



2011-2015 Linked Infant Mortality Report

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Karen Hacker, MD, MPH, Director

Report prepared by:

John M. Kokenda, Statistical Analyst



Introduction

Infant mortality remains a serious public health issue in Allegheny County, Pennsylvania, the United States and in many countries around the world. Despite achieving the Healthy People 2020 (HP 2020) goal of 6.0 infant deaths per 1,000 live births in 2012, the United States ranked 25th in the world in infant mortality in 2015.¹

Both Allegheny County and Pennsylvania's infant mortality rate (IMR) was 6.2 infant deaths per 1,000 live births in 2015, slightly higher than the HP 2020 goal.

The purpose of this report is to look at both mother and infant characteristics by linking the infant's death certificate with the birth certificate. In the past, the Allegheny County Health Department has analyzed the linked data set as a birth cohort. This report, in order to be consistent with the reporting procedures of the Centers for Disease Control (CDC) National Vital Statistics System (NVSS) will present the data as a death cohort.

In past reports, to calculate infant mortality rates by race, the infant's race was taken from the death certificate (numerator) and mother's race was taken from the birth certificate (denominator). For this report, mother's race as reported on the birth certificate is used in both the numerator and the denominator when calculating infant mortality rates. Race reported on the birth certificate is reported by the mother and is considered to be more reliable than the reported infant's race on the death certificate.² This is consistent with the CDC NVSS Linked Birth and Infant Death Data.

DISCLAIMER

The data is provided by the Allegheny County Health Department, Office of Epidemiology and Biostatistics through a cooperative agreement with the Pennsylvania Department of Health which requires the following disclaimer: "These data were supplied by the State Health Data Center, Pennsylvania Department of Health, Harrisburg, Pennsylvania. The Pennsylvania Department of Health specifically disclaims responsibility for any analyses, interpretations or conclusions."



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2011-2015 Allegheny County Linked Infant Mortality Report SUMMARY AND ILLUSTRATIONS



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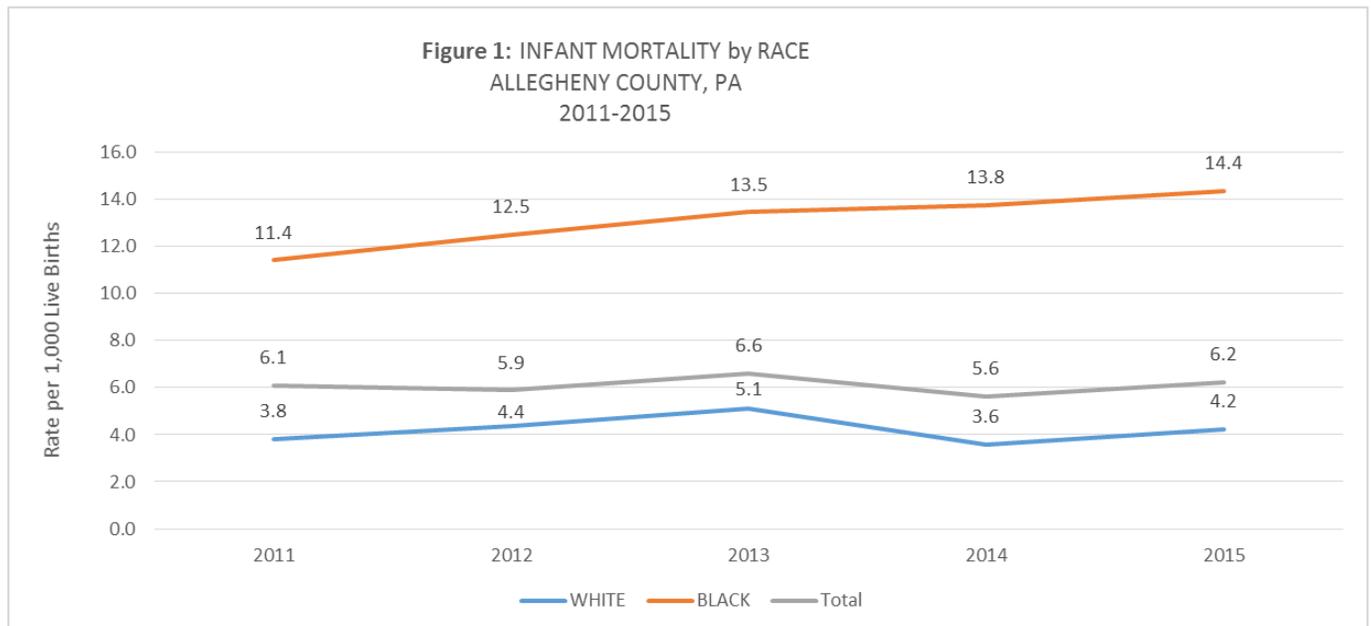
Overview

From 2011 through 2015 there were 66,075 live births to Allegheny County residents. During this time there were 403 infant deaths for an IMR of 6.1 deaths per 1,000 live births. Although the IMR for Allegheny County achieved the HP 2020 goal in 2012 and 2014, the aggregated IMR for 2011 – 2015 is slightly higher than the HP 2020 goal of 6.0 infant deaths per 1,000 live births. However, when compared to the previous five year IMR of 7.4 (2006-2010), the 2011-2015 IMR has shown a decrease of 17.6 percent.

