



# Hamilton County Maternal and Infant Health Monthly Surveillance Report



October 2014

Thomas Boeshart, MPH, Epidemiologist  
David Carlson, MPH, Senior Epidemiologist  
Dan Bush, MPH, Epidemiologist



## 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 December 12, 2014 and December 15, 2014; the birth data were updated on the Ohio Public Health Information Warehouse on December 16, 2014.

### 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.

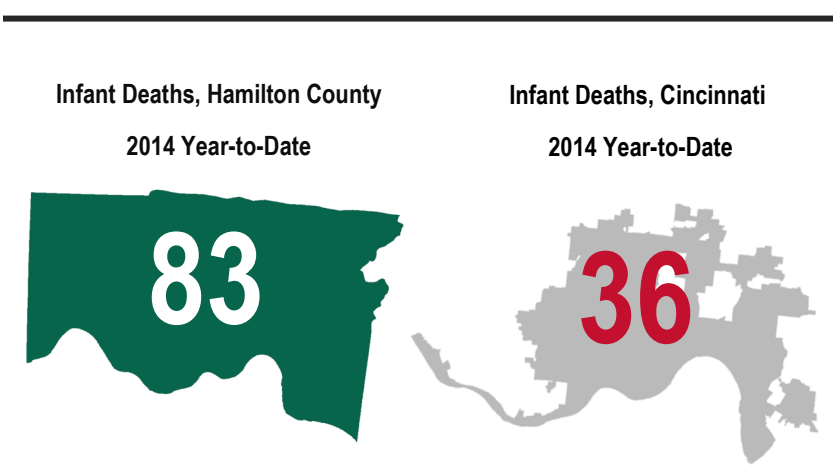


## Number of Infant Deaths

**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	775	852
March	12	7	872	879
April	5	10	865	832
May	14	9	931	909
June	4	11	886	965
July	4	9	996	1007
August	8	11	959	897
September	5	10	919	956
October	11	8	880	900
November	10		871	
December	7		917	
<b>Total</b>	<b>96</b>	<b>83</b>	<b>10,751</b>	<b>9,090</b>

One measure of infant mortality is the number of infant deaths per month. In October 2014, there were 8 infant deaths within Hamilton County. Three of the infant deaths that occurred in October 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.



