Infant Mortality in Communities Across Texas

Data Brief

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Key Points

The infant mortality rate is a leading health indicator that provides insight into the health of infants, mothers, and the larger community.

Some zip codes in the state did not experience a single infant death in the four-year study window (2011–2014), whereas others experienced more than one percent of their infants dying before their first birthday.

Substantial zip-code level geographic variation exists for all racial/ethnic groups, as both low and high rates of infant mortality are seen across zip codes for Hispanic, white, and black mothers. Thus, race/ethnicity cannot be the sole explanation for a community's high or low rate.

These data document the wide geographic variation in the state but do not show why that variation exists. Explaining this variation, including the role of social and economic factors operating outside the individual or family sphere, is an important next step.

INTRODUCTION

The infant mortality rate (number of deaths before an infant's first birthday per 1,000 births) is a leading health indicator that provides insight into the health of infants, mothers, and the larger community. Texas has been meeting the Healthy People 2020 target for infant mortality since 2012, and has an infant mortality rate lower than the national rate.[1] However, in addition to the extensively documented racial/ethnic disparities in infant mortality, there are substantial geographic differences within Texas that deserve special attention.

Knowing local-level health indicators such as infant mortality facilitates understanding community health needs, identifying health disparities, planning and targeting interventions, and assessing progress towards population health objectives. Identifying communities in our state with high rates of infant mortality can help focus resources to improve outcomes. There is also great value in identifying areas where the infant mortality rate is low so that the protective factors that exist in those communities can be understood. Identifying modifiable protective factors can help guide prevention efforts in other communities across Texas, and throughout the nation.

In order to document and understand this health indicator, UT System Population Health calculated zip-code level infant mortality rates using data from Texas Vital Statistics Linked Birth and Death Records from 2011-2014 (1,543,167 births). Zip-code level infant mortality rates were calculated if there were at least 400 births to mothers living in that zip code during that time period. Of the 2,455 zip codes in Texas, infant mortality rates for 842 were included. While only 34% of the zip codes in the state could be included, these zip codes contained 93% of all the births in Texas over this four-year period. Maps and downloadable data of these rates are available on the UT System website (utsystempophealth.org/imr-texas)

OVERALL INFANT MORTALITY

These zip-code level data show that despite our state's relatively low infant mortality rate, substantial variation exists across zip codes. Fifteen of the included zip codes did not experience a single infant death in this four-year time period, whereas 59 experienced more than one percent of their infants dying before their first birthday.
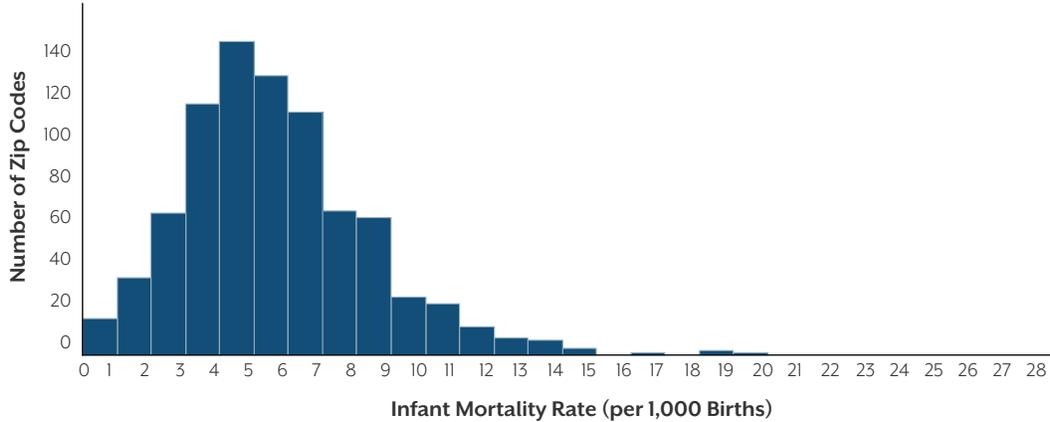
This variation also is seen within cities. For example, in Fort Worth, the infant mortality rate was more than six times higher in the 76164 zip code (12.3 deaths per 1,000 births) than in neighboring 76107 (1.8 deaths per 1,000 births). Fort Worth is not alone – there are stark zip-code level differences in infant mortality rates within many cities in Texas.

