



# Hamilton County Maternal and Infant Health Monthly Surveillance Report



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## Introduction

The series of Maternal and Infant Health Monthly Surveillance Reports are part of a county-wide initiative to improve maternal and infant health and reduce infant mortality. In order to take effective actions to improve the health and safety of infants in the community, it is essential to identify, describe and monitor the problems and populations at risk. This report characterizes the current status of infant mortality in Hamilton County.

The data sources for this report series have been enhanced to improve the monthly surveillance process. The Ohio Department of Health (ODH) provides monthly mortality data to Hamilton County Public Health that will be used to improve the timeliness and accuracy of monthly surveillance. These provisional data are numbers only and do not include any additional information from birth or death certificates (**Appendix A**). The mortality data included in this report were obtained from ODH on February 5, 2015 and February 19, 2019; the birth data were updated on the Ohio Public Health Information Warehouse on March 4, 2015.

### Infant Mortality Surveillance

- ⇒ 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 death
- ⇒ 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 a health-related event for use in public health action to reduce morbidity and mortality and improve health<sup>1</sup>. The Maternal and Infant Health Surveillance System is designed to better understand infant morbidity and mortality in our community, monitor infant deaths and evaluate whether collective actions to prevent infant deaths are effective. The surveillance charts contained within this report are tools that are used to monitor infant mortality in our community. Please read the General Guidelines for Using Surveillance Charts in **Appendix B**.

<sup>1</sup>Centers for Disease Control and Prevention. *Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group*, MMWR, July 27, 2001, Vol. 50 No. RR-13.

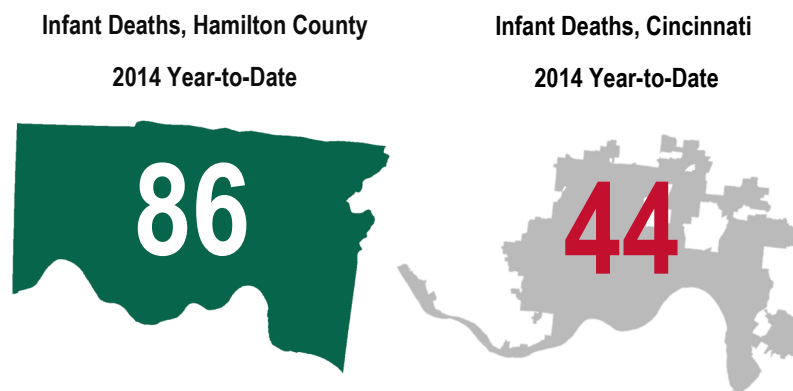


## Number of Infant Deaths

**Table 1. Number of Infant Deaths and Births, Hamilton County, 2013-2014**

Month	Hamilton County		Hamilton County	
	Infant Deaths 2013	Infant Deaths 2014	Infant Births 2013	Infant Births 2014
January	7	7	880	893
February	9	1	774	853
March	11	7	872	879
April	5	10	865	831
May	14	9	931	906
June	4	11	886	964
July	4	9	995	1007
August	8	11	957	897
September	5	10	919	960
October	11	8	880	989
November	10	3	871	868
December	7		916	
<b>Total</b>	<b>95</b>	<b>86</b>	<b>10,746</b>	<b>10,037</b>

One measure of infant mortality is the number of infant deaths per month. In November 2014, there were 3 infant deaths within Hamilton County. None of the infant deaths that occurred in November 2014 in Hamilton County, occurred amongst Cincinnati residents. Table 1 displays the provisional number of infant deaths and births for each month in 2013 and 2014. Please see **Appendix A** on Page 9 to learn more about provisional death data limitations.



