HAMILTON COUNTY

Maternal and Infant Health Monthly Surveillance Report

October 2015

Thomas Boeshart, MPH, Epidemiologist

HAMILTON COUNTY PUBLIC HEALTH

PREVENT. PROMOTE. PROTECT.

cradle cincinnati

every baby, every day

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 data. These data were provided by the Ohio Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions. 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 November 4th, 2015 and November 10th, 2015; the birth data were updated on the Ohio Public Health Information Warehouse on December 1st, 2015.

The Maternal and Infant Health Monthly Surveillance Report will include the following indicators:

- 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 deaths
- Current two-year infant mortality rate moving average
- Comparison of "Filed" and "Unfiled" data

INFANT MORTALITY SURVEILLANCE

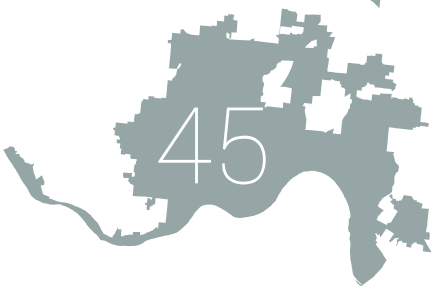
Public health surveillance is the ongoing systematic collection, analysis, interpretation and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and improve health[1]. The Maternal and Infant Health Surveillance System is designed 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 27,2007, Vol. 50 No. RR-13.

NUMBER OF INFANT DEATHS

One measure of infant mortality is to track the number of infant deaths per month. In October 2015, there were 10 infant deaths within Hamilton County. Four of the infant deaths that occurred in October 2015 in Hamilton County, occurred amongst Cincinnati residents. Table 1 displays the provisional number of infant deaths and births for each month in 2014 and 2015. Please see **Appendix A** on Page 12 to learn more about provisional death data limitations.

Infant Deaths, Hamilton County 2015 Year-to-date



Infant Deaths, Cincinnati 2015 Year-to-date

Table 1. Number of Infant Deaths and Births, Hamilton County, 2014-2015

	2014		2015	
	Infant Deaths	Live Births	Infant Deaths	Live Births
January	7	893	10	938
February	1	854	5	797
March	7	880	15	913
April	10	832	1	924
May	9	909	7	923
June	11	964	8	928
July	9	1,008	12	958
August	11	899	11	941
September	10	960	7	966
October	9	980	10	837
November	3	875		
December	10	903		
Total	97	10,957	86	9,125

INFANT MORTALITY RATES

11.9 per 1,000

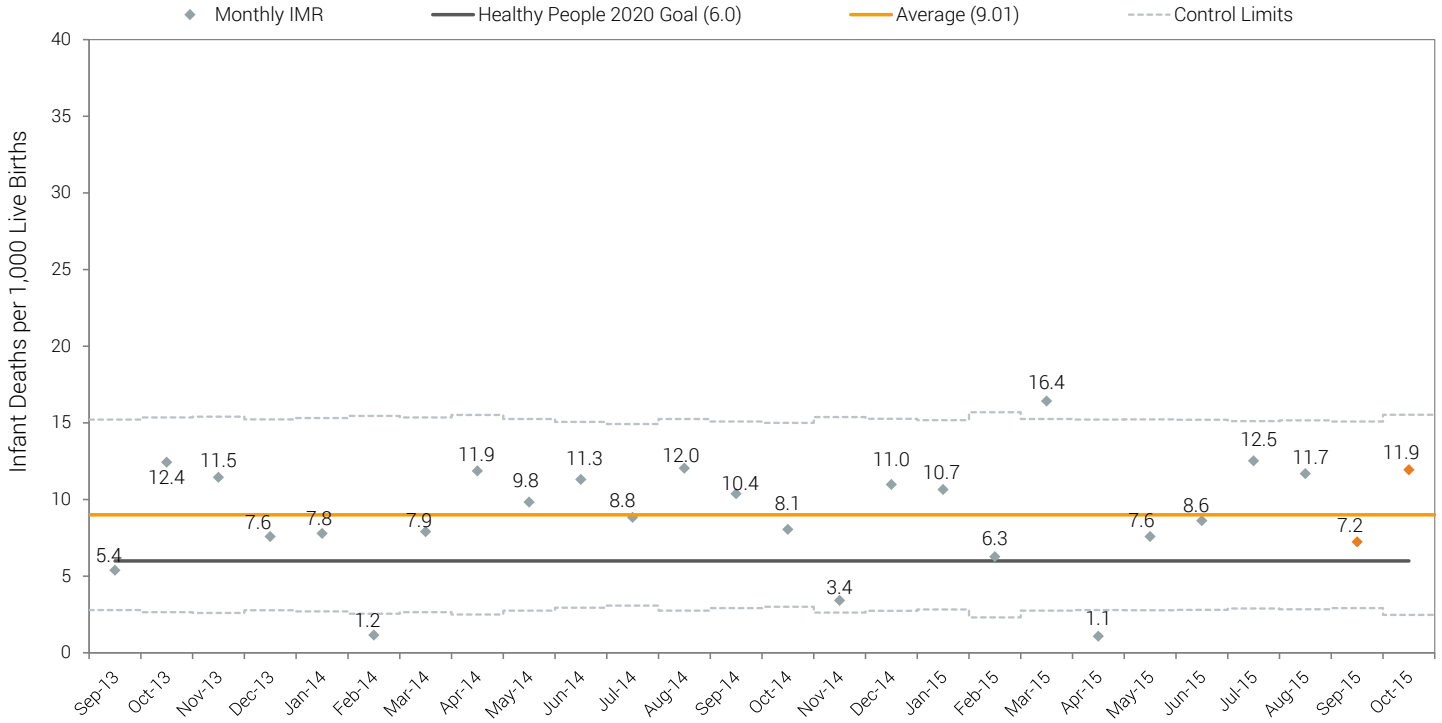
October 2015 IMR

This provisional rate was higher than the Healthy People 2020 goal (6.0)

