



**Maternal and Infant Health Monthly Surveillance Report**  
**Hamilton County**  
**May 2012**

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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 to 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 the 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 mortality data to Hamilton County Public Health on a monthly basis 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 May 14, 2012; the birth data were obtained on May 2, 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 to 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 death are effective. The surveillance charts contained within this report are tools that are used to monitor infant mortality and select risk factors 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

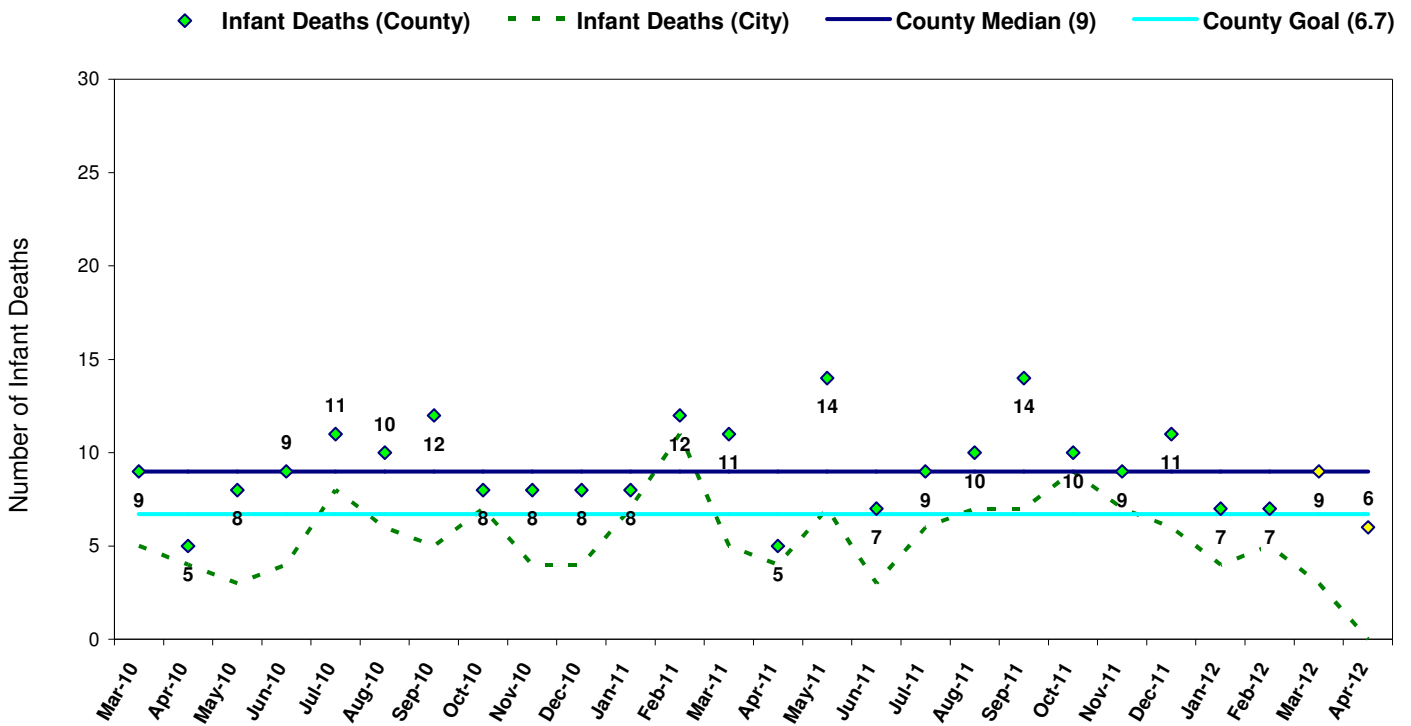
## Number of Infant Deaths

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

Month	Infant Deaths 2011	Infant Deaths 2012	Infant Births 2011	Infant Births 2012
January	8	7	946	868
February	12	7	845	839
March	11	9	881	910
April	5	6	880	548
May	14		870	
June	7		889	
July	9		1,006	
August	10		978	
September	14		1,011	
October	10		957	
November	9		922	
December	11		885	
<b>Total</b>	120	29	11,070	3,165

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. In April 2012, the number of infant deaths (6) within Hamilton County was below the previous 24-month median (Figure 1). Three infant deaths for March 2012 were reported in the City of Cincinnati at the time of data gathering for this report. Table 1 displays the provisional number of infant deaths and births for each month in 2011 and 2012. Provisional data for 2011-2012 indicate that 63.2% of infant deaths have occurred to residents of Cincinnati (Figure 1). Please see **Appendix A** on page 6 to learn more about provisional death data limitations.

