Ohio
Department of Health

2015 Ohio Infant Mortality Data: General Findings

INFANT MORTALITY IN OHIO

Infant mortality is defined as the death of a live-born baby before his or her first birthday. An infant mortality rate is the number of babies who died during the first year of life per 1,000 live births. Ohio's target is to achieve fewer than 6.0 infant deaths per 1,000 live births in every racial and ethnic group, which aligns with the national Healthy People 2020 objective established in 2010.[1] Ohio's All Races Infant Mortality Rate in 2010 was 7.7 infant deaths per 1,000 live births.

In 2015, 1,005 Ohio infants died before their first birthday, compared to 955 in 2014. Ohio's 2015 All Races Infant Mortality Rate was 7.2 deaths per 1,000 live births, compared to 6.8 deaths per 1,000 live births in 2014.

Ohio's Black Infant Mortality Rate in 2015 remains well above the Healthy People 2020 objective, and black infants in Ohio died at nearly three times the rate as white infants. Ohio's White Infant Mortality Rate in 2015 was better than the national Healthy People 2020 objective, and the Hispanic Infant Mortality Rate met the Healthy People 2020 objective.

Ohio's All Races Infant Mortality Rate, White Infant Mortality Rate and Black Infant Mortality Rate all have been trending downward significantly since at least 1990 (Figure 1 on page 2).

Table 1: Ohio Infant Mortality Rate (2013-2015) (Number of Deaths per 1,000 Live Births)

Group	2013	2014	2015
All Races	7.4	6.8	7.2
Race			
White	6.0	5.3	5.5
Black	13.8	14.3	15.1
American Indian	*	*	*
Asian/Pacific Islander	*	*	*
Ethnicity			
Hispanic	8.8	6.2	6.0
Non-Hispanic**	7.3	6.9	7.3

Source: Ohio Department Of Health, Bureau of Vital Statistics.
**Rates based on fewer than 20 infant deaths are unstable and not reported.*
***Non-Hispanic births and deaths include those of unknown ethnicity.*

[1] *Healthy People 2020 is a national collaborative established in 2010 that provides science-based, national objectives for improving the health of Americans. It is managed by the federal Office of Disease Prevention and Health Promotion within the U.S. Department of Health and Human Services.*

Table 2: Ohio Infant Mortality, by Race and Ethnicity (2015)

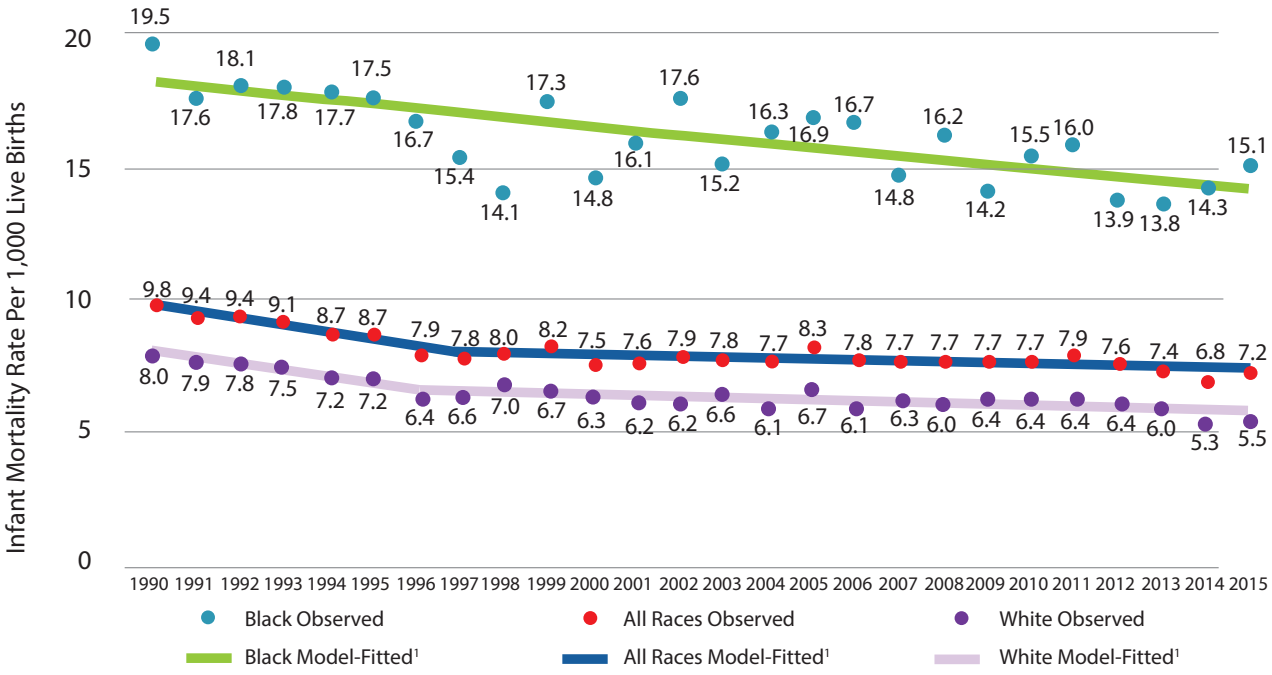
Group	Infant Deaths (Number)	Infant Mortality Rate (Per 1,000 Live Births)
Race		
White	580	5.5
Black	367	15.1
American Indian	2	*
Asian/Pacific Islander	16	*
Unknown	40	8.9
Ethnicity		
Hispanic	42	6.0
Non-Hispanic**	963	7.3
TOTAL (All Races)	1,005***	7.2

