreased risk for preterm birth. This trend can be viewed in Figure 5.

### Montgomery County

**Univariate analysis.** The data set for Montgomery County included a total of 37,197 resident live births from 2013 to 2018; of which 4,230 (11.37%) were considered preterm and 32,967 (88.62%) were considered term. The mean number of total births per year was 6,199 and the average rate of preterm births per year was 11.12%. Throughout 2013 to 2018, the preterm birth rate in Montgomery County fluctuated. The lowest rate of preterm births was in 2014 at 10.07%, and the highest rate of preterm births was in 2017 at 11.64%. The preterm birth rate in



Montgomery County decreased from 2013 to 2014 then increased until 2017, before falling again in 2018.

Of the total births in Montgomery County from 2013 to 2018, 10,079 (27.09%) were to African-American mothers, 37,197 (66.17%) were to White mothers, and 2,504 (6.73%) were to mothers in the ‘other’ racial category. Among the 4,230 total preterm births in Montgomery County from 2013 to 2018, 1,462 (34.56%) were to African-American mothers, 2,515 (59.45%) were to White mothers, and 253 (5.98%) were to mothers of the ‘other’ racial category.

Univariate analysis results can be viewed in Table 6.

Table 6

*Birth Outcomes and Maternal Race in Montgomery County from 2013 to 2018*

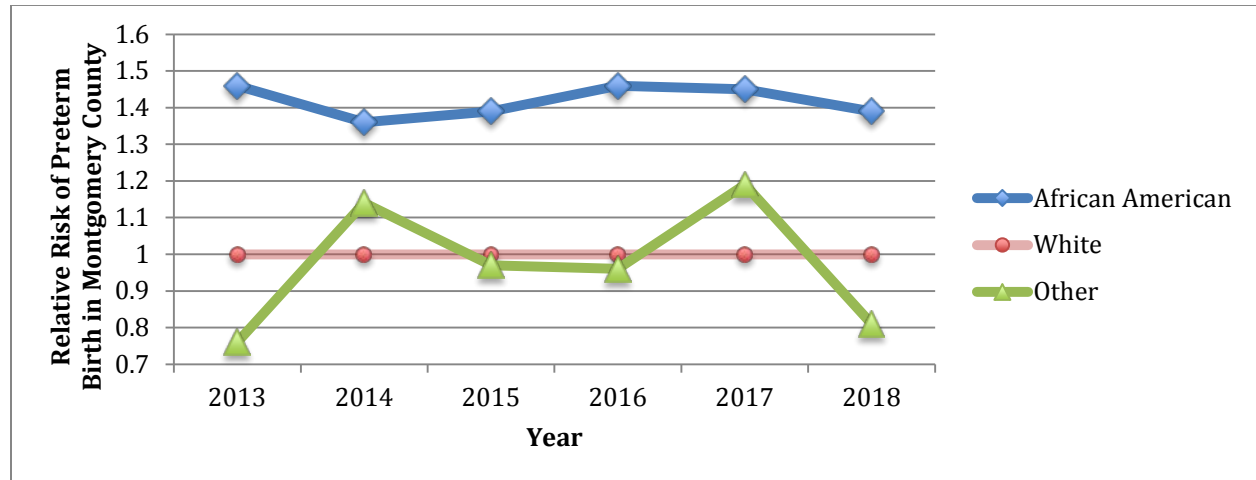
	2013 N (%)	2014 N (%)	2015 N (%)	2016 N (%)	2017 N (%)	2018* N (%)	Mean N (%)
<b>Preterm</b>	<b>776 (11.51%)</b>	<b>724 (10.07%)</b>	<b>781 (10.99%)</b>	<b>747 (11.01%)</b>	<b>784 (11.64%)</b>	<b>418 (10.78%)</b>	<b>705 (11.12%)</b>
African American	273 (35.18%)	234 (32.32%)	267 (34.18%)	256 (34.27%)	278 (35.49%)	154 (36.84%)	243 (34.02%)
White	471 (60.69%)	446 (61.60%)	468 (59.92%)	440 (58.90%)	445 (56.76%)	245 (58.61%)	413 (59.79%)
Other	32 (4.12%)	44 (6.07%)	46 (5.88%)	51 (6.92%)	61 (7.78%)	19 (4.54%)	42 (6.03%)
<b>Term</b>	<b>5,961 (88.49%)</b>	<b>5,839 (89.92%)</b>	<b>5,862 (89.01%)</b>	<b>5,897 (88.99%)</b>	<b>5,949 (88.36%)</b>	<b>3,459 (89.22%)</b>	<b>5,494 (88.88%)</b>
African American	1,521 (25.51%)	1,487 (25.46%)	1,529 (26.08%)	1,486 (25.19%)	1,618 (27.19%)	976 (28.21%)	1,368 (25.04%)
White	4,066 (68.21%)	4,013 (68.72%)	3,934 (67.11%)	3,934 (66.71%)	3,889 (65.37%)	2,263 (65.42%)	3,208 (66.67%)
Other	374 (6.27%)	339 (5.81%)	399 (6.80%)	477 (8.08%)	442 (7.42%)	220 (6.36%)	374 (6.37%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Montgomery County across each racial category. When compared to White mothers, the risk of preterm birth among African-American mothers in

