



# **Report on Pregnant Women, Infants and Children**

Submitted December 31, 2018

**The Ohio Department of Medicaid**

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



## Department of Medicaid

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

December 31, 2018

Governor John R. Kasich

Ohio House Speaker, the Honorable Ryan Smith

Ohio Senate President, the Honorable Larry Obhof

Ohio House Minority Leader, the Honorable Fred Strahorn

Ohio Senate Minority Leader, the Honorable Kenny Yuko

Ohio Commission on Infant Mortality, Representative Sarah LaTourette, Co-Chair

Ohio Commission on Infant Mortality, Senator Stephanie Kunze, Co-Chair

Joint Medicaid Oversight Committee, Senator Dave Burke, Chair

Legislative Service Commission Director, Mark Flanders

### **RE: Pregnant Women, Infants, and Children Report - State Fiscal Year 2018**

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 -2017 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

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*Appendix A: Data Sources and Methodologies for Calculations*

*Appendix B: FFS Days Prior to MCP Enrollment for Medicaid Women who Delivered in CY 2017 by County*

*Appendix C: Low Birth Weight Births by County, CY2017*

*Appendix D: Preterm Births by County, CY2017*

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 - 2017.

**Figure 1: Ohio Medicaid Enrollment, CY 2013 - 2017**

Average Monthly Enrollment				
2013	2014	2015	2016	2017
2,389,017	2,776,163	3,066,685	3,062,161	3,071,625

### 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 – 2017, 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 - 2017 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 - 2017**

	# of Births (N)					% of Total Births				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
<b>All</b>	136,137	136,570	136,417	135,074	133,892	100%	100%	100%	100%	100%
<b>Medicaid</b>	70,885	70,634	70,816	70,004	69,261	52.1%	51.7%	51.9%	51.8%	51.7%
<b>Non-Medicaid</b>	65,252	65,936	65,601	65,070	64,631	47.9%	48.3%	48.1%	48.2%	48.3%

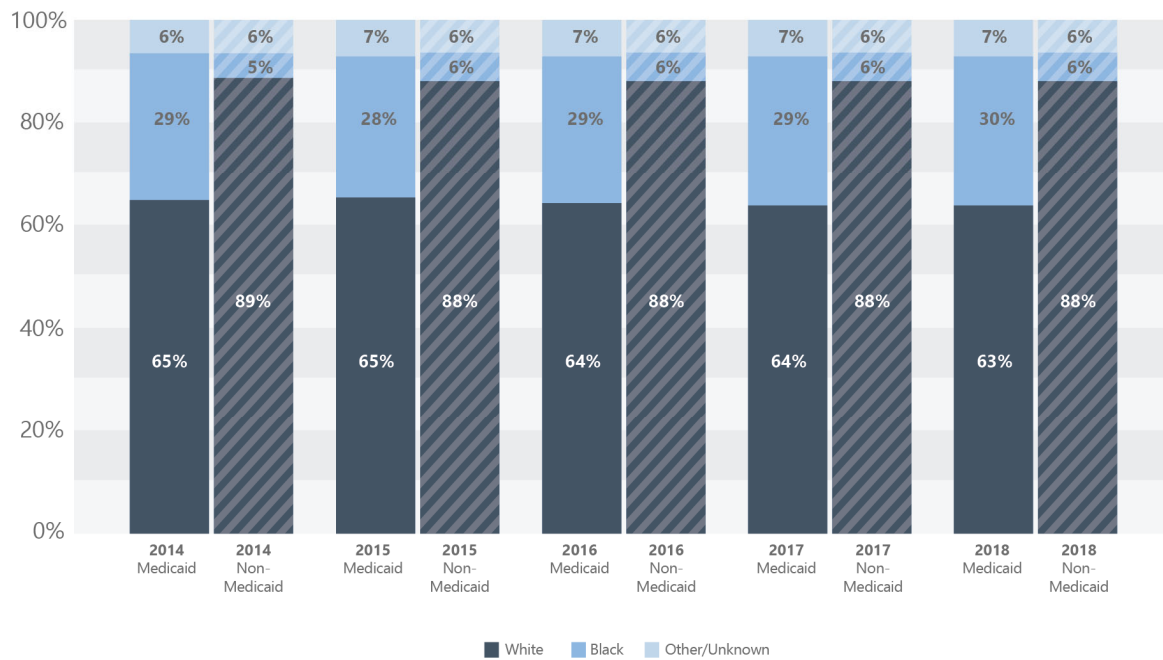
### 1.3 Demographic Information Related to Ohio Births

Throughout CYs 2013 - 2017, there are notable differences in the demographics of mothers with Medicaid paid deliveries as compared to mothers with non-Medicaid paid deliveries (Figures 3 -5). 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.<sup>1-3</sup>

