INFANT MORTALITY AND LOW BIRTH WEIGHT RATES COMPARED TO EXPECTED RATES BY HEALTHY START COALITION AREA 2007

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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 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 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 areas 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 used in calculating the adjusted and expected statistics. These are maternal race, marital status, and education. These variables are used because of known associations with risk of LBW and IM, and because adjusting for these characteristics provides 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 are 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 2006 and 2007. 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. 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 1,100 birth records in the ninth category (less than 1% of the resident births). The nine categories are as follows:

Mother's Category	Mother's Race	Mother's Marital Status	Education
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 2006 (the latest year for complete matched birth and infant death data) statewide totals, and these rates were used with the 2007 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 and maps 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 an "H", and "L" indicates significantly lower than expected actual statistics The maps display the results of the statistical tests for significance. Areas where the actual statistics are significantly higher or lower are shaded, as indicated by the legend on the maps.

The correlation, between areas with high LBW percentages and areas with high infant death rates, is weak and not statistically significant. This means areas with high LBW percentages do not have a strong tendency to have high infant death rates and vice versa. The correlation coefficient based on the ranks of the p values across areas is 0.076 with an associated p value of 0.673.

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.

Healthy Start Coalition	2007 Births	2007 Expected[1] Infant Deaths	2007 Actual Infant Deaths	2007 Expected Infant Death Rate Per 1000 Births	2007 Actual Infant Death Rate Per 1000 Births	H=Actual Rate Signif.Higher[2] L=Actual Rate Signif.Lower[2] Than Expected
Bay, Franklin, Gulf Healthy Start Coalition	2487	16	9	6.49	3.62	L
Broward Healthy Start Coalition, Inc.	22926	181	130	7.90	5.67	L
Capital Area Healthy Start Coalition, Inc.	3630	29	31	8.05	8.54	
Central Healthy Start, Inc.	6925	44	54	6.32	7.80	
Charlotte County Healthy Start Coalition, Inc.	1199	7	7	6.02	5.84	
Chipola Healthy Start Coalition, Inc.	1411	9	7	6.73	4.96	
Desoto	483	3	1	6.82	2.07	L
Escambia County Healthy Start Coalition, Inc.	4261	32	31	7.57	7.28	
Florida Keys Healthy Start Coalition, Inc.	810	5	2	6.08	2.47	L
Gadsden Citizens for Healthy Babies Inc.	760	8	10	10.39	13.16	
Miami-Dade	34286	248	214	7.24	6.24	L
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3439	20	28	5.74	8.14	H
Healthy Start of North Central Florida, Inc.	10745	75	100	7.00	9.31	H
Healthy Start Coalition of Sarasota County, Inc.	3298	20	8	6.03	2.43	L
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	10218	71	88	7.00	8.61	H
Healthy Start Coalition of Hillsborough County, Inc	18001	126	153	7.03	8.50	H
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	718	6	2	8.60	2.79	L
Healthy Start Coalition of Manatee County, Inc.	4133	28	36	6.83	8.71	
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15689	120	102	7.62	6.50	L
Healthy Start Coalition of Pasco County, Inc.	5528	32	33	5.71	5.97	
Healthy Start Coalition of Pinellas County, Inc.	9397	65	69	6.89	7.34	
Healthy Start Coalition of Santa Rosa County, Inc	1886	10	14	5.25	7.42	
Healthy Start Coalition of Southwest Florida, Inc.	12595	88	90	6.95	7.15	
Healthy Start Coalition of St. Lucie County, Inc.	3623	26	24	7.15	6.62	
Indian River County Healthy Start Coalition, Inc.	1424	9	13	6.60	9.13	
Martin County Healthy Start Coalition, Inc.	1302	9	11	6.77	8.45	
Northeast Florida Healthy Start Coalition, Inc.	19268	140	154	7.27	7.99	
Okeechobee County Family Health / Healthy Start Coalition, Inc.	642	4	4	6.55	6.23	
Orange County Healthy Start Coalition, Inc.	16858	121	120	7.21	7.12	
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5731	36	38	6.37	6.63	
Seminole County Healthy Start Coalition, Inc.	4772	29	28	6.12	5.87	
The Healthy Start Prenatal & Infant Coalition of Flager and Volusia Counties, Inc.	6405	42	47	6.53	7.34	
The Healthy Start Coalition of Osceola County, Inc.	4219	26	30	6.15	7.11	
TOTAL	239,069	1,688	1,688	7.06	7.06	