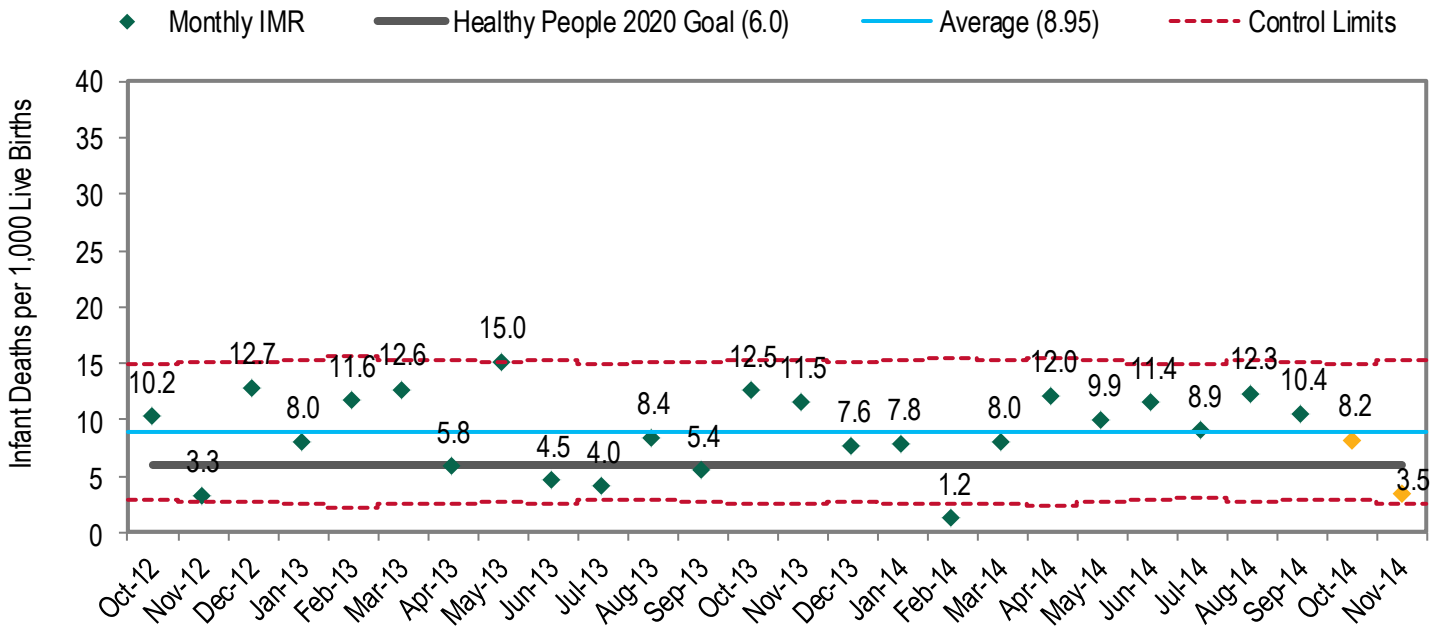
## Infant Mortality Rates

Another method used to monitor infant mortality is the examination of the number of infant deaths in relation to the total number of births. An increase in the number of infant deaths may not be surprising if there is also an increase in the overall number of babies born. To evaluate infant deaths with regard to the number of babies born, the Infant Mortality Rate (IMR) is calculated. The monthly IMR is the number of infants (children less than one year of age) who died, divided by the number of live births during the month per 1,000 live births. The Neonatal Infant Mortality Rate (NIMR) is a specific IMR for neonates (infants younger than 28 days) who died per 1,000 live births.

**The IMR for November 2014 was 3.5. This provisional rate was lower than the Healthy People 2020 goal (6.0).**

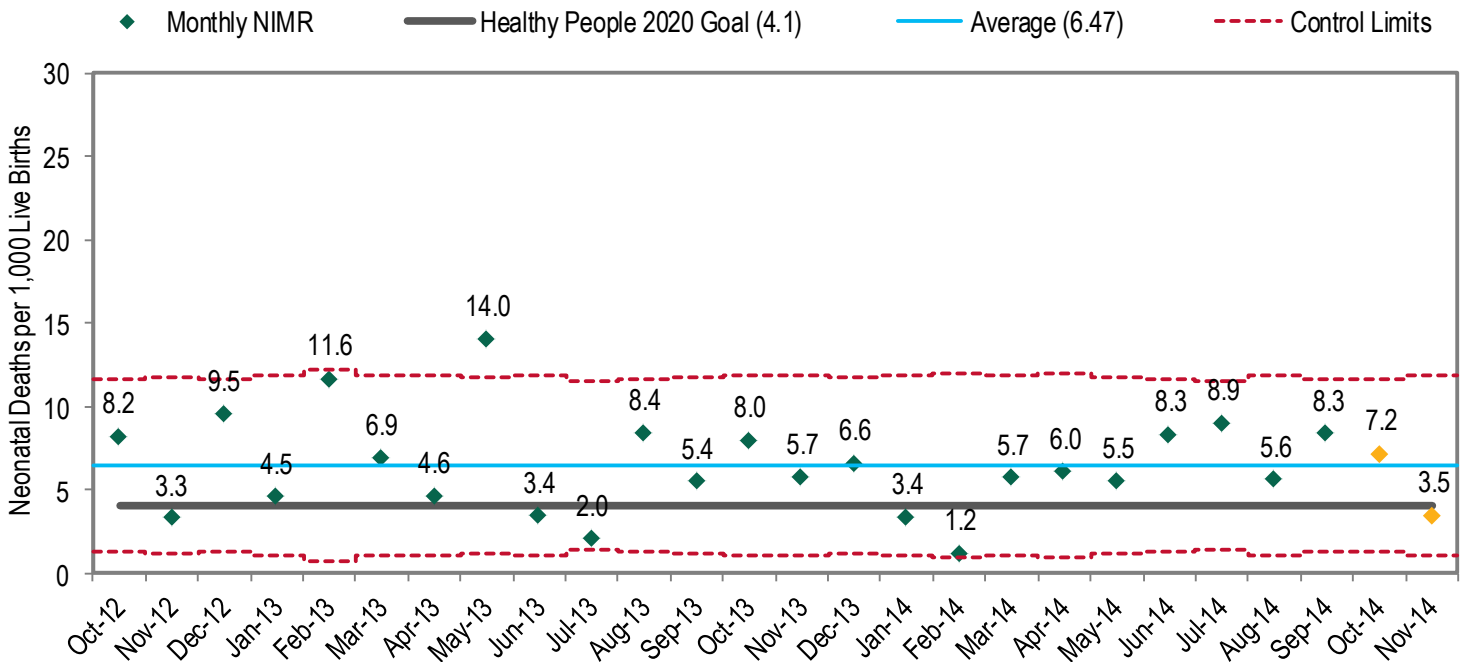
The IMR for November 2014 was 3.5 infant deaths per 1,000 live births (Figure 1). November was lower than the average IMR (8.95) as shown in Figure 1. Subsequent reports will provide improved statistical validity of these estimates (**Appendix A**). The November 2014 NIMR was below the upper statistical thresholds and is displayed in Figure 2. The November NIMR (3.5) is below the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births and below the Hamilton County 24-month average of 6.47 neonatal deaths per 1,000 live births. Neonatal deaths accounted for 69.1 percent of the January 2013-November 2014 infant deaths as of data collected on February 19, 2015. As can be seen from the comparison of 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 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 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 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.  
 Data Source: ODH Vital Statistics