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

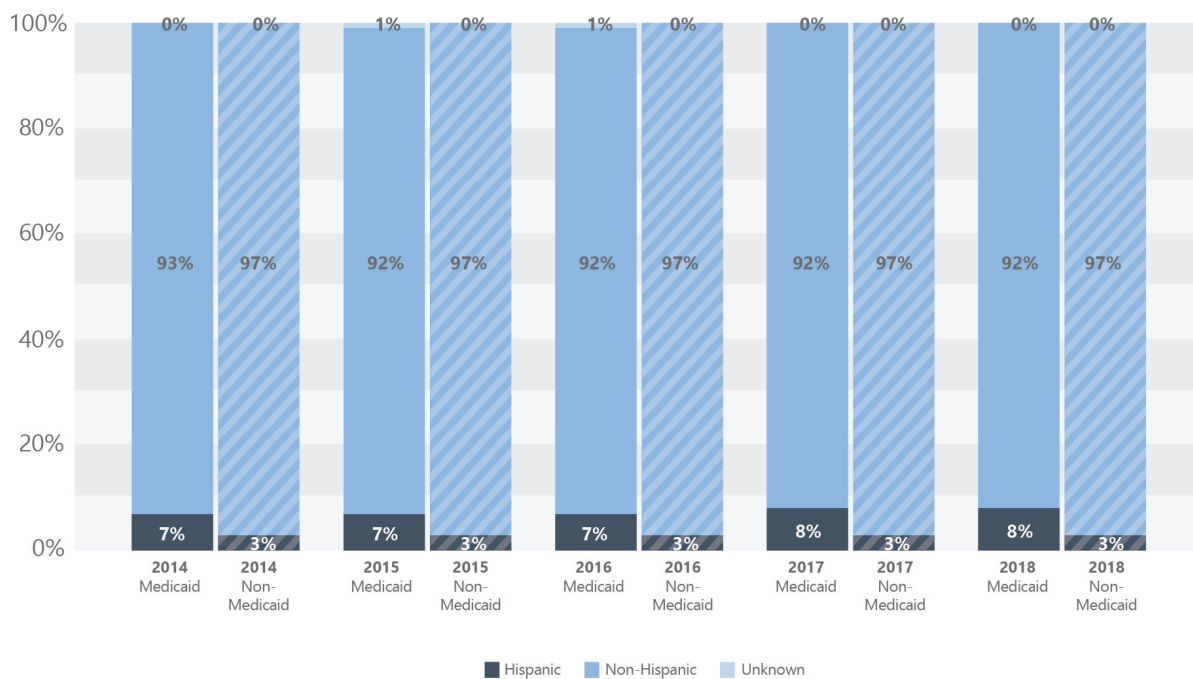
### 1.3.1 Ohio Births by Maternal Race

Figure 3: Ohio Births by Maternal Race, CY 2013- 2017



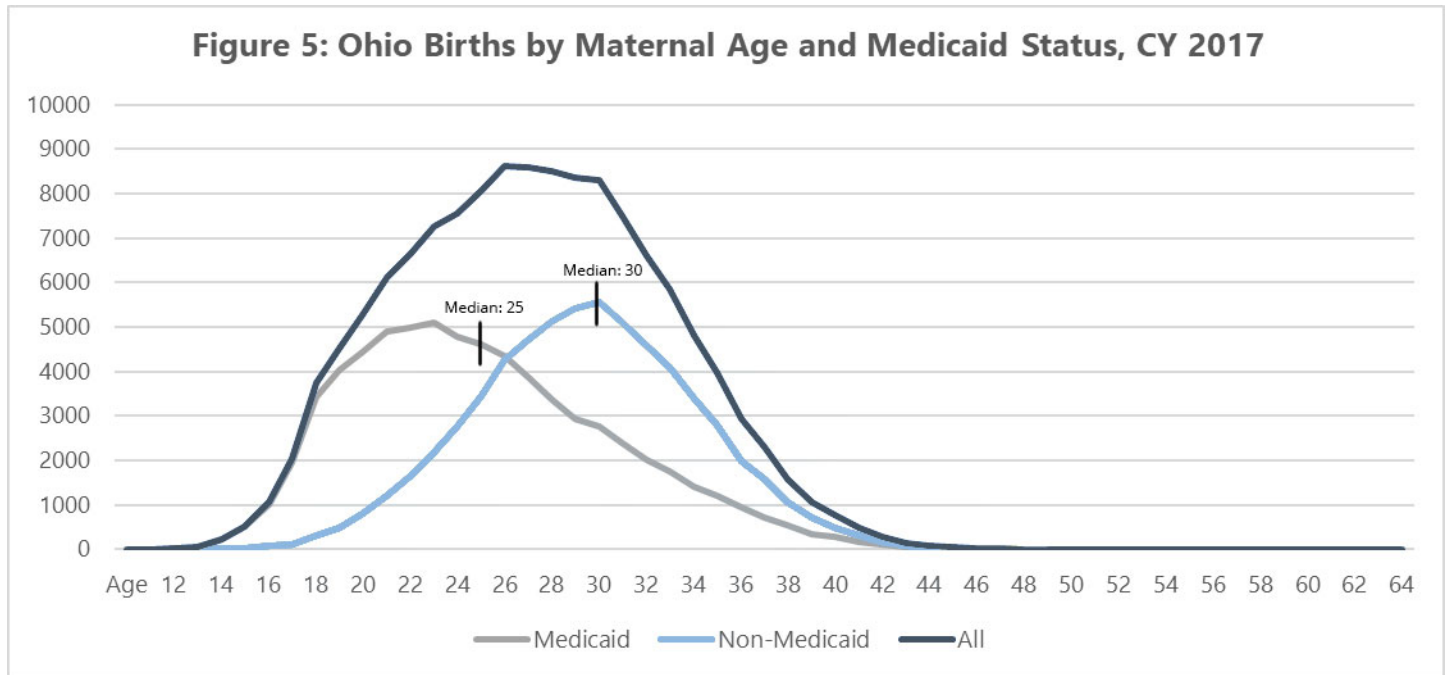
### 1.3.2 Ohio Births by Maternal Ethnicity

Figure 4: Ohio Births by Maternal Ethnicity, CY 2013- 2017



### 1.3.3 Maternal Age

As shown in Figure 5, a wide disparity exists in the maternal age of mothers receiving Medicaid benefits at the 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 – 2017. The median age for women with non-Medicaid paid deliveries has held steady at 30 years of age from 2013 – 2017.



### 1.3.4 Marital Status

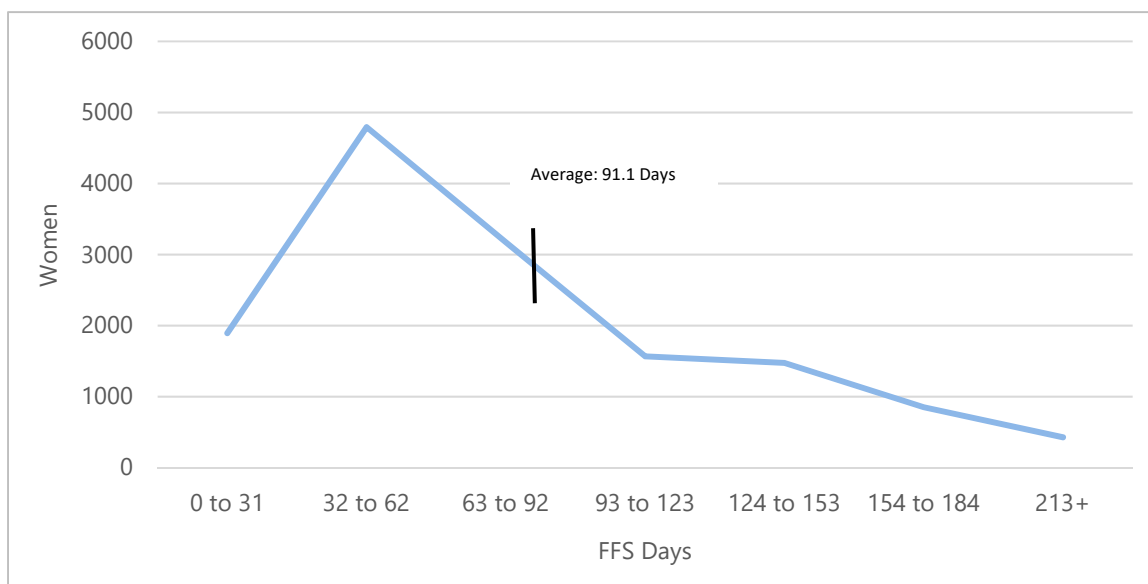
In 2013, 26.6% of women with Medicaid paid deliveries were married as compared to 88.4% of women with non-Medicaid paid deliveries. This trend holds steady in CYs 2014 -2017 with 26.7%, 27%, 27.3%, and 27.1% of women with Medicaid paid deliveries identifying as being married.

## 1.4 Medicaid Program Enrollment and Gestational Age

### 1.4.1 Program Enrollment

In CY 2016 and 2017 respectively, 60,099 (CY 2016) and 62,825 (CY 2017) women enrolled in Ohio Medicaid were identified via the linked VS/Medicaid data as having given birth<sup>†</sup>. An analysis of available data indicated that 42,436 (CY 2016) and 45,146 (CY 2017) of these women (71% CY 2016, 72% CY 2017) were enrolled in Ohio Medicaid 11 months prior to their dates of delivery; these women have been removed from the analysis below. Of the 17,679 remaining women, 11,041 eventually enrolled in a Medicaid managed care plan (MCP). In CY 2016, 56,614 out of 60,099 (94%) women who delivered in Ohio Medicaid were enrolled in a Medicaid MCP spending an average of 91.1 days covered by Medicaid FFS. Comparably, in CY 2017, 56,187 (89%) of the women who delivered in Medicaid were enrolled in a Medicaid MCP spending an average of 88.3 days covered by Medicaid fee-for-service (FFS) if they were not already enrolled in Ohio Medicaid. For the women who were not already enrolled in Ohio Medicaid 11 months prior to their delivery in CY 2017, Figures 6 (CY 2016) and 7 (CY 2017) shows the complete frequency distribution of the number of days spent on FFS before enrolling in an 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 was implemented in 2018. Previously, when Medicaid eligibility was authorized, the member had 18 days to select an 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 is enrolled in managed care back to the beginning of that month.

