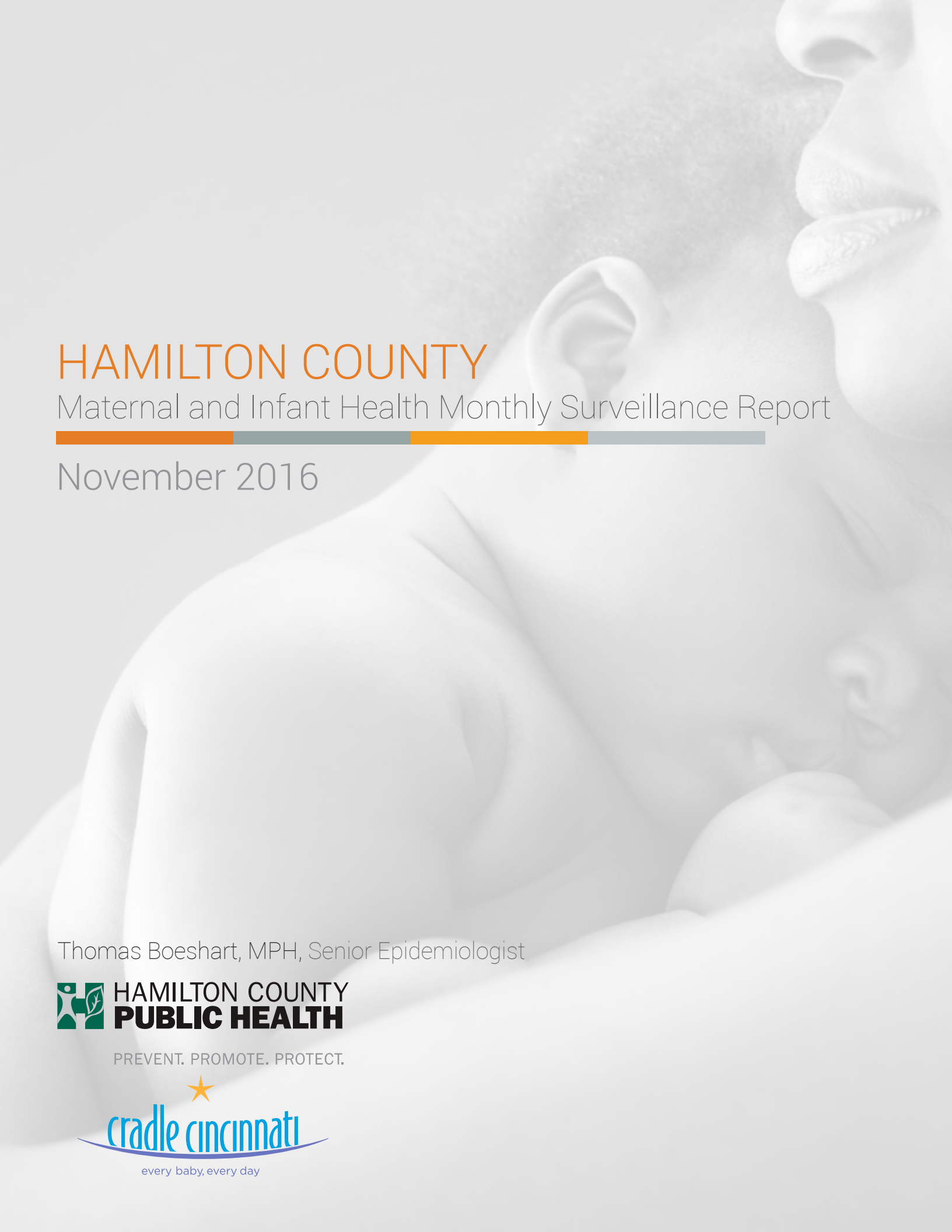

HAMILTON COUNTY

Maternal and Infant Health Monthly Surveillance Report

November 2016

Thomas Boeshart, MPH, Senior Epidemiologist

HAMILTON COUNTY PUBLIC HEALTH

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INTRODUCTION

The Maternal and Infant Health Monthly Surveillance Reports are part of work throughout Hamilton County to improve the health of women and infants, and to lower the number of infant deaths. In order to improve the health and safety of infants in Hamilton County, it is important to identify, describe, and track the problems and people at risk. This report shows the current state of infant mortality in Hamilton County.

The data for these reports has been enhanced to improve the monthly tracking process. The Ohio Department of Health (ODH) provides monthly death data to Hamilton County Public Health that is used to improve the timeliness and accuracy of the monthly data. These data were provided by the Ohio Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions. These data are provisional and are numbers only; they do not include any additional information from birth or death certificates (**Appendix A**). Future reports will provide improved validity of these estimates (**Appendix A**). Death data in this report were collected from ODH on January 12th, 2017 and January 11th, 2017; birth data were collected from the Ohio Public Health Information Warehouse on January 27th, 2017.

The Maternal and Infant Health Monthly Surveillance Report will include the following topics:

- Number of infant deaths by month
- Current monthly infant mortality rate
- Current monthly neonatal mortality rate
- Current monthly preterm, very preterm, and <23 weeks gestation birth rate
- Current monthly small for gestational age birth rate
- Percentage of pregnancies spaced <18 months
- Maternal smoking rates
- Number of sleep-related deaths
- Current two-year infant mortality rate moving average
- Comparison of "Filed" and "Unfiled" data

INFANT MORTALITY SURVEILLANCE

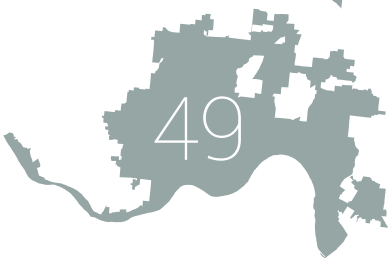
Public Health surveillance is the ongoing systematic collection, analysis, interpretation and dissemination of data regarding health-related events for use in public health action to decrease sickness and death, and improve health[1]. The Maternal and Infant Health Surveillance System is designed to better understand infant health in Hamilton County, track infant deaths and determine whether the ongoing work in Hamilton County to prevent infant deaths are effective. The charts used within this report are surveillance charts, which are tools to monitor infant health in Hamilton County. Comparisons to the national Healthy People 2020 Goals are made when possible. Healthy People 2020 Goals are a set of nationwide goals that support prevention efforts to create a healthier nation. These goals are released every 10 years from the US Department of Health and Human services. For more information about how to understand the surveillance charts, please read the General Guidelines for Using Surveillances Charts in **Appendix B**.

1. Centers for Disease Control and Prevention. *Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group*, MMWR, July 27,2007, Vol. 50 No. RR-13.

