

# Racial Disparities in Infant Mortality in West Virginia



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WEST VIRGINIA  
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**Resources**



*Bureau for Public Health  
Office of Epidemiology & Health Promotion  
HEALTH STATISTICS CENTER  
350 Capitol Street, Room 165  
Charleston, WV 25301*

*Joe Manchin III, Governor  
Martha Yeager Walker, Secretary*





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## **In West Virginia**

**Joe Manchin III**  
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West Virginia Bureau for Public Health

Chris Curtis, MPH  
Acting Commissioner

Catherine Slem, MD, MPH  
Acting Medical Officer

Joe Barker, MPA  
Director, Office of Epidemiology and Health Promotion

Daniel M. Christy, MPA  
Director, Health Statistics Center

Report Written By

Eugenia Thoenen

Health Statistics Center

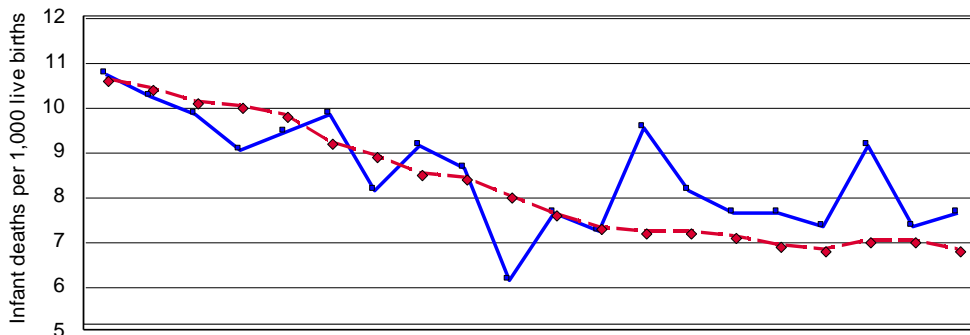
James C. Doria  
Program Manager, Statistical Services Unit  
Thomas N. Leonard, MS, Programmer/Analyst  
Tom Light, Programmer

# Racial Disparities in Infant Mortality In West Virginia

One of the key indicators of a population's health is its infant mortality rate (IMR), i.e., the number of deaths of infants in the first 12 months of life per every 1,000 live births. The IMR is indicative of a society's overall health, as well as maternal health and access to and quality of care for pregnant women and their children.

The IMR has seen an overall decrease in West Virginia and the United States during the past two decades, as shown in the graph below. While the state's rate has experienced more fluctuations between 1985 and 2004 than the national rate, there has been an average annual decline of 1.6% in both.

Figure 1. Infant Mortality Rates  
West Virginia and United States, 1985-2004



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
■ WV	10.7	10.2	9.8	9	9.4	9.8	8.1	9.1	8.6	6.1	7.6	7.2	9.5	8.1	7.6	7.6	7.3	9.1	7.3	7.6
◆ US	10.6	10.4	10	10	9.8	9.2	8.8	8.5	8.4	8	7.6	7.3	7.2	7.2	7.1	6.8	6.8	7	7	6.8

Despite the decrease in the IMR over time, a significant disparity between African American and white infants has remained, with African American infants dying at a consistently higher rate than white infants in both the state and the nation. This report addresses the infant mortality problem in West Virginia, in particular what has been termed the black-white gap in infant deaths (1). Two different data sets provided by the West Virginia Health Statistics Center have been used in the analysis, death certificate data from 1985-2004 and aggregated 1995-2004 data from the state's linked birth/infant death file. Race is defined in this report as that of the mother.

