

## **INTRODUCTION**

Infant Mortality Rate is one of the most important indicators of the general level of health or well being of a given community. It is a measure of the yearly rate of deaths in children less than one year old. It is commonly divided into two categories, neonatal and post-neonatal deaths. Neonatal deaths occur in infants under 28 days of age, and post-neonatal deaths occur in infants between 28 days and one year of life (A dictionary of Epidemiology by J.M. Last). Infant mortality rate, neonatal death rates and post-neonatal deaths rates are calculated in relation to total live births within a given period and expressed per 1000 live births.

Although, overall infant mortality rates in most states and local jurisdictions including Tarrant County have been declining during the past decade, the magnitude of the infant mortality rate still poses a significant challenge to the society and to the public health system. In 1998, United States ranked 28<sup>th</sup> in Infant Mortality Rate among all countries in the world according to “The World Almanac and Book of Facts 2001”. The most recently available Infant Mortality Rate data for the United States (6.9 per 1000 live births in 2000) is more than one and a half times the year 2010 objective of 4.5 per 1000 live births.

Table 1 highlights the trend in infant mortality rate in the United States by race from 1991 to 2001:

**TABLE 1: INFANT MORTALITY RATES IN THE UNITED STATES BY RACE, 1991-2001**

Year	White	African Americans	Hispanic	All Races
1991	7.3	17.6	@@	8.9
1992	6.9	16.8	@@	8.5
1993	6.8	16.5	@@	8.4
1994	6.6	15.8	@@	8.0
1995	6.3	15.1	@@	7.6
1996	6.1	14.7	@@	7.3
1997	6.0	14.2	@@	7.2
1998	6.0	14.3	@@	7.2
1999	5.8	14.6	@@	7.1
2000	5.7	14.1	@@	6.9
2001	@@	@@	@@	@@

**Infant Mortality Rate = Deaths in infants under 1 year per 1,000 live births**

**In this table all women (including Hispanic women) are classified only according to their race.**

**@@Data is not available.**

Overall, infant mortality rates for the United States declined by 23.5% from 8.9 in 1991 to 6.9 in 2000. Among the two racial groups with available infant mortality data, African American fared worse than Whites and the decline in rate for African American was less than the overall decline. In 1991, the infant mortality rate for African Americans (17.6) was more than twice of Whites (7.3). Despite the overall decline, the gap in IMR between Whites and African American remained the same over the years and in the year 2000 IMR for African Americans (14.1) exceeds two time that of Whites (5.7).

Table 2 highlights the trend in infant mortality rate in the state of Texas from 1991 to 2001:

**TABLE 2: INFANT MORTALITY RATES IN TEXAS BY RACE  
1991-2001**

Year	White	African Americans	Hispanic	All Races
	Rate	Rate	Rate	Rate
1991	6.5	14.5	6.7	7.7
1992	7.0	14.2	6.5	7.7
1993	6.3	14.5	6.7	7.5
1994	6.3	12.5	6.6	7.1
1995	5.7	11.6	6.0	6.5
1996	5.7	11.4	5.5	6.3
1997	5.7	10.9	6.0	6.4
1998	5.6	11.6	5.8	6.4
1999	5.1	12.5	5.7	6.2
2000	4.8	11.3	5.2	5.7
2001	5.1	12.0	5.4	6.0

**Infant Mortality Rate=deaths to infants under 1 year, per 1,000 live births**

Over the years, the Infant Mortality Rates for Texas have been consistently lower than that of the United States follows the same pattern of continuous decline in trend as seen in the nation. In 2001, the overall infant mortality rate declined by 22.1% from 7.7 in 1991 to 6.0 in 2001. As in the nation, the IMR for African Americans was more than twice as high as other racial/ethnic groups in Texas. As well, the IMR for African Americans declined by 20% from 14.5 in 1991 to 11.6 in 2001. Despite the decline, the consistent pattern of racial disparity observed over the years in the Nation was also seen in the State of Texas.