NUMBER OF INFANT DEATHS

One way to look at infant health is to track the number of infant deaths in Hamilton County per month. Infant deaths are the death of a child before his or her first birthday. In November 2016, there were 9 infant deaths in Hamilton County. Three of the infant deaths that occurred in November 2016 in Hamilton County, occurred among Cincinnati residents. Table 1 displays the provisional number of infant deaths and births for each month in 2015 and 2016. To learn more about provisional death data and it's limitations, please see **Appendix A** on Page 12.

Infant Deaths, Hamilton County 2016 Year-to-date



Infant Deaths, Cincinnati 2016 Year-to-date

Table 1. Number of Infant Deaths and Births, Hamilton County, 2015-2016

	2015		2016	
	Infant Deaths	Live Births	Infant Deaths	Live Births
January	10	938	12	884
February	5	800	6	885
March	15	920	5	798
April	1	928	3	888
May	7	922	7	879
June	9	930	12	932
July	12	961	12	894
August	10	941	9	947
September	8	956	6	886
October	12	842	10	886
November	6	867	9	857
December	4	885		
Total	99	10,890	91	9,736

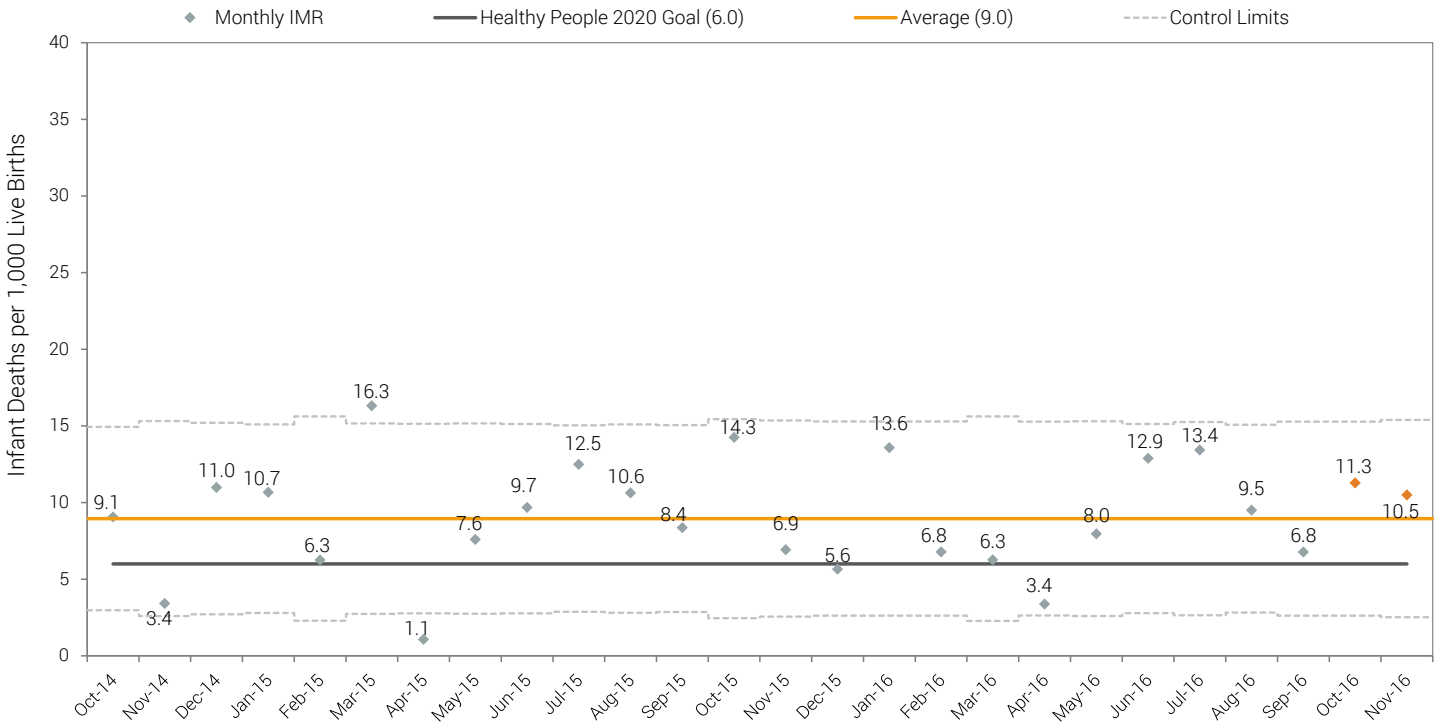
INFANT MORTALITY RATES

10.5 per 1,000
November 2016 IMR
This provisional rate was lower than the Healthy People 2020 goal (6.0)

Another way to measure infant health is to track the Infant Mortality Rate (IMR) per month. An infant mortality rate is the number of infant deaths for every 1,000 live births. The Neonatal Infant Mortality Rate (NIMR) is a specific IMR for neonates (infants who are younger than 28 days). A neonatal infant mortality rate is the number of neonatal deaths for every 1,000 live births. An infant mortality rate is highly sensitive to changes in the number of births within a community, and it may not be surprising to have an increase in the number of infant deaths if there is also an increase in the number overall babies being born.