**Figure 1. Number of Infant Deaths, Hamilton County Mar 2010 – Apr 2012\***



NOTE: The county median is calculated using data from Mar 2010 – Feb 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: Ohio Department of Health Vital Statistics

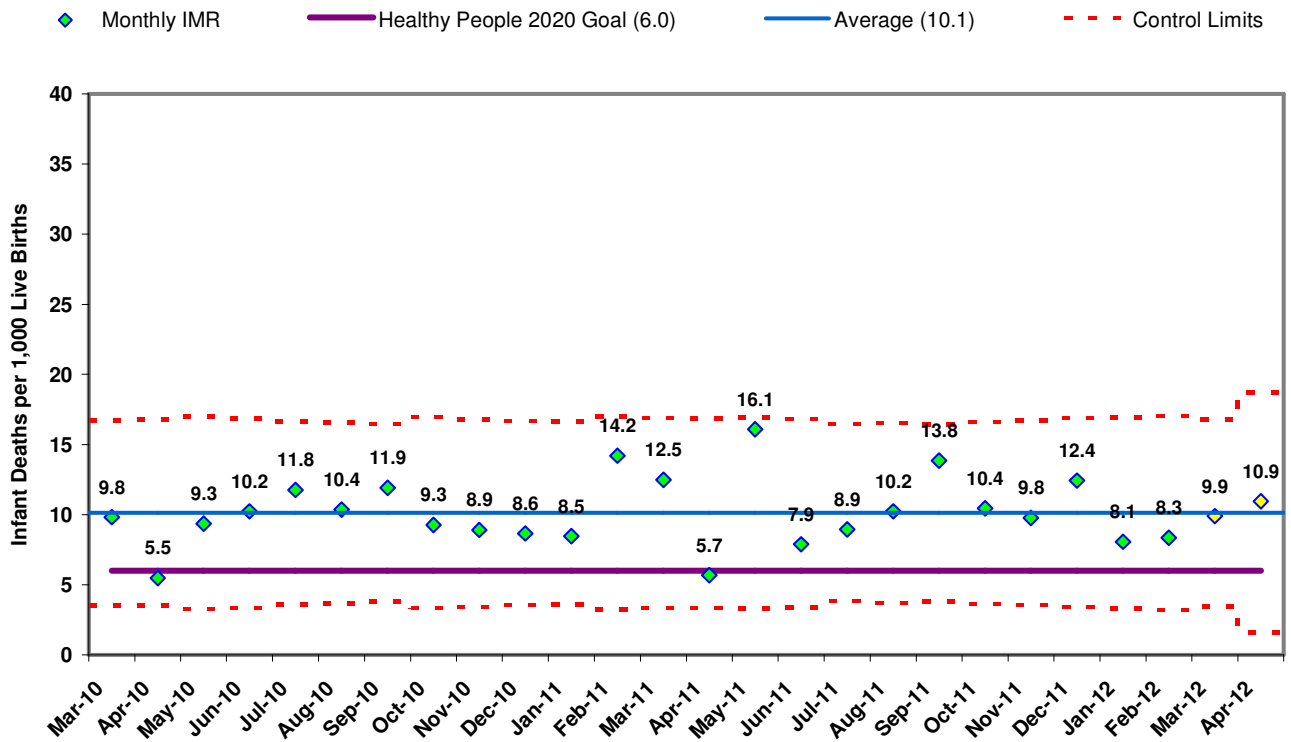
## Infant Mortality Rates

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.