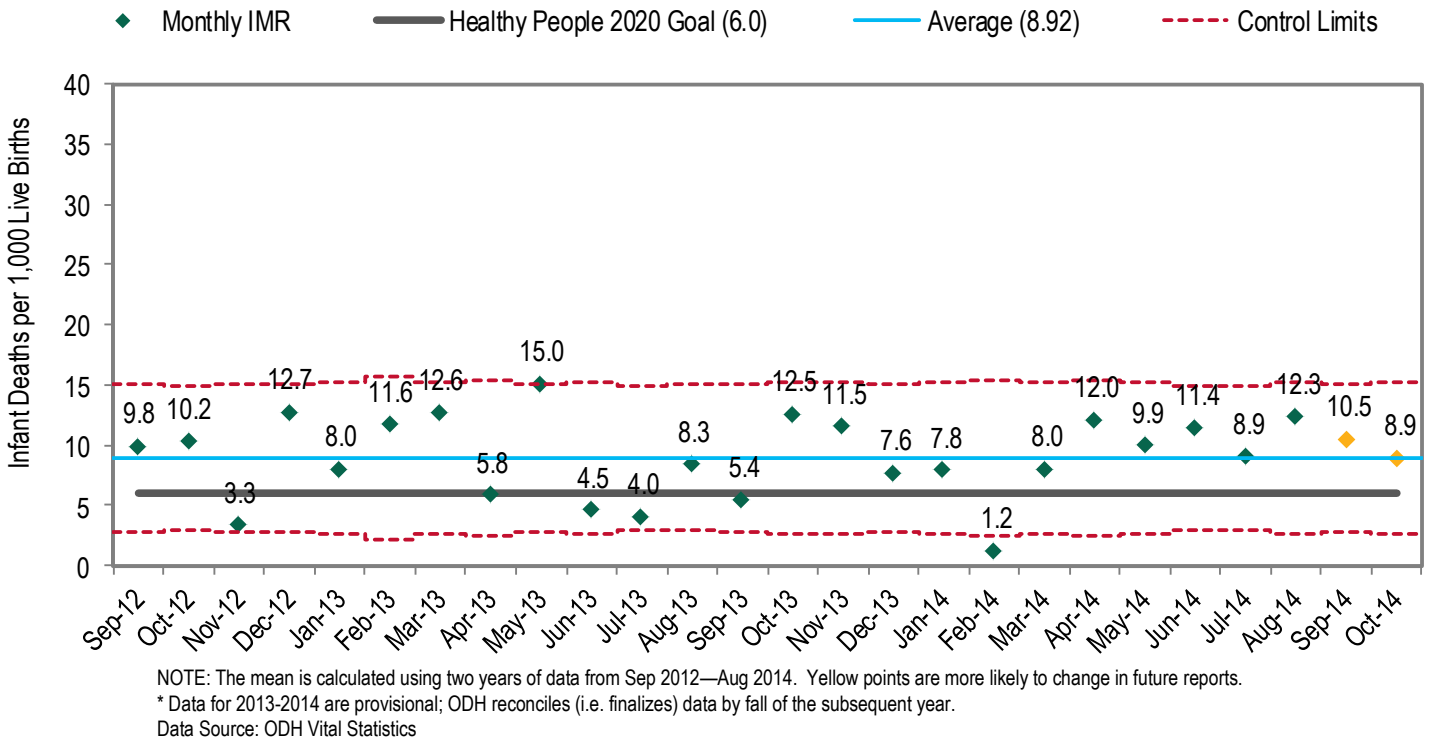
## Infant Mortality Rates

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.

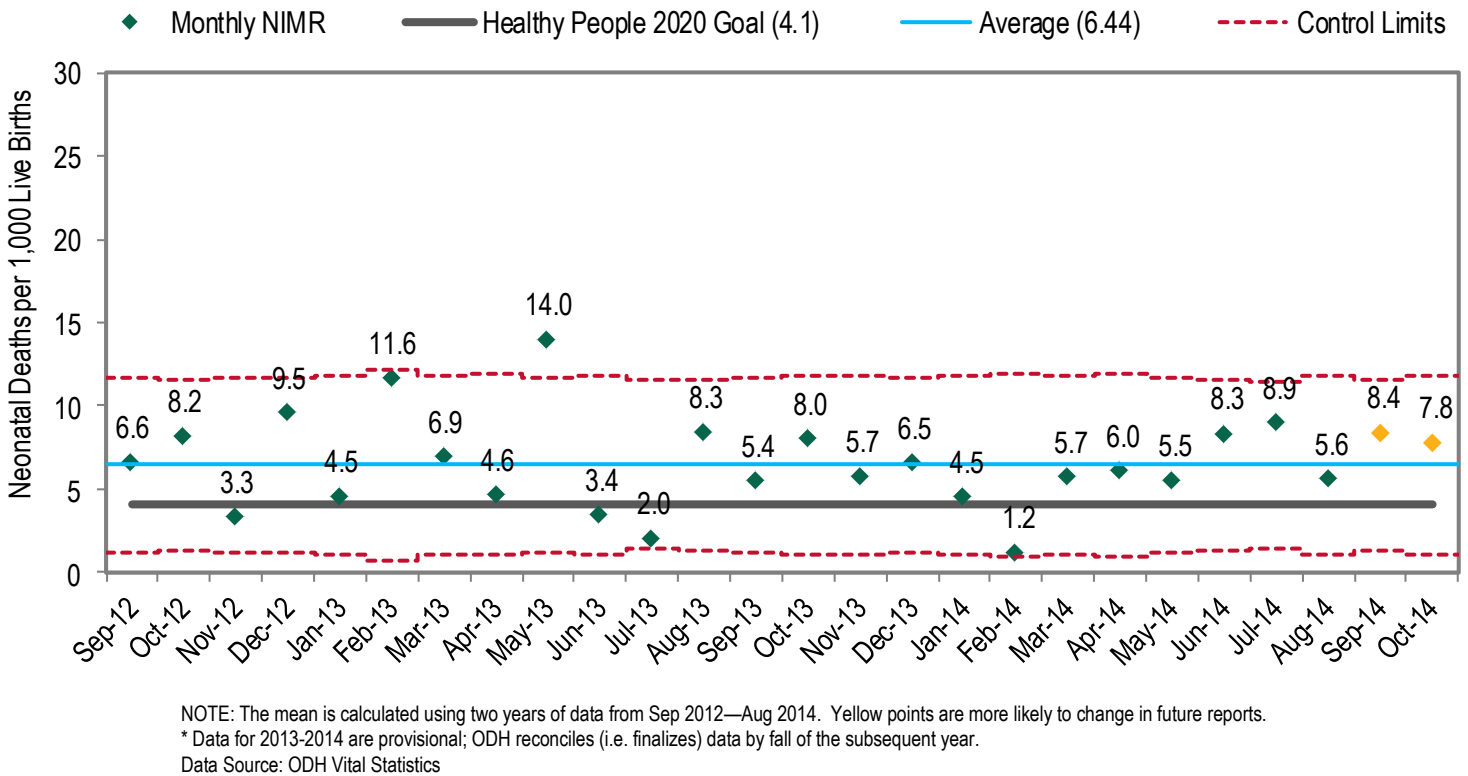
**The IMR for October 2014 was 8.9. This provisional rate was higher than the Healthy People 2020 goal (6.0).**

