INFANT MORTALITY AND LOW BIRTH WEIGHT RATES COMPARED TO EXPECTED RATES BY COUNTY FOR FLORIDA 2001

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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. These data are also virtually 100 percent complete since they are recorded for every birth and death that occurs in the state.

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. The adjusted statistics can then be compared across counties independently of the demographic differences.

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 year 2001. Births were classified as LBW if the birth weight on the birth record was in the range 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 12^{th} grade or higher completed or less than 12^{th} 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 1500 birth records in the ninth category, or less than one percent 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

Using this classification, the category specific rates were calculated from the statewide totals, and these rates were used with the 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.

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.

Results

The results of this analysis are shown in the following tables and maps. 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. 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 0.351 with an associated p value of 0.00356.

Discussion

This analysis should be considered a preliminary step in the continuing endeavor to reduce risk of low birth weight and infant death 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. The process becomes much more complicated at this point, and a separate analysis should be done for each area of concern.

2001 FLORIDA ACTUAL INFANT DEATH RATES PER 1000 BIRTHS COMPARED TO EXPECTED [1] RATES PER 1000 BIRTHS

1	2	3	4	5	6	7
Mother's Resident County	2001 Births	2001 Expected Infant Deaths [1]	2001 Actual Infant Deaths	2001 Expected Infant Death Rate Per 1000 Births	2001 Actual Infant Death Rate Per 1000 Births	H=Actual Rate Signif.Higher [2] L=Actual Rate Signif.Lower [2] Than Expected Rate
ALACHUA	2,462	18.6	20	7.55	8.12	
BAKER	340	2.3	2	6.74	5.88	
BAY	1,906	12.5	16	6.56	8.39	
BRADFORD	290	2.1	3	7.26	10.34	
BREVARD	4,789	31.0	24	6.48	5.01	
BROWARD	22,384	174.5	147	7.80	6.57	L
CALHOUN	143	1.0	3	7.22	20.98	
CHARLOTTE	1,038	6.1	8	5.92	7.71	
CITRUS	852	5.0	6	5.87	7.04	
CLAY	1,955	11.7	14	5.97	7.16	
COLLIER	3,484	24.1	20	6.90	5.74	
COLUMBIA	764	5.6	6	7.31	7.85	
DADE	32,425	249.9	189	7.71	5.83	L
DESOTO	448	3.4	4	7.63	8.93	
DIXIE	172	1.2	1	7.01	5.81	
DUVAL	12,185	97.2	136	7.98	11.16	H
ESCAMBIA	3,916	30.4	58	7.77	14.81	H
FLAGLER	418	2.5	3	6.07	7.18	
FRANKLIN	91	0.6		6.85	0.00	
GADSDEN	703	7.4	9	10.47	12.80	
GILCHRIST	172	1.0		5.87	0.00	
GLADES	95	0.6		6.69	0.00	
GULF	111	0.7	2	6.35	18.02	
HAMILTON	163	1.4	3	8.44	18.40	
HARDEE	474	3.5	3	7.36	6.33	
HENDRY	671	5.2	7	7.70	10.43	
HERNANDO	1,242	7.6	6	6.15	4.83	
HIGHLANDS	889	6.7	11	7.52	12.37	
HILLSBOROUGH	14,866	106.5	125	7.17	8.41	H
HOLMES	224	1.3	4	5.94	17.86	H
INDIAN RIVER	1,124	7.7	4	6.84	3.56	
JACKSON	518	3.9	4	7.57	7.72	
JEFFERSON	154	1.4	2	8.88	12.99	
LAFAYETTE	95	0.6		6.59	0.00	
LAKE	2,487	16.9	19	6.78	7.64	
LEE	5,340	36.4	29	6.82	5.43	
LEON	2,938	23.6	29	8.04	9.87	
LEVY	381	2.6	2	6.91	5.25	
LIBERTY	84	0.6		6.71	0.00	
MADISON	239	2.3	2	9.56	8.37	
MANATEE	3,194	22.6	29	7.07	9.08	
MARION	2,953	21.4	22	7.24	7.45	
MARTIN	1,219	8.1	12	6.65	9.84	
MONROE	709	4.3	3	6.05	4.23	
NASSAU	713	4.2	4	5.90	5.61	
OKALOOSA	2,387	15.2	22	6.36	9.22	
OKEECHOBEE	552	3.9	2	7.01	3.62	
ORANGE	14,242	106.5	105	7.48	7.37	
OSCEOLA	2,704	16.9	15	6.25	5.55	
PALM BEACH	13,745	102.2	89	7.44	6.48	
PASCO	3,871	23.0	24	5.93	6.20	
PINELLAS	9,425	64.1	81	6.80	8.59	H
POLK	6,876	51.4	50	7.47	7.27	
PUTNAM	912	7.3	10	8.01	10.96	
SAINT JOHNS	1,269	7.7	10	6.04	7.88	
SAINT LUCIE	2,228	17.4	9	7.80	4.04	L
SANTA ROSA	1,537	8.7	7	5.63	4.55	
SARASOTA	2,787	17.3	10	6.22	3.59	L
SEMINOLE	4,510	27.9	26	6.19	5.76	
SUMTER	429	3.2	2	7.56	4.66	
SUWANNEE	458	3.3	3	7.24	6.55	
TAYLOR	256	1.9	3	7.37	11.72	
UNION	154	1.1	1	6.97	6.49	
VOLUSIA	4,665	31.4	29	6.74	6.22	
WAKULLA	294	1.9	2	6.36	6.80	
WALTON	460	3.0	1	6.44	2.17	
WASHINGTON	219	1.5	3	6.87	13.70	
TOTAL	205800	1,495	1,495	7.26	7.26	

