# Hamilton County Maternal and Infant Health Monthly Surveillance Report

December 2013

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HAMILTON COUNTY
**PUBLIC HEALTH**

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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) is now providing additional 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 January 16, 2014 and January 29, 2014; the birth data were updated on the Ohio Public Health Information Warehouse on January 9, 2014.

> ### Infant Mortality Surveillance
>
> $\Rightarrow$ Number of infant deaths by month
> $\Rightarrow$ Current monthly infant mortality rate
> $\Rightarrow$ Current monthly neonatal mortality rate
> $\Rightarrow$ Current monthly preterm birth rate
> $\Rightarrow$ Current two-year infant mortality rate moving average
> $\Rightarrow$ 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[1]. 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**.

[1]Centers for Disease Control and Prevent. *Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group,* MMWR, July 27, 2001, Vol. 50 No. RR-13.
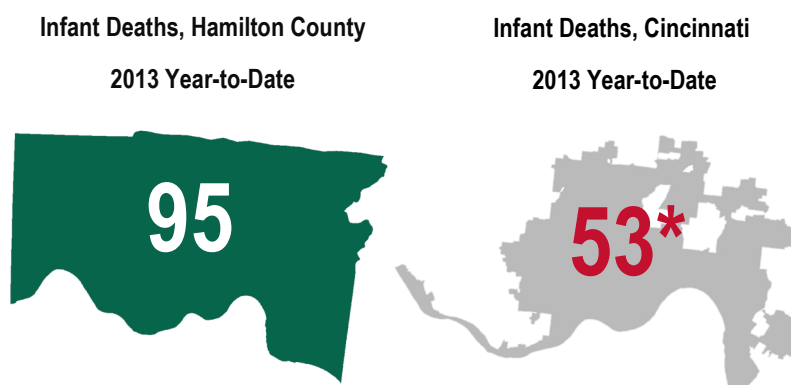
# Number of Infant Deaths

## Table 1. Number of Infant Deaths and Births, Hamilton County, 2012-2013

| Month | Hamilton County Infant Deaths 2012 | Hamilton County Infant Deaths 2013 | Hamilton County Infant Births 2012 | Hamilton County Infant Births 2013 |
|---|---|---|---|---|
| January | 7 | 7 | 870 | 880 |
| February | 7 | 9 | 844 | 773 |
| March | 10 | 11 | 924 | 872 |
| April | 6 | 5 | 834 | 864 |
| May | 10 | 14 | 931 | 928 |
| June | 6 | 4 | 871 | 886 |
| July | 10 | 4 | 991 | 992 |
| August | 10 | 8 | 979 | 955 |
| September | 9 | 5 | 914 | 917 |
| October | 10 | 11 | 976 | 877 |
| November | 4 | 10 | 920 | 867 |
| December | 12 | 7 | 943 | 908 |
| Total | 101 | 95 | 10,997 | 10,719 |

One measure of infant mortality is the number of infant deaths per month.  Five of the infant deaths that occurred in December 2013 in Hamilton County, occurred amongst Cincinnati residents.  In December 2013, there were 7 infant deaths within Hamilton County.  Table 1 displays the provisional number of infant deaths and births for each month in 2012 and 2013.  Please see **Appendix A** on page 6 to learn more about provisional death data limitations.

**Infant Deaths, Hamilton County**
**2013 Year-to-Date**



95

**Infant Deaths, Cincinnati**
**2013 Year-to-Date**



53*

*The number of infant deaths in the city of Cincinnati changed due to the use of a more accurate geocoding method.

