White Paper:

Racial Disparities in Infant Mortality Rates for Florida Compared to All Other States Combined 2007 through 2018

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Acknowledgements

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Executive Summary

This document serves as a summary of statistical analyses related to infant mortality rates within Florida and the disparity of infant mortality experienced by differing racial groups. Infant mortality is the death of an infant prior to their first birthday. National and state level data have consistently demonstrated that Black infants are twice as likely to die in infancy in comparison to White infants. Such a health disparity, or differing health outcome in a socially disadvantaged group, is concerning and should be addressed in order to ensure health and well-being of the population. The purpose of this paper is to review the infant mortality rate (IMR) across racial groups and aims to help in developing a better understanding of the health disparity.

It is important to note this analysis in no way provides an exhaustive understanding of infant mortality as many factors across the socio-ecological system contribute to the phenomenon. Such factors include, but are not limited to, individual behaviors, level of educational attainment, access to quality health care, and policy. However, with concerted efforts across multiple domains, improvement is possible.

Introduction

Infant death occurs when an infant, that is a child less than one year old, dies (Centers for Disease Control and Prevention, 2019). The most common causes of death cited by the Centers for Disease Control and Prevention (CDC) are birth defects, preterm birth and low birth weight, maternal pregnancy complications, sudden infant death syndrome, and injuries. In Florida, the top five leading causes of infant death in 2018 were congenital malformations, deformations, and chromosomal abnormalities; other non-rankable cause of death; disorders related to short gestation and low birth weight, not elsewhere classified; unintentional injuries; and newborn affected by maternal complications of pregnancy.

The risk of death within the first year of life is very high compared to subsequent ages. The Florida Vital Statistics Annual Report 2018 states the death rate for children under one year old (or less than 365 days old) was 615.7 deaths per 100,000 population in 2018. A sharp contrast is evident when this rate is compared to the death rate for the one to four age group, which was 26.9 deaths per 100,000 population for the same year. A review of the age specific death rates maintains the trend of disproportionately higher death rates in infants when compared to older age groups up through ages 45–54 (Florida Department of Health, Office of Vital Statistics, 2019).

The infant mortality rate (IMR) is the number of infant deaths divided by the number of live births that occurred during the same period multiplied by 1,000. This calculation provides the rate of infant deaths per 1,000 live births (i.e., IMR; CDC, 2019b). The IMR serves as a measure of infant death risk and is used as an indicator of infant and population health. IMRs are also used to assess the presence and magnitude of infant health disparities between and within populations. Health disparities are when avoidable differences in health metrics, such as disease incidence, mortality, or burden, are disproportionately evident in socially disadvantaged groups within a population (CDC, 2019a).

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 across racial groups. Historically, at both the state and national levels, 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, Florida reached a historic low of 6.0 infant deaths per 1,000 live births in 2012. In 2018, both race-specific Florida IMRs for Black and White infants were also historically low, but the IMR for Black infants was still 2.6 times higher than the IMR for White infants at 11.26 and 4.29 infant deaths per 1,000 live births, respectively (Florida Department of Health, 2019).

The top five leading causes of infant death in Florida are consistent across race. Figure 1 depicts the top five leading causes of death by race. Florida's Black infants were more likely to die due to gestation and low birth weight while White infants were more likely to die due to congenital malformations, deformations and chromosomal abnormalities (Florida Department of Health, 2019).

Consistent racial disparities in infant mortality remain a national and state public health concern. It is well demonstrated that racial disparities between Black and White infant mortality in the U.S. are also present in Florida. The primary purpose of this analysis is to compare total and race-specific IMRs and assess the race-specific IMR trends for Florida and the remaining states (hereafter referred to as 'All Other States'). This analysis also examines and compares the magnitude of Black-White disparity trends in infant mortality for Florida and All Other States.

Methods

Florida infant mortality data were obtained from the Florida Community Health Assessment Resource Tool Set (Florida CHARTS; Florida Department of Health, 2019). Florida CHARTS is available at floridacharts.com/charts/default.aspx. Infant mortality data for All Other States was obtained from CDC Wonder, available at wonder.cdc.gov/lbd.html. In this analysis, data for All Other States were obtained by populating the data counts for All Other States except Florida.

Infant mortality data for Florida and All Other States combined was used to calculate the annual percent change and corresponding 95% confidence intervals. All statistical testing was performed by Joinpoint Regression Program (Version 4.5.0.1; National Cancer Institute, 2017).