[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**

2007 FLORIDA ACTUAL LOW BIRTH WEIGHT1 PERCENTAGES
COMPARED TO EXPECTED[2] PERCENTAGES

Healthy Start Coalition	2007 Births	2007 Expected[2] LBW Births	2007 Actual LBW Births	2007 Expected LBW Percent	2007 Actual LBW Percent	H=Actual Rate Signif.Higher [3] L=Actual Rate Signif.Lower [3] Than Expected
Bay, Franklin, Gulf Healthy Start Coalition	2,487	203	193	8.17%	7.76%	
Broward Healthy Start Coalition, Inc.	22,926	2,133	2,105	9.30%	9.18%	
Capital Area Healthy Start Coalition, Inc.	3,630	344	335	9.49%	9.23%	
Central Healthy Start, Inc.	6,925	557	541	8.05%	7.81%	
Charlotte County Healthy Start Coalition, Inc.	1,199	94	92	7.84%	7.67%	
Chipola Healthy Start Coalition, Inc.	1,411	118	109	8.37%	7.73%	
Desoto	483	41	27	8.42%	5.59%	L
Escambia County Healthy Start Coalition, Inc.	4,261	396	440	9.28%	10.33%	H
Florida Keys Healthy Start Coalition, Inc.	810	64	67	7.89%	8.27%	
Gadsden Citizens for Healthy Babies Inc.	760	85	97	11.23%	12.76%	
Miami-Dade	34,286	3,028	3,092	8.83%	9.02%	
Healthy Start Community Coalition of Okaloosa and Walton Counties, Inc.	3,439	269	267	7.81%	7.76%	
Healthy Start of North Central Florida, Inc.	10,745	940	924	8.74%	8.60%	
Healthy Start Coalition of Sarasota County, Inc.	3,298	262	244	7.96%	7.40%	
Healthy Start Coalition of Hardee / Highlands / Polk Counties, Inc.	10,218	885	837	8.66%	8.19%	L
Healthy Start Coalition of Hillsborough County, Inc	18,001	1,559	1,593	8.66%	8.85%	
Healthy Start Coalition of Jefferson / Madison / Taylor Counties, Inc.	718	69	83	9.67%	11.56%	
Healthy Start Coalition of Manatee County, Inc.	4,133	351	300	8.50%	7.26%	L
Maternal Child Family Health Alliance of Palm Beach County, Inc.	15,689	1,411	1,480	8.99%	9.43%	H
Healthy Start Coalition of Pasco County, Inc.	5,528	423	453	7.65%	8.19%	
Healthy Start Coalition of Pinellas County, Inc.	9,397	795	789	8.46%	8.40%	
Healthy Start Coalition of Santa Rosa County, Inc	1,886	141	148	7.47%	7.85%	
Healthy Start Coalition of Southwest Florida, Inc.	12,595	1,047	1,016	8.31%	8.07%	
Healthy Start Coalition of St. Lucie County, Inc.	3,623	321	310	8.86%	8.56%	
Indian River County Healthy Start Coalition, Inc.	1,424	119	105	8.37%	7.37%	
Martin County Healthy Start Coalition, Inc.	1,302	106	110	8.16%	8.45%	
Northeast Florida Healthy Start Coalition, Inc.	19,268	1,727	1,722	8.96%	8.94%	
Okeechobee County Family Health / Healthy Start Coalition, Inc.	642	52	56	8.14%	8.72%	
Orange County Healthy Start Coalition, Inc.	16,858	1,496	1,508	8.88%	8.95%	
Prenatal and Infant Health Care Coalition of Brevard County, Inc.	5,731	472	487	8.23%	8.50%	
Seminole County Healthy Start Coalition, Inc.	4,772	384	354	8.05%	7.42%	L
The Healthy Start Prenatal & Infant Coalition of Flager and Volusia Counties, Inc.	6,405	532	541	8.31%	8.45%	
The Healthy Start Coalition of Osceola County, Inc.	4,219	335	335	7.94%	7.94%	
TOTAL	239,069	20,760	20,760	8.68%	8.68%	

[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