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Racial Disparities in Infant Mortality Rates for Florida Compared to All Other States Combined 2001 through 2010

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Introduction

The risk of death within the first year of life is very high compared to the risk of death at subsequent ages. According to the 2012 Florida Vital Statistics Annual Report, the death rate for persons below age 1 (or less than 365 days old) was 614.7 deaths per 100,000 population in 2012. In contrast, the death rate for the 1-4 age group was 27.9 deaths per 100,000 population. In 2012, the death rates were also lower for older age groups up through the 55-64 age group where the 2012 death rate was 880.0 deaths per 100,000 population (Florida Department of Health, Office of Vital Statistics, 2013).

The infant mortality rate is another measure of infant death risk. An infant mortality rate (IMR) is calculated as the number of infant deaths in a period of time, divided by the number of live births that occurred during the same period of time with the product multiplied by 1,000 to provide an infant mortality rate per 1,000 live births. IMRs are globally used as indicators of infant and population health. IMRs are also used to assess the presence and magnitude of infant health disparities between populations and population subgroups. A health disparity is defined as 'differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups' or 'if a health outcome is seen in a greater or lesser extent between populations' (National Cancer Institute, 2010; United States Department of Health and Human Services, 2014).

In addition to the higher risk of death within the first year of life compared to older age groups, the risk of infant death is not equal between racial subgroups. Historically, nationally and in Florida, IMRs of infants born to Black mothers have been much higher than IMRs of infants born to White mothers despite declines in overall infant mortality. For example, the 2012 Florida IMR reached an historic low of 6.0 infant deaths per 1,000 live births. In 2012, both race-specific Florida IMRs for Black and White infants were also historically low, but the IMR for Black infants was still 2.3 times higher than the IMR for White infants at 10.7 and 4.6 infant deaths per 1,000 live births, respectively (Florida Department of Health, 2013).

Consistent racial disparities in infant mortality is a national and state public health issue. It is well known that racial disparities between Black and White infant mortality in the U.S. are mirrored in Florida. The purposes of this analysis are to compare total and race-specific IMRs and assess the race-specific IMR trends for Florida and the remaining collective of states (hereafter known as 'All Other States'). In addition, this analysis examines and compares the magnitude of Black-White disparity trends in infant mortality for Florida and All Other States.

Methods

Florida infant mortality data was obtained from the Florida Community Health Assessment Resource Tool Set (Florida CHARTS) . Florida CHARTS is available at <http://www.floridacharts.com/charts/default.aspx>. Infant mortality data for All Other States was obtained from CDC Wonder, available at <http://wonder.cdc.gov/>. In this analysis, data counts for All Other States were obtained by subtracting the data counts for Florida from total U.S. data counts.

Infant mortality data for Florida and All Other States combined was used to calculate the annual percent change and corresponding 95% confidence intervals. All calculations and statistical testing was performed by R statistical software (R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>).

Results

Table 1 and Figure 1 show that the Black IMRs have been generally decreasing from 2001 to 2012 in Florida and from 2001 to 2010 in All Other States. [Note: At the time of this analysis, 2011 and 2012 final infant mortality data were not available for the All Other States]. In the latter years, 2007 through 2010, the Florida Black IMRs are higher than the Black IMRs for All Other States. However, the differences between the Florida and All Other States IMRs are only statistically significant for Year 2009. In 2009, the difference between Florida and All Other States Black IMRs is statistically significant at a p-value= 0.03.

From 2001 to 2012, the Florida annual percent change in Black IMRs was -1.72%. The annual percent change in Black IMRs in All Other States was -1.91% from 2001 to 2010. Although the annual percent change values for Black IMRs between Florida and All Other States are different in these comparison periods, the difference is not statistically significant. This is also true when the comparison is done using only the years 2001 to 2010 for Florida.

From 2001 to 2003, the differences between White IMRs for Florida and White IMRs for All Other States are not statistically significant. However, from 2004 through 2010, the differences between the Florida and All Other State White IMRs are statistically significant (α -level < 0.05) with Florida having the lower rates. This change in the White IMR trends can be seen in Figure 2 where the White IMR lines for Florida and All Other States combined begin diverging after Year 2003.

For White infants in Florida, IMRs decreased at an annual percent change of -2.09% between 2001 and 2012 (Table 2). In contrast, the White IMR trend for All Other States did not decrease at the same rate as the Florida White IMR as shown by an annual percent change of -0.66% between 2001 and 2010. This difference in annual percent change in White IMRs between Florida and All Other States is statistically significant (α -level < 0.05). However, the difference in the annual percent change is not statistically significant when comparing the Florida annual percent change for 2001 to 2010 to the annual percent change for All Other States for the same time period.

For Florida and All Other States, Table 3 shows the magnitude of Black-to-White disparities in infant mortality as measured by Black-White IMR ratios. Between 2001 and 2012, the trend of Black-White IMR ratios was essentially flat for Florida with an annual percentage increase of 0.38%, which is not a statistically significant increase. In contrast, there was a statistically significant decline in the trend of Black-White IMR ratios for All Other States at an annual percentage decline of -1.26%.

