Report on Pregnant Women, Infants and Children

Submitted December 29, 2017

The Ohio Department of Medicaid

John R. Kasich, Governor Barbara R. Sears, Director

Ohio | Department of Medicaid

John R. Kasich, Governor
Barbara R. Sears, Director

December 29, 2017

Governor John R. Kasich
Ohio House Speaker, the Honorable Cliff Rosenberger
Ohio Senate President, the Honorable Larry Obhof
Ohio House Minority Leader, the Honorable Fred Strahorn
Ohio Senate Minority Leader, the Honorable Kenny Yuko
Joint Medicaid Oversight Committee, Susan Ackerman, Executive Director
Legislative Service Commission Director, Mark Flanders

RE: Pregnant Women, Infants, and Children Report - State Fiscal Year 2017

The attached report is provided in compliance with Section 5162.13 of the Ohio Revised Code requiring the Ohio Department of Medicaid (ODM) to report annually on the effectiveness of the Medicaid program meeting the health care needs of low-income pregnant women, infants, and children. In addition, this report focuses on infant mortality, preterm births, and low birth weight infants.

The rates reported for infant mortality, preterm births and low birth weight infants are calculated for Medicaid and non-Medicaid populations based on both Medicaid data and infant death and birth files from The Ohio Department of Health Bureau of Vital Statistics using the same basic methodology as historically used in the Ohio Medicaid 2014 and 2015 Reports on Pregnant Women, Infants and Children.

Given that this report focuses on the Medicaid population, ODM employs methodologies for these calculations appropriate for the Medicaid population and data as described in Section II and Appendix A of this report that differ from those used by the Ohio Department of Health. Therefore, the data on infant mortality, preterm births, and low birth weight infants published by The Ohio Department of Health may not be directly compared to the data presented in this report.

Sincerely,

Barbara R. Sears
Director

Enclosure

50 W. Town Street, Suite 400
Columbus, Ohio 43215
medicaid.ohio.gov

Table of Contents

PLEASE NOTE: When race data is collected through Ohio Benefits, it is an optional, self-reported data field. Due to the significant level of non-reported race data on Medicaid eligibility / claims records, this information will not always be included in this report.

Section I: Profile of Ohio Births

1.1 Overall Medicaid Enrollment

Figure 1 presents the average monthly enrollment in Ohio Medicaid for calendar years (CY) 2013 - 2016.

Figure 1: Ohio Medicaid Enrollment, CY 2013 - 2016

Average Monthly Enrollment			
2013	**2014**	**2015**	**2016**
2,389,017	2,776,163	3,066,685	3,062,161

1.2 Profile of Ohio Births and Medicaid Demographics

Medicaid plays a significant role in access to health care for pregnant women and children in Ohio. In CY 2013 – 2016, Medicaid has consistently paid for approximately 52% of births in Ohio (see Figure 2). The below information is based on the total number of births to Ohio residents* on the CY 2013 - 2016 birth files provided by the Ohio Department of Health (ODH) Bureau of Vital Statistics (VS); Medicaid-paid deliveries are identified via Medicaid claims/eligibility data. Throughout this report, comparisons are made between Medicaid and non-Medicaid individuals based on the linked VS birth and death data and Medicaid claims/eligibility data. *Please see Appendix A for more information on this process.*

Figure 2: Ohio Births by Payer, CY 2013 - 2016

	# of Births (N)				% of Total Births			
	2013	**2014**	**2015**	**2016**	**2013**	**2014**	**2015**	**2016**
All	136,137	136,570	136,417	135,074	100%	100%	100%	100%
Medicaid	70,885	70,634	70, 816	70,004	52.1%	51.7%	51.9%	51.8%
Non-Medicaid	65,252	65,936	65, 601	65,070	47.9%	48.3%	48.1%	48.2%

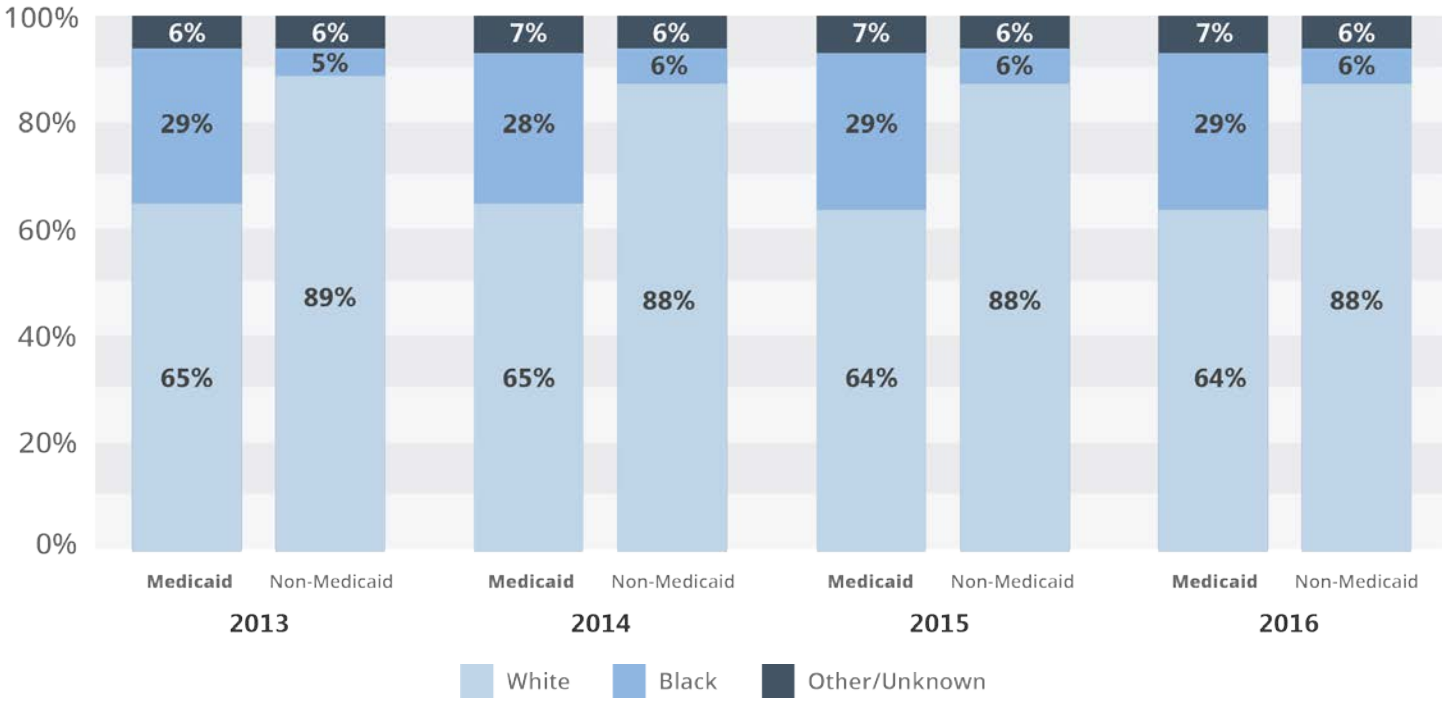
1.3 Demographic Information Related to Ohio Births

Throughout CYs 2013 - 2016, there are notable differences in the demographics of mothers with Medicaid paid deliveries as compared to mothers with non-Medicaid paid deliveries (Figures 3 and 4). This report includes comparisons between Medicaid and non-Medicaid populations by demographic factors known to be associated with birth outcomes: race, ethnicity, maternal age, and marital status. [1-3]

* This number reflects births that occurred in Ohio to Ohio residents.