Zip code: **76164**
Overall Infant Mortality Rate:
12.3 per 1,000 births

Zip code: **76107**
Overall Infant Mortality Rate:
1.8 per 1,000 births

Infant deaths per 1000 births

0 - 2.74	8.21 - 10.95
2.74 - 5.48	> 10.95
5.48 - 8.21	Data Suppressed
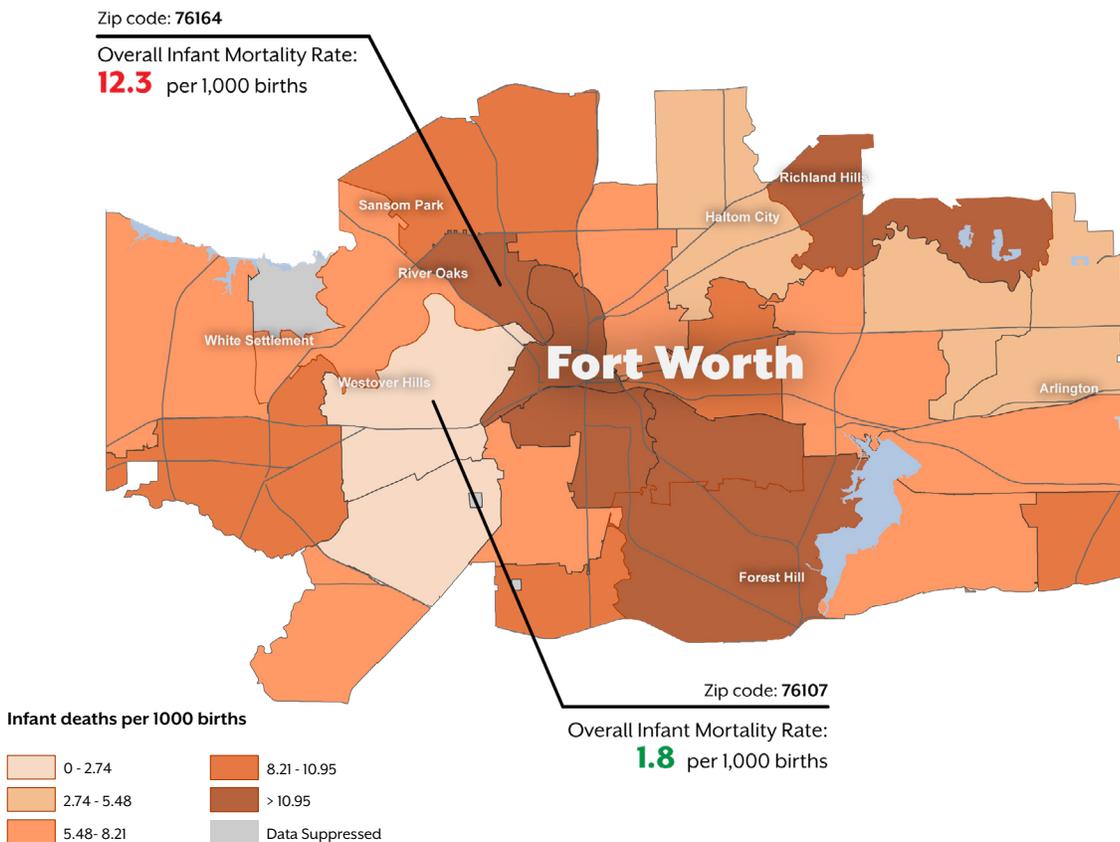
VARIATION WITHIN RACE/ETHNIC GROUPS