Montgomery County ranged from 36% increased risk in 2014 (RR: 1.36; 95% CI: 1.17-1.57) to 46% increased risk in 2016 (RR: 1.46; 95% CI: 1.26-1.68). The mean risk for preterm birth among African-American mothers in Montgomery County was 1.42. From 2013 to 2018, the risk of preterm birth among African-American mothers remained fairly unchanged. This can be seen in Figure 6.



*Figure 6.* Relative risk of preterm birth among Montgomery County resident live births across maternal racial categories in Ohio from 2013 to 2018.

From 2013 to 2018 the risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Montgomery County fluctuated. The risk of preterm birth for mothers in the category ‘other’ ranged from 24% decreased risk in 2013 (RR: 0.76; 95% CI: 0.54-1.07) to 19% increased risk in 2017 (RR: 1.19; 95% CI: 0.92-1.53). The mean risk from 2013 to 2018 was 0.97. Being a mother in the racial category ‘other’ in Montgomery County was a protective factor for preterm birth in 2013, and then spiked to a risk factor in 2014 before dropping back to a protective factor through 2016. In 2017, being a mother in the ‘other’ racial category was once again a risk factor, before dropping back down to a protective factor in 2018. This trend can be seen in Figure 6.

**Summit County**

**Univariate analysis.** The data set for Summit County included a total of 33,732 resident live births from 2013 to 2018, of which 3,511 (10.40%) were considered preterm and 30,221 (89.59%) were considered term. The mean number of total births per year was 5,622 and the average rate of preterm births per year was 10.28%. Throughout 2013 to 2018, the preterm birth rate in Summit County increased steadily until 2016, before decreasing in 2017 to 2018. The lowest rate of preterm births was in 2013 at 9.78%, and the highest rate of preterm births was in 2016 at 11.01%.

Of the total births in Summit County from 2013 to 2018, 7480 (22.17%) were to African-American mothers, 23,723 (70.32%) were to White mothers, and 2,529 (7.49%) were to mothers in the 'other' racial category. Among the 3,511 total preterm births in Summit County from 2013 to 2018, 1,110 (31.61%) were to African-American mothers, 2,182 (62.14%) were to White mothers, and 219 (6.23%) were to mothers of the 'other' racial category. Univariate analysis results can be viewed in Table 7.

