



Maternal and Infant Health Monthly Surveillance Report
Hamilton County
November 2012

David Carlson, MPH, Epidemiologist
Dan Bush, MPH, Epidemiologist



250 William Howard Taft Road, 2nd Floor
Cincinnati, OH 45219 • 513.946.7800
hamiltoncountyhealth.org

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 December 12, 2012; the birth data were updated on the Ohio Public Health Information Warehouse on December 30, 2012.

Infant Mortality Surveillance

- Number of infant deaths by month
- Current monthly infant mortality rate
- Current monthly neonatal mortality rate
- Current monthly preterm birth rate
- Current two-year IMR 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.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 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

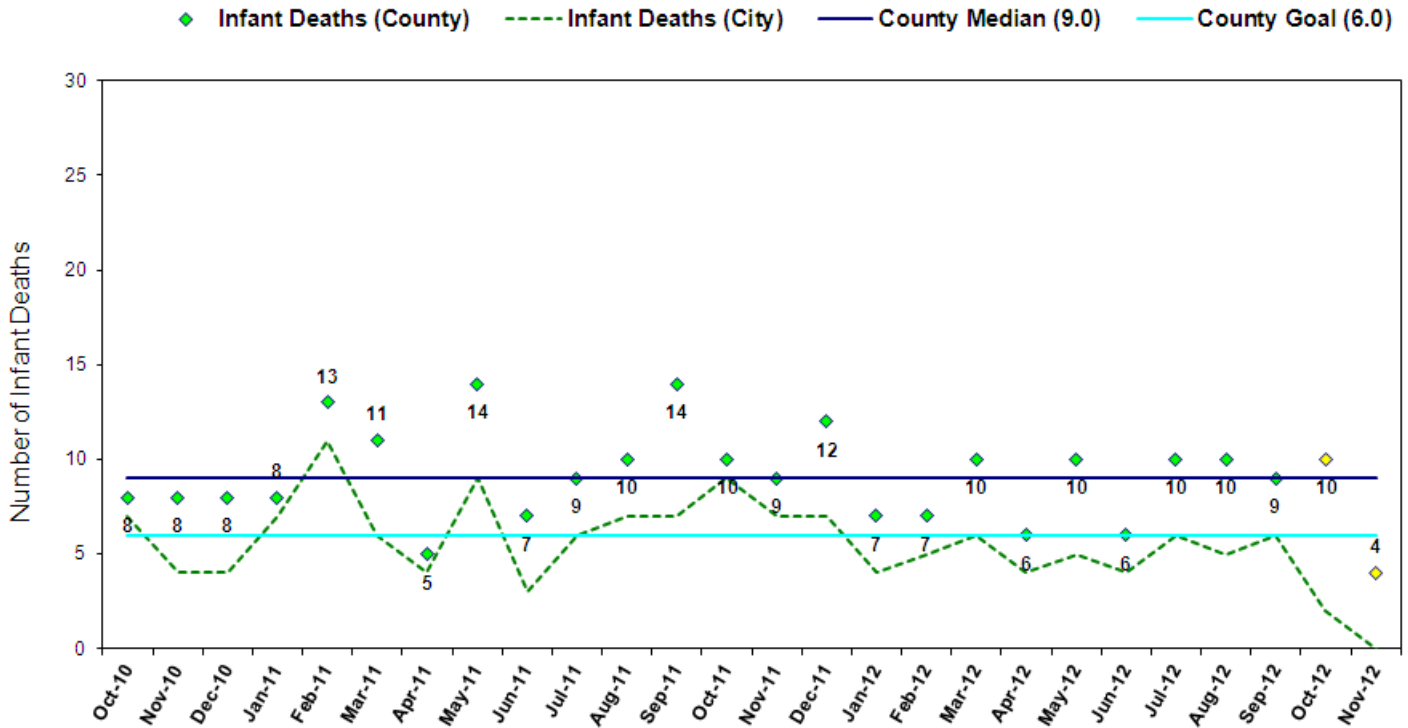
Table 1. Number of Infant Deaths and Births, Hamilton County 2011-2012

Month	Infant Deaths 2011	Infant Deaths 2012	Infant Births 2011	Infant Births 2012
January	8	7	952	869
February	13	7	847	844
March	11	10	881	923
April	5	6	880	833
May	14	10	871	930
June	7	6	892	869
July	9	10	1,010	991
August	10	10	982	976
September	14	9	1,019	908
October	10	10	962	970
November	9	4	926	821
December	12		886	
Total	122	89	11,108	9,934

One measure of infant mortality is the number of infant deaths per month. Figure 1 below shows the monthly count of infant deaths in Hamilton County and Cincinnati over the past two years. From 2011-2012, approximately 60 percent of infant death in Hamilton County occurred amongst Cincinnati residents. In November 2012, the number of infant deaths (4) within Hamilton County was below the previous 24-month median (Figure 1). Table 1 displays the provisional number of infant deaths and births for each month in 2011 and 2012. Please see **Appendix A** on page 6 to learn more about provisional death data limitations.