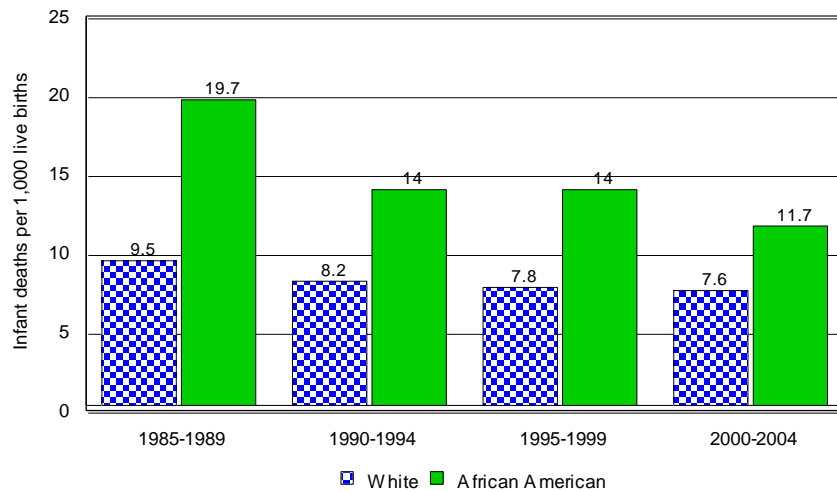
## Overall IMR by Race of Mother

In 2004, the most recent data available at the time of this analysis, the overall IMR in West Virginia was 7.6 deaths per 1,000 births; the national IMR was 6.8. The IMR among infants born to white mothers in West Virginia was 7.5, compared with 5.6 in the nation; the IMR among infants born to African American mothers in the state was 10.6, compared with 13.6 in the United States as a whole (2).

Using 2001-2003 linked birth/infant death files, the National Center for Health Statistics (NCHS) calculated IMRs by mother's race for the 50 states and the District of Columbia, allowing state-by-state comparisons (3). For those years combined, West Virginia ranked 14<sup>th</sup> in overall IMR at 7.9, compared with a national rate of 6.9. However, the state was **first** among the 50 states and the District of Columbia in IMR among infants born to white mothers with a rate of 7.7; the U.S. rate was 5.7. West Virginia's rate of infant mortality among infants born to African American mothers was 12.8, ranking the state 39<sup>th</sup> and lower than the national rate of 13.5.

While infant mortality has declined among both white and African American infants, Figure 2 below illustrates how the black-white gap has persisted, though narrowing over time. Using five-year aggregates of data between 1985 and 2004, the rates among infants of white mothers have decreased from 9.5 in 1985-1989 to 7.6 in 2000-2004, a decrease of 20.0%. Among infants of African American mothers, the rate decreased from 19.7 to 11.7, a 40.6% decline over the two decades.

Figure 2. Infant Mortality Rates by Race of Mother  
West Virginia, 1985-2004



## Leading Causes of Infant Mortality

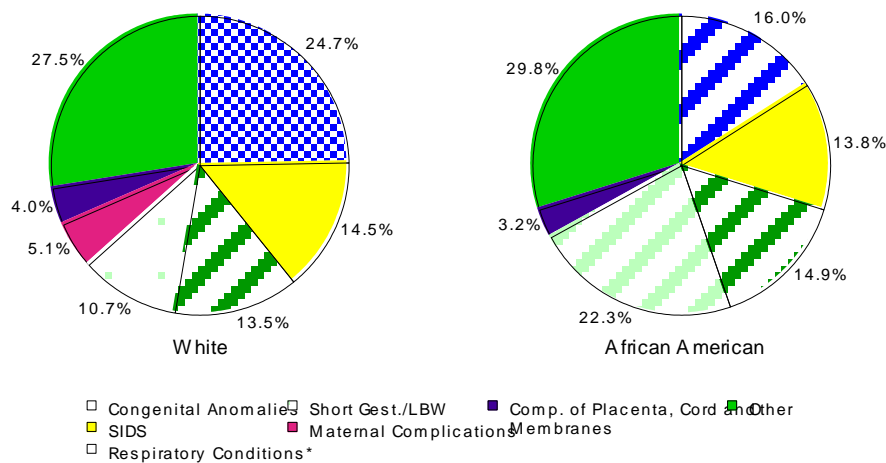
Leading causes of death were examined using linked birth/infant death data from 1995-2004. The four leading causes of overall infant mortality in West Virginia were congenital anomalies, sudden infant death syndrome (SIDS), respiratory conditions of the

newborn, and disorders related to short gestation and low birthweight. Together, these causes accounted for two-thirds (66.4%) of all infant deaths during the time period. Maternal complications of pregnancy and complications of placenta, cord and membranes resulted in an additional 4.8% of infant deaths in the state. While infants born to white mothers were more likely to die from congenital anomalies than any other cause, short gestation and low birthweight was the leading cause of death among infants born to African American mothers (Figure 3).