## Preterm, Very Preterm, and <23 Weeks Gestation Birth Rates

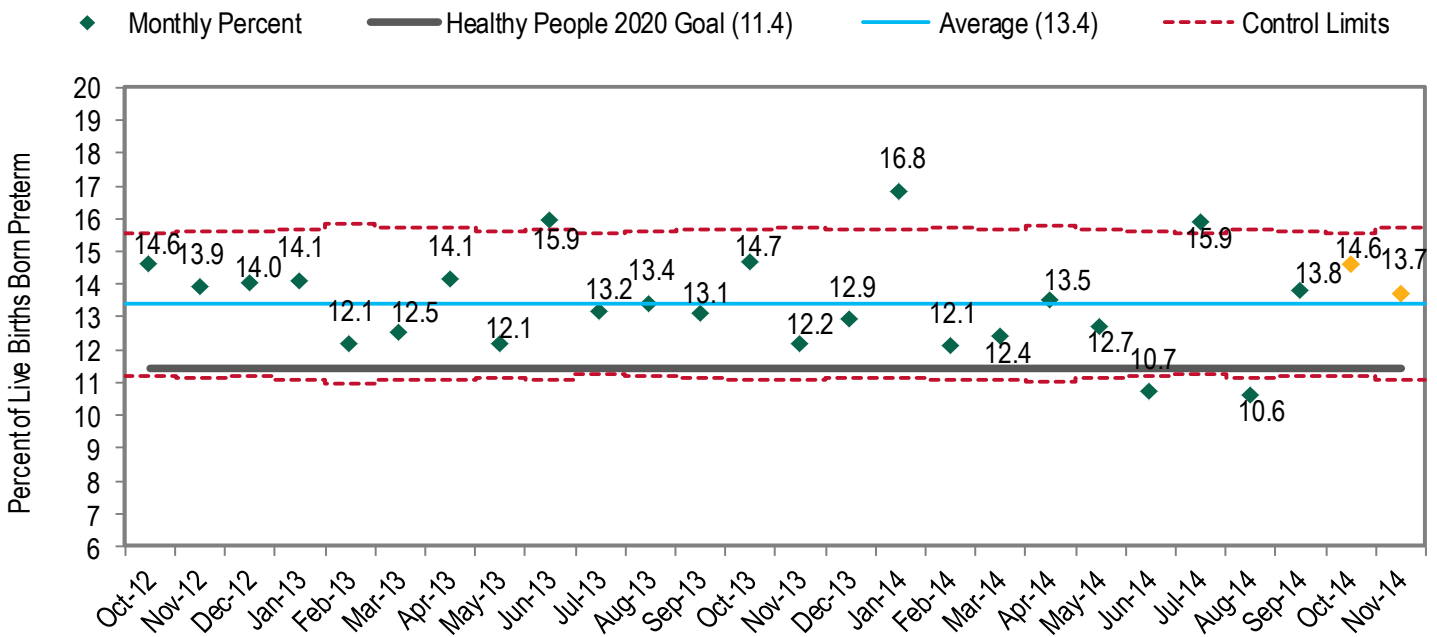
The preterm birth rate is the percentage of infants born before 37 weeks gestation. The very preterm birth rate is the percentage of infants born before 32 weeks gestation. Preterm birth is a significant risk factor of infant mortality and many other adverse health outcomes. The average preterm birth rate in Hamilton County (13.4 percent) is above the Healthy People 2020 goal of 11.4 percent. The provisional preterm birth for November is 13.7 percent; this rate is above the Healthy People 2020 goal of 11.4 percent for all live births. The average very preterm birth percentage in Hamilton County (2.84 percent) is above the Healthy People 2020 goal of 1.8 percent. The provisional very preterm birth percentage for November 2014 is 3.3 percent; this rate is above the Healthy People 2020 goal of 1.8 percent for all live births. The provisional <23 weeks gestation birth percentage for November 2014 is 0.3 percent in Hamilton County which is above the average <23 weeks gestation birth rate in Hamilton County (0.40 percent). The <23 weeks gestation birth rate is also important to track as approximately 1/3 of infant deaths within Hamilton County each year are from babies who are born earlier than 23 weeks gestation. These babies are born so early that their chance of survival after being born is very small. By preventing preterm births in Hamilton County, infant morbidity and mortality can be reduced, ultimately preserving the community's financial resources and providing children with a healthy start to life.