The IMR for October 2014 was 8.9 infant deaths per 1,000 live births (Figure 1). October was approximately the same as the average IMR (8.92) as shown in Figure 1. Subsequent reports will provide improved statistical validity of these estimates (**Appendix A**). The October 2014 NIMR was below the upper statistical thresholds and is displayed in Figure 2. The October NIMR (7.8) is above the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births and above the Hamilton County 24-month average of 6.44 neonatal deaths per 1,000 live births. Neonatal deaths accounted for 72.0 percent of the January 2013-October 2014 infant deaths as of data collected on December 15, 2014. 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, Sep 2012—Oct 2014\***



**Figure 2. Neonatal Mortality Rate Surveillance Chart, Hamilton County, Sep 2012—Oct 2014\***



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

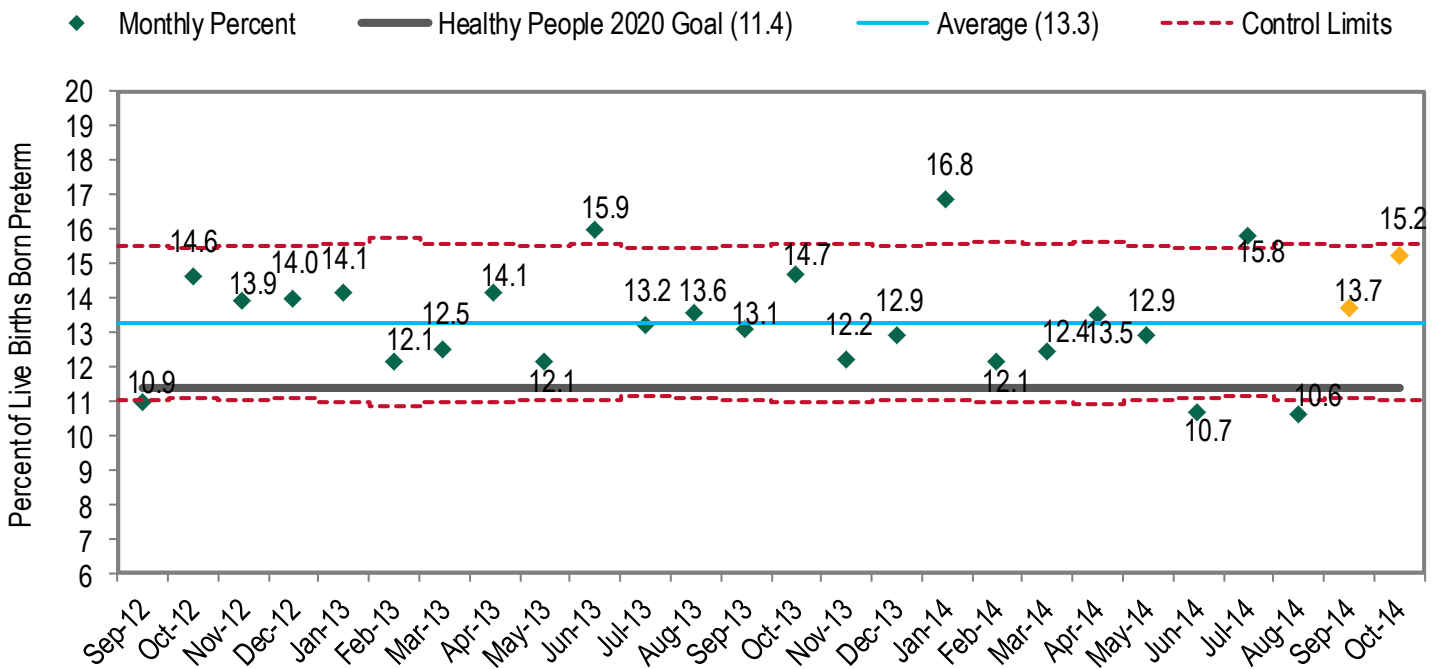
The preterm birth rate is the percentage of infants born before 37 weeks gestation. The very preterm birth rate is the percentage of infants born before 32 weeks gestation. Preterm birth is a significant risk factor of infant mortality and many other adverse health outcomes. The average preterm birth rate in Hamilton County (13.3 percent) is above the Healthy People 2020 goal of 11.4 percent. The provisional preterm birth below the Healthy People 2020 goal of 15.2 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 October 2014 is 3.0 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 October 2014 is 0.4 percent in Hamilton County which is above the average <23 weeks gestation birth rate in Hamilton County (0.39 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 October 2014 (15.2 percent) was above the Hamilton County average (13.3 percent) and the Healthy People 2020 goal for preterm births (11.4 percent).**