Results

Table 1 and Figure 2 show that the Black IMRs have been generally decreasing from 2007 to 2018 in Florida and from 2007 to 2017 in All Other States. [Note: At the time of this analysis, 2018 final infant mortality data were not available for All Other States]. In the earlier years of the trend (i.e., 2007–2010), a minor elevation is observed in Florida's Black IMRs in comparison to All Other States Black IMRs. However, the differences between the Florida and All Other States IMRs is only statistically significant for 2009. In 2009, the difference between Florida and All Other States Black IMR is statistically significant at a p-value <0.05.

From 2007 to 2018, the Florida annual percent change in Black IMRs was -1.67%. The annual percent change in Black IMRs in All Other States was -1.81% from 2007 to 2017. 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. The lack of statistical significance remains true in comparisons between Florida and All Other States for the same years.

The White IMRs for Florida and All Other States also have generally been decreasing from 2007 to 2018. These data are displayed in Table 2 and Figure 3. From 2008 to 2010, the differences between White IMRs for Florida and White IMRs for All Other States are not statistically significant. In all other years, however, the differences between the Florida and All Other States White IMRs are statistically significant (α-level < 0.05) with Florida having the lower rates. This change in the White IMR trends is depicted in Figure 3 where the White IMR lines for Florida and All Other States start to diverge in 2010 and maintain this divergence through 2017.

For White infants in Florida, IMRs decreased at an annual percent change of -1.91% between 2007 and 2018 (Table 2). The White IMR trend for All Other States had a decrease at an annual percent change of -1.28% between 2007 and 2017. The observed differences in annual percent change in Florida White IMRs and All Other States White IMRs are statistically significant (α-level < 0.05).

Table 3 and Figure 4 show the magnitude of Black-to-White disparities in infant mortality as measured by Black-White IMR ratios for Florida and All Other States. Between 2007 and 2018, the trend of Black-White IMR ratios was flat for Florida with a statistically insignificant annual percent increase of 0.25%. For All Other States, there was a statistically insignificant decline in the trend of Black-White IMR ratios with an annual percent change of -0.54%.

Discussion

This analysis is consistent with previous publications which indicate infant mortality is declining for Black and White infants in the U.S. and Florida despite the maintenance of racial disparities (e.g., Thompson, Clark, & Canty, 2014; Ely, & Driscoll, 2019). From 2007 through 2018, the Black IMRs decreased at approximately the same pace for Florida and All Other States. The trend in White IMRs for Florida and All Other States is also 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.

The results of this analysis indicate the magnitude of disparity between Black and White infant mortality in Florida has not significantly changed between the years of 2007 and 2018. This is consistent with the lack of significant change observed in the magnitude of disparity between Black and White infant mortality in All Other States between 2007 and 2017.

The sole use of state and national vital statistics data to assess infant mortality rates and trends is a limitation of this analysis. These data potentially may not capture 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 All 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.
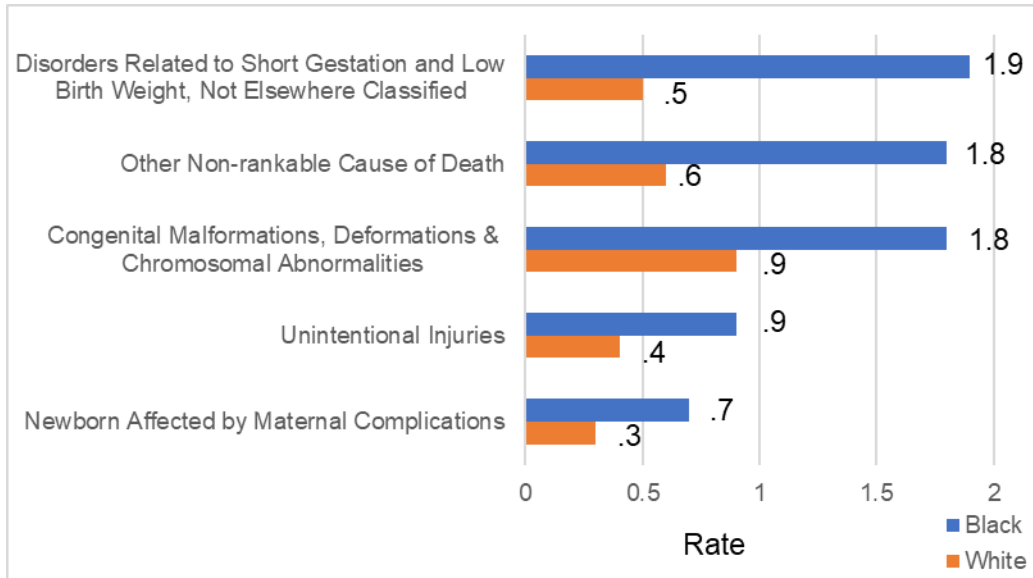
Figure 1: Leading Causes of Infant Mortality in Florida (per 1,000 live births) by Race, 2018