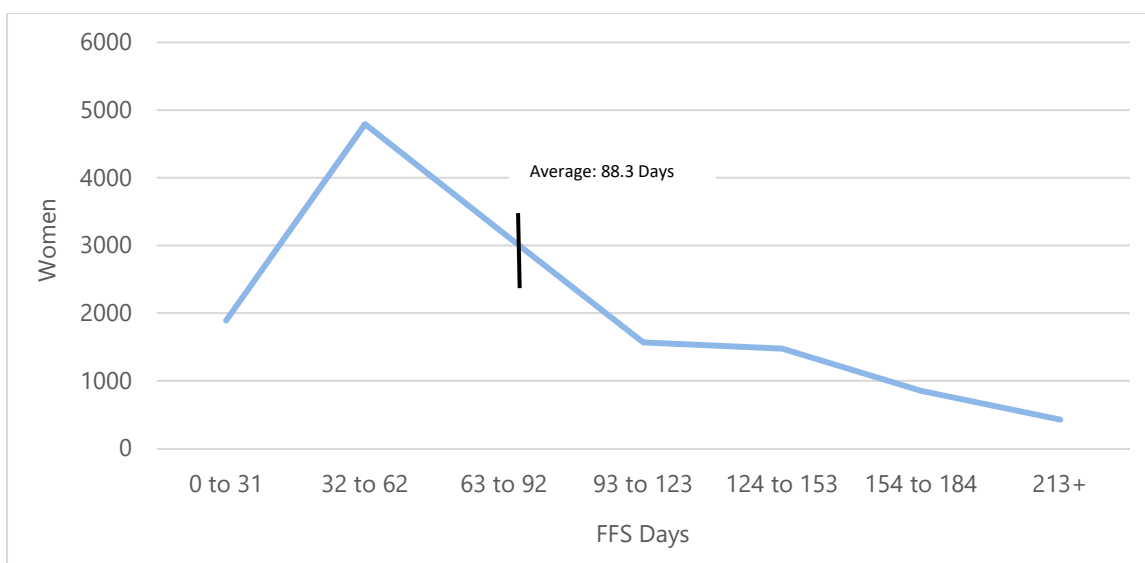
**Figure 6: FFS Days Prior to MCP Enrollment, 2016<sup>‡</sup>**



<sup>†</sup> 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.

<sup>‡</sup> The measure population for this analysis includes the 17,679 women who did not have Medicaid eligibility 11 months prior to delivery, and who eventually enrolled in a MCP.

**Figure 7: FFS Days Prior to MCP Enrollment, 2017<sup>§</sup>**



Further summary statistics for the analysis presented in Figure 7—including the count, mean, and median number of FFS days by county— can be found in *Appendix B*.

<sup>§</sup> The measure population for this analysis includes the 11,041 women who did not have Medicaid eligibility 11 months prior to delivery, and who eventually enrolled in a MCP.

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1.4.2 Medicaid Enrollment and Gestational Age

In CY 2016 and 2017 respectively, 42,436 (CY 2016) and 45,146 (CY 2017) 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. As stated in the previous section, 17,663 (CY 2016) and 17,679 (CY 2017) were not enrolled in Medicaid prior to their pregnancy. The majority of these women, 57% (CY 2016) and 64% (CY 2017), were enrolled in Medicaid during their first trimester, specifically during the period of 0-12 weeks of gestational age (see figures 8- 11). Please note that the date of first enrollment in tables 8-11 reflects the initial Medicaid enrollment date regardless of program type. It is not specific to FFS or MCP enrollment.

Figure 8: First Enrollment by Gestational Age in Weeks, CY 2016

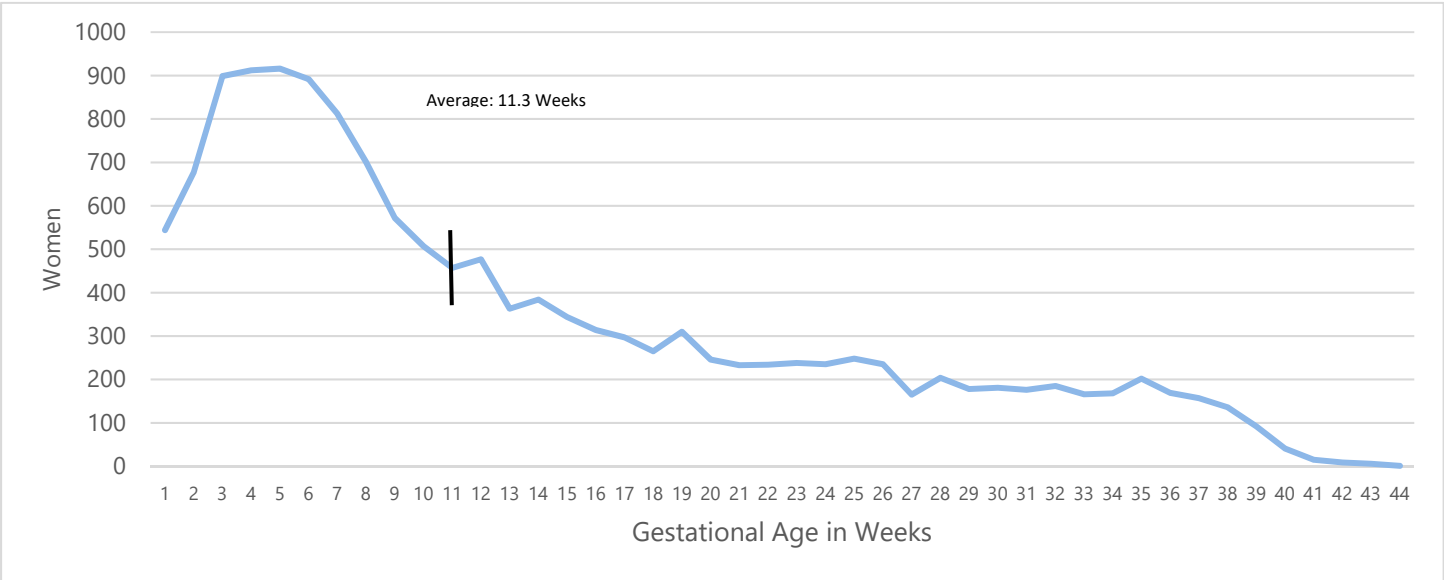
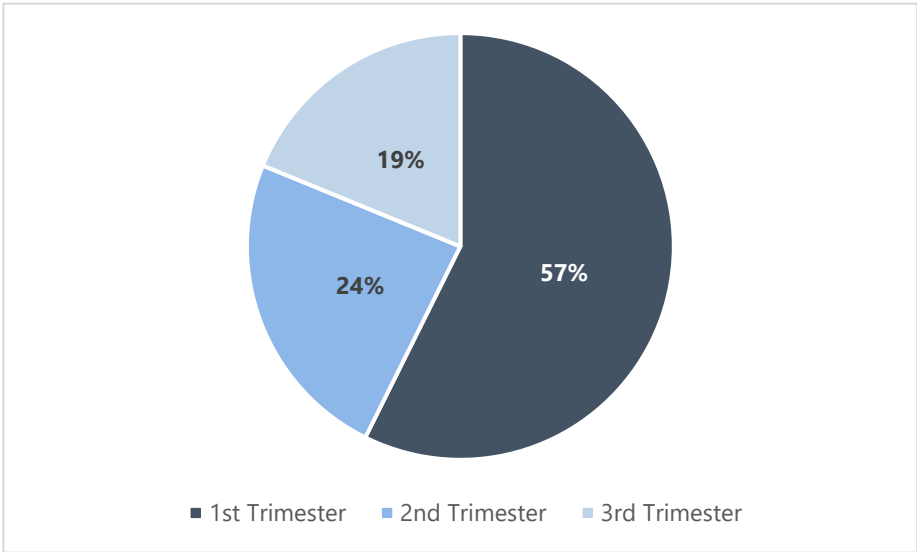
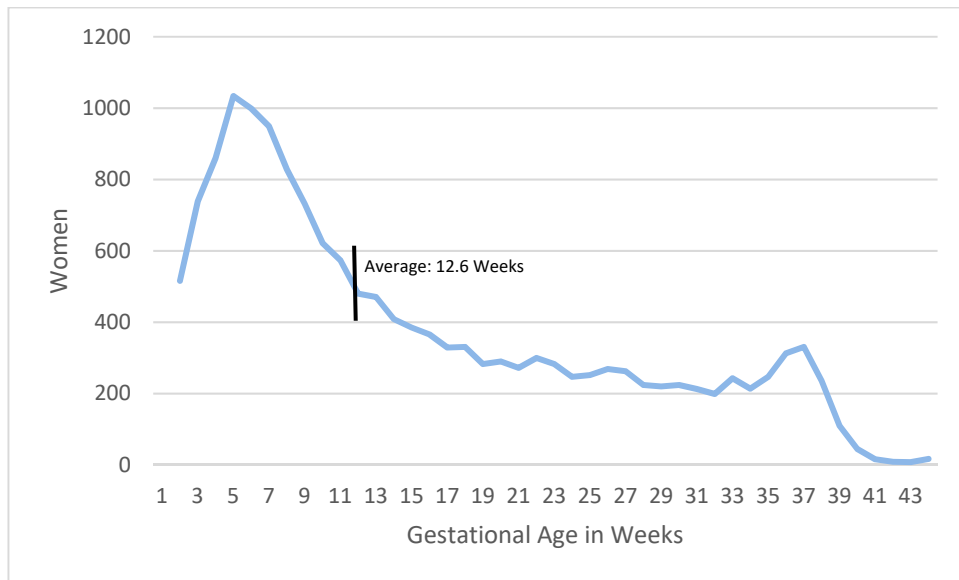