Seven Leading Causes of Infant Mortality by Race of Mother West Virginia, 1995-2004						
Cause of Death (ICD-10)	Total		White		African American	
	Rate*	Rank	Rate*	Rank	Rate*	Rank
All causes	7.9		7.7		12.9	
Congenital anomalies, deformations and chromosomal abnormalities (Q00-Q99)	191.3	1	190.4	1	205.4	2
Sudden infant death syndrome (R95)	113.0	2	111.5	2	178.0	4
Respiratory distress syndrome and other respiratory conditions of newborn (P22-P29)	106.1	3	107.5	3	191.7	3
Disorders related to short gestation and low birthweight, NEC (PO7)	88.9	4	82.4	4	287.6	1
Newborn affected by maternal complications of pregnancy (PO1)	37.5	5	39.2	5	0.0	N/A
Newborn affected by complications of placenta, cord and membranes (PO2)	31.2	6	30.6	6	41.1	5
Injury, events of undetermined intent	25.0	7	24.6	7	41.1	5

\*Rates for all causes are deaths per 1,000 live births; rates for individual causes are deaths per 100,000 live births.

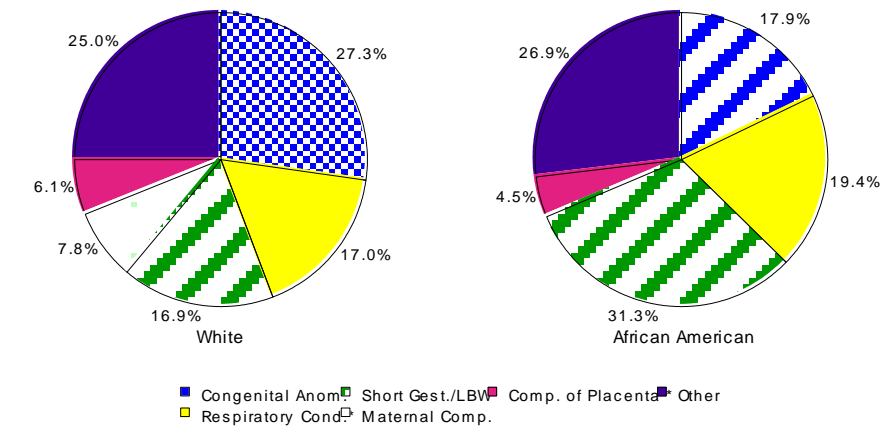
Figure 3. Leading Causes of Infant Death by Race of Mother  
West Virginia, 1995-2004



\*Includes respiratory distress syndrome and other respiratory conditions

**Leading Causes of Neonatal Mortality.** Neonatal deaths accounted for 65.7% of all deaths among infants born to white mothers and 71.3% among infants born to African American mothers. The marked difference by race in the leading causes of death among neonates (infants under the age of 28 days) is illustrated in Figure 4. While fewer than one in five neonates born to white mothers (16.9%) died due to disorders relating to short gestation and low birthweight, it was the leading cause of mortality among neonates born to African American mothers, responsible for almost one-third (31.3%) of their deaths. Over one-fourth of neonates born to white mothers (27.3%) died from congenital anomalies, the cause of death for only 17.9% of neonates born to African American mothers.

Figure 4. Leading Causes of Neonatal Mortality by Race of Mother  
West Virginia, 1995-2004

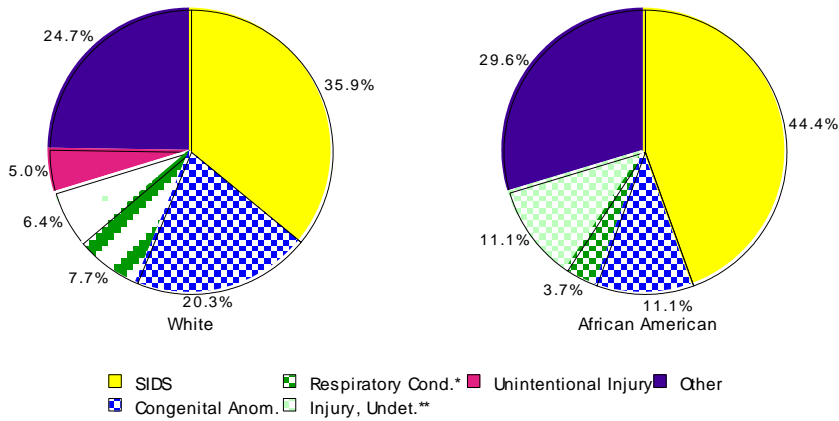


\*Respiratory distress syndrome and other respiratory conditions  
\*\*Complications of placenta, cord and membranes

**Leading Causes of Postneonatal Mortality.** Postneonatal infants (those aged 28 days through 12 months) born to African American mothers were more likely to die from SIDS from 1995-2004 than from any other cause. Over forty-four percent (44.4%) of those postneonates died from SIDS over the decade, compared with 35.9% of postneonates born to white mothers. One in five postneonatal infants of white mothers (20.3%) died from congenital anomalies, compared with only 11.1% of those born to African American mothers. These differences are shown in Figure 5 on the following page.