Table 7

*Birth Outcomes and Maternal Race in Summit County from 2013 to 2018*

	2013 N (%)	2014 N (%)	2015 N (%)	2016 N (%)	2017 N (%)	2018* N (%)	Mean N (%)
<b>Preterm</b>	<b>592</b> <b>(9.78%)</b>	<b>641</b> <b>(10.78%)</b>	<b>676</b> <b>(10.99%)</b>	<b>705</b> <b>(11.01%)</b>	<b>538</b> <b>(9.13%)</b>	<b>359</b> <b>(10.01%)</b>	<b>585</b> <b>(10.28%)</b>
African American	177 (29.89%)	195 (30.42%)	207 (30.62%)	233 (33.04%)	186 (34.57%)	112 (31.19%)	185 (31.62%)
White	385 (65.03%)	397 (61.93%)	433 (64.05%)	437 (61.98%)	313 (58.17%)	217 (60.44%)	363 (61.93%)
Other	30 (5.06%)	49 (7.64%)	36 (5.32%)	35 (4.96%)	39 (7.24%)	30 (8.35%)	36 (6.42%)
<b>Term</b>	<b>5,459</b> <b>(90.22%)</b>	<b>5,839</b> <b>(89.22%)</b>	<b>5,862</b> <b>(89.01%)</b>	<b>5,897</b> <b>(88.99%)</b>	<b>5,949</b> <b>(90.87%)</b>	<b>3,459</b> <b>(89.99%)</b>	<b>5,410</b> <b>(89.71%)</b>
African American	1,122 (20.55%)	1,179 (21.31%)	1,106 (20.64%)	1,085 (20.49%)	1,137 (21.24%)	741 (22.96%)	1,061 (21.19%)
White	3,985 (72.99%)	3,984 (72.01%)	3,830 (71.48%)	3,761 (71.04%)	3,774 (70.52%)	2,207 (68.39%)	3,590 (71.07%)
Other	352 (6.44%)	369 (6.67%)	422 (7.87%)	448 (8.46%)	440 (8.22%)	279 (8.64%)	385 (7.71%)

\*2018 data is preliminary

Note: Maternal race percentages calculated of birth outcome per year

**Bivariate analysis.** Relative risk and 95% confidence intervals were calculated to determine the probability of preterm birth in Summit County across each racial category. When compared to White mothers, the risk of preterm birth among African-American mothers in Summit County ranged from 46% increased risk in 2018 (RR: 1.46; 95% CI: 1.18-1.81) to 83% increased risk in 2017 (RR: 1.83; 95% CI: 1.64-2.10). The mean risk for preterm birth among African-American mothers in Summit County was 1.60. From 2013 to 2018, the risk of preterm birth among African-American mothers gradually increased until 2017 before decreasing in 2018. This trend can be seen in Figure 7.

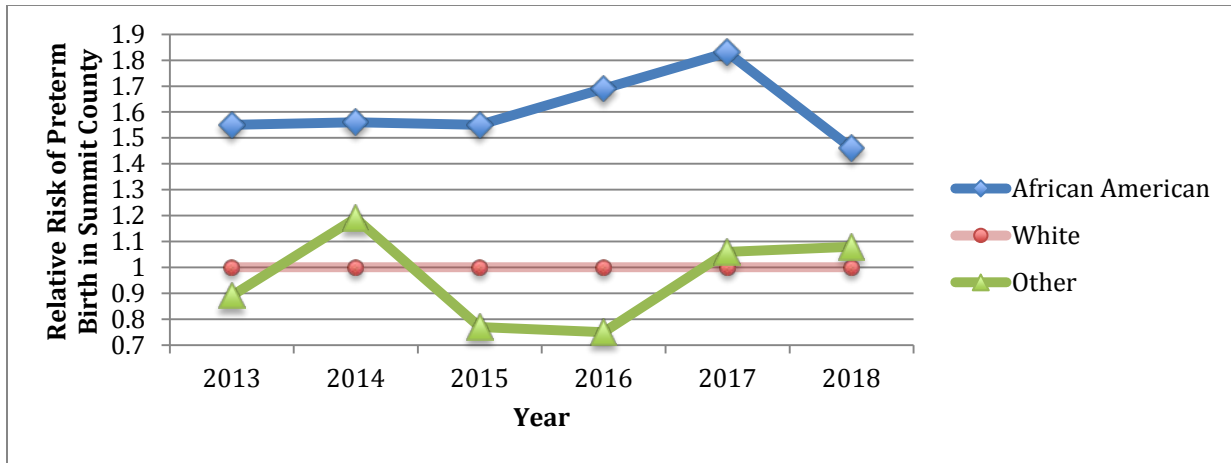
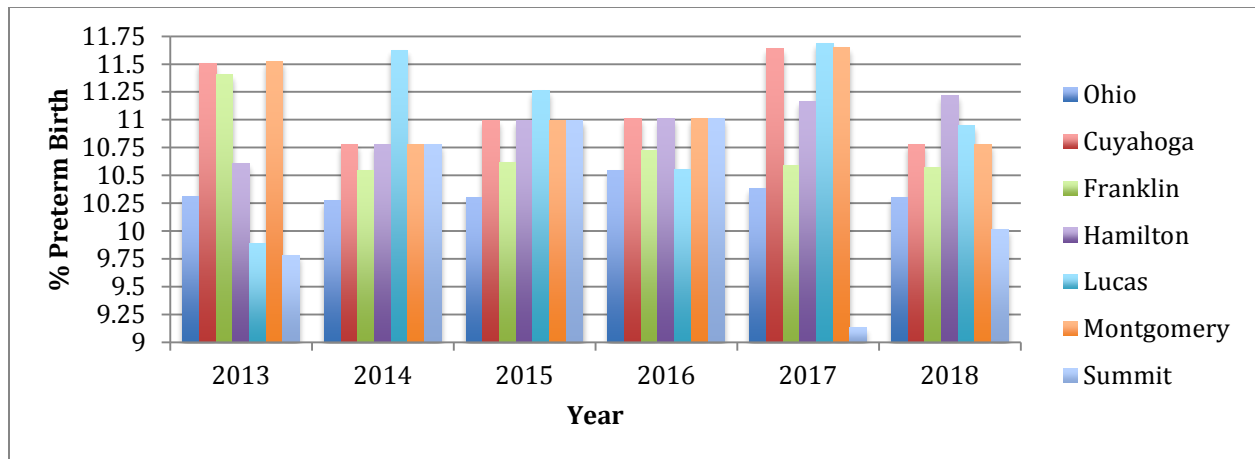