# Infant Mortality Rates

Another method used to monitor infant mortality is 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 IMR for December 2013 was 7.7.  This provisional rate was greater than the Healthy People 2020 goal (6.0).**

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 December 2013 was 7.7 infant deaths per 1,000 live births (Figure 1).  December was below the average IMR (9.15) as shown in Figure 1.  Subsequent reports will provide improved statistical validity of these estimates (**Appendix A**).  The December 2013 NIMR was below the upper statistical thresholds and is displayed in Figure 2.  The December 2013 NIMR (6.6) is above the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births and below the Hamilton County 24-month average of 6.62 neonatal deaths per 1,000 live births.  Neonatal deaths accounted for 73.85 percent of the January 2012—December 2013 infant deaths as of data collected on January 29, 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, Nov 2011—Dec 2013*
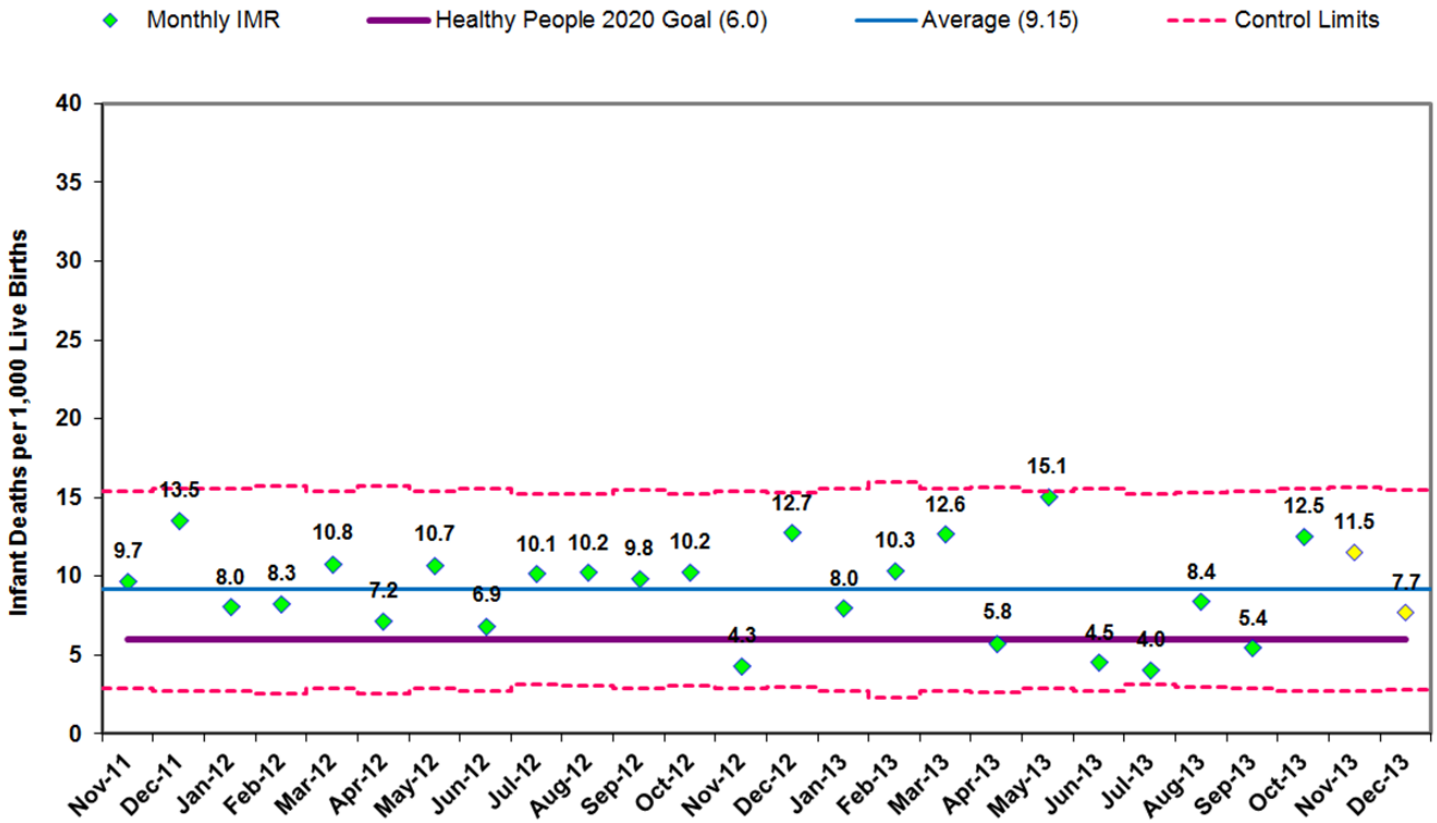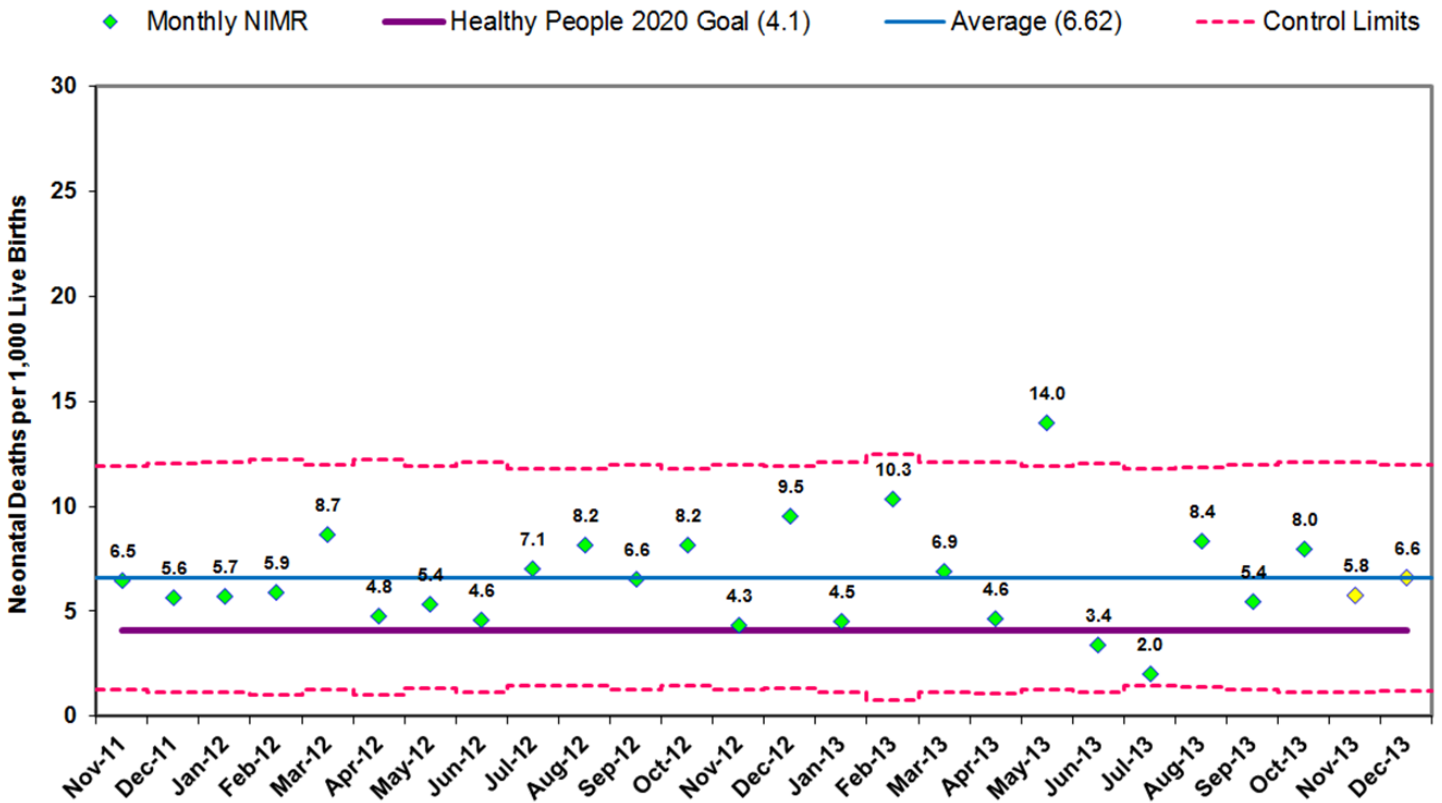
Legend: ◆ Monthly IMR — Healthy People 2020 Goal (6.0) — Average (9.15) - - - Control Limits



