CELEBRATING MORE FIRST BIRTHDAYS: AN ANALYSIS OF INFANT DEATH IN KENT COUNTY, MICHIGAN 2022

Written By:
Marissa Brown, RN BSN
Madelyn Hall, RN BSN
Brandi Berry, LLMSW
Savannah Tallman, MPH

HEALTH DEPARTMENT
Caring today for a healthy tomorrow

A Publication by Kent County's Fetal Infant Mortality Review Program

TABLE OF CONTENTS

INTRODUCTION

OBJECTIVE

Overall, the US and comparable countries have seen a decrease in infant mortality rates in recent years, with the national infant mortality rate being 5.4 deaths per 1,000 live births in 2020.[1] While this is great improvement, work can still be done to lower this rate even more. The objective of this statistical summary is to provide the latest data on infant mortality rates, compare factors that contribute to infant death, and offer recommendations to further reduce the number of infant deaths in Kent County, Michigan because every infant deserves to have a chance to celebrate their first birthday.

1. Murphy SL, Kochanek KD, Xu JQ, Arias E. Mortality in the United States, 2020. NCHS Data Brief, no 427. Hyattsville, MD: National Center for Health Statistics. 2021.

INTRODUCTION

Infant mortality, or the death of a child before their first birthday, is a strong indicator of population health. It can be used as an explanatory variable to the socioeconomic development, basic living conditions, social well-being, and the quality of an environment in a given population. An infant mortality rate is defined as the number of infant deaths for every 1,000 live births in the same year. This rate varies greatly within different countries, states, and even smaller areas such as cities or counties.

As definitions vary from state to state, this report will be using the following definitions as defined by the State of Michigan:[2]

Live Birth

The complete expulsion or extraction of a product of conception from its mother, regardless of the duration of the pregnancy, that after expulsion or extraction, whether or not the umbilical cord has been cut or the placenta is attached, shows any evidence of life including, but not limited to, 1 or more of the following:

- Breathing
- A Heartbeat
- Umbilical cord pulsation
- Definite movement of voluntary muscles

Fetal Death

The death of a fetus that has completed at least 20 weeks of gestation or weighs at least 400 grams. Fetal death includes a stillbirth.

Miscarriage or Spontaneous Abortion

A non-induced termination of pregnancy of less than 20 weeks gestation, regardless of outcome.

2. State of Michigan Department of Community Health Vital Records & Health Statistics Section. Physicians Handbook on the Reporting of Abortions. (DCH-0819b (3/13)

INTRODUCTION

Abortion

The intentional use of an instrument, drug, or other substance or device to terminate a woman's pregnancy.

Fetal Viability

The good-faith professional judgement of an attending health care professional believes there to be a significant likelihood of the fetus's sustained survival outside of the uterus without the application of extraordinary medical measures. It is generally considered to begin at 24 weeks gestation. At the present time there is no worldwide, uniform gestational age that defines viability. With greater knowledge and technological advancement, fetal viability may sometimes be considered at 22 weeks gestation.

2. State of Michigan Department of Community Health Vital Records & Health Statistics Section. Physicians Handbook on the Reporting of Abortions. (DCH-0819b (3/13)

FIMR PROCESS

The purpose of the Fetal Infant Mortality Review (FIMR) program is to identify and take action to prevent a wide range of local social, economic, public health, education, environmental, and safety factors that contribute to the tragedy of fetal and infant loss. FIMR "is a community based, action-oriented process aimed at improving services, systems, and resources for women, infants, and families. The program brings a multidisciplinary community team together to examine confidential, de-identified cases of fetal and infant deaths. Review of individual cases helps teams understand families' experiences, including racism, and how those experiences may have impacted maternal and child outcomes." [3]

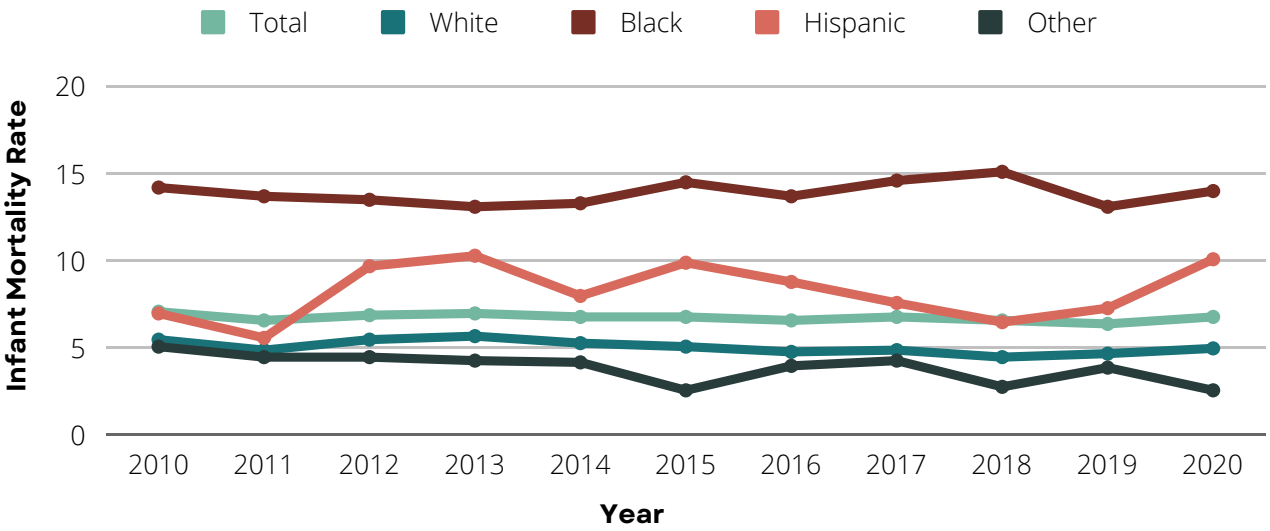
3. Fetal & Infant Mortality Review. The National Center for Fatality Review and Prevention. (2021, November 16).

INFANT MORTALITY TRENDS

This section offers a summary and trends for infant mortality rates in Michigan as well as Kent County from years 2010-2020. Infant mortality rates are calculated by the number of infant deaths per 1000 live births. Data for this section is taken from the Michigan Department of Health and Human Services Division for Vital Records and Health Statistics, January 2022 Michigan Infant Death Statistics report.

Graph 1 shows the infant mortality rate per year by race in Michigan in the years 2010-2020. Over the last decade, the total infant mortality rate in Michigan has stayed consistent, hovering around 7 deaths per 1,000 live births, while fluctuations were more prominent amongst each individual race or ethnicity. Black infants had the highest rates of mortality across all years, and were 2.8 times more likely to die than White infants in 2020. Hispanic infants also had higher rates of infant mortality compared to other races or ethnicities and were 2 times more likely to die than White non-Hispanic infants in 2020.

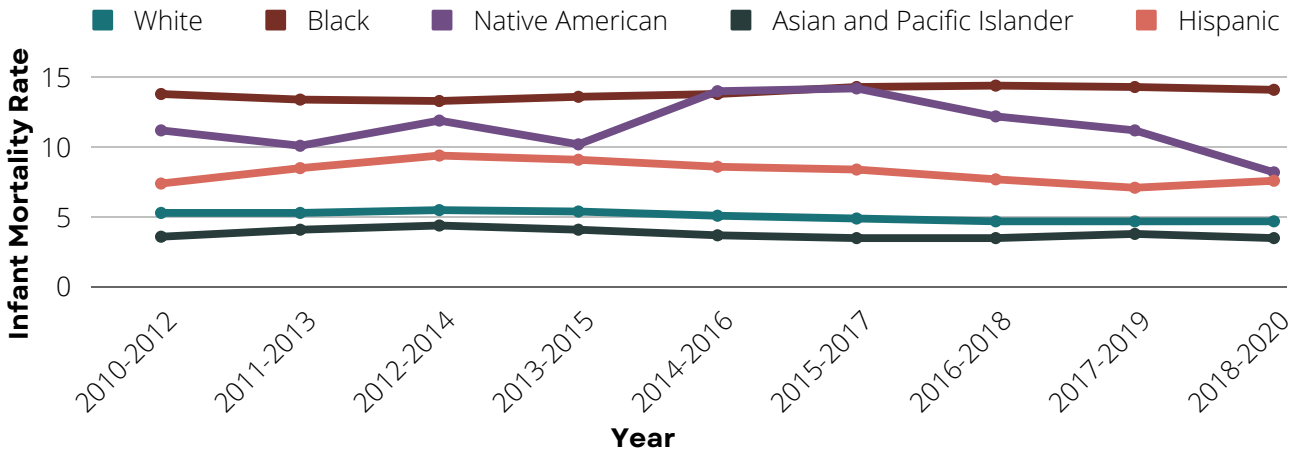
Graph 1. Infant Mortality Rate Per Year by Race and Ethnicity in Michigan