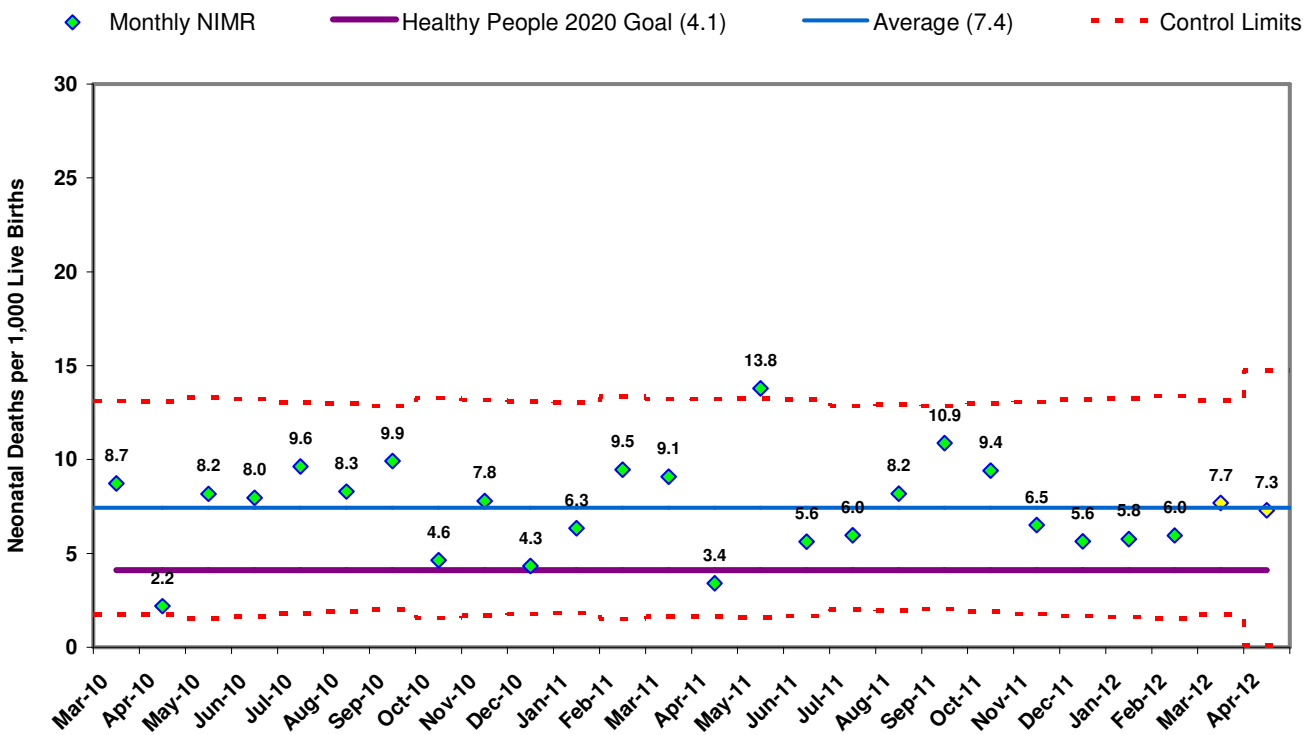
The IMR for April 2012 was 10.9. This provisional rate was within the control limits for the data, but above the Healthy People 2020 goal (6.0).

The IMR for April 2012 was at 10.9 infant deaths per 1,000 live births (Figure 2). April was above the average IMR (10.1) as shown in Figure 2. The April IMR was calculated based on 548 reported births for the month of April 2012. Subsequent reports will provide improved statistical validity of these estimates (**Appendix A**). The April 2012 NIMR remained within the statistical thresholds and is displayed in Figure 3. The April 2012 NIMR (7.3) is above the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births. Neonatal deaths account for 72.7% of the 2011-2012 infant deaths as of data collected on May 14, 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 Mar 2010 - Apr 2012\***



**Figure 3. Neonatal Mortality Rate Surveillance Chart, Hamilton County Mar 2010 – Apr 2012\***



NOTE: The mean is calculated using two years of data from Mar 2010 – Feb 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: Ohio Department of Health Vital Statistics