Data points (Infant Deaths per 1,000 Live Births):
Nov-11: 9.7, Dec-11: 13.5, Jan-12: 8.0, Feb-12: 8.3, Mar-12: 10.8, Apr-12: 7.2, May-12: 10.7, Jun-12: 6.9, Jul-12: 10.1, Aug-12: 10.2, Sep-12: 9.8, Oct-12: 10.2, Nov-12: 4.3, Dec-12: 12.7, Jan-13: 8.0, Feb-13: 10.3, Mar-13: 12.6, Apr-13: 5.8, May-13: 15.1, Jun-13: 4.5, Jul-13: 4.0, Aug-13: 8.4, Sep-13: 5.4, Oct-13: 12.5, Nov-13: 11.5, Dec-13: 7.7

## Figure 2. Neonatal Mortality Rate Surveillance Chart, Hamilton County, Nov 2011—Dec 2013*

Legend: ◆ Monthly NIMR — Healthy People 2020 Goal (4.1) — Average (6.62) - - - Control Limits



Data points (Neonatal Deaths per 1,000 Live Births):
Nov-11: 6.5, Dec-11: 5.6, Jan-12: 5.7, Feb-12: 5.9, Mar-12: 8.7, Apr-12: 4.8, May-12: 5.4, Jun-12: 4.6, Jul-12: 7.1, Aug-12: 8.2, Sep-12: 6.6, Oct-12: 8.2, Nov-12: 4.3, Dec-12: 9.5, Jan-13: 4.5, Feb-13: 10.3, Mar-13: 6.9, Apr-13: 4.6, May-13: 14.0, Jun-13: 3.4, Jul-13: 2.0, Aug-13: 8.4, Sep-13: 5.4, Oct-13: 8.0, Nov-13: 5.8, Dec-13: 6.6

NOTE: The mean is calculated using two years of data from Nov 2011—Oct 2013. Yellow points are more likely to change in future reports.
* Data for 2012-2013 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

# Preterm Birth Rates

The preterm birth rate is the percentage of infants born before 37 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 (13.6 percent) is above the Healthy People 2020 goal of 11.4 percent. The provisional preterm birth percentage for December 2013 is 13.0 percent; this rate is above the Healthy People 2020

**The preterm birth rate for December 2013 (13.0 percent) was below the Hamilton County average (13.6 percent) and above the Healthy People 2020 goal for preterm births (11.4 percent).**

goal of 11.4 percent for all live births. By preventing preterm births in Hamilton County, infant morbidity and mortality can be reduced, ultimately saving the community financial resource and providing children with a healthy start to life.