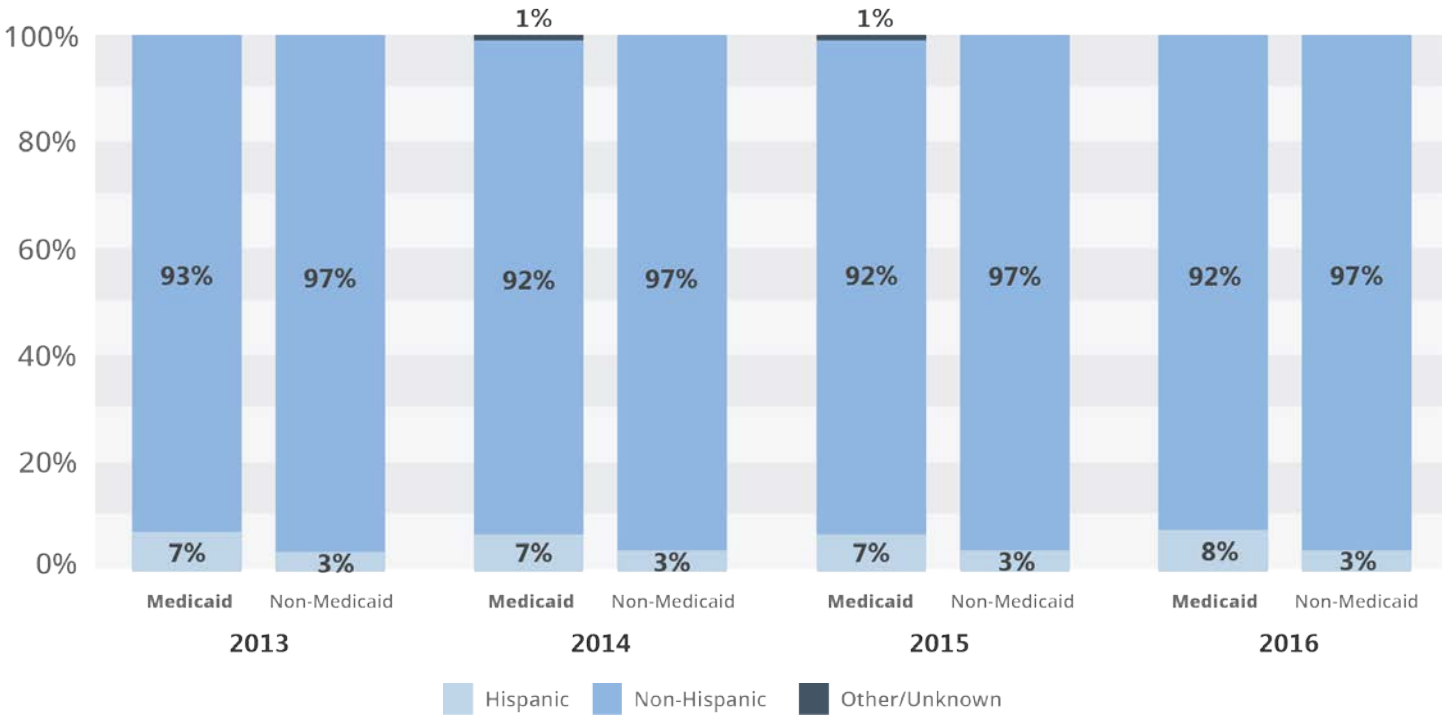
1.3.1 Ohio Births by Maternal Race

Figure 3: Ohio Births by Maternal Race, CY 2013 - 2016



1.3.2 Ohio Births by Maternal Ethnicity

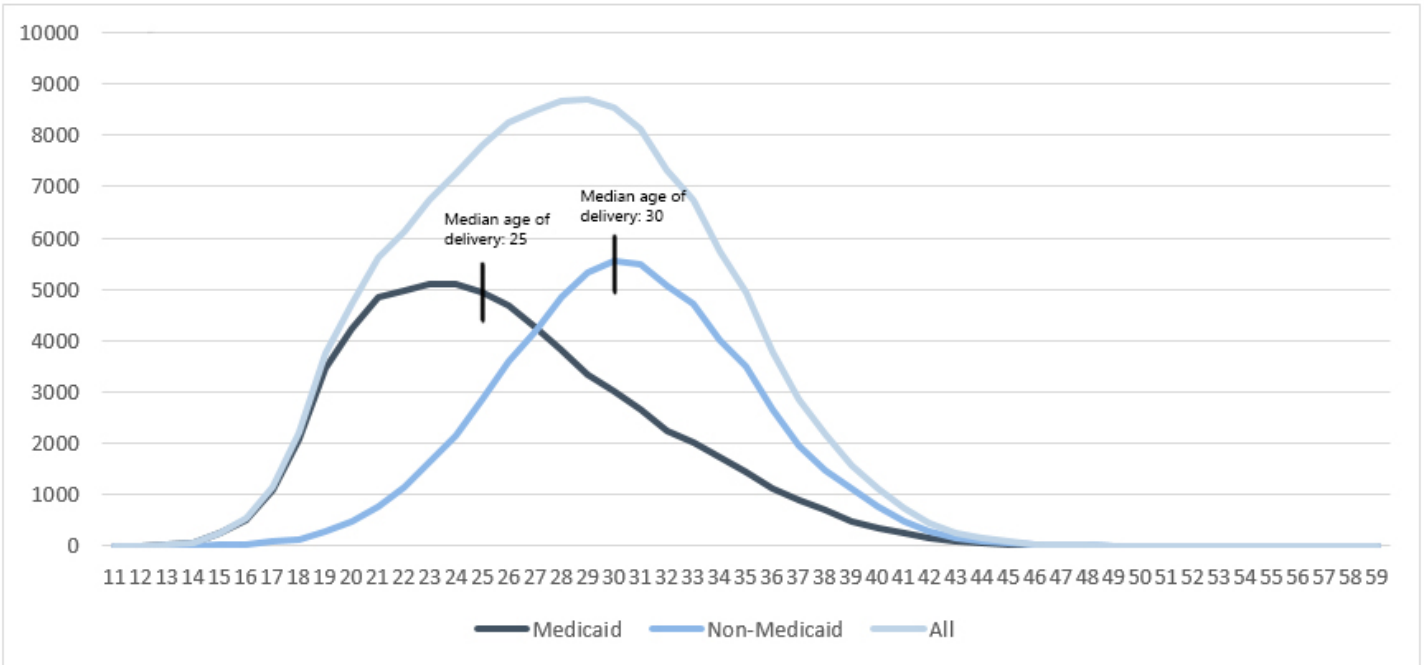
Figure 4: Ohio Births by Maternal Race, CY 2013 - 2016



1.3.3 Maternal Age

As shown in Figure 5, a wide disparity exists in the maternal age of mothers receiving Medicaid benefits at time of delivery as compared to mothers who were not receiving Medicaid benefits at the time of delivery. In 2013, the median age for mothers with a Medicaid paid delivery was 24 years of age; the median age for this group rises to 25 years of age for CYs 2014 – 2016. The median age for women with non-Medicaid paid deliveries has held steady at 30 years of age from 2013 – 2016.

Figure 5: Ohio Births by Maternal Age and Medicaid Status, CY 2016



1.3.4 Marital Status

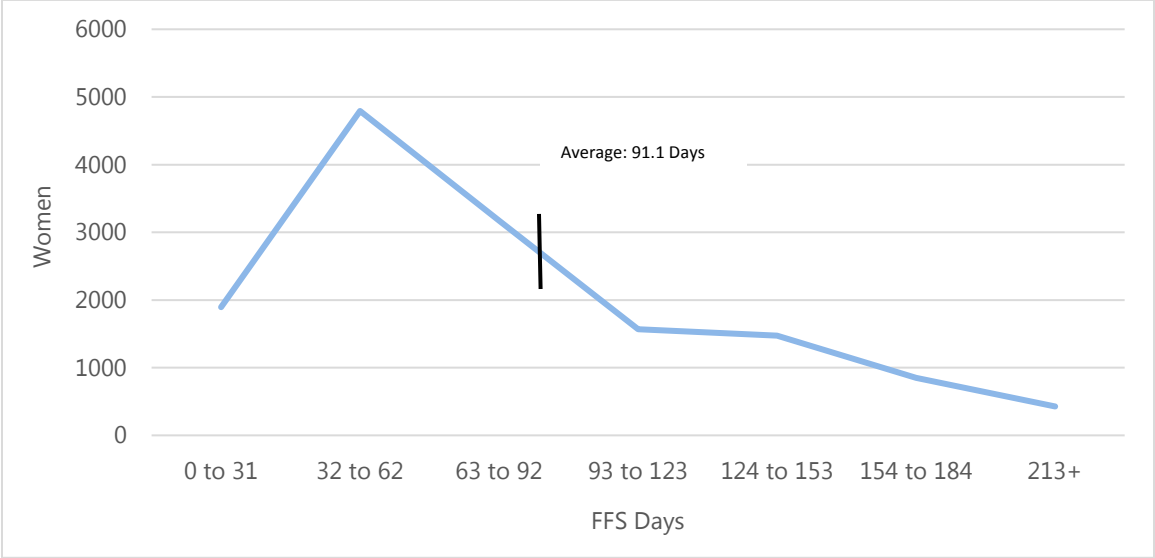
In 2013, 26.6% of women with Medicaid paid deliveries were married as compared to 88.4% of women with non-Medicaid paid deliveries. This trend holds steady in CYs 2014 -2016 with 26.7%, 27%, and 27.3% of women with Medicaid paid deliveries identifying as being married.

1.4 Medicaid Program Enrollment and Gestational Age

1.4.1 Program Enrollment

In CY 2016, 60,099 women enrolled in Ohio Medicaid were identified via the linked VS/Medicaid data as having given birth[†]. An analysis of available data indicated that 42,436 of these women (71%) were enrolled in Ohio Medicaid 11 months prior to their dates of delivery; these women have been removed from the analysis below. Of the 17,663 remaining women, 14,178 (80%) eventually enrolled in a Medicaid managed care plan (MCP) after spending an average of 91.1 days covered by the Medicaid Fee for Service (FFS) program. For these women, Figure 6 shows the complete frequency distribution of the number of days spent on FFS before enrolling in a MCP; this metric will be referred to as "FFS Days" throughout the remainder of this report. It is important to note that a new MCP enrollment policy will be implemented in 2018. Currently, when Medicaid eligibility is authorized, the member has 18 days to select a MCP and the enrollment is effective the first day of the month after plan selection. Effective January 1, 2018, when an individual's Medicaid eligibility is authorized, the member will be enrolled in managed care back to the beginning of that month.

Figure 6: FFS Days Prior to MCP Enrollment[‡]



Further summary statistics for the analysis presented in Figure 6—including the count, mean, and median number of FFS days by county— can be found in *Appendix B*.

[†] Mothers who gave birth twice in 2016 (e.g., January and December) were counted twice, once for each delivery. In the case of a multiple births delivery (e.g., twins) the mother was counted once.

[‡] The measure population for this analysis includes the 14,178 women who did not have Medicaid eligibility 11 months prior to delivery, and who eventually enrolled in a MCP.

1.4.2 Medicaid Enrollment and Gestational Age

As mentioned above, 42,436 of the women who delivered in CY 2016 (71%) were enrolled in Ohio Medicaid 11 months prior to their dates of delivery and were therefore covered by Medicaid throughout their entire pregnancy; these women have been removed from the analysis below. Of the 17,663 women remaining, Figure 7 shows the frequency distribution for first date of enrollment[4] by gestational age in weeks. The majority of these women (57%) were enrolled[4] in Medicaid during their first trimester, specifically during the period of 0-5 weeks of gestational age (Figure 8).

Figure 7: First Enrollment[4] by Gestational Age in Weeks, CY 2016

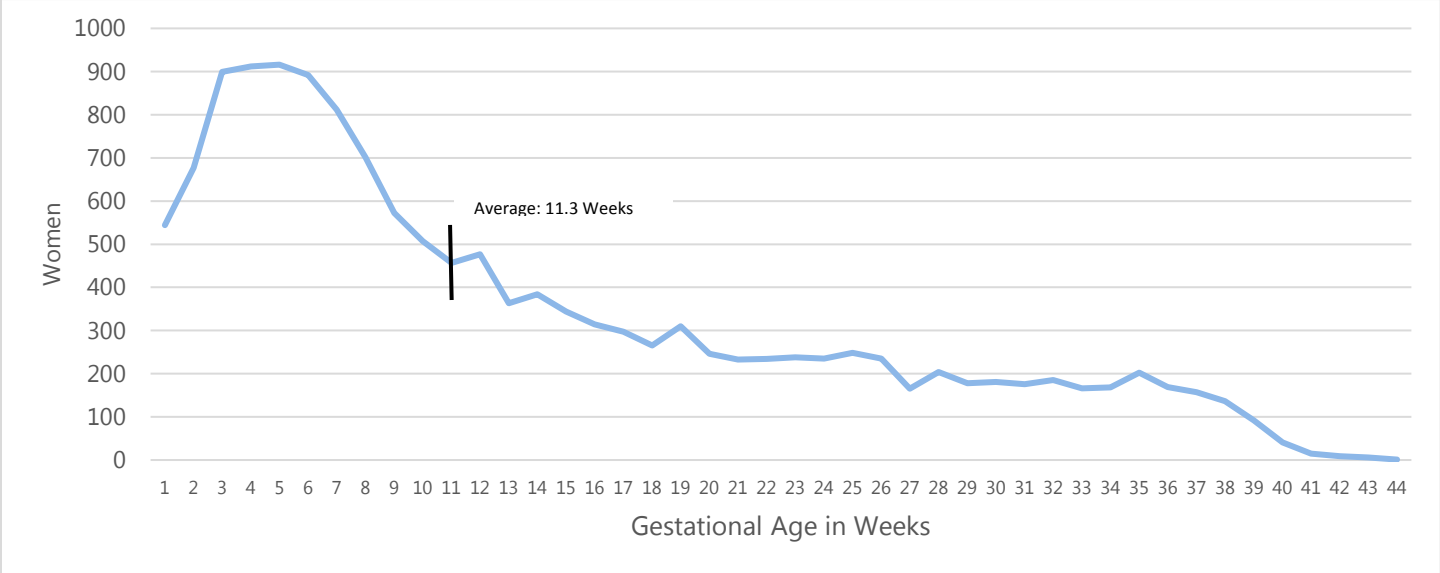
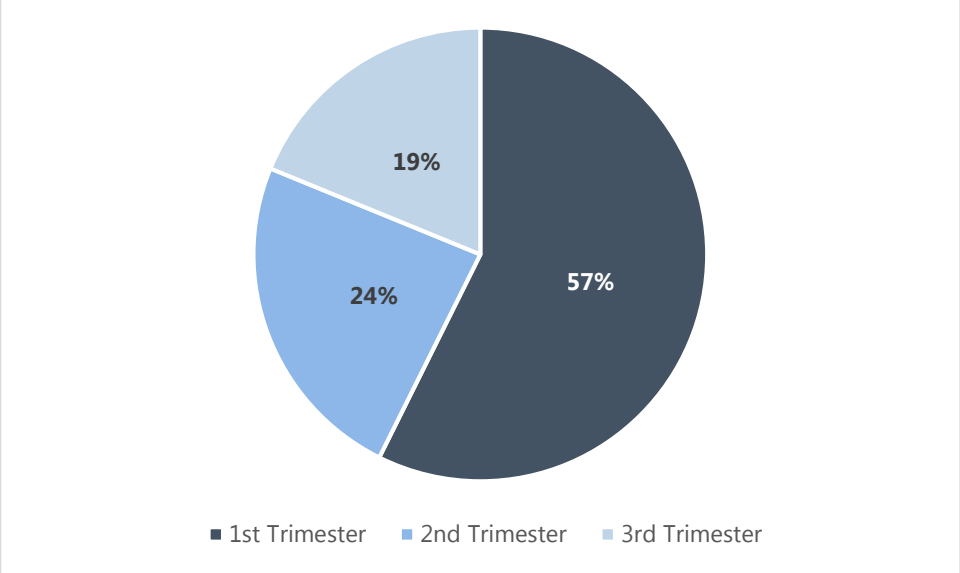