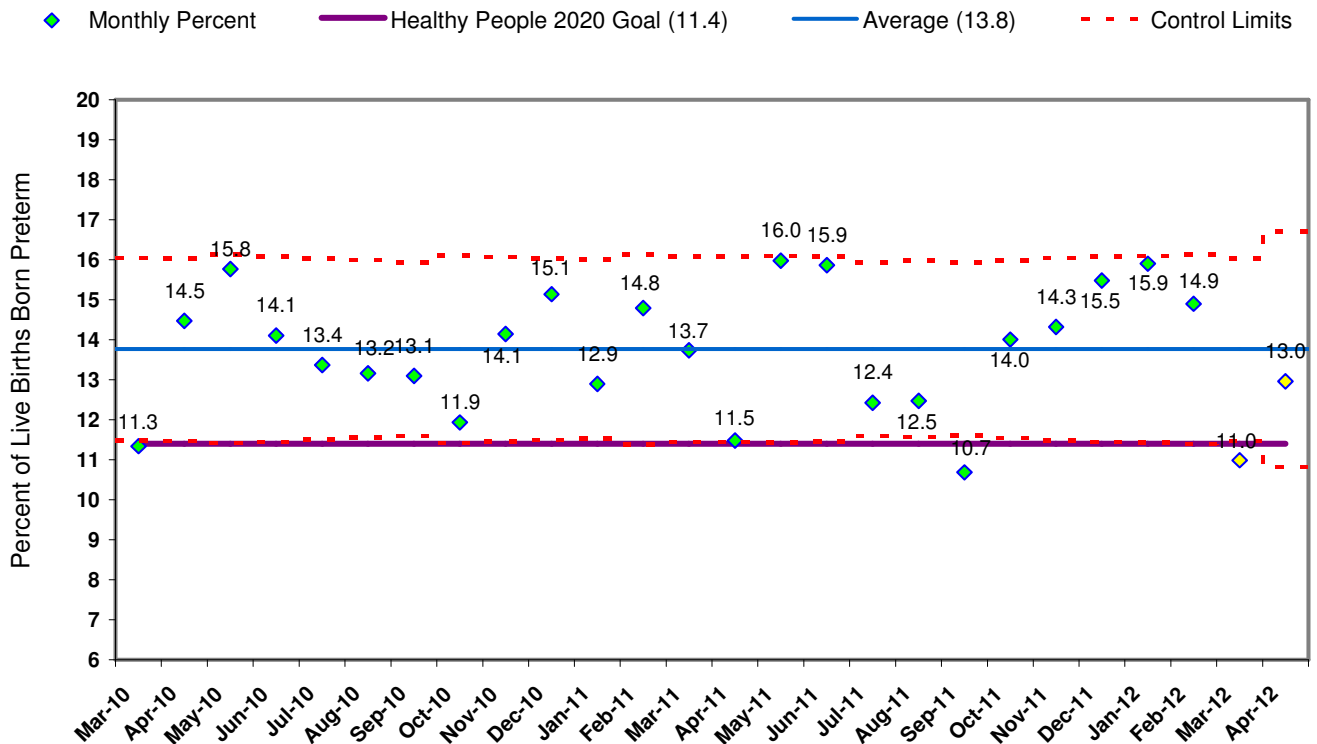
# Preterm Birth Rates

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 (13.8%) is above the Healthy People 2020 goal of 11.4%. The provisional preterm birth percentage for April is 13.0%; this rate is above the Healthy People 2020 goal of 11.4% for all live births.

The preterm birth for April 2012 (13.0%) was below the average (13.8%) and above the Healthy People 2020 goal for preterm births (11.4%). These data are provisional and may change in future reports.

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.

**Figure 4. Preterm Birth Rate Surveillance Chart, Hamilton County Mar 2010 - Apr 2012\***



NOTE: The mean is calculated using two years of data from Mar 2010 – Feb 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: Ohio Department of Health Vital Statistics

## Maternal Factors Related to Preterm Birth

In an effort to understand factors that may be driving preterm birth, a comparison is presented between mothers who delivered full term babies to mothers who delivered preterm babies (Table 2). Live births that occurred at 37 weeks gestation or later were considered full term. Live births between 32 and 36 weeks gestation were considered moderately preterm, while any birth that took place before 32 weeks gestation was considered very preterm. Table 2 below shows the percentage of each risk factor group attributed to mothers who had full term, moderately preterm, or very preterm babies in 2011 and 2012.

The Adequacy of Prenatal Care Utilization (APNCU) index, also known as the Kotelchuck index, is a measurement combining the month in which prenatal care began along with the number of prenatal care visits. Individuals who fell into the intensive group had a higher number of prenatal care visits than traditionally recommended for adequate care, as they are most likely mothers who often have complications requiring more frequent prenatal care. As Table 2 shows, an increase in percentage of mothers receiving inadequate or intensive care occurred when comparing full term against moderately preterm births.

Notably higher percentages of chlamydia infection, smoking before or during pregnancy, and hypertension were found within mothers who gave birth moderately preterm or very preterm when compared to full term pregnancies; the percentages are shown in Table 2. When compared to full term mothers, mothers who gave birth either moderately or very preterm were less likely to have a high school education. Mothers who gave birth to very preterm babies were more likely to be teen mothers than mothers who delivered full term or moderately preterm. The percentage of black Hamilton County mothers increased when comparing full term to moderately preterm to very preterm births.