Table 1:
Infant Mortality Rates by Race of Mother by Year: Allegheny County, PA, 2011-2015

YEAR	WHITE		BLACK		TOTAL ¹	
	Infant Deaths	Rate	Infant Deaths	Rate	Infant Deaths	Rate
2011	36	3.8	29	11.4	80	6.1
2012	41	4.4	32	12.5	77	5.9
2013	48	5.1	35	13.5	88	6.6
2014	34	3.6	35	13.8	75	5.6
2015	40	4.2	37	14.4	83	6.2
2011 -2015	199	4.2	168	13.1	403	6.1

¹ Includes all other and unknown race.
NOTE: Mortality rate per 1,000 live births by mother's race as specified on the birth certificate.





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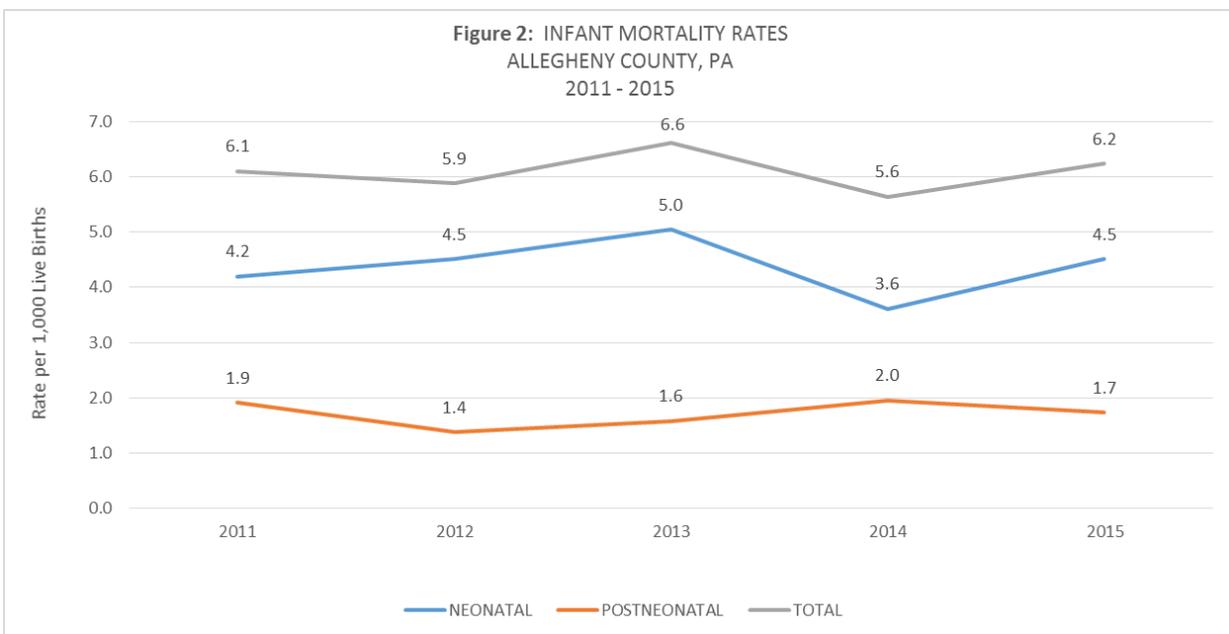
Despite a slight increase in the total IMR from 2014 to 2015 in Allegheny County, since 2000 the total IMR has trended downward. Despite this downward trend a large racial disparity remains. The black IMR (13.1) is 3.1 times greater than the white IMR (4.2). A similar three-fold disparity between blacks and whites is also apparent when looking at neonatal (3.2:1) and postneonatal (3.0:1) infant mortality rates.

Table 2:
Infant Mortality Rates by Race of Mother: Allegheny County, PA - 2011-2015

	NEONATAL	POSTNEONATAL	TOTAL ¹
Total¹	4.4	1.7	6.1
White	3.0	1.2	4.2
Black	9.5	3.6	13.1
Asian/PI	2.5	0.5	3.0
Multi-Racial	6.0	2.7	8.6

¹ Includes all other and unknown race.

NOTES: Mortality rate is per 1,000 live births by mother's race as specified on the birth certificate. Neonatal is under 28 days and postneonatal is 28 days to under 1 year.





Data by Infant and Maternal Characteristics

Multiple births

The IMR for infants in multiple deliveries, twins and higher, was 28.7. This is 5.5 times greater than the IMR for singleton births. The risk for an infant death increases as the number of births in a single pregnancy increases. The IMR for twin births was 27.0 while the IMR for triplets was 83.3, more than 16 times the rate for singleton births. Between 2011 and 2015 there were no quadruplets born to Allegheny County mothers. During this same period there was one set of quintuplets born, all of which survived.