Figure 7. Relative risk of preterm birth among Summit County resident live births across maternal racial categories in Ohio from 2013 to 2018.

From 2013 to 2018 the risk of preterm birth among mothers included in the ‘other’ racial category as compared to White mothers in Summit County fluctuated. The risk of preterm birth for mothers in the category ‘other’ ranged from 25% decreased risk in 2016 (RR: 0.75; 95% CI: 0.54-1.04) to 19% increased risk in 2014 (RR: 1.19; 95% CI: 0.97-1.50). The mean risk for preterm birth among mothers in the ‘other’ racial category from 2013 to 2018 was 0.97. The risk for preterm birth in Summit County increased until 2014, and then decreased to its lowest point in 2016, and then increased through 2018. This trend can be seen in Figure 7.

### Combined Results

**Univariate analysis.** Results from this study show that rates of preterm birth across the state of Ohio and counties studied are all fairly similar and remain generally unchanged over the study period. The lowest preterm birth rate was in Summit County in 2017 at 9.31%, and the highest preterm birth rate was in Lucas County at 11.69%, also in 2017. Total reterm birth rates from 2013 to 2018 can be represented visually in Figure 8.



*Figure 8.* Total preterm birth rates in Ohio, Cuyahoga, Franklin, Hamilton, Lucas, Montgomery, and Summit counties from 2013 to 2018.

**Bivariate analysis.** Results from this study show that risk of preterm birth is consistently highest among African-American mothers in every county studied, and is consistently statistically significant. According to this study, the risk of preterm birth continuously increased from 2013 to 2018 in Hamilton County for African-American mothers. The risk for preterm birth for African-American mothers in Cuyahoga County, Lucas County, and Summit County fluctuated across the six-year period. The risk for preterm birth among African-American mothers in Franklin County and Montgomery County remained fairly unchanged. This study also showed that the risk for preterm birth among mothers in the racial category ‘other’ showed little to no risk, but the association was hardly ever significant with large confidence intervals due to small sample sizes. These results can be seen in Table 8.

Table 8

*Relative Risk for Preterm Birth from 2013 to 2018 by Maternal Race and County of Residence*