Another method used to monitor infant mortality is the examination of an Infant Mortality Rate (IMR). 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. 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.

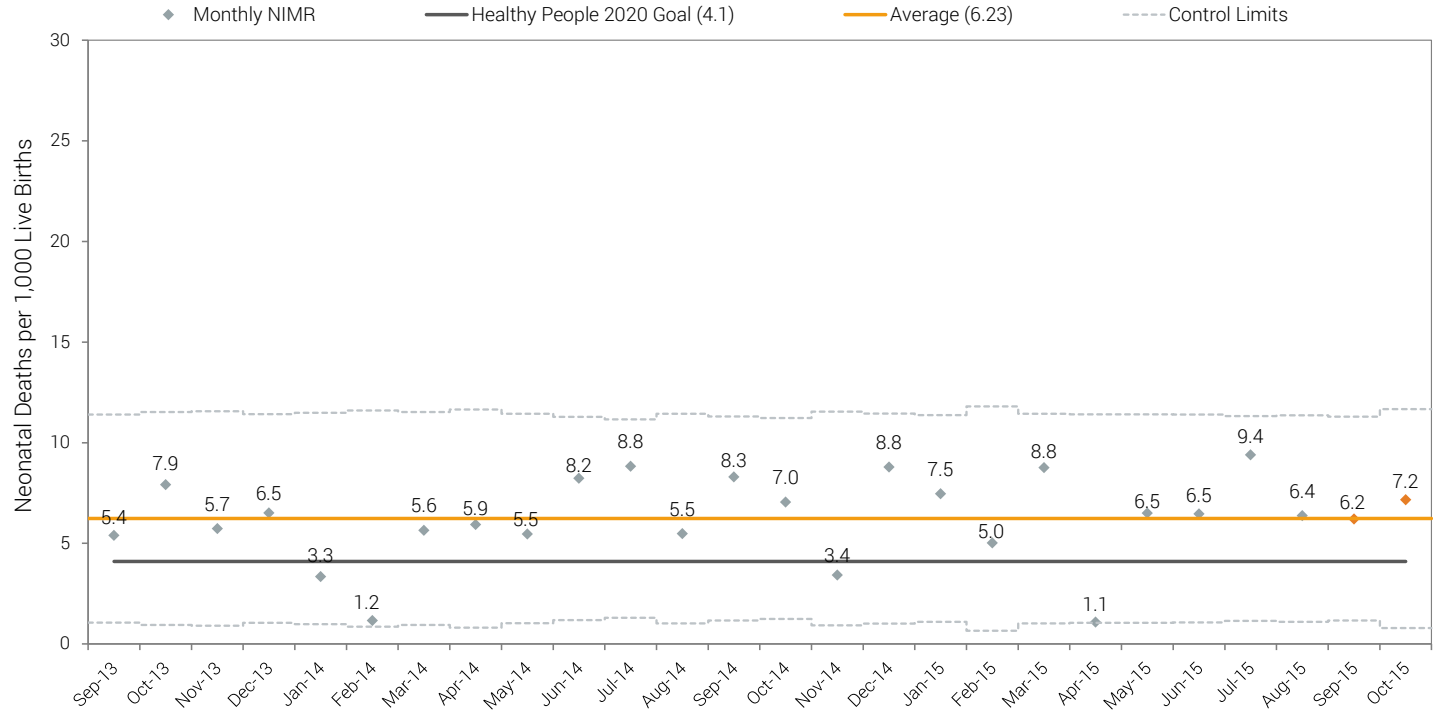
The IMR for October 2015 was 11.9 infant deaths per 1,000 live births (Figure 1). October was higher than the average IMR (9.01) as shown in Figure 1. Subsequent reports will provide improved statistical validity of these estimates (Appendix A). The October 2015 NIMR was below the upper statistical thresholds and is displayed in Figure 2. The October NIMR (7.2) is above the Healthy People 2020 goal of 4.1 neonatal deaths per 1,000 live births and higher than the Hamilton County 24-month average of 6.23 neonatal deaths per 1,000 live births. Neonatal deaths accounted for 69.2% of the January 2014 - October 2015 infant deaths as of data collected November 4th, 2015 and November 10th, 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, Sep 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 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, Sep 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

PRETERM, VERY PRETERM, & <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 (13.0%) is above the Healthy People 2020 goal of 11.4%. The provisional preterm birth rate for October 2015 is 12.1%; this rate is above the Healthy People 2020 goal of 11.4% for all live births. The average very preterm birth rate in Hamilton County (2.85%) is above the Healthy People 2020 goal of 1.8%. The provisional very preterm birth rate for October 2015 is 3.1%; this rate is above the Healthy People 2020 goal of 1.8% for all live births. The provisional <23 weeks gestation birth percentage for October 2015 is 0.7% in Hamilton County, which is above the average <23 weeks gestation birth rate (0.35%). The <23 weeks gestation birth rate is also important to track as approximately $^{1}/_{3}$ of all 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 & mortality can be reduced, ultimately preserving the community's financial resources and providing children with a healthy start to life.