Zip-code level infant mortality rates were also calculated based on maternal race/ethnicity for groups with more than 400 births in the zip code. There was substantial geographic variation in rates within racial/ethnic groups. All racial/ethnic groups had zip codes with infant mortality rates at or near zero. All groups also had zip codes with rates greater than 10 deaths per 1,000 births. Black mothers had the highest rates of infant mortality. They also, however, had the largest zip-code level variation across the state.
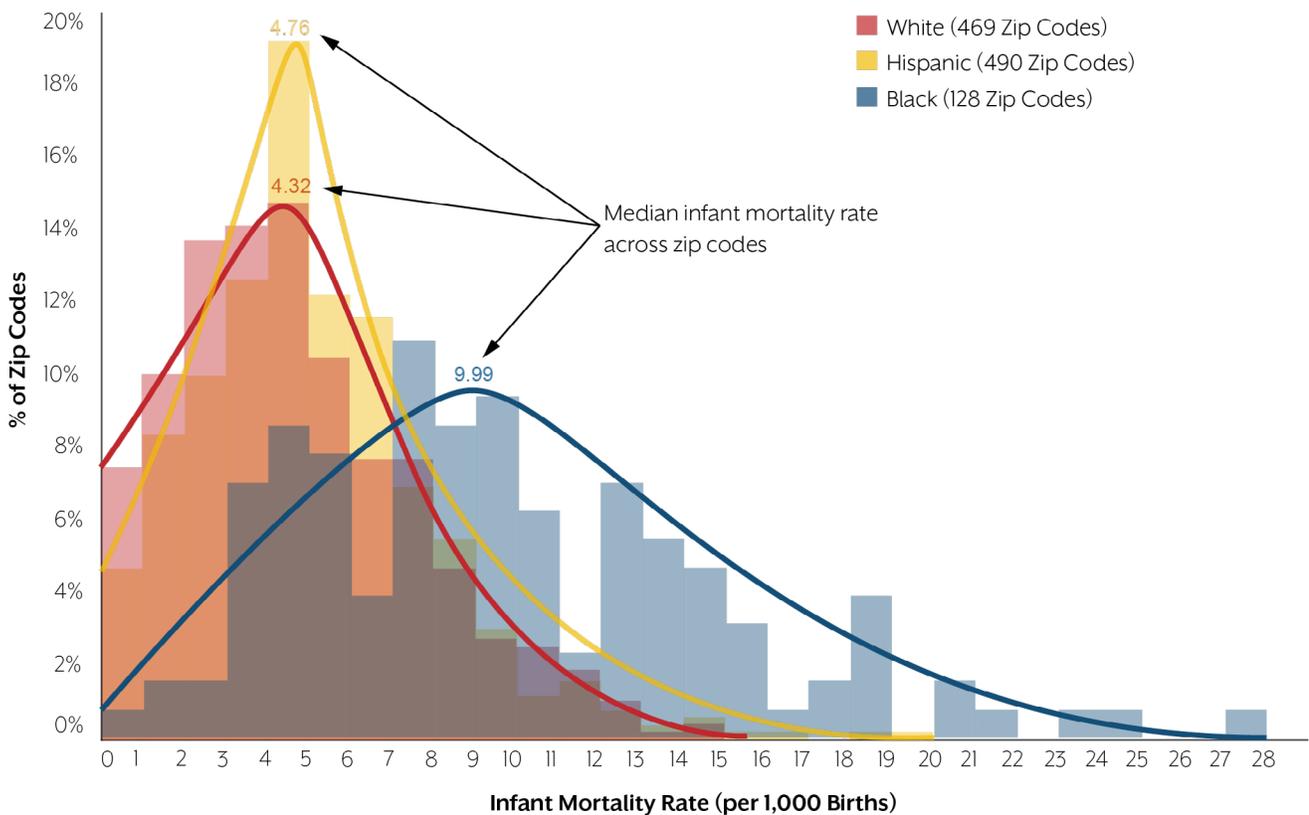
Infant Mortality Rate in Infants of White Mothers by Zip Code
2011-2014 Births – Longview, Texas

Babies born to non-Hispanic white women in Texas have a relatively low risk of dying within the first year after birth, but this risk varies significantly within cities. Longview had more than one zip code with a mortality rate for infants of white mothers that was more than double (11.4 and 12.3 deaths per 1,000 in zip codes 75647 and 75605, respectively) the overall infant mortality rate for the state.