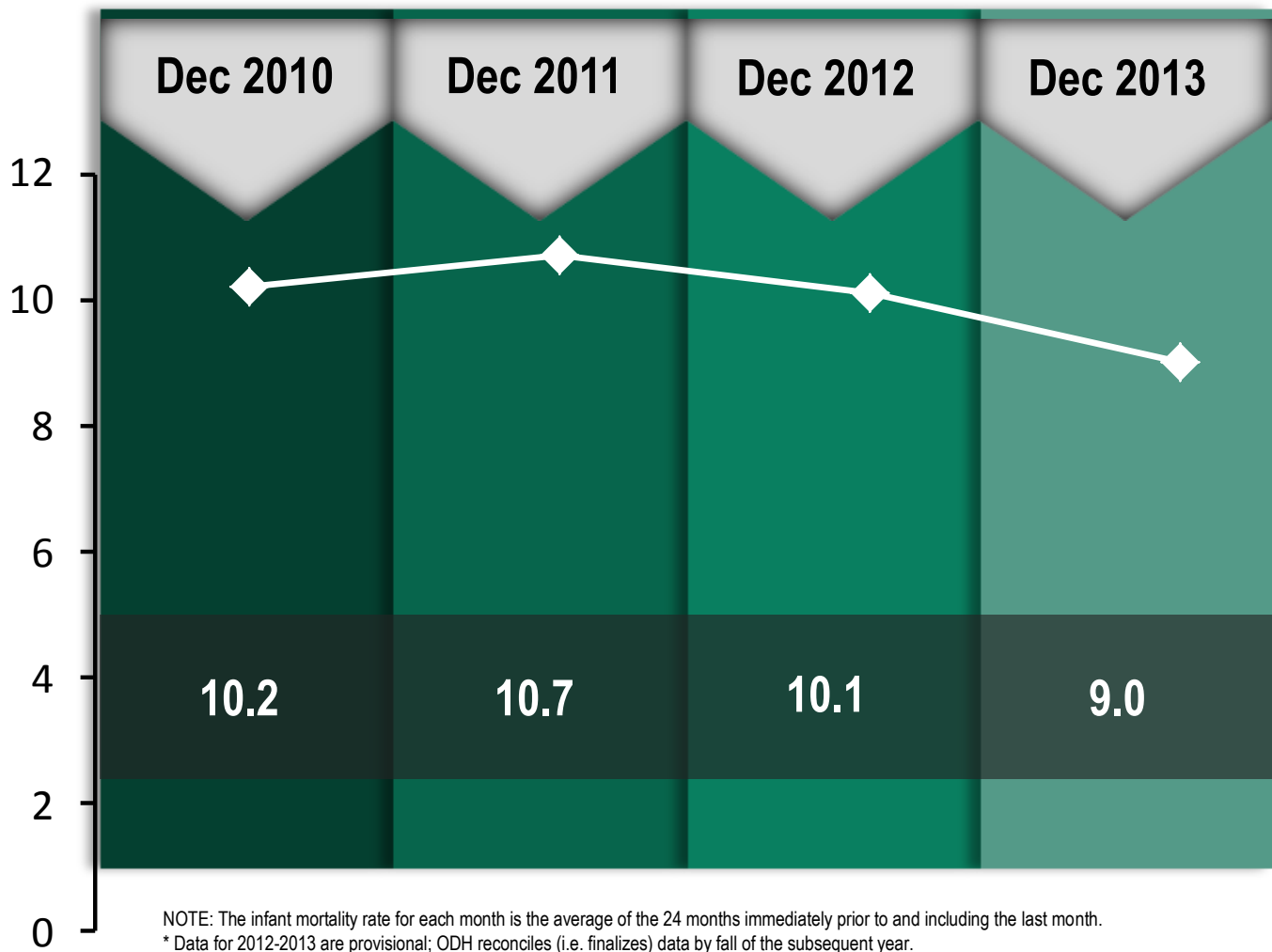**Figure 3. Preterm Birth Rate Surveillance Chart, Hamilton County, Nov 2011—Dec 2013\***
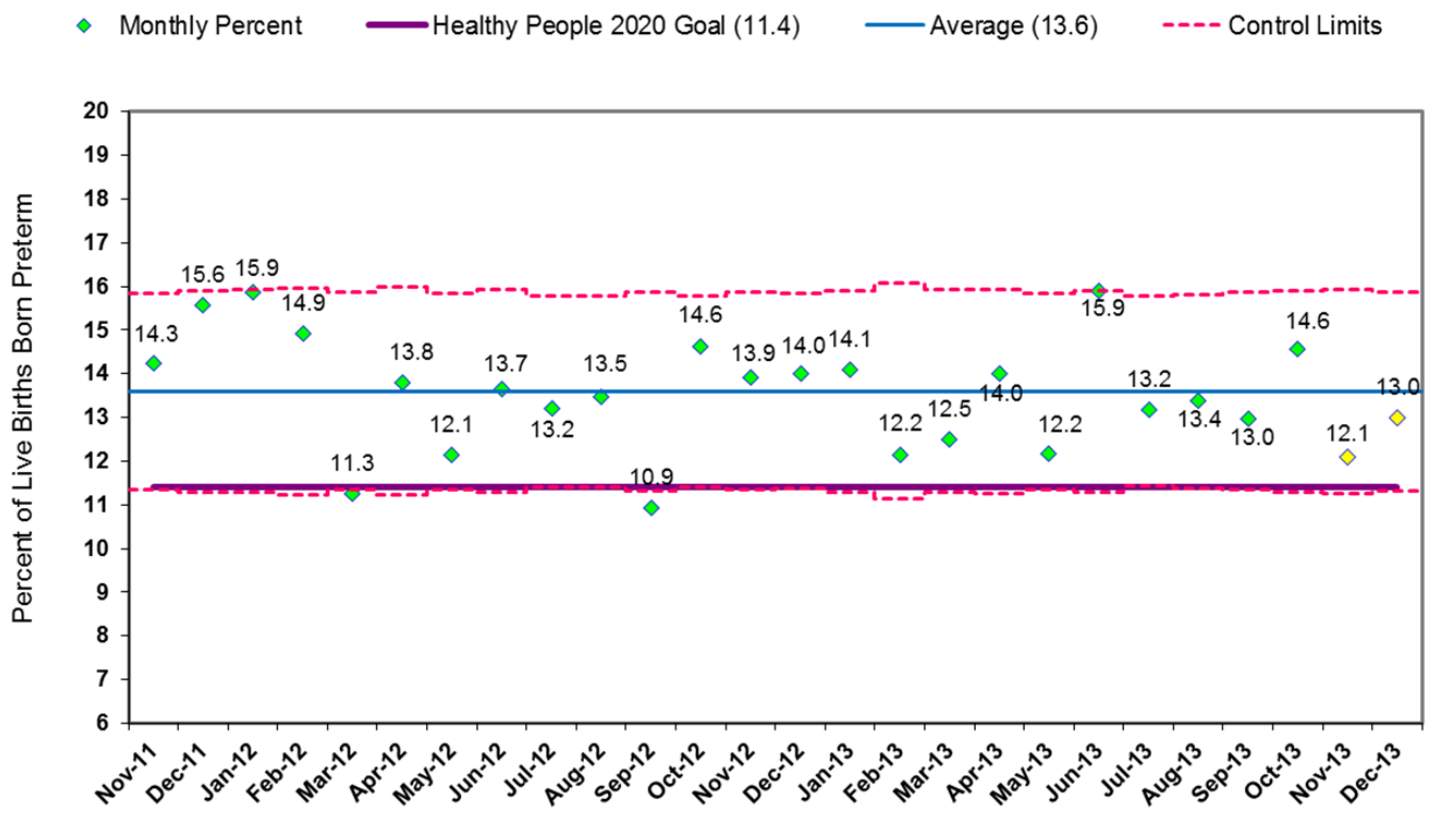


