

INFANT MORTALITY AND LOW BIRTH WEIGHT RATES COMPARED TO EXPECTED RATES BY HEALTHY START COALITION AREA 2006

**By: Daniel Thompson, M.P.H.; Cheryl Clark, M.P.H., R.H.I.A. ;
Angel Watson, M.P.H., R.H.I.A.**

**Florida Department of Health, Division of Family Health Services
Bureau of Family and Community Health**

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Introduction

Infant mortality and birth weight statistics are used extensively in public health. These statistics are especially useful because of their relevance as maternal and child health indicators and because of their ease of availability and relatively high level of completeness.

The purpose of this analysis is to identify geographic areas in the state where low birth weight (LBW) rates and infant mortality (IM) rates are statistically, significantly higher than would be expected considering the unique demographics of each area. These areas should then be the focus of further, more detailed analyses to determine the reasons for the high rates and to develop intervention strategies for improving the outcomes.

IM and LBW rates vary in relation to the demographic characteristics and the variation in rates across the Healthy Start coalition areas is due in part to the unique demographic characteristics of the local populations. In this analysis, adjustments are made to account for the differences in demographic characteristics.

Three demographic variables are used in calculating the adjusted and expected statistics. These are maternal race, marital status, and education. These variables are used because they are known to be associated with risk of LBW and IM, and because public health interventions are not designed to influence these characteristics in the prenatal or infancy period. In an analysis (data not shown) of Florida resident births in 2001, linked to infant deaths, risk of infant death was found to be 133 percent (133%) higher for maternal race Black, 89 percent (89%) higher for unmarried maternal marital status, and 41 percent (41%) higher for maternal education less than high school. In the same analysis, risk of LBW was found to be 82 percent (82%) higher for maternal race Black, 44 percent (44%) higher for unmarried maternal marital status, and 22 percent (22%) higher for maternal education less than high school. These results were all statistically significant at the 0.05 alpha level.

Maternal characteristics such as maternal age and smoking status are not used in the adjustment because there are public health efforts directed at changing these factors and adjusting for them would eliminate differences due to these factors. For example, if an area has an actual LBW percentage significantly lower than the expected LBW percentage, the difference could be due to the extraordinary success of a smoking cessation program in the area. If adjustments were made for smoking status, this difference would not be apparent. Maternal age can be influenced by reducing teen births, and by the same logic, adjustments are not made for maternal age.

IM and LBW rates also reflect random variation. In this analysis, statistical methods are used to separate the random variation from the non-random variation, so rates that are significantly high are most likely a result of non-random influences. Likewise, rates that are higher than expected, but not significantly high, are likely to be the result of random variation and are said to be within the range of normal variation.

Methods

The data used in this analysis were extracted from the birth records for residents of Florida born in calendar years 2005 and 2006. Births were classified as LBW if the birth weight on the birth record was in the range of 1 to 2499 grams. Three demographic variables were used in this analysis: mother’s race, marital status, and education. These are recorded on the birth record, and for the purposes of this analysis, two categories were used for each variable. Mother’s race was classified as Black or non-Black, marital status was classified as married or not married, and mother’s education was classified as 12th grade or higher completed or less than 12th grade completed. The three variables were then used to classify the births into eight mutually exclusive categories. Birth records with unknown values for any of the three variables were placed in a ninth category. There were roughly 2300 birth records in the ninth category (about 1.0% of the resident births). The nine categories are as follows:

<u>Mother’s Category</u>	<u>Mother’s Race</u>	<u>Mother’s Marital Status</u>	<u>Education</u>
1	Non-Black	Married	High School or More
2	Non-Black	Married	Less than High School
3	Non-Black	Not Married	High School or More
4	Non-Black	Not Married	Less than High School
5	Black	Married	High School or More
6	Black	Married	Less than High School
7	Black	Not Married	High School or More
8	Black	Not Married	Less than High School
9*	Unknown	Unknown	Unknown

* This includes records with unknown values in any of the three categories.

Calculating Expected Rates:

Using this classification, the category-specific rates were calculated from the 2005 (the latest year for complete matched birth and infant death data) statewide totals, and these rates were used with the 2006 births in each Healthy Start coalition area to calculate the expected LBW births and infant deaths. In this way, the expected statistics are adjusted for the three demographic characteristics and then used to calculate the adjusted rates. The term for this adjustment technique is “indirect adjustment.”

In March of 2004, the recording of maternal race on the birth record was changed so that more than one race can be selected. For the purposes of this analysis, births where the only maternal race recorded was Black were classified as Black and all others were classified as non-Black. There were 52,115 births with maternal race Black and 50,808 (97.5%) of these recorded no other race for maternal race.

For example, if an area existed where all the births were in category 1, then the expected statistics for the area would be the same as the statewide statistics for category 1. Another area might have had births that were all in category 8. For this area, the expected statistics would be the same as the statewide statistics for category 8. These two hypothetical areas would have different expected statistics because they have populations with different demographic characteristics. If both areas had actual rates equal to the expected rates, they would be considered equal regarding the rates. Stated differently, both areas are doing equally well at preventing IM and LBW, considering their different demographic characteristics.