12.1%

October 2015 Preterm Birth Rate

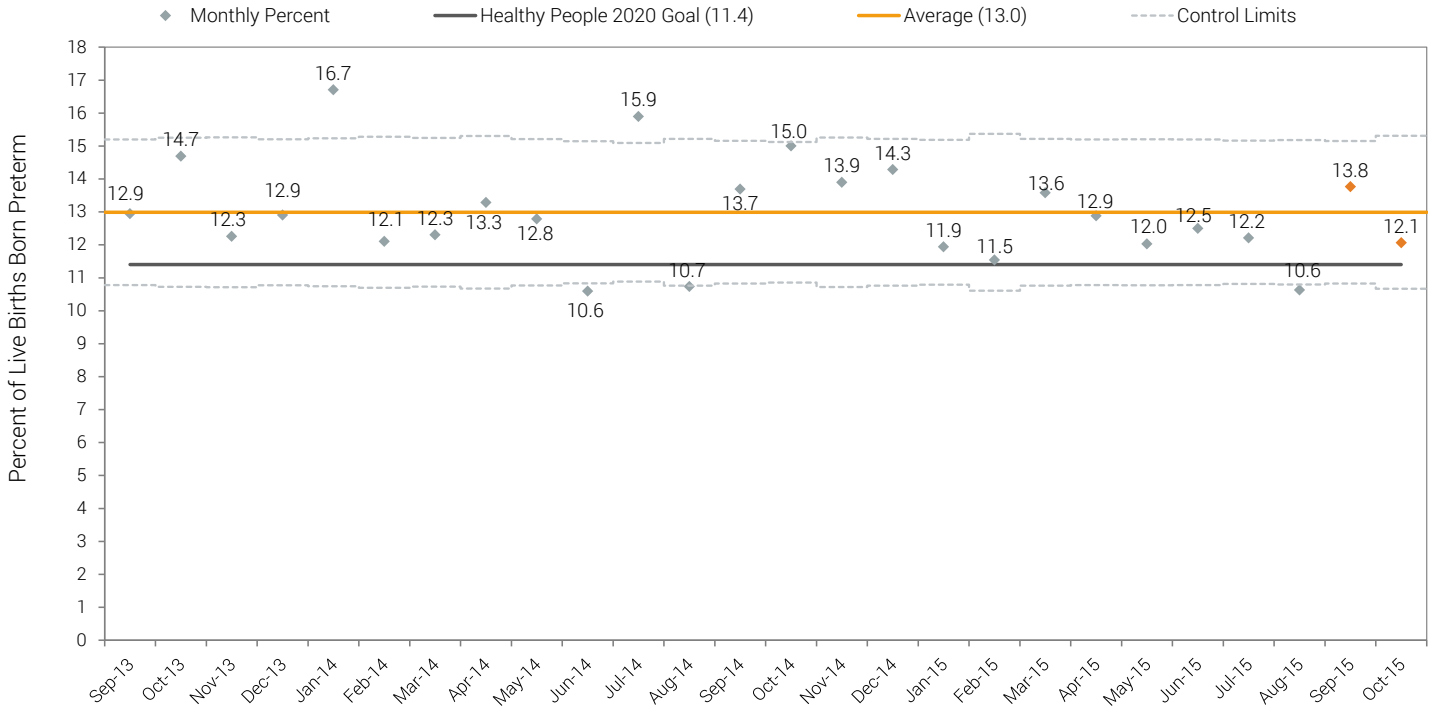
This provisional rate was higher than the Healthy People 2020 goal (11.4%)