** Rates based on fewer than 20 infant deaths are unstable and not reported.*

*** Non-Hispanic births and deaths include those of unknown ethnicity.*

**** Ethnicity is separate from race, and a single infant death may be included in both a race category and an ethnic category. In order to avoid double-counting, only infant deaths by race are included in total deaths.*

Figure 1: Trends in Ohio Infant Mortality Rates, by Race (1990-2015)



Source: Ohio Department Of Health, Bureau Of Vital Statistics.

[1]"Model-Fitted" Definition – Joinpoint software models were used to test the statistical significance of changes in trends using a Monte Carlo permutation method. The same methods were used to assess All Races, Black and White Infant Mortality trends. In all cases, the best fitting line for the observed data is presented.

From 2011 through 2015, Ohio's infant mortality rates for all races, white infants and black infants improved faster than the national rates through 2014 (national 2015 infant mortality rates have not yet been reported).

Table 3: Infant Mortality by Race
Percent Change (Improvement) in Infant Mortality Rate[1]
From 2011 to 2015

	Ohio			National		
	2011	2015	% Change	2011	2014	% Change
All Races	7.9	7.2	**-8.9%**	6.1	5.8	**-4.9%**
White	6.4	5.5	**-14.1%**	5.1	4.9	**-3.9%**
Black	16.0	15.1	**-5.6%**	11.5	11.1	**-3.5%**

Table 4: Neonatal Infant Mortality[2] by Race
Percent Change (Improvement) In Neonatal Infant Mortality Rate
From 2011 to 2015

	Ohio			National		
	2011	2015	% Change	2011	2014	% Change
All Races	5.3	4.8	**-9.4%**	4.1	3.9	**-4.9%**
White	4.2	3.6	**-14.3%**	3.5	3.4	**-2.9%**
Black	11.0	10.4	**-5.5%**	7.5	7.3	**-2.7%**

Table 5: Postneonatal Infant Mortality[3] by Race
Percent Change (Improvement) in Postneonatal Infant Mortality Rate
From 2011 to 2015

	Ohio			National		
	2011	2015	% Change	2011	2014	% Change
All Races	2.6	2.4	**-7.7%**	2.0	1.9	**-5.0%**
White	2.2	1.9	**-13.6%**	1.7	1.6	**-5.9%**
Black	5.0	4.7	**-6.0%**	4.0	3.7	**-7.5%**

Source: Ohio Department Of Health, Bureau of Vital Statistics; Centers for Disease Control and Prevention, Center for Health Statistics.

[1] Infant mortality rate is expressed as the number of infant deaths during the first year of life per 1,000 live births.

[2] Neonatal Death – Death of a live-born infant during the first 27 days of life.

[3] Postneonatal Death – Death of infant aged 28 days through 364 days of life.