Figure 8: First Enrollment[4] by Trimester, CY 2016



[4] This date is not specific to FFS or MCP enrollment; this date reflects the initial Medicaid enrollment date regardless of program type.

Section II: Birth Outcomes and Risk Factors

2.1 Infant Mortality

Using the linked VS/Medicaid data, the Ohio Department of Medicaid (ODM) calculated Ohio's infant mortality rate using a cohort approach for births to Ohio residents in CYs 2012 - 2015, comparing Medicaid paid to non-Medicaid paid deliveries. This cohort approach identifies all infants who were born in Ohio with Ohio maternal residence by year, and follows them through their first year of life.

Using this cohort approach, the infant mortality rate for the Medicaid population was 7.57 deaths per 1,000 live births for births in 2012; 7.72 deaths per 1,000 live births in 2013; 8.03 deaths per 1,000 live births in 2014; and 8.30 deaths per 1,000 live births in 2015. As a note of caution, the cohort approach is different than the traditional measure of infant mortality and should not be compared directly to other infant mortality rates, including those published by the National Center for Health Statistics (NCHS) or ODH. Due to the cohort approach utilized by ODM, death data lags one full year behind birth data; therefore, the most recent available data for this measure is CY 2015.

Figure 9: Ohio Infant Mortality Rates[5] by Medicaid Status, CYs 2012 – 2015

	Infant Mortality Rate	
	Medicaid	Non-Medicaid
2012	7.57	5.75
2013	7.72	5.29
2014	8.03	5.35
2015	8.30	5.35

Figure 10: Ohio Infant Mortality Rates[5] by Medicaid Status, Race, and Ethnicity, CYs 2012 – 2015

	Race			Ethnicity		
	White	Black	Other/ Unknown	Hispanic	Non-Hispanic	Unknown
Medicaid						
2012	6.56	10.42	5.22	3.99	7.79	13.99
2013	6.78	9.88	7.43	6.84	7.79	7.08
2014	6.43	12.46	4.45	6.48	8.16	5.10
2015	6.99	12.05	4.83	3.72	8.61	14.89
Non-Medicaid						
2012	5.20	16.48	4.15	4.64	5.76	14.18
2013	4.18	21.86	6.67	11.52	5.09	17.05
2014	4.40	19.71	5.48	6.30	5.30	17.86
2015	4.45	18.72	6.06	8.74	5.22	22.90

Above, Figure 10 shows the infant mortality rates broken down by Medicaid status, race, and ethnicity. Across all four measurement years, the infant mortality rates are higher for the Black population as compared to the White population; this distinction is even more pronounced in the non-Medicaid subpopulation.

[5]Please note the method used to calculate the infant mortality rates in this figure is not comparable to those published by NCHS or the ODH.

In regards to ethnicity, the most notable trend displayed in Figure 10 is that Medicaid infant mortality rates are lower in the Hispanic population as compared to the Non-Hispanic population across all four measurement years, especially in CYs 2012 and 2015. It is important to take denominator size (N) into account when comparing demographic breakdowns. Hispanic infant mortality rates among the non-Medicaid subpopulation fluctuate widely from year to year because of the very small N size. Hispanic infant mortality rates fluctuate in the Medicaid subpopulation as well (due in part to small N sizes), but not as widely year to year as those seen in the non-Medicaid subpopulation.

2.2 Preterm Birth and Low Birth Weight

Prematurity (birth prior to 37 weeks gestation) and low birth weight (a birth weight under 2,500 grams) are significant risk factors for infant mortality.[4] Prematurity is an issue that is not limited to the Medicaid population, but is a broader public health issue across the state of Ohio.

Preterm birth (PTB) and low birth weight (LBW) rates have remained consistent over time (CYs 2013 – 2016) for both Medicaid and non-Medicaid paid births (Figure 11).

Figure 11: Ohio Preterm and Low Birth Weight Rates by Medicaid Status, CYs 2013 – 2016

	Preterm Birth		Low Birth Weight	
	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid
Crude Rate				
2013	14.37%	9.86%	10.18%	6.36%
2014	14.53%	9.73%	10.21%	6.21%
2015	14.40%	9.61%	10.27%	6.18%
2016	14.74%	9.55%	10.70%	6.11%

Similar to the racial and ethnic breakdown of infant mortality rates in section 2.1, the PTB and LBW rates by Medicaid status, race, and ethnicity remain consistent over time (Figures 12 and 13). Also, in parallel to the trends seen with infant mortality rates by race, the rates for PTB and LBW are higher for the Black population as compared to the White population for all four measurement years. This distinction is slightly more pronounced in the non-Medicaid subpopulation as compared to the Medicaid subpopulation.

Figure 12: Ohio Preterm and Low Birth Weight Rates by Medicaid Status and Race, CYs 2013 – 2016

	Medicaid			Non-Medicaid		
	White	Black	Other/Unknown	White	Black	Other/Unknown
Preterm Births						
2013	12.97%	17.54%	14.04%	9.52%	15.93%	9.46%
2014	13.02%	17.93%	14.67%	9.37%	14.70%	10.26%
2015	12.92%	17.69%	14.31%	9.30%	15.38%	8.80%
2016	13.30%	17.91%	14.62%	9.10%	15.56%	10.47%
Low Birth Weight						
2013	8.88%	13.42%	8.66%	5.99%	11.02%	7.74%
2014	8.88%	13.42%	9.35%	5.80%	10.88%	7.63%
2015	8.84%	13.76%	8.94%	5.75%	11.95%	7.18%
2016	9.22%	14.24%	9.38%	5.67%	11.27%	7.75%

Figure 13: Ohio Preterm and Low Birth Weight Rates by Medicaid Status and Ethnicity, CYs 2013 – 2016

	Medicaid			Non-Medicaid		
	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown
Preterm Births						
2013	13.57%	14.38%	20.43%	10.58%	9.84%	13.29%
2014	14.41%	14.53%	16.37%	9.77%	9.72%	16.07%
2015	14.26%	14.38%	17.99%	9.79%	9.60%	12.31%
2016	14.50%	14.74%	19.62%	12.38%	9.46%	11.11%
Low Birth Weight						
2013	8.23%	10.29%	14.52%	6.64%	6.34%	9.41%
2014	8.48%	10.33%	12.53%	5.69%	6.22%	10.71%
2015	7.97%	10.40%	17.24%	6.31%	6.17%	9.23%
2016	8.61%	10.84%	18.77%	8.11%	6.05%	6.03%

In regards to ethnicity, PTB rates are similar for Hispanic and non-Hispanic populations in the Medicaid and non-Medicaid subpopulations. Conversely, Hispanic LBW rates are lower than non-Hispanic LBW rates in the Medicaid subpopulation, while LBW rates for the Hispanic and non-Hispanic populations are similar in the non-Medicaid subpopulation.

When interpreting both PTB and LBW rates, it is important to note that rates in the non-Medicaid Hispanic population fluctuate from year to year due to the small N of these subpopulations. The Medicaid Hispanic rates do not fluctuate as much because the N is larger for Hispanic Medicaid versus Hispanic non-Medicaid populations, in both the numerator and denominator. However, year to year fluctuations for Hispanic rates among the non-Medicaid population are not as great in the PTB and LBW measures as compared to infant mortality, because the PTB/LBW numerators are larger than that of the infant mortality rate.

2.2.1 Risk Factors for Preterm Birth and Low Birth Weight

There is a greater risk for a preterm and/or low birth weight delivery if the mother had a previous preterm birth, had low maternal weight gain, smoked during pregnancy, had a previous poor birth outcome, delivered within 18 months of a prior delivery, or had little or no prenatal care.[1-3]

As shown in Figure 14, crude rates show consistent trends over time (CYs 2013-2016). From 2013-2016, with the exception of short birth spacing (less than 18 months between deliveries), pregnant women on Medicaid had higher rates for all risk factors as compared to non-Medicaid pregnant women. Most notably, Medicaid women had smoking rates at least 20% higher than non-Medicaid women for each of the measurement years. All of the data presented regarding selected risk factors are based on self-reported data found on the birth certificate.

