Birth Outcome Correlations for Florida Counties Compared to Correlations for Individuals

Abstract

Correlations between low birth weight, preterm birth and infant death were calculated for individual births and also for aggregated county level data. It was found that statistically significant correlations at the individual level were not correlated at the county level.

Introduction

Infants born weighing less than 2500 grams (5 pounds, 8 ounces) or before 37 weeks gestation are far more likely to die before their first birthday compared to infants born weighing more than 2500 grams and after 36 weeks gestation. At the county level, this might be expected to result in strong correlations between the percentages of these birth outcomes and infant death rates for Florida's 67 counties. The purpose of this analysis is to determine if these correlations are evident in the county level data.

Analysis

The data used in this analysis were birth records for 2017 linked to infant deaths, and aggregate data by county from Florida CHARTS (http://www.flhealthcharts.com/charts/Default.aspx).

Table 1 and Graph 1 below show the infant death rates for births with and without low birth weight (LBW) and preterm birth (PT) outcomes.

Table 1

	Florida 2017 Infant Death Rates by Birth Outcome		
	Infant Death Rate	95% Confidence Interval	
	Per 1,000 Births	Lower	Upper
Births < 2500 grams (LBW)	49.1	46.1	52.1
Births < 37 weeks gestation (PT)	41.4	38.8	44.0
Births LBW and PT	65.5	61.4	69.7
All Births	6.0	5.7	6.4
Births not PT and not LBW	1.7	1.5	1.9

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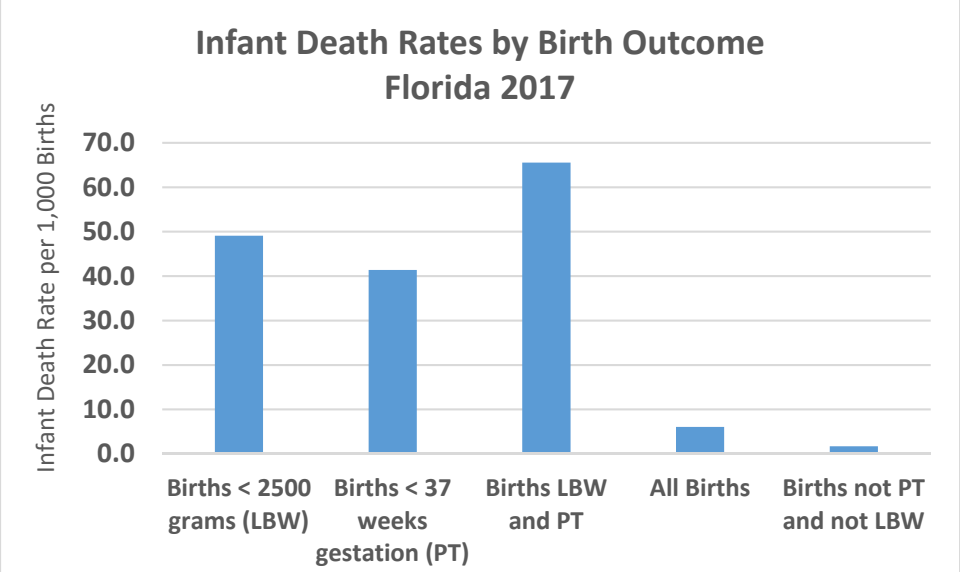
Graph 1



The high infant death rates for LBW and PT births are also evident in the correlation between these outcomes and infant death as shown in Table 2.

Table 2

Florida 2017 Correlation of Infant Deaths to Birth Outcomes by Individual			
	Correlation with		
For births in 2017 linked to infant deaths (n = 224,700)	**Infant Death**	**P value**	
Births < 2500 grams (LBW)	0.17	0.000	**
Births < 37 weeks gestation (PT)	0.15	0.000	**
Births LBW and PT	0.20	0.000	**
** Statistically significant at the 0.001 level			

Note that the tables and graph above are based on individual level data. The data set used in this analysis contained 224,700 rows, one row for each birth in 2017.

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Another way to analyze the data is to look at county level data. This data has the advantage of being more readily available and easier to process since the number of rows in the data set is 67, one row for each county in Florida.

Table 3 below shows the correlation between LBW and PT percentages and infant death rates for the 67 counties.

Table 3

Florida 2017 Correlation of Infant Death Rates to Birth Outcomes by County			
For 67 Counties (n = 67)	**Correlation**	**P value**	
Percentage of Births < 2500 grams (LBW)	0.05	0.674	
Percentage of Births < 37 weeks gestation (PT)	-0.02	0.874	
Percentage of Births LBW and PT	0.24	0.049	*
* Statistically significant at the 0.05 level			

In Table 3, only the percentage of births that are PT and LBW is significantly correlated with the infant death rates. For the other 2 measures, LBW and PT, the correlation is close to zero which indicates no correlation.

In summary, at the individual level all three measures are significantly correlated with infant death. This is different at the county level where only one of the measures (LBW with PT) is significantly correlated with infant death, while the other two measures (LBW and PT) are not correlated with infant death.

Discussion

This analysis illustrates the limitations of using aggregated data to assess correlation. In this analysis, some measures that are known to be highly correlated with infant death, do not reveal any correlation when aggregate county level data are examined. This could have implications for the analysis of other aggregated data sets. For example, on an individual level it may be true that income below the poverty level is associated with lower life expectancy and higher death rates. But the relationship may not be apparent when analysis is done with data aggregated at the county, census tract or zip code level.