Table 6: Ohio Neonatal, Postneonatal and Infant Mortality, by County (2015)

County	Number Neonatal Deaths**	Neonatal IM Rate	Number Postneonatal Deaths***	Postneonatal IM Rate	Total Number Infant Deaths	Overall IM Rate	Number Births****
Ohio	667	4.8	338	2.4	1005	7.2	139,312
Adams	1	*	1	*	2	*	322
Allen	4	*	4	*	8	*	1,272
Ashland	4	*	2	*	6	*	603
Ashtabula	3	*	3	*	6	*	1,146
Athens	1	*	3	*	4	*	491
Auglaize	1	*	1	*	2	*	563
Belmont	5	*	4	*	9	*	692
Brown	1	*	1	*	2	*	501
Butler	24	5.2	9	*	33	7.2	4,604
Carroll	1	*	0	*	1	*	292
Champaign	5	*	3	*	8	*	417
Clark	5	*	1	*	6	*	1,630
Clermont	11	*	5	*	16	*	2,321
Clinton	2	*	2	*	4	*	517
Columbiana	4	*	0	*	4	*	1,106
Coshocton	3	*	1	*	4	*	472
Crawford	1	*	1	*	2	*	494
Cuyahoga	109	7.3	47	3.2	156	10.5	14,843
Darke	5	*	1	*	6	*	578
Defiance	1	*	1	*	2	*	413
Delaware	7	*	0	*	7	*	2,231
Erie	0	*	3	*	3	*	785
Fairfield	3	*	4	*	7	*	1,749
Fayette	1	*	0	*	1	*	365
Franklin	101	5.3	44	2.3	145	7.6	19,064
Fulton	0	*	2	*	2	*	493

Source: Ohio Department Of Health, Bureau Of Vital Statistics.

** Rates based on fewer than 20 infant deaths are unstable and not reported.*

*** Neonatal Death – Death of a live-born infant during the first 27 days of life.*

**** Postneonatal Death – Death of infant aged 28 days through 364 days of life.*

***** Number of births and infant mortality rates for Hamilton, Mahoning and Stark counties have been restated since initial report was released to correct a data error.*

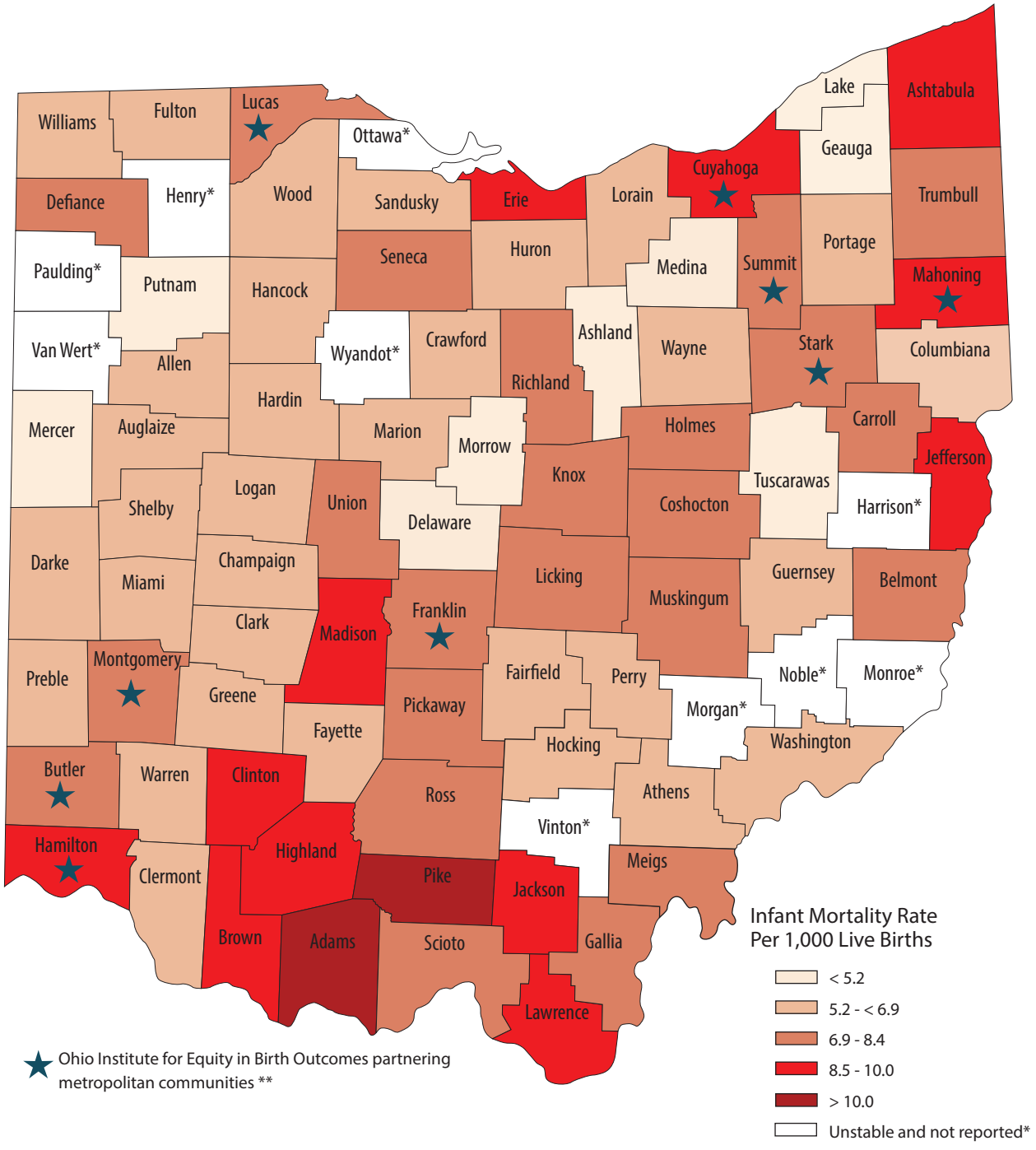
Ohio Neonatal, Postneonatal and Infant Mortality, by County (2015) continued