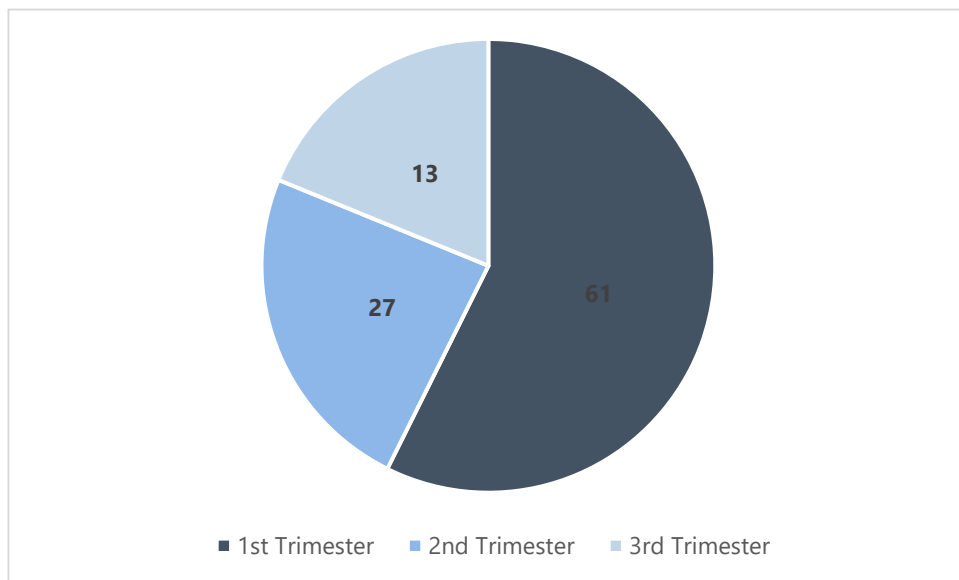
Figure 9: First Enrollment by Trimester, CY 2016



**Figure 10: First Enrollment by Gestational Age in Weeks, CY 2017**



**Figure 11: First Enrollment by Trimester, CY 2017**



## 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 - 2016, 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; 8.30 deaths per 1,000 live births in 2015; and 8.53 deaths per 1,000 live births in 2016. 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 2016.

**Figure 12: Ohio Infant Mortality Rates by Medicaid Status, CYs 2012 – 2016**

Infant Mortality Rate		
	Medicaid	Non-Medicaid
2012	7.57	5.75
2013	7.72	5.29
2014	8.03	5.35
2015	8.3	5.35
2016	8.53	5.66

**Figure 13: Ohio Infant Mortality Rates by Medicaid Status, Race, and Ethnicity, CYs 2012 – 2016**

	Race			Ethnicity		
	White	Black	Other/Unknown	Hispanic	Non-Hispanic	Unknown
<b>Medicaid</b>						
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	5.1
2015	6.99	12.05	4.83	3.72	8.61	14.89
2016	7.04	12.15	6.89	5.18	8.81	7.52
<b>Non-Medicaid</b>						
2012	5.2	16.48	4.15	4.64	5.76	14.18
2013	4.18	21.86	6.67	11.52	5.09	17.05
2014	4.4	19.71	5.48	6.3	5.3	17.86
2015	4.45	18.72	6.06	8.74	5.22	22.9
2016	4.64	21.14	5.92	12.16	5.43	16.81

Figure 13 shows the infant mortality rates broken down by Medicaid status, race, and ethnicity. Across all five 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.

For ethnicity, the most notable trend displayed in Figure 13 is that Medicaid infant mortality rates are lower in the Hispanic population as compared to the Non-Hispanic population across all five measurement years. 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.<sup>4</sup> 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 – 2017) for both Medicaid and non-Medicaid paid births (Figure 14).

**Figure 14: Ohio Preterm and Low Birth Weight Rates by Medicaid Status, CYs 2013 – 2017**

	Preterm Birth		Low Birth Weight	
	Medicaid	Non-Medicaid	Medicaid	Non-Medicaid
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%
2017	14.40%	9.63%	10.44%	6.37%

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 15 and 16). 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 five measurement years. This distinction is slightly more pronounced in the non-Medicaid subpopulation as compared to the Medicaid subpopulation.

**Figure 15: Ohio Preterm and Low Birth Weight Rates by Medicaid Status and Race, CYs 2013 – 2017**

	Medicaid			Non-Medicaid		
	White	Black	Other/Unknown	White	Black	Other/Unknown
<b>Preterm Births</b>						
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%
2017	13.04%	17.58%	13.20%	8.99%	17.80%	11.15%
<b>Low Birth Weight</b>						
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%
2017	9.02%	13.78%	9.18%	5.71%	13.91%	8.89%

**Figure 16: Ohio Preterm and Low Birth Weight Rates by Medicaid Status and Ethnicity, CYs 2013 – 2017**

	Medicaid			Non-Medicaid		
	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown
<b>Preterm Births</b>						
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%
2017	14.06%	14.43%	14.73%	12.30%	9.54%	19.67%
<b>Low Birth Weight</b>						
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%
2017	8.57%	10.60%	14.73%	8.04%	6.31%	18.33%

In regard 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.<sup>1-3</sup>

As shown in Figure 17, rates show consistent trends over time (CYs 2013-2017). From 2013-2017, each of the rates for pregnant women on Medicaid were higher for all risk factors as compared to non-Medicaid pregnant women, except short birth spacing (less than 18 months between deliveries). Most notably, Medicaid women had smoking rates at least 20% higher than non-Medicaid women for each of the measurement years. The data presented below regarding selected risk factors are based on self-reported data found on the birth certificate.

**Figure 17: Selected Risk Factors for Prematurity and Low Birth Weight, CY 2013 – 2017**

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
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%
2017	7.50%	4.15%	33.75%	24.08%	23.53%	3.23%	6.68%	4.56%	6.38%	7.91%	2.21%	0.77%

**Figure 18: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Medicaid Paid Births by Race, CY 2013-2017**

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
2013	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%
2014	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%
2015	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%
2016	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%
2017	6.35%	10.21%	6.41%	31.59%	37.03%	39.99%	30.72%	12.41%	4.41%	5.54%	8.98%	7.23%	6.47%	6.55%	4.91%	1.98%	2.85%	1.63%

When comparing across racial breakdowns (White and Black) in the Medicaid subpopulation between CYs 2013-2017 for previous preterm birth, low maternal weight gain, previous poor outcome, and no prenatal care, rates in the White population are 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 over 15% higher than that of the Black population (Figure 18).