**The preterm birth rate for November 2014 (13.7 percent) was above the Hamilton County average (13.4 percent) and the Healthy People 2020 goal for preterm births (11.4 percent).**

**The very preterm birth rate for November 2014 (3.3 percent) was above the Hamilton County average (2.84 percent) and above the Healthy People 2020 goal for very preterm births (1.8 percent)**

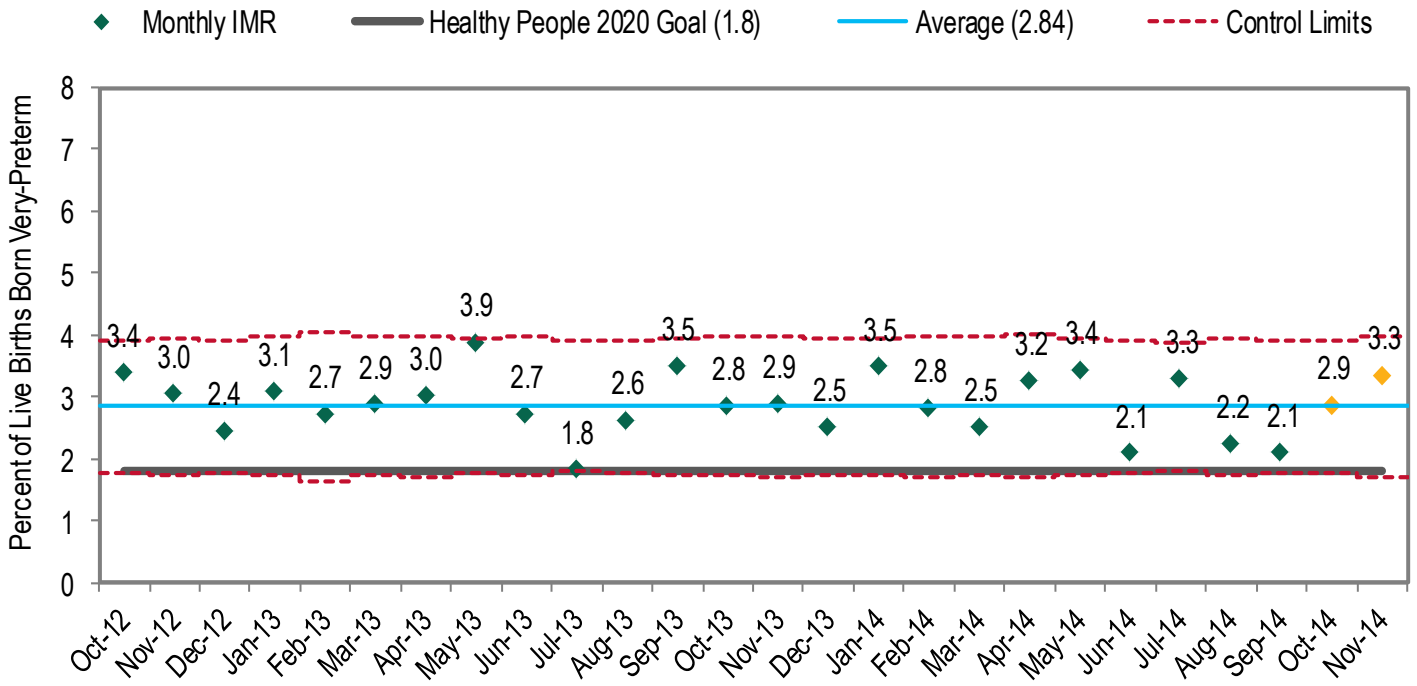
**These data are provisional and may change in future reports**

**Figure 3. Preterm Birth Rate Surveillance Chart, Hamilton County, Oct 2012—Nov 2014\***



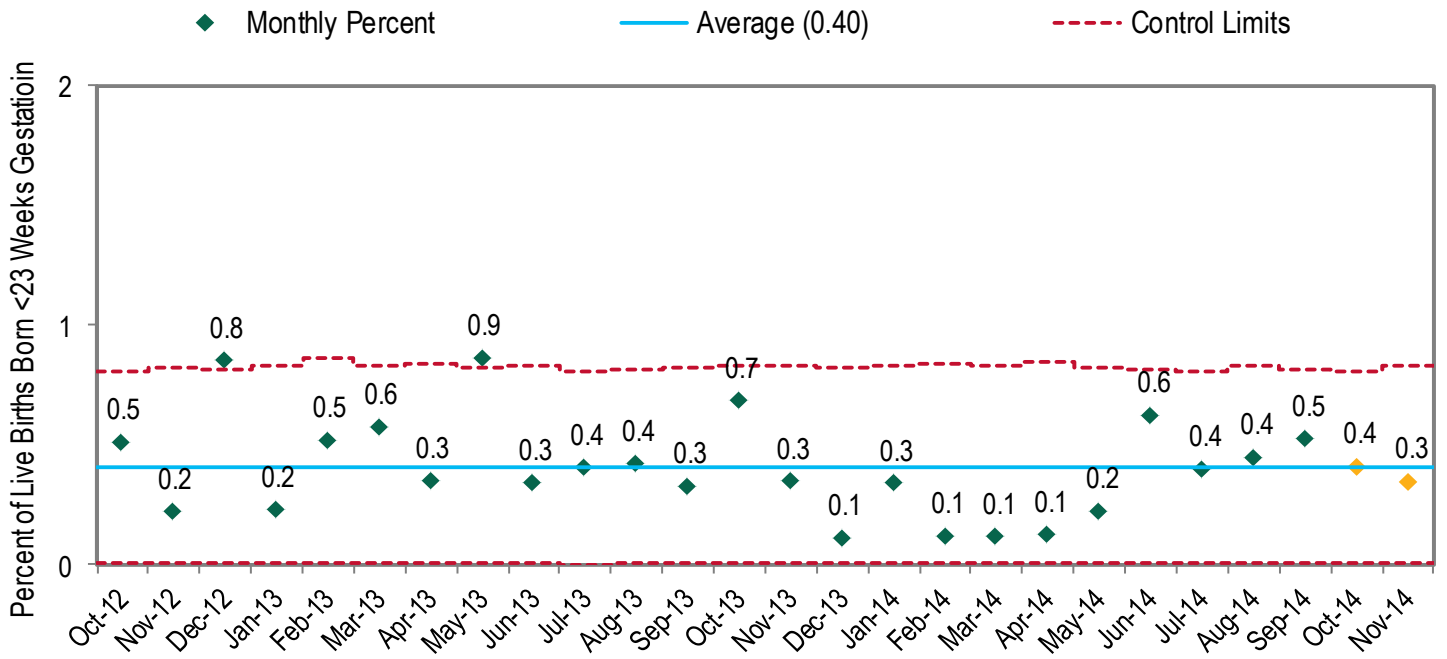
NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.  
 Data Source: ODH Vital Statistics