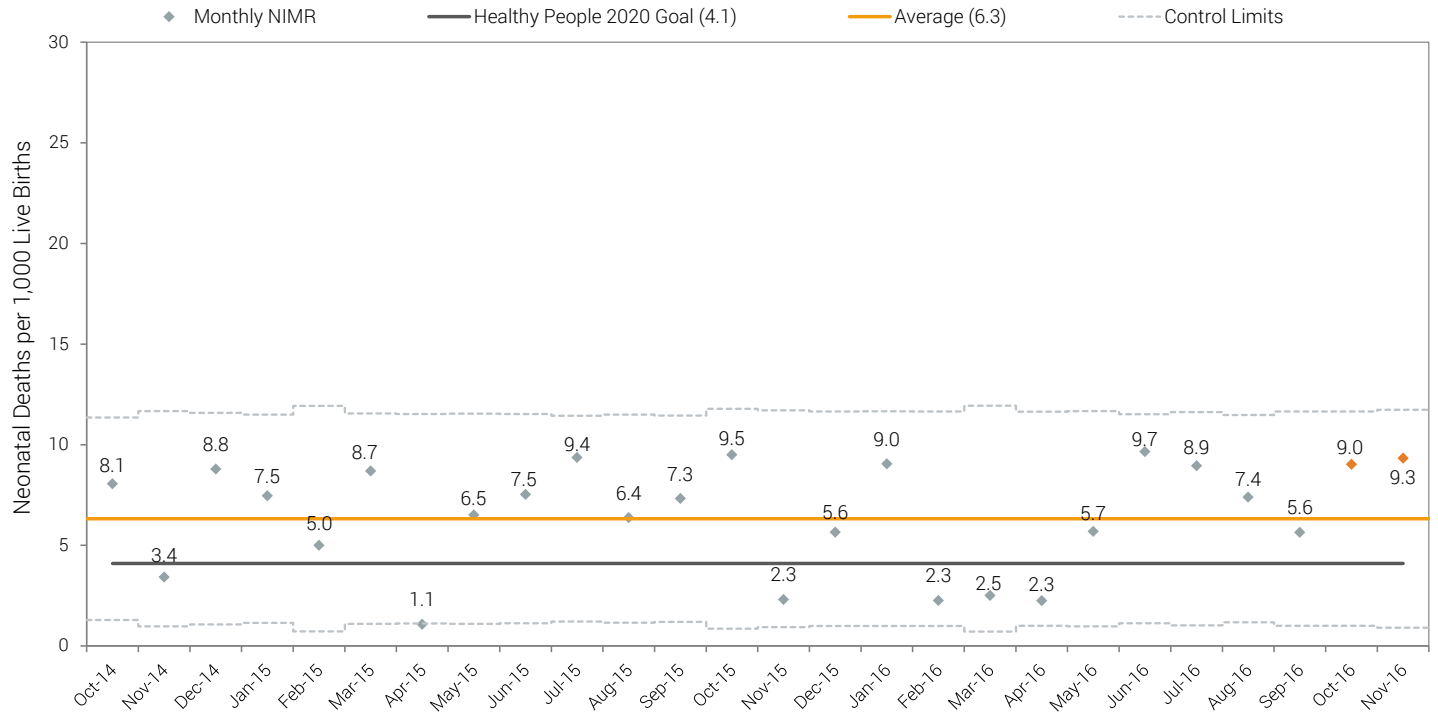
The IMR for November 2016 was 10.5 infant deaths per 1,000 live births (Figure 1). The November IMR is higher than the Healthy People 2020 goal of 6.0 infant deaths per 1,000 live births as shown in Figure 1. The November 2016 NIMR was 9.3 neonatal deaths per 1,000 live births (Figure 2). The November NIMR was higher than the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births. Neonatal deaths make up 70% of infant deaths in Hamilton County from January 2015 - November 2016. As can be seen from comparing Hamilton County rates and national infant health goals, Hamilton County is experiencing problems within the community regarding maternal and infant health.

Figure 1. Infant Mortality Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016. Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

Figure 2. Neonatal Mortality Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016. Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

PRETERM, VERY PRETERM, & <23 WEEKS GESTATION BIRTH RATES

A preterm birth is the birth of a baby that happens more than three weeks before the baby is due. A preterm birth rate is the percent of babies who are born before the start of the 37th week of pregnancy. The very preterm birth rate is the percent of babies who are born before the start of the 32nd week of pregnancy. The <23 weeks gestation birth rate is the percent of babies who are born before the start of the 23rd week of pregnancy. The <23 weeks gestation birth rate is important to track as approximately 1/3 of all infant deaths in Hamilton County each year are from babies who are born before the start of the 23rd week of pregnancy. Preterm birth increases the chance for infant death and many other poor health outcomes.

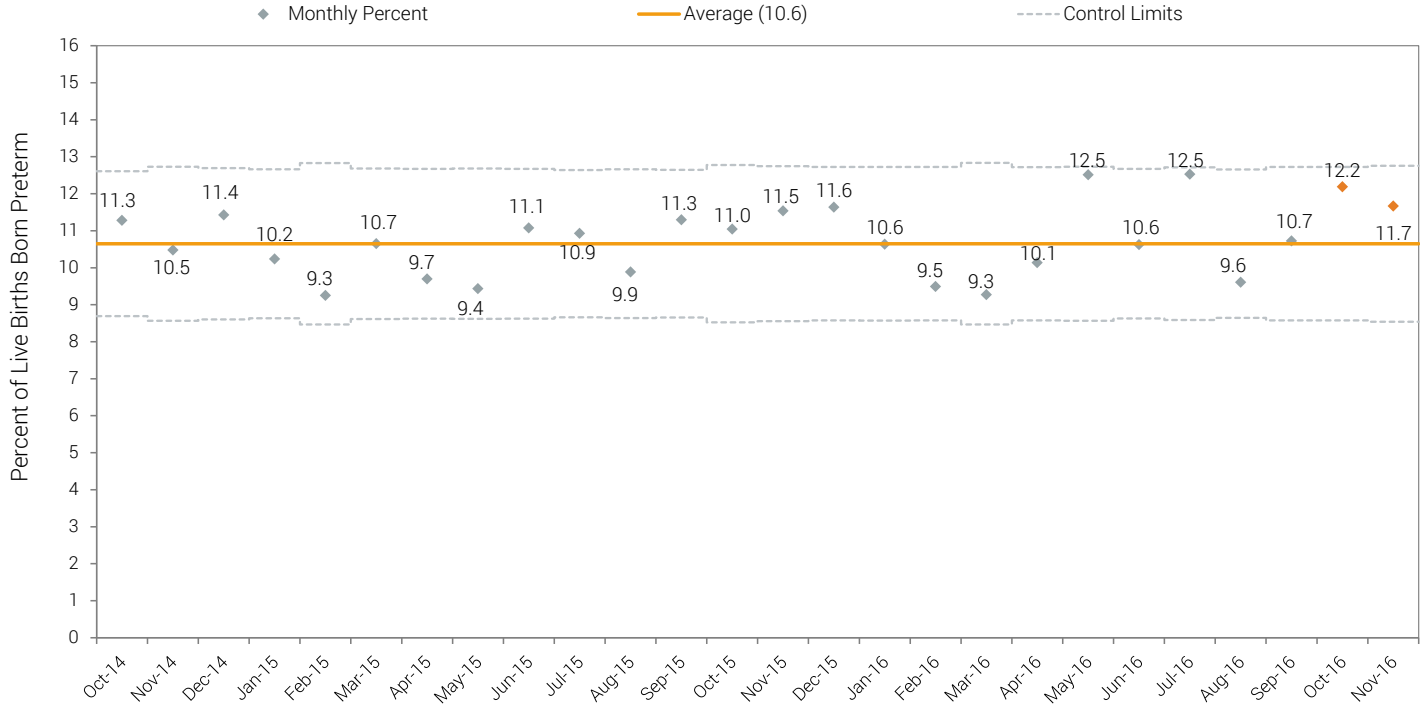
11.7%
November 2016 Preterm Birth Rate

2.9%
November 2016 Very Preterm Birth Rate

The preterm birth rate for November 2016 (11.7%) is higher than the average preterm birth rate in Hamilton County (10.6%). The very preterm birth rate for November 2016 (2.9%) was higher than the Hamilton County average (2.2%). The <23 weeks gestation birth rate for November 2016 is 0.6%, which is higher than the Hamilton County average (0.33%).