INFANT MORTALITY TRENDS

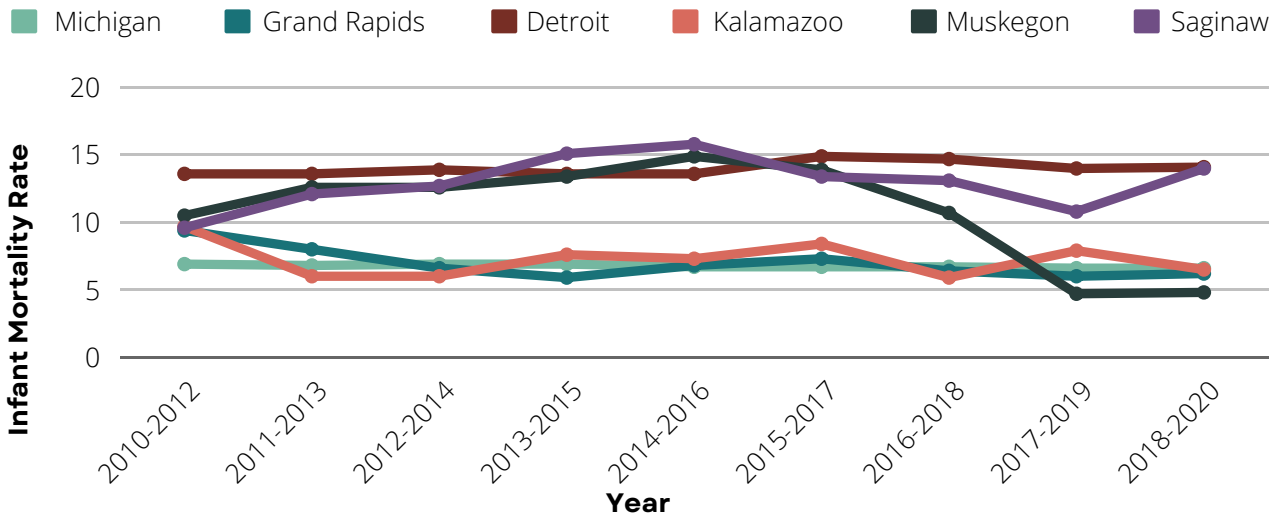
Graph 2 exhibits the three-year moving average of infant death rates by race and ethnicity in Michigan for years 2010-2020. Three-year moving averages are used in most trends and are preferred with smaller sets of data to eliminate year-to-year variability and to smooth out fluctuations. The Native American infant death rate has seen the most fluctuations over the years, increasing up to 14.2 deaths per 1,000 live births in the years 2015-2017 but decreasing down to 8.2 in the most recent years, 2018-2020. Again, a large disparity is seen between different races and ethnicities in Michigan.

Graph 2. Three-Year Moving Average of Infant Mortality by Race in Michigan



Graph 3 exhibits the three-year moving average of infant mortality in different cities in Michigan for the years 2010-2020. The infant mortality rate in Grand Rapids and Kalamazoo was similar to the whole state of Michigan, while Detroit, Muskegon, and Saginaw had higher rates of infant mortality. In years 2014-2016, Muskegon saw a rapid decline in rates, down to 4.8 deaths per 1,000 live births.

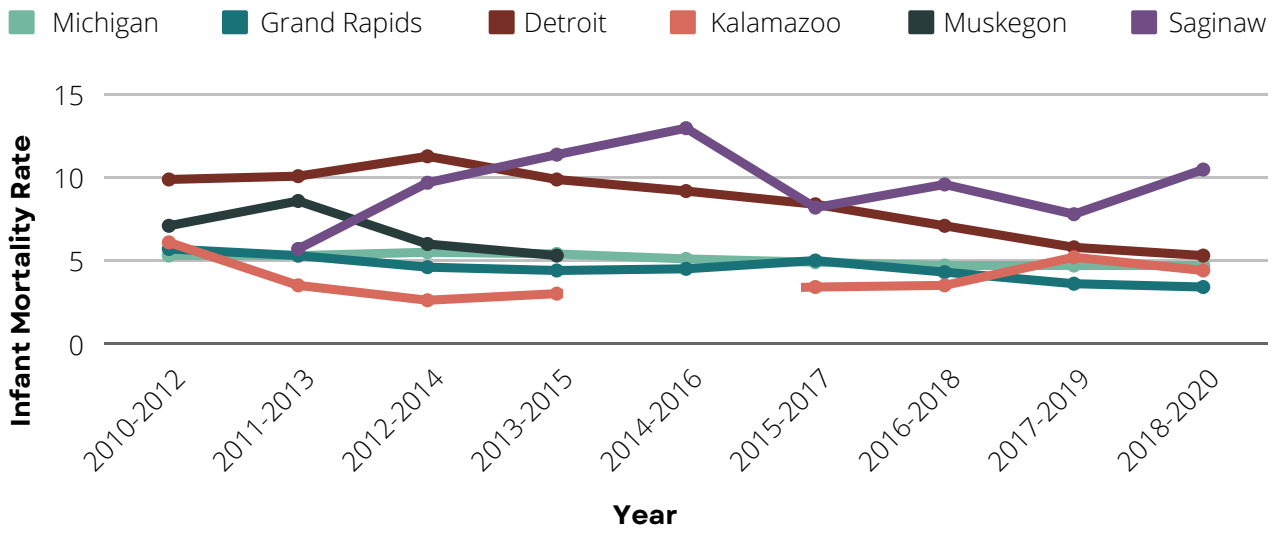
Graph 3. Three-Year Moving Average of Infant Mortality in Michigan by City



INFANT MORTALITY TRENDS

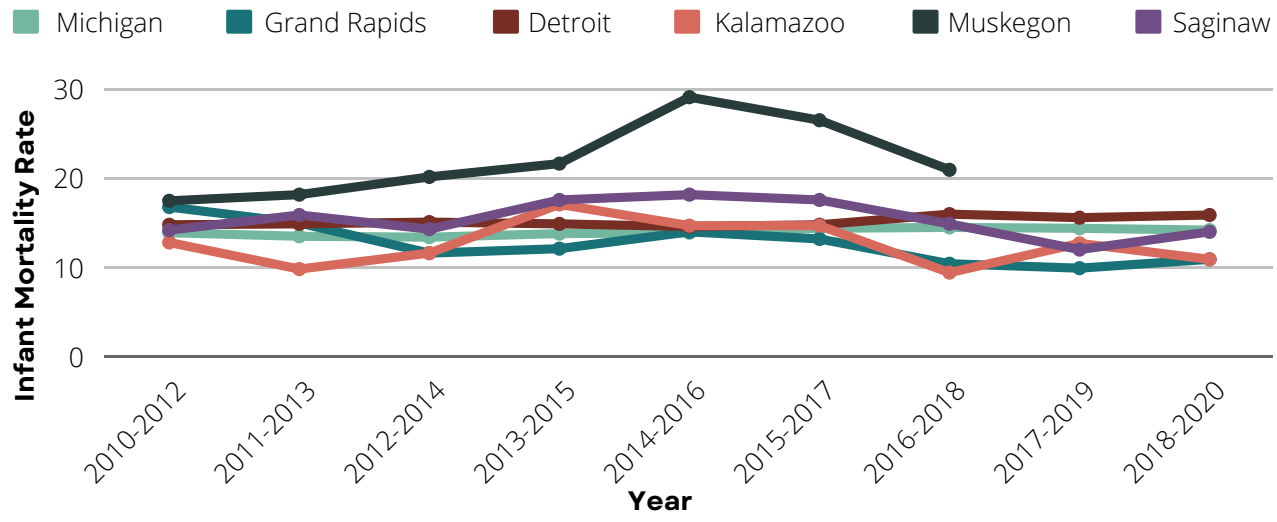
Graph 4 displays the three-year moving average of White infant mortality rates in select cities in Michigan for years 2010-2020. Again, the rates of infant mortality for White infants in Grand Rapids and Muskegon were similar to the whole state of Michigan while Detroit and Saginaw had the highest rates. In 2014-2016, Saginaw had 13 White infant deaths per 1,000 live births. Rates for Muskegon after the years 2013-2015 and Kalamazoo in 2014-2016 could not be calculated as less than 6 events were reported.

Graph 4. Three-Year Moving Average of White Infant Mortality by Michigan Cities



Graph 5 shows the three-year moving average of Black infant mortality rates in select cities in Michigan from years 2010-2020. In 2010-2012, Grand Rapids had the second highest Black infant mortality rate at 16.7, but decreased to 10.8 in the most recent years. Muskegon had significantly higher Black infant mortality rates, peaking at 29.1 in 2014-2016. After 2016-2018, Black infant mortality rates in Muskegon could not be calculated as less than 6 events were reported.