Table 1: Black Infant Mortality Rates and Rate Ratios: Florida and All Other States, 2007–2018

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
2007	13.36	12.96	1.03
2008	12.87	12.38	1.04
2009	13.19	12.12	1.09
2010	11.79	11.21	1.05
2011	11.96	11.16	1.07
2012	10.68	10.92	0.98
2013	10.61	10.85	0.98
2014	10.97	10.75	1.02
2015	11.36	11.00	1.03
2016	11.64	10.78	1.08
2017	10.76	10.49	1.03
2018	11.26	NA	NA
Annual Percent Change	-1.67%	-1.81%	-0.17%
95% CI lower	-2.7%	-2.5%	-1.0%
95% CI upper	-0.6%	-1.1%	0.6%

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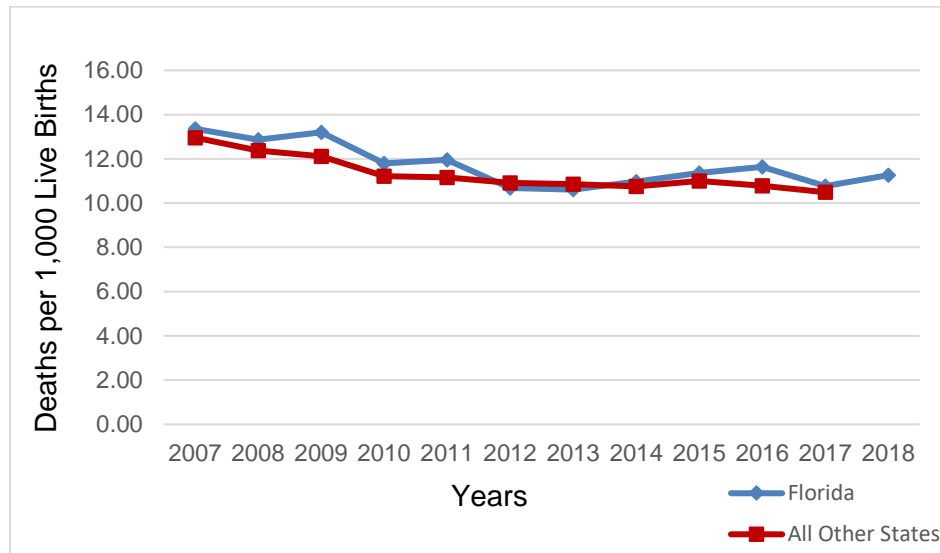

Figure 2: Black Infant Mortality Rates per 1,000 Live Births: Florida and All Other States, 2007–2018

Table 2: White Infant Mortality Rates and Rate–Ratios: Florida and 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
2007	5.19	5.64	0.92
2008	5.46	5.56	0.98
2009	4.90	5.34	0.92
2010	4.89	5.22	0.94
2011	4.59	5.13	0.89
2012	4.55	5.10	0.89
2013	4.61	5.09	0.91
2014	4.38	5.28	0.83
2015	4.42	4.95	0.89
2016	4.33	4.95	0.87
2017	4.40	4.86	0.91
2018	4.29	NA	NA
Annual Percent Change	-1.91%	-1.28%	-0.77%
95% CI lower	-2.5%	-1.7%	-1.5%
95% CI upper	-1.3%	-0.8%	0.0%

