

# **INFANT MORTALITY AND LOW BIRTH WEIGHT RATES COMPARED TO EXPECTED RATES BY COUNTY FOR FLORIDA 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 counties is due in part to the unique demographic characteristics of the county 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 a county 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 county. 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:

<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 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 county to calculate the expected LBW births and infant deaths. In this way the county-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 a county existed where all the births were in category 1, then the expected statistics for the county would be the same as the statewide statistics for category 1. Another county might have had births that were all in category 8. For this county, the expected statistics would be the same as the statewide statistics for category 8. These two hypothetical counties would have different expected statistics because they have populations with different demographic characteristics. If both counties had actual rates equal to the expected rates, they would be considered equal regarding the rates. Stated differently, both counties 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 county. The correlation between IM and LBW rates across the counties was also assessed.

## **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 county, as described above. Counties with statistically, significantly high actual statistics are indicated in the tables with an “H” and “L” indicates significantly low actual statistics. The maps display the results of the statistical tests for significance. Counties where the actual statistics are significantly higher or lower are shaded, as indicated by the legend on the maps.

There is a statistically, significant correlation between counties with high LBW percentages and counties with high infant death rates. This means counties with high LBW percentages tend to have high infant death rates and counties with low LBW percentages tend to have low infant death rates. The correlation coefficient based on the ranks of the p values across counties is 0.287 with an associated p value of 0.02.

## **Discussion**

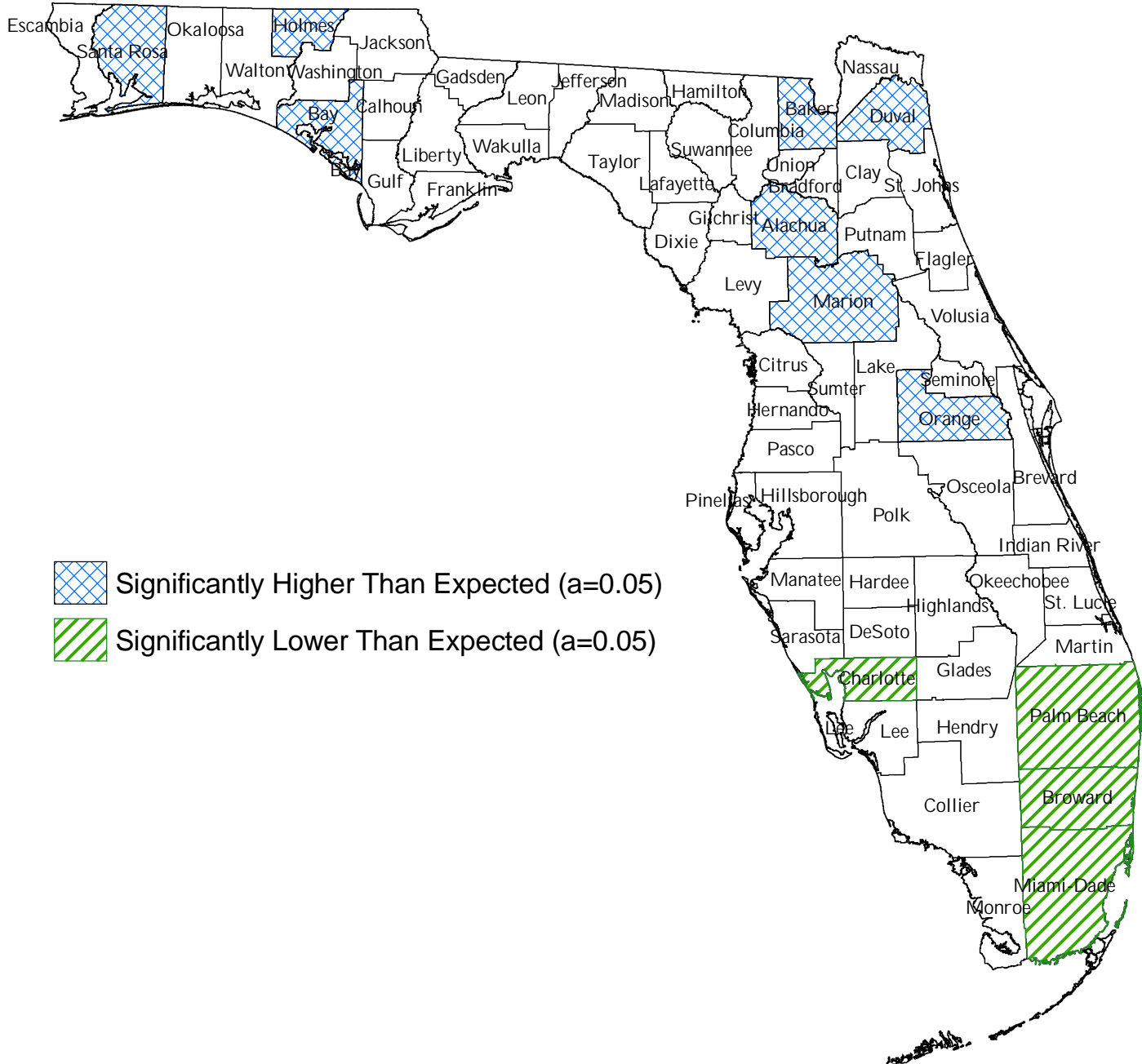
This analysis should be considered a preliminary step in the continuing endeavor to reduce risk of infant death and low birth weight in Florida. The rationale is to use the results of this analysis to focus further analysis and efforts on the areas where the risks are significantly high. Since adjustments were used to account for the differing demographic composition in each county, further analysis would focus on other factors such as smoking rates and mother’s age at birth.

