

# **INFANT MORTALITY AND LOW BIRTH WEIGHT RATES COMPARED TO EXPECTED RATES BY HEALTHY START COALITION AREA 2008**

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## **Introduction**

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

The purpose of this annual analysis is to identify Healthy Start Coalition 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 identified areas should become the focus of further detailed analyses to investigate the reasons for the higher than expected rates and to develop intervention strategies for improving the outcomes.

IM and LBW rates will vary across areas. This variation is due, in part, to the unique demographic characteristics of the area populations. In this analysis, adjustments are made to account for the differences in demographic characteristics. Three demographic variables are accounted for when calculating the adjusted and expected statistics. These are maternal race, marital status, and maternal education. These variables are used because of known associations with risk of LBW and IM, and because adjusting for these characteristics provide a way to make valid comparisons among areas with different demographic characteristics.

Other maternal characteristics, such as young maternal age and smoking status, are not used in this adjustment, because there are public health interventions directed at addressing these factors and adjustment would eliminate differences that may be due to the effects of public health interventions. For example, if an area has an actual LBW percentage significantly lower than the expected LBW percentage, the difference could be due to the success of a smoking cessation program in the area. If adjustments were made for smoking status, differences between actual and expected statistics would not be apparent. In another example, births to women of young maternal age can be influenced by teen pregnancy prevention interventions and by the same logic; adjustments are not made for maternal age.

IM and LBW rates can also vary due to random variation or chance. In this analysis, statistical methods are used to separate random variation from non-random variation, so rates that are reported as significantly higher or lower are most likely a result of non-random influences. Likewise, rates that are higher or lower than expected, but not significantly, are likely to be the result of random variation.

## **Methods**

The data used in this analysis were extracted from the birth records for residents of Florida born in calendar years 2007 and 2008. 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 obtained from the

birth record were used in this analysis: mother’s race, marital status, and educational attainment. 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. These three variables were 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 approximately 1,600 birth records in the ninth category (less than 1% of the resident births). The nine categories are as follows:

<b><u>Mother’s Category</u></b>	<b><u>Mother’s Race</u></b>	<b><u>Mother’s Marital Status</u></b>	<b><u>Education</u></b>
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 2007 (the latest year for complete matched birth and infant death data) statewide totals, and these rates were used with the 2008 births in each area to calculate the expected LBW births and infant deaths. The area-expected statistics are adjusted for the three demographic characteristics and used to calculate the adjusted rates. The term for this adjustment technique is “indirect adjustment.”

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 *Normal Approximation to the Binomial Distribution* was used to test for statistically significant differences between actual and expected rates in most of the areas. In instances where the number of infant deaths or number of low birth weight infants was less than 30, the Poisson formula was used. The correlation between IM and LBW rates across the areas was also assessed.

In March 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.

## **Results**

The results of this analysis are shown in the following tables for IM and LBW. In the tables, 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 higher than expected actual statistics are indicated in the tables with a “H”, and “L” indicates significantly lower than expected actual statistics.

The correlation, between areas with high LBW percentages and areas with high infant death rates, is statistically significant. This means areas with high LBW percentages have a tendency to have high infant death rates and vice versa. The correlation coefficient based on the ranks of the p values across areas is 0.371 with an associated p value of 0.033.

## **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 analysis and efforts on the areas where the risks are significantly high and also analyze factors that contribute to the lower risks seen in some areas.

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 that were not adjusted for, 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 with separate analyses performed for each area of concern. Finally, it should be noted that in this analysis, rates for each area are compared to the statewide rates, after adjustment for maternal race, marital status and education attainment. The issue of whether or not the statewide rates should be used as a baseline in these comparisons is not addressed in this analysis.

**2008 FLORIDA ACTUAL INFANT DEATH RATES PER 1000 BIRTHS  
COMPARED TO EXPECTED<sup>1</sup> RATES PER 1000 BIRTHS**

	2008 Births	2008 Infant Deaths <sup>1</sup>	2008 Infant Deaths	2008 Expected Infant Death Rate Per 1000 Births	2008 Actual Infant Death Rate Per 1000 Births	H=Actual Rate Signif.Higher <sup>2</sup> L=Actual Rate Signif.Lower <sup>2</sup> Than Expected
<b>Healthy Start Coalition</b>						
Bay, Franklin, Gulf Healthy Start Coalition	2629	18	24	6.85	9.13	
Broward Healthy Start Coalition, Inc.	22233	183	130	8.23	5.85	L
Capital Area Healthy Start Coalition, Inc.	3546	29	28	8.18	7.90	
Central Healthy Start, Inc.	6576	42	48	6.39	7.30	
Charlotte County Healthy Start Coalition, Inc.	1216	7	8	5.76	6.58	
Chipola Healthy Start Coalition, Inc.	1354	10	12	7.39	8.86	
Desoto	469	3	2	6.40	4.26	
Escambia County Healthy Start Coalition, Inc.	4195	32	44	7.63	10.49	H
Florida Keys Healthy Start Coalition, Inc.	717	4	4	5.58	5.58	
Gadsden Citizens for Healthy Babies Inc.	734	8	10	10.90	13.62	
Miami-Dade	33639	258	174	7.67	5.17	L
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3382	20	29	5.91	8.57	H
Healthy Start of North Central Florida, Inc.	10755	75	99	6.97	9.21	H
Healthy Start Coalition of Sarasota County, Inc.	3029	18	14	5.94	4.62	
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	9454	66	67	6.98	7.09	
Healthy Start Coalition of Hillsborough County, Inc.	17401	125	139	7.18	7.99	
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	705	6	7	8.51	9.93	
Healthy Start Coalition of Manatee County, Inc.	3885	26	31	6.69	7.98	
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15246	118	84	7.74	5.51	L
Healthy Start Coalition of Pasco County, Inc.	5303	31	32	5.85	6.03	
Healthy Start Coalition of Pinellas County, Inc.	9141	63	85	6.89	9.30	H
Healthy Start Coalition of Santa Rosa County, Inc.	1847	10	9	5.41	4.87	
Healthy Start Coalition of Southwest Florida, Inc.	11631	81	69	6.96	5.93	
Healthy Start Coalition of St. Lucie County, Inc.	3363	25	22	7.43	6.54	
Indian River County Healthy Start Coalition, Inc.	1373	9	11	6.55	8.01	
Martin County Healthy Start Coalition, Inc.	1280	9	3	7.03	2.34	L
Northeast Florida Healthy Start Coalition, Inc.	18720	138	166	7.37	8.87	H
Okeechobee County Family Health / Healthy Start Coalition, Inc.	532	4	4	7.52	7.52	
Orange County Healthy Start Coalition, Inc.	16568	120	150	7.24	9.05	H
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5467	35	34	6.40	6.22	
Seminole County Healthy Start Coalition, Inc.	4643	29	29	6.25	6.25	
The Healthy Start Prenatal & Infant Coalition of Flager and Volusia Counties, Inc.	6156	40	56	6.50	9.10	H
The Healthy Start Coalition of Osceola County, Inc.	4046	25	43	6.18	10.63	H
<b>TOTAL</b>	<b>231,235</b>	<b>1,667</b>	<b>1,667</b>	<b>7.21</b>	<b>7.21</b>	