The Poisson formula was used to test for statistically significant differences between actual and expected rates in each area. The correlation between IM and LBW rates across areas was also assessed.

Results

The results of this analysis are shown in the following tables where actual statistics are compared to expected statistics. The expected statistics are adjusted for the demographic characteristics in each area, as described above. Areas with statistically, significantly high actual statistics are indicated in the tables with an “H” and “L” indicates significantly low actual statistics.

There is a statistically significant correlation between areas with high LBW percentages and areas with high infant death rates. This means areas with high LBW percentages tend to have high infant death rates, and areas with low LBW percentages tend to have low infant death rates. The correlation coefficient based on the ranks of the p values across coalition areas is 0.58 with an associated p value of 0.0004.

Discussion

This analysis should be considered a preliminary step in the continuing endeavor to reduce risk of infant death and low birth weight in Florida. The rationale is to use the results of this analysis to focus further efforts on the areas where the risks are significantly high. One limitation of this analysis is the comparatively high level of variability of rates in smaller areas. Consequently, larger differences in rates for small areas may not be statistically significant while the same or smaller differences may be statistically significant in larger areas. Rates that are statistically significantly higher than the expected rates are most likely not a result of random fluctuations and are cause for concern; however, higher rates that are not statistically significant may warrant further investigation. Additionally, smaller areas with higher than expected rates for a period of several years may also be cause for concern.

Since adjustments were used to account for the differing demographic composition in each area, further analysis would focus on other factors such as smoking rates and mother's age at birth. Unique factors in each area contribute to infant deaths and low birth weight. Local area analysis of factors associated with these outcomes should be undertaken to better understand the reasons for higher than expected rates. The process becomes much more complicated at this point, and a separate analysis should be done for each area of concern. Finally, although demographic adjustment is useful for analyzing additional influencing variables, it remains critical to continue efforts to address issues such as racial disparity in health outcomes.

**2006 FLORIDA ACTUAL INFANT DEATH RATES PER 1000 BIRTHS
COMPARED TO EXPECTED¹ RATES PER 1000 BIRTHS**

	2006 Expected ¹ 2006 Births	2006 Infant Deaths	2006 Actual Infant Deaths	2006 Expected Infant Death Rate Per 1000 Births	2006 Actual Infant Death Rate Per 1000 Births	H=Actual Rate Signif.Higher ² L=Actual Rate Signif.Lower ² Than Expected
Healthy Start Coalition						
Bay, Franklin, Gulf Healthy Start Coalition	2,710	18.4	28	6.79	10.33	H
Broward Healthy Start Coalition, Inc.	23,434	199.0	147	8.49	6.27	L
Capital Area Healthy Start Coalition, Inc.	3,578	28.3	28	7.91	7.83	
Central Healthy Start, Inc.	6,707	43.1	40	6.43	5.96	
Charlotte County Healthy Start Coalition, Inc.	1,202	7.3	2	6.07	1.66	L
Chipola Healthy Start Coalition, Inc.	1,361	9.4	14	6.91	10.29	
Desoto	489	3.6	6	7.36	12.27	
Escambia County Healthy Start Coalition, Inc.	4,478	35.1	36	7.84	8.04	
Florida Keys Healthy Start Coalition, Inc.	720	4.4	6	6.11	8.33	
Gadsden Citizens for Healthy Babies Inc.	761	7.7	9	10.12	11.83	
Miami-Dade	33,739	246.8	218	7.31	6.46	L
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3,481	21.1	22	6.06	6.32	
Healthy Start of North Central Florida, Inc.	10,534	75.1	103	7.13	9.78	H
Healthy Start Coalition of Sarasota County, Inc.	3,163	19.4	13	6.13	4.11	
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	9,926	71.4	71	7.19	7.15	
Healthy Start Coalition of Hillsborough County, Inc.	17,520	125.4	137	7.16	7.82	
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	692	5.6	6	8.09	8.67	
Healthy Start Coalition of Manatee County, Inc.	4,139	28.3	26	6.84	6.28	
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15,702	120.1	87	7.65	5.54	L
Healthy Start Coalition of Pasco County, Inc.	5,237	30.7	35	5.86	6.68	
Healthy Start Coalition of Pinellas County, Inc.	9,541	68.5	82	7.18	8.59	
Healthy Start Coalition of Santa Rosa County, Inc.	1,863	10.4	17	5.58	9.13	H
Healthy Start Coalition of Southwest Florida, Inc.	12,614	84.8	84	6.72	6.66	
Healthy Start Coalition of St. Lucie County, Inc.	3,534	26.0	27	7.36	7.64	
Indian River County Healthy Start Coalition, Inc.	1,410	9.6	6	6.81	4.26	
Martin County Healthy Start Coalition, Inc.	1,399	9.2	7	6.58	5.00	
Northeast Florida Healthy Start Coalition, Inc.	19,024	142.3	156	7.48	8.20	
Okeechobee County Family Health / Healthy Start Coalition, Inc.	623	4.2	3	6.74	4.82	
Orange County Healthy Start Coalition, Inc.	16,966	124.4	144	7.33	8.49	H
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5,610	36.5	45	6.51	8.02	
Seminole County Healthy Start Coalition, Inc.	4,821	30.3	33	6.29	6.85	
The Healthy Start Prenatal & Infant Coalition of Flagler and Volusia Counties, Inc.	6,205	40.8	43	6.58	6.93	
The Healthy Start Coalition of Osceola County, Inc.	3,959	25.4	32	6.42	8.08	
TOTAL	237,142	1,713	1,713	7.22	7.22	