Zip code: **75605**

White Infant Mortality Rate:
12.3 per 1,000 births

Zip code: **75647**

White Infant Mortality Rate:
11.4 per 1,000 births

East Mountain

Judson

Union Grove

Wilkins

White Oak

Lansing

Longview

Footes

Liberty City

Hughey

Lakeport

Rolling Meadows

Kilgore

Laird Hill

New Hope

Pitner Junction

Infant deaths per 1000 births

0 - 2.74	8.21 - 10.95
2.74 - 5.48	> 10.95
5.48 - 8.21	Data Suppressed
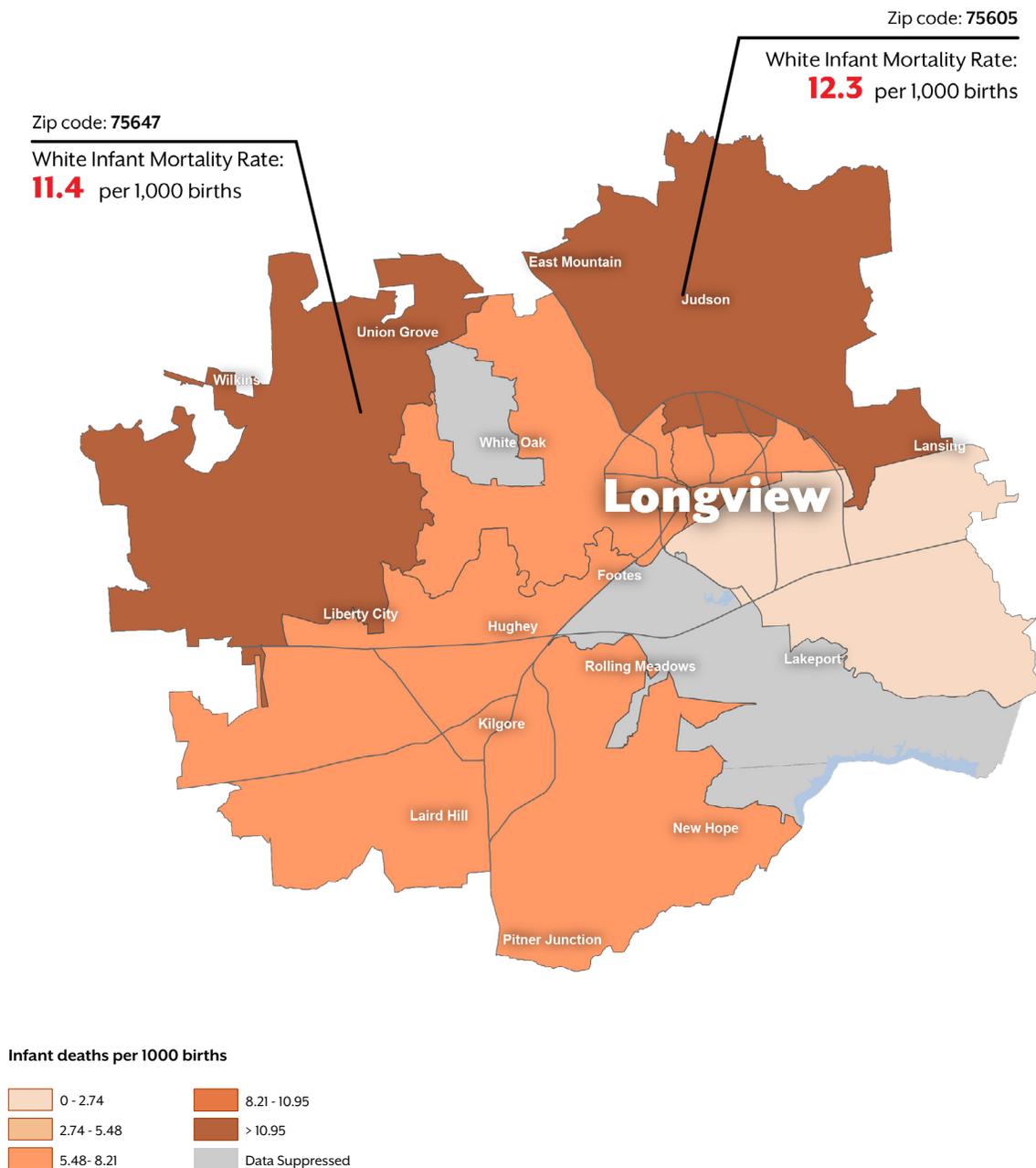
Infant Mortality Rate in Infants of Hispanic Mothers by Zip Code 2011-2014 Births – San Antonio, Texas

Babies born to Hispanic women have the lowest rate of infant mortality of the three major racial/ethnic groups in Texas. However, as for infants of white mothers, mortality rates for infants of Hispanic mothers varied greatly depending on where the mothers lived when they were pregnant. For example, in San Antonio, adjacent zip codes 78203 and 78220 had Hispanic infant mortality rates (16.0 and 11.6 deaths per 1,000 births, respectively) that were over double the overall state rate.