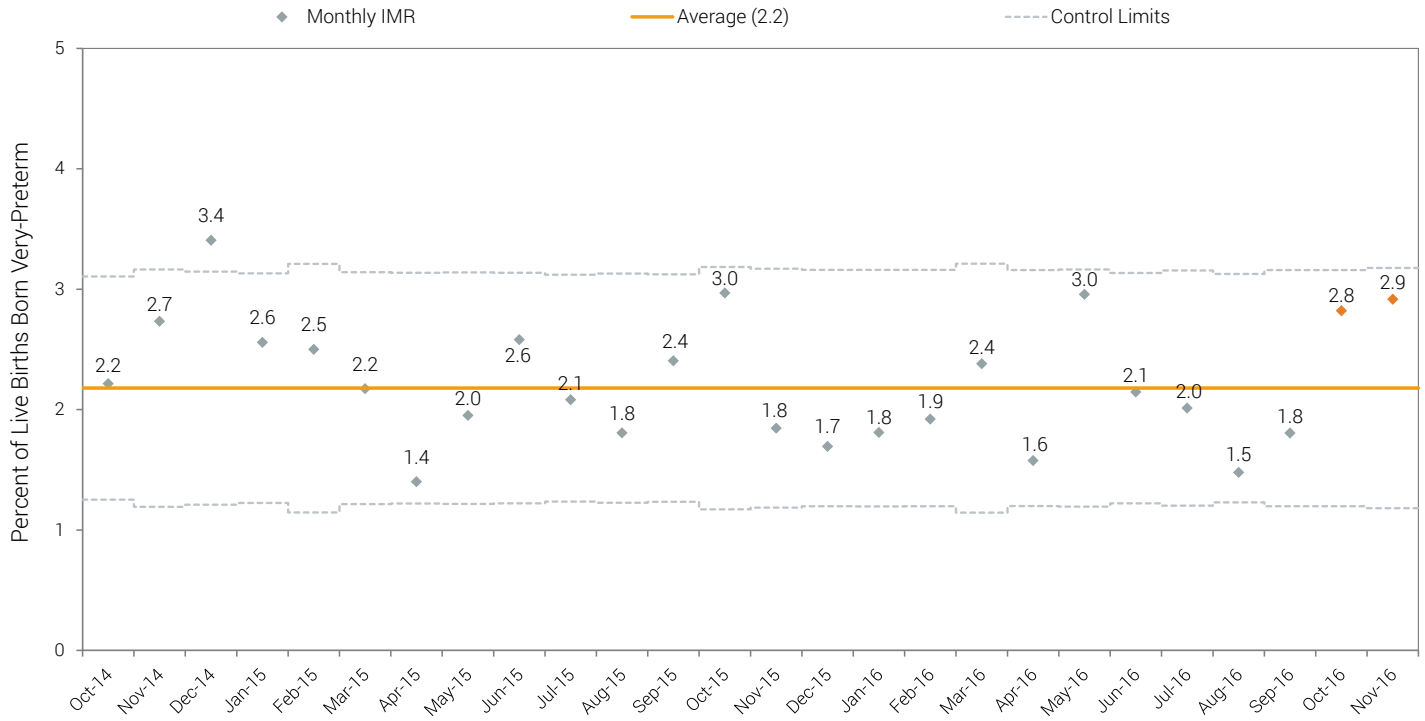
The method for determining preterm birth has been updated using a new standard. The new measure, the obstetric estimate of gestation at delivery replaces the measure based on the date of last normal menses used in previous reports. Because of the new method Healthy People 2020 goals are not able to be used due to the goals for preterm birth using the previous methods.

Figure 3. Preterm Birth Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



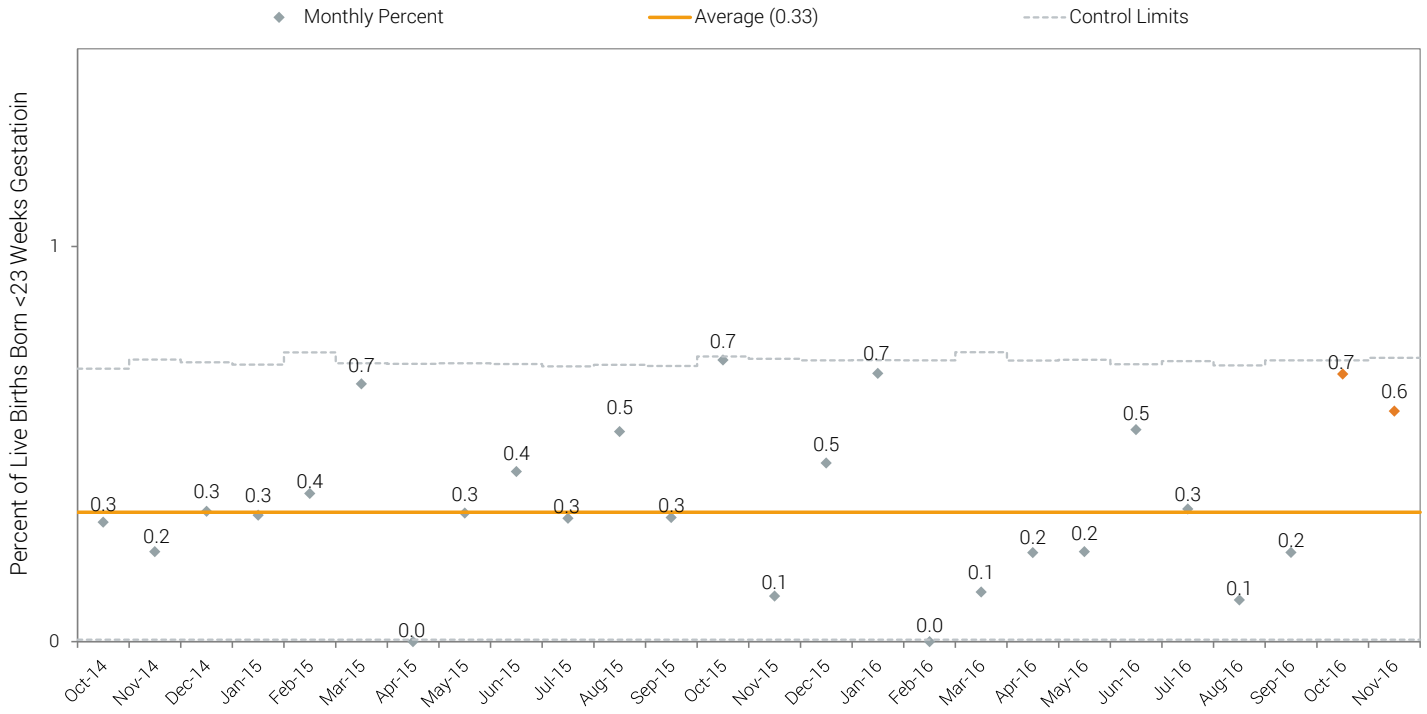
NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016 Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