3.1%

October 2015 Very Preterm Birth Rate

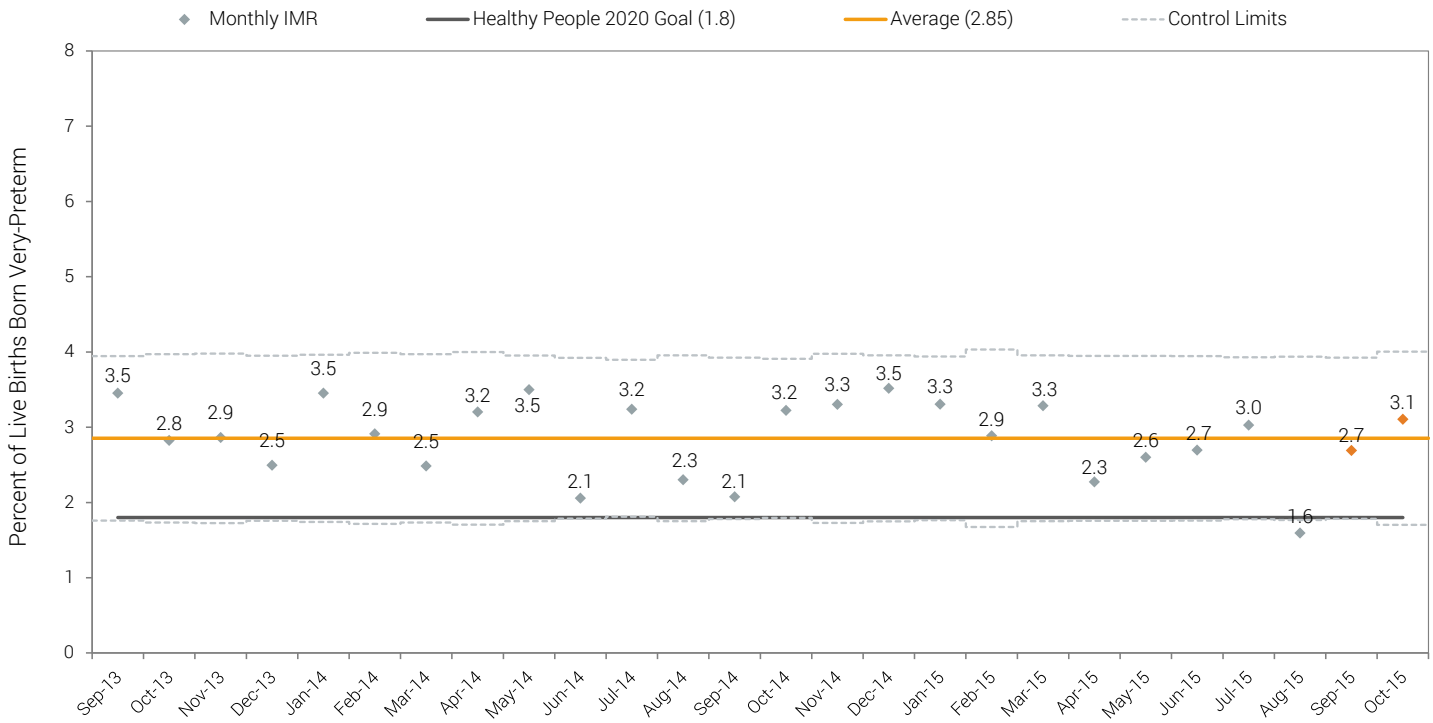
This provisional rate was higher than the Healthy People 2020 goal (1.8%)

Figure 3. Preterm Birth Rate Surveillance Chart, Hamilton County, Sep 2013 - Oct 2015*



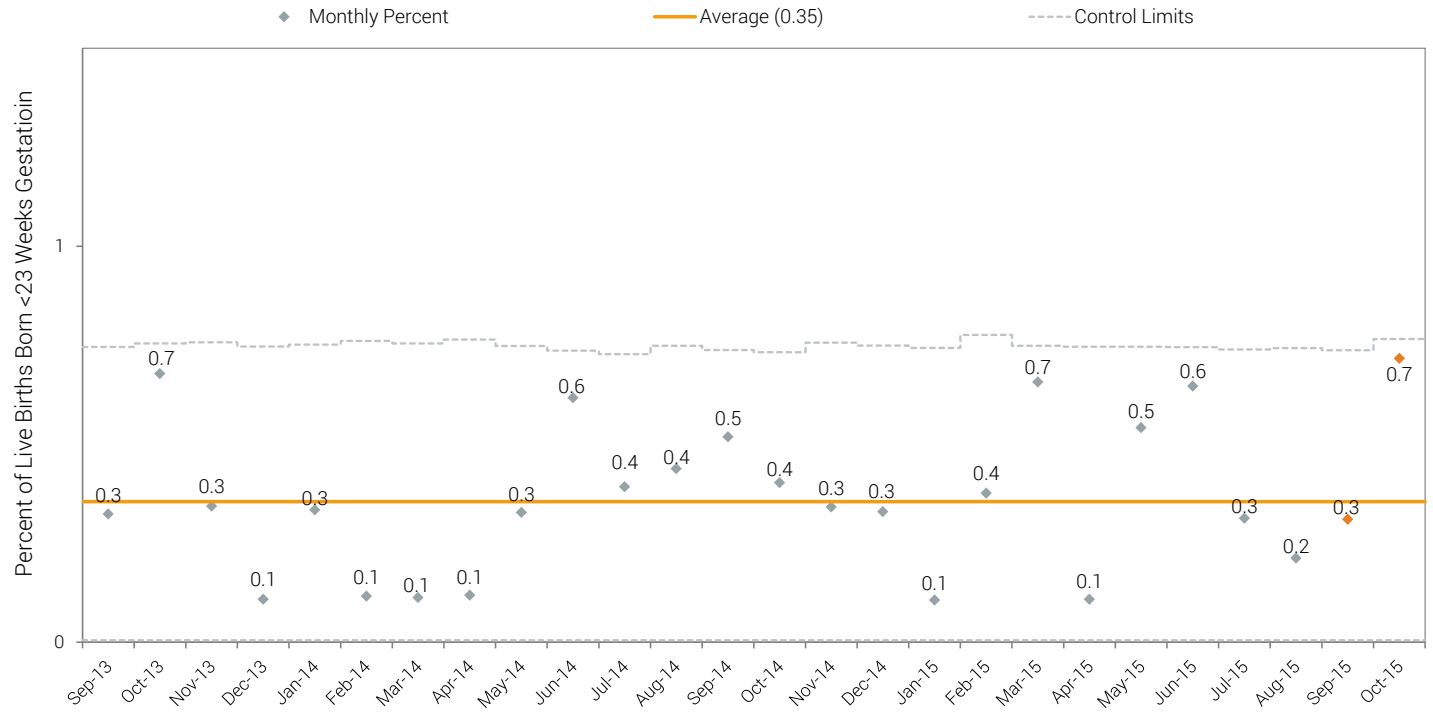
NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015 Orange points are more likely to change in future reports.
*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