Figure 14: Selected Risk Factors for Prematurity and Low Birth Weight, CY 2013 – 2016

	Previous Preterm Birth		Low Maternal Weight Gain		Smoking During Pregnancy		Previous Poor Outcome		Birth Spacing (<18 months)		No Prenatal Care	
	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid
Crude Rate												
2013	6.36%	3.65%	31.72%	21.94%	28.16%	4.62%	5.27%	3.75%	5.42%	6.87%	2.07%	0.71%
2014	6.80%	4.00%	31.30%	21.55%	27.14%	4.38%	5.13%	3.79%	5.55%	7.27%	2.82%	0.95%
2015	6.69%	4.09%	32.01%	22.02%	25.62%	3.83%	5.67%	4.55%	5.60%	7.44%	2.48%	2.48%
2016	7.33%	4.15%	32.89%	22.95%	24.34%	3.39%	6.63%	4.66%	5.84%	7.74%	2.24%	0.80%

Figure 15: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Medicaid Paid Births by Race, CY 2013-2016

	Previous Preterm Birth			Low Maternal Weight Gain			Smoking During Pregnancy			Previous Poor Outcome			Birth Spacing (<18 months)			No Prenatal Care		
	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown
CRUDE RATE	5.36%	8.81%	5.24%	29.38%	35.95%	36.96%	35.81%	15.28%	7.84%	4.80%	6.35%	5.17%	5.48%	5.67%	3.68%	1.66%	2.90%	2.59%
2013	5.90%	9.12%	5.49%	28.80%	35.17%	39.43%	34.71%	14.60%	7.07%	4.85%	5.83%	4.77%	5.63%	5.86%	3.53%	2.19%	3.97%	4.08%
2014	5.98%	9.37%	5.98%	29.55%	35.72%	39.74%	32.90%	14.21%	5.73%	5.20%	6.77%	5.38%	5.54%	6.03%	4.50%	2.06%	3.22%	3.27%
2015	6.41%	9.87%	5.07%	30.70%	36.20%	39.57%	31.51%	13.03%	5.30%	5.63%	8.68%	7.12%	5.84%	6.31%	3.90%	1.89%	3.03%	2.21%
2016	5.36%	8.81%	5.24%	29.38%	35.95%	36.96%	35.81%	15.28%	7.84%	4.80%	6.35%	5.17%	5.48%	5.67%	3.68%	1.66%	2.90%	2.59%

When comparing across racial breakdowns (White and Black) in the Medicaid subpopulation for previous preterm birth, low maternal weight gain, previous poor outcome, and no prenatal care, rates in the White population are slightly lower. This disparity is most pronounced in the previous preterm birth measure. The measure of birth spacing shows virtually no difference between rates in the White and Black populations, however, the measure of smoking during pregnancy shows rates in the White population that are substantially higher than that of the Black population (Figure 15).

Figure 16: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Non-Medicaid Paid Births by Race, CY 2013 – 2016

	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown	White	Black	Other/ Unknown
CRUDE RATE																		
2013	3.48%	6.70%	3.37%	21.16%	31.10%	25.60%	4.94%	3.30%	1.00%	3.74%	4.78%	2.93%	7.01%	5.62%	5.92%	0.58%	1.59%	1.97%
2014	3.79%	7.39%	3.77%	20.53%	31.52%	27.00%	4.62%	4.18%	1.24%	3.79%	4.71%	3.05%	7.34%	6.97%	6.47%	0.78%	2.13%	2.29%
2015	3.88%	7.54%	3.89%	21.11%	31.59%	26.78%	4.02%	3.98%	0.94%	4.46%	6.97%	3.49%	7.54%	7.18%	6.17%	0.57%	1.74%	1.70%
2016	3.96%	7.72%	3.58%	21.97%	32.59%	28.42%	3.58%	3.45%	0.69%	4.43%	8.81%	4.12%	7.92%	6.51%	6.20%	0.71%	2.15%	0.89%

The trends in risk factors in the non-Medicaid subpopulation are similar to those found in the Medicaid subpopulation. When comparing the Black and White populations in the non-Medicaid subpopulation on measures of previous poor outcome and no prenatal care, rates in the White population are slightly lower. This disparity is most pronounced in the previous preterm birth and low maternal weight gain measures, where rates in the White population are much lower than those of the Black population. In the measures of birth spacing and smoking during pregnancy, the rates for the White population are slightly higher than that of the Black population.

Figure 17: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Medicaid Paid Births by Ethnicity, CY 2013 – 2016[††]

	Previous Preterm Birth			**Low Maternal Weight Gain**			**Smoking During Pregnancy**			**Previous Poor Outcome**			**Birth Spacing (<18 months)**			**No Prenatal Care**		
	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown
CRUDE RATE	5.60%	6.40%	8.01%	36.14%	31.37%	38.71%	10.69%	29.48%	22.58%	4.36%	5.34%	5.10%	4.67%	5.49%	3.17%	2.07%	2.04%	7.27%
2013	5.63%	6.90%	4.35%	38.00%	30.76%	40.00%	11.01%	28.40%	20.12%	4.03%	5.22%	3.32%	4.43%	5.65%	2.78%	3.51%	2.75%	6.55%
2014	6.00%	7.01%	10.26%	38.84%	31.46%	36.31%	9.08%	26.97%	15.92%	4.37%	5.76%	6.62%	4.97%	5.67%	3.14%	3.20%	2.40%	7.12%
2015	5.77%	7.43%	15.59%	38.94%	32.35%	43.48%	8.82%	25.68%	12.39%	5.59%	6.71%	6.84%	4.71%	5.93%	6.47%	1.82%	2.26%	6.84%
2016	5.60%	6.40%	8.01%	36.14%	31.37%	38.71%	10.69%	29.48%	22.58%	4.36%	5.34%	5.10%	4.67%	5.49%	3.17%	2.07%	2.04%	7.27%

[††] Yes = Hispanic; No= Non-Hispanic

When comparing Hispanic and non-Hispanic populations in the Medicaid subpopulation for previous preterm birth, previous poor outcome, and birth spacing, the Hispanic and non-Hispanic rates are reasonably similar, although the rates in the Hispanic population are slightly lower. This disparity is most pronounced in the smoking during pregnancy measure (Figure 17). Hispanic and non-Hispanic rates are nearly identical for the measure of no prenatal care; however, when looking at low maternal weight gain, rates in the Hispanic population are substantially higher than those in the non-Hispanic population.

Figure 18: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Non-Medicaid Paid Births by Ethnicity, CY 2013 – 2016[††]

	Previous Preterm Birth			Low Maternal Weight Gain			Smoking During Pregnancy			Previous Poor Outcome			Birth Spacing (<18 months)			No Prenatal Care		
	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown	Yes	No	Unknown
CRUDE RATE	3.30%	3.66%	2.96%	28.25%	21.76%	32.28%	3.29%	4.66%	3.52%	2.69%	3.78%	2.37%	4.94%	6.93%	5.33%	1.80%	0.67%	6.41%
2013	4.47%	3.99%	2.70%	27.43%	21.38%	28.40%	3.00%	4.42%	5.38%	3.73%	3.80%	2.70%	6.40%	7.30%	4.21%	2.76%	0.89%	8.08%
2014	5.41%	4.05%	5.34%	29.64%	21.80%	29.21%	2.75%	3.86%	4.76%	3.72%	4.56%	8.40%	7.31%	7.44%	8.18%	1.46%	0.68%	2.56%
2015	4.15%	4.15%	5.08%	30.28%	22.72%	26.19%	2.23%	3.43%	4.00%	4.56%	4.67%	0.85%	6.87%	7.77%	4.17%	0.87%	0.79%	3.74%
2016	3.30%	3.66%	2.96%	28.25%	21.76%	32.28%	3.29%	4.66%	3.52%	2.69%	3.78%	2.37%	4.94%	6.93%	5.33%	1.80%	0.67%	6.41%

When comparing non-Medicaid Hispanic and non-Hispanic populations for smoking during pregnancy, previous poor outcome, and birth spacing, the rates in the Hispanic and non-Hispanic populations are reasonably similar, although rates in the Hispanic population are slightly lower. Rates in the Hispanic and non-Hispanic populations are similar in regards to the previous preterm birth measure, however, rates in the Hispanic population are substantially higher with looking at the measures of low maternal weight gain and no prenatal care (Figure 18).

It is important to note that rates in the non-Medicaid Hispanic population may fluctuate from year to year because of the small N of this subpopulation. For the measures presented in Figures 17 and 18, year to year rates in the Medicaid Hispanic population do not fluctuate as much as compared to those of the Medicaid non-Hispanic population because the N is larger for the Medicaid Hispanic versus non-Medicaid Hispanic populations in both denominators and numerators.

2.3 Progesterone

The State of Ohio is committed to reducing the incidence of preterm birth, one of the primary contributors to infant mortality. Progesterone is a hormone medication that has the potential to reduce the incidence of preterm birth for high-risk women. The state is working with the Ohio Perinatal Quality Collaborative (OPQC), composed of perinatal clinicians, hospitals, and government entities working together to improve birth outcomes through wider use of progesterone treatment. Ohio Equity Institute teams will begin implementing the progesterone evidence-based strategies in high-risk communities in late 2017 in conjunction with ODH and ODM.

In support of this commitment, ODM and its MCPs have created a web-based standardized pregnancy risk assessment and notification form (PRAF 2.0). When providers use this system to enter in information about a Medicaid pregnancy, it provides same day notification to the patient's MCP, home health agency, and the county of residence so that they can maintain Medicaid coverage during pregnancy and connect her with needed services, including progesterone. Prior to this system, providers had to determine which of six forms to use to notify an MCP or county agency of pregnancy, and had to submit separate referrals to home health agencies. In 2018, this system will be connected to Ohio's eligibility system, Ohio Benefits, further reducing the risk of losing coverage and needed services during pregnancy.

The rates presented in Figure 19 represent the percentage of women who had a high-risk pregnancy—as determined by a either a prior preterm birth or shortened cervix during their pregnancy—and were administered progesterone to help prevent preterm birth. Rates of progesterone administration have continued to increase from 2013 - 2016 across all races and ethnicities, with the highest overall progesterone administration rate being achieved in high-risk Black women in 2016.

Figure 19: Overall Progesterone Rates for Medicaid Paid High Risk Pregnancies by Maternal Race and Ethnicity, CYs 2013 – 2016

		Race			Ethnicity	
	Overall Rate	White	Black	Other	Hispanic	Non-Hispanic
2013	24.64%	23.38%	26.88%	24.76%	22.71%	24.87%
2014	26.65%	25.17%	28.80%	22.66%	26.16%	26.67%
2015	30.20%	29.28%	31.29%	36.23%	31.90%	30.12%
2016	30.50%	29.08%	32.60%	32.32%	29.56%	30.55%

2.4 Smoking Cessation

Smoking is one of the most common preventable risk factors for infant mortality as it increases the risk of preterm birth and low birth weight. The state is expanding publicly funded maternal and child health programs and recommended clinical practice guidelines from the U.S. Public Health Service about how to encourage people to quit smoking. The state also promotes a nationally recognized, evidence-based smoking cessation model to reduce smoking among women during pregnancy. The *Moms Quit for Two* program utilizes the "Baby and Me – Tobacco Free" model and is offered across Ohio by many local health departments, Ohio Equity Institute teams, and other community organizations.

Rates presented in Figure 20 represent the percentage of members aged 15 - 44 screened for tobacco use who received cessation counseling intervention if identified as a tobacco user, as reported on Medicaid claims data. Please note that the procedure codes used to calculate this measure are voluntary to report by the provider, therefore, the calculated rates may be underrepresented in Medicaid claims data. Beginning in 2017, this measure has been added to the list of quality metrics for which providers participating in Ohio's patient centered medical home initiative, the Comprehensive Primary Care (CPC) Program, will be held accountable.