	<b>2013</b> RR (95% CI)	<b>2014</b> RR (95% CI)	<b>2015</b> RR (95% CI)	<b>2016</b> RR (95% CI)	<b>2017</b> RR (95% CI)	<b>2018*</b> RR (95% CI)
<u>African American</u>						
Ohio	1.39 (1.36-1.44)	1.38 (1.34-1.43)	1.49 (1.44-1.55)	1.47 (1.42-1.53)	1.53 (1.47-1.58)	1.43 (1.36-1.50)
Cuyahoga	1.60 (1.45-1.75)	1.51 (1.37-1.65)	1.63 (1.49-1.79)	1.75 (1.59-1.91)	1.74 (1.60-1.91)	1.41 (1.25-1.59)
Franklin	1.35 (1.24-1.46)	1.29 (1.17-1.41)	1.24 (1.13-1.35)	1.30 (1.19-1.42)	1.34 (1.23-1.46)	1.26 (1.12-1.41)
Hamilton	1.44 (1.28-1.61)	1.54 (1.38-1.72)	1.57 (1.41-1.76)	1.52 (1.35-1.69)	1.47 (1.28-1.61)	1.68 (1.46-1.94)
Lucas	1.20 (1.10-1.42)	1.59 (1.37-1.85)	1.76 (1.52-1.98)	1.48 (1.26-1.73)	1.33 (1.14-1.55)	1.53 (1.25-1.87)
Montgomery	1.46 (1.27-1.68)	1.36 (1.17-1.57)	1.39 (1.21-1.61)	1.46 (1.26-1.68)	1.45 (1.26-1.67)	1.39 (1.15-1.68)
Summit	1.55 (1.31-1.83)	1.56 (1.33-1.84)	1.55 (1.33-1.81)	1.69 (1.46-1.96)	1.83 (1.64-2.10)	1.46 (1.18-1.81)
<u>Other</u>						
Ohio	1.03 (0.98-1.08)	1.05 (0.99-1.11)	1.07 (1.01-1.13)	1.04 (0.99-1.10)	1.05 (0.99-1.12)	1.09 (1.02-1.17)
Cuyahoga	1.06 (0.89-1.27)	1.07 (0.91-1.25)	1.09 (1.01-1.21)	1.03 (0.84-1.24)	0.95 (0.77-1.16)	1.01 (0.78-1.30)
Franklin	0.99 (0.86-1.14)	0.91 (0.78-1.04)	0.90 (0.78-1.03)	0.94 (0.82-1.08)	0.92 (0.81-1.03)	1.06 (0.89-1.26)
Hamilton	0.92 (0.72-1.17)	1.11 (0.90-1.37)	1.13 (0.91-1.41)	1.15 (0.93-1.41)	0.79 (0.62-1.02)	0.99 (0.73-1.35)
Lucas	1.05 (0.70-1.61)	1.53 (1.12-1.89)	0.68 (0.40-1.08)	0.77 (0.50-1.02)	0.82 (0.50-1.05)	0.93 (0.56-1.23)
Montgomery	0.76 (0.54-1.07)	1.14 (0.85-1.54)	0.97 (0.73-1.20)	0.96 (0.73-1.26)	1.19 (0.92-1.53)	0.81 (0.53-1.27)
Summit	0.89 (0.64-1.27)	1.29 (0.97-1.50)	0.77 (0.59-1.04)	0.75 (0.54-1.04)	1.06 (0.77-1.46)	1.08 (0.77-1.56)

\*2018 data is preliminary

Note. Relative Risk was calculated using 'White' maternal race as reference category.

## Discussion

The purpose of this study was to describe preterm birth outcomes by maternal race in Ohio, and in six Ohio counties across a six-year period. This study found that African-American mothers have a significant increased risk of preterm birth in every county studied each year and 'other' maternal races provided inconclusive results. These findings are consistent with previous literature; African-American mothers have been shown to be at increased risk for preterm birth and 'other' races have shown inconclusive results (Schaaf et al., 2013). Inconclusive results

provided by ‘other’ mothers is likely due to small sample size in each county. It is important to note that this study can make no allegations of what causes preterm birth and it does not suggest that maternal race causes preterm birth; rather, this study describes preterm birth outcomes by maternal race in Ohio.

The rate of premature birth was relatively unchanged across the State of Ohio from 2013 to 2018. This finding is consistent with the issued March of Dimes preterm birth report card. March of Dimes issues a report card to each state and county yearly that compares the current preterm birth rate to the goal rate of 8.1% by 2020. Ohio’s preterm birth rate consistently performs at a ‘D’ level, meaning the preterm birth rate in Ohio remains between 10.4%-11.4%. March of Dimes Ohio considers this unchange to be ‘remarkable’ given all of the interventions in the state to address preterm birth and infant mortality (Viviano, 2017). In the past years, interventions such as CelebrateOne in Columbus and Full Term First Birthday in Akron have recently been implemented. Perhaps future interventions need to target race specific populations in order to be more effective.