**Figure 19: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Non-Medicaid Paid Births by Race, CY 2013 – 2017**

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
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%
2017	3.95%	7.75%	3.65%	23.09%	34.31%	28.71%	3.41%	2.82%	0.91%	4.32%	8.02%	4.73%	7.99%	7.85%	6.92%	0.66%	1.96%	1.21%

The trends in risk factors in the non-Medicaid subpopulation are similar to those found in the Medicaid subpopulation when comparing between Black and White populations. When comparing the Black and White populations in the non-Medicaid subpopulation between CYs 2013-2017 for previous preterm birth, low maternal weight gain, previous poor outcome, and no prenatal care, rates in the White population are lower. This disparity is most pronounced in the previous preterm birth and low maternal weight gain measures. 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 20: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Medicaid Paid Births by Ethnicity, CY 2013 – 2017**

Previous Preterm Birth				Low Maternal Weight Gain			Smoking During Pregnancy			Previous Poor Outcome			Birth Spacing (< 18 months)			No Prenatal Care		
	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown
2013	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%
2014	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%
2015	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%
2016	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%
2017	6.97%	7.55%	9.02%	38.06%	33.38%	35.48%	8.64%	24.83%	17.82%	6.55%	6.70%	5.26%	5.40%	6.48%	1.67%	1.43%	2.28%	2.65%

When comparing Hispanic and non-Hispanic populations in the Medicaid subpopulation between CYs 2013-2017 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 20). 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 21: Selected Risk Factors for Prematurity and Low Birth Weight in Ohio Non-Medicaid Paid Births by Ethnicity, CY 2013 – 2017**

Previous Preterm Birth				Low Maternal Weight Gain			Smoking During Pregnancy			Previous Poor Outcome			Birth Spacing (< 18 months)			No Prenatal Care		
	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown	Hispanic	Non-Hispanic	Unknown
2013	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%
2014	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%
2015	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%
2016	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%
2017	5.35%	4.11%	3.08%	31.41%	23.87%	16.00%	2.76%	3.24%	5.77%	4.56%	4.56%	3.08%	7.25%	7.93%	7.55%	1.29%	0.74%	7.02%

When comparing non-Medicaid Hispanic and non-Hispanic populations between CYs 2013-2016 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 for 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 21).

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 20 and 21, 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, through promotion of progesterone use for women at high risk of preterm birth. Progesterone is a hormone treatment that has the potential to prevent preterm birth among women who are at risk due to a previous preterm birth or short cervix. The state is working with perinatal clinicians and hospitals affiliated with the Ohio Perinatal Quality Collaborative (OPQC), as well as Medicaid managed care plans, home health agencies and specialty pharmacies to prevent preterm birth through simplifying the many steps required for effective progesterone treatment.

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 submit information regarding the needs of a pregnant individual, the information is integrated into Ohio Benefits so that Medicaid coverage can be maintained throughout the pregnancy and postpartum period. The submission of the PRAF 2.0 also provides same day notification to the patient's MCP, home health agency, and specialty pharmacy, allowing her to be quickly linked to 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 via mail and had to submit separate referrals to home health agencies if in-home administration of progesterone was needed. Forms were often batched to alleviate the needs for separate mailings, resulting in delayed notification of patient needs.

The rates presented in Figure 22 represent the percentage of women who had a high-risk pregnancy—as determined by 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 - 2017 across all races and ethnicities, with the highest overall progesterone administration rate being achieved in high-risk Black women in 2017.

**Figure 22: Overall Progesterone Rates for Medicaid Paid High Risk Pregnancies  
by Maternal Race and Ethnicity, CYs 2013 – 2017**

		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%
2017	33.13%	30.73%	35.83%	44.90%	41.65%	32.70%

## 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 23 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, the *Preventive Care and Screening Tobacco Use: Screening and Cessation Intervention* measure was 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, are held accountable. Rates are increasing in 2017, which may be indicative of improvements in cessation and counseling and/or coding among providers.

**Figure 23: Tobacco Cessation and Counseling for Women 15-44 Years of Age  
by Race and Ethnicity, CYs 2015 – 2017**

		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%
2017	10.72%	11.72%	8.87%	9.19%	9.55%	10.76%

### Section III: State Innovation Model (SIM) Perinatal Episode

Only 17 states spend more per person on health care than Ohio (CMS 2012); despite this high spend, the state has not seen value commensurate with its level of spending as 41 states have a healthier population than Ohio (CMFW 2014). With nearly 12 million residents, seven metropolitan areas, 50 rural counties, and a plethora of health plans, Ohio does not lend itself to easy solutions. It does, however, make it an optimum state in which to test innovative payment and care delivery models. Ohio is a leader in shifting away from this system to one that encourages value over volume of care.

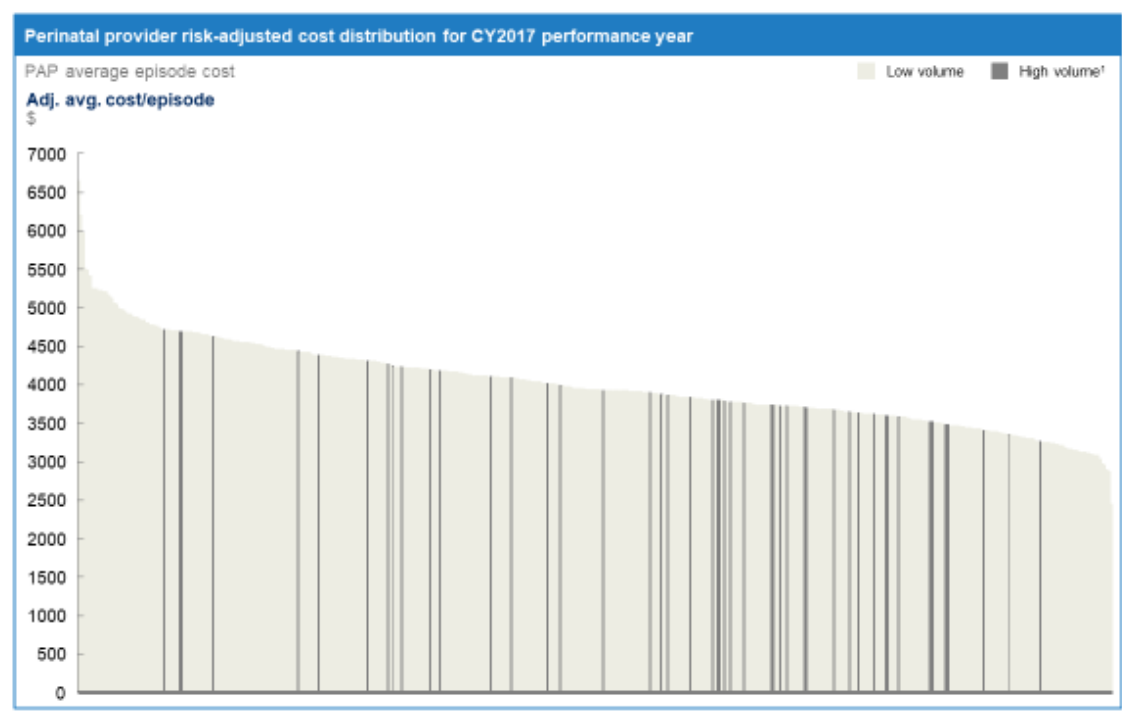
In 2012, the state of Ohio was awarded a State Innovation Model (SIM) grant by the Centers for Medicare and Medicaid Services (CMS) that supported the State of Ohio in launching two value-based care models statewide: a patient-centered medical home CPC model and an episode-based payment model. Partners included all Medicaid MCPs (Buckeye, CareSource, Molina, Paramount, and UnitedHealthcare) and a multi-payer coalition that was comprised of four private payers with 80 percent of the commercial market (Aetna, Anthem, Medical Mutual, and UnitedHealthcare),

The largest episode or bundle of care designed is the perinatal episode which covers all pregnancy, delivery and post-partum care. 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 delivering facility. The obstetrician is assigned as the Principle Accountable Provider (PAP) as he/she is in the best position to guide ideal birth outcomes, both in quality and cost, and subsequently receives relevant reports to assist in the management of this population. Please see <https://medicaid.ohio.gov/provider/PaymentInnovation/Episodes> for more detail.