**The very preterm birth rate for October 2014 (3.0 percent) was below the Hamilton County average (2.84 percent) and above the Healthy People 2020 goal for very preterm births (1.8 percent)**

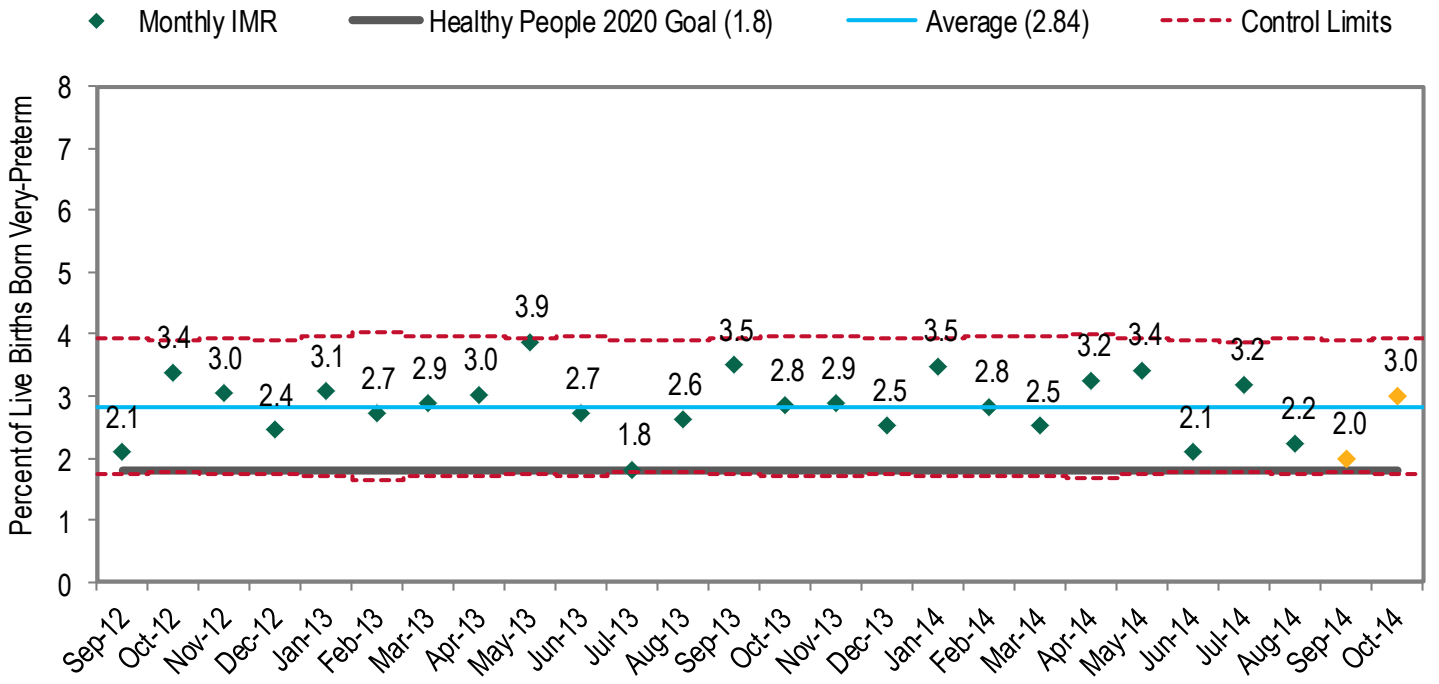
**These data are provisional and may change in future reports**