Zip code: **78203**

Hispanic Infant Mortality Rate:
16.0 per 1,000 births

Zip code: **78220**

Hispanic Infant Mortality Rate:
11.6 per 1,000 births

Infant deaths per 1000 births

0 - 2.74	8.21 - 10.95
2.74 - 5.48	> 10.95
5.48- 8.21	Data Suppressed
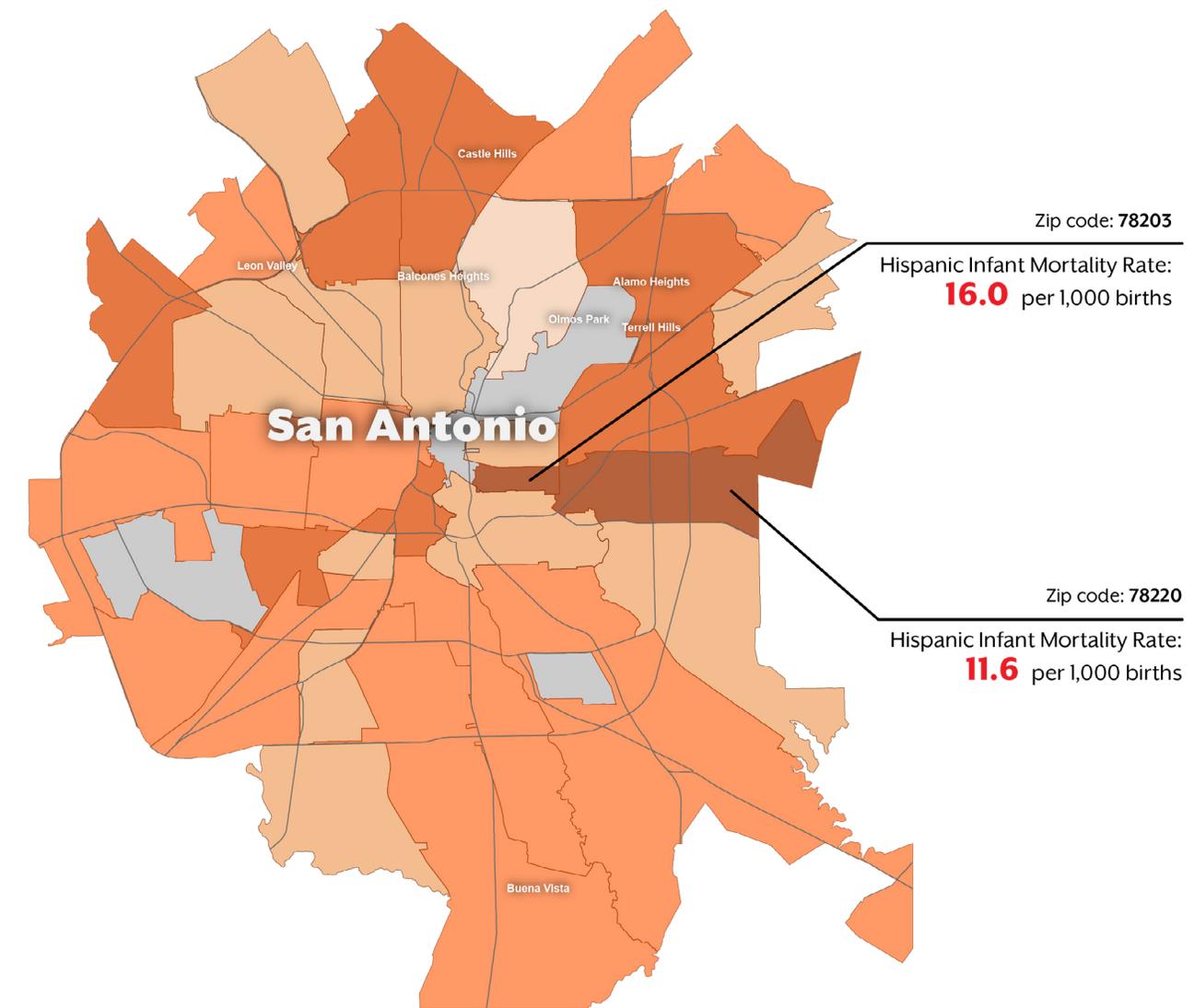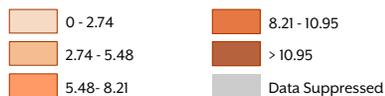
Infant Mortality Rate in Infants of Black Mothers by Zip Code
2011-2014 Births – Houston, Texas

Non-Hispanic black families in Texas and the U.S. are disproportionately impacted by infant mortality. Within Houston, for example, mortality rates for infants of black mothers varied eight-fold from 3.3 to 28.1 deaths per 1,000 births in zip codes 77077 and 77026, respectively.