* November 2012 birth data are incomplete due to the lag in time for reporting births. Future reports will give a better estimate for November births.

Figure 1. Number of Infant Deaths, Hamilton County Oct 2010 – Nov 2012*



NOTE: The county median is calculated using data from Oct 2010 – Sep 2012.

* Data for 2011-2012 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year. Yellow points are more likely to change in future reports.

** Data for the City of Cincinnati should be interpreted with caution. Records in 2011-2012 have not been geo-coded and city assignment is based on provisional methods; data are subject to change.

Data Source: ODH Vital Statistics.

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 births, 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 2012 was 4.9. This provisional rate was below the Healthy People 2020 goal (6.0).

The IMR for November 2012 was 4.9 infant deaths per 1,000 live births (Figure 2). November was below the average IMR (10.1) as shown in Figure 2. Subsequent reports will provide improved statistical validity of these estimates (**Appendix A**). The November 2012 NIMR remained within the statistical thresholds and is displayed in Figure 3. The November 2012 NIMR (4.9) is above the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births but below the Hamilton County 24-month average of 7.0 neonatal deaths per 1,000 live births. Neonatal deaths accounted for 72.0 percent of the 2011-2012 infant deaths as of data collected on December 12, 2012. 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 2. Infant Mortality Rate Surveillance Chart, Hamilton County Oct 2010 - Nov 2012*