Figure 4. Very Preterm Birth Rate Surveillance Chart, Hamilton County, Sep 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 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 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 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

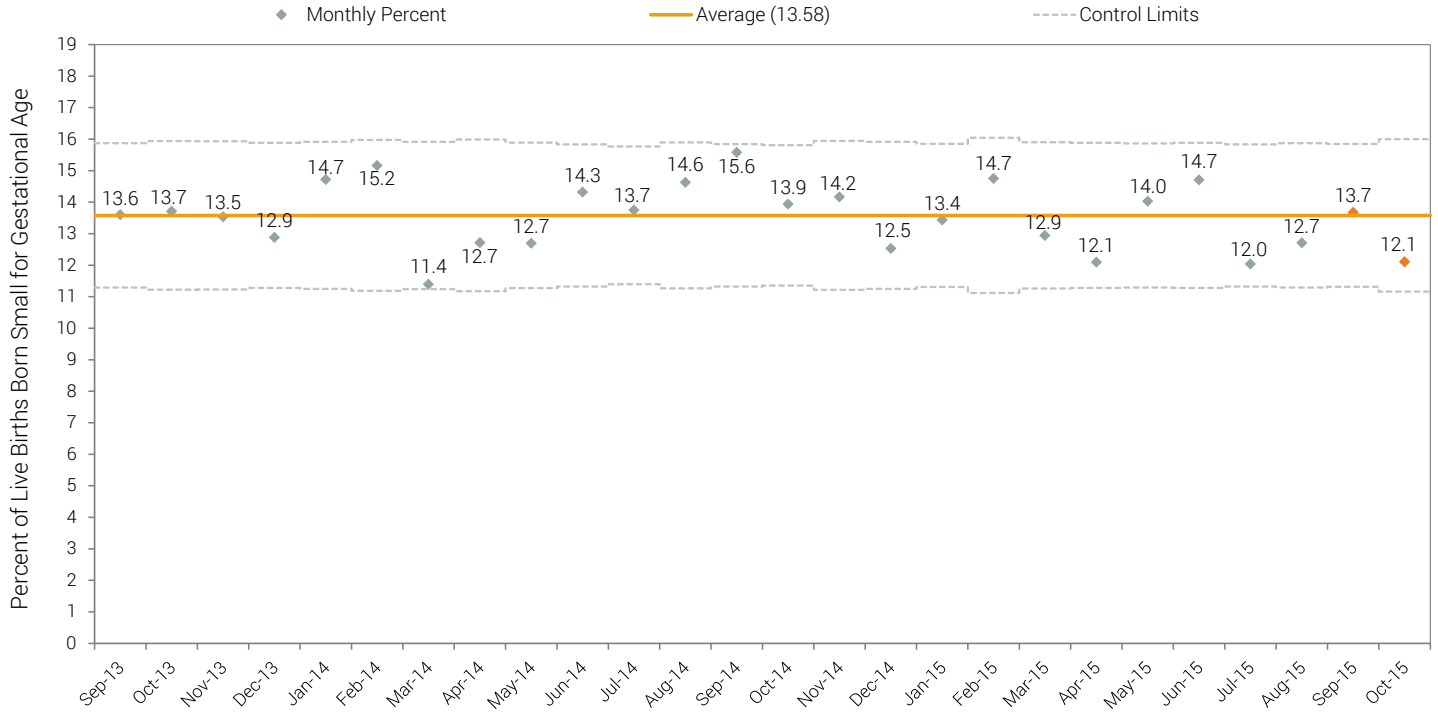
12.1%
October 2015 SGA Birth Rate

The small for gestational age (SGA) birth rate is the proportion of singleton live-born infants whose birth weight is at or below the 10th percentile for a given gestational age[2]. 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[2]. The 10th percentile cut-off of birth weight was derived from 1990 live births in the United States as a baseline[3]. 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[2]. Infants who are born with birth weights below the 10th 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[2]. The provisional SGA birth rate in October 2015 is 12.1%, which is below the average SGA birth rate in Hamilton County (13.58%).

2. Association of Maternal & Child Health Programs. *Life Course Indicator: Small for Gestational Age*, 2014.
3. Oken E, Kleinman KP, Rich-Edwards J, Gillman MW. *A nearly continuous measure of birth weight for gestational age using a United States reference.* BMC Pediatric. 2003; 3:6. doi: 10.1186/1471-2431-3-6.