Figure 5. Leading Causes of Postneonatal Mortality by Race of Mother  
West Virginia, 1995-2004

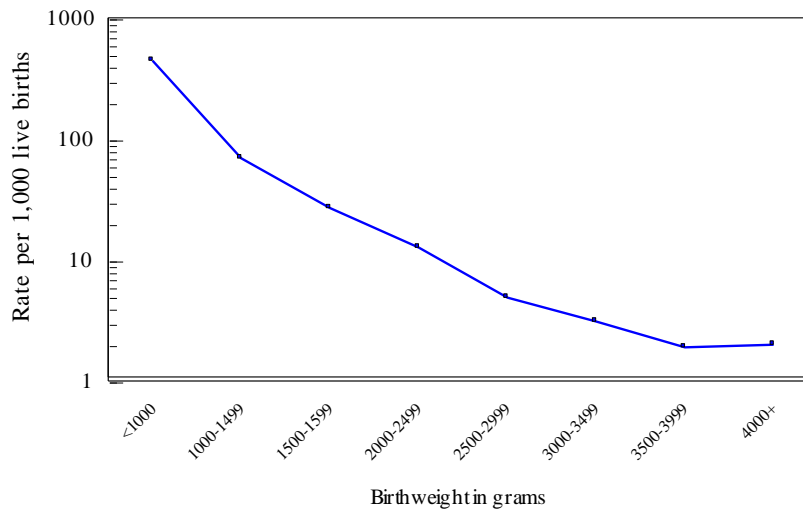


\*Respiratory distress syndrome and other respiratory conditions  
\*\*Injury, undetermined if unintentional or assault

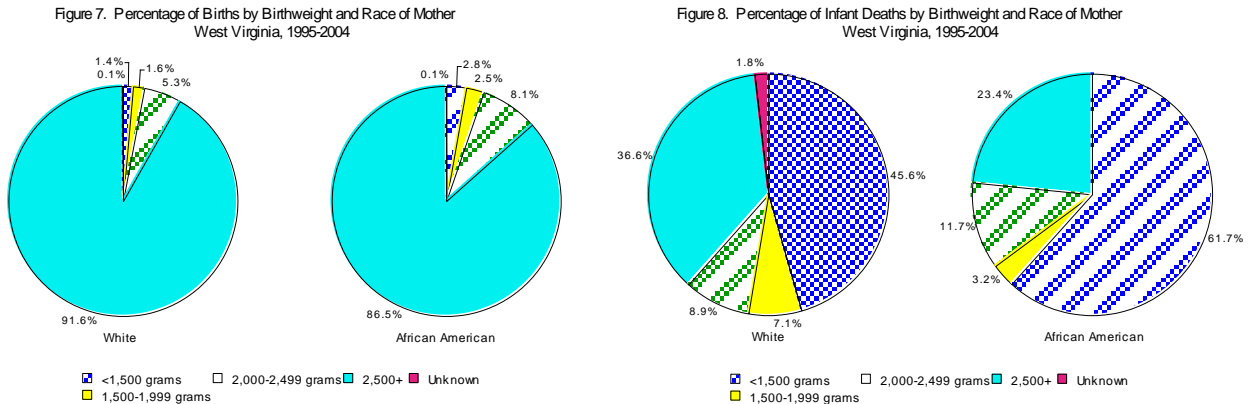
### Birthweight and Gestational Age

Birthweight and gestational age are the two most significant predictors of an infant's survival. Infants who are born too soon and/or too small are at greater risk of death (or disability) than are those born at normal weights (more than 2,500 grams) and gestational age (37+ weeks). Figure 6 uses a logarithmic scale to illustrate the relationship of overall IMR with eight birthweight categories using data from 2000-2004. As shown, IMRs are exponentially higher among infants with the lowest birthweights, decreasing dramatically as birthweight increases, up to 4,000 grams. This scale best illustrates the fact that an infant's chances of survival increase substantially with increased birthweight.