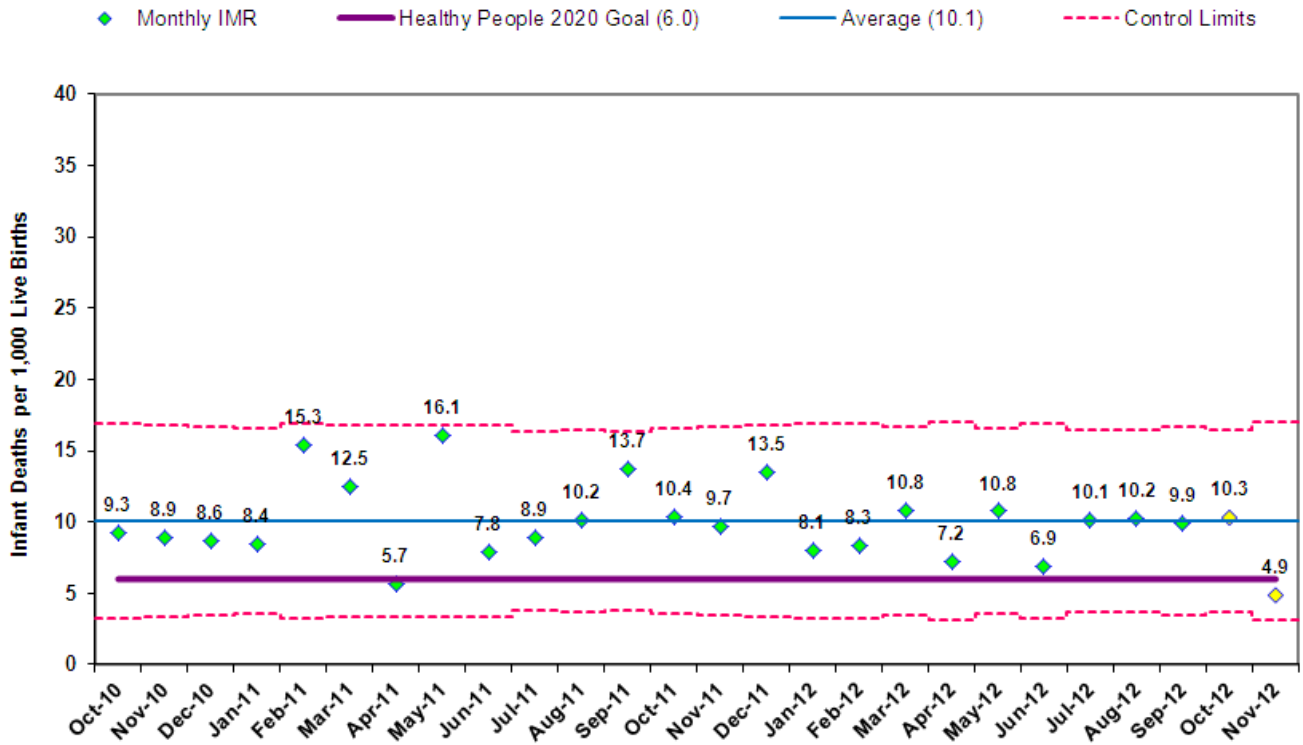
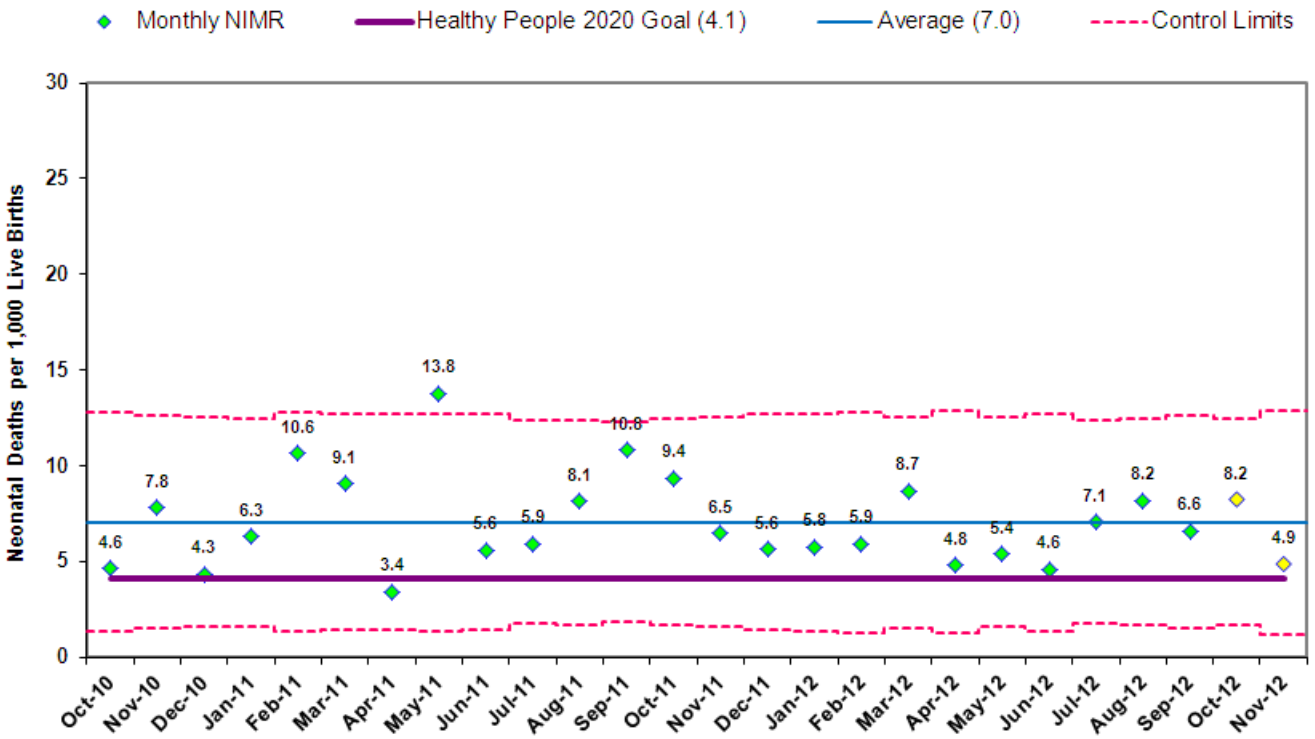


Figure 3. Neonatal Mortality Rate Surveillance Chart, Hamilton County Oct 2010 - Nov 2012*