NOTE: The mean is calculated using two years of data from Nov 2011—Oct 2013. Yellow points are more likely to change in future reports.
\* Data for 2012-2013 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

# 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 in the un-weighted, monthly moving average, which can provide a more stable picture of evolving patterns. In Figure 4, 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 Dec 2010 (10.2) to Dec 2013 (9.0) as shown in Figure 4. Please not that the two-year moving average is subject to change based on new data, which may ultimately affect current rends. Multiple approaches are required to measure the impact of program efforts on infant mortality.

**Figure 4. Two-Year Moving Average Infant Mortality Rate by Month, Hamilton County, Dec 2010—Dec 2013***



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 2012-2013 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

# 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). 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 even to report. Annual, 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 infant deaths within the City of Cincinnati (Figure 1) and preterm births (Figure 6-8). 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.

| Table 2. Infant Mortality Data Source Assessment, Hamilton County, 2012-2013 | | |
|---|---|---|
| **Data Source** | **2012** No. Infants < 1 yr. | **2013** No. Infants < 1 yr. |
| **PDS-A** | 98 | 92 |
| **PDS-B** | 101 | 95 |
| **Discrepancy** | 3 | 3 |

# Appendix B

## General Guidelines for Using Surveillance Charts

The Hamilton County Infant Mortality Surveillance System (HCMISS) uses surveillance charts to monitor infant mortality rates and preterm birth rates.  These charts provide a method for monitoring the status of infant health other 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 evens.  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

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

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