County	Number Neonatal Deaths	Neonatal IM Rate	Number Postneonatal Deaths	Postneonatal IM Rate	Total Number Infant Deaths	Overall IM Rate	Number Births
Gallia	1	*	1	*	2	*	360
Geauga	2	*	2	*	4	*	891
Greene	9	*	4	*	13	*	1,891
Guernsey	4	*	1	*	5	*	470
Hamilton	70	6.4	30	2.8	100	9.2	10,890
Hancock	6	*	2	*	8	*	917
Hardin	0	*	0	*	0	*	347
Harrison	0	*	1	*	1	*	159
Henry	0	*	0	*	0	*	305
Highland	0	*	2	*	2	*	563
Hocking	4	*	0	*	4	*	325
Holmes	4	*	1	*	5	*	741
Huron	2	*	1	*	3	*	757
Jackson	4	*	0	*	4	*	445
Jefferson	3	*	2	*	5	*	670
Knox	2	*	1	*	3	*	750
Lake	3	*	11	*	14	*	2,342
Lawrence	2	*	3	*	5	*	683
Licking	8	*	4	*	12	*	1,885
Logan	4	*	2	*	6	*	581
Lorain	14	*	6	*	20	5.9	3,402
Lucas	23	4.1	12	*	35	6.3	5,566
Madison	0	*	0	*	0	*	407
Mahoning	16	*	10	*	26	11.0	2,368
Marion	2	*	2	*	4	*	735
Medina	2	*	4	*	6	*	1,724
Meigs	2	*	4	*	6	*	239
Mercer	5	*	1	*	6	*	599
Miami	4	*	1	*	5	*	1,186
Monroe	1	*	1	*	2	*	148
Montgomery	34	5.1	16	*	50	7.5	6,653

Ohio Neonatal, Postneonatal and Infant Mortality, by County (2015) continued

County	Number Neonatal Deaths	Neonatal IM Rate	Number Postneonatal Deaths	Postneonatal IM Rate	Total Number Infant Deaths	Overall IM Rate	Number Births
Morgan	0	*	1	*	1	*	158
Morrow	0	*	1	*	1	*	396
Muskingum	5	*	4	*	9	*	1,026
Noble	1	*	0	*	1	*	139
Ottawa	0	*	1	*	1	*	358
Paulding	1	*	1	*	2	*	223
Perry	1	*	0	*	1	*	444
Pickaway	4	*	3	*	7	*	629
Pike	1	*	1	*	2	*	354
Portage	7	*	2	*	9	*	1,400
Preble	4	*	1	*	5	*	434
Putnam	0	*	1	*	1	*	420
Richland	7	*	3	*	10	*	1,451
Ross	4	*	3	*	7	*	847
Sandusky	6	*	1	*	7	*	696
Scioto	1	*	1	*	2	*	884
Seneca	1	*	2	*	3	*	595
Shelby	2	*	0	*	2	*	611
Stark	15	*	5	*	20	4.8	4,204
Summit	29	4.8	16	*	45	7.4	6,054
Trumbull	12	*	8	*	20	9.6	2,079
Tuscarawas	2	*	0	*	2	*	1,184
Union	4	*	2	*	6	*	659
Van Wert	4	*	0	*	4	*	311
Vinton	0	*	1	*	1	*	159
Warren	5	*	2	*	7	*	2,354
Washington	1	*	1	*	2	*	617
Wayne	12	*	5	*	17	*	1,596
Williams	1	*	1	*	2	*	431
Wood	2	*	3	*	5	*	1,376
Wyandot	0	*	0	*	0	*	245
Unknown	1	*	0	*	1	*	15