Figure 6. Birthweight-Specific Infant Mortality Rates  
West Virginia, 2000-2004



Regardless of maternal race, low birthweight (LBW) births account for an overall small percentage of births but a large percentage of infant deaths, as illustrated in Figures 7 and 8. African American women are more likely than white women to give birth to a LBW infant, 13.4% and 8.3% of births, respectively. Seventy-seven percent (76.6%) of infants who died who were born to African American mothers were low birthweight, compared with 63.4% of infants of white mothers.



The table below compares state and national IMRs by birthweight and race using the West Virginia linked 1995-2004 birth/infant death file and the U.S. linked 2000 file, the approximate midpoint of the state database (4). The state's total IMRs were higher than the corresponding national rates for all birthweight categories, as were the mortality rates of infants of white mothers; IMRs among infants born to African American mothers were higher in the state than in the nation for infants born weighing less than 1,500 grams (very low birthweight, or VLBW) and 2,000-2,400 grams. In West Virginia, the IMRs among VLBW infants born to both white and African American mothers were approximately 80 times higher than the IMRs among infants of either race of normal birthweight.

Infant Mortality Rates* by Birthweight and Race West Virginia, 1995-2004** and United States, 2000**						
Birthweight	Total		White		African American	
	WV	US	WV	US	WV	US
<1,500 grams	249.7	244.3	247.1	232.7	281.6	266.9
1,500-1,999 grams	33.0	28.3	34.2	28.4	16.4	27.9
2,000-2,499 grams	13.3	11.7	13.1	12.0	18.5	11.7
2,500+ grams	3.1	2.5	3.1	2.2	3.5	3.9

\*Deaths per 1,000 live births. \*\*Linked birth/infant death files

African American mothers in West Virginia are also more likely to give birth to a preterm infant than white mothers, as shown in Figure 9. Between 1995 and 2004, fifteen percent (14.7%) of infants of African American mothers were born before 37 weeks of gestation, compared with 11.8% of infants of white mothers. Over seventy percent (71.3%) of deaths of infants born to African American mothers occurred among preterm

infants; 64.0% of mortality among infants born to white mothers involved preterm infants (Figure 10).

Figure 9. Percentage of Births by Gestational Age and Race of Mother West Virginia, 1995-2004

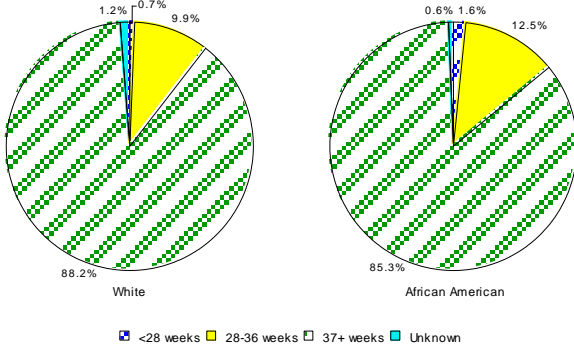
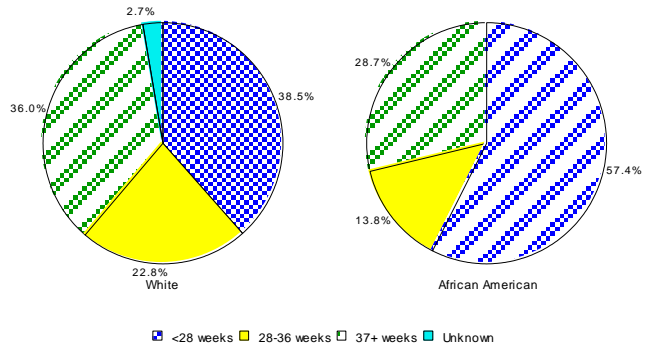


Figure 10. Percentage of Infant Deaths by Gestational Age and Race of Mother West Virginia, 1995-2004



Comparisons with U.S. data are presented in the table below, using the gestational period categories used by NCHS in its analysis of the 2000-period linked birth/infant death data set. IMRs were higher in West Virginia than in the nation for every period of gestation studied. Among state infant deaths, mortality rates were 60 to 70 times higher for infants of African American and white mothers, respectively, who were born at less than 32 weeks gestation than for those born at 37-41 weeks gestation