Figure 20: Tobacco Cessation and Counseling for Women 15-44 Years of Age by Race and Ethnicity, CYs 2015 – 2016

		Race			Ethnicity	
	Overall Rate	White	Black	Other	Hispanic	Non-Hispanic
2015	4.45%	5.24%	2.91%	3.24%	2.90%	4.95%
2016	5.27%	6.15%	3.64%	3.64%	3.30%	5.33%

Section III: State Innovation Model (SIM) Perinatal Episode

In 2012, the state of Ohio was awarded a SIM grant by the Centers for Medicare and Medicaid Services (CMS). Only 17 states spend more per person on health care than Ohio (CMS 2012). Despite high spending by and for Ohio residents, Ohio has not seen value commensurate with its level of spending. 41 states have healthier populations than Ohio (CMFW 2014). Ohio is one of many states which employs a predominantly FFS system, and this system all too often encourages health care providers to deliver more care rather than better care. Moving away from FFS is especially challenging for a large and diverse state like Ohio. With nearly 12 million residents, seven metropolitan areas, 50 rural counties, a plethora of health plans (none with more than 20 percent market share), and many thriving, and competing, health systems, Ohio does not lend itself to easy solutions. It does, however, make it an ideal testing ground for consumer research companies and, for those same reasons, the optimum state in which to test innovative payment and service delivery models.

The State of Ohio, along with its Medicaid MCPs (Buckeye, CareSource, Molina, Paramount, and UnitedHealthcare) and a multi-payer coalition that includes four private payers with 80 percent of the commercial market (Aetna, Anthem, Medical Mutual, and UnitedHealthcare) launched two models statewide: a patient-centered medical home CPC model and an episode-based payment model.

One of many episodes deigned as part of the SIM work includes a perinatal episode, which consists of all relevant care delivered to a patient due to a birth. The episode is triggered by a live birth and includes all prenatal care 280 days before the delivery through postnatal care 60 days after discharge from the delivery facility. All inpatient, outpatient, professional, and pharmacy claims tied to relevant perinatal care, less specific spend exclusions, are included in the episode duration.

The Principle Accountable Provider (PAP) is the clinician or medical entity responsible for billing the delivery, defined by billing ID. This provider is accountable for the entire perinatal episode from start to finish as he or she is in the position to guide the most appropriate care to deliver the best health outcome for the mother.

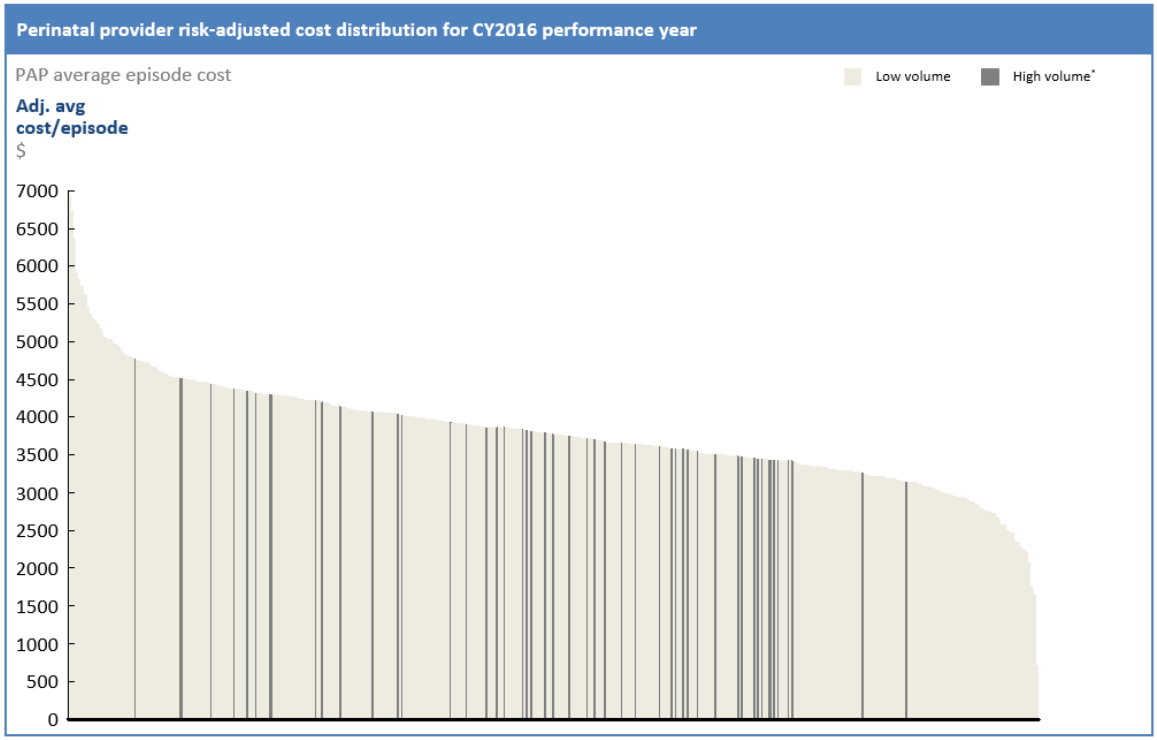
Episodes that are included are risk adjusted to specifically capture the impact of documented clinical factors that

typically require additional care during an episode and are outside of the PAP's control. Risk factor examples include age, specific chronic conditions, and comorbidities. Episodes are excluded in cases where patient characteristics and diagnoses may not render an apples-to-apples comparison as the patient journey is so different.

PAPs receive quarterly episode performance reports on their latest perinatal performance, and also an annual PAP referral report showing their relative performance compared to all other PAPs. Figure 21 depicts a PAP curve demonstrative of the variation in costs for all PAPs with five or more perinatal delivery episodes.

For a given performance year, final reports on performance and associated incentive payments are released approximately nine months after the conclusion of the performance year to allow for sufficient claims run out (e.g. final reports for the CY2016 performance year were released in September 2017). For perinatal, there are four quality metrics: Prenatal HIV screening rate (pass threshold: 50%), Prenatal GBS screening rate (50%), C-section rate (45%), and Percent of episodes with follow-up visit within 60 days (50%). Neonatal care is addressed through three separate episodes across low, moderate, and high risk levels.

Figure 21: Perinatal Provider Risk-Adjusted Cost Distribution for the 2016 Performance Year



* Top 10% of providers by volume

Source: OH Medicaid Fee for Service claims and encounter data, CY2016;

More details on the perinatal episode can be found at:
http://medicaid.ohio.gov/providers/paymentinnovation.aspx

Section IV: Prenatal, Postnatal, and Well-Child Visits

4.1 Measure Results by Statewide Average, Medicaid MCP, and FFS

The Healthcare Effectiveness Data and Information Set (HEDIS) results, as well as administrative data, were used to examine frequency and timeliness of prenatal care, as well as postpartum care and well-child visits. HEDIS is a healthcare quality measurement tool through the National Committee for Quality Assurance (NCQA) that is utilized by more than 90 percent of America's health plans. HEDIS measures performance on important dimensions of care and service are based on 81 measures across 5 domains of care.

Data displayed in Figure 22 includes self-reported audited HEDIS data from Ohio Medicaid's five MCPs, as well as administrative FFS data. Self-reported audited HEDIS rates may contain data from both claims and medical record reviews (hybrid methodology), while FFS data is solely claims based (administrative); therefore, the results between MCPs and FFS may not be comparable.

Using HEDIS methodology: in 2013, 86% of women in Medicaid MCPs received timely prenatal care; 69.9% received over 81% of the expected prenatal visits (Frequency of Ongoing Prenatal Care); and 63% received post-partum visits within 90 days of delivery (See Figure 22).[5] Within the first 15 months of life, 60.1% of infants met the requirement for the well-child visit criteria, whereas, 69.0% of children in their third, fourth, fifth, and sixth year of life met the well-child visit criteria.[5]

Similarly in 2014, 85.9% of women in Medicaid MCPs received timely prenatal care; 69.8% received over 81% of the expected prenatal visits (Frequency of Ongoing Prenatal Care); and 61.4% received post-partum visits within 90 days of delivery.[6] Within the first 15 months of life, 59.7% of infants met the requirement for the well-child visit criteria, whereas, 63.1% of children in their third, fourth, fifth, and sixth year of life met the well- child visit criteria.[6]

These trends held steady in 2015 with, 83.9% of women in Medicaid MCPs receiving timely prenatal care; 69.1% received over 81% of the expected prenatal visits (Frequency of Ongoing Prenatal Care); and 62.8% received post-partum visits within 90 days of delivery.[7] Within the first 15 months of life, 54.9% of infants met the requirement for the well-child visit criteria, whereas 65.7% of children in their third, fourth, fifth, and sixth year of life met the well-child visit criteria.[7]

In 2016, 84.5% of women in Medicaid MCPs received timely prenatal care; 68.8% of women received over 81% of the expected prenatal visits (Frequency of Ongoing Prenatal Care); and 62.9% received post-partum visits within 90 days of delivery.[8] Within the first 15 months of life, 59.0% of infants met the requirement for the well-child visit criteria, whereas, 69.7% of children in their third, fourth, fifth, and sixth year of life met the well-child visit criteria.[8]

The ranking represents how Ohio's Medicaid MCPs' HEDIS results compare with national Medicaid benchmarks collected by NCQA. For example, Ohio's Medicaid MCPs were between the 50th and 75th percentile for the Timeliness of Prenatal Care HEDIS measure in comparison with other Medicaid MCPs reporting results to NCQA in calendar years 2013, 2014, and 2016, and between the 50th and 75th percentile for over 81% of the expected prenatal visits (Frequency of Ongoing Prenatal Care) and post-partum visits within 90 days of delivery in CYs 2013 – 2016.

Figure 22: Medicaid MCP Self-Reported Audited HEDIS and FFS Rates, CYs 2013 – 2016