Table 3:
Infant Mortality Rates by Birth Plurality: Allegheny County, PA - 2011-2015

	Infant Deaths	Births ¹	IMR
SINGLE	332	63,772	5.2
MULTIPLE	66	2,303	28.7
TWIN	60	2,226	27.0
TRIPLET	6	72	83.3
Quadruplets	0	0	n.a
Quintuplets	0	5	0.0

¹ Total number of births per specified order of pregnancy.
NOTE: Mortality rate per 1,000 live births by specified birth plurality.

Length of gestation

Length of gestation is the most important factor in the survival and future health of a newborn. Infants born too soon have less chance of survival and a greater risk for long-term health problems and disabilities. The closer an infant is to term (37-41 weeks of gestation) the more likely the infant will survive. Between 2011 and 2015, 67% of all infant deaths were to infants born prematurely (less than 37 weeks gestation). Although the chances of survival increase greatly between 24 and 25 weeks gestation, even an infant born a few weeks prematurely has less of a chance of survival than a full term infant. The IMR for late preterm infants (34-36 weeks gestation) was 6.2, which is 3.2 times greater than the IMR for infants carried to term.



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Table 4:

Percent of Infants Surviving by Weeks of Gestation and Race of Mother: Allegheny County, PA - 2011-2015

Weeks Gestation	Black	White	TOTAL
16	-	-	-
17	-	50.0%	16.7%
18	-	-	-
19	-	-	-
20	-	10.0%	8.7%
21	18.2%	9.1%	14.3%
22	-	-	-
23	31.8%	21.1%	25.5%
24	66.7%	35.1%	50.7%
25	85.2%	75.0%	80.7%
26	81.3%	83.3%	81.1%
27	96.9%	95.7%	95.2%
28	97.3%	93.1%	95.2%
29	98.0%	94.3%	96.3%
30	96.2%	94.7%	95.6%
31	94.1%	97.5%	96.6%
32	95.7%	97.2%	97.0%
33	97.1%	99.0%	98.2%
34	97.8%	99.6%	99.0%
35	99.7%	99.5%	99.6%
36	99.4%	99.5%	99.4%
37	99.5%	99.7%	99.6%
38	99.4%	99.9%	99.8%
39	99.5%	99.9%	99.8%
40	99.8%	99.9%	99.9%
41	100.0%	99.9%	99.9%
42	100.0%	99.7%	99.7%
43+	100.0%	100.0%	100.0%

NOTES: Mortality rate per 1,000 live births at specified weeks gestation and mother's race as specified on the birth certificate.

- represents no occurrences and 0.0% represents a percent less than 0.05%.



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Racial disparities are evident for both preterm and term infant deaths. The black IMR for preterm infants is 2.1 times greater than for white infants. For term infants the IMR for blacks is 2.7 times greater than for whites.

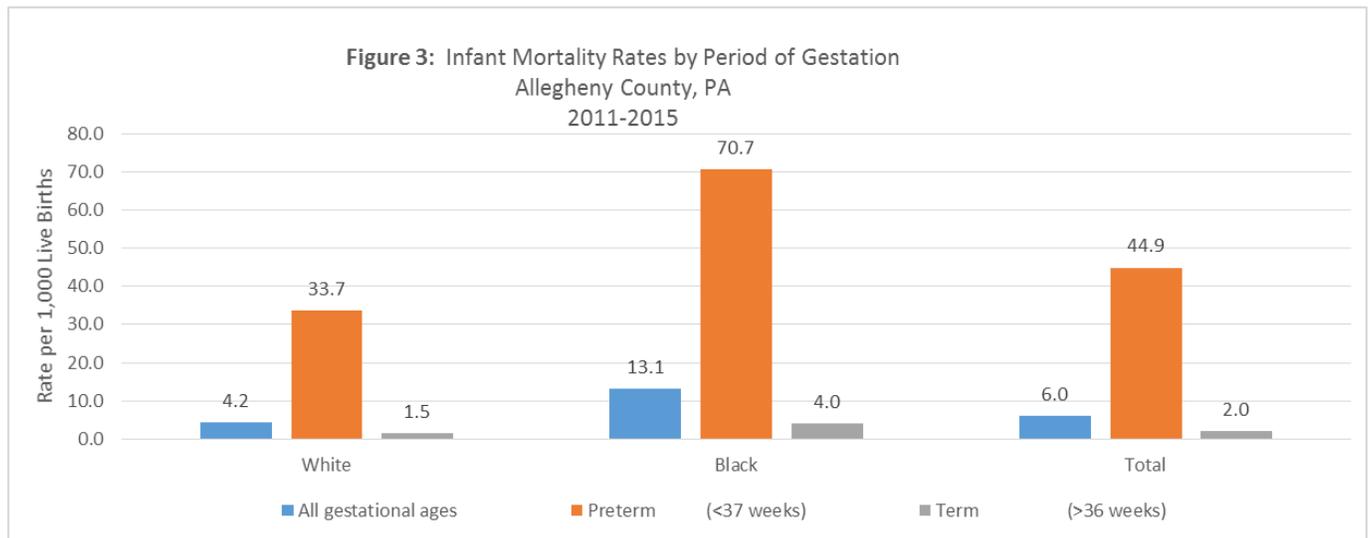
Table 5:

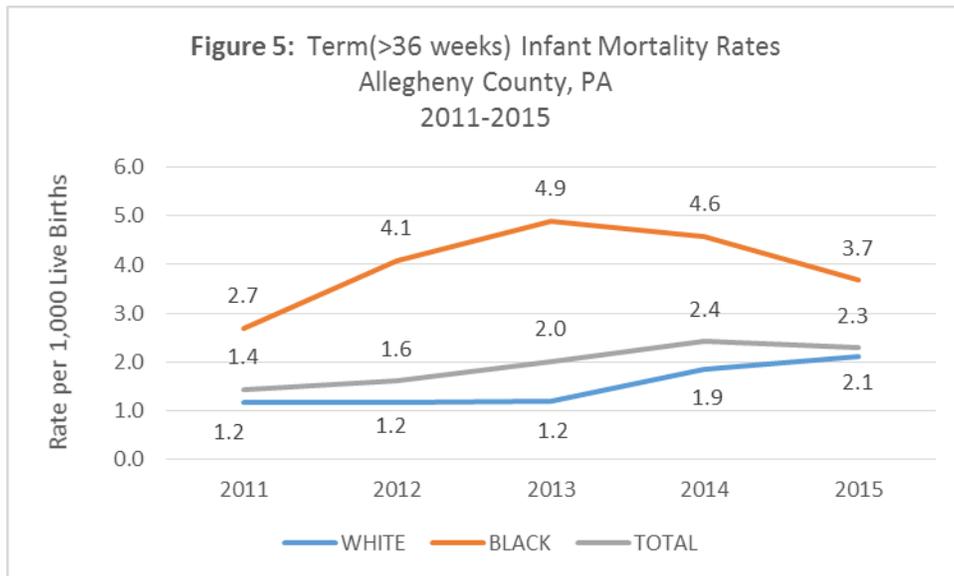
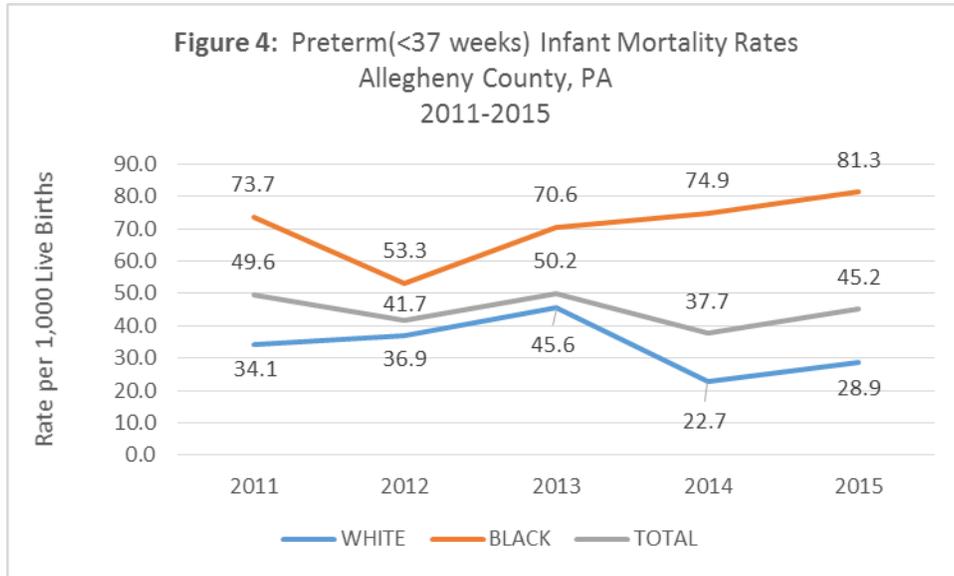
Infant Mortality Rates by Period of Gestation: Allegheny County, PA, 2011-2015

	WHITE			BLACK			TOTAL ¹		
	All gestational ages	Preterm (<37 weeks)	Term (>36 weeks)	All gestational ages	Preterm (<37 weeks)	Term (>36 weeks)	All gestational ages	Preterm (<37 weeks)	Term (>36 weeks)
2011	3.8	34.1	1.2	11.4	73.7	2.7	6.1	49.6	1.4
2012	4.4	36.9	1.2	12.5	53.3	4.1	5.9	41.7	1.6
2013	5.1	45.6	1.2	13.5	70.6	4.9	6.6	50.2	2.0
2014	3.6	22.7	1.9	13.8	74.9	4.6	5.6	37.7	2.4
2015	4.2	28.9	2.1	14.4	81.3	3.7	6.2	45.2	2.3
2011 -2015	4.2	33.7	1.5	13.1	70.7	4.0	6.0	44.9	2.0

¹ Includes all other and unknown race.

NOTE: Mortality rate per 1,000 live births by mother's race in specified period of gestation.