Unique factors in each county 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 EXPECTED <sup>1</sup> RATES PER 1000 BIRTHS						
Mother's Resident County	2006 Births	2006 Expected <sup>1</sup> 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 <sup>2</sup> L=Actual Rate Signif. Lower <sup>2</sup> Than Expected
ALACHUA	2,837	20.8	30	7.33	10.57	H
BAKER	395	2.6	6	6.58	15.19	H
BAY	2,449	16.6	27	6.78	11.02	H
BRADFORD	359	2.4	1	6.69	2.79	
BREVARD	5,610	36.5	45	6.51	8.02	
BROWARD	23,434	199.0	147	8.49	6.27	L
CALHOUN	180	1.2	1	6.67	5.56	
CHARLOTTE	1,202	7.3	2	6.07	1.66	L
CITRUS	1,136	6.9	7	6.07	6.16	
CLAY	2,359	14.4	11	6.10	4.66	
COLLIER	4,294	28.6	28	6.66	6.52	
COLUMBIA	857	6.0	8	7.00	9.33	
DADE	33,739	246.8	218	7.31	6.46	L
DESOTO	489	3.6	6	7.36	12.27	
DIXIE	184	1.2	0	6.52	0.00	
DUVAL	13,687	110.2	130	8.05	9.50	H
ESCAMBIA	4,478	35.1	36	7.84	8.04	
FLAGLER	942	5.8	7	6.16	7.43	
FRANKLIN	125	0.9	1	7.20	8.00	
GADSDEN	761	7.7	9	10.12	11.83	
GILCHRIST	180	1.1	0	6.11	0.00	
GLADES	97	0.7	0	7.22	0.00	
GULF	136	0.9	0	6.62	0.00	
HAMILTON	188	1.6	2	8.51	10.64	
HARDEE	530	3.5	5	6.60	9.43	
HENDRY	726	5.4	4	7.44	5.51	
HERNANDO	1,600	9.6	11	6.00	6.88	
HIGHLANDS	1,106	7.9	11	7.14	9.95	
HILLSBOROUGH	17,520	125.4	137	7.16	7.82	
HOLMES	213	1.3	5	6.10	23.47	H
INDIAN RIVER	1,410	9.6	6	6.81	4.26	
JACKSON	596	4.4	7	7.38	11.74	
JEFFERSON	176	1.5	1	8.52	5.68	
LAFAYETTE	87	0.5	1	5.75	11.49	
LAKE	3,448	22.3	19	6.47	5.51	
LEE	7,497	50.1	52	6.68	6.94	
LEON	3,271	26.5	27	8.10	8.25	
LEVY	488	3.1	6	6.35	12.30	
LIBERTY	111	0.7	0	6.31	0.00	
MADISON	254	2.2	2	8.66	7.87	
MANATEE	4,139	28.3	26	6.84	6.28	
MARION	3,611	25.5	39	7.06	10.80	H
MARTIN	1,399	9.2	7	6.58	5.00	
MONROE	720	4.4	6	6.11	8.33	
NASSAU	813	4.8	4	5.90	4.92	
OKALOOSA	2,788	16.9	15	6.06	5.38	
OKEECHOBEE	623	4.2	3	6.74	4.82	
ORANGE	16,966	124.4	144	7.33	8.49	H
OSCEOLA	3,959	25.4	32	6.42	8.08	
PALM BEACH	15,702	120.1	87	7.65	5.54	L
PASCO	5,237	30.7	35	5.86	6.68	
PINELLAS	9,541	68.5	82	7.18	8.59	
POLK	8,290	60.0	55	7.24	6.63	
PUTNAM	1,072	8.4	11	7.84	10.26	
SAINT JOHN'S	1,770	10.3	5	5.82	2.82	
SAINT LUCIE	3,534	26.0	27	7.36	7.64	
SANTA ROSA	1,863	10.4	17	5.58	9.13	H
SARASOTA	3,163	19.4	13	6.13	4.11	
SEMINOLE	4,821	30.3	33	6.29	6.85	
SUMTER	523	4.3	3	8.22	5.74	
SUWANNEE	500	3.4	5	6.80	10.00	
TAYLOR	262	1.9	3	7.25	11.45	
UNION	171	1.1	0	6.43	0.00	
VOLUSIA	5,263	35.0	36	6.65	6.84	
WAKULLA	307	1.8	1	5.86	3.26	
WALTON	693	4.2	7	6.06	10.10	
WASHINGTON	261	1.8	1	6.90	3.83	
TOTAL <sup>4</sup>	237,142	1,713	1,713	7.22	7.22	
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>4</sup> The significance level used is .05						
* Total excludes 24 births with county unknown						