[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*

2001 FLORIDA ACTUAL LOW BIRTH WEIGHT[1] PERCENTAGES COMPARED TO EXPECTED PERCENTAGES[2]

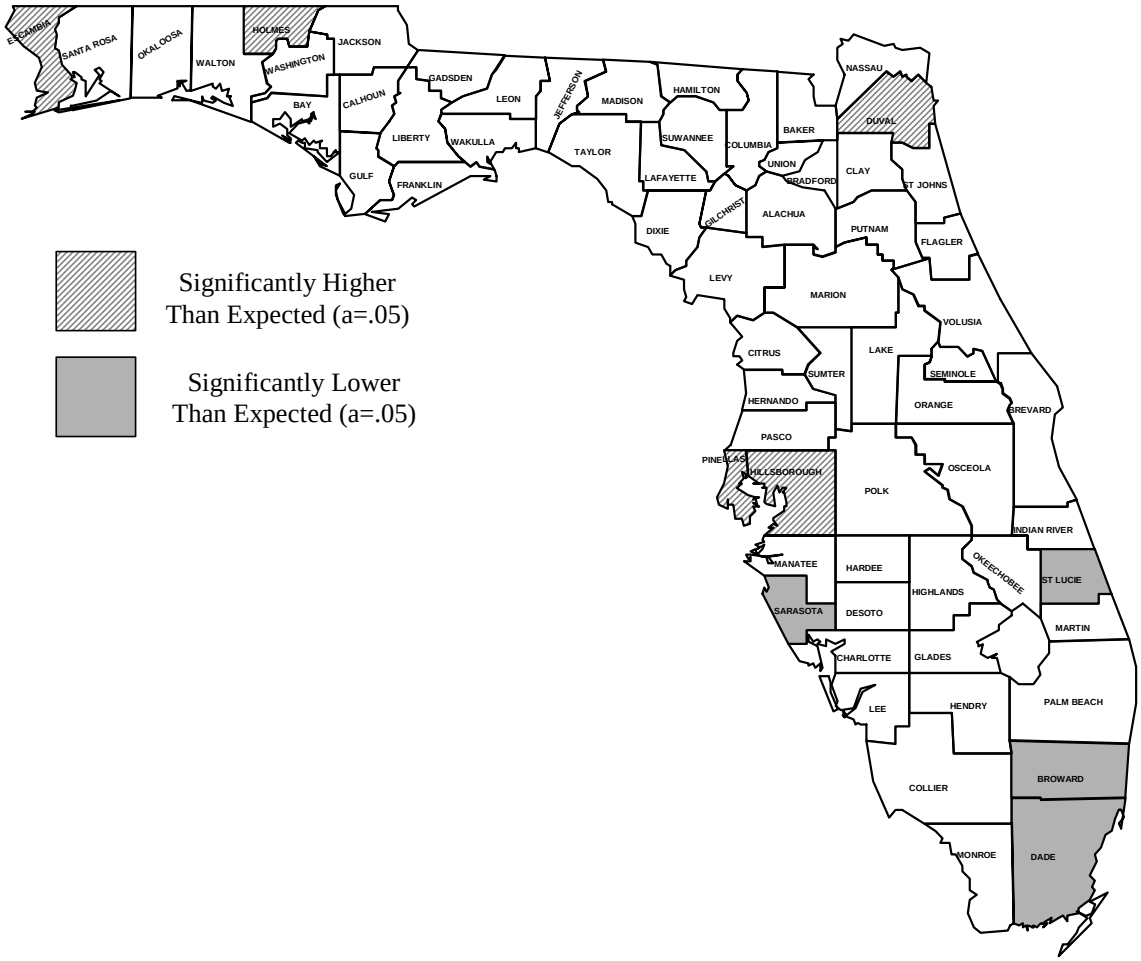
1	2	3	4	5	6	7
Mother's Resident County	2001 Resident Births	2001 Expected LBW Births	2001 Actual LBW Births	2001 Expected LBW Percent	2001 Actual LBW Percent	H=Actual LBW % Signif.Higher [3] L=Actual LBW % Signif.Lower [3] Than Expected %
ALACHUA	2462	210	191	8.52%	7.76%	
BAKER	340	26	27	7.71%	7.94%	
BAY	1906	155	150	8.16%	7.87%	
BRADFORD	290	23	26	7.93%	8.97%	
BREVARD	4789	368	337	7.69%	7.04%	L
BROWARD	22384	1938	1852	8.66%	8.27%	L
CALHOUN	143	11	8	7.87%	5.59%	
CHARLOTTE	1038	76	79	7.30%	7.61%	
CITRUS	852	63	58	7.36%	6.81%	
CLAY	1955	141	150	7.23%	7.67%	
COLLIER	3484	266	218	7.64%	6.26%	L
COLUMBIA	764	63	69	8.21%	9.03%	
DADE	32425	2728	2467	8.41%	7.61%	L
DESOTO	448	36	40	7.93%	8.93%	
DIXIE	172	13	12	7.52%	6.98%	
DUVAL	12185	1074	1129	8.82%	9.27%	H
ESCAMBIA	3916	338	398	8.63%	10.16%	H
FLAGLER	418	32	33	7.65%	7.89%	
FRANKLIN	91	7	5	8.18%	5.49%	
GADSDEN	703	74	79	10.57%	11.24%	
GILCHRIST	172	12	16	7.16%	9.30%	
GLADES	95	7	6	7.66%	6.32%	
GULF	111	9	11	8.22%	9.91%	
HAMILTON	163	15	15	9.13%	9.20%	
HARDEE	474	36	36	7.57%	7.59%	
HENDRY	671	54	55	8.03%	8.20%	
HERNANDO	1242	91	90	7.32%	7.25%	
HIGHLANDS	889	71	69	7.99%	7.76%	