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

<sup>2</sup> The significance level used is .05

**2008 FLORIDA ACTUAL LOW BIRTH WEIGHT<sup>1</sup> PERCENTAGES  
COMPARED TO EXPECTED<sup>2</sup> PERCENTAGES**

<b>Healthy Start Coalition</b>	<b>2008 Births</b>	<b>2008 Expected<sup>2</sup> LBW Births</b>	<b>2008 Actual LBW Births</b>	<b>2008 Expected LBW Percent</b>	<b>2008 Actual LBW Percent</b>	<b>H=Actual Rate Signif.Higher<sup>3</sup> L=Actual Rate Signif.Lower<sup>3</sup> Than Expected</b>
Bay, Franklin, Gulf Healthy Start Coalition	2,629	217	230	8.25%	8.75%	
Broward Healthy Start Coalition, Inc.	22,233	2,131	2,168	9.58%	9.75%	
Capital Area Healthy Start Coalition, Inc.	3,546	346	329	9.76%	9.28%	
Central Healthy Start, Inc.	6,576	532	524	8.09%	7.97%	
Charlotte County Healthy Start Coalition, Inc.	1,216	96	89	7.89%	7.32%	
Chipola Healthy Start Coalition, Inc.	1,354	115	129	8.49%	9.53%	
Desoto	469	40	29	8.53%	6.18%	L
Escambia County Healthy Start Coalition, Inc.	4,195	393	450	9.37%	10.73%	H
Florida Keys Healthy Start Coalition, Inc.	717	56	52	7.81%	7.25%	
Gadsden Citizens for Healthy Babies Inc.	734	85	82	11.58%	11.17%	
Miami-Dade	33,639	3,029	3,031	9.00%	9.01%	
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3,382	266	283	7.87%	8.37%	
Healthy Start of North Central Florida, Inc.	10,755	942	916	8.76%	8.52%	
Healthy Start Coalition of Sarasota County, Inc.	3,029	241	221	7.96%	7.30%	
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	9,454	819	769	8.66%	8.13%	L
Healthy Start Coalition of Hillsborough County, Inc.	17,401	1,525	1,613	8.76%	9.27%	H
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	705	72	72	10.21%	10.21%	
Healthy Start Coalition of Manatee County, Inc.	3,885	322	312	8.29%	8.03%	
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15,246	1,390	1,381	9.12%	9.06%	
Healthy Start Coalition of Pasco County, Inc.	5,303	407	436	7.67%	8.22%	
Healthy Start Coalition of Pinellas County, Inc.	9,141	785	809	8.59%	8.85%	
Healthy Start Coalition of Santa Rosa County, Inc.	1,847	138	142	7.47%	7.69%	
Healthy Start Coalition of Southwest Florida, Inc.	11,631	968	921	8.32%	7.92%	
Healthy Start Coalition of St. Lucie County, Inc.	3,363	304	288	9.04%	8.56%	
Indian River County Healthy Start Coalition, Inc.	1,373	115	80	8.38%	5.83%	L
Martin County Healthy Start Coalition, Inc.	1,280	105	80	8.20%	6.25%	L
Northeast Florida Healthy Start Coalition, Inc.	18,720	1,697	1,624	9.07%	8.68%	L
Okeechobee County Family Health / Healthy Start Coalition, Inc.	532	43	51	8.08%	9.59%	
Orange County Healthy Start Coalition, Inc.	16,568	1,492	1,551	9.01%	9.36%	
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5,467	453	447	8.29%	8.18%	
Seminole County Healthy Start Coalition, Inc.	4,643	380	366	8.18%	7.88%	
The Healthy Start Prenatal & Infant Coalition of Flager and Volusia Coun	6,156	515	525	8.37%	8.53%	
The Healthy Start Coalition of Osceola County, Inc.	4,046	325	344	8.03%	8.50%	
<b>TOTAL</b>	<b>231,235</b>	<b>20,344</b>	<b>20,344</b>	<b>8.80%</b>	<b>8.80%</b>	

<sup>1</sup> L BW = Low birth Weight, defined as birth weight below 2500 grams.

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

<sup>3</sup> The significance level used is .05