Table 3 highlights the trend in infant mortality rate in Tarrant County from 1991 to 2001:

**TABLE 3: INFANT MORTALITY RATES IN TARRANT COUNTY BY RACE, 1991-2001**

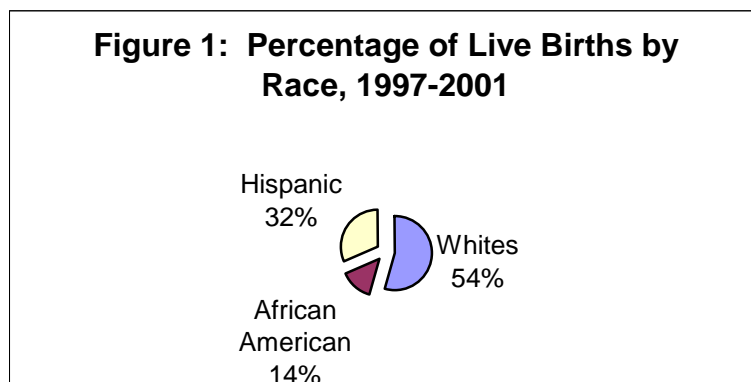
Tarrant County Infant Mortality Rates by Race: 1991-2001*				
Year	White	African American	Hispanic	All Races
	Rate	Rate	Rate	Rate
1991	6.6	19.9	8.1	8.6
1992	6.3	15.3	8.7	7.9
1993	6.5	16.8	8.4	8.1
1994	7.4	12.6	8.3	8.2
1995	5.5	13.2	7.1	6.7
1996	6.9	12.3	3.8	6.6
1997	6.6	11.7	7.1	7.2
1998	5.6	12.9	7.2	6.9
1999	5.6	17.0	8.0	7.9
2000	4.8	14.1	5.5	6.2
2001	6.5	12.5	7.1	7.4

\*Infant Mortality Rate=deaths to infants under 1 year, per 1,000 live births

The infant mortality rate in Tarrant County for each year was consistently higher than that of the State of Texas, but closer in comparison to that of the nation. Unlike the continuous declining trend of IMR observed in the nation and the State of Texas, Tarrant County has experienced some fluctuations over the years. These fluctuations are likely due to small numbers of infant deaths. Overall, the infant mortality rate in Tarrant County declined by close to 14% from 8.6 in 1991 to 7.4 in 2001. However, the racial disparity in infant mortality that was observed in the nation and in the State of Texas is also seen in Tarrant County. The infant mortality rate of African Americans remained much higher than other racial/ethnic groups in Tarrant County. In 1991, the African American infant mortality rate of 19.9 was two to three times higher than that for Whites (6.6) and for Hispanics (8.1). Despite the continuously higher infant mortality rates among African Americans in Tarrant County, they appear to have experienced the greatest decline in infant mortality rates over the years among all races/ethnicity. In 2001, infant mortality

rate declined by 37% in African America, by 1.5% in Whites and 12% in Hispanics. However, it is important to note that between 1991 and 2000 the infant mortality rate for Whites decreased by 27.3%, for African Americans by 29% and for Hispanics by 32%. The fluctuation in number seen between 2000 and 2001 appears to have affected the Whites and Hispanics more than the African Americans. It is also important to note that the 2001 infant mortality rate for African Americans (12.5) is close to twice that of Whites (6.5) and Hispanics (7.1) in Tarrant County.

Figure 1 contains the racial distribution of live births in Tarrant County from 1997 to 2001.



Whites account for the majority of live births (53%) occurring in Tarrant County, followed by Hispanics (32%) and African Americans (14%).

### **NEONATAL AND POST-NEONATAL DEATHS IN TARRANT COUNTY**

As previously discussed, infant mortality is divided into two categories based on the age of the infant at death, neonatal deaths and post-neonatal deaths. This division will help to better identify factors contributing to infant mortality within each period. It is believed that neonatal deaths reflects problems with heredity, prenatal development, and the birth process, while post-neonatal deaths reflects problems in the infant's

environment such as nutrition, hygiene, and accidents. Table 4 presents figures for neonatal and post-neonatal deaths in Tarrant County from 1997-2001:

**TABLE 4: NEONATAL AND POST-NEONATAL DEATHS IN TARRANT COUNTY BY RACE, 1997-2001**

Age at Death	White	African American	Hispanic	Tarrant County
Neonatal Deaths (< 28 days)	252 (69.6%)	147 (62.0%)	182 (71.4%)	595 (67.8%)
Post-neonatal Deaths (1- 11 months)	110 (30.4%)	90 (38.0%)	73 (28.6%)	282 (32.2)
Total	362 (100.0%)	237 (100.0%)	255 (100.0%)	877 (100.0%)

Surprisingly, the proportion of neonatal deaths among African Americans (62%) is lower than that for Whites (69.6%) and Hispanics (71.4%). However, most of the research indicates that African American infants are much more likely than White or Hispanic infants to have a lower birth weight and/or a shorter gestation. When early and late neonatal deaths are examined in Table 5, the results indicate that Hispanic (15.9%) had a lower proportion of late neonatal mortality than African Americans (21.8%) and Whites (21.0%). Regardless of race, close to 70% who died during the neonatal period died before one week of life. Hispanics had the highest rate of early neonatal deaths (84.1%).