HILLSBOROUGH	14866	1202	1242	8.09%	8.35%	
HOLMES	224	16	20	7.09%	8.93%	
INDIAN RIVER	1124	89	82	7.87%	7.30%	
JACKSON	518	45	46	8.68%	8.88%	
JEFFERSON	154	15	11	9.92%	7.14%	
LAFAYETTE	95	7	6	7.36%	6.32%	
LAKE	2487	191	202	7.69%	8.12%	
LEE	5340	418	458	7.83%	8.58%	H
LEON	2938	260	292	8.84%	9.94%	H
LEVY	381	30	38	7.99%	9.97%	
LIBERTY	84	7	10	8.08%	11.90%	
MADISON	239	23	32	9.61%	13.39%	H
MANATEE	3194	249	259	7.80%	8.11%	
MARION	2953	238	256	8.07%	8.67%	
MARTIN	1219	91	80	7.44%	6.56%	
MONROE	709	53	46	7.50%	6.49%	
NASSAU	713	52	52	7.24%	7.29%	
OKALOOSA	2387	179	203	7.50%	8.50%	H
OKEECHOBEE	552	42	38	7.58%	6.88%	
ORANGE	14242	1181	1301	8.29%	9.13%	H
OSCEOLA	2704	201	238	7.42%	8.80%	H
PALM BEACH	13745	1155	1101	8.40%	8.01%	L
PASCO	3871	278	299	7.19%	7.72%	
PINELLAS	9425	738	754	7.83%	8.00%	
POLK	6876	560	568	8.14%	8.26%	
PUTNAM	912	79	84	8.67%	9.21%	
SAINT JOHNS	1269	94	96	7.37%	7.57%	
SAINT LUCIE	2228	189	178	8.48%	7.99%	
SANTA ROSA	1537	107	135	6.93%	8.78%	H
SARASOTA	2787	206	201	7.40%	7.21%	
SEMINOLE	4510	339	338	7.51%	7.49%	
SUMTER	429	35	25	8.10%	5.83%	
SUWANNEE	458	36	31	7.83%	6.77%	
TAYLOR	256	21	22	8.11%	8.59%	
UNION	154	11	12	7.38%	7.79%	
VOLUSIA	4665	364	365	7.80%	7.82%	
WAKULLA	294	22	21	7.55%	7.14%	
WALTON	460	34	30	7.46%	6.52%	
WASHINGTON	219	18	14	8.10%	6.39%	
TOTAL	205800	16812	16812	8.17%	8.17%	