Figure 4. Very Preterm Birth Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016. Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

Figure 5. <23 Weeks Gestation Birth Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016. Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

SMALL FOR GESTATIONAL AGE BIRTH RATE

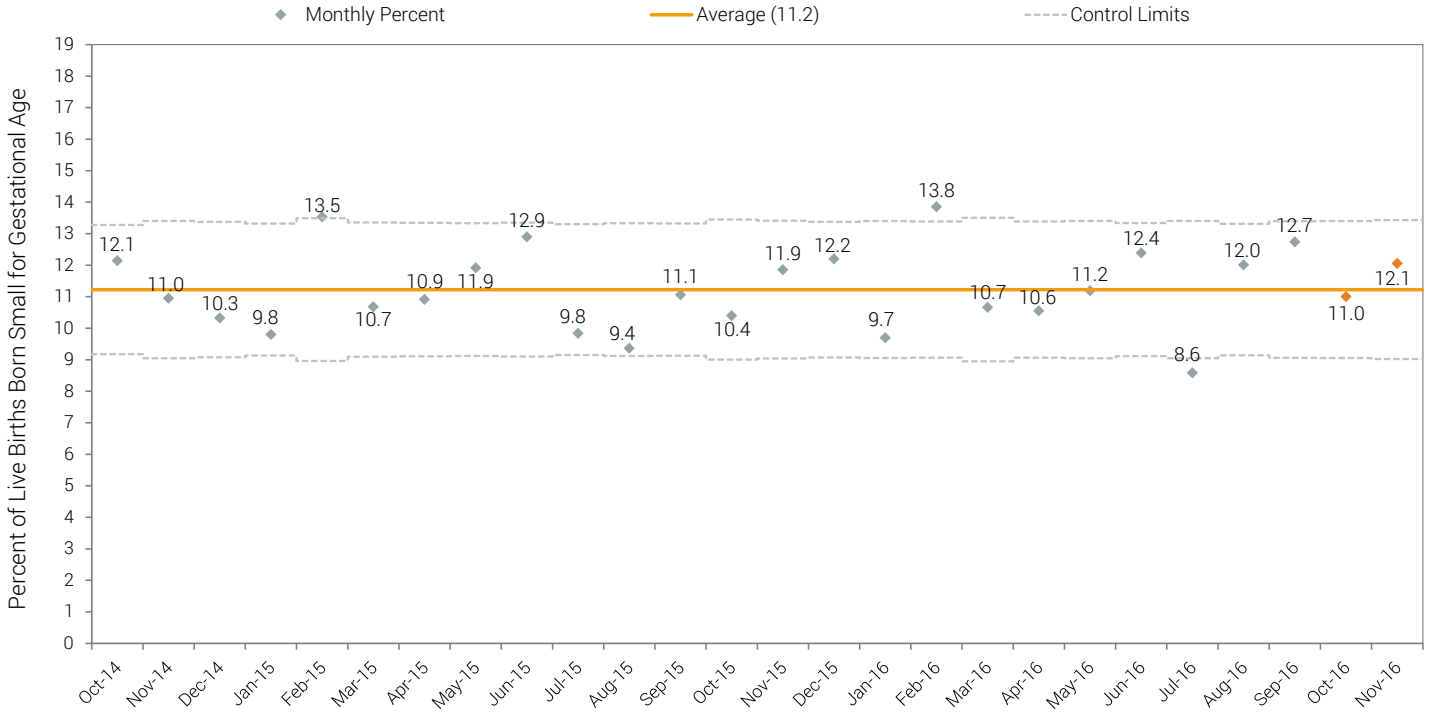
12.1%
November 2016 SGA Birth Rate

Small for gestational age (SGA) birth rate is the percent of births where only one baby was born whose weight at birth is at or below a set value (10th percentile) for the week of pregnancy they were born at[2]. SGA compares the birth weight of an infant to a national distribution of live births so the weights are specific to infants of the same gestational age. The value for the 10th percentile of birth weight was adopted from the live births for 1990 in the United States[3]. The health of the mother and social factors prior to pregnancy can influence if a child is born small for their gestational age[2]. SGA can have an impact on the health of the infant throughout childhood and into adulthood[2]. Babies who are born small for their gestational age have an increased risk for infant death and illness, permanent lack in growth, reduction or impairment of cognitive function, and the development of adult chronic disease[2]. The SGA birth rate in November 2016 is 12.1%, which is lower than the average SGA birth rate in Hamilton County (11.2%).

2. Association of Maternal & Child Health Programs. *Life Course Indicator: Small for Gestational Age*, 2014.
3. Oken E, Kleinman KP, Rich-Edwards J, Gillman MW. *A nearly continuous measure of birth weight for gestational age using a United States reference.* BMC Pediatric. 2003; 3:6. doi: 10.1186/1471-2431-3-6.