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



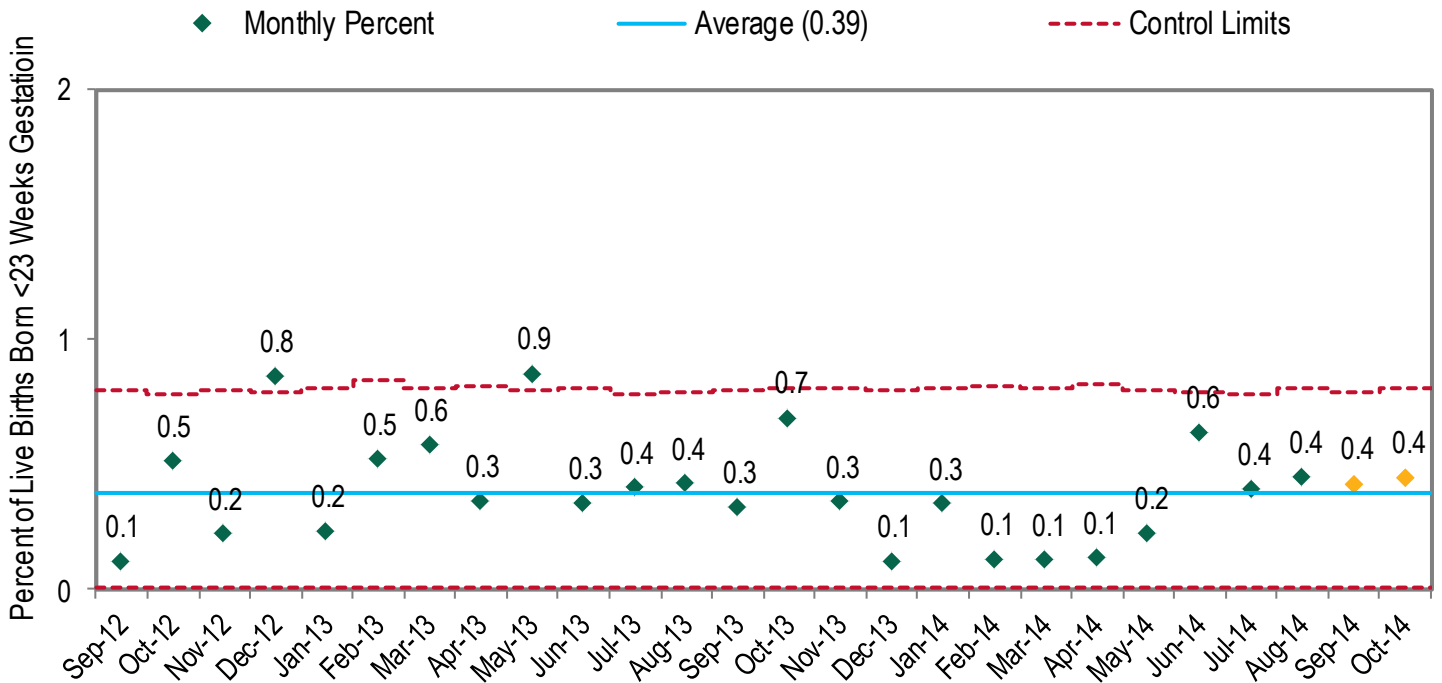
NOTE: The mean is calculated using two years of data from Sep 2012—Aug 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.  
 Data Source: ODH Vital Statistics

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



NOTE: The mean is calculated using two years of data from Sep 2012—Aug 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, Sep 2012—Oct 2014\***



NOTE: The mean is calculated using two years of data from Sep 2012—Aug 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 October 2014 is 14.3 percent, which is above the average SGA birth rate in Hamilton County (13.45 percent).

The small for gestational age birth rate for October 2014 (14.3 percent) was below the Hamilton County average (13.45 percent).

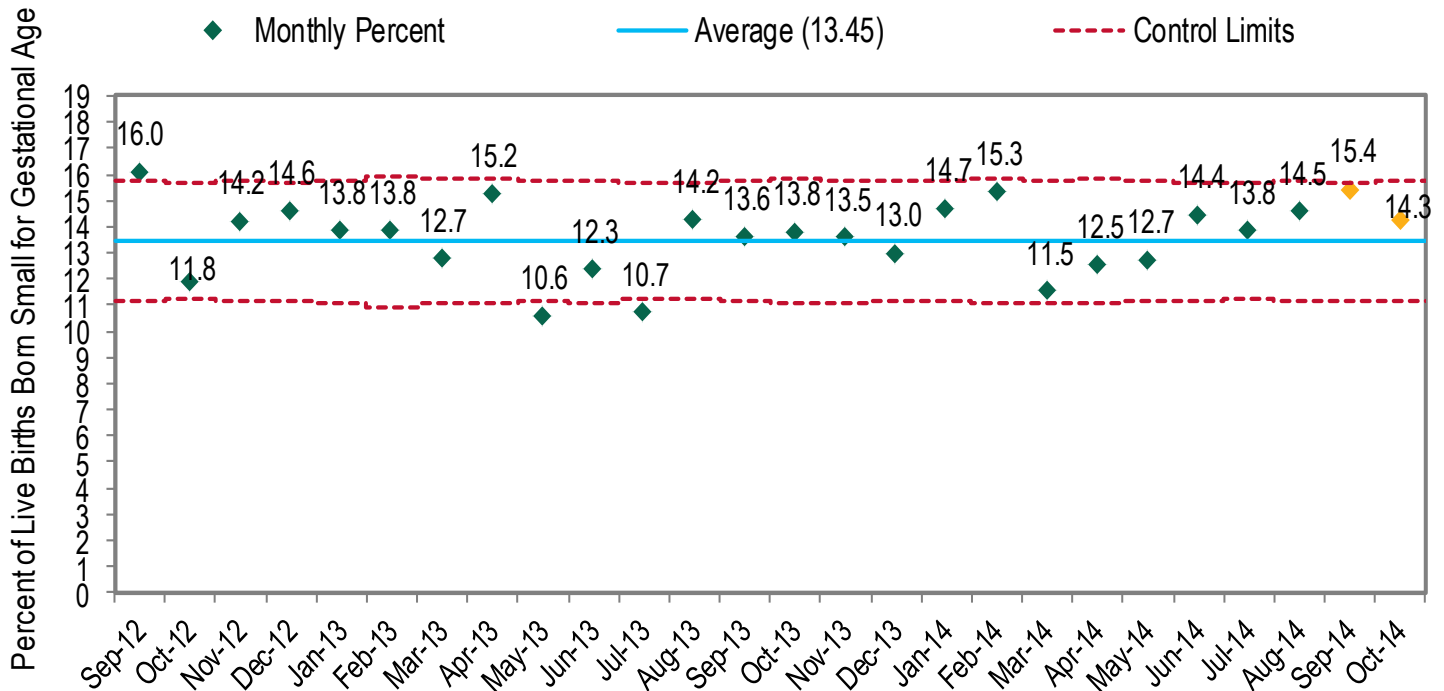
The 10<sup>th</sup> percentile cut off of birth weight was derived from the 1990 live births in the United States as a baseline<sup>3</sup>. Maternal health and social factors prior to pregnancy influence SGA, and can have an impact on the health of the infant throughout childhood and into adulthood<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 October 2014 is 14.3 percent, which is above the average SGA birth rate in Hamilton County (13.45 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, Sep 2012—Oct 2014\***