Figure 2: Ohio Infant Mortality Average 10-Year Rate, by County (2006-2015)



Source: Ohio Department of Health, Bureau of Vital Statistics.

** Rates based on fewer than 20 infant deaths are unstable and not reported.*

*** Ohio Institute for Equity in Birth Outcomes partnering communities seek to improve overall birth outcomes and reduce racial and ethnic disparities in infant mortality.*

Ohio Overall Infant Mortality Rate 2006-2015: 7.5 infant deaths per 1,000 live births.

Healthy People 2020 Objective: 6.0 infant deaths per 1,000 live births.

Table 7: Ohio 10-Year Average Annual Infant Mortality Rate, by County (2006-2015)

Area	Total Births	Total Deaths	Infant Mortality Rate
Ohio	1,427,658	10,763	7.5
Adams	3,560	37	10.4
Allen	13,349	91	6.8
Ashland	6,401	31	4.8
Ashtabula	11,744	100	8.5
Athens	5,524	37	6.7
Auglaize	5,717	30	5.2
Belmont	7,090	49	6.9
Brown	5,241	49	9.3
Butler	47,552	366	7.7
Carroll	2,997	22	7.3
Champaign	4,425	29	6.6
Clark	16,894	105	6.2
Clermont	25,012	164	6.6
Clinton	5,308	45	8.5
Columbiana	11,426	64	5.6
Coshocton	4,483	31	6.9
Crawford	4,880	31	6.4
Cuyahoga	154,648	1,454	9.4
Darke	6,454	39	6.0
Defiance	4,673	34	7.3
Delaware	22,271	98	4.4
Erie	8,025	69	8.6
Fairfield	16,966	92	5.4
Fayette	3,752	24	6.4
Franklin	184,240	1,552	8.4
Fulton	5,124	31	6.0
Gallia	3,937	33	8.4
Geauga	9,266	43	4.6
Greene	17,930	105	5.9
Guernsey	4,740	28	5.9
Hamilton	112,519	1,110	9.9
Hancock	9,283	61	6.6
Hardin	3,862	22	5.7
Harrison	1,678	13	*
Henry	3,401	15	*
Highland	5,587	48	8.6
Hocking	3,306	20	6.0
Holmes	8,029	55	6.9
Huron	7,761	50	6.4
Jackson	4,307	39	9.1
Jefferson	6,834	58	8.5
Knox	7,339	55	7.5
Lake	23,700	108	4.6
Lawrence	7,350	69	9.4

Area	Total Births	Total Deaths	Infant Mortality Rate
Licking	19,961	138	6.9
Logan	5,805	39	6.7
Lorain	34,684	231	6.7
Lucas	59,232	461	7.8
Madison	4,534	40	8.8
Mahoning	24,708	219	8.9
Marion	7,854	50	6.4
Medina	18,250	75	4.1
Meigs	2,533	20	7.9
Mercer	5,545	23	4.1
Miami	11,949	64	5.4
Monroe	1,540	10	*
Montgomery	68,816	531	7.7
Morgan	1,528	6	*
Morrow	4,024	20	5.0
Muskingum	10,591	74	7.0
Noble	1,490	6	*
Ottawa	3,741	19	*
Paulding	2,352	17	*
Perry	4,447	24	5.4
Pickaway	6,132	44	7.2
Pike	3,654	39	10.7
Portage	15,103	93	6.2
Preble	4,643	24	5.2
Putnam	4,730	24	5.1
Richland	14,732	102	6.9
Ross	8,818	63	7.1
Sandusky	7,212	41	5.7
Scioto	9,326	69	7.4
Seneca	6,319	48	7.6
Shelby	6,527	41	6.3
Stark	42,696	328	7.7
Summit	62,734	457	7.3
Trumbull	22,085	178	8.1
Tuscarawas	11,395	58	5.1
Union	6,392	45	7.0
Van Wert	3,463	18	*
Vinton	1,568	15	*
Warren	25,235	151	6.0
Washington	6,295	36	5.7
Wayne	15,558	94	6.0
Williams	4,393	24	5.5
Wood	13,680	81	5.9
Wyandot	2,687	15	*

Source: Ohio Department Of Health, Bureau Of Vital Statistics.