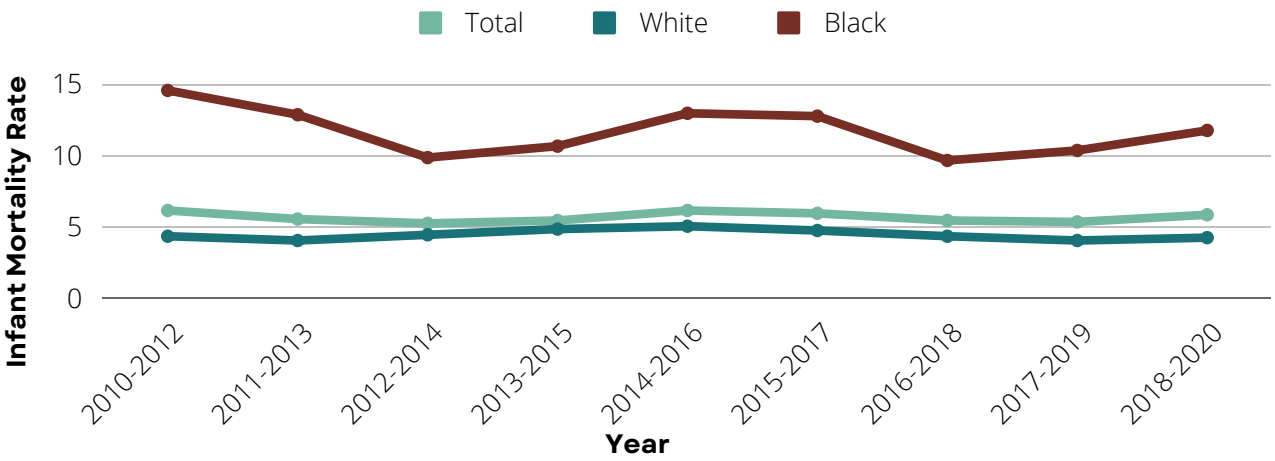
Graph 5. Three-Year Moving Average of Black Infant Mortality by Michigan Cities



INFANT MORTALITY TRENDS

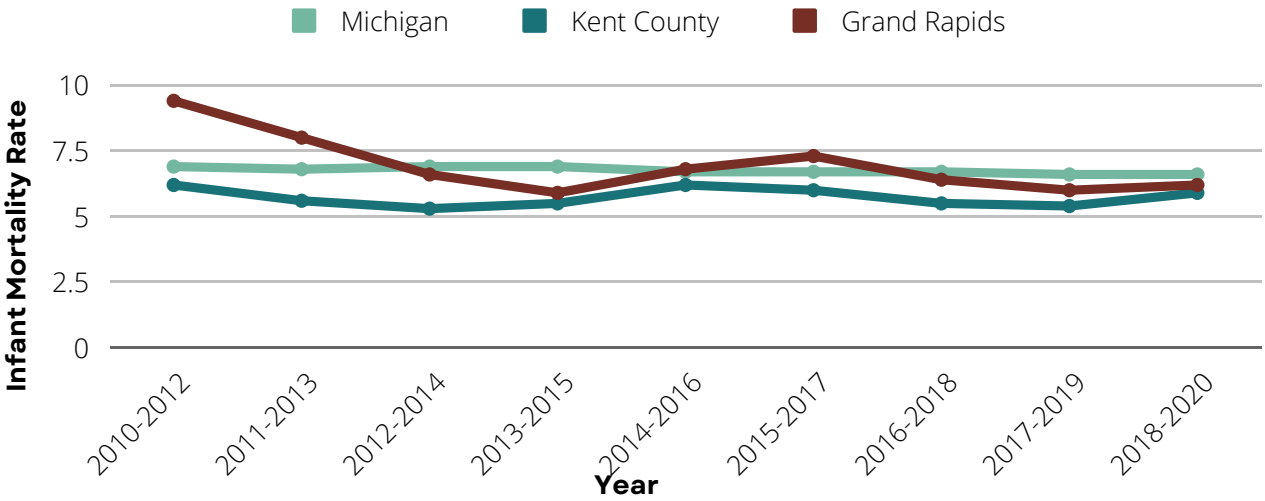
Graph 6 displays the three-year moving average of infant mortality by race in Kent County for years 2010-2020. Kent County is similar to the whole state of Michigan in that the Black infant mortality rate remains significantly higher than the White infant mortality rate. In years 2010-2012, a Black infant was 3.3 times more likely to die than a White infant. That ratio decreased to 2.4 in years 2012-2014, but has slightly increased again to 2.7 in 2018-2020.

Graph 6. Three-Year Moving Average of Infant Mortality by Race in Kent County



Graph 7 exhibits the three-year moving average of infant mortality rates in Grand Rapids, Kent County, and the total state of Michigan for years 2010-2020. In 2010-2012, the infant mortality rate in Grand Rapids was 9.4, making an infant 1.5 times more likely to die in Grand Rapids than elsewhere in Kent County. Over the years, infant mortality in Grand Rapids has decreased, and is now similar to the infant mortality rate in Kent County and Michigan at 6.2 deaths per 1,000 live births.

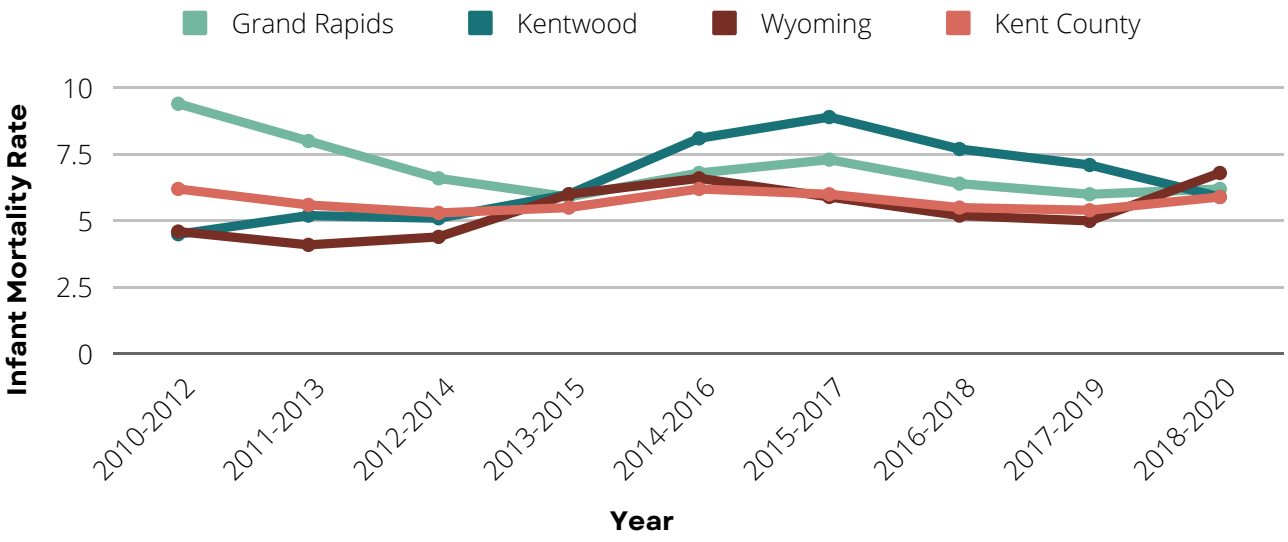
Graph 7. Three-Year Moving Average of Infant Mortality by City, County, and State



INFANT MORTALITY TRENDS

Graph 8 shows the three-year moving average of infant mortality for different cities in Kent County, Michigan. In 2010-2012 Grand Rapids had the highest infant mortality rate, but was surpassed by Kentwood in 2014-2016. In most recent years, Grand Rapids, Kentwood, and Wyoming have had similar infant mortality rates hovering around 6 deaths per 1,000 live births.

Graph 8. Three-Year Moving Average of Infant Mortality by City in Kent County



DEMOGRAPHICS

In years 2016 through 2020, Kent County had 244 infant deaths. Of those 244 deaths, 180 were reviewed by the Fetal Infant Mortality Case Review Team. While Kent County's FIMR program strives to review all cases of infant death, the remaining 64 cases were unable to be reviewed during due to a temporary lapse of the program. The infant death cases selected for review were chosen through an epidemiological sampling plan, representative of the population in Kent County, Michigan. This section will focus on the 180 cases that were reviewed, and the demographics of the mother, father, and infant compared to their race and ethnicity. Percentages are used in place of rates as this data is not compared against the number of live births. Due to having very few occurrences of Native American and Multi-Racial deaths, these groups were combined into an "Other Race" category reflected in the following charts and tables. Data tables and occurrence numbers are not included in this version of the report in order to protect the privacy of families.