### **Limitations**

This study has several limitations. The data set was limited to only being stratified by maternal race and preterm delivery among resident live births, so there was no way to tell if the association between risk of preterm birth and maternal race is independent. The relationship between maternal race and increased risk of preterm birth may be confounded by maternal age, ethnicity, social characteristics, or any preexisting medical conditions. Another limitation of this study is that the data set did not account for biracial or multi-racial mothers so describing how mixed-race women are affected by preterm birth in Ohio’s most populated counties is impossible. The data set also did not specify any differences between ‘very preterm deliveries’,



(<32 weeks gestation) and ‘preterm deliveries’; the variable ‘very preterm’ was never differentiated from ‘preterm’ in this data set. More information on preterm versus very preterm delivery and maternal race could warrant further study. Another limitation is that only resident live births were included in the data set. There was no information available on the stillborn births and maternal race; another relationship that may warrant further research. Finally, this study was limited in sample size for some race strata. For example, the small sample size of mothers in the racial category ‘other’, which had a preterm birth, made for wide, insignificant confidence intervals.

### **Future Public Health Implications**

As stated above, this study is a descriptive study not intended to establish a causal relationship between maternal race and preterm birth. The strength of this study is that it can serve as a starting point for further research. In accordance with previous literature, there is an unclear association between preterm birth and mothers of ‘other’ races (Schaaf et al., 2013). A better-designed research study, perhaps on the national level with higher sample sizes, would be able to capture the true association. Another strength of this study is that it can be used to help target future public health interventions. This study also indicated that the overall preterm birth rate in the most populated counties in Ohio has remained largely unchanged for the past six years. The burden of preterm birth, including financial costs and health issues, will continue to stay the same in Ohio unless public health interventions target this issue directly. Preterm birth is largely an issue for African-American women in Ohio’s most populated counties who are consistently at high risk for preterm birth. From this data, we can design public health interventions around preterm birth prevention targeted to African American populations specifically in order to reduce the preterm birth rate and target racial disparities.

### **Conclusion**

Ohio is one of the worst states in the nation for poor birth outcomes, one of those being preterm birth. The findings of this study are consistent with previous literature. The results of this study show that preterm birth is disproportionately a problem among African-American mothers, but the association between preterm birth and other maternal races in Ohio is unclear. The association between preterm birth and 'other' maternal races warrants further study from a larger sample size to find the true association. The burden of preterm birth and all of the complications associated with it, such as financial costs and health issues, will continue to remain high among African-American women unless specific efforts are made to decrease rates. Further study needs to identify intrinsic biologic and/or social factors that contribute to the increased risk of adverse pregnancy outcomes and interventions need to be put into place to minimize the effects of these intrinsic factors.