NOTE: SGA Percent illustrated in Figure 6 is calculated using gender-specific small for gestational age 10th percentile cut-off for more accurate measures

Figure 6. Small for Gestational Age Rate Surveillance Chart, Hamilton County, Sep 2013 - Oct 2015*



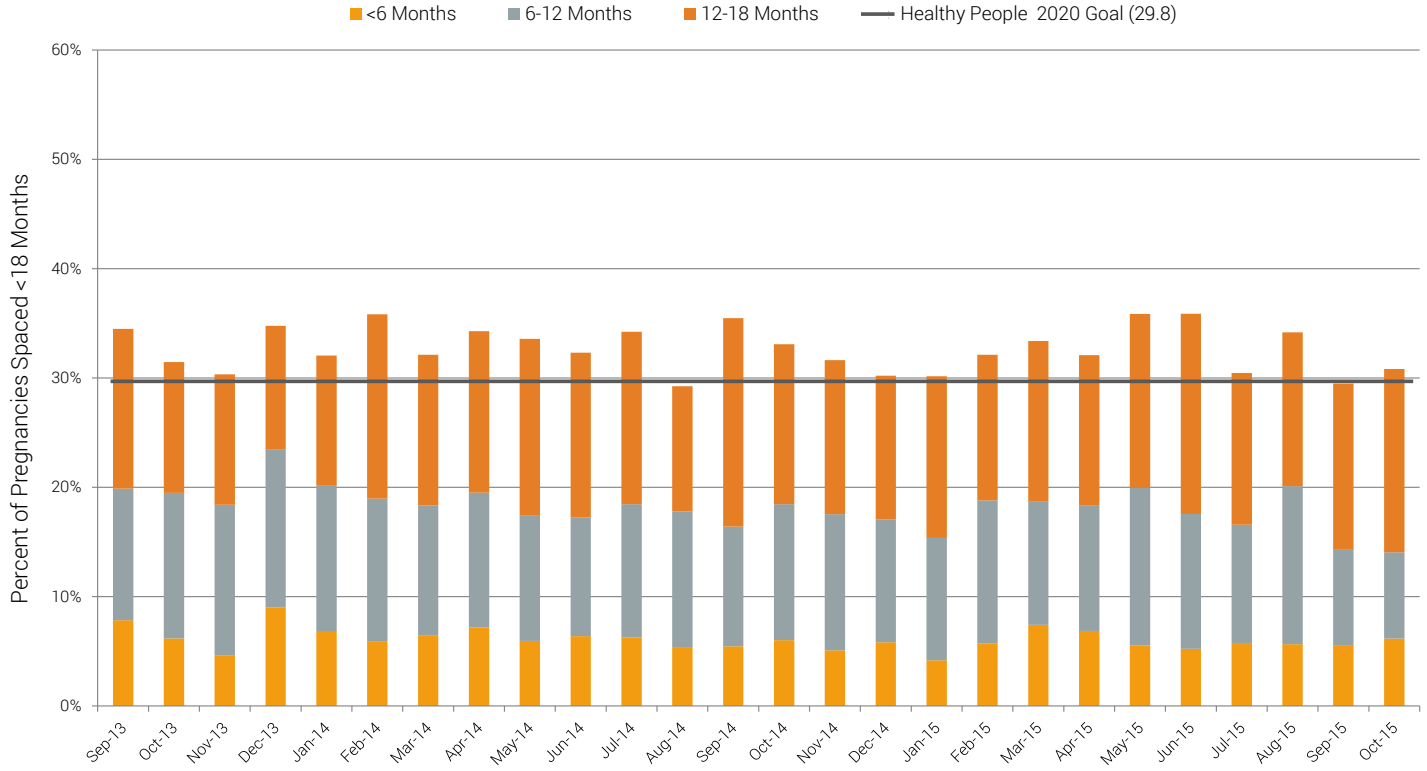
NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

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 pre-eclampsia, while the infant is more likely to be born prematurely, or with low birth weight. Short spacing between pregnancies was a factor in 45% of Hamilton County's infant deaths† between 2007 and 2012. Pregnancy intervals between 18 and 59 months are considered optimal birth spacing, as recommended by the World Health Organization[4]. 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 short spacing between pregnancies. The average percentage‡ of Hamilton County pregnancies that were spaced less than 18 months (32.9%) is slightly above the Healthy people 2020 goal of 29.8%. The provisional percentage of pregnancies that were spaced less than 18 months for October 2015 is 30.8%; this percent is slightly above the Healthy People 2020 goal of 29.8% of all pregnancies spaced less than 18 months. Of the Hamilton County pregnancies spaced less than 18 months between January 2013 and October 2015, 44.4% of pregnancies were spaced between 12 and 18 months. By informing mothers about properly spacing pregnancies, the risk for adverse health complications for both mother and infant could be reduced.

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

Figure 7. Percent of Pregnancies Spaced <18 Months, Hamilton County, Sep 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015

*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.