** Rates based on fewer than 20 infant deaths are unstable and not reported. Total births includes 112 unknown county.*

Table 8: Ohio Neonatal, Postneonatal, and All Races Infant Mortality, by Race (2006-2015)

Group	Year	Number Neonatal Deaths*	Neonatal IM Rate	Number Postneonatal Deaths**	Postneonatal IM Rate	Total Number Infant Deaths	Overall Infant Mortality Rate	Number Births
WHITE	2006	489	4.0	249	2.0	738	6.1	121,465
	2007	512	4.2	257	2.1	769	6.3	121,267
	2008	460	3.9	253	2.1	713	6.0	118,901
	2009	494	4.3	244	2.1	738	6.4	115,328
	2010	482	4.5	206	1.9	688	6.4	107,189
	2011	439	4.2	233	2.2	672	6.4	104,906
	2012	469	4.4	206	1.9	675	6.4	106,004
	2013	446	4.3	184	1.8	630	6.0	104,938
	2014	406	3.8	162	1.5	568	5.3	106,369
	2015	379	3.6	201	1.9	580	5.5	106,028
BLACK	2006	292	11.5	133	5.2	425	16.7	25,494
	2007	261	10.1	123	4.7	384	14.8	25,959
	2008	290	11.1	134	5.1	424	16.2	26,131
	2009	251	9.9	111	4.4	362	14.2	25,433
	2010	231	9.8	132	5.6	363	15.5	23,469
	2011	256	11.0	115	5.0	371	16.0	23,252
	2012	220	9.3	110	4.6	330	13.9	23,696
	2013	244	10.1	90	3.7	334	13.8	24,158
	2014	252	10.4	92	3.8	344	14.3	24,132
	2015	252	10.4	115	4.7	367	15.1	24,288
ALL RACES	2006	783	5.2	384	2.6	1,167	7.8	150,510
	2007	781	5.2	382	2.5	1,163	7.7	150,784
	2008	755	5.1	389	2.6	1,143	7.7	148,592
	2009	750	5.2	359	2.5	1,109	7.7	144,569
	2010	725	5.2	343	2.5	1,068	7.7	139,034
	2011	724	5.3	362	2.6	1,086	7.9	138,024
	2012	720	5.2	327	2.4	1,047	7.6	138,284
	2013	729	5.2	295	2.1	1,024	7.4	139,035
	2014	692	5.0	263	1.9	955	6.8	139,518
	2015	667	4.8	338	2.4	1,005	7.2	139,312

Source: Ohio Department Of Health, Bureau Of Vital Statistics.

**Neonatal Death – Death of a live-born infant during the first 27 days of life.*

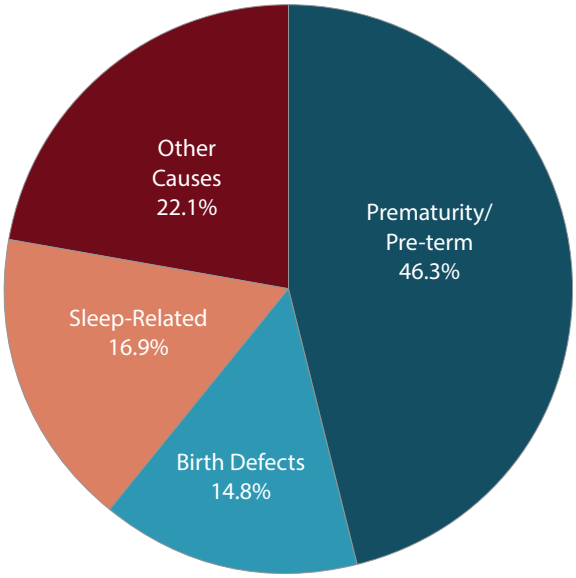
*** Postneonatal Death – Death of infant aged 28 days through 364 days of life*

The majority of infant deaths were neonatal deaths while fewer than one-third were postneonatal deaths.