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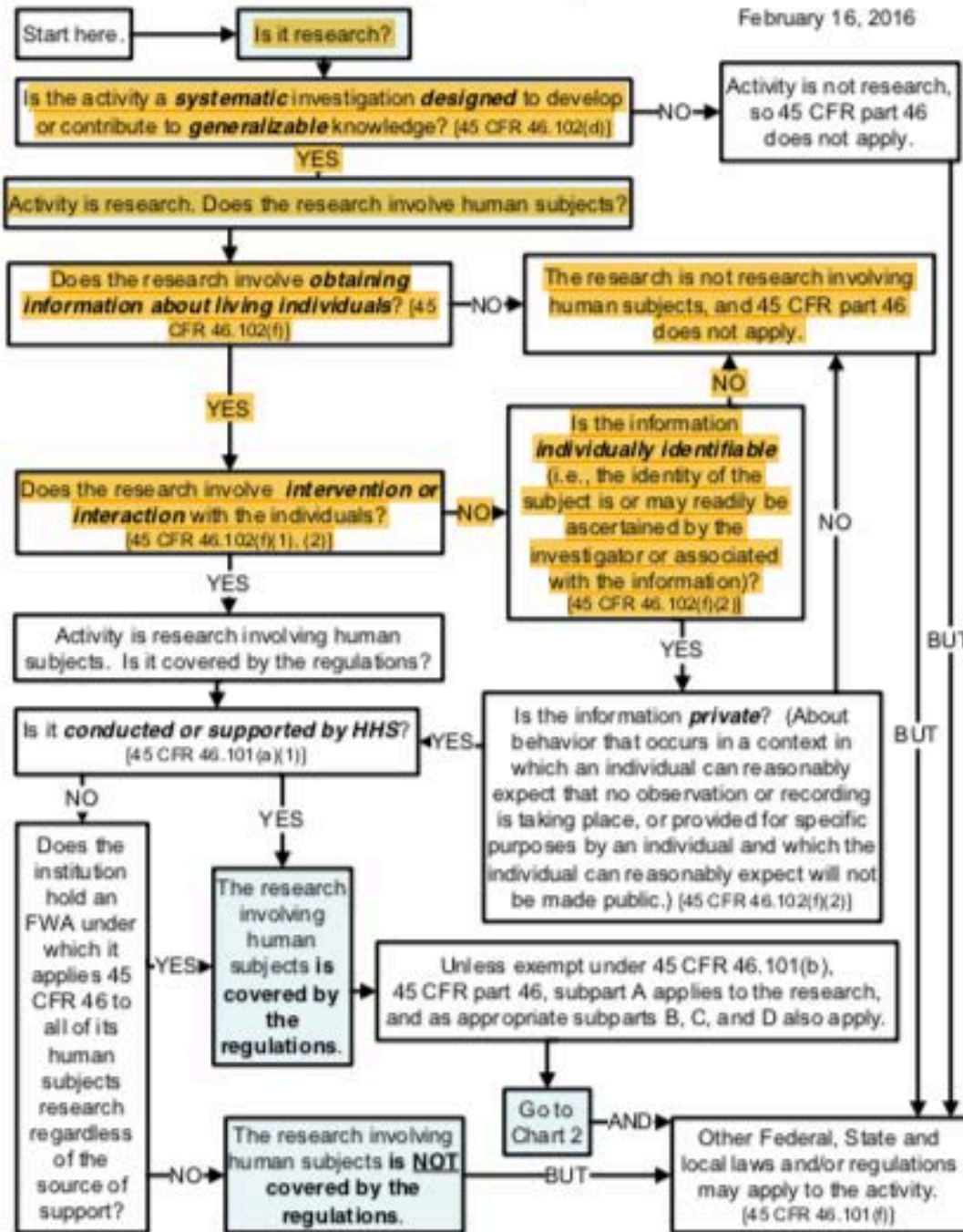
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Appendix A: IRB Review Chart

**Chart 1: Is an Activity Research Involving Human Subjects Covered by 45 CFR part 46?**



## Appendix B: List of Competencies Met in Integrative Learning Experience

**CEPH Foundational Competencies**

<b>Evidence-based Approaches to Public Health</b>
1. Apply epidemiological methods to the breadth of settings and situations in public health practice
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
4. Interpret results of data analysis for public health research, policy or practice
<b>Public Health &amp; Health Care Systems</b>
5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels
<b>Planning &amp; Management to Promote Health</b>
7. Assess population needs, assets and capacities that affect communities' health
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
11. Select methods to evaluate public health programs
<b>Policy in Public Health</b>
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes
<b>Leadership</b>
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making
<b>Communication</b>
18. Select communication strategies for different audiences and sectors
19. Communicate audience-appropriate public health content, both in writing and through oral presentation
20. Describe the importance of cultural competence in communicating public health content
<b>Interprofessional Practice</b>
21. Perform effectively on interprofessional teams
<b>Systems Thinking</b>
22. Apply systems thinking tools to a public health issue

**WSU MPH Concentration Competencies**

<b>Population Health</b>
1. Use evidence based problem solving in the context of a particular population health challenge.
2. Demonstrate application of an advanced quantitative or qualitative research methodology.
3. Demonstrate the ability to contextualize and integrate knowledge of specific population health issues.
4. Address diversity when evaluating population health issues related to improving population health, reducing disparities, or increasing equity.
5. Analyze public health as part of larger inter-related systems of organizations that influences population health at the local, regional, national, and global levels.