Figures 24 (CY 2016) and 25 (CY 2017) depicts a PAP curve demonstrative of the variation in costs for all PAPs with five or more perinatal 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. There are three quality metrics in the perinatal episode of care with thresholds to be passed in order to be eligible for gain-sharing: Prenatal HIV screening rate, C-section rate, and Percent of episodes with post-partum visit within 60 days. Quality thresholds for these measures for 2018 are 61%, 38% and 66% respectively, with plans to tighten these pass rates over time. Neonatal care is addressed through three separate episodes across low, moderate, and high-risk levels.

**Figure 25: Perinatal Provider Risk-Adjusted Cost Distribution for the 2017 Performance Year**



<sup>1</sup> Top 10% of providers by volume  
Source: Ohio Medicaid FFS claims and encounter data CY 2017

More details on the perinatal episode can be found at:  
[medicaid.ohio.gov/providers/paymentinnovation.aspx](https://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 60 measures across 5 domains of care.

Data displayed in Figure 26 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 2017, 81.1% of women in Medicaid MCPs received timely prenatal care; and 63.4% received post-partum visit within 90 days of delivery. The Frequency of Ongoing Prenatal Care measure was not reported for 2017; this measure was retired by the National Committee for Quality Assurance effective 2017. Within the first 15 months of life, 57.9% of infants met the requirement for the well-child visit criteria, whereas 71.2% of children in their third, fourth, fifth, and sixth year of life met the well-child visit criteria.<sup>9</sup>

There has been a downward trend in the percent of women in Medicaid MCPs receiving timely prenatal care with 85% receiving a timely initial prenatal visit in 2013 and 81.1% receiving the visit in 2017. The percent of women receiving postpartum care has trended up slightly from 63.0% receiving care in 2013 to 63.4% in 2017. For well-child care, the 5 of children within the first 15 months of life who received 6 or more visits has trended down from 60.1% of children receiving a least 6 visits in 2013 to 57.9% in 2017. For children in the third, fourth, fifth and sixth year of life, the percent of children with a visit trended up from 69.0% in 2013 to 71.2% in 2017.

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 25th and 50th percentile for 2015 and 2017. For the Post-Partum Visits HEDIS (between 21 and 56 days after delivery) measure, Ohio's Medicaid MCPs were between the 50th and 75th percentile in calendar years 2015 & 2016, and between the 25th and 50th percentiles in 2013, 2014 and 2017.

Figure 26: Medicaid MCP Self-Reported Audited HEDIS and FFS Rates, CYs 2013 – 2017

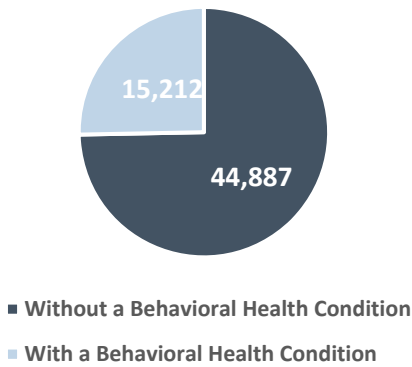
Frequency of Ongoing Prenatal Care			Timeliness of Prenatal Care		Postpartum Care		Well Child Visits (First 15 Months of Life, Six or More Visits)		Well Child Visits (Third, Fourth, Fifth, and Sixth Year of Life)	
	Overall Reported Rate	NCQA Percentile Range	Overall Reported Rate	NCQA Percentile Range	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
2017	N/A - HEDIS measure retired		81.1%	P25-50	63.4%	P25-50	57.9%	P25-50	71.2%	P25-50
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
2017	N/A - HEDIS measure retired		86.6%	P50-75	63.7%	P25-50	60.3%	P25-50	68.6\$	P25-50
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
2017	N/A - HEDIS measure retired		78.6%	P25-50	62.3%	P25-50	57.2%	P25-50	73.0%	P50-75
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
2017	N/A - HEDIS measure retired		82.8%	P25-50	62.6%	P25-50	61.8%	P25-50	69.1%	P25-50
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
2017	N/A - HEDIS measure retired		83.0%	P25-50	69.1%	P50-75	58.6%	P25-50	69.3%	P25-50
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
2017	N/A - HEDIS measure retired		83.7%	P50-75	64.3%	P25-50	52.6%	P10-25	68.6%	P25-50
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
2017	N/A - HEDIS measure retired		50.2%	N/A	31.0%	N/A	26.4%	N/A	38.4%	N/A

## Section V: Behavioral Health Services

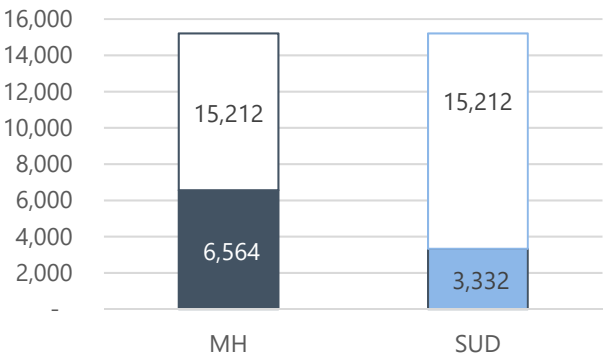
Under the leadership of the Governor’s Office of Health Transformation, the Ohio Department of Mental Health and Addiction Services and ODM collaborated to implement reforms and enhance the quality of behavioral health services delivered to residents of our state. Behavioral Health Redesign is a transformative initiative aimed at rebuilding Ohio’s community behavioral health system capacity, including the addition 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 (CY 2016) and 62,825 (CY 2017) women enrolled in Ohio Medicaid identified as having had a birth via the linked VS/Medicaid data †, in those years, 25% (15,515) in CY 2016 and 26% (16,389) in CY 2017 had a behavioral health clinical condition identified by a primary diagnosis on a Medicaid claim † (Figures 27 and 29). Of those women, 42% for both CYs 2016 (6,564) and 2017 (6,948) received services from a community mental health center (CMHC) at an annual rate of 12 visits per patient with 6% (3,332) in CY 2016 and 5% (3,316) in CY 2017 having received addiction services from a SUD clinic at an annual rate of 46 visits per patient (Figures 28 and 30). Of these women, 13% (2,027) in CY 2016 and 14% (2,217) in CY 2017 utilized medication assisted treatment (MAT) services for substance abuse issues.