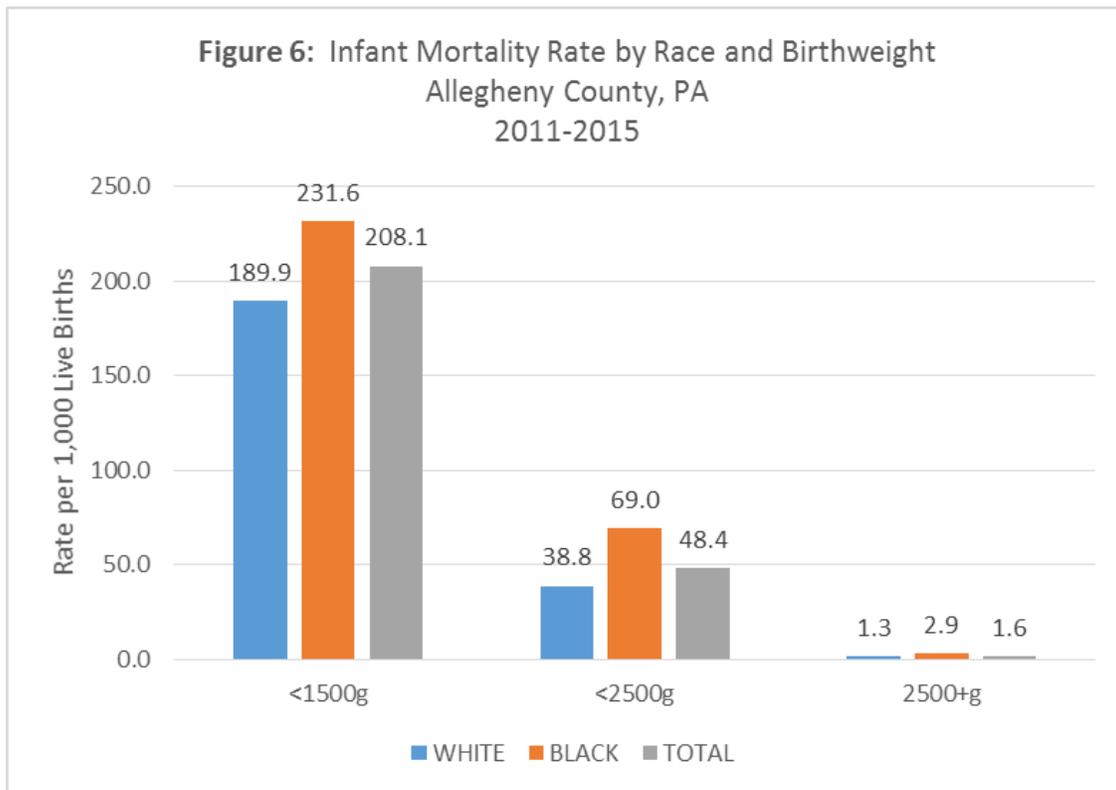
Birthweight

Birthweight is also an important indicator of an infant’s health. Birthweight is closely associated with the length of gestation. Infant mortality rates are highest for very low birthweight infants (<1500 grams). The IMR for very low birthweight infants (208.1) was over 130 times the IMR for normal birthweight infants (1.6). For both blacks and whites, the majority of infant deaths occurred to infants weighing less than 1500 grams.

Table 6:
 Infant Mortality Rates by Birth Weight Category and Race of Mother: Allegheny County, PA - 2011-2015

Birthweight Category	WHITE		BLACK		TOTAL ¹	
	Infant Deaths	Rate	Infant Deaths	Rate	Infant Deaths	Rate
Very Low Birth Weight (<1500 grams)	94	189.9	91	231.6	201	208.1
Low Birth Weight (<2500 grams)	118	38.8	119	69.0	256	48.4
Normal and High Birth Weight (>=2500 grams)	59	1.3	32	2.9	99	1.6

¹ Includes all other and unknown race.
 NOTE: Mortality rate per 1,000 live births in specified birthweight category and mother's race as specified on the birth certificate.