**TABLE 5: EARLY NEONATAL AND LATE NEONATAL DEATHS IN TARRANT COUNTY BY RACE, 1997-2001**

Age at Death	White	African American	Hispanic	Tarrant County
Early Neonatal Deaths (< 7 days)	199 (79.0%)	115 (78.2%)	153 (84.1%)	595 (67.8%)
Late Neonatal Deaths (<27 days)	53 (21.0%)	32 (21.8%)	29 (15.9%)	282 (32.2)
Total	252 (100.0%)	147 (100.0%)	255 (100.0%)	877 (100.0%)

**CAUSES OF INFANT MORTALITY IN TARRANT COUNTY**

This section examines causes of infant mortality for the period between 1999 and 2001. Changes in death codes from ICD-9 to ICD-10 poses some complexity when comparing causes of infant mortality from years prior to 1999, therefore the causes of death analysis was limited to 1999 - 2001. The three leading causes of deaths for White infants were congenital malformations, disorders related to short gestation and low-birth weight and sudden infant death syndrome. The leading causes of deaths for African American infants were Sudden Infant Death Syndrome (SIDS), disorders related to short gestation and low-birth weight and congenital malformations. For Hispanics infants, the leading causes of death were congenital malformations, disorders related to short gestation and low-birth weight followed by condition originating in the perinatal period.

**TABLE 6: THREE LEADING CAUSES OF INFANT MORTALITY BY RACE, 1999-2001**

	<i>White*</i>	African American	<i>Hispanic</i>
<i>1</i>	Congenital Malformations	Sudden infant death syndrome	Congenital Malformations
<i>2</i>	Disorders related to short gestation and low birth weight	Disorders related to short gestation and low birth weight	Disorders related to short gestation and low birth weight
<i>3</i>	Sudden infant death syndrome	Congenital Malformations	Conditions originating in the perinatal period

\*ICD-10 Selected Causes of Infant Deaths

**INFANT MORATALITY BY GENDER IN TARRANT COUNTY**

A higher proportion of males than females are represented among infants who die in Tarrant County. Of the 877 infants who died in Tarrant County between 1997 and 2001, 57.7% were males. This gender disparity holds true regardless of race. Within each racial/ethnic group, African Americans (61.2%) and Hispanic (60.8%) male infants accounted for a higher proportion of infant deaths than the White male infant (52.5%). When individual years were examined, this pattern occurred every year.

**TABLE 7: INFANT MORTALITY BY GENDER AND RACE,  
1997-2001**

<b>Gender</b>	<b>White</b>	<b>African American</b>	<b>Hispanic</b>	<b>Tarrant County</b>
Male	190 (52.5%)	145 (61.2%)	155 (60.8%)	506 (57.7%)
Female	172 (47.5%)	92 (38.8%)	100 (39.2%)	371 (42.3)
Total	362 (100.0%)	237 (100.0%)	255 (100.0%)	877 (100.0%)

**SELECT BIRTH CHARACTERISTICS OF INFANTS WHO DIED IN TARRANT COUNTY (1997-2001)**

This section of the report will focus on the birth characteristics of the infants who died in the county from 1997-2001. Linked death and birth data files supplied to the Tarrant County Health Department by the Texas Department of Health were used in this analysis. Figure 2. shows comparisons of inadequate prenatal care of infants who died by race from 1997-2001. Inadequate prenatal care is defined as no prenatal care in the first trimester of pregnancy. Hispanic (44%) and African American (33%) accounted for the majority of the infants who died with inadequate prenatal care. Overall, only 20% (162) of the 877 infants who died from 1997-2001 did not receive prenatal care during the first trimester of pregnancy.