**Figure 4. Very Preterm Birth Rate Surveillance Chart, Hamilton County, Oct 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013—2014 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 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013—2014 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

The small for gestational age (SGA) birth rate is the proportion of singleton live-born infants whose birth weight is at or below the 10<sup>th</sup> percentile for a given gestational age<sup>2</sup>. SGA compares the infant birth weight with a national distribution of live births so that weights are relative to infants of the same gestational age<sup>2</sup>. The 10<sup>th</sup> percentile cut off of birth weight was derived from the 1990 live births in the United States as a baseline<sup>3</sup>. Maternal health and social factors prior to pregnancy influence SGA, and can have an impact on the health of the infant throughout childhood and into adulthood<sup>2</sup>. Infants who are born with birth weights below the 10<sup>th</sup> percentile are at an increased risk for infant mortality and morbidity, permanent deficits in growth, neurocognitive developments in childhood, and development of adult chronic disease<sup>2</sup>. The provisional SGA birth rate in November 2014 is 13.7 percent, which is above the average SGA birth rate in Hamilton County (13.44 percent).

The small for gestational age birth rate for November 2014 (13.7 percent) was above the Hamilton County average (13.44 percent).

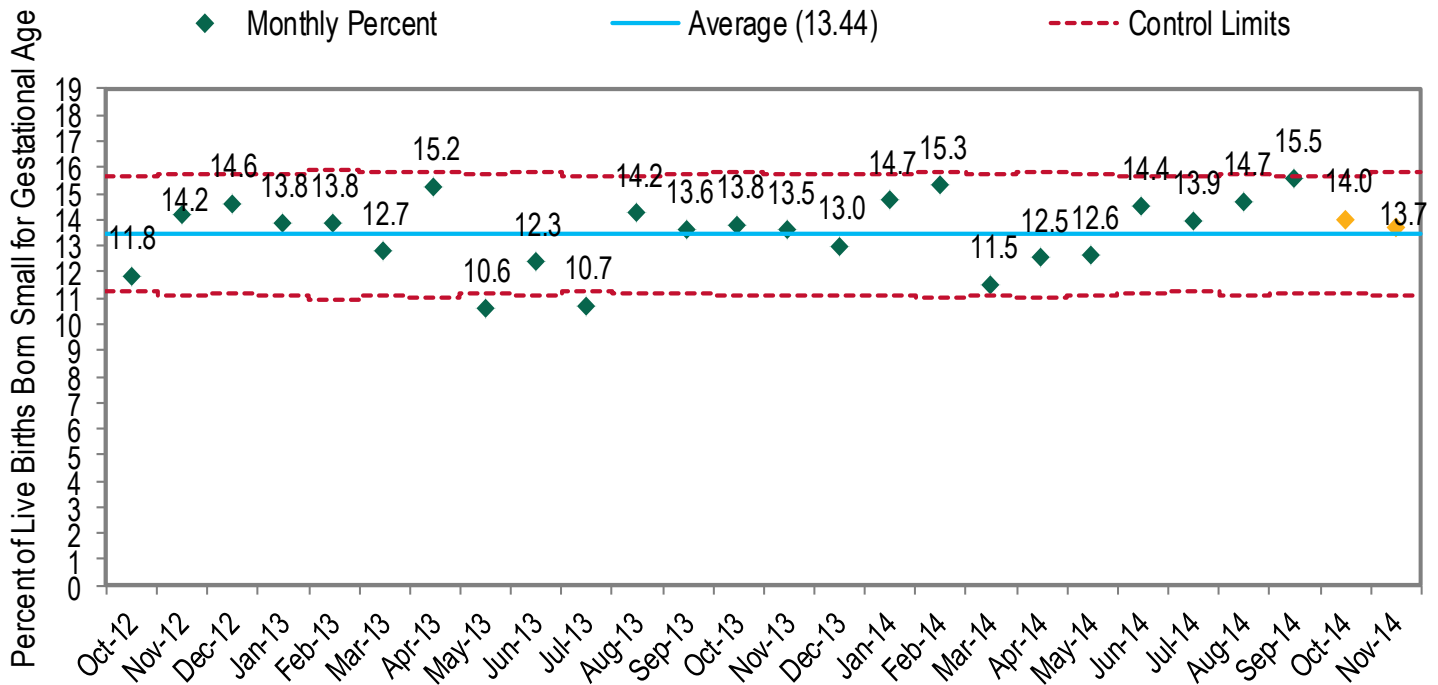
The 10<sup>th</sup> percentile cut off of birth weight was derived from the 1990 live births in the United States as a baseline<sup>3</sup>. Maternal health and social factors prior to pregnancy influence SGA, and can have an impact on the health of the infant throughout childhood and into adulthood<sup>2</sup>. Infants who are born with birth weights below the 10<sup>th</sup> percentile are at an increased risk for infant mortality and morbidity, permanent deficits in growth, neurocognitive developments in childhood, and development of adult chronic disease<sup>2</sup>. The provisional SGA birth rate in November 2014 is 13.7 percent, which is above the average SGA birth rate in Hamilton County (13.44 percent).