Annual percent change for Florida, All Other States, and between Florida and All Other States **IS** statistically significantly different at alpha <.05.
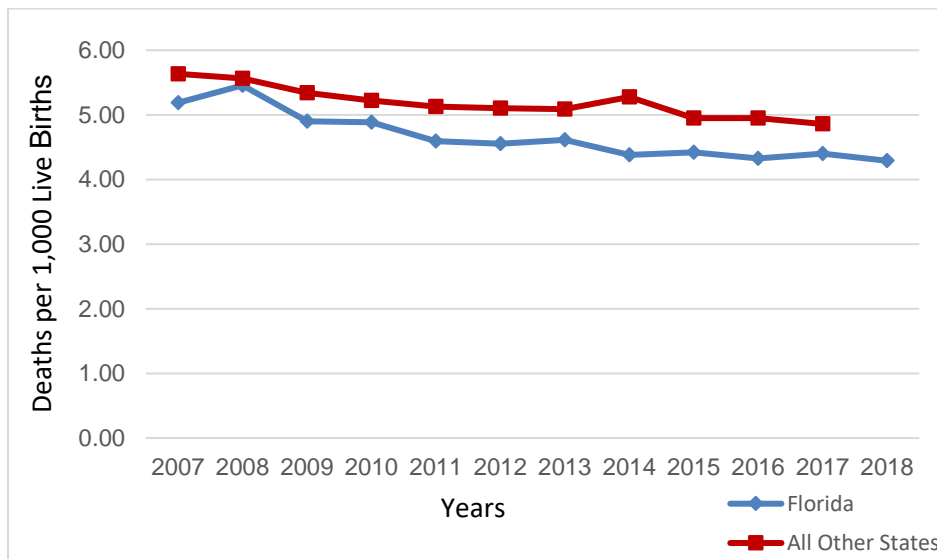

Figure 3: White Infant Mortality Rates per 1,000 Live Births: Florida and All Other States, 2007–2018

Table 3: Black-White Infant Mortality Rate Ratios: 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
2007	2.57	2.30	0.27
2008	2.36	2.23	0.13
2009	2.69	2.27	0.42
2010	2.41	2.15	0.27
2011	2.60	2.17	0.43
2012	2.34	2.14	0.21
2013	2.30	2.13	0.17
2014	2.50	2.04	0.47
2015	2.57	2.22	0.35
2016	2.69	2.18	0.51
2017	2.44	2.16	0.29
2018	2.63	NA	NA
Annual Percent Change	0.25%	-0.54%	
95% CI lower	-0.8%	-1.2%	
95% CI upper	1.3%	0.1%	

Annual percent change for Florida and All Other States is **NOT** statistically significantly different at an alpha of <.05.
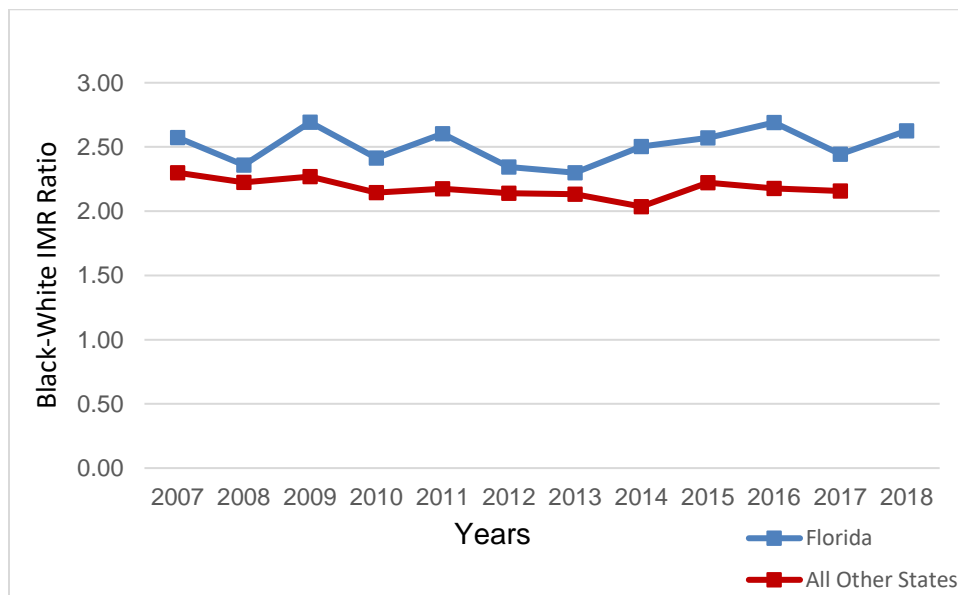

Figure 4: Black-White Infant Mortality Rate Ratios: Florida and All Other States, 2007–2018

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