2006 FLORIDA ACTUAL LOW BIRTH WEIGHT <sup>1</sup> PERCENTAGES COMPARED TO EXPECTED <sup>2</sup> PERCENTAGES						
Mother's Resident County	2006 Births	2006 Expected <sup>1</sup> LBW Births	2006 Actual LBW Births	2006 Expected LBW Percent	2006 Actual LBW Percent	H=Actual Rate Signif. Higher <sup>3</sup> L=Actual Rate Signif. Lower <sup>3</sup> Than Expected
ALACHUA	2,837	259.8	256	9.16%	9.02%	
BAKER	395	32.2	41	8.15%	10.38%	
BAY	2,449	202.9	207	8.29%	8.45%	
BRADFORD	359	30.5	34	8.50%	9.47%	
BREVARD	5,610	461.8	512	8.23%	9.13%	H
BROWARD	23,434	2210.1	2,130	9.43%	9.09%	L
CALHOUN	180	14.5	16	8.06%	8.89%	
CHARLOTTE	1,202	94.5	99	7.86%	8.24%	
CITRUS	1,136	88.4	92	7.78%	8.10%	
CLAY	2,359	187.9	192	7.97%	8.14%	
COLLIER	4,294	352.1	289	8.20%	6.73%	L
COLUMBIA	857	74.6	68	8.70%	7.93%	
DADE	33,739	3008.2	2,901	8.92%	8.60%	L
DESOTO	489	41.4	41	8.47%	8.38%	
DIXIE	184	14.6	18	7.93%	9.78%	
DUVAL	13,687	1298.0	1,303	9.48%	9.52%	
ESCAMBIA	4,478	418.1	491	9.34%	10.96%	H
FLAGLER	942	75.7	93	8.04%	9.87%	H
FRANKLIN	125	10.0	9	8.00%	7.20%	
GADSDEN	761	86.0	89	11.30%	11.70%	
GILCHRIST	180	13.9	18	7.72%	10.00%	
GLADES	97	8.1	6	8.35%	6.19%	
GULF	136	11.3	16	8.31%	11.76%	
HAMILTON	188	17.8	24	9.47%	12.77%	
HARDEE	530	42.2	44	7.96%	8.30%	
HENDRY	726	62.3	70	8.58%	9.64%	
HERNANDO	1,600	124.9	121	7.81%	7.56%	
HIGHLANDS	1,106	95.2	90	8.61%	8.14%	
HILLSBOROUGH	17,520	1514.9	1,595	8.65%	9.10%	H
HOLMES	213	16.3	16	7.65%	7.51%	
INDIAN RIVER	1,410	118.4	100	8.40%	7.09%	L
JACKSON	596	54.0	64	9.06%	10.74%	
JEFFERSON	176	17.6	19	10.00%	10.80%	
LAFAYETTE	87	6.9	8	7.93%	9.20%	
LAKE	3,448	280.6	281	8.14%	8.15%	
LEE	7,497	620.2	624	8.27%	8.32%	
LEON	3,271	319.1	326	9.76%	9.97%	