Infant Mortality Rates* by Gestational Age and Race West Virginia, 1995-2004** and United States, 2000**						
Gestational Age	Total		White		African American	
	WV	US	WV	US	WV	US
<32 weeks	220.8	180.9	218.6	170.2	250.0	203.7
32-36 weeks	13.1	9.4	13.1	8.9	13.7	11.2
37-41 weeks	3.1	2.6	3.1	2.4	4.2	4.1
42+ weeks	6.1	2.9	5.8	2.5	***	4.8

\*Deaths per 1,000 live births. \*\*Linked birth/infant death files. \*\*\*Fewer than 3 deaths

### **Prenatal Care**

From 1995-2004, the rate of infant mortality among mothers who began prenatal care during the first trimester was 6.7 deaths per 1,000 live births, 6.6 among infants born to white mothers and 12.6 among infants born to African American mothers. Comparable national rates from 2000 were 5.1 among infants of white mothers and 12.2 among infants born to African American mothers.

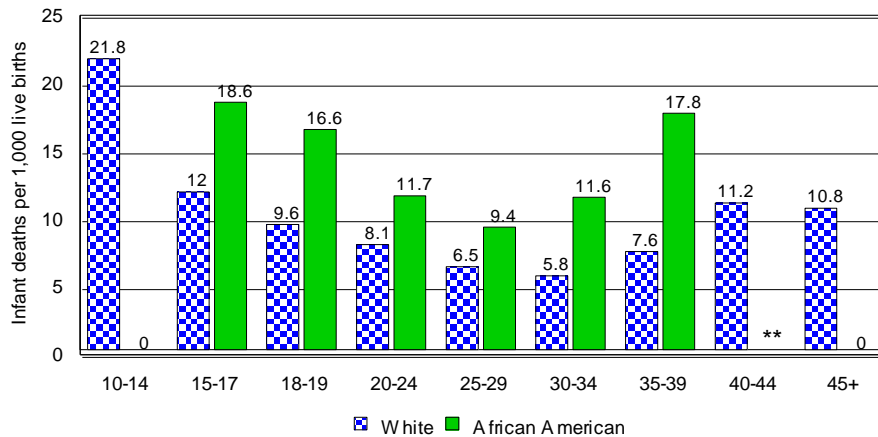
Infant Mortality Rates* by Prenatal Care and Race West Virginia, 1995-2004** and United States, 2000**						
Trimester Care Began	Total		White		African American	
	WV	US	WV	US	WV	US
1 <sup>st</sup>	6.7	6.1	6.6	5.1	12.6	12.2
2 <sup>nd</sup>	8.8	7.2	8.8	6.2	9.4	11.0
3 <sup>rd</sup>	9.3	6.1	9.5	5.4	***	8.3
No care	43.4	33.8	41.5	25.7	63.1	50.0

\*Deaths per 1,000 live births. \*\*Linked birth/infant death files. \*\*\*Fewer than 3 deaths

### Maternal Characteristics

Selected maternal characteristics including age, educational attainment, marital status, and smoking status were examined using the 1995-2004 linked data set. Infant deaths were found to decrease with maternal age until ages 35-39 for both white and African American mothers, after which an increase was noted, as illustrated in Figure 11 below. The lowest IMRs by race were found among infants of white mothers aged 30-34 (5.8 deaths per 1,000 live births) and African American mothers aged 25-29 (9.4).

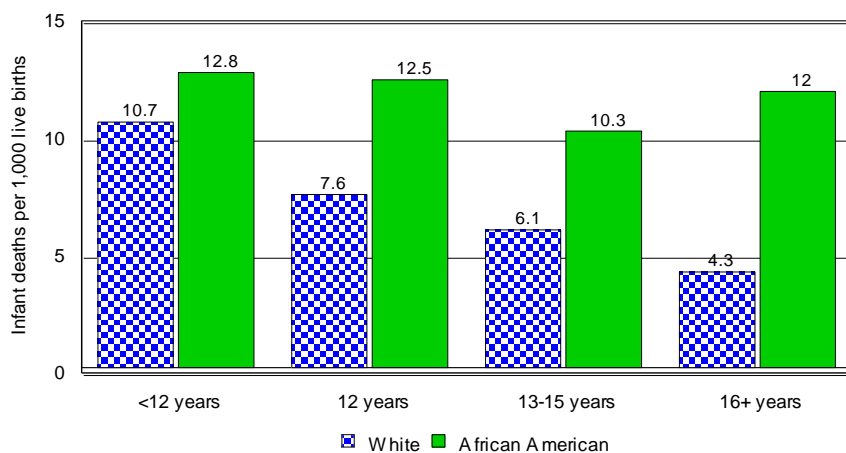
Figure 11. Infant Mortality Rates by Maternal Age and Race of Mother  
West Virginia, 1995-2004\*



\*Linked birth/infant death file  
\*\*Fewer than 3 deaths

There was a direct correlation established between maternal education and IMR. The IMR decreased steadily with maternal educational level among infants born to white mothers. Among infants born to African American mothers, the IMR declined with maternal education through 13-15 years, with a subsequent increase among mothers with 16 or more years of education, as shown in Figure 12.