<sup>2</sup>Association of Maternal & Child Health Programs. *Life Course Indicator: Small for Gestational Age*, 2014.

<sup>3</sup>Oken E, Kleinman KP, Rich-Edwards J, Gillman MW. *A nearly continuous measure of birth weight for gestational age using a United States national reference*. BMC Pediatr. 2003;3:6. doi: 10.1186/1471-2431-3-6 .

<sup>4</sup>Note: SGA Percent illustrated in Figure 6 is calculated using gender-specific small for gestational age 10<sup>th</sup> percentile cut-off for more accurate measures.

**Figure 6. Small for Gestational Age Birth Rate Surveillance Chart, Hamilton County, Oct 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.

\* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.

Data Source: ODH Vital Statistics

<sup>4</sup>SGA percent is calculated using gender-specific small for gestational age 10<sup>th</sup> percentile cut-off for more accurate measures

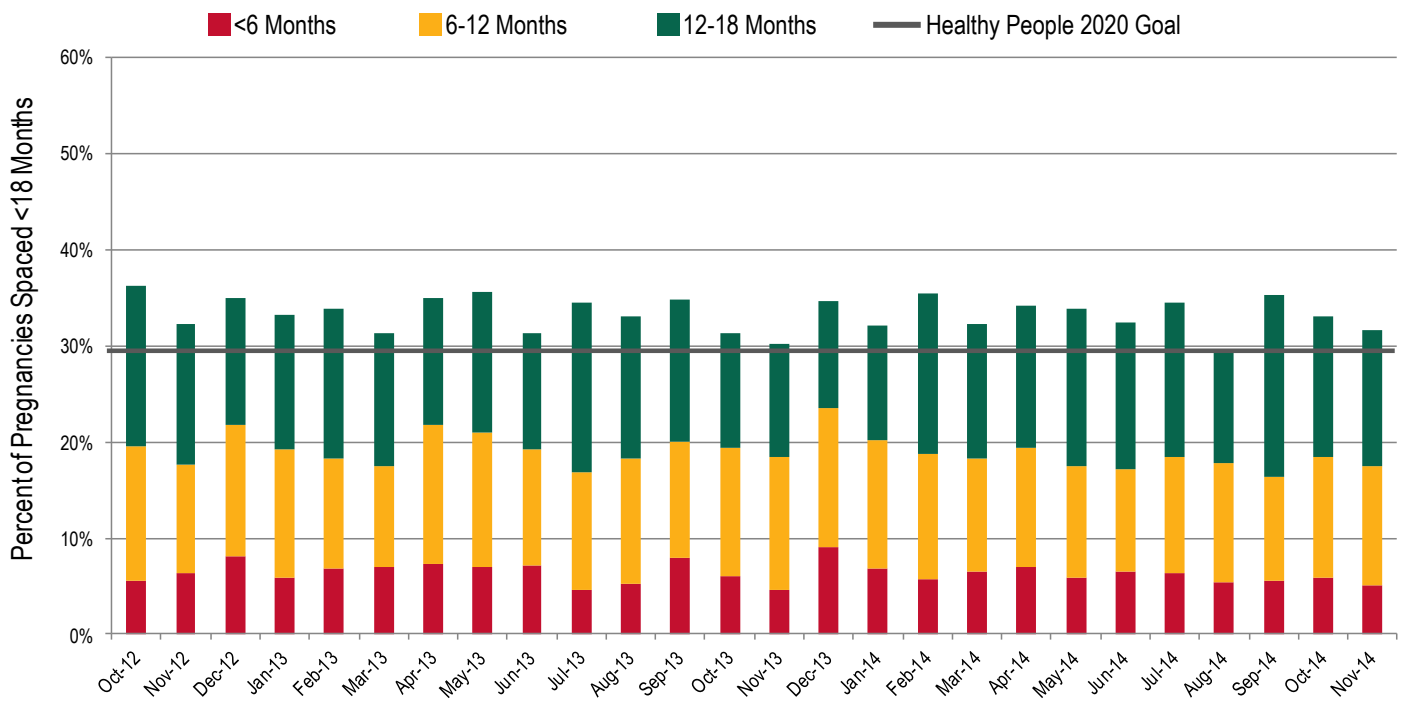


## Pregnancy Spacing

Research has shown that short spacing between pregnancies, less than 18 months from a previous live birth to conception of the next pregnancy, can lead to harmful outcomes for both mothers and newborns. Women with short pregnancy spacing have an increased risk for developing preeclampsia, while the infant is more likely to be born prematurely, or with low birth weight. Short spacing between pregnancies was a factor in 45 percent of Hamilton County's infant deaths<sup>†</sup> between 2007 and 2012. Pregnancy intervals between 18 and 59 months are considered optimal birth spacing, as recommended by the World Health Organization<sup>4</sup>. Optimal spacing can lead to better outcomes for both the mother and the infant. However, for women of advanced maternal age, short pregnancy spacing may be part of the intended family building; in these cases women should consult with their doctor to weigh the health benefits of longer spacing between pregnancies and health risks of shorter spacing between pregnancies. The average