NOTE: SGA Percent illustrated in Figure 6 is calculated using gender-specific small for gestational age 10th percentile cut-off for more accurate measures

Figure 6. Small for Gestational Age Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016. Orange points are more likely to change in future reports.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

PREGNANCY SPACING

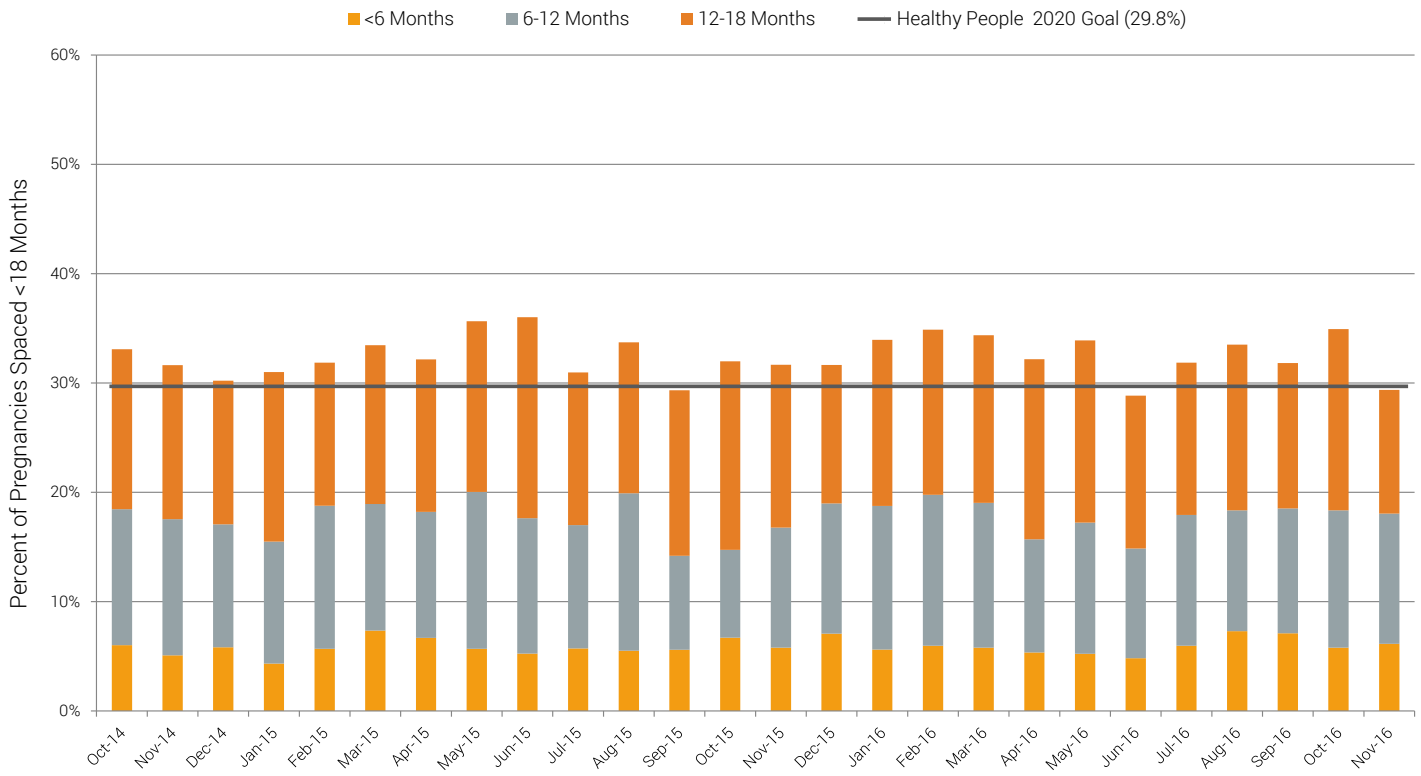
Pregnancy spacing is the number of months between the live birth of a previous child and the conception of the next pregnancy. It has been shown that short spacing between pregnancies, less than 18 months from the previous live birth to conception of the next pregnancy, can lead to harmful outcomes for both mothers and newborns. Mothers with short pregnancy spacing have an increased risk for developing pre-eclampsia (a condition that can cause blood pressure to rise and put mothers at risk for health issues including death), while the infant is more likely to be born prematurely. Pregnancies spaced between 18 and 59 months are considered optimal pregnancy spacing, as recommended by the World Health Organization[4]. Optimal spacing can lead to better outcomes for both the mother and the infant. However, for women of older ages, short pregnancy spacing may be part of the intended family building; in these cases women should talk with their doctor to weigh the health benefits of longer spacing between pregnancies and the health risks of short spacing between pregnancies.

The percentage of pregnancies in Hamilton County that were spaced less than 18 months for November 2016 is 29.4%; this percent is lower than the Healthy People 2020 goal of 29.8% of all pregnancies spaced less than 18 months. Of the pregnancies spaced less than 18 months between October 2014 and November 2016, 45.5% of pregnancies were spaced between 12 and 18 months.

By educating mothers about the importance of properly spacing pregnancies, the risk for poor health complications for both mother and infant could be reduced.

4. World Health Organization. *Report of a WHO Technical Consultation on Birth Spacing*, 2006

Figure 7. Percent of Pregnancies Spaced <18 Months, Hamilton County, Oct 2014 - Nov 2016*



NOTE: The mean is calculated using two years of data from Oct 2014 - Sep 2016

*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.

† Infant deaths to mothers with a previous live birth

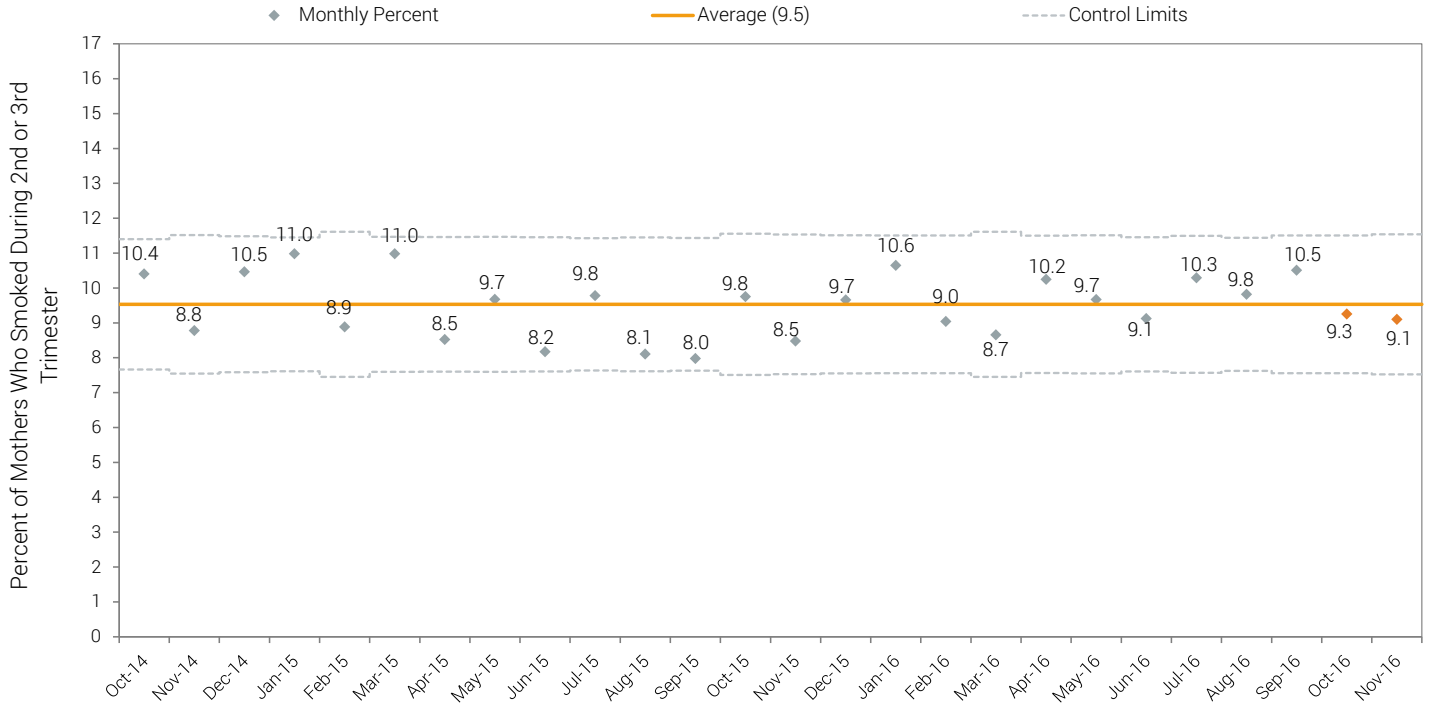
‡ Percentage of short spaced pregnancies does not include first time mothers or pregnancies where information pertaining to previous live birth was missing/unknown