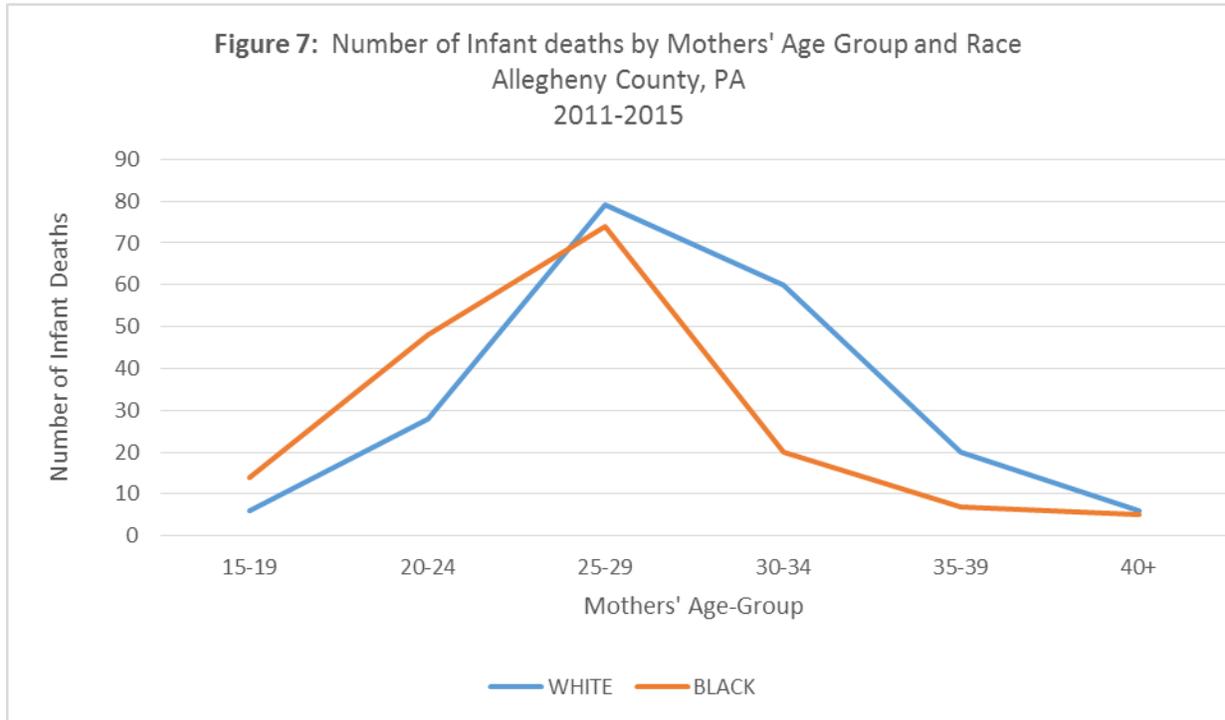
Age of mother

Infant mortality rates vary by the age of the mother. For both blacks and whites the highest IMR was to infants born to mothers between the ages of 25-29. The lowest IMR for both blacks and whites was to infants born to mothers aged 35-39. This differs from past years when the highest infant mortality rates for whites were to infants born to mothers aged 15-19. Previously the highest infant mortality rates for blacks were to infants born to mothers aged 40 and older. Caution should be exercised when making statements about infant deaths among teen mothers and mothers aged 40 and older. Due to the small number of births at each end of the age-spectrum a slight change in the number of infant deaths to mothers can have a large impact on the IMR for these age-groups.

Table 7:
 Infant Mortality Rates by Age and Race of Mother: Allegheny County, PA - 2011-2015

Mothers' Age Group	WHITE		BLACK		TOTAL ¹	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
15-19	6	5.4	14	8.6	21	7.0
20-24	28	5.0	48	11.0	83	7.7
25-29	79	5.8	74	21.2	168	8.9
30-34	60	3.4	20	9.4	87	4.0
35-39	20	2.7	7	7.6	29	3.1
40+	6	4.1	5	22.2	11	5.9
TOTAL	199	4.2	168	13.1	403	6.1

¹ Includes all other and unknown race.
 NOTE: Mortality rate per 1,000 live births by age of mother and mother's race as specified on the birth certificate.



Maternal smoking

There have been many studies linking maternal smoking during pregnancy to poor birth outcomes, lower birth weight, and a higher risk of infant mortality. The data for mothers who smoked 3 months prior to or during their pregnancy is self-reported from the birth certificate and therefore subject to questions of reliability. Studies have shown that self-reported smoking data on the birth certificate is under-reported when compared to medical records.³

Despite the possibility of smoking during pregnancy being under-reported on the birth certificate, the percentage of Allegheny County women who smoked at least 1 cigarette 3 months prior to or during their pregnancy is quite high (15%). For births that resulted in an infant death the percentage of mothers who smoked prior to or during their pregnancy was even greater (24.3%).

Overall, maternal smoking percentages were higher for blacks (19%) than whites (15%). However, for births that resulted in an infant death maternal smoking percentages were higher among whites (29.6%) than blacks (20.2%).



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Table 8:
Percent of Births Where Mother Smoked 3 Months Prior to, or During Pregnancy: Allegheny County, PA - 2011-2015

MOTHER SMOKED	BIRTHS RESULTING IN AN INFANT DEATH			ALL BIRTHS		
	WHITE	BLACK	TOTAL ¹	WHITE	BLACK	TOTAL ¹
During the 3 Months Prior to Pregnancy	29.6%	19.0%	23.3%	14.8%	18.6%	14.8%
During the 1 st Trimester	27.6%	19.6%	22.6%	12.0%	16.6%	12.3%
During the 2 nd Trimester	28.1%	16.1%	21.3%	10.8%	14.8%	11.1%
During the 3 rd Trimester	26.1%	17.9%	20.8%	10.5%	14.6%	10.7%
Yes ²	29.6%	20.2%	24.3%	14.9%	19.0%	15.0%

¹ Includes all other and unknown race.
² Mother smoked 3 months prior to becoming pregnant or during her pregnancy.

The IMR for mothers who smoked 3 months prior to or during their pregnancy is higher for both races. Among whites the IMR for mothers who smoked is 2.5 times greater than for mothers who did not smoke. While the IMR among black mothers who smoked is 1.7 times greater than the rate for whites, the difference in the IMR for black mothers who smoked (14.0) and black mothers who didn't smoke (13.0) is negligible.