	Frequency of Ongoing Prenatal Care		Timeliness of Prenatal Care		Postpartum Care		Well Child Visits (Frist 15 Months of Life, Six or More Visits)		Well Child Visits (Third, Fourth, Fifth, and Sixth Year of Life)	
	Overall Reported Rate	NCQA Percentile Range	Overall Reported Rate	NCQA Percentile Range	Overall Reported Rate	NCQA Percentile Range	Overall Reported Rate	NCQA Percentile Range	Overall Reported Rate	NCQA Percentile Range
STATE WIDE										
2013	69.9%	P50-P75	86.0%	P50-P75	63.0%	P25-P50	60.1%	P25-P50	69.0%	P25-P50
2014	69.8%	P50-P75	85.9%	P50-P75	61.4%	P25-P50	59.7%	P25-P50	63.1%	P10-P25
2015	69.1%	P50-P75	83.9%	P25-P50	62.8%	P50-P75	54.9%	P25-P50	65.7%	P25-P50
2016	68.8%	P50-P75	84.5%	P50-P75	62.9%	P50-P75	59.0%	P25-P50	69.7%	P25-P50
BUCKEYE										
2013	67.4%	P50-P75	82.5%	P25-P50	63.6%	P25-P50	57.2%	P25-P50	66.2%	P10-P25
2014	69.0%	P50-P75	85.2%	P50-P75	63.9%	P50-P75	61.9%	P25-P50	59.2%	<P10
2015	71.2%	P75-P90	88.4%	P50-P75	60.4%	P25-P50	50.3%	P10-P25	61.4%	P10-P25
2016	71.9%	P75-P90	86.8%	P50-P75	65.3%	P50-P75	53.5%	P25-P50	64.6%	P10-P25
CARESOURCE										
2013	68.4%	P50-P75	86.1%	P50-P75	64.0%	P50-P75	60.3%	P25-P50	71.5%	P25-P50
2014	67.6%	P50-P75	85.4%	P50-P75	60.6%	P25-P50	59.1%	P25-P50	64.2%	P10-P25
2015	66.4%	P50-P75	82.7%	P25-P50	63.5%	P50-P75	55.7%	P25-P50	67.4%	P25-P50
2016	65.9%	P50-P75	83.7%	P50-P75	63.3%	P50-P75	61.6%	P50-P75	71.0%	P25-P50
MOLINA										
2013	72.5%	P50-P75	85.5%	P25-P50	56.6%	P10-P25	55.0%	P10-P25	64.1%	P10-P25
2014	76.2%	P75-P90	88.7%	P50-P75	62.5%	P25-P50	58.0%	P25-P50	62.4%	P10-P25
2015	75.8%	≥P90	84.1%	P25-P50	63.7%	P50-P75	50.5%	P10-P25	63.9%	P10-P25
2016	73.8%	P75-P90	84.0%	P50-P75	58.8%	P25-P50	58.1%	P25-P50	65.7%	P25-P50
PARAMOUNT										
2013	78.7%	P75-P90	89.9%	P75-P90	71.6%	P75-P90	69.0%	P50-P75	67.8%	P25-P50
2014	76.2%	P75-P90	86.4%	P50-P75	68.6%	P50-P75	62.0%	P25-P50	60.6%	P10-P25
2015	74.2%	P75-P90	85.9%	P50-P75	67.9%	P50-P75	59.8%	P50-P75	64.8%	P10-P25
2016	73.7%	P75-P90	87.6%	P75-P90	63.7%	P50-P75	56.0%	P25-P50	69.2%	P25-P50
UNITED										
2013	68.8%	P50-P75	86.9%	P50-P75	59.0%	P25-P50	65.0%	P25-P50	63.6%	P10-P25
2014	69.6%	P50-P75	85.4%	P50-P75	54.8%	P10-P25	60.9%	P25-P50	63.5%	P10-P25
2015	67.5%	P50-P75	82.9%	P25-P50	56.0%	P25-P50	57.0%	P25-P50	64.6%	P10-P25
2016	69.3%	P50-P75	83.5%	P50-P75	61.2%	P50-P75	56.0%	P25-P50	73.6%	P50-P75
FFS										
2013	37.5%	N/A	58.6%	N/A	31.7%	N/A	40.4%	N/A	52.4%	N/A
2014	33.1%	N/A	51.3%	N/A	31.3%	N/A	33.7%	N/A	51.9%	N/A
2015	31.6%	N/A	55.8%	N/A	33.1%	N/A	19.7%	N/A	50.9%	N/A
2016	23.3%	N/A	48.9%	N/A	30.5%	N/A	23.5%	N/A	35.9%	N/A

Section V: Behavioral Health Services

Under the leadership of the Governor's Office of Health Transformation, the Ohio Department of Mental Health and Addiction Services and ODM are collaborating to implement reforms and enhance the quality of behavioral health services delivered to residents of our state. In doing so, state partners have enlisted the help and expertise of various stakeholders to serve on the Behavioral Health Redesign Core Team to further inform and guide this work. Behavioral Health Redesign is a transformative initiative aimed at rebuilding Ohio's community behavioral health system capacity. Key proposals include adding new services for people with high intensity service and support needs and aligning the procedure codes used by Ohio's behavioral health providers to better integrate physical and behavioral healthcare.

Of the 60,099 women enrolled in Ohio Medicaid that were identified via the linked VS/Medicaid data as having given birth[†] in CY 2016, 15,515 (25%) had a behavioral health clinical condition (identified by a primary diagnosis on a Medicaid claim) [†] (Figure 23). Of which, 6,564 (42%) received services from a community mental health center at an annual rate of 12 visits per patient, and 3,332 (6%) received addiction services from a substance use disorder (SUD) clinic at an annual rate of 46 visits per patient (Figure 24). 2,027 of these women (13%) were utilizing medication assisted treatment services for substance abuse issues.

Figure 23: Women with a Medicaid Paid Delivery in CY 2016 with a Behavioral Health Clinical Condition

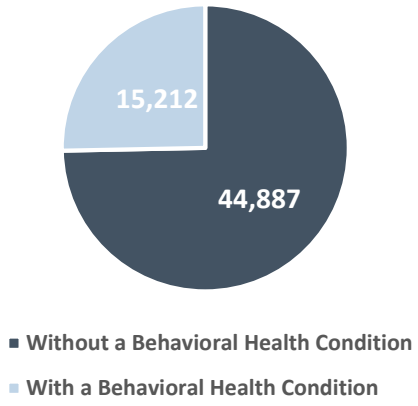
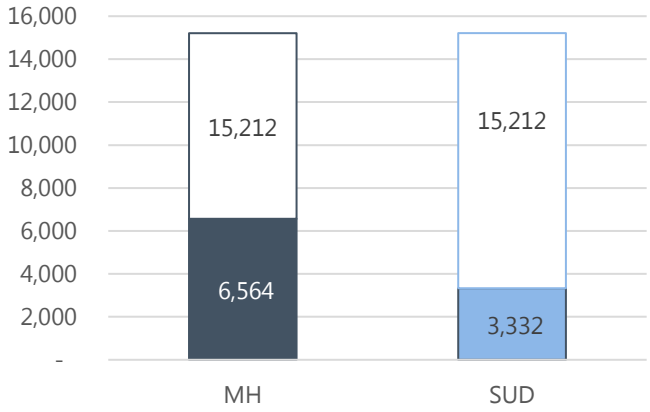


Figure 24: Women with a Medicaid Paid Delivery in CY 2016 with a Behavioral Health Clinical Condition Treated by a Mental Health Provider



Section VI: Medicaid Prenatal Care, Delivery, and Infant Costs

The average total cost during pregnancy of a woman enrolled in Medicaid (costs for all covered services for nine months prior to the delivery month to one month after the delivery month) was $8,641 in 2013, $9,112 in 2014, $10,059 in 2015, and $9,302 in 2016 (see Figure 25). Prenatal and delivery costs[#] paid by Medicaid include direct FFS payments to service providers, and capitation and birth premium payments to managed care providers for women enrolled in managed care.

In 2016, the total cost paid by Medicaid for prenatal care and deliveries was $651,177,208 for 70,004 births. Of these Medicaid payments, 55% of these dollars ($359,750,556) paid for deliveries compared to 45% of these dollars ($290,516,588) which paid for prenatal care. Only costs and member months for those months in which a woman had Medicaid eligibility were included; a woman may have utilized Medicaid for only a portion of her pregnancy, and in some instances only as of her delivery date.

Costs paid by Medicaid during an infant's first year of life include direct FFS payments to service providers, and capitation payments to managed care providers for infants enrolled in managed care. In 2016, 70,816 infants were eligible and enrolled in Medicaid for at least a portion of their first year of life; this trend has been steady throughout past measurement years (CY 2013 – 2015).

The total cost paid by Medicaid for the first year of life for infants enrolled in 2016 was $841,213, 314. Only costs and member months for those months of the infants' first year of life in which the infant had Medicaid eligibility were included; an infant may have utilized Medicaid for only a portion of their first year of life.

Overall, costs for prenatal care, deliveries, and infants in the first year of life decreased from CY 2015 to CY 2016. The lower costs are primarily due to a decrease in MCP per member/per month capitation payments for the Covered Families and Children (CFC) population. Delivery capitation payments (i.e. payment per delivery) for CFC decreased by approximately 11% from CY 2015 to CY 2016, and non-delivery related capitation payments (per member per month payments) decreased by 1.6%. For CY 2016, managed care costs accounted for approximately 85% of the costs for infants in the first year of life, approximately 92% of delivery costs, and approximately 84% of the total costs for deliveries and prenatal care. The FFS costs for infants in the first year of life, deliveries, and total costs for deliveries and prenatal care accounted for 15%, 8% and 16% of total costs for each category, respectively. There were no industry standard data sources available with current costs of national Medicaid prenatal care, deliveries, and/or infant care for comparison with Ohio data.

[#] Delivery costs include FFS delivery costs, delivery capitation payments and estimated delivery payments for certain managed care members as determined by the applicable capitation rate cell payment.

Figure 25: Total and Average Cost of Deliveries, Prenatal Care, and Infants, CY 2013 – 2016

	Deliveries	Prenatal Care	Total Prenatal Care and Delivery Care	Infants— First Year of Life
Total Beneficiaries				
2013	70,885	70,885	70,885	69,667
2014	70,634	70,634	70,634	70,885
2015	70,816	70,816	70,816	70,634
2016	70,004	70,004	70,004	70,816
Total Cost				
2013	$324,895,506	$287,598,095	$612,493,601	$739,671,129
2014	$364,914,896	$278,720,827	$643,635,723	$842,220,609
2015	$413,599,850	$298,760,862	$712,320,711	$878,019,086
2016	$359,750,556	$290,516,588	$651,177,208	$841,213,314
Average Cost/ Beneficiary				
2013	$4,583	$4,057	$8,641	$10,617
2014	$5,166	$3,946	$9,112	$11,882
2015	$4,840	$4,219	$10,059	$12,431
2016	$5,139	$4,150	$9,302	$11,879
Total Member Months				
2013	N/A	515,592	639,506	874,847
2014	N/A	521,369	659,310	884,729
2015	N/A	541,061	678,752	889,072
2016	N/A	548,472	686,766	896,922
Average Cost/ Member Month				
2013	N/A	$558	$958	$845
2014	N/A	$535	$976	$952
2015	N/A	$552	$1,049	$988
2016	N/A	$530	$948	$938

Section VII: References

1. Centers for Disease Control and Prevention (2014). Factors Associated with Preterm Birth. Retrieved December 18, 2014 from http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PDF/PretermBirth-Infographic.pdf.

2. March of Dimes (2014). Low Birth Weight. Retrieved December 18, 2014 from http://www.marchofdimes.org/baby/low-birthweight.aspx#.

3. Institute of Medicine, Committee on Understanding Premature Birth and Assuring Healthy Outcomes (2007). Preterm Birth Causes, Consequences, and Prevention. Retrieved December 18, 2014 from http://www.ncbi.nlm.nih.gov/books/NBK11362/pdf/TOC.pdf.

4. Centers for Disease Control and Prevention. Infant Mortality. Retrieved December 18, 2014 from http://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm.

5. National Committee for Quality Assurance. HEDIS & Performance Measurement. Retrieved December 18, 2014 from http://www.ncqa.org/HEDISQualityMeasurement.aspx.

6. National Committee for Quality Assurance. HEDIS & Performance Measurement. Retrieved March 7, 2015 from http://www.ncqa.org/HEDISQualityMeasurement.aspx.

7. National Committee for Quality Assurance. HEDIS & Performance Measurement. Retrieved November 30, 2016 from http://www.ncqa.org/HEDISQualityMeasurement.aspx.