NOTE: The mean is calculated using two years of data from Sep 2012—Aug 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

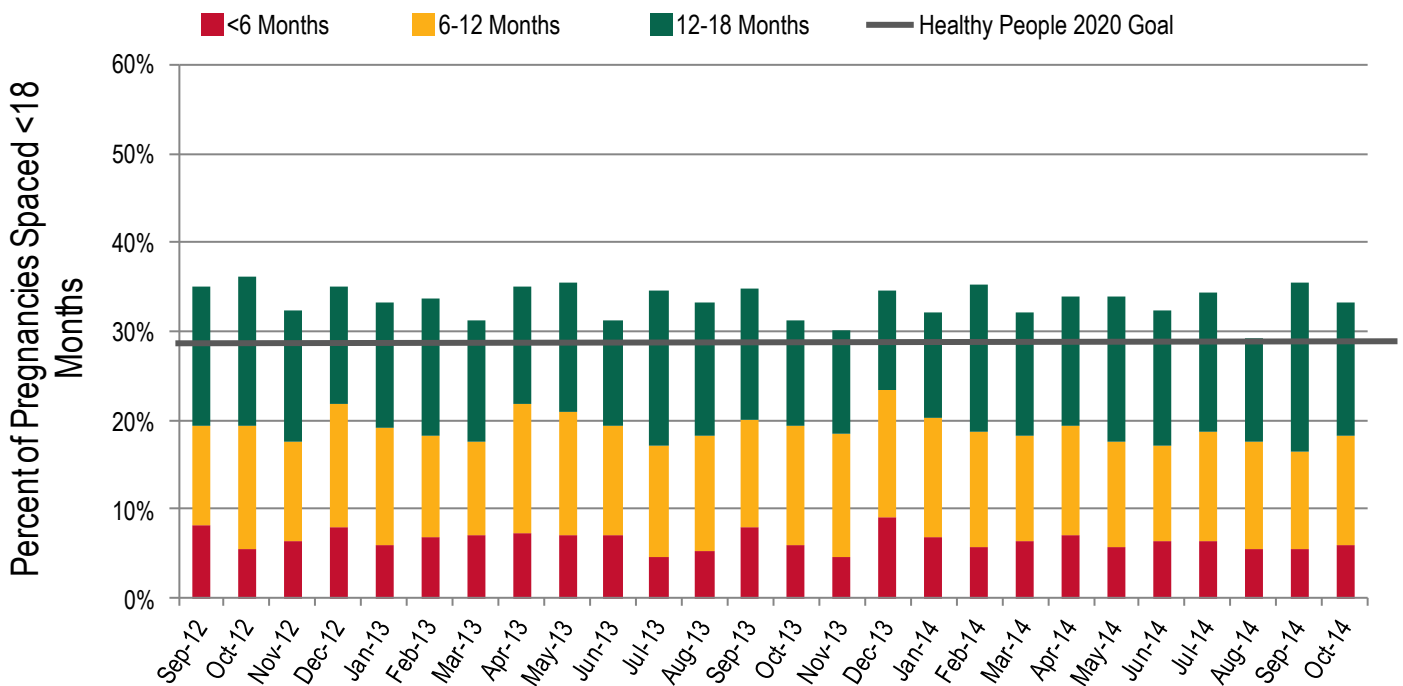


## Pregnancy Spacing

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>3</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 October 2014 is 33.3 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 August 2012 and October 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>3</sup>World Health Organization. *Report of a WHO Technical Consultation on Birth Spacing*, 2006.