Data Source: ODH Vital Statistics

MATERNAL SMOKING RATE

Smoking, tobacco use, and other forms of substance use and abuse during pregnancy can be extremely harmful to a developing baby. Women who smoked during pregnancy in Hamilton County were 44% more likely to experience an infant death. The percentage of births in Hamilton County where the mother smoked in the 2nd or 3rd trimester (the last 6 months of pregnancy) for November 2016 was 9.1% (Figure 8). This was lower than the average number of births to women who reported smoking in the 2nd or 3rd trimester for Hamilton County (9.5%)

Figure 8. Maternal Smoking Rate Surveillance Chart, Hamilton County, Oct 2014 - Nov 2016*



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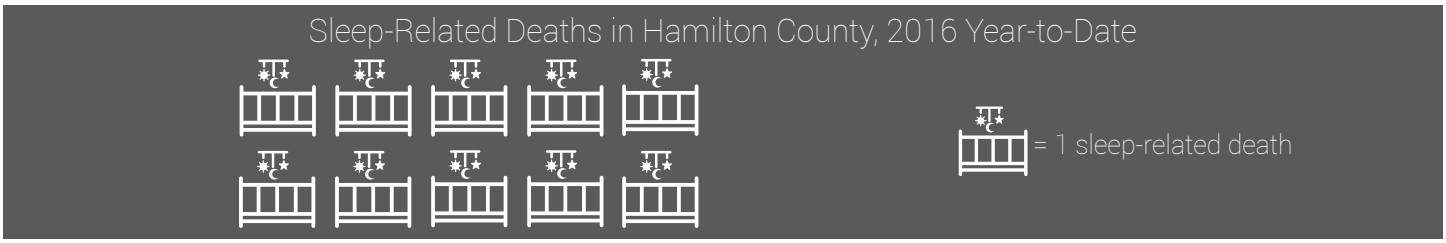
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

SLEEP-RELATED DEATHS

A sleep-related death is the death of an infant due to unsafe sleeping environments. A safe sleeping environment is one in which the infant is sleeping alone, on their back, and in a crib. Unsafe sleeping environments can consist of co-sleeping (a parent, adult or older child sharing a bed with an infant), an infant sleeping on a couch, an infant sleeping in a crib filled with blankets or pillows, or an infant being put to sleep on his/her stomach. There have been 10 sleep-related deaths in Hamilton County in 2016 so far. However, as further iterations of the report are published, the number of sleep-related deaths may change as records become finalized and complete.



ALWAYS FOLLOW THE ABC'S OF SAFE SLEEP, EVEN DURING NAP TIME.