APPENDIX A
Causes of Death as Identified through Child Fatality Review

Causes of death in Ohio illustrated below were identified through in-depth Child Fatality Reviews of infant deaths. Ohio law requires every county to review the deaths of children. These data are the outcome of thoughtful inquiry and discussion by a multi-disciplinary group of local experts who consider all circumstances surrounding the death of each child. The cause of death identified through this process may not match the death certificate.

Ohio Infant Mortality by Leading Causes Identified by Child Fatality Review (2015)



The leading causes of infant deaths in Ohio have not changed meaningfully from 2009-2015. Some risk factors, such as smoking, may have contributed to more than one of the above factors. It is estimated that 23-34 percent of deaths due to Sudden Infant Death Syndrome, and 5-7 percent of preterm related infant deaths in the U.S., are attributable to smoking during pregnancy.[1]

Number of Deaths by Cause as Identified by Child Fatality Review (2012-2015)				
Cause	Year			
	2012	2013	2014	2015
Prematurity	469	457	445	411
Other Causes	220	244	195	196
Sleep-Related	173	148	118	150
Birth Defects	144	136	134	131

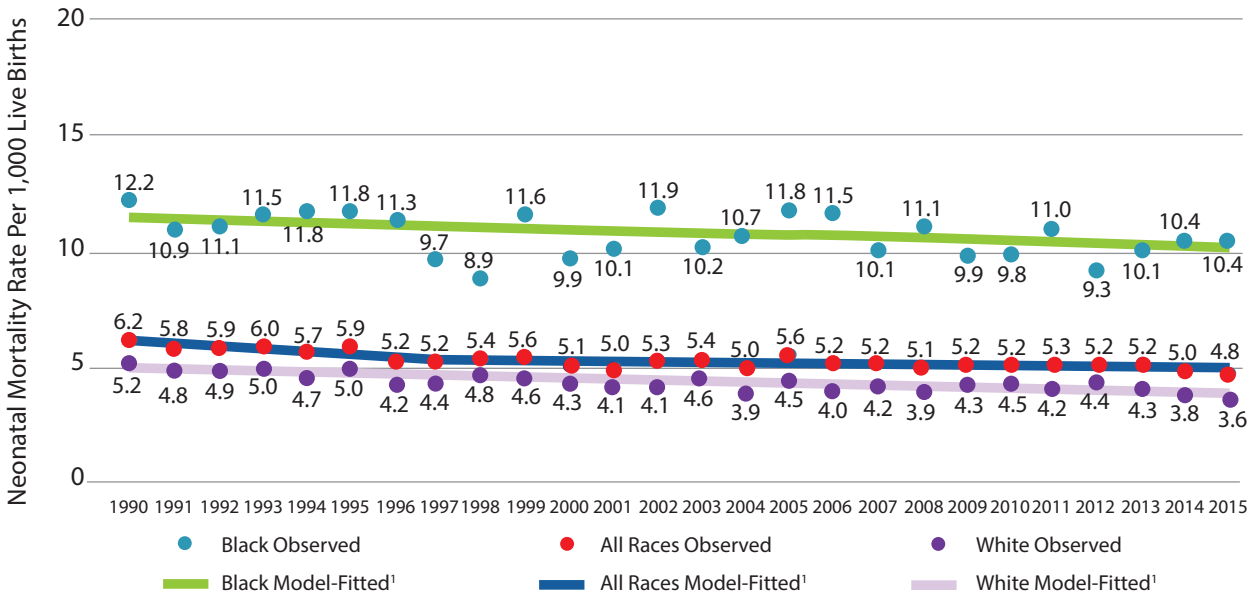
[1] *Dietz PM, England LJ, Shapiro-Mendoza CK, Tong VT, Farr SL, Callaghan WM. Infant morbidity and mortality attributable to prenatal smoking in the U.S. Am J Prev Med 2010*

Neonatal Infant Mortality Rate Trends (1990-2015)

Neonatal infant mortality is defined as the death of a live-born infant during the first 27 days of life. Ohio's neonatal infant mortality rate was 6.2 deaths per 1,000 live births in 1990; 5.1 deaths per 1,000 live births in 2000; 5.2 deaths per 1,000 live births in 2010; and 4.8 deaths per 1,000 live births in 2015.

There was a downward trend in neonatal infant mortality in Ohio throughout the course of this 25-year period. This downward trend has been similar for both white infant mortality and black infant mortality.