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



NOTE: The mean is calculated using two years of data from Sep 2012—Aug 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

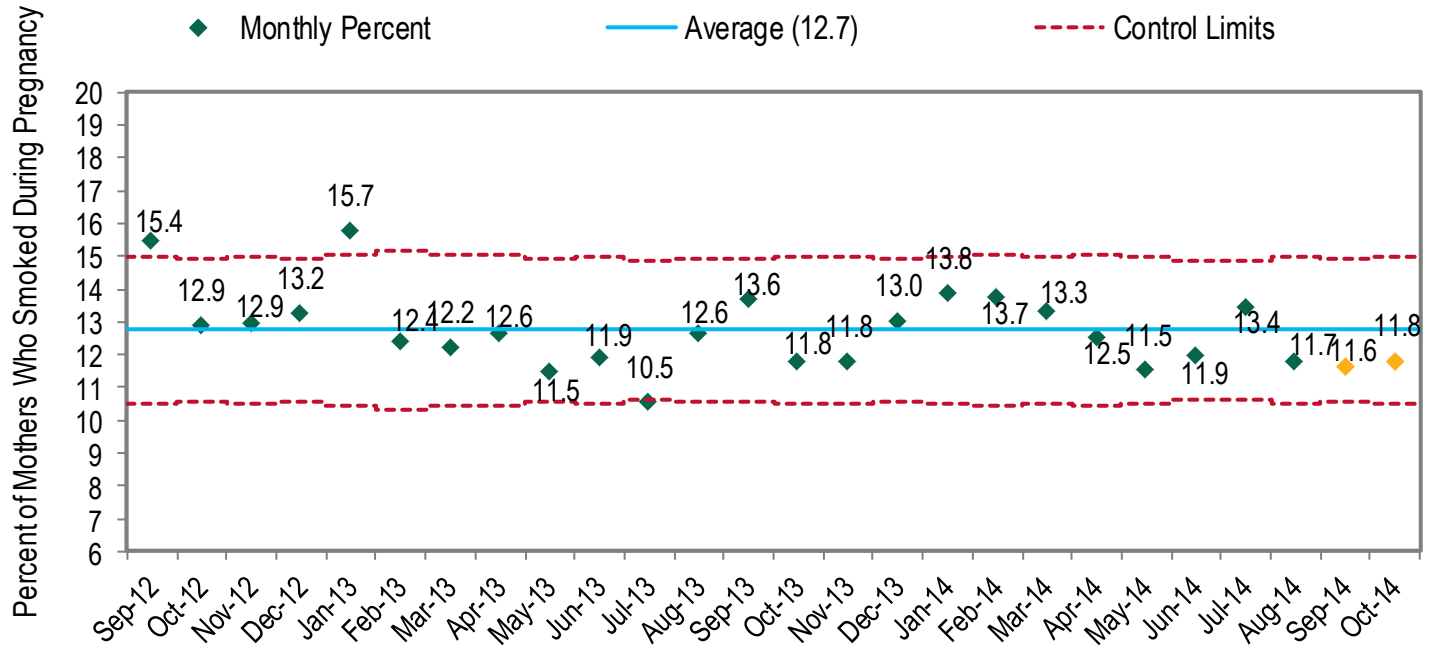
**Note: Pregnancy spacing is defined as the months from the previous live birth to conception of the next pregnancy. Hamilton County Maternal and Infant Health Monthly Surveillance Reports from January - May 2013 reported pregnancy spacing as the months from previous live birth to the next live birth, 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 October 2014 was 11.8 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 , Sep 2012—Oct 2014\***



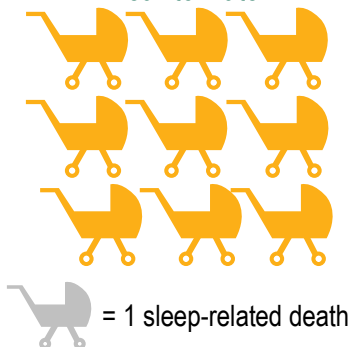
NOTE: The mean is calculated using two years of data from Sep 2012—Aug 2014. Yellow points are more likely to change in future reports.  
 \* Data for 2013-2014 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.  
 Data Source: ODH Vital Statistics