8. National Committee for Quality Assurance. HEDIS & Performance Measurement. Retrieved December 14, 2017 from http://www.ncqa.org/HEDISQualityMeasurement.aspx.

Appendix A: Data Sources and Methodologies for Calculations

Data Sources

Medicaid information was obtained from Medicaid claims, premium payment records, and eligibility records from Ohio Medicaid's Medicaid Information Technology System (MITS), Business Intelligence and Analytical Research (BIAR) system, and Medicaid's Quality Decision Support System (QDSS). In addition, the ODH Bureau of VS provided birth certificate data and linked birth certificate/death certificate data. Where information is reported for Medicaid individuals and non-Medicaid populations, the linked VS/Medicaid data was used.

Linkage of Ohio Birth Certificates to Medicaid Data

The matching process for mothers and infants typically consists of deterministic linkages followed by several rounds of multiple-iteration probabilistic linkages implemented in Statistical Analysis System (SAS) using a program called The Link King[8].

The Link King is a rigorous public domain option for matching individuals in administrative datasets in the absence of a common identifier. The Link King was originally developed at Washington State's Division of Alcohol and Substance Abuse (DASA) and incorporates a probabilistic algorithm developed by MEDSTAT for the Substance Abuse and Mental Health Services Administration (SAMHSA).

The matching process seeks to identify the same infants and mothers (women who have given birth) from: 1) a file of infants derived from an analysis of Medicaid claims, encounter, and eligibility files; and 2) an annual file of statewide birth certificate data. Personal identifiers from each source are compared using string matching techniques, and potential matches are assigned a score based on the likelihood of being a match. Only those links that have received a score above a certain threshold are considered a match. Examples of personal identifiers used in the iterative matching process include: date of birth, first, middle, and last names, sex, race/ethnicity, and zip code. The result of the matching process is a file that, where possible, includes an associated Medicaid ID and birth certificate number. For infants, this would be the infant's Medicaid ID and, for mothers, the mother's Medicaid ID. Both baby and mother would be associated with the same birth certificate number for Ohio births. Because both baby and mother would share the same birth certificate number for Ohio births, this common birth certificate number is then used to try to create a final linked file of infants and mothers that contains the unique identifiers from both data sources.

Match statistics are generated throughout the process and are ultimately used to quantify the success of the linkage process. The proportion of Medicaid mothers joined to their infants via a common Ohio birth certificate is known as the "match rate." For 2012, 90.8% of Medicaid mothers and their infants were linked via a birth certificate. The match rate for 2013 and 2014 was 89.4% and 90.1%, respectively. In 2015, the linked percentage was 85.6% to 91.8%. In 2016, the linked percentage was 90.4%. The range for 2015 is a result of the transition from the 9th revision (ICD-9) to the 10th revision (ICD-10) of the International Statistical Classification of Diseases and Related Health Problems and more specifically, the inclusion or exclusion of ICD-10 code O99.89 in the matching process. The issues arising as a result of the ICD-9 to ICD-10 revision were not apparent in the linkage process for births in calendar year 2016; therefore, billing code O99.89 was not used to reduce potential

[8] Campbell, K. M. (2009) "Impact of record-linkage methodology on performance indicators and multivariate relationships," Journal of Substance Abuse Treatment, 36:110-117.

misclassification bias.

The United States Department of Health and Human Services identified October 1, 2015 as the date to begin compliance with the ICD-10 code sets. Following this date, O99.83 became the updated version of code 646.93 from ICD-9. While defined in ICD-9 as "unspecified complication of pregnancy, antepartum condition or complication," the ICD-10 code description also includes childbirth and the puerperium, or the six weeks after childbirth. Implementation of ICD-10 code O99.89 in the matching process beginning October 1, 2015 may result not only in deliveries, but also in flagging women as pregnant who already gave birth.

When including code O99.83 in the 2015 matching process, the linked percentage is 85.6%. There appears to be an increase in the deliveries, but not in the number of linked birth claims to birth certificates. Using more restrictive criteria to define deliveries, and excluding code O99.83 when there are not birth certificate matches, results in a linked percentage of 91.8%. This is comparable to the rates from recent years.

In addition, analysis of the 2015 Medicaid claims data demonstrates that not all providers began implementation of the ICD-10 code sets on October 1, 2015, which may have impacted the 2015 linked percentage. For example, some providers continued to use ICD-9 code sets following the transition date for the classification of pregnancies and deliveries. In addition, some providers used ICD-10 codes prior to the Oct. 1, 2015 start date. Both errors may eventually result in resubmission of claims. Therefore, the matching rate from the latter half of 2015 may have been adversely affected by the ICD coding changeover.

Reporting and Interpretation of Crude Rates

For each of the birth outcomes of interest (prematurity, low birth weight, and infant mortality) and each of the risk factors of interest (previous preterm birth, low maternal weight gain, smoking during pregnancy, previous poor outcomes, short birth spacing, and no prenatal care), a crude rate was calculated for both the Medicaid population and the non-Medicaid population. Crude rates are the number of events in a population divided by the number of people who were eligible for the event in the population. For example, the crude prematurity rate within the Medicaid population is the number of premature births in the Medicaid population divided by the total number of births in the Medicaid population for a specific year. Comparing the crude rate for the Medicaid population to the crude rate for the non-Medicaid population may be misleading due to the large disparities that are observed between the Medicaid and non-Medicaid populations on age, race, ethnicity and other non-demographic risk factors such as short birth spacing and prior preterm births.

Calculation of Costs during Pregnancy and the Cost of Deliveries

Costs were included for all Medicaid deliveries in CYs 2013 - 2016. Costs during pregnancy, for the purposes of this report, include all costs for the nine (9) months prior to the month of delivery, the month of delivery and the month following the month of delivery.

The costs of deliveries for women enrolled in managed care include birth premium payments and estimated birth premium payments for women with managed care encounter claims for a delivery service(s) but no delivery premium payment (incurred but not paid deliveries). Estimated birth premium payments were determined using the mother's county of residence, the last date of service on the delivery encounter claim, and the applicable managed care delivery rate cell code & premium amount (delivery encounter claims included those with a $0 payment and no indication of third party payment, and those with a net claim payment > $0).

Delivery payments for mothers with FFS claims include net payments for inpatient hospital claims with an Ohio DRG code for a delivery, as applicable for the date of service/delivery. For those mothers with FFS claims indicating delivery, but no inpatient claim with an applicable DRG, the cost of delivery was estimated using the statewide FFS average net payment for inpatient claims with an Ohio DRG code for a delivery. There were deliveries identified for both managed care and FFS for which the Ohio Medicaid cost was $0: 1) managed care deliveries for which third party payment was rendered and the net payment (by the MCP) was $0; and 2) FFS claims with an Ohio DRG delivery code in a paid status where the net payment was $0. Delivery and prenatal care costs were estimated for infants with Medicaid IDs identified on the ODH VS birth file where the mother's Medicaid ID could not be determined.

Calculation of Costs of Infants in Medicaid

Infant costs include all managed care premium payments for dates of service in the month of birth through the month of the infant's first birthday if the infant was enrolled in a MCP. In addition, infant costs include FFS claims with dates of service in the month of birth up through the first 365 days of life. Infants may have both FFS claims and managed care premium payments included in the analysis. For CY 2016, costs were estimated for approximately 4% of newborns for whom a Medicaid recipient ID could not be determined, but who we were identified on the ODH VS birth file and linked to a mother with Medicaid birth and delivery claims data.

Appendix B: FFS Days Prior to MCP Enrollment for Medicaid Women who Delivered*** in CY 2016 by County

County Name	FFS Days (Count)	FFS Days (Mean)	FFS Days (Median)	Rural vs. †††
Adams	40	75.6	61.5	Rural
Allen	152	103.1	91	Urban
Ashland	86	82.5	61.5	Urban
Ashtabula	122	94.7	91	Urban
Athens	54	90.4	91	Urban
Auglaize	60	95.1	91.5	Rural
Belmont	12	71.2	62	Urban
Brown	60	95.0	91	Rural
Butler	464	95.6	91	Urban
Carroll	33	94.1	91	Rural
Champaign	50	79.9	61	Rural
Clark	218	77.6	61	Urban
Clermont	254	89.7	91	Urban
Clinton	67	92.9	91	Rural
Columbiana	155	78.9	61	Urban
Coshocton	35	80.2	61	Rural
Crawford	66	92.0	76	Rural
Cuyahoga	1287	97.4	91	Urban
Drake	58	127.7	122.5	Rural
Defiance	62	81.5	61.5	Rural
Delaware	94	89.9	91	Urban
Erie	95	71.9	61	Urban
Fairfield	171	75.1	61	Urban
Fayette	46	91.5	91	Rural
Franklin	1966	95.8	91	Urban
Fulton	58	81.1	62	Rural
Gallia	40	76.2	61	Rural
Geauga	58	105.1	91	Urban
Greene	152	106.6	92	Urban
Guernsey	69	78.2	62	Rural
Hamilton	961	99.3	92	Urban
Hancock	93	98.2	92	Urban
Hardin	60	95.6	90	Rural
Harrison	14	69.8	61	Rural
Henry	34	81.6	62	Rural
Highland	51	94.4	91	Rural
Hocking	45	90.0	62	Rural
Holmes	36	96.7	90.5	Rural
Huron	111	86.3	62	Urban
Jackson	37	101.4	91	Rural
Jefferson	37	70.8	61	Urban

***There are 151 women with missing county information; these women have been excluded from this analysis

††† Urban and rural communities are defined as specified in rules adopted under section 3701.142 of Ohio Revised Code.