Discussion

This analysis confirms infant mortality is declining for Black and White infants in the U.S. and Florida. However, this analysis highlights race-specific differences in the infant mortality declines between Florida and All Other States. From 2001 through 2010, IMRs for Black infants are decreasing at approximately the same pace for Florida and All Other States. However, while the trend in White IMRs for All Other States is statistically flat, the White IMR trend for Florida is decreasing significantly. Additionally, in contrast to the Black IMRs during the same period, the White IMRs in Florida are lower than the White IMRs for All Other States.

This analysis also shows that the magnitude of disparity between the Black and White infant mortality in Florida has remained essentially unchanged between 2001 and 2012. In contrast, the magnitude of disparity between Black and White infant mortality in All Other States decreased at a small, but significant rate between 2001 and 2010.

Limitations of this analysis are that data used to examine infant mortality rates and trends are solely state and national vital statistics data. This data used for statistical examination may not have captured quantitative or qualitative nuances between Florida and All Other States that may influence similarities or differences in IMRs, IMR trends and magnitude of racial disparities. An overriding strength of this analysis is the use of historical infant mortality measures to identify components that uniquely identify disparities in Florida compared to other states. Differences in the infant mortality and racial disparity experiences found between Florida and All Other States indicate that Florida's interventions and initiatives to improve infant health may have differed from broad-based national measures.

Table 1
**Black Infant Mortality Rates and Rate Ratios:
 Florida and All Other States, 2001-2012**

Year	Florida Black Infant Mortality Rate per 1,000 Births	All Other States Black Infant Mortality Rate per 1,000 Live Births	Florida to All Other States Black Rate Ratio
2001	13.49	13.19	1.02
2002	13.64	13.62	1.00
2003	13.73	13.55	1.01
2004	13.21	13.48	0.98
2005	13.60	13.42	1.01
2006	12.85	13.39	0.96
2007	13.36	12.82	1.04
2008	12.87	12.21	1.05
2009	13.19	12.07	1.09
2010	11.79	10.96	1.08
2011	11.96	NA	NA
2012	10.68	NA	NA
Annual Percent Change	-1.72%	-1.91%	0.85%
95% CI lower	-2.54%	-2.94%	0.00%
95% CI upper	-0.89%	-0.87%	1.70%

Annual percent change for Florida and All Other States is not statistically significantly different at alpha < 0.05

**Figure 1 Black Infant Mortality Rates per 1,000 Live Births:
 Florida and All Other States, 2001-2012**

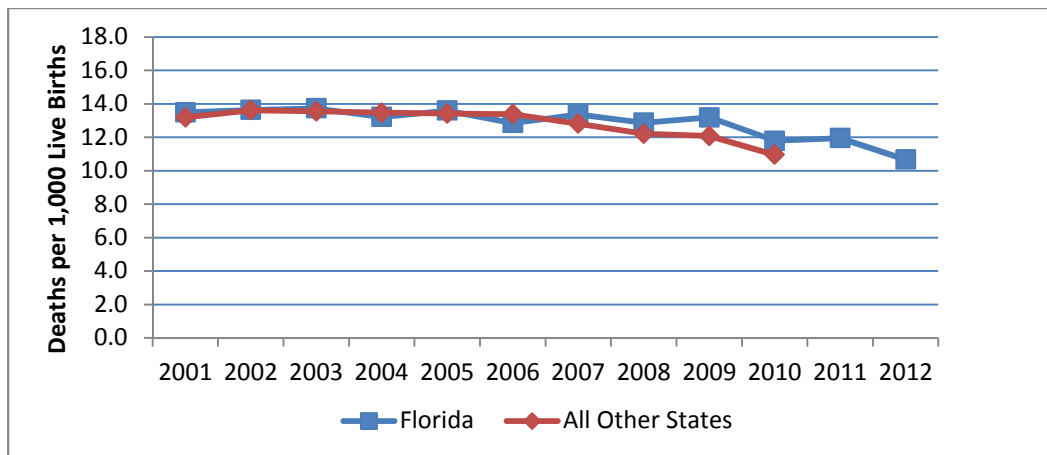


Table 2
Florida White Race Infant Mortality Rates Compared to Rates for All Other States

Year	Florida White Infant Mortality Rate per 1,000 Live Births	All Other States White Infant Mortality Rate per 1,000 Live Births	Florida to All Other States White Rate Ratio
2001	5.53	5.77	0.96
2002	5.86	5.98	0.98
2003	5.76	5.97	0.96
2004	5.47	5.88	0.93
2005	5.31	6.06	0.88
2006	5.59	5.97	0.94
2007	5.19	6.01	0.86
2008	5.46	5.84	0.93
2009	4.90	5.62	0.87
2010	4.89	5.40	0.91
2011	4.59	NA	NA
2012	4.55	NA	NA
Annual Percent Change	-2.09%	-0.66%	-0.99%
95% CI lower	-2.80%	-1.45%	-1.87%
95% CI upper	-1.37%	0.14%	-0.10%