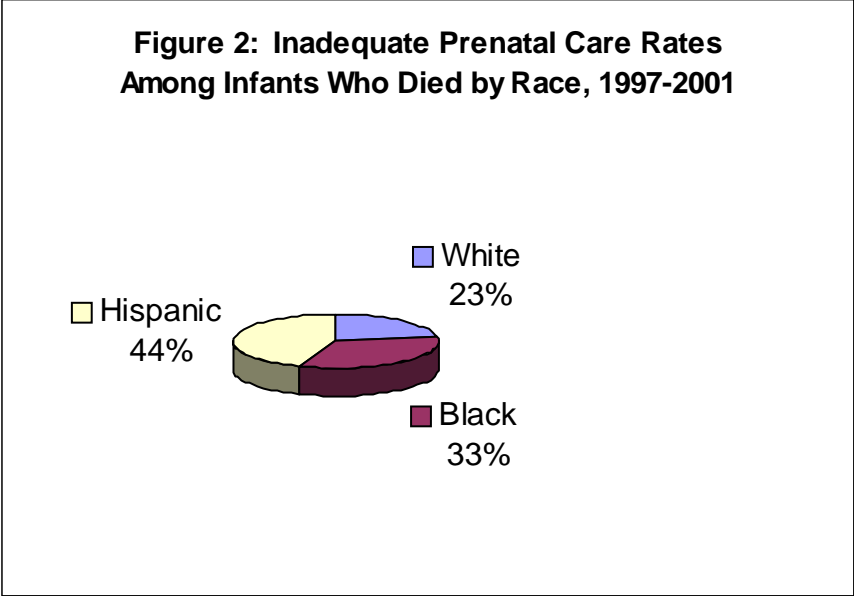


Figure 3 compares infants who died and who were also born prematurely (less than 37 weeks gestation) by their race. Slightly over 70% of the African American infants who died between 1997 thru 2001 were born prematurely, while 64% of the White and Hispanic infants who died were born prematurely.

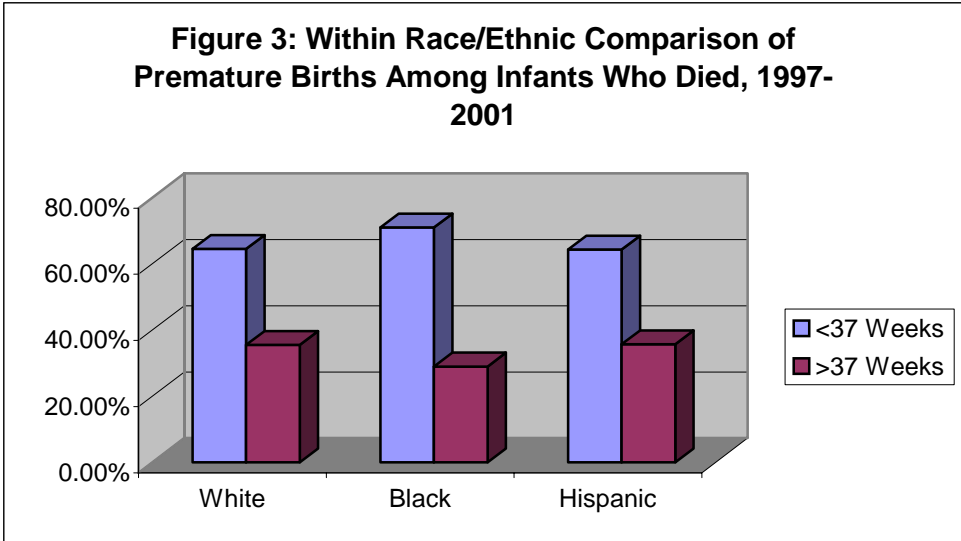


Table 8 outlines the proportion of infants who died in Tarrant County with low birth weight between 1997 thru 2001. Over 66% of those infant (544 out 877 infant deaths) weighed less than 2500 grams. This is consistent with previous studies that have found an association between low birth weight and infant mortality <sup>(reference)</sup>.

**Table 8: Birth Weight of Infants Who Died in Tarrant County 1997-2001**

<i>Birth Weight</i>	<i>Frequency</i>	<i>Percent</i>
<b>Less than 2500 Grams</b>	544	66.0
<b>Greater 2500 Grams</b>	280	34.0
<b>Total</b>	824	100.0

Table 9 shows the racial/ethnic breakdown of the infants who died with a low-birth weight. Sixty-three percent of the African American infants who died in 1997-2001 weighed less than 2500 grams at the time they were born, while 59% of White infants and 58 % of Hispanic infants who died during the same time period weighed less than 2500 grams.