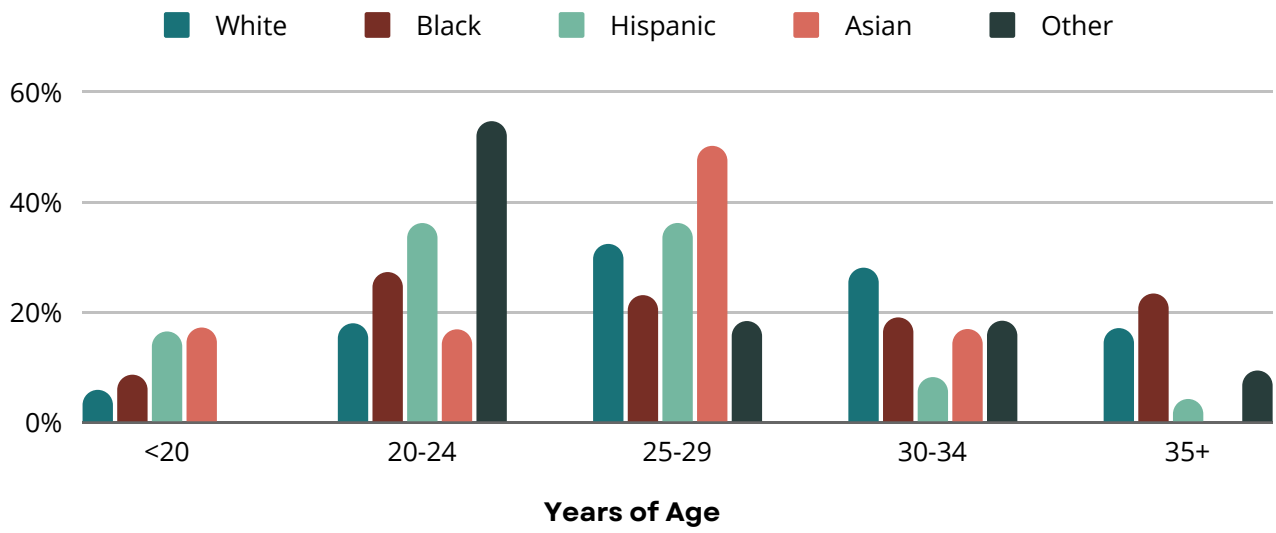
DEMOGRAPHICS

Mother of Baby

Keeping infants healthy starts with the health and wellbeing of the birthing parent. Factors that influence prenatal health include a person's preconception health status, age, access to care, poverty, and more. This section will begin by looking at the demographics of the birthing person. The manner in which the data was collected utilizes feminine terms and pronouns when referring to the birthing parent. However, it is important to recognize that birthing parents may utilize various pronouns and have diverse identities.

Figure 1 shows the age of the mother at the time of the infant's birth. 30% of infant deaths occurred for mothers between 25-29 years of age. Asian mothers (16.7%) and Hispanic mothers (16%) were the most likely to give birth in their teen years, while Black mothers (22.9%) had the highest percentage of advanced maternal age births, 35 years and older. The majority of Other race mothers (54.5%) were 20-24 years of age.

FIGURE 1. MOTHER'S AGE BY RACE AND ETHNICITY



Why is this Important?

- Maternal age impacts infant mortality as women under 20 and women over 40 have higher rates of preterm births and low birthweight infants.[4]
- The average age of mothers at the time of birth has steadily increased in the US. Women are delaying motherhood in order to seek higher education and build a career, but are also impacted by the increased costs of living, childcare, housing and education. [5]

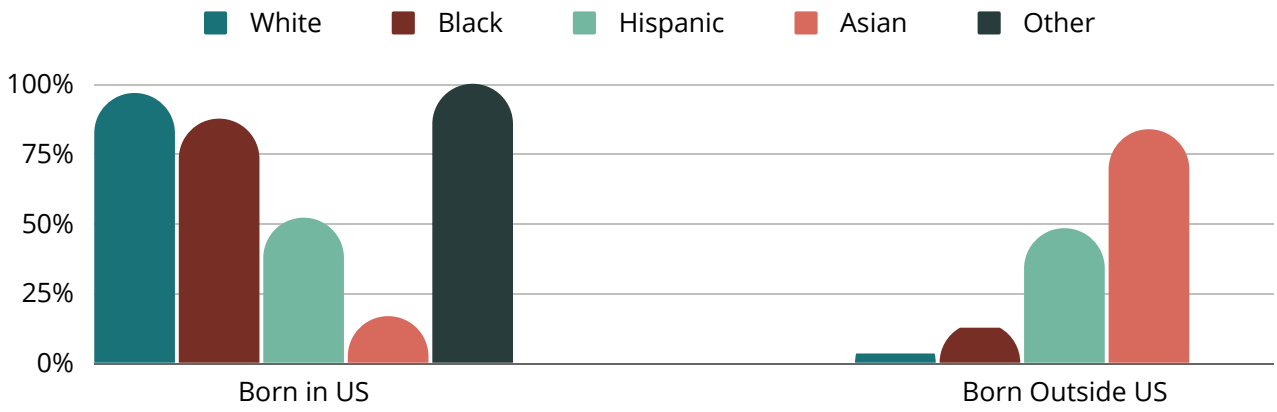
4. Driscoll, A. K., & Ely, D. M. (2020, June 25). Effects of Changes in Maternal Age Distribution and Maternal Age-Specific Infant Mortality Rates on Infant Mortality Trends: United States, 2000-2017. Retrieved August 16, 2022, from https://www.cdc.gov/nchs/data/nvsr/nvsr69/NVSR-69-05-508.pdf
5. Tavernise, S., Miller, C. C., Bui, Q., & Gebeloff, R. (2021, June 16). Why American women everywhere are delaying motherhood. The New York Times. Retrieved August 16, 2022, from https://www.nytimes.com/2021/06/16/us/declining-birthrate-motherhood.html

DEMOGRAPHICS

Mother of Baby

Figure 2 exhibits whether the mother of the baby was born in the United States or in another country. 85.6% of mothers were born in the U.S. while 14.4% were born outside of the U.S. Asian mothers (83.3%) and Hispanic mothers (48%) were most likely to be born outside of the US.

FIGURE 2. MOTHER'S PLACE OF BIRTH BY RACE AND ETHNICITY



Why is this Important?

- Existing health inequities in America, such as reduced access to care, has negatively impacted infant death rates as infants born in the US die at a rate of 5.7 deaths per 1,000 live births, compared to 3.8 in other countries with comparable economies.[6]

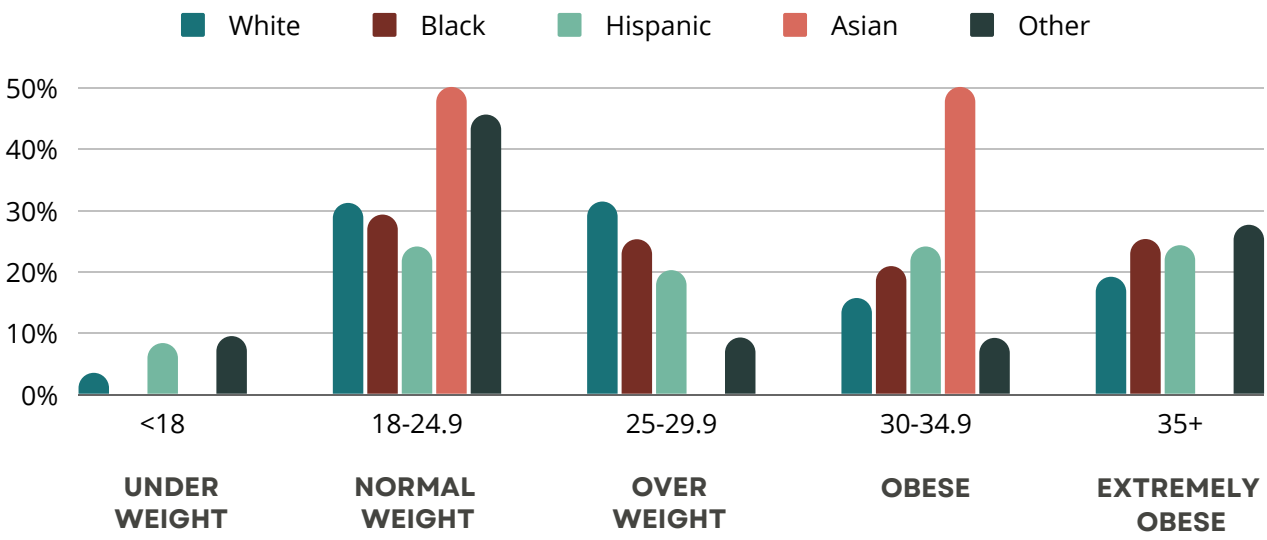
6. The Lancet Child Adolescent Health (2021). Infant and maternal mortality in the USA. The Lancet. Child & adolescent health, 5(1), 1. https://doi-org.ferris.idm.oclc.org/10.1016/S2352-4642(20)30369-2

DEMOGRAPHICS

Mother of Baby

Figure 3 outlines the birthing mother's Body Mass Index compared to her race or ethnicity. 31.1% of mothers had a healthy BMI of 18-24.9 while 65.6% were either overweight or obese. Asian mothers (50%), Hispanic mothers (48%), and Black mothers (45.8%) had the highest percentages of obesity compared to other race mothers (36.4%) and White mothers (34.5%).

FIGURE 3. MOTHER'S BODY MASS INDEX BY RACE AND ETHNICITY



Why is this Important?