Table 2. Maternal Health, Hamilton County, 2011-2012						
	2011			2012		
	Full Term N=9,563	Moderately PTB N=1,167	Very PTB N=340	Full Term N=2,731	Moderately PTB N=344	Very PTB N=90
<b>APNCU (Kotelchuck)*</b>						
Inadequate	16.2%	23.4%	17.7%	17.9%	21.2%	21.5%
Intensive	44.3%	67.1%	70.0%	45.2%	66.3%	63.1%
Intermediate	8.6%	3.3%	2.3%	7.7%	5.1%	7.7%
Adequate	30.9%	6.2%	10.0%	29.2%	7.3%	7.7%
<b>Hypertension</b>						
Pre-pregnancy	2.7%	6.4%	8.5%	3.0%	5.2%	6.7%
Gestational	6.0%	12.6%	15.3%	7.4%	13.7%	8.9%
Eclampsia	1.0%	5.6%	5.9%	1.5%	5.2%	8.9%
<b>Maternal Race*</b>						
White	59.0%	48.9%	35.6%	57.8%	47.6%	48.8%
Black	31.5%	42.8%	56.9%	32.2%	44.2%	46.3%
Other	9.6%	8.2%	7.5%	10.0%	8.2%	4.9%
<b>Smoking</b>						
3 Months Before Pregnancy	21.1%	26.0%	30.9%	20.6%	25.0%	26.7%
During Pregnancy	15.9%	21.0%	25.0%	14.1%	20.1%	20.0%
<b>Payment Type</b>						
Medicaid	36.3%	46.0%	54.7%	38.2%	49.7%	45.6%
Private	49.9%	38.9%	30.6%	51.4%	37.2%	37.8%
Self-Pay	9.2%	10.9%	12.1%	8.7%	11.3%	16.7%
Other	4.6%	4.2%	2.6%	1.8%	1.7%	0.0%
<b>Maternal Age</b>						
<15 Years	0.1%	0.3%	0.6%	0.2%	0.0%	1.1%
15-19 Years	8.2%	10.1%	13.2%	8.4%	10.2%	14.4%
20-24 Years	24.1%	25.9%	27.6%	22.6%	23.5%	27.8%
25-29 Years	29.6%	29.5%	25.9%	28.6%	26.2%	13.3%
30-34 Years	25.5%	20.8%	21.5%	26.8%	26.5%	31.1%
35-39 Years	10.3%	10.4%	8.2%	11.1%	10.8%	10.0%
40-44 Years	2.0%	2.8%	2.4%	2.2%	2.6%	2.2%
45+ Years	0.2%	0.3%	0.6%	0.1%	0.3%	0.0%

Note: \* APNCU was missing in 21.1% and 18.3% of the birth records for 2011 and 2012 respectively. Race was missing in 0.7% and 46.5% of birth records for 2011 and 2012 respectively. The high percent missing in 2012 is a result of the quickness in which the records are made available.