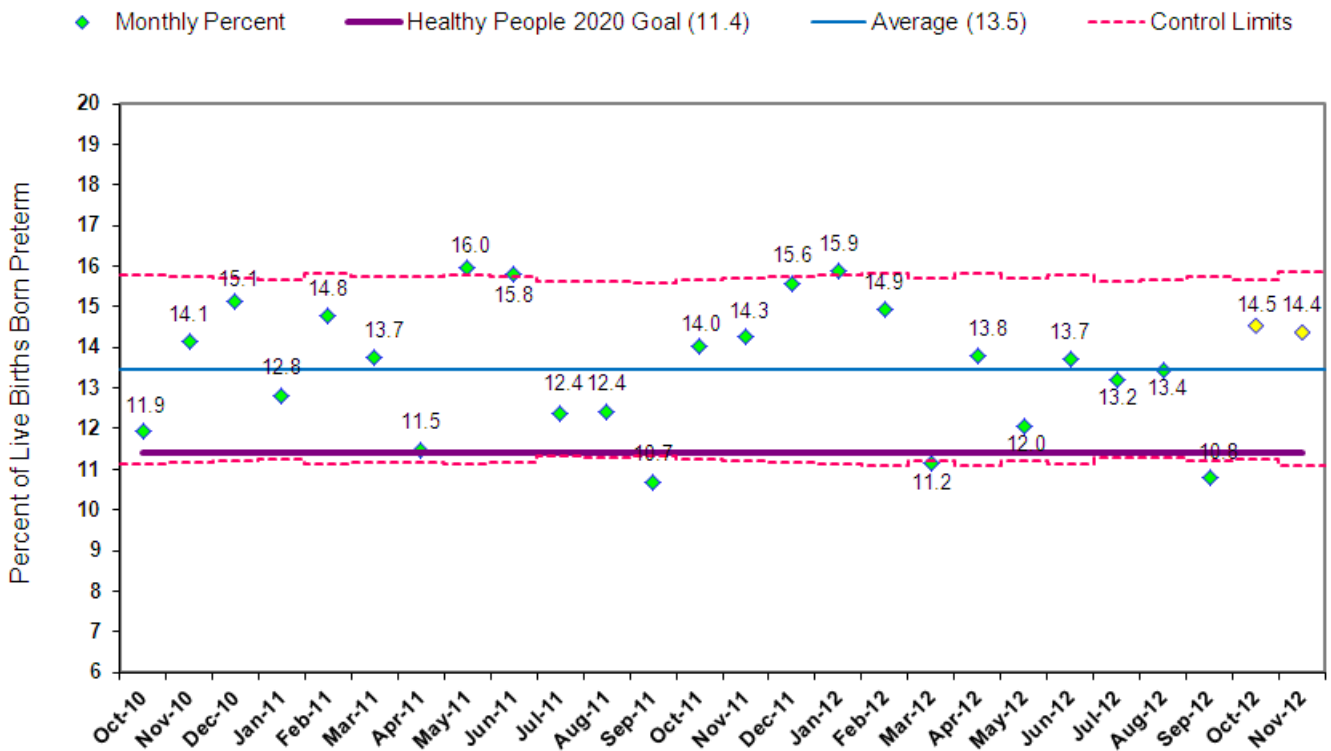
NOTE: The mean is calculated using two years of data from Oct 2010 – Sep 2012. Yellow points are more likely to change in future reports.
 * Data for 2011-2012 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
 Data Source: ODH Vital Statistics.

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 (13.5 percent) is above the Healthy People 2020 goal of 11.4 percent. The provisional preterm birth percentage for November 2012 is 14.4 percent; this rate is above the Healthy People 2020 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 resources and providing children with a healthy start to life.

The preterm birth for November 2012 (14.4 percent) was above the Hamilton County average (13.5 percent) and above the Healthy People 2020 goal for preterm births (11.4 percent). These data are provisional and may change in future reports.

Figure 4. Preterm Birth Rate Surveillance Chart, Hamilton County Oct 2010 - Nov 2012*