percentage<sup>‡</sup> of Hamilton County pregnancies that were spaced less than 18 months (33.4 percent) is above the Healthy People 2020 goal of 29.8 percent. The provisional percentage of pregnancies that were spaced less than 18 months for November 2014 is 31.7 percent; this percent is above the Healthy People 2020 goal of 29.8 percent of all pregnancies spaced less than 18 months. Of the Hamilton County pregnancies spaced less than 18 months between October 2012 and November 2014, 43.2 percent of pregnancies were spaced between 12 and 18 months. By informing mothers about properly spacing pregnancies, the risk of adverse health complications for both mother and infant could be reduced.

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

**Figure 7. Percentage of Pregnancies Spaced < 18 Months, Hamilton County, Oct 2012—Nov 2014\***



NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014.

<sup>†</sup> Infant deaths to mothers with a previous live birth

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

\* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.

Data Source: ODH Vital Statistics

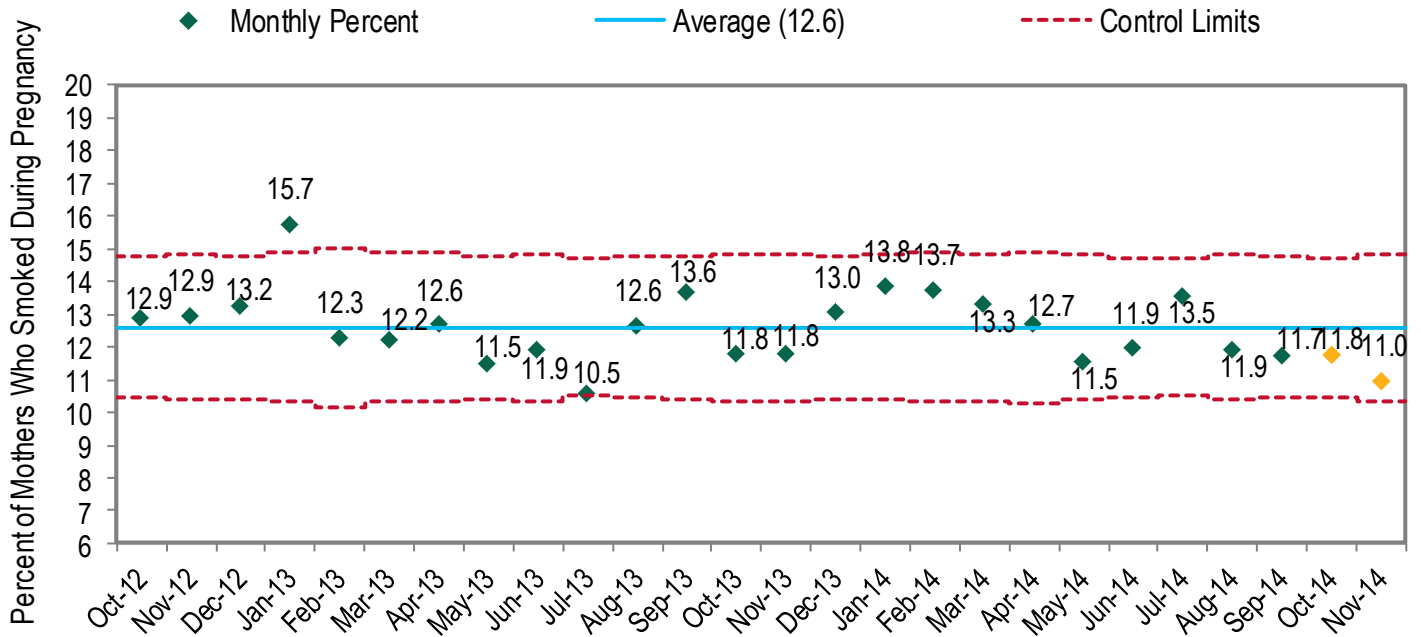
**Note: Pregnancy spacing is defined as the months from the previous live birth to conception of the next pregnancy. Hamilton County Maternal and Infant Health Monthly Surveillance Reports from January - May 2013 reported pregnancy spacing as the months from previous live birth to the next live birth, and may over-represent the number of pregnancies that are optimally spaced.**



## Maternal Smoking Rate

Tobacco use, and other forms of substance abuse during pregnancy, can be extremely harmful to a developing baby. Recent data show us that local women who smoked during pregnancy were 44% more likely to have an infant death. The provisional rate for November 2014 was 11.0 percent (Figure 8). This rate was below the average rate of women who smoked during pregnancy for Hamilton County (12.7 percent) as shown in Figure 8.