† Infant deaths to mothers with a previous live birth

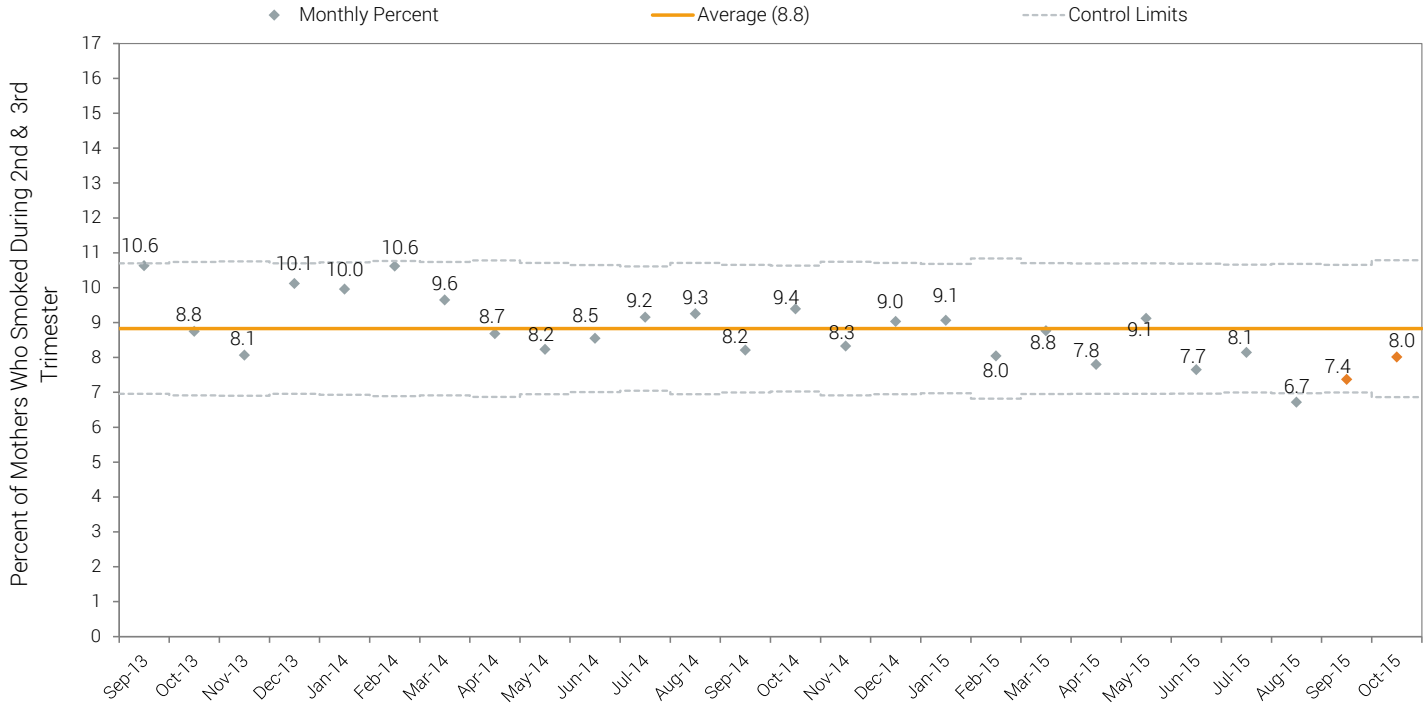
‡ Percentage of short spaced pregnancies does not include first time mothers or pregnancies where information pertaining to previous live birth was missing/unknown

Data Source: ODH Vital Statistics

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 mothers who smoked during the 2nd and 3rd trimester of pregnancy for October 2015 was 8.0% (Figure 8). This rate was lower than the average number of women who reported smoking during the 2nd and 3rd trimester of pregnancy for Hamilton County (8.8%) as shown in Figure 8.

Figure 8. Maternal Smoking Rate Surveillance Chart, Hamilton County, Sep 2013 - Oct 2015*



NOTE: The mean is calculated using two years of data from Sep 2013 - Aug 2015. Orange points are more likely to change in future reports.
*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

SLEEP-RELATED DEATHS

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, adult or older child sharing a bed with an infant), an infant sleeping on a couch, an infant sleeping in a crib filled with blankets or pillows, or an infant being put to sleep on his/her stomach. There has been eight sleep-related deaths in Hamilton County in 2015 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, 2015 Year-to-Date

ALWAYS FOLLOW THE ABC'S OF SAFE SLEEP, EVEN DURING NAP TIME.