Table 9:
Infant Mortality Rate by Maternal Smoking: Allegheny County, PA - 2011-2015

MOTHER SMOKED BEFORE/DURING PREGNANCY	WHITE	BLACK	TOTAL ¹
Yes ²	8.4	14.0	9.9
No	3.4	13.0	5.3

¹ Includes all other and unknown race.
² Mother smoked 3 months prior to becoming pregnant or during her pregnancy.
NOTE: Mortality rate is per 1,000 live births by mother's race as specified on the birth certificate.



Causes of Infant Death

The leading cause of infant death in Allegheny County between 2011 and 2015 was Disorders related to short gestation and low birth weight, not elsewhere classified. The second leading cause of infant death was Sudden unexpected infant deaths (SUID), which is comprised of Sudden infant death syndrome (SIDS), Unknown sudden infant death, and Accidental suffocation and strangulation in bed. The third leading cause of infant death was Congenital malformations, deformations and chromosomal abnormalities. Together these 3 causes accounted for 58.1% of all infant deaths. The IMR for blacks was higher than whites for the five leading causes of death with the exception of Accidents (Table 9)

Table 10:

Infant Mortality Rates for the Five Leading Causes of Death by Race of Mother: Allegheny County, PA - 2011-2015						
Cause of Death (ICD_10 codes)	WHITE		BLACK		TOTAL ¹	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
All causes	199	4.2	168	13.1	403	6.1
Newborn affected by maternal complications of pregnancy (P01)	8	0.2	10	0.8	19	0.3
Disorders related to short gestation and low birthweight, nec (P07)	52	1.1	62	4.8	124	1.9
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	30	0.6	16	1.2	47	0.7
Sudden unexpected infant deaths (R95, R99, W75)	31	0.7	29	2.3	63	1.0
<i>Sudden infant death syndrome (R95)</i>	23	0.5	16	1.2	41	0.6
<i>Unknown cause (R99)</i>	8	0.2	13	1.0	22	0.3
<i>Accidental suffocation and strangulation in bed (W75)</i>	0	0.0	0	0.0	0	0.0
Accidents (unintentional injuries) (V01-X59)	2	0.0	0	0.0	2	0.0

¹ Includes all other and unknown race.

NOTES: Mortality rate is per 1,000 live births by mother's race as specified on the birth certificate.

nec: not elsewhere classified



Geographic Distribution

Tables 11 and 12 rank the Allegheny County municipalities and City of Pittsburgh neighborhoods where there were 5 or more infant deaths between 2011 and 2015. The rankings are based on total IMR. Many of the ranked municipalities and neighborhoods have fewer than 10 infant deaths. Due to these small numbers many of the areas drop in and out of the rankings from year to year. The municipalities that make the list year after year since 2000 are: Pittsburgh City, McKeesport City, McKees Rocks Borough, Wilkinsburg Borough, Penn Hills Township, Monroeville Municipality, Mt. Oliver Borough, and Scott Township. The City of Pittsburgh neighborhoods are much smaller than most municipalities and tend to have greater fluctuations from year to year.

Table 11:			
Infant Mortality Rates by Municipality by Race of Mother: Allegheny County, PA - 2011-2015			
MUNICIPALITY	WHITE RATE	BLACK RATE	TOTAL¹ RATE
MCKEES ROCKS BOROUGH	8.8	35.6	24.4
MILLVALE BOROUGH	16.1	52.6	23.6
MT. OLIVER BOROUGH	31.3	19.4	21.2
MCKEESPORT CITY	17.3	17.9	17.4
NORTH BRADDOCK BOROUGH	0.0	25.0	17.0
HARRISON TOWNSHIP	14.8	-	13.2
STOWE TOWNSHIP	11.7	15.9	12.7
CLAIRTON CITY	4.5	19.1	11.8
WILKINSBURG BOROUGH	-	14.8	11.3
MUNHALL BOROUGH	8.6	9.0	10.0
RICHLAND TOWNSHIP	10.0	-	9.5
PITTSBURGH CITY	4.8	13.0	7.9
MONROEVILLE MUNICIPALITY	4.2	17.8	6.3
PENN HILLS TOWNSHIP	4.4	7.4	5.9
SHALER TOWNSHIP	5.0	-	4.7
SCOTT TOWNSHIP	4.8	-	4.6
MOON TOWNSHIP	3.6	15.9	4.5
ROSS TOWNSHIP	3.2	24.4	3.4
¹ Includes all other and unknown race.			
NOTES: Mortality rate per 1,000 live births by mother's race as specified on the birth certificate. Municipalities are ranked by Total Infant Mortality Rate where there were 5 or more occurrences from 2011-2015..			
- represents no occurrences and 0.0 represents a rate less than 0.05.			



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Table 12:			
Infant Mortality Rates by City of Pittsburgh Neighborhood by Race			
NEIGHBORHOOD¹	WHITE	BLACK	TOTAL¹
	RATE	RATE	RATE
NORTHVIEW HEIGHTS	-	26.2	28.1
HOMEWOOD NORTH	-	15.7	18.5
PERRY SOUTH	14.1	19.4	16.7
EAST HILLS	71.4	13.8	15.7
CARRICK	14.5	19.8	14.0
¹ Includes all other and unknown race.			
NOTES: Mortality rate per 1,000 live births by mother's race as specified on the birth certificate. Neighborhoods are ranked by Total Infant Mortality Rate where there are 5 or more occurrence from 2011-2015.			
- represents no occurrences and 0.0 represents a rate less than 0.05.			