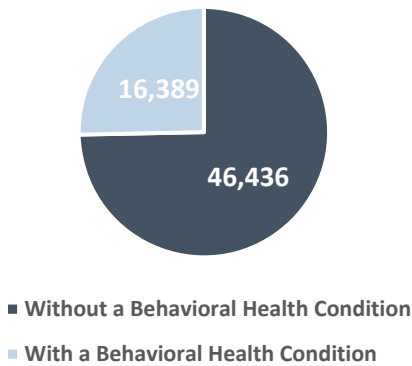
**Figure 27: Women with a Medicaid Paid Delivery in CY 2016 with a Behavioral Health Clinical Condition**



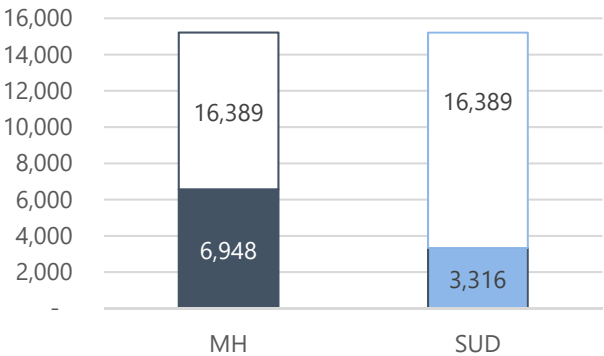
**Figure 28: Women with a Medicaid Paid Delivery in CY 2016 with a Behavioral Health Clinical Condition Treated by a Mental Health Provider**



**Figure 29: Women with a Medicaid Paid Delivery in CY 2017 with a Behavioral Health Clinical Condition**



**Figure 30: Women with a Medicaid Paid Delivery in CY 2017 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, \$9,302 in 2016, and \$8,652 in 2017 (see Figure 31). 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 2017, the total cost paid by Medicaid for prenatal care and deliveries was \$599,212,443 for 69,261 births. Of these Medicaid payments, 53% of these dollars (\$318,269,463) paid for deliveries compared to 47% of these dollars (\$280,942,080) 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 2017, 70,004 infants were eligible and enrolled in Medicaid for at least a portion of their first year of life.

The total cost paid by Medicaid for the first year of life for infants enrolled in 2017 was \$796,090,010. 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 2016 to CY 2017. 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 10.5% from CY 2016 to CY 2017, and non-delivery related capitation payments (per member per month payments) for women of child-bearing age decreased by 2.4%. For CY 2017, managed care costs accounted for approximately 88% of the costs for infants in the first year of life, approximately 93% of delivery costs, and approximately 87% 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 12%, 7% and 13% 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.

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\*\* 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 31: Total and Average Cost of Deliveries, Prenatal Care, and Infants, CY 2013 – 2017

	Deliveries	Prenatal Care	Total Prenatal Care and Delivery Care	Infants— First Year of Life
<b>Total Beneficiaries</b>				
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
2017	69,261	69,261	69,261	70,004
<b>Total Cost</b>				
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
2017	\$318,269,463	\$280,942,980	\$599,212,443	\$796,090,010
<b>Average Cost/ Beneficiary</b>				
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
2017	\$4,595	\$4,056	\$8,652	\$11,372
<b>Total Member Months</b>				
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
2017	N/A	540,249	676,352	883,697
<b>Average Cost/ Member Month</b>				
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
2017	N/A	\$520	\$886	\$901

## Section VII: References

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## 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 a probabilistic linkage implemented in Statistical Analysis System (SAS) using a program called The Link King.<sup>††</sup>

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. The probabilistic linkage algorithm designed by the research team uses available identifying information to produce an estimate of the likelihood that two records in two different datasets refer to the same individual. This is then applied to all the datasets in the data universe for this project. For identifiers that are not names, such as zip code or date of birth, the algorithm looks for both perfect agreement as well as similarity. Searching for similarity is critical when linking administrative data because a certain percentage of cases contain errors. For example, the date "3/24/1998" shares a certain resemblance to "3/24/2998", and it is possible that the latter is a typographical error and was supposed to be recorded as "3/24/1998". For names, the similarity criteria are more complex because names may differ across datasets for legitimate reasons such as the use of nicknames, name changes, and misspellings. Beyond perfect string matches, first and last names are also reviewed for similarity using a variety of methods, including but not limited to a string-matching score, phonetic equivalence, one of the names is a nickname of the other, the names share a string of five or more common characters, and the first and last names appear to have been "swapped". Once the degree of agreement and similarity between two records is calculated, the algorithm then compares this to a population-level database containing names, birthdays and other demographic information and estimate the probability that two different individuals could share that degree of similarity across all identifiers. If the possibility is remote, then the algorithm will conclude that the two records refer to the same individual and should be linked.

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." The match rate for 2012, 2013 and 2014 was 90.8%, 89.4% and 90.1%, respectively. In 2015, the match rate was estimated between 85.6% to 91.8%. The range for 2015 is a result of the transition

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<sup>††</sup> Campbell, K. M. (2009) "Impact of record-linkage methodology on performance indicators and multivariate relationships," *Journal of Substance Abuse Treatment*, 36:110-117.

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 discussed in the below section. 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 years 2016 and 2017; therefore, billing code O99.89 was not used to reduce potential misclassification bias. In 2016 and 2017 respectively, the match rate was 90.4%, and 94.7%.

### ***ICD-9 to ICD-10 Coding Issues for 2015 Data***

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.

### **Calculation of Costs during Pregnancy and the Cost of Deliveries**

Costs were included for all Medicaid deliveries in CYs 2013 - 2017. 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 an 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 2017, costs were estimated for approximately 1.2% 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<sup>##</sup> in CY 2017 by County

County	FFS days (count)	FFS Days (Mean)	FFS Days (Median)
Adams	50	86	57
Allen	136	80	53
Ashland	82	77	53
Ashtabula	138	89	68
Athens	49	88	52
Auglaize	54	71	54
Belmont	9	101	57
Brown	59	84	61
Butler	633	116	92
Carroll	40	79	63
Champaign	57	77	48
Clark	250	106	77
Clermont	303	92	71
Clinton	75	85	51
Columbiana	137	98	67
Coshocton	58	83	65
Crawford	80	84	61
Cuyahoga	1503	97	76
Darke	78	98	77
Defiance	59	95	77

<sup>##</sup>There are 151 women with missing county information; these women have been excluded from this analysis

County	FFS days (count)	FFS Days (Mean)	FFS Days (Median)
Delaware	111	93	65
Erie	99	103	86
Fairfield	220	88	58
Fayette	40	57	42
Franklin	2607	112	83
Fulton	85	103	83
Gallia	38	89	65
Geauga	60	87	71
Greene	142	85	64
Guernsey	63	62	39
Hamilton	1257	122	105
Hancock	98	94	82
Hardin	64	94	73
Harrison	13	86	47
Henry	43	96	70
Highland	75	86	67
Hocking	32	57	41
Holmes	30	103	94
Huron	112	97	73
Jackson	50	79	71
Jefferson	30	76	64
Knox	77	91	66
Lake	249	105	78
Lawrence	2	100	100

County	FFS days (count)	FFS Days (Mean)	FFS Days (Median)
Licking	225	89	68
Logan	86	88	68
Lorain	356	88	68
Lucas	707	98	76
Madison	60	120	109
Mahoning	259	95	71
Marion	109	94	64
Medina	139	101	75
Meigs	26	73	61
Mercer	44	98	69
Miami	144	91	63
Monroe	7	118	70
Montgomery	851	97	72
Morgan	15	97	81
Morrow	34	84	56
Muskingum	119	71	46
Noble	16	62	36
Ottawa	54	81	63
Paulding	40	88	67
Perry	72	64	37
Pickaway	70	85	74
Pike	50	86	58
Portage	156	109	95
Preble	64	67	48



County	FFS days (count)	FFS Days (Mean)	FFS Days (Median)
Putnam	24	120	92
Richland	170	76	55
Ross	129	86	66
Sandusky	96	77	57
Scioto	99	87	62
Seneca	91	84	54
Shelby	84	80	64
Stark	432	91	65
Summit	696	100	72
Trumbull	253	100	79
Tuscarawas	179	123	90
Union	46	103	68
VanWert	44	70	58
Vinton	10	74	57
Warren	183	106	90
Washington	82	88	76
Wayne	141	108	80
Williams	53	88	59
Wood	147	96	73
Wyandot	34	77	52
Missing	10	105	89