Figure 3: Trends in Ohio Neonatal Mortality, by Race (1990-2015)



Source: Ohio Department Of Health, Bureau Of Vital Statistics.

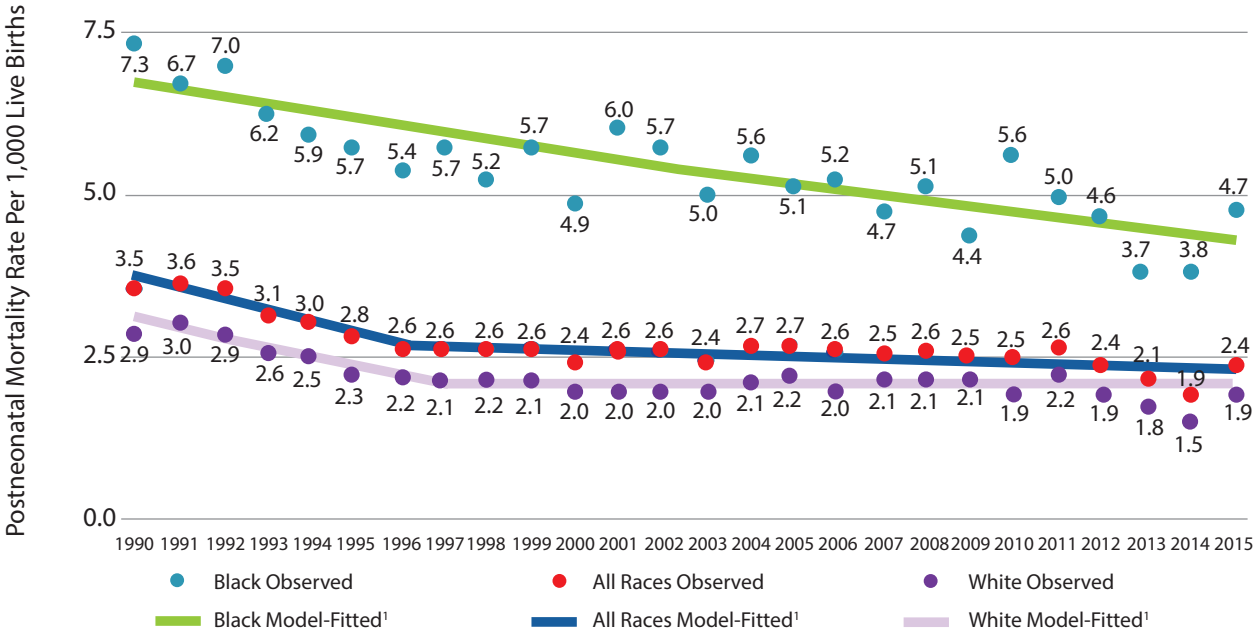
[1] "Model-Fitted" Definition – Joinpoint software models were used to test the statistical significance of changes in trends using a Monte Carlo permutation method. For each group the best fitting trend lines are presented. A change in trend was observed for all races infant mortality in 1997. No change in trend was detected for black infant mortality or white infant mortality.

Postneonatal Infant Mortality Rate Trends (1990-2015)

Postneonatal infant mortality is defined as the death of an infant between 28 days and 364 days of life. Ohio's postneonatal mortality rate was 3.5 deaths per 1,000 live births in 1990; 2.4 deaths per 1,000 live births in 2000; 2.5 deaths per 1,000 live births in 2010; and 2.4 deaths per 1,000 live births in 2015.

There was a downward trend in postneonatal infant mortality in Ohio throughout the course of this 25-year period. Postneonatal infant mortality for white infants and black infants differed significantly during this timeframe. Among white infants, postneonatal infant mortality decreased throughout the 25-year period, but more slowly after 1997 than from 1990 to 1996. Among black infants, however, an ongoing significant decrease in postneonatal infant mortality occurred throughout the entire period from 1990 through 2015.

Figure 4: Trends in Ohio Postneonatal Mortality, by Race (1990-2015)



Source: Ohio Department Of Health, Bureau Of Vital Statistics.

[1] "Model-Fitted" Definition – Joinpoint software models were used to test the statistical significance of changes in trends using a Monte Carlo permutation method. For each group the best fitting trend lines are presented. A change in trend was observed for all races infant mortality in 1996 and for white mortality in 1997. No change in trend was detected for black infant mortality.