**Figure 8. Maternal Smoking Rates, Hamilton County , Oct 2012—Nov 2014\***



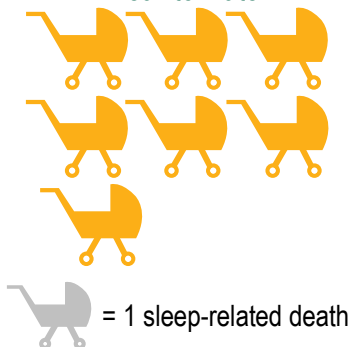
NOTE: The mean is calculated using two years of data from Oct 2012—Sep 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.  
 Data Source: ODH Vital Statistics

## Sleep-Related Death

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 or adult sharing a bed with an infant), an infant sleeping on a couch or in a crib filled with blankets or pillows, or an infant being put to sleep on his/her stomach. There have been seven sleep-related deaths in Hamilton County in 2014 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.

### Sleep-Related Deaths in Hamilton County, 2014

Year-to-Date



### The ABC's of Safe Sleep



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 mortality. However, monthly rates have a tendency to fluctuate and may disguise emerging trends. An alternative measure is the un-weighted, monthly moving average, which can provide a more stable picture of evolving patterns. In Figure 9, 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 decreased from November 2011 (10.3) to November 2014 (8.9) as shown in Figure 9. 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 9. Two-Year Moving Average Infant Mortality Rate by Month, Hamilton County, Nov 2011—Nov 2014\***



NOTE: The infant mortality rate for each month is the average of the 24 months immediately prior to and including the last month.

\* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.

Data Source: ODH Vital Statistics

## Cradle Cincinnati's Corner

A Cradle Cincinnati analysis of 2007-2012 data for Hamilton County shows the following:

- A pregnancy conceived less than 12 months after a previous pregnancy is nearly twice as likely to result in preterm birth\*.
- A pregnancy conceived less than 6 months after a previous pregnancy is nearly three times as likely to result in an infant death\*.

The amount of time between a woman's pregnancies matters. Local data show that the single most important modifiable risk factor for infant mortality is pregnancy *spacing* - or the amount of time from the birth of one child to the conception of the next. Families should wait at least one year before trying to get pregnant again in order to reduce their likelihood of having a preterm birth. In 2011, 19.2% of births to non-first time moms in Hamilton County were the result of a pregnancy spaced less than one year after a previous birth<sup>5</sup>.

Of course, unintentional pregnancies complicate the problem of short spacing. More than half of the live births in Hamilton County in 2011 were the result of pregnancies that were either unwanted or were wanted later<sup>6</sup>.

**What can you do?** If you work with women of childbearing age (15-44), consider incorporating this One Key Question into your interactions: Would you like to become pregnant in the next year? Developed by the Oregon Foundation for Reproductive Health, the One Key Question Initiative is a method of prompting women to consider their reproductive plans. In doing this, health care professionals can help prepare patients for a healthy pregnancy or conversely, reduce the likelihood of an unintended pregnancy.

Click [HERE](#) for more information on the One Key Question Initiative.

For more information, visit us at [cradlecincinnati.org](http://cradlecincinnati.org)

Or follow us on Twitter at [@CradleCincy](https://twitter.com/CradleCincy)

\*As compared to pregnancies spaced at least 18 months apart

5. 2011 Ohio Vital Statistics, Ohio Department of Health (ODH)

6. 2010-2012 Pregnancy Risk Assessment Monitoring System (PRAMS)

## 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 from monthly Maternal and Infant Health Surveillance Reports ([http://www.hamiltoncountyhealth.org/en/resource\\_library/reports.html](http://www.hamiltoncountyhealth.org/en/resource_library/reports.html)). Both of these data sources are considered provisional until the 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), pregnancy spacing (Figure 6) maternal smoking (Figure 7) and sleep-related deaths. Table 2 displays the discrepancy between the two infant mortality data sources from ODH. Please note that delayed certificates directly impact data quality, and therefore the integrity of findings shared in this report.

Data Source	2013	2014
	No. Infants < 1 yr.	No. Infants < 1 yr.
PDS-A	96	86
PDS-B	95	86
Discrepancy	1	0



## Appendix B

### General Guidelines for Using Surveillance Charts

The Hamilton County Infant Mortality Surveillance System (HCIMSS) uses surveillance charts to monitor infant mortality rates and preterm birth rates. 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 and preterm births.

Several tools are included in the surveillance charts that help facilitate interpretation: ❶ a baseline—the center line which is the average number of deaths per month over the preceding two years, ❷ a goal line which shows the goal that has been established by the community and ❸ upper and lower control limits [dashed] that allow users 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.*



PREVENT. PROMOTE. PROTECT.



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