Zip code: **77026**

Black Infant Mortality Rate:
28.1 per 1,000 births

Zip code: **77077**

Black Infant Mortality Rate:
3.3 per 1,000 births

Bammel

Humble

Aldine

North Houston

Dyersdale

Jersey Village

Hilshire Village

Houston

Jacinto City

Bunker Hill Village

Galena Park

West University Place

Pasadena

Bellaire

Meadows Place

Stafford

Almeda

Brookside Village

Pearland

Fres

Infant deaths per 1000 births

0 - 2.74	8.21 - 10.95
2.74 - 5.48	> 10.95
5.48 - 8.21	Data Suppressed

IMPLICATION AND NEXT STEPS

Texas has made positive progress in reducing infant mortality, with many important statewide initiatives working together to make these reductions possible. These data document the wide geographic variation in the state and demonstrate substantial variation within racial/ethnic groups. Zip codes with both low and high rates of infant mortality can be found for all groups. Thus, race/ethnicity cannot be the sole explanation for a community's high or low rates.

There is substantial evidence that social, environmental, and economic factors at the community level partially explain this variation. Socio-economic status of the community, income inequality, and air pollution are three community-level factors that have been found to be related to infant mortality.[2, 3] Expanding this existing research to understand how these factors are playing out across communities in Texas will be an important next step.

Researchers with Population Health in the Office of Health Affairs at UT System and UT Health Northeast will continue to work towards understanding why the variation in infant mortality rates across Texas exists and what can be done to reduce it.

We also encourage other researchers to study the modifiable factors that explain why this variation exists and, importantly, work towards finding solutions to improve the health and wellbeing of all mothers and infants in the state.

To view and interact with the map, and to download public use tables for relevant zip codes, visit our website at utsystempophealth.org/imr-texas.

REFRENCES

1-   Kormondy M, Archer N. 2017 Healthy Texas Babies Data Book. Austin, TX: Division for Community Health Improvement, Texas Department of State Health Services, 2017. https://www.dshs.texas.gov/healthytexasbabies/data.aspx

2-   Kim D, Saada A. The social determinants of infant mortality and birth outcomes in Western developed nations: a cross-country systematic review. International Journal of Environmental Research and Public Health. 2013 Jun 5;10(6):2296-335.

3-   Lacasana M, Esplugues A, Ballester F. Exposure to ambient air pollution and prenatal and early childhood health effects. European Journal of Epidemiology. 2005 Feb 1;20(2):183-99.

Technical Notes

Data Source & Definitions

Infant mortality rates were calculated using prospectively linked birth and death records provided by the Texas Department of State Health Services (DSHS). This birth-cohort linked dataset is defined by the year that the child was born. The dataset only includes births to a woman who was a Texas resident. These births were linked to infant deaths that occurred in Texas. Infant deaths are defined as those that occurred before the child's 1st birthday.

Geographic region is defined as the mother's zip code of residence at the time of birth, which serves as a proxy for where she lived during the pregnancy. For mapping purposes, the 2014 zip code boundaries were used. Maternal zip code was not adjusted to account for zip code boundary changes between 2011 and 2014.

Race/ethnicity is the mother's race/ethnicity. We utilized the combined race/ethnic categories determined by DSHS, based on information on the birth certificate. In these categories, mixed race women are included in the "other" category if they did not identify as Hispanic.

The infant mortality rate is calculated as the number of infant deaths divided by the number of live births times 1,000. The infant mortality rate can be interpreted as the number of infant deaths expected for every 1,000 births.

Data Suppression and Interpretation

In order to protect confidentiality and ensure a minimum level of data stability, rates were suppressed for geographic areas with fewer than 400 births between 2011-2014. This suppression rule was also applied to all of the race/ethnicity calculations. Therefore, rates by race/ethnicity are only available for zip codes with a large number of women in that racial/ethnic category.

Standard errors and 95% confidence intervals for the infant mortality rates were calculated using a Poisson mean and the normal approximation method. Infant mortality rates without overlapping confidence intervals were determined to be significantly different.

All rates that survive the suppression rule but have a relative standard error of the rate (RSE) of 30% or greater were flagged on the map as unstable (with an asterisk mark). The relative standard error is a standardized way to determine whether the confidence interval of a rate is large. A large proportion of the zip code-level IMR rates had an RSE of 30% or greater, which is not unusual with rare events. In a small geographic area such as a zip code, the number of infant deaths over a four-year period is usually small and typically in the single digits. Small changes in the number of deaths can result in substantially different rates. The relative rarity of infant death leads to higher RSE values. Flagged rates should be interpreted with caution.