## Appendix C: Low Birth Weight Births by County, CY 2017

County	Medicaid			Non-Medicaid		
County Name	LBW Births	Total Births	LBW Rate	LBW Births	Total Births	LBW Rate
Adams	22	181	12.16%	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	2,213	9.04%	144	2,230	6.46%
Carroll	14	144	9.72%	-	-	4.24%
Champaign	12	171	7.02%	8	215	3.72%
Clark	91	1,024	8.89%	28	503	5.57%
Clermont	105	996	10.54%	66	1,302	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%	-	-	1.78%
Cuyahoga	1,104	8,353	13.22%	466	6,325	7.37%
Darke	21	269	7.81%	11	305	3.61%
Defiance	9	222	4.05%	10	175	5.71%
Delaware	28	357	7.84%	107	1,762	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%	-	-	3.57%
Franklin	1,118	9,938	11.25%	595	8,932	6.66%
Fulton	19	204	9.31%	11	237	4.64%
Gallia	18	189	9.52%	-	-	1.79%
Geauga	16	208	7.69%	35	716	4.89%
Greene	69	674	10.24%	73	1,126	6.48%
Guernsey	29	297	9.76%	9	167	5.39%
Hamilton	684	5,642	12.12%	337	4,969	6.78%
Hancock	35	394	8.88%	28	502	5.58%
Hardin	9	189	4.76%	10	205	4.88%
Harrison	-	-	4.55%	-	-	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	5.09%	18	568	3.17%
Huron	33	447	7.38%	12	335	3.58%
Jackson	26	231	11.26%	-	-	3.31%
Jefferson	16	216	7.41%	-	-	4.17%
Knox	34	347	9.80%	26	422	6.16%
Lake	77	888	8.67%	75	1,267	5.92%

County	Medicaid			Non-Medicaid		
County Name	LBW Births	Total Births	LBW Rate	LBW Births	Total Births	LBW Rate
Lawrence	-	-	15.39%	-	-	0.00%
Licking	94	992	9.48%	56	1,103	5.08%
Logan	27	263	10.27%	7	236	2.97%
Lorain	208	1,812	11.48%	80	1,475	5.42%
Lucas	371	3,412	10.87%	148	2,143	6.91%
Madison	16	197	8.12%	17	216	7.87%
Mahoning	186	1,633	11.39%	55	844	6.52%
Marion	44	509	8.64%	15	250	6.00%
Medina	46	526	8.75%	70	1,285	5.45%
Meigs	17	146	11.64%	-	-	9.43%
Mercer	10	134	7.46%	14	419	3.34%
Miami	45	546	8.24%	24	678	3.54%
Monroe	-	-	7.69%	2	-	6.06%
Montgomery	435	3,759	11.57%	183	2,861	6.40%
Morgan	7	92	7.61%	-	-	10.87%
Morrow	12	164	7.32%	11	191	5.76%
Muskingum	55	651	8.45%	18	374	4.81%
Noble	-	-	1.75%	-	-	6.35%
Ottawa	13	124	10.48%	12	194	6.19%
Paulding	9	92	9.78%	-	-	2.08%
Perry	17	247	6.88%	6	163	3.68%
Pickaway	25	271	9.23%	23	333	6.91%
Pike	19	221	8.60%	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	77	820	9.39%	33	514	6.42%
Ross	63	551	11.43%	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	2,243	10.08%	116	1,974	5.88%
Summit	401	3,093	12.97%	182	2,900	6.28%
Trumbull	125	1,278	9.78%	43	711	6.05%
Tuscarawas	48	579	8.29%	36	625	5.76%
Union	18	168	10.71%	32	493	6.49%
Van Wert	17	168	10.12%	-	-	3.20%
Vinton	8	96	8.33%	-	-	4.44%
Warren	53	676	7.84%	115	1,752	6.56%
Washington	17	255	6.67%	16	208	7.69%
Wayne	35	504	6.94%	47	1,019	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%	-	-	1.32%

## Appendix D: Preterm Births by County, CY 2017

County	Medicaid			Non-Medicaid		
County Name	Preterm Births	Total Births	Preterm Rate	Preterm Births	Total Births	Preterm Rate
Adams	28	182	15.39%	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	-	-	29.63%	-	-	7.14%
Brown	34	260	13.08%	13	189	6.88%
Butler	323	2,218	14.56%	226	2,231	10.13%
Carroll	15	144	10.42%	14	118	11.86%
Champaign	22	172	12.79%	19	215	8.84%
Clark	158	1,032	15.31%	58	505	11.49%
Clermont	150	997	15.05%	120	1,303	9.21%
Clinton	32	297	10.77%	18	187	9.63%
Columbiana	85	638	13.32%	31	352	8.81%
Coshocton	33	246	13.42%	14	214	6.54%
Crawford	52	302	17.22%	11	169	6.51%
Cuyahoga	1,376	8,367	16.45%	620	6,341	9.78%
Darke	22	268	8.21%	21	305	6.89%
Defiance	17	222	7.66%	15	176	8.52%
Delaware	38	357	10.64%	170	1,762	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	1,564	9,957	15.71%	968	8,957	10.81%
Fulton	29	206	14.08%	17	237	7.17%
Gallia	9	188	4.79%	-	-	3.57%
Geauga	18	208	8.65%	56	717	7.81%
Greene	106	675	15.70%	122	1,126	10.84%

County	Medicaid			Non-Medicaid		
County Name	Preterm Births	Total Births	Preterm Rate	Preterm Births	Total Births	Preterm Rate
Guernsey	45	299	15.05%	12	168	7.14%
Hamilton	902	5,655	15.95%	476	4,982	9.55%
Hancock	47	395	11.90%	41	502	8.17%
Hardin	23	189	12.17%	16	205	7.81%
Harrison	-	-	11.36%	-	-	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	889	14.29%	109	1,269	8.59%
Lawrence	-	-	7.69%	-	-	0.00%
Licking	145	996	14.56%	103	1,102	9.35%
Logan	49	263	18.63%	20	236	8.48%
Lorain	278	1,814	15.33%	132	1,476	8.94%
Lucas	454	3,420	13.28%	203	2,149	9.45%
Madison	36	197	18.27%	31	216	14.35%
Mahoning	248	1,635	15.17%	78	846	9.22%
Marion	64	509	12.57%	22	251	8.77%
Medina	64	526	12.17%	104	1,285	8.09%
Meigs	14	146	9.59%	-	-	7.55%
Mercer	16	134	11.94%	30	419	7.16%
Miami	74	547	13.53%	46	678	6.79%
Monroe	-	-	5.13%	-	-	9.09%
Montgomery	628	3,769	16.66%	294	2,867	10.26%
Morgan	6	92	6.52%	6	46	13.04%
Morrow	19	164	11.59%	17	192	8.85%

County	Medicaid			Non-Medicaid		
County Name	Preterm Births	Total Births	County Name	Preterm Births	Total Births	County Name
Muskingum	97	652	14.88%	42	375	11.20%
Noble	-	-	7.02%	7	63	11.11%
Ottawa	12	124	9.68%	22	194	11.34%
Paulding	8	92	8.70%	-	-	2.08%
Perry	25	247	10.12%	7	163	4.29%
Pickaway	36	271	13.28%	35	333	10.51%
Pike	40	220	18.18%	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	102	821	12.42%	52	517	10.06%
Ross	78	552	14.13%	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	14.54%	26	251	10.36%
Shelby	30	281	10.68%	26	311	8.36%
Stark	283	2,250	12.58%	191	1,978	9.66%
Summit	514	3,097	16.60%	288	2,905	9.91%
Trumbull	151	1,280	11.80%	61	714	8.54%
Tuscarawas	91	580	15.69%	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%	-	-	8.89%
Warren	85	675	12.59%	164	1,754	9.35%
Washington	28	255	10.98%	18	208	8.65%
Wayne	62	505	12.28%	82	1,020	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%