- Infants born to underweight, overweight, and obese mothers have higher rates of mortality than those born to mothers of a normal weight. [7]
- Mothers at an unhealthy weight have more adverse outcomes such as diabetes, hypertension, preeclampsia, and birth defects. [7]

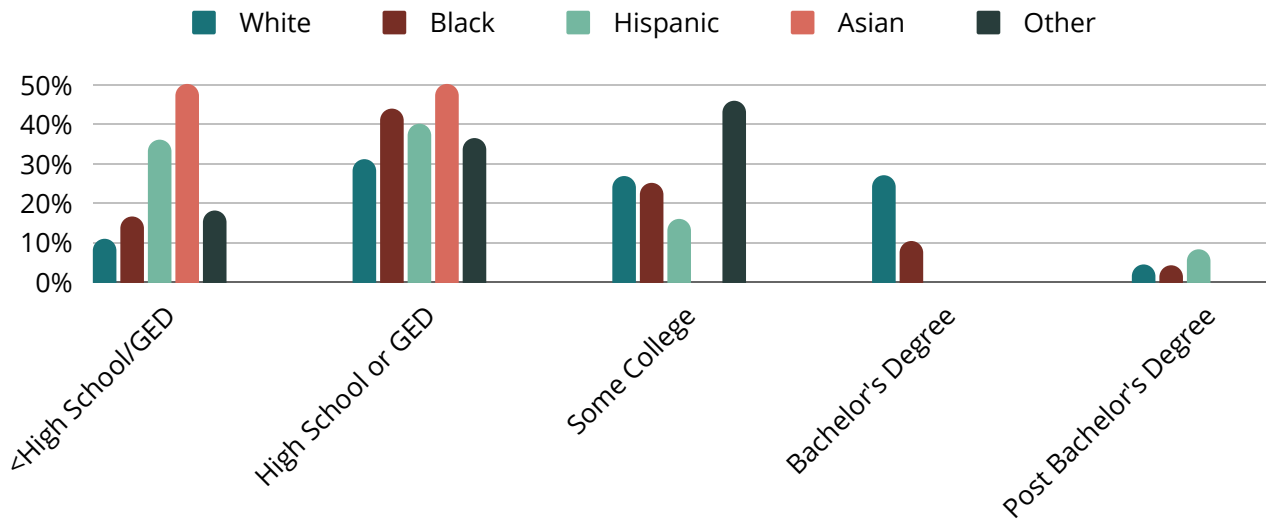
7. Ely DM, Gregory ECW, Drake P. Infant mortality by maternal prepregnancy body mass index: United States, 2017–2018. National Vital Statistics Reports; vol 69 no 9. Hyattsville, MD: National Center for Health Statistics. 2019..

DEMOGRAPHICS

Mother of Baby

Figure 4 shows the birth mother's education compared to her race and ethnicity. 36.7% of mothers who experienced an infant loss had a High School Diploma or GED equivalent education, while 25% had some college, and 17.8% had less than a High School Diploma. A disparity can be seen between race and ethnicity as 57.8% of White mothers had a higher education (Some College, Bachelor's or Post Bachelor's Degree), compared to 39.6% of Black mothers, 24% of Hispanic mothers, and 0% of Asian mothers.

FIGURE 4. MOTHER'S EDUCATION BY RACE AND ETHNICITY



Why is this Important?

- **Higher education affects socioeconomic status, is a social support, and can lead to better health habits relating to diet and exercise.** [8]

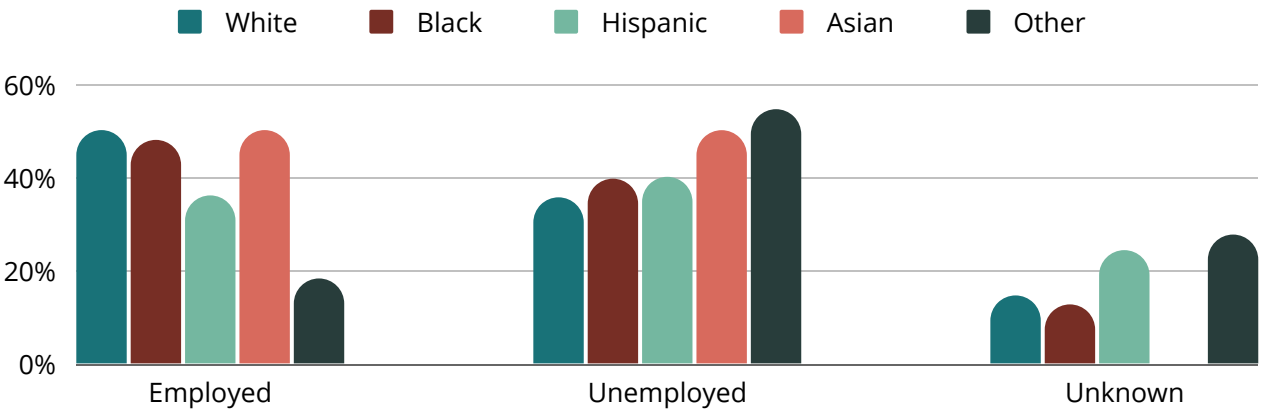
8. Zajacova, A., & Lawrence, E. M. (2018). The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annual review of public health, 39, 273–289. https://doi.org/10.1146/annurev-publhealth-031816-044628

DEMOGRAPHICS

Mother of Baby

Figure 5 exhibits the employment status of the birthing mother compared to her race and ethnicity. 45.6% of mothers reported having employment during pregnancy or around the time of the infant's death, while 38.9% were unemployed. White and Asian mothers had the highest percentages of employment at 50%, while other race mothers (18.2%) and Hispanic mothers (36%) had the lowest percentages of employment.

FIGURE 5. MOTHER'S EMPLOYMENT BY RACE AND ETHNICITY



Why is this Important?

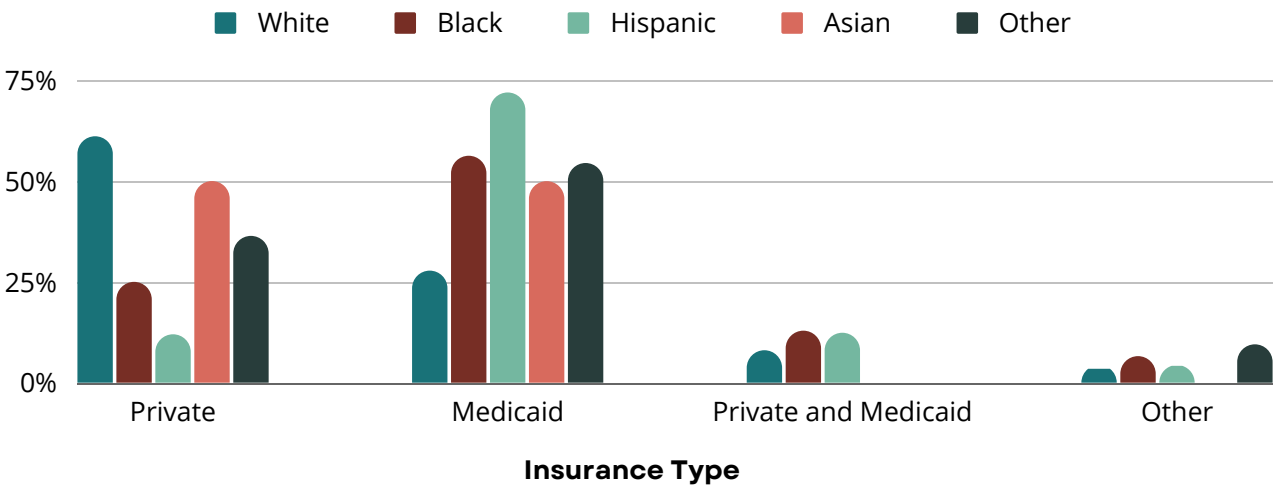
- Employment may be a positive factor by offering income, a sense of self-worth, and health insurance, but can also be seen as a negative factor as it may increase stress levels, require childcare, reduce maternity leave, or affect a mother's ability to attend prenatal visits.

DEMOGRAPHICS

Mother of Baby

Figure 6 displays the health insurance of the birthing mother during pregnancy. 43.9% of mothers had Medicaid, while 42.8% had private insurance. A large disparity exists between different races and ethnicities as Black mothers (56.3%), Hispanic mothers (72%), Asian mothers (50%), and other race mothers (54.5%) were more likely to receive Medicaid compared to White mothers (27.8%).

FIGURE 6. MOTHER'S INSURANCE BY RACE AND ETHNICITY



Why is this Important?