**Table 9: Birth Weight by Race Among Infants Who Died 1997-2001**

<i>Birth Weight</i>	<i>Whites</i>	<i>African Americans</i>	<i>Hispanics</i>
<b>Less than 2500 Grams</b>	202 (59.2%)	140 (62.5%)	139 (58.4%)
<b>Greater 2500 Grams</b>	139 (40.8%)	84 (41.6%)	99 (41.6%)
<b>Total</b>	341 (100.0%)	224 (100.0%)	238 (100.0%)

### **TEEN BIRTHS AND INFANT MORTALITY**

Another risk factor that has been associated with infant mortality is births to teen mothers. Close to 17% of the infants who died in Tarrant County between 1997-2001 were born to teen mothers. Of the infants who died and were born to teen mothers, 41%

were Hispanics, 38% African American and 21% Whites. The two leading causes of death among infants born to teen mothers from 1999-2001 were sudden infant death syndrome and disorders related to short gestation and low-birth weight. In addition, 67% of the infants who died and were born to teen mothers were born prematurely, and more than 33% of those mothers did not receive prenatal care during the first trimester of pregnancy.

**Table 10: Infant Deaths by Race Among Women 19 and Under, 1997-2001**

<i>Race/Ethnicity</i>	<i>Frequency</i>	<i>Percent</i>
<b>Whites</b>	28	20.6%
<b>African Americans</b>	52	38.0%
<b>Hispanics</b>	56	40.9%
<b>Total</b>	136	100%

**INFANT MORTALITY AT THE SUBCOUNTY LEVEL**

It is important to note that Tarrant County’s infant mortality rate has not remained consistent from year to year at the sub-county level. Some areas in the county have higher rates than the county’s five-year infant mortality average of 7.12. Table 11 highlights 12 zip codes in Tarrant County that have the highest infant mortality rates. Zip code 76104 has the highest rate of infant mortality with a five-year rate of 17.05. This particular zip code experienced 30 infant deaths during the past five years. Close to 60% of those deaths were African American and 33% were Hispanic.

**Table 11: Zip Codes in Tarrant County with Highest Infant Mortality Rate, 1997-2001**

<b>Zipcode</b>	<b>Infant Death Rate (per 1,000)</b>	<b># of infant deaths</b>	<b># of infant births</b>	<b># of White Infant Deaths</b>	<b># of Black Infant Deaths</b>	<b># of Hispanics Deaths</b>	<b>%White Infant Deaths</b>	<b>%Black Infant Deaths</b>	<b>%Hispanic Infant Deaths</b>
<b>76104</b>	17.05	30	1760	1	18	11	3.33%	60.00%	36.67%
<b>76155</b>	12.71	3	236	2	1	0	66.67%	33.33%	0.00%
<b>76105</b>	12.28	37	3013	1	23	13	2.70%	62.16%	35.14%
<b>76135</b>	11.90	12	1008	10	0	2	83.33%	0.00%	16.67%
<b>76102</b>	10.71	8	747	1	6	1	12.50%	75.00%	12.50%
<b>76140</b>	10.46	16	1529	1	14	1	6.25%	87.50%	6.25%
<b>76114</b>	10.39	19	1829	12	1	5	63.16%	5.26%	26.32%
<b>76012</b>	10.35	19	1835	8	5	6	42.11%	26.32%	31.58%
<b>76103</b>	10.17	14	1376	1	9	4	7.14%	64.29%	28.57%
<b>76011</b>	10.04	33	3287	6	11	14	18.18%	33.33%	42.42%
<b>76053</b>	9.99	20	2002	10	3	6	50.00%	15.00%	30.00%
<b>76133</b>	9.79	31	3168	13	13	5	41.94%	41.94%	16.13%

Table 12 has select demographic and clinical characteristics of mothers whose infant died between 1997 and 2001. African American and Hispanic mother's tended to be younger than White mothers. Over 55% of the African American mothers and close to 50% of the Hispanic mothers were under the age of 24. Over 63% of Hispanic mothers in this group did not complete high school. African American mothers were also much more likely to be unmarried (roughly 70%), when compared to White and Hispanic mothers.

The other section of Table 12 examined certain clinical factors that have been known to be associated with infant mortality. Almost half of the mothers whose infant died between 1997 and 2001 had some medical risk factor such as diabetes or heart disease. Finally, close to 60% of the mothers whose infant died during the same time period have a child living.

## **CONCLUSION**

Tarrant County has made some gains over the past ten years in reducing infant mortality. However, this problem continues to pose a significant burden to the county, especially in the African American community. The African American infant mortality rate of 12.5 in 2001 (although significantly less than its 1991 high of 19.9) remains roughly twice as high as that of other racial/ethnic groups in the county.

Addressing some of the most common risk factors known to contribute to infant mortality such as reducing teen births, increasing prenatal care during the first trimester, and addressing the problem of Sudden Infant Death Syndrome could significantly aid in reducing infant mortality in the Tarrant County.