¹ The expected number of infant deaths is calculated based on the maternal race, marital status and education characteristics of the births in each county

² The significance level used is .05

**2006 FLORIDA ACTUAL LOW BIRTH WEIGHT¹ PERCENTAGES
COMPARED TO EXPECTED² PERCENTAGES**

<i>Healthy Start Coalition</i>	2006	2006	2006	2006	<i>H=Actual Rate</i>	
	<i>Births</i>	<i>Expected² LBW</i>	<i>Actual LBW</i>	<i>Expected LBW</i>	<i>Actual LBW</i>	
				<i>Percent</i>	<i>Percent</i>	
					<i>Signif.Higher³ L=Actual Rate Signif.Lower³ Than Expected</i>	
Bay, Franklin, Gulf Healthy Start Coalition	2,710	224.2	232	8.27%	8.56%	
Broward Healthy Start Coalition, Inc.	23,434	2210.1	2,130	9.43%	9.09%	L
Capital Area Healthy Start Coalition, Inc.	3,578	343.4	353	9.60%	9.87%	
Central Healthy Start, Inc.	6,707	540.1	540	8.05%	8.05%	
Charlotte County Healthy Start Coalition, Inc.	1,202	94.5	99	7.86%	8.24%	
Chipola Healthy Start Coalition, Inc.	1,361	116.0	135	8.52%	9.92%	H
Desoto	489	41.4	41	8.47%	8.38%	
Escambia County Healthy Start Coalition, Inc.	4,478	418.1	491	9.34%	10.96%	H
Florida Keys Healthy Start Coalition, Inc.	720	56.9	63	7.90%	8.75%	
Gadsden Citizens for Healthy Babies Inc.	761	86.0	89	11.30%	11.70%	
Miami-Dade	33,739	3008.2	2,901	8.92%	8.60%	L
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3,481	274.7	277	7.89%	7.96%	
Healthy Start of North Central Florida, Inc.	10,534	925.6	949	8.79%	9.01%	
Healthy Start Coalition of Sarasota County, Inc.	3,163	251.5	214	7.95%	6.77%	L
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	9,926	860.8	798	8.67%	8.04%	L
Healthy Start Coalition of Hillsborough County, Inc	17,520	1514.9	1,595	8.65%	9.10%	H
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	692	66.7	68	9.64%	9.83%	
Healthy Start Coalition of Manatee County, Inc.	4,139	346.6	305	8.37%	7.37%	L
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15,702	1407.3	1,412	8.96%	8.99%	
Healthy Start Coalition of Pasco County, Inc.	5,237	400.9	442	7.66%	8.44%	H
Healthy Start Coalition of Pinellas County, Inc.	9,541	818.8	811	8.58%	8.50%	
Healthy Start Coalition of Santa Rosa County, Inc	1,863	140.4	149	7.54%	8.00%	
Healthy Start Coalition of Southwest Florida, Inc.	12,614	1042.7	989	8.27%	7.84%	L
Healthy Start Coalition of St. Lucie County, Inc.	3,534	315.4	283	8.92%	8.01%	L
Indian River County Healthy Start Coalition, Inc.	1,410	118.4	100	8.40%	7.09%	L
Martin County Healthy Start Coalition, Inc.	1,399	113.2	104	8.09%	7.43%	
Northeast Florida Healthy Start Coalition, Inc.	19,024	1718.5	1,738	9.03%	9.14%	
Okeechobee County Family Health / Healthy Start Coalition, Inc.	623	50.3	63	8.07%	10.11%	H
Orange County Healthy Start Coalition, Inc.	16,966	1510.6	1,602	8.90%	9.44%	H
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5,610	461.8	512	8.23%	9.13%	H
Seminole County Healthy Start Coalition, Inc.	4,821	393.6	363	8.16%	7.53%	
The Healthy Start Prenatal & Infant Coalition of Flager and Volusia Counties, Inc.	6,205	515.4	489	8.31%	7.88%	
The Healthy Start Coalition of Osceola County, Inc.	3,959	321.0	371	8.11%	9.37%	H
TOTAL	237,142	20,708	20,708	8.73%	8.73%	

¹ *LBW = Low birth Weight, defined as birth weight below 2500 grams.*

² *The expected number of infant deaths is calculated based on the maternal race, marital status and education characteristics of the births in each county*

³ *The significance level used is .05*