- Every state in the US is required to provide Medicaid coverage for individuals at or below 133% of the federal poverty level.[9]
- Medicaid recipients are almost twice as likely to experience severe maternal morbidity and mortality compared to those with Private insurance.[9]

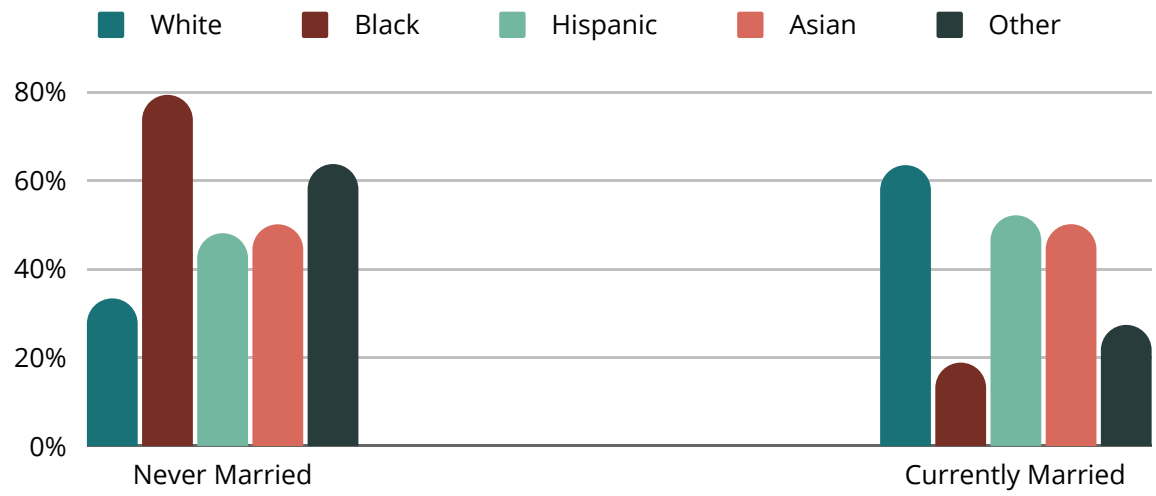
9. Medicaid and CHIP Payment and Access Commission (MACPAC). 2020. Chapter 5: Medicaid's role in maternal health. In Report to Congress on Medicaid and CHIP. June 2020. Washington, DC: MACPAC.

DEMOGRAPHICS

Mother of Baby

Figure 7 outlines the marital status of the birthing mother compared to her race and ethnicity. Again, a disparity is shown as 63.3% of White mothers were married at the time of the infant's death, while 18.8% of Black mothers, 52% of Hispanic mothers, 50% of Asian mothers, and 27.3% of other race mothers were married.

FIGURE 7. MOTHER'S MARITAL STATUS BY RACE AND ETHNICITY



Why is this Important?

- Single mothers have higher rates of preterm delivery, small for gestational age infants, and NICU admissions.[10]
- Married mothers are more likely to have vaginal deliveries and breastfeed their infants.[10]

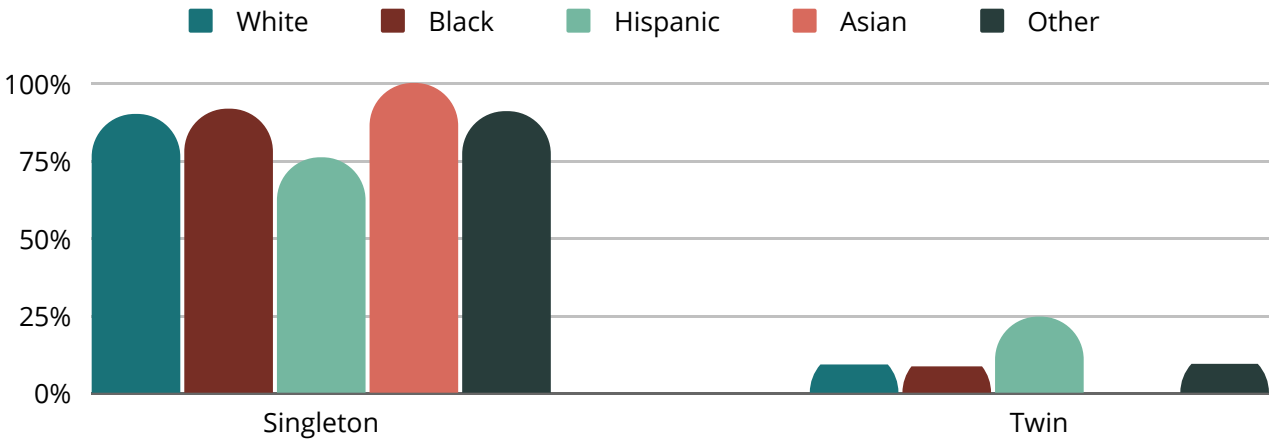
10. Barr, J. J., & Marugg, L. (2019). Impact of Marriage on Birth Outcomes: Pregnancy Risk Assessment Monitoring System, 2012-2014. The Linacre quarterly, 86(2-3), 225–230. https://doi.org/10.1177/0024363919843019

DEMOGRAPHICS

Mother of Baby

Figure 8 shows if the deceased infant was a singleton or twin. 88.9% of infants who died were singleton births, and 10.6% were twins. Hispanic mothers had a slightly higher percentage of twin births at 24% compared to other races and ethnicities.

FIGURE 8. MULTIPLE GESTATION BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Multiple gestation pregnancies have higher rates of preterm birth and low birthweight infants. Longer hospital stays are often required.[11]

11. Kalikkot Thekkeveedu, R., Dankhara, N., Desai, J. et al. Outcomes of multiple gestation births compared to singleton: analysis of multicenter KID database. matern health, neonatol and perinatol 7, 15 (2021). https://doi.org/10.1186/s40748-021-00135-5

DEMOGRAPHICS

Father of Baby

As our culture evolves, more births are happening outside of marriage, creating barriers to the involvement of fathers. Their role is often seen as secondary to the mother, but fathers can be powerful allies when it comes to maternal and infant health. They can offer financial and emotional support and can act as advocates for the mother and infant. This section will look at the demographics of the 180 fathers who lost infants in 2016-2020.

Figure 9 exhibits the fathers race and ethnicity compared to the mothers race and ethnicity. 45.6% of fathers were White, 26.1% were Black, 16.7% were Hispanic, 0.6% were Asian, and 3.9% were of other race which includes Multi-racial and Native American.

FIGURE 9. FATHER'S RACE AND ETHNICITY BY MOTHER'S RACE AND ETHNICITY

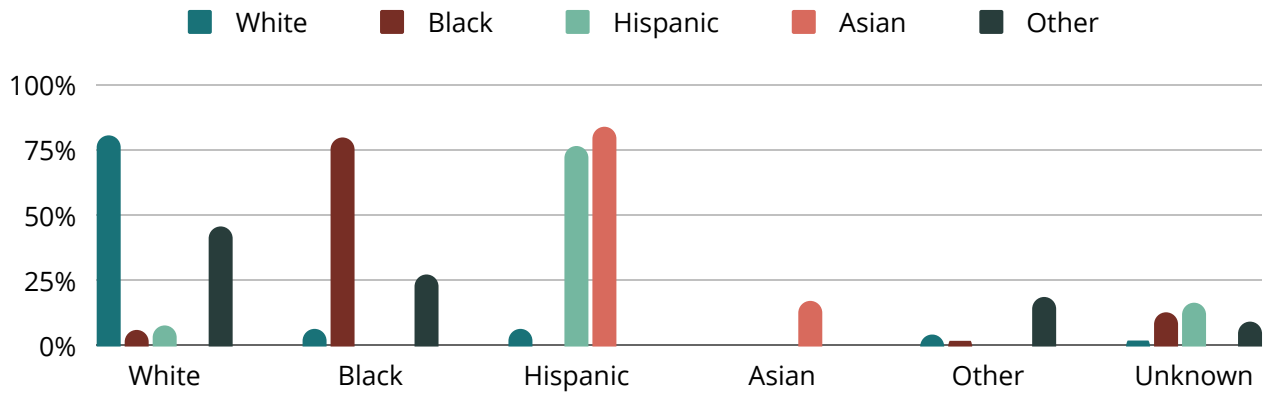
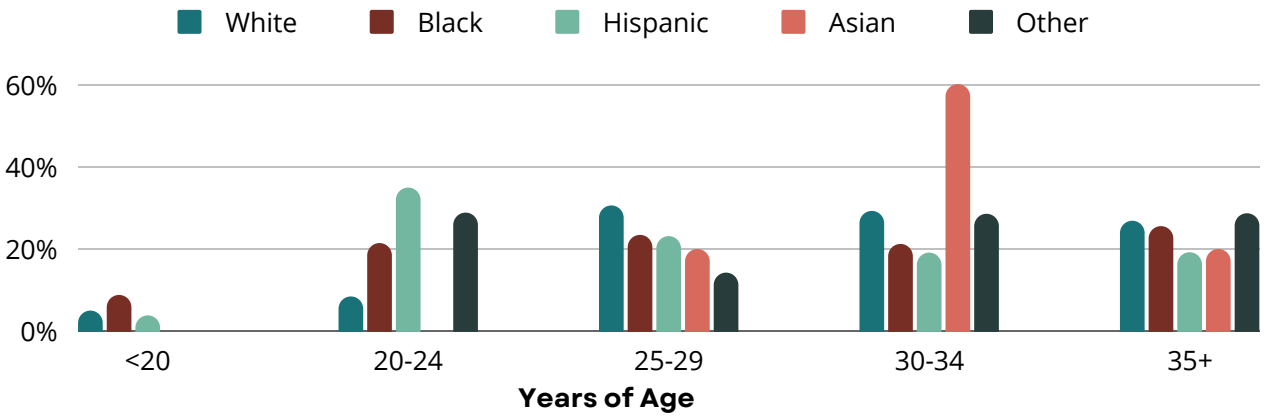


Figure 10 shows the age of the father compared to his race or ethnicity. There was a wide distribution across age groups, but the majority (48.8%) of fathers were between the ages of 25-34.