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

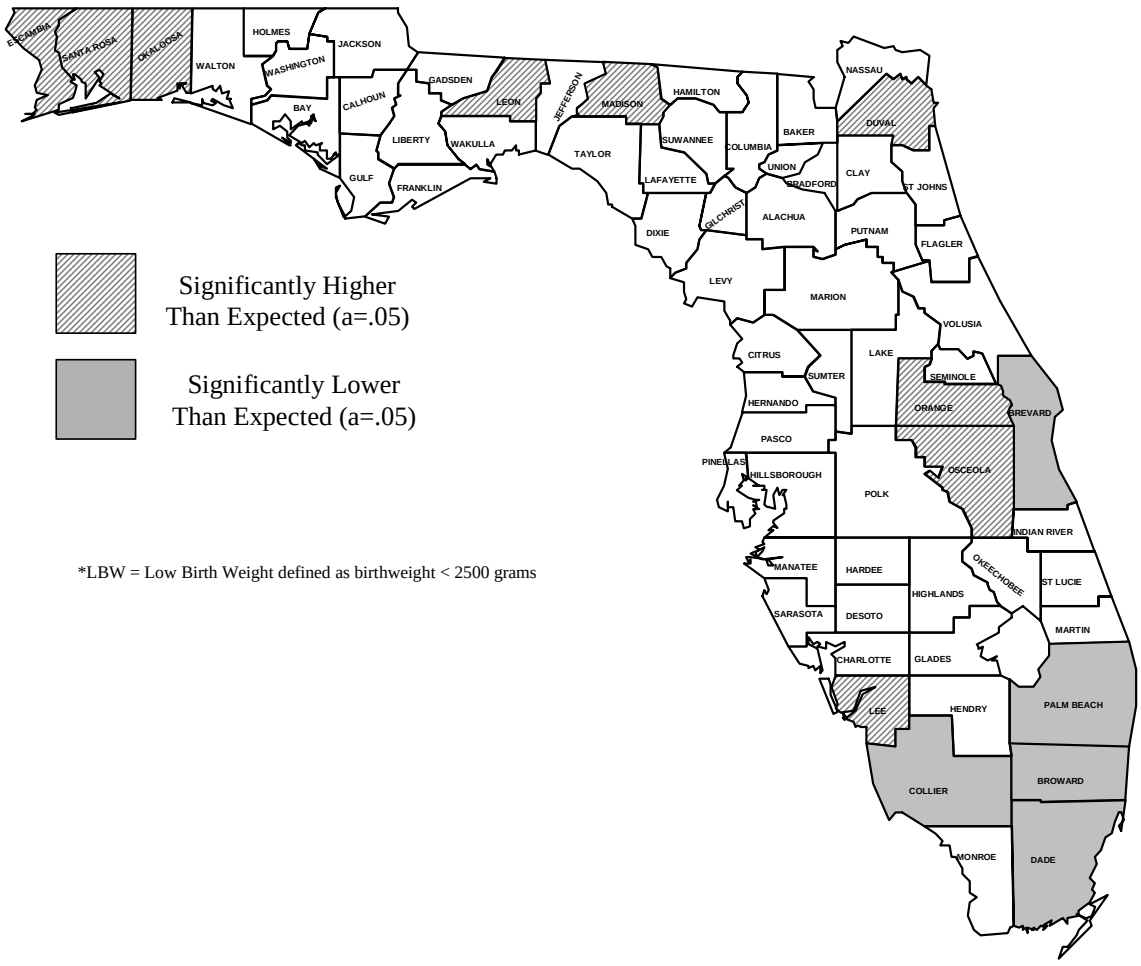
[2] *The expected LBW percentage is calculated based on the maternal race, marital status and education characteristics of the births in each county*

[3] *The significance level used is .05*

FLORIDA 2001 COUNTY ACTUAL
INFANT DEATH RATES PER 1000 BIRTHS
COMPARED TO EXPECTED
COUNTY INFANT DEATH RATES PER 1000 BIRTHS



FLORIDA 2001 COUNTY ACTUAL LBW* PERCENTAGE
COMPARED TO EXPECTED COUNTY LBW PERCENTAGE



*LBW = Low Birth Weight defined as birthweight < 2500 grams