LEVY	488	39.7	43	8.14%	8.81%	
LIBERTY	111	9.0	11	8.11%	9.91%	
MADISON	254	25.6	28	10.08%	11.02%	
MANATEE	4,139	346.6	305	8.37%	7.37%	L
MARION	3,611	313.1	311	8.67%	8.61%	
MARTIN	1,399	113.2	104	8.09%	7.43%	
MONROE	720	56.9	63	7.90%	8.75%	
NASSAU	813	63.1	77	7.76%	9.47%	H
OKALOOSA	2,788	221.0	209	7.93%	7.50%	
OKEECHOBEE	623	50.3	63	8.07%	10.11%	H
ORANGE	16,966	1510.6	1,602	8.90%	9.44%	H
OSCEOLA	3,959	321.0	371	8.11%	9.37%	H
PALM BEACH	15,702	1407.3	1,412	8.96%	8.99%	
PASCO	5,237	400.9	442	7.66%	8.44%	H
PINELLAS	9,541	818.8	811	8.58%	8.50%	
POLK	8,290	723.4	664	8.73%	8.01%	L
PUTNAM	1,072	98.3	117	9.17%	10.91%	H
SAINT JOHNS	1,770	137.3	125	7.76%	7.06%	
SAINT LUCIE	3,534	315.4	283	8.92%	8.01%	L
SANTA ROSA	1,863	140.4	149	7.54%	8.00%	
SARASOTA	3,163	251.5	214	7.95%	6.77%	L
SEMINOLE	4,821	393.6	363	8.16%	7.53%	
SUMTER	523	46.2	46	8.83%	8.80%	
SUWANNEE	500	42.1	37	8.42%	7.40%	
TAYLOR	262	23.5	21	8.97%	8.02%	
UNION	171	14.3	15	8.36%	8.77%	
VOLUSIA	5,263	439.7	396	8.35%	7.52%	L
WAKULLA	307	24.3	27	7.92%	8.79%	
WALTON	693	53.7	68	7.75%	9.81%	H
WASHINGTON	261	22.2	28	8.51%	10.73%	
TOTAL <sup>4</sup>	237,142	20708.0	20,708	8.73%	8.73%	
<sup>1</sup> LBW = Low birth Weight. defined as birth weight below 2500 grams.						
<sup>2</sup> The expected number of low birth weight births 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						
<sup>4</sup> Total excludes 24 births with county unknown						

**Florida 2006**  
**Actual County Infant Deaths per 1,000 Births**  
**Compared to Expected County Infant Deaths per 1,000 Births**



# Florida 2006 Actual County LBW Percentage Compared to Expected County LBW Percentage