FIGURE 10. FATHER'S AGE BY RACE AND ETHNICITY

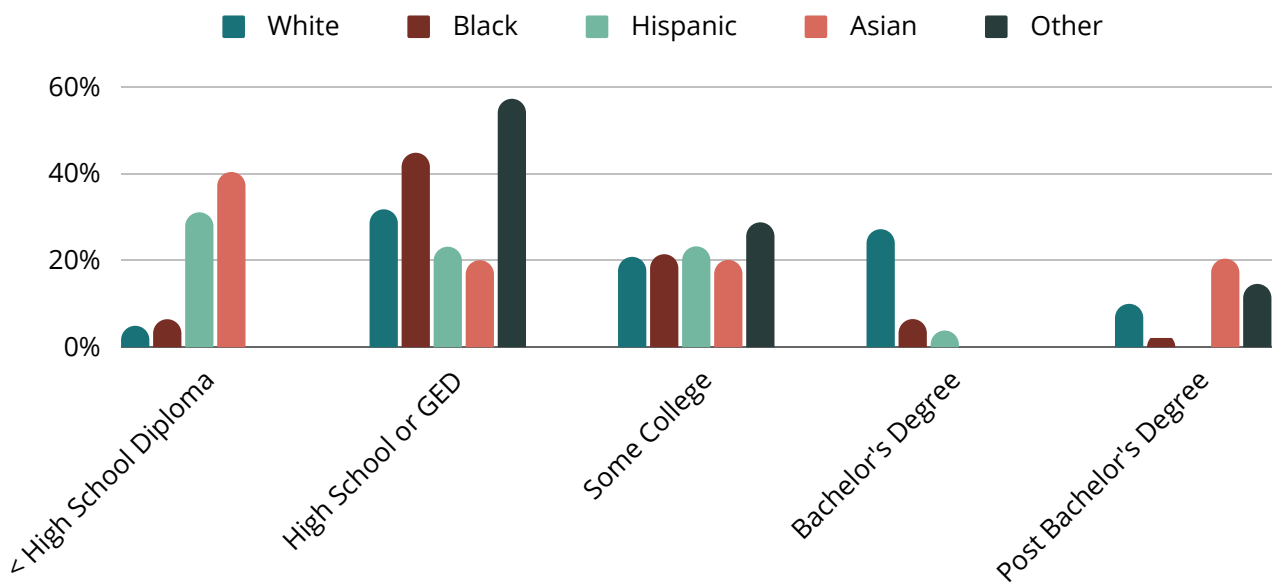


DEMOGRAPHICS

Father of Baby

Figure 11 summarizes the father's education compared to his race and ethnicity. 32.2% of all fathers had a High School Diploma or GED. A disparity is seen between race and ethnicity as 36.6% of White fathers had a Bachelor's Degree or higher compared to 8.5% of Black fathers and 3.8% of Hispanic fathers.

FIGURE 11. FATHER'S EDUCATION BY RACE AND ETHNICITY



Why is this Important?

- Education is an indicator of socioeconomic status, can be a social support, and may lead to better health habits including diet and exercise.[8]

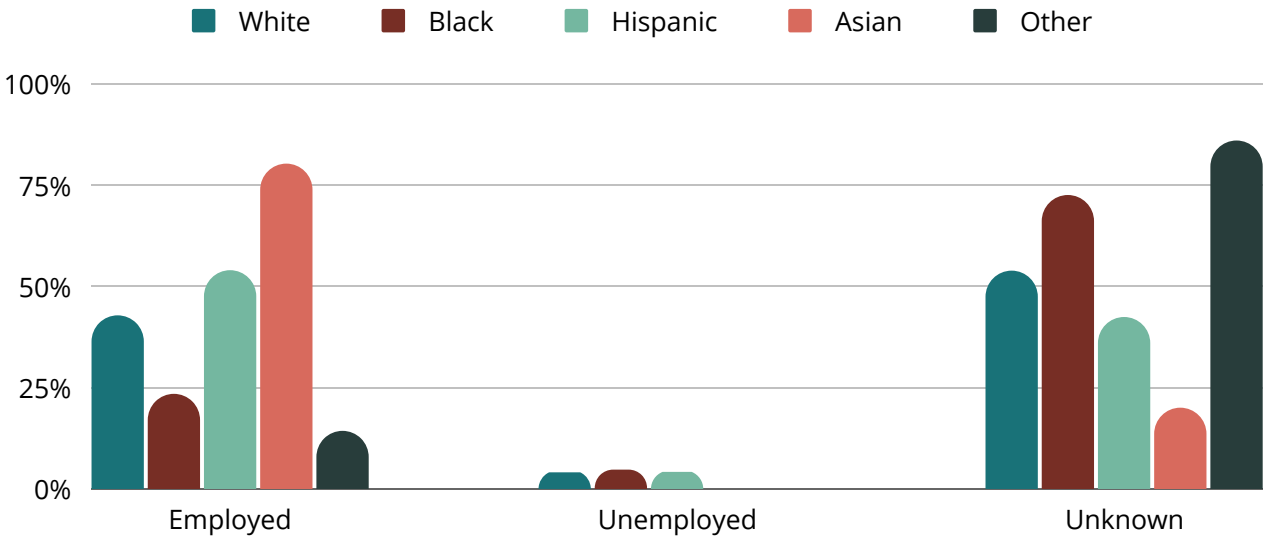
8. Zajacova, A., & Lawrence, E. M. (2018). The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annual review of public health, 39, 273–289. https://doi.org/10.1146/annurev-publhealth-031816-044628

DEMOGRAPHICS

Father of Baby

Figure 12 summarizes the employment status of the father by his race and ethnicity. This information is widely unknown as employment status is rarely included in a mother's medical chart. 36.7% of fathers were reported to be employed while 3.3% were not employed. The majority, 60%, were unknown.

FIGURE 12. FATHER'S EMPLOYMENT BY RACE AND ETHNICITY



Why is this Important?

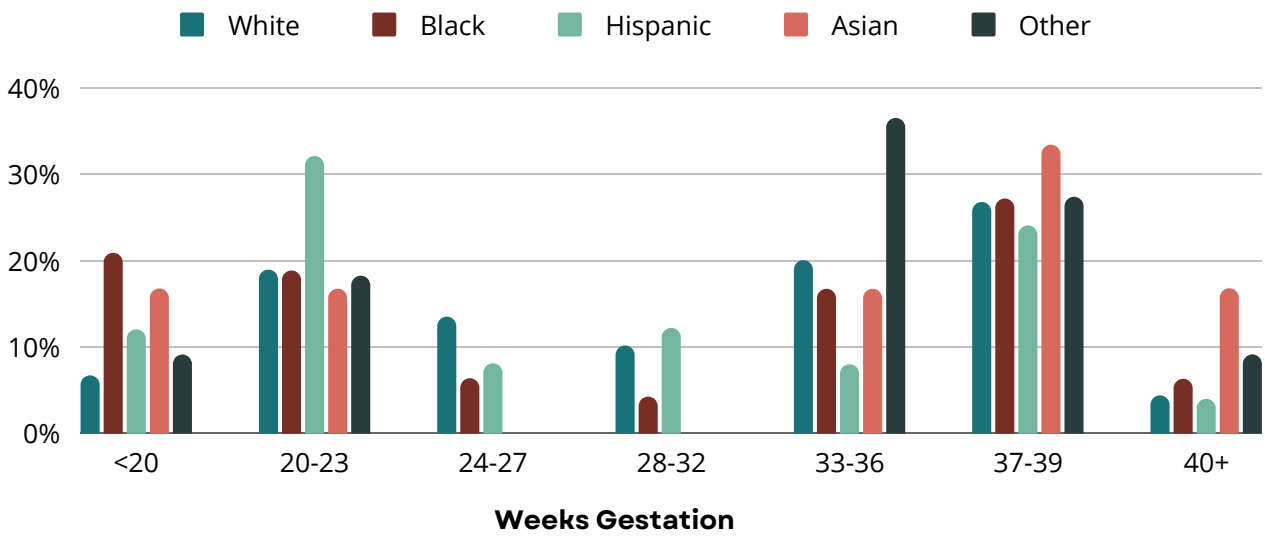
- Similar to mothers, a father's employment status can be positive or negative as it may offer financial support and access to health insurance, but can also limit the father's ability to attend prenatal appointments or require him to return to work soon after the delivery of the infant.