County Name	FFS Days (Count)	FFS Days (Mean)	FFS Days (Median)	Rural vs. Urban†††
Knox	81	77.9	61	Urban
Lake	187	101.6	91	Urban
Lawrence	1	0.0	0	Urban
Licking	238	85.2	61	Urban
Logan	74	79.5	61	Rural
Lorain	316	94.6	91	Urban
Lucas	635	86.3	62	Urban
Madison	37	80.7	61	Rural
Mahoning	276	89.8	62	Urban
Marion	102	85.2	61	Urban
Medina	143	80.4	62	Urban
Meigs	28	75.3	61.5	Rural
Mercer	35	103.0	92	Rural
Miami	128	103.6	92	Urban
Monroe	7	96.1	92	Rural
Montgomery	788	96.9	91	Urban
Morgan	16	78.0	90.5	Rural
Morrow	37	76.1	61	Rural
Muskingum	115	75.6	61	Urban
Noble	19	78.6	61	Rural
Ottawa	35	79.5	62	Rural
Paulding	28	79.8	61	Rural
Perry	41	67.7	61	Rural
Pickaway	51	93.1	91	Urban
Pike	34	75.3	61	Rural
Portage	131	95.2	91	Urban
Preble	44	74.7	61	Rural
Putnam	28	72.0	61	Rural
Richland	175	84.2	62	Urban
Ross	106	86.8	62	Urban
Sandusky	103	85.0	62	Urban
Scioto	108	79.1	62	Urban
Seneca	92	72.9	61	Urban
Shelby	74	89.9	62	Rural
Stark	482	92.1	91	Urban
Summit	601	80.9	62	Urban
Trumbull	236	83.6	62	Urban
Tuscarawas	146	91.5	91	Urban
Union	43	93.6	92	Urban
Van Wert	48	105.4	92	Rural
Vinton	18	89.9	61.5	Rural
Warren	178	98.0	92	Urban
Washington	73	75.2	61	Rural
Wayne	115	88.3	91	Urban
Williams	55	97.0	91	Rural
Wood	138	97.2	92	Urban
Wyandot	31	81.8	62	Rural

Appendix C: Low Birth Weight Births by County, CY 2016

County	Medicaid			Non-Medicaid		
County Name	LBW Births	Total Births	Crude Rate	LBW Births	Total Births	Crude Rate
Adams	22	181	12.15%	8	90	8.89%
Allen	93	765	12.16%	28	476	5.88%
Ashland	22	264	8.33%	6	357	1.68%
Ashtabula	72	693	10.39%	21	350	6.00%
Athens	34	328	10.37%	11	216	5.09%
Auglaize	24	237	10.13%	14	332	4.22%
Belmont			18.52%			7.14%
Brown	20	259	7.72%	9	189	4.76%
Butler	200	2212	9.04%	143	2227	6.42%
Carroll	14	144	9.72%		118	4.24%
Champaign	12	171	7.02%	8	215	3.72%
Clark	91	1024	8.89%	28	503	5.57%
Clermont	105	995	10.55%	66	1302	5.07%
Clinton	23	297	7.74%	11	187	5.88%
Columbiana	52	638	8.15%	22	352	6.25%
Coshocton	29	246	11.79%	9	215	4.19%
Crawford	26	301	8.64%		169	1.78%
Cuyahoga	1103	8347	13.21%	464	6320	7.34%
Drake	21	268	7.84%	11	305	3.61%
Defiance	9	221	4.07%	10	175	5.71%
Delaware	28	355	7.89%	107	1762	6.07%
Erie	46	444	10.36%	24	349	6.88%
Fairfield	74	760	9.74%	62	915	6.78%
Fayette	25	223	11.21%		112	3.57%
Franklin	1116	9927	11.24%	595	8923	6.67%
Fulton	19	204	9.31%	11	237	4.64%
Gallia	18	189	9.52%		112	1.79%
Geauga	16	208	7.69%	35	716	4.89%
Greene	69	672	10.27%	73	1125	6.49%
Guernsey	29	297	9.76%	9	167	5.39%
Hamilton	684	5633	12.14%	336	4964	6.77%
Hancock	35	394	8.88%	28	502	5.58%
Hardin	9	189	4.76%	10	205	4.88%
Harrison		44	4.55%		50	8.00%
Henry	17	126	13.49%	11	161	6.83%
Highland	37	343	10.79%	6	220	2.73%
Hocking	21	213	9.86%	7	86	8.14%
Holmes	6	118	5.08%	18	568	3.17%
Huron	33	447	7.38%	12	335	3.58%
Jackson	26	231	11.26%		151	3.31%
Jefferson	16	216	7.41%		96	4.17%
Knox	34	347	9.80%	26	422	6.16%

County	Medicaid			Non-Medicaid		
County Name	LBW Births	Total Births	Crude Rate	LBW Births	Total Births	Crude Rate
Lake	77	887	8.68%	75	1267	5.92%
Lawrence			15.38%			0.00%
Licking	94	991	9.49%	56	1101	5.09%
Logan	27	263	10.27%	7	236	2.97%
Lorain	208	1812	11.48%	80	1475	5.42%
Lucas	370	3408	10.86%	148	2143	6.91%
Madison	16	197	8.12%	17	216	7.87%
Mahoning	186	1632	11.40%	55	844	6.52%
Marion	44	509	8.64%	15	250	6.00%
Medina	46	525	8.76%	70	1285	5.45%
Meigs	17	146	11.64%		53	9.43%
Mercer	10	134	7.46%	14	419	3.34%
Miami	45	546	8.24%	24	678	3.54%
Monroe		39	7.69%		33	6.06%
Montgomery	435	3752	11.59%	183	2858	6.40%
Morgan	7	92	7.61%		46	10.87%
Morrow	12	164	7.32%	11	191	5.76%
Muskingum	55	650	8.46%	18	374	4.81%
Noble		57	1.75%		63	6.35%
Ottawa	13	124	10.48%	12	194	6.19%
Paulding	9	92	9.78%		48	2.08%
Perry	17	247	6.88%	6	163	3.68%
Pickaway	25	271	9.23%	23	333	6.91%
Pike	18	220	8.18%	9	103	8.74%
Portage	72	617	11.67%	59	815	7.24%
Preble	26	224	11.61%	9	163	5.52%
Putnam	13	132	9.85%	18	298	6.04%
Richland	76	819	9.28%	33	514	6.42%
Ross	63	550	11.45%	17	279	6.09%
Sandusky	30	398	7.54%	15	282	5.32%
Scioto	56	601	9.32%	7	206	3.40%
Seneca	38	344	11.05%	8	250	3.20%
Shelby	16	281	5.69%	17	311	5.47%
Stark	226	2242	10.08%	116	1972	5.88%
Summit	401	3089	12.98%	182	2898	6.28%
Trumbull	125	1277	9.79%	43	711	6.05%
Tuscarawas	48	578	8.30%	36	625	5.76%
Union	18	168	10.71%	32	493	6.49%
Van Wert	17	168	10.12%		125	3.20%
Vinton	8	96	8.33%		45	4.44%
Warren	52	675	7.70%	115	1751	6.57%
Washington	17	255	6.67%	16	208	7.69%
Wayne	35	504	6.94%	47	1019	4.61%
Williams	15	208	7.21%	7	170	4.12%
Wood	27	459	5.88%	71	900	7.89%
Wyandot	8	97	8.25%		152	1.32%

Appendix D: Preterm Births by County, CY 2016

County	Medicaid			Non-Medicaid		
County Name	Preterm Births	Total Births	Crude Rate	Preterm Births	Total Births	Crude Rate
Adams	28	182	15.38%	13	90	14.44%
Allen	151	765	19.74%	64	480	13.33%
Ashland	32	263	12.17%	17	358	4.75%
Ashtabula	97	693	14.00%	32	351	9.12%
Athens	47	328	14.33%	19	217	8.76%
Auglaize	35	237	14.77%	30	333	9.01%
Belmont	8		29.63%			7.14%
Brown	34	260	13.08%	13	189	6.88%
Butler	323	2217	14.57%	226	2228	10.14%
Carroll	15	144	10.42%	14	118	11.86%
Champaign	22	172	12.79%	19	215	8.84%
Clark	158	1032	15.31%	58	505	11.49%
Clermont	150	996	15.06%	120	1303	9.21%
Clinton	32	297	10.77%	18	187	9.63%
Columbiana	85	638	13.32%	31	352	8.81%
Coshocton	33	246	13.41%	14	214	6.54%
Crawford	52	302	17.22%	11	169	6.51%
Cuyahoga	1374	8361	16.43%	618	6336	9.75%
Drake	22	267	8.24%	21	305	6.89%
Defiance	17	221	7.69%	15	176	8.52%
Delaware	37	355	10.42%	170	1762	9.65%
Erie	58	444	13.06%	34	351	9.69%
Fairfield	108	761	14.19%	91	916	9.93%
Fayette	30	222	13.51%	9	112	8.04%
Franklin	1563	9947	15.71%	968	8948	10.82%
Fulton	29	206	14.08%	17	237	7.17%
Gallia	9	188	4.79%		112	3.57%
Geauga	18	208	8.65%	56	717	7.81%
Greene	104	673	15.45%	122	1125	10.84%
Guernsey	45	299	15.05%	12	168	7.14%
Hamilton	902	5646	15.98%	475	4977	9.54%
Hancock	47	395	11.90%	41	502	8.17%
Hardin	23	189	12.17%	16	205	7.80%
Harrison		44	11.36%		50	8.00%
Henry	14	126	11.11%	16	161	9.94%
Highland	36	340	10.59%	22	220	10.00%
Hocking	32	213	15.02%	8	86	9.30%
Holmes	12	118	10.17%	40	569	7.03%
Huron	56	447	12.53%	31	336	9.23%
Jackson	30	231	12.99%	16	149	10.74%
Jefferson	32	217	14.75%	6	97	6.19%
Knox	52	347	14.99%	35	422	8.29%
Lake	127	888	14.30%	109	1269	8.59%

County	Medicaid			Non-Medicaid		
County Name	Preterm Births	Total Births	Crude Rate	Preterm Births	Total	Crude Rate
Lawrence			7.69%			0.00%
Licking	145	995	14.57%	103	1100	9.36%
Logan	49	263	18.63%	20	236	8.47%
Lorain	278	1814	15.33%	132	1476	8.94%
Lucas	453	3416	13.26%	203	2149	9.45%
Madison	36	197	18.27%	31	216	14.35%
Mahoning	248	1634	15.18%	78	846	9.22%
Marion	64	509	12.57%	22	251	8.76%
Medina	64	525	12.19%	104	1285	8.09%
Meigs	14	146	9.59%		53	7.55%
Mercer	16	134	11.94%	30	419	7.16%
Miami	74	547	13.53%	46	678	6.78%
Monroe		39	5.13%		33	9.09%
Montgomery	626	3762	16.64%	294	2864	10.27%
Morgan	6	92	6.52%	6	46	13.04%
Morrow	19	164	11.59%	17	192	8.85%
Muskingum	97	651	14.90%	42	375	11.20%
Noble		57	7.02%	7	63	11.11%
Ottawa	12	124	9.68%	22	194	11.34%
Paulding	8	92	8.70%		48	2.08%
Perry	25	247	10.12%	7	163	4.29%
Pickaway	36	271	13.28%	35	333	10.51%
Pike	39	219	17.81%	7	103	6.80%
Portage	85	618	13.75%	78	815	9.57%
Preble	37	224	16.52%	15	163	9.20%
Putnam	25	132	18.94%	37	298	12.42%
Richland	101	820	12.32%	52	517	10.06%
Ross	78	551	14.16%	20	279	7.17%
Sandusky	50	398	12.56%	26	283	9.19%
Scioto	72	601	11.98%	10	206	4.85%
Seneca	50	344	14.53%	26	251	10.36%
Shelby	30	281	10.68%	26	311	8.36%
Stark	283	2249	12.58%	191	1976	9.67%
Summit	513	3093	16.59%	287	2903	9.89%
Trumbull	151	1279	11.81%	61	714	8.54%
Tuscarawas	91	579	15.72%	54	626	8.63%
Union	27	169	15.98%	56	494	11.34%
Van Wert	26	167	15.57%	11	125	8.80%
Vinton	11	96	11.46%		45	8.89%
Warren	84	674	12.46%	164	1753	9.36%
Washington	28	255	10.98%	18	208	8.65%
Wayne	62	505	12.28%	82	1020	8.04%
Williams	21	208	10.10%	14	170	8.24%
Wood	57	460	12.39%	92	900	10.22%
Wyandot	11	97	11.34%	9	153	5.88%