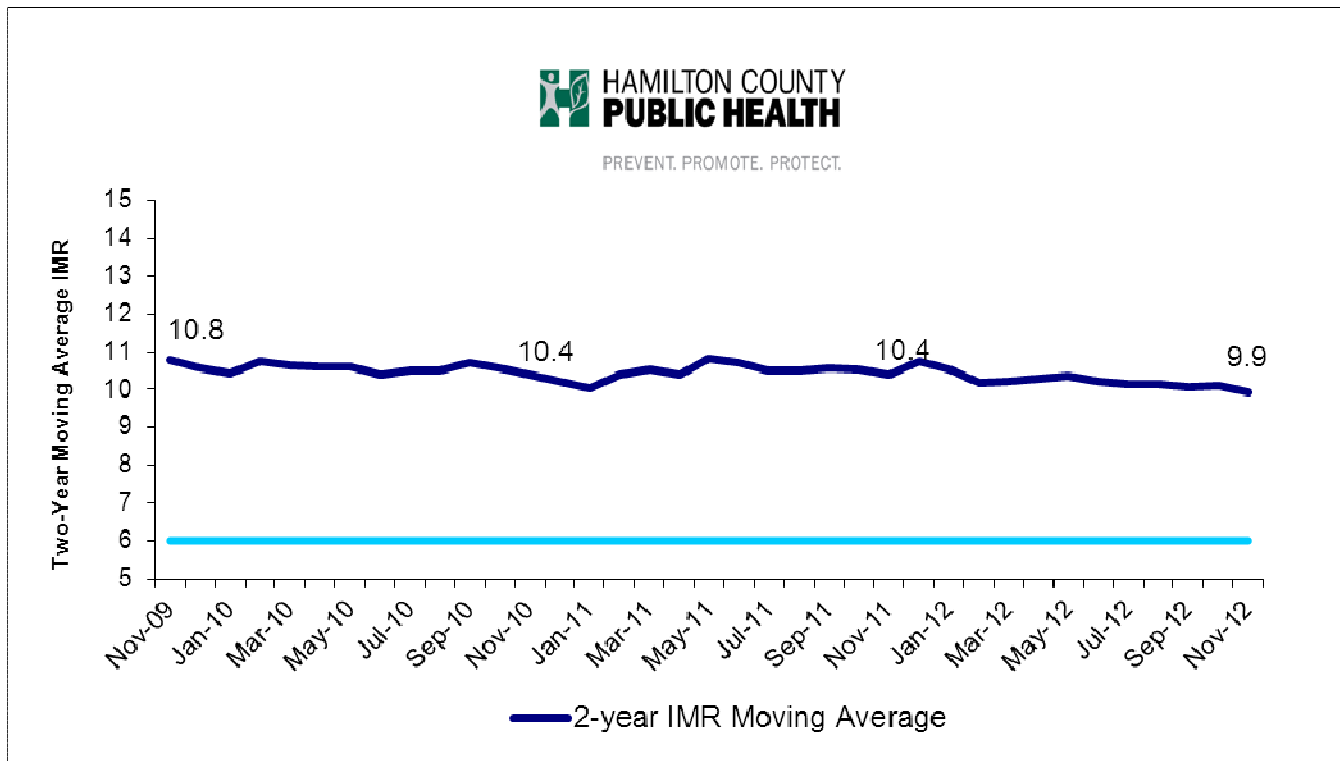


NOTE: The mean is calculated using two years of data from Oct 2010 – Sep 2012. Yellow points are more likely to change in future reports.
 * Data for 2011-2012 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
 Data Source: ODH Vital Statistics.

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 is the un-weighted, monthly moving average, which can provide a more stable picture of evolving patterns. In Figure 5, 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 slightly from November 2009 (10.8) to November 2012 (9.9) as shown in Figure 5. 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 program efforts on infant mortality.

Figure 5. Two-Year Moving Average Infant Mortality Rate by Month, Hamilton County Nov 2009 - Nov 2012*



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

* Data for 2011-2012 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 for 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 Ohio Department of Health (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. The former (PDS-A) is used for more in-depth analysis of risk factors, but suffers from incompleteness due to missing unfiled/pending certificates. The latter (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 infant deaths within the City of Cincinnati (Figure 1) and preterm births (Figure 4). Table 3 displays the discrepancy between the two infant mortality data sources available from ODH. Please note that delayed certificates directly impact data quality, and therefore the integrity of findings shared in this report.

Table 3. Infant Mortality Data Source Assessment, Hamilton County 2011 - 2012		
Data Source	2011	2012
	No. Infants < 1 yr.	No. Infants < 1 yr.
PDS-A	122	76
PDS-B	122	89
Discrepancy	0	13

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: (1) a baseline - the center line which is the average number of deaths or births per month over the preceding two years, (2) a goal line which shows the goal that has been established by the community and (3) 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 for the Office of Maternal and Infant Health and Infant Mortality Reduction, now known as the Women and Infant Vitality Network.



Thank you to John Paulson, Ohio Department of Health Center for Public Health Statistics and Informatics, and Merrily Wholf, Ohio Bureau of Child and Family Health Services, for providing data for this report. We also appreciate the contributions of the Child Policy Research Center at Cincinnati Children's Hospital Medical Center for ongoing quality improvement support and the HCIMSS Data Work Group for input and guidance.