**Table 2. Maternal Health, Hamilton County, 2011-2012 (Cont.)**

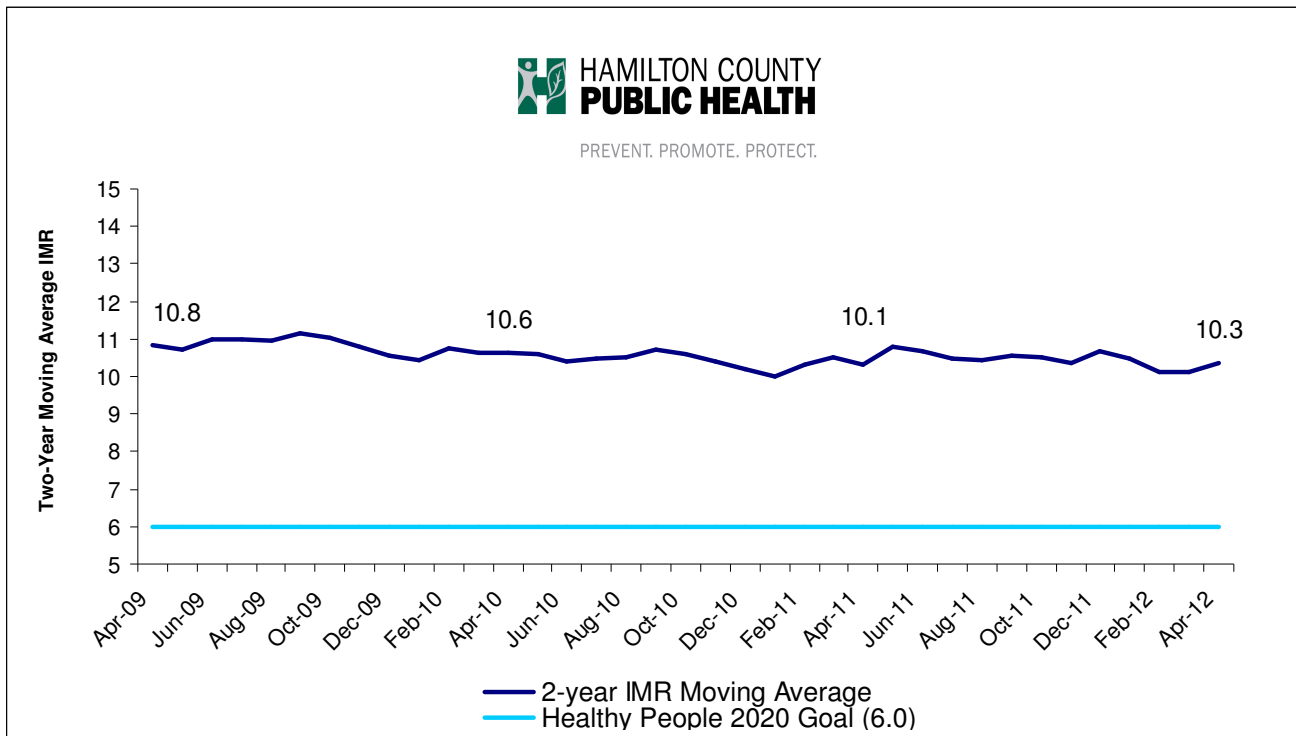
	2011			2012		
	Full Term N=9,563	Moderately PTB N=1,167	Very PTB N=340	Full Term N=2,731	Moderately PTB N=344	Very PTB N=90
<b>Education</b>						
Less than H. S. Diploma	16.3%	22.2%	22.6%	16.3%	25.9%	23.3%
Diploma/GED	19.3%	22.9%	19.7%	17.8%	20.3%	24.4%
Some College or Greater	63.2%	51.8%	52.4%	64.4%	52.3%	48.9%
Unknown	1.2%	3.1%	5.3%	1.5%	1.5%	3.3%
<b>Infections</b>						
Chlamydia	5.5%	5.8%	7.4%	6.1%	7.3%	7.8%
Gonorrhea	1.6%	1.6%	2.4%	1.5%	2.6%	1.1%
Syphilis	0.4%	0.5%	0.9%	0.6%	0.3%	2.2%
HSV	5.0%	5.1%	4.1%	5.1%	5.2%	5.6%

Note: Data for 2011 and 2012 are provisional data sources. Birth data are not finalized by ODH until fall of the following year. Missing data will become more complete once a finalized data set is released by ODH.

## 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 decreased from April 2009 (10.8) to April 2012 (10.3) 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 Apr 2009 - Apr 2012\***



NOTE: The infant mortality rate for each month is the average of twenty-four 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: Ohio Department of Health 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](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. There were eleven infant deaths in 2012 that were not yet filed at the time of this report, amounting in a 7.4% difference between the two data sources (Table 3). Please note that delayed certificates directly impact data quality and therefore, the integrity of findings shared in this report.

<b>Table 3. Infant Mortality Data Source Assessment, Hamilton County 2011 - 2012</b>		
<b>Data Source</b>	<b>2011</b>	<b>2012</b>
	<b>No. Infants &lt; 1 yr.</b>	<b>No. Infants &lt; 1 yr.</b>
<b>PDS-A</b>	<b>120</b>	<b>18</b>
<b>PDS-B</b>	<b>120</b>	<b>29</b>
<b>Discrepancy</b>	<b>0</b>	<b>11</b>



## Appendix B

### General Guidelines for Using Surveillance Charts

The Hamilton County Infant Mortality Surveillance System, part of the Office of Maternal and Infant Health and Infant Mortality Reduction, 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.**



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