Figure 12. Infant Mortality Rates by Maternal Education and Race of Mother  
West Virginia, 1995-2004\*

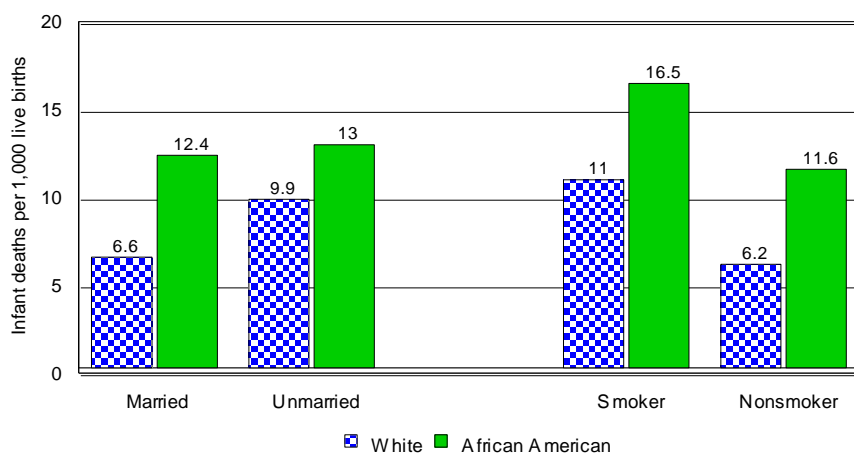


\*Linked birth/infant death file

The rate of infant mortality by marital status and race is illustrated in Figure 13. A marked difference by marital status is seen in IMR among infants born to white mothers (6.6 deaths per 1,000 live births to married mothers compared with 9.9 among unmarried mothers). Little difference was noted in IMR by marital status among African American women; among married mothers, the IMR was 12.4, compared with 13.0 among unmarried mothers.

Overall, the rate of mortality among infants whose mothers smoked during pregnancy was 11.1 deaths per 1,000 live births, compared with 6.3 among infants whose mothers did not smoke. Infants born to both white and African American mothers who smoked were more likely to die than those born to mothers who did not smoke (Figure 13).

Figure 13. Infant Mortality Rates by Marital and Smoking Status and Race of Mother  
West Virginia, 1995-2004\*

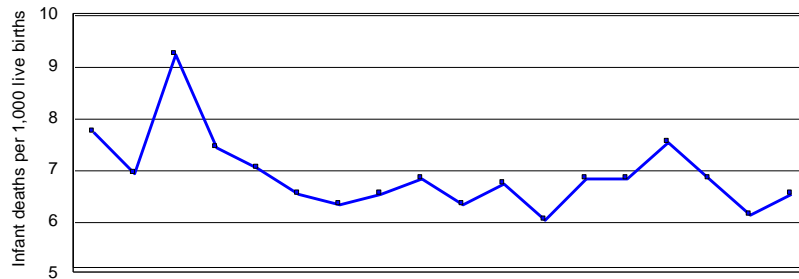


\*Linked birth/infant death file

## Fetal Deaths

The overall fetal death ratio<sup>1</sup> in West Virginia declined slightly, at an annual average of 1%, over the 18-year period from 1987, the first year for which data are available by race, through 2004 (Figure 14). A high of 9.2 fetal deaths per 1,000 live births was recorded in 1987; a low ratio of 6.0 occurred in 1998. The U.S. overall fetal death ratio in 2002 (the latest data available at time of publication) was 6.4, declining from 7.5 in 1990 (5).