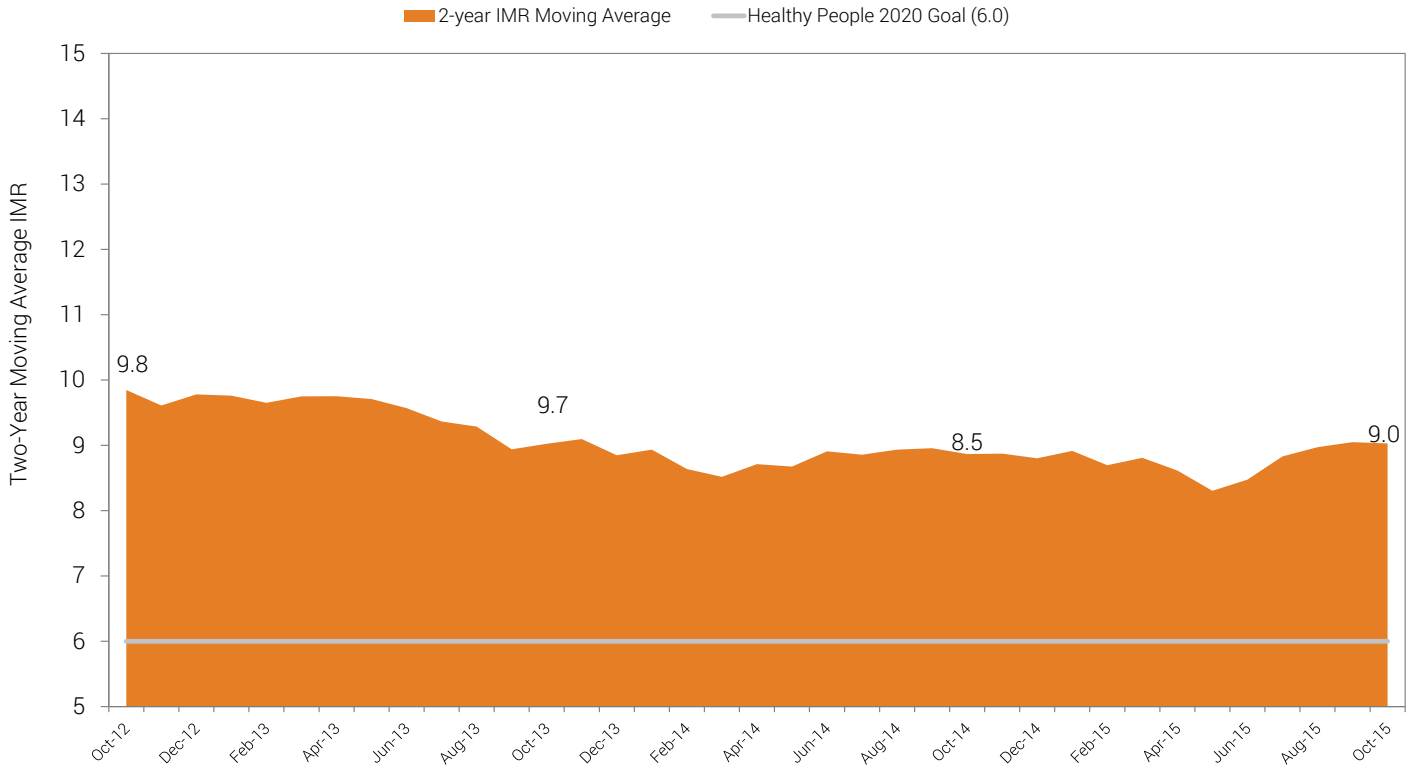
Alone **B**ack **C**rib

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 10, 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 2012 (9.8) to October 2015 (9.0) as shown in Figure 10. 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 10. Two-Year Moving Average Infant Mortality Rate by Month, Hamilton County, Oct 2012 - Oct 2015*



NOTE: The infant mortality rate for each month in the average of the 24 months immediately prior to and including the last month.
*Data for 2014 - 2015 are provisional; ODH reconciles (i.e. finalizes) data by fall of the subsequent year.
Data Source: ODH Vital Statistics

CRADLE CINCINNATI'S CORNER

If you provide care for pregnant women in Hamilton County who are trying to quit smoking, you are in luck. Hamilton County has a variety of convenient, mobile-based smoking cessation services designed specifically for pregnant women and/or those planning on becoming pregnant. One such resource is SmokeFreeMOM. SmokeFreeMOM is a free text messaging service that provides 24/7 tips and encouragement to motivate pregnant women to stop smoking. Any pregnant woman that is trying to quit or has recently quit is eligible for this service and will receive text messages until they reach their indicated quit date. If your patient is interested in signing up for SmokeFreeMOM, they can text the word QUIT to 222888, answer a few questions about their habits (quit date goal, number of cigarettes per day, etc), and start receiving messages. To learn more about SmokeFreeMOM, visit, http://women.smokefree.gov/smokefree-mom.aspx.

The Ohio Tobacco Quit Line is another free, mobile-based program and is available to uninsured Ohioans, Medicaid recipients, pregnant women, and members of the Ohio Tobacco Collaborative. The program provides members with the resources necessary to stop smoking through a team of support coaches, special tools, and research-based information. If someone you know qualifies for the Quit Line program and is ready to quit smoking, refer them to 1-800-QUIT-NOW or have them log on to https://ohio.quitlogix.org/ .

For more information on local smoking cessation resources available to pregnant moms, call 211.

For more information, check us out on-line at www.cradlecincinnati.org, and follow us on social media:

@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 for the 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 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), small for gestational age (Figure 6), pregnancy spacing (Figure 7), maternal smoking (Figure 8), and sleep-related deaths. Table 2 displays the discrepancy between the two infant mortality data sources from ODH. Please note that delayed certificates impact data quality, and therefore the integrity of findings shared in this report.

Table 2. Infant Mortality Data Source Assessment, Hamilton County, 2014-2015

Data Source	2014 Number of Infant Deaths	2015 Number of Infant Deaths
PDS-A	97	82
PDS-B	97	86
Discrepancy	0	4

APPENDIX B
GENERAL GUIDELINES FOR USING SURVEILLANCE CHARTS

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

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 per month over the preceding two years,
2. A goal line which shows the goal that has been established by the community,
3. Upper and lower control limits (dashed) that allow user 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.

JOIN US ON SOCIAL MEDIA
@HamCoHealth

Images courtesy of:
Kelvin Murray via Getty Images | ©iStockphoto.com/ArtisticCaptures | ©iStockphoto.com/Christopher Futcher | ©iStockphoto.com/bo1982
©iStockphoto.com/TatyanaGI | ©iStockphoto.com/Bruno Monteny