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Summary: Selected characteristics for infant deaths and live births by race of mother: Allegheny County, PA, 2011-2015

Characteristic	Infant Mortality								Live Births			
	Number				Rate				Number			
	White	Black	Asian or Pacific Islander	All Races and Unknown	White	Black	Asian or Pacific Islander	All Races and Unknown	White	Black	Asian or Pacific Islander	All Races and Unknown
Total	199	168	11	403	4.2	13.1	3.0	6.1	46,981	12,808	3,643	66,075
Plurality												
Single Births	163	139	11	332	3.6	11.3	3.1	5.2	45,295	12,340	3,563	63,773
Multiple Births	36	29	0	67	21.4	62.0	0.0	29.1	1,686	468	80	2,302
Period of Gestation												
Extremely Preterm (<28 weeks)	91	93	6	203	443.9	455.9	500.0	456.2	205	204	12	445
Very Preterm (28 to <32 weeks)	16	8	0	24	46.4	38.6	0.0	39.9	345	207	21	602
Moderate to Late PretermTerm (32 to <37 weeks)	23	16	2	44	7.0	12.9	8.8	8.8	3,303	1,245	226	4,991
Full Term (37+ weeks)	64	44	3	116	1.5	4.0	0.9	2.0	42,773	11,022	3,345	59,457
Unknown	5	7	0	16	n.a.	n.a.	n.a.	n.a.	355	130	39	581
Birthweight												
Less than 2500 grams	118	119	5	256	38.8	69.0	16.9	48.4	3,045	1,724	296	5,294
Less than 1500 grams	94	91	5	201	189.9	231.6	156.3	208.1	495	393	32	966
2500 grams and greater	59	32	3	99	1.3	2.9	0.9	1.6	43,780	11,024	3,328	60,501
Unknown	22	17	3	48	n.a.	n.a.	n.a.	n.a.	156	60	19	280
Age of Mother												
Under 20 years	6	14	0	21	5.3	8.4	0.0	6.9	1,124	1,662	26	3,040
20-24 years	28	48	2	83	5.0	11.0	7.1	7.7	5,546	4,373	281	10,835
25-29 years	79	74	4	168	5.8	21.2	3.5	8.9	13,646	3,492	1,138	18,967
30-34 years	60	20	5	87	3.4	9.4	3.4	4.0	17,705	2,131	1,472	21,998
35-39 years	20	7	0	29	2.7	7.6	0.0	3.1	7,471	921	611	9,333
40-54 ¹	6	5	0	11	4.1	22.2	0.0	5.9	1,468	225	114	1,871
Unknown	0	0	0	4	n.a.	n.a.	n.a.	n.a.	21	4	1	31
¹ Includes 5 mothers over the age of 54.												
WIC												
Yes	41	48	7	101	4.7	6.1	11.7	5.6	8,667	7,818	600	18,194
No	149	104	1	266	3.9	21.3	0.3	5.6	37,897	4,872	2,936	47,143
Unknown	9	16	3	36	n.a.	n.a.	n.a.	n.a.	417	118	107	738
Insurance												
Private Insurance	110	45	9	171	3.0	11.7	3.1	3.9	36,071	3,854	2,884	44,078
Medicaid	76	115	1	204	9.6	13.7	1.7	11.4	7,887	8,381	602	17,878
Self Pay	1	2	0	3	4.7	90.9	0.0	10.5	212	22	23	285
Other	1	4	0	6	1.3	15.4	0.0	5.2	741	260	27	1,144
Unknown	11	2	1	19	n.a.	n.a.	n.a.	n.a.	2,070	291	107	2,690
Mother smoked ¹												
Yes	59	34	0	98	8.4	14.0	0.0	9.9	7,019	2,436	22	9,919
No	136	132	11	294	3.4	13.0	3.1	5.3	39,625	10,123	3,590	55,416
Unknown	4	2	0	11	n.a.	n.a.	n.a.	n.a.	337	249	31	740
¹ Mother smoked 3 months prior to becoming pregnant or during her pregnancy.												



Citations

¹World Health Organization. (2017) Global Health data repository (database)

²Mathews TJ, MacDorman MF. Infant mortality statistics from the 2010 period linked birth/infant death data set. National vital statistics reports: vol 62 no 8. Hyattsville, MD: National Center for Health Statistics: 2013.

³Howland, Renata & Mulready-Ward, Candace & M Madsen, Ann & Sackoff, Judith & Nyland-Funke, Michael & M Bombard, Jennifer & Tong, Van. (2015). Reliability of Reported Maternal Smoking: Comparing the Birth Certificate to Maternal Worksheets and Prenatal and Hospital Medical Records, New York City and Vermont, 2009. Maternal and child health journal. 19. . 10.1007/s10995-015-1722-1.