Annual percent change for Florida and All Other States is statistically significantly different at alpha < 0.05

Figure 2 White Infant Mortality rates per 1,000 Live Births: Florida and All Other States, 2001-2012

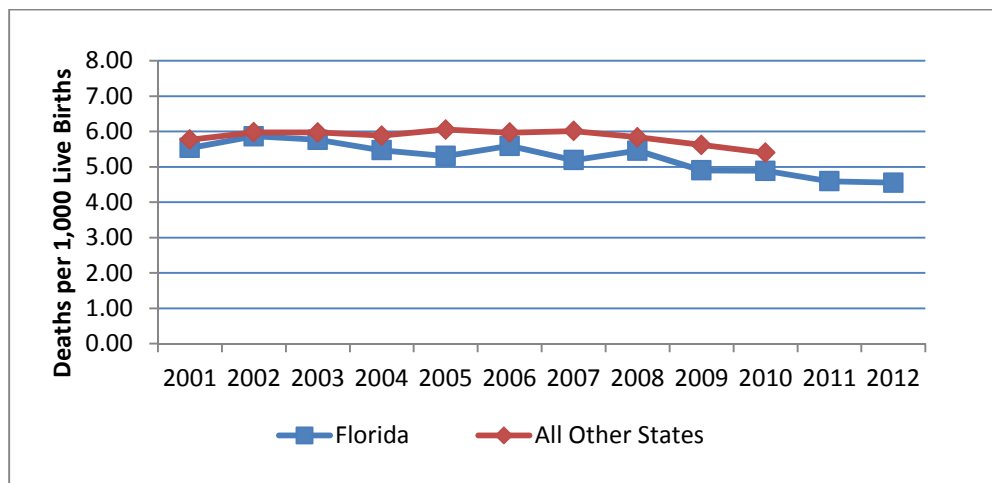


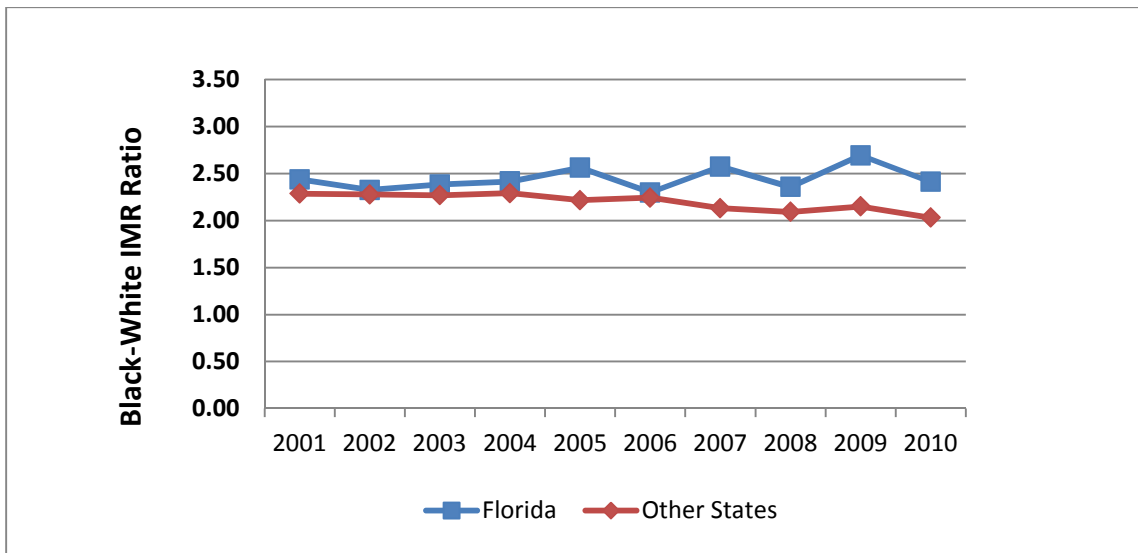
Table 3
**Florida Rate Ratio of Black Infant Mortality Rates to
 White Rates for Florida and All Other States**

Year	Florida Black to White Rate Ratio	All Other States Black to White Rate Ratio	Rate Ratio Difference Florida minus All Other States
2001	2.44	2.29	0.15
2002	2.33	2.28	0.05
2003	2.38	2.27	0.11
2004	2.42	2.29	0.12
2005	2.56	2.22	0.35
2006	2.30	2.24	0.05
2007	2.57	2.13	0.44
2008	2.36	2.09	0.27
2009	2.69	2.15	0.54
2010	2.41	2.03	0.38
2011	2.60	NA	NA
2012	2.34	NA	NA

Annual Percent Change	0.38%	-1.26%
95% CI lower	-0.58%	-1.75%
95% CI upper	1.34%	-0.77%

Annual percent change for Florida and All Other States is statistically significantly different at alpha < 0.05

**Figure 3 Black-White Infant Mortality Rate Ratios:
 Florida and All Other U.S. States, 2001-2010**



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