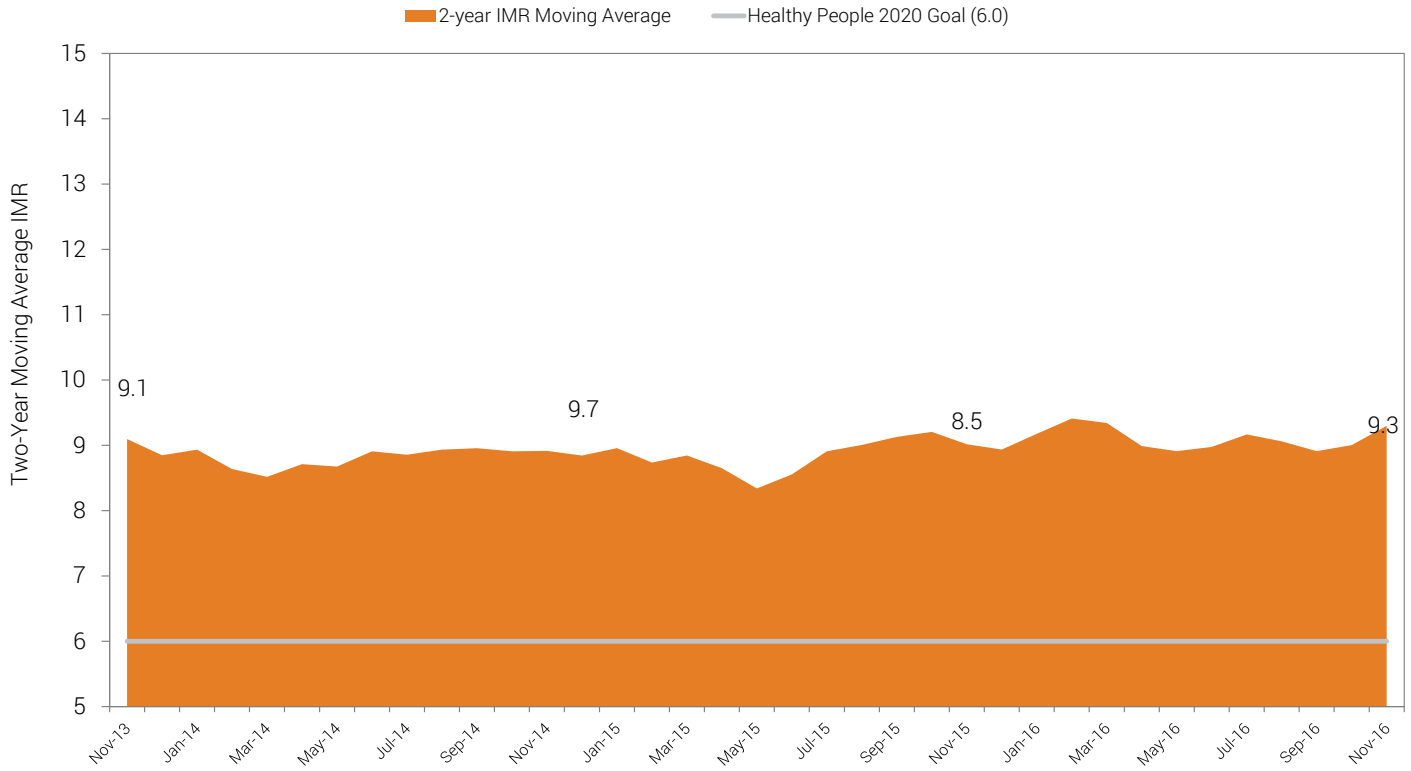
Alone **B**ack **C**rib

Baby sleeps safest alone, on their back, in a crib.

TWO-YEAR MOVING AVERAGE

Reviewing monthly rates is one approach used to determine whether there has been a change over time in infant deaths. However, monthly rates have a tendency to fluctuate and may hide emerging trends. An alternative measure is the un-weighted, monthly moving average, which can provide a more stable picture of evolving patterns. In Figure 10, the infant mortality rate for each month is the 24-month average of months immediately prior to and including the current month. The two-year moving average has slightly increased from November 2013 (9.1) to November 2016 (9.3) as shown in Figure 10. Please note that the two-year moving average is subject to change based on new data, which may ultimately affect current trends. Multiple approaches are required to measure the impact of efforts to reduce infant mortality.

Figure 10. Two-Year Moving Average Infant Mortality Rate by Month, Hamilton County, Nov 2013 - Nov 2016*



NOTE: The infant mortality rate for each month in the average of the 24 months immediately prior to and including the last month.
*Data for 2016 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

CRADLE CINCINNATI'S CORNER

New Infant Mortality Law Signed by Governor Kasich

On January 11, Governor Kasich signed into law Senate Bill 332, a comprehensive infant mortality reduction bill for the state of Ohio. Thanks to Senator Shannon Jones and Senator Charleta Tavares, as well as many from the Cincinnati area, this law will impact efforts in safe sleep promotion, maternal smoking cessation, availability of long acting reversible contraceptives, home visiting, housing and more. Specific policy items include

- The Ohio Department of Health (ODH) providing annual training classes on safe sleep to hospital staff, health departments, social workers, home visitors and community health workers.
- ODH preparing a tobacco reduction plan that includes an emphasis on Medicaid recipients.
- ODH partnering with medical and nursing colleges to develop and implement training on how to counsel patients on contraceptives, including LARCs.
- ODH reporting quarterly on infant mortality and preterm birth and creating an infant mortality scorecard that includes infant mortality rate, Sudden Unexpected Infant Death rate, preterm birth rate, low birthweight – each broken out by race.
- Creating the Ohio Home Visiting Consortium to ensure that home visiting services provided in Ohio are high-quality and delivered through evidenced-based or innovative, promising home visiting models

You can read a summary of the law here.

Angel Baby Network founder, Cradle Cincinnati advisory board member and Cincinnati Children's Hospital Medical Center employee Danielle Jones was one of the law's local champions. She testified for the bill on honor of her son, Christopher Jones, Jr., who passed away at 10 days of age. You can read her thoughts on the passing of Senate Bill 332 as well as her family story

For more information, check us out on-line at www.cradlecincinnati.org, and follow us on social media:

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APPENDIX A
DATA LIMITATIONS

There are multiple datasets that can be used to support surveillance activities associated with infant mortality. Two primary data sources are used to supply the data for the monthly Maternal and Infant Health Surveillance Reports (http://www.hamiltoncountyhealth.org/en/resource_library/reports.html). Both of these data sources are considered provisional until ODH completes data reconciliation processes each year. Provisional Data Source A (PDS-A) contains records that correspond to filed certificates and are linkable (i.e., birth to death records), whereas Provisional Data Source B (PDS-B) contains records that correspond to both filed and unfiled/pending certificates and are not linkable. PDS-A is used for more in-depth analysis of risk factors, but suffers from incompleteness due to missing unfiled/pending certificates. PDS-B is used to collect death data more expeditiously, but provides only count data, precluding more in-depth analysis of prenatal and perinatal risk factors. Data from both PDS-A and PDS-B become more accurate as the length of time increases from event to report. Annually, ODH releases a reconciled dataset that contains final cause of death information and geographic information.

PDS-B is used in this report to provide the count statistics in each section except preterm births (Figure 3-5), small for gestational age (Figure 6), pregnancy spacing (Figure 7), maternal smoking (Figure 8), and sleep-related deaths. Table 2 displays the discrepancy between the two infant mortality data sources from ODH. Please note that delayed certificates impact data quality, and therefore the integrity of findings shared in this report.

Table 2. Infant Mortality Data Source Assessment, Hamilton County, 2014-2015

Data Source	2015 Number of Infant Deaths	2016 Number of Infant Deaths
PDS-A	99	91
PDS-B	99	89
Discrepancy	0	2

APPENDIX B
GENERAL GUIDELINES FOR USING SURVEILLANCE CHARTS

The Hamilton County Infant Mortality Surveillance System (HCIMSS) uses surveillance charts to monitor infant mortality rates, preterm birth rates, and other birth outcomes. These charts provide a method for monitoring the status of infant health over time and provide timely feedback on the effectiveness of local efforts to reduce infant deaths.

Several tools are included in the surveillance charts that help facilitate interpretation:

1. A baseline - the center line which is the average number of deaths per month over the preceding two years,
2. A goal line which shows the goal that has been established by the community,
3. Upper and lower control limits (dashed) that allow user to detect unusual events.

Annotations indicate when certain interventions began or special changes occurred.

Here are some types of unexpected events that could be detected within surveillance charts:

- A single point outside of the control limit
- A run of eight or more consecutive points below or above the center line
- Six consecutive decreasing or increasing points
- Two out of three consecutive points near a control limit.

This report was prepared by Hamilton County Public Health, Department of Community Health Services, Division of Epidemiology and Assessment in collaboration with Cradle Cincinnati.

HAMILTON COUNTY PUBLIC HEALTH

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Thank you to John Paulson, Ohio Department of Health, Center for Public Health Statistics and Information, and Merrily Wholf, Ohio Bureau of Child and Family Health Services, for providing data for this report.

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