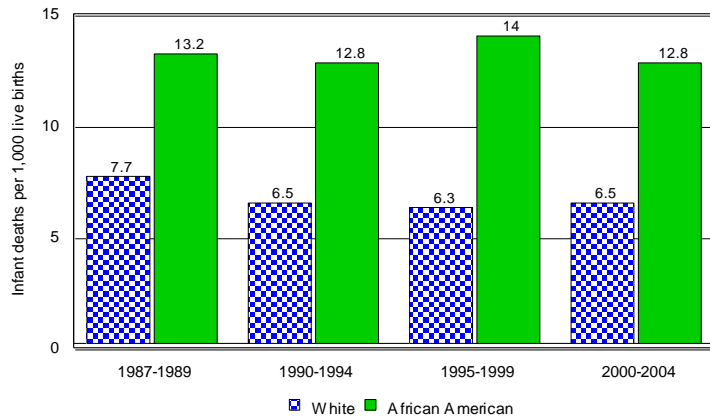
Figure 14. Fetal Mortality Rates  
West Virginia, 1987-2004



1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
7.7	6.9	9.2	7.4	7.0	6.5	6.3	6.5	6.8	6.3	6.7	6.0	6.8	6.8	7.5	6.8	6.1	6.5

As with infant mortality, disparities by race continue to persist in fetal death occurrence. Four time periods were examined from 1987 through 2004 to determine differences between white and African American fetal death ratios (Figure 15). After 1987-1989, fetal deaths among white women showed a slight decline; the fetal death ratio among African American women, consistently higher over the entire period than that among white women, showed little variation over time. National fetal mortality ratios in 2002 were 5.5 deaths per 1,000 births among white women and 11.9 deaths among African American women.

Figure 15. Fetal Mortality Rates by Race of Mother  
West Virginia, 1987-2004



<sup>1</sup> Fetal deaths are defined as a death prior to the complete expulsion or extraction from its mother of a product of conception, having passed through at least the 20<sup>th</sup> week of gestation. The fetal death ratio is the number of fetal deaths per 1,000 live births in a specified population.

## **Discussion**

The black-white gap in infant mortality, and in fetal mortality, persists regardless of an overall decline in both. According to the most recent data for West Virginia (2000-2004), the IMR for infants born to African American mothers was 11.7 deaths per 1,000 live births, compared with 7.6 deaths of infants with white mothers. Marked differences exist in the causes of infant deaths among babies born to white and African American women; death from prematurity and low birthweight, the two most significant determinants of infant mortality, is a much larger risk for infants born to African American mothers. Fourteen percent (13.5%) of babies born to African American women weigh less than 2,500 grams at birth, compared with 8.4% of those born to white women; 14.7% of African American mothers give birth prematurely, compared with 11.8% of white mothers.

Differences in timing of prenatal care do not account for the racial differences in infant mortality. Combined data from 1995-2004 show that babies born to African American mothers who began care in the first trimester still had a higher rate of death than babies born to white mothers who did not begin care until the third trimester, 12.6 deaths per 1,000 live births and 9.3 deaths, respectively. The other sociodemographic characteristics examined in this brief also do not provide an explanation for the higher IMR. Infant mortality poses a greater risk to infants of African American mothers at every age and educational level; infants born to college-educated African American women in our state have a higher rate of mortality than infants of white women lacking a high school education. Infants born to married African American mothers are more likely to die than those born to unmarried white mothers. African American women who do not smoke during their pregnancy still have a slightly higher risk of having their infant die than white women who do smoke.

These findings point to an etiology of infant mortality that is multifactorial, one requiring a multidisciplinary approach. Genetics may be a strong determinant, along with socioeconomic and cultural issues not addressed in this report. What is without question is that strategies for the prevention of infant and fetal mortality among all of our state's residents will require a sustained effort at every level of society.

## References

1. Parker WJ. Black-white infant mortality disparity in the United States: A societal litmus test. *Public Health Rep* 2003;118:336-7.
2. Minino AM, Heron M, Smith BL. Deaths: Preliminary data for 2004. Health E-Stats. National Center for Health Statistics. Released April 19, 2006.
3. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2003 period linked birth/infant death data set. *National Vital Statistics Reports*; vol. 54 no.16. Hyattsville, MD: National Center for Health Statistics. 2006.
4. Mathews TJ, Menacker F, MacDorman MF. Infant mortality statistics from the 2000 period linked birth/infant death data set. *National Vital Statistics Reports*; vol. 50 no. 12. Hyattsville, MD: National Center for Health Statistics. 2002.
5. National Center for Health Statistics. *Health, United States, 2005*. Hyattsville, MD. 2005.