## 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 nine 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

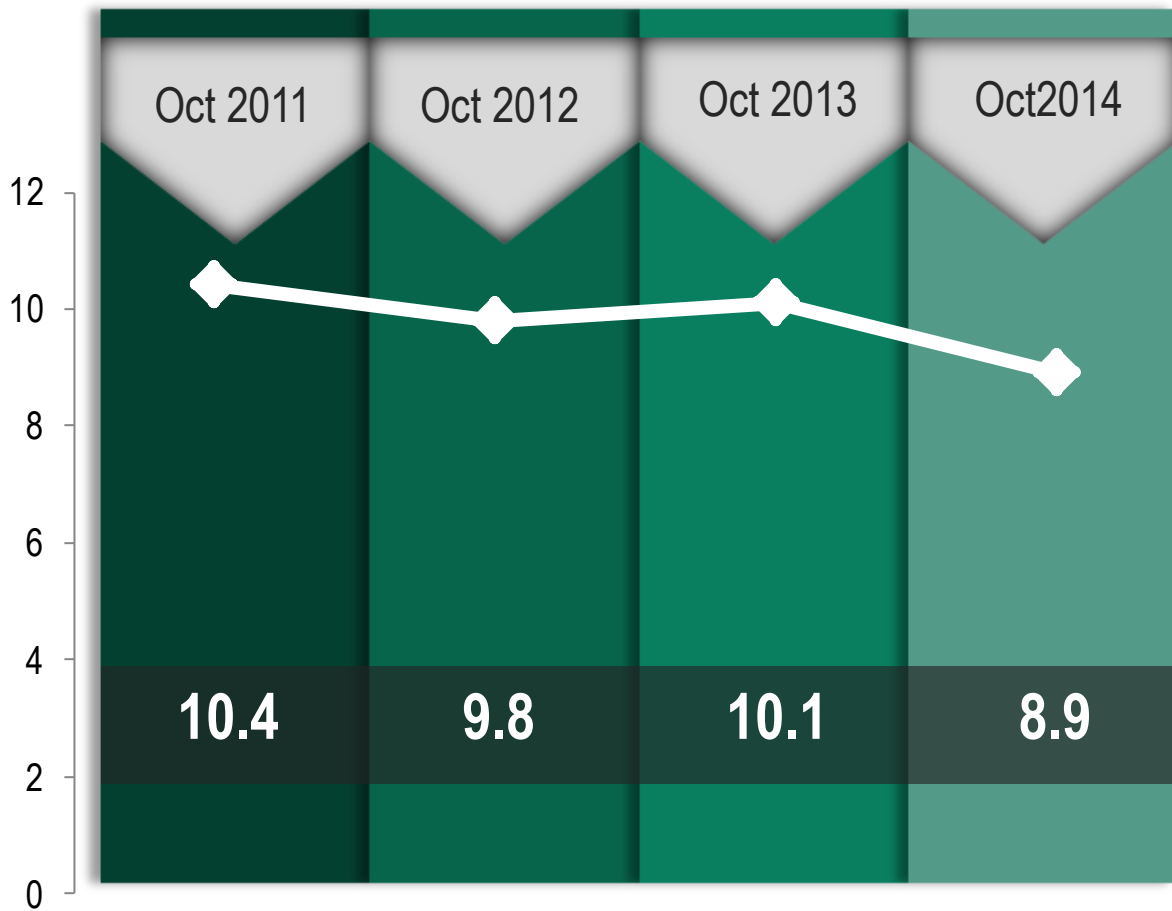


Baby sleeps safest alone, on their back, in a crib.

## 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 October 2011 (10.4) to October 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, Oct 2011—Oct 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



We recently recognized the winners of our first ever “Champions for Change” Awards. These awards highlight individuals who are partnering to help lower Hamilton County’s unacceptably high infant mortality rate. Our five winners were honored in front of local leaders and County Commissioners Todd Portune, Greg Hartman, and Chris Monzel at the weekly Board of Hamilton County Commissioners’ meeting. This diverse group of awardees – which includes a pastor, a pediatrician, a nurse practitioner, an epidemiologist, and a community health worker – demonstrates that everyone can play a role in caring for and supporting moms and babies. The winners of the 2014 Cradle Cincinnati “Champions for Change” Awards are:

- **Champion for Community Change:** Pastor Ennis Tait of Church of the Living God in Avondale
- **Safe Sleep Champion:** Dr. Carrie McIntyre of the CCHMC Pediatric Primary Care Center
- **Champion for Better Care:** Jenny Glassmeyer, nurse practitioner with the Cincinnati Health Department Price Hill Health Center
- **Champion for Knowledge:** David Carlson, Senior Epidemiologist with Hamilton County Public Health
- **Social Support Champion:** Venita C. Dell, Service Coordinator and Home Visitor with Hamilton County ‘Help Me Grow’ and Executive Director of Helping Young Mothers Mentor, Inc.

*How can you help?* Get connected with local health initiatives, such as StartStrong, Best Babies Zone, Ohio Equity Institute, and Cradle Cincinnati. Check out our [community calendar](#) to find maternal and infant health events in Cincinnati. Or spearhead a health campaign in your neighborhood or church. Find ways to support your community [here](#).

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

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

## 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	82
PDS-B	95	83
Discrepancy	1	1

## 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.



*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.*