DEMOGRAPHICS

Infant

Figure 13 displays the gestational age of the infant compared to the birth mother's race and ethnicity. 41.7% of the infants who died were born extremely preterm, less than 28 weeks gestation. A disparity can be seen as 38.9% of infants born to White mothers were extremely preterm compared to 45.9% of infants born to Black mothers, and 52% of infants born to Hispanic mothers. Asian mothers were the most likely to have a full term birth, 37+ weeks gestation.

FIGURE 13. INFANT'S GESTATIONAL AGE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Preterm infants are often born at a low birth weight, experience problems with breathing, temperature control, digestion, or other long-term complications.
- "A non-smoking Black woman faces the same odds of delivering prematurely as a white woman who smokes up to nine cigarettes per day before and during pregnancy." [12]
- "Racism-related stress may help explain why Black women in the United States are over 50% more likely to deliver a premature baby than white women." [12]

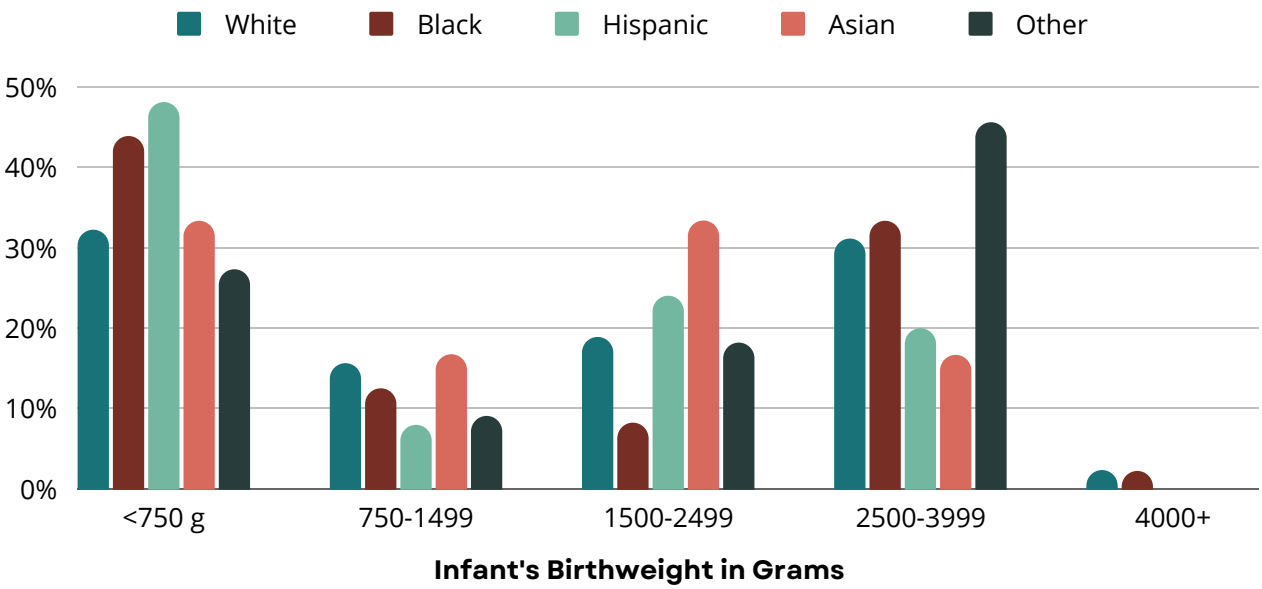
12. Scommegna, P. (2021, January 21). High premature birth rates among U.S. black women may reflect the stress of racism and health and economic factors. PRB. Retrieved September 23, 2022, from https://www.prb.org/resources/high-premature-birth-rates-among-u-s-black-women-may-reflect-the-stress-of-racism-and-health-and-economic-factors/

DEMOGRAPHICS

Infant

Figure 14 summarizes the birth weight of the 180 infants who died compared to the mother's race and ethnicity. 67.7% of the infants who died were born with a low birth weight, less than 2,500 grams. 37.2% of infants were born at an extremely low birth weight, less than 750 grams. Again, a disparity can be seen as 32.2% of infants born to White mothers were less than 750 grams compared to 43.8% of infants born to Black mothers and 48% of infants born to Hispanic mothers.

FIGURE 14. INFANT'S BIRTHWEIGHT BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Maternal health factors such as chronic illness, smoking during pregnancy, infections, STIs, and poor nutrition may lead to low birthweight infants.[13]
- Infants born with a low birthweight may have troubles eating, gaining weight, or fighting off infections. [13]
- Black babies are two times as likely to be born with a low birth weight even if the mother has a college education and receives adequate prenatal care.[14]

13. Low Birthweight. March of Dimes. (2021, June). Retrieved August 23, 2022, from https://www.marchofdimes.org/complications/low-birthweight.aspx
14. Matoba, N., & Collins, J. W. (2017, August 31). Racial disparity in infant mortality. Seminars in Perinatology. Retrieved September 23, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0146000517300757?via%3Dihub#preview-section-cited-by

DEMOGRAPHICS

Infant

The Case Review Team uses the State of Michigan's standard cause of death categories to select the most appropriate cause of the infant's death. This selection does not always align with the cause of death listed on the death certificate as the FIMR case review process allows for a more in depth review of the factors that may have contributed to the infant's death. The State's cause of death categories are listed below:

PERINATAL

Complications of Pregnancy/Labor/Delivery
Moderately Preterm (32-36 weeks)
Very Preterm (28-31 weeks)
Extreme Preterm 1 (24-27 weeks)
Extreme Preterm 2 (21-23 weeks)
Extreme Preterm 3 (20 weeks or below)
Birth Trauma
Respiratory Distress

CONGENITAL

Nervous System
Cardiovascular
Respiratory
Gastrointestinal
Genitourinary
Musculoskeletal
Chromosomal
Other
Unknown

INFECTION

Nervous System
Respiratory
Septicemia
Other

OTHER

Motor Vehicle
Poisoning
Fire/Burn
Drowning
Asphyxia
Overlay
Maltreatment
Other
Necrotizing Enterocolitis
Elective Termination

UNKNOWN

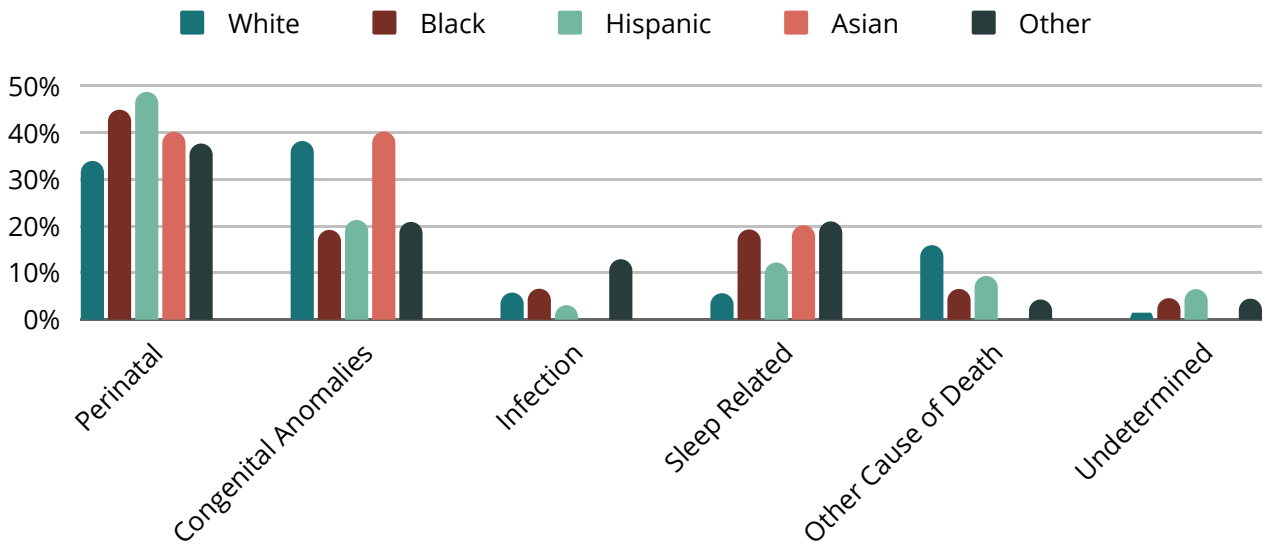
Undetermined
Unknown

DEMOGRAPHICS

Infant

Figure 15 outlines the infant's cause of death compared to the infant's race and ethnicity. Recognizing which cause of death is most common in a particular race or ethnicity identifies possible disparities. Figure 15 indicates that Black and Hispanic infants most commonly died of perinatal issues which are most likely attributed to the health of the mother during pregnancy. White infants most commonly died of congenital anomalies-conditions associated with older maternal age or genetic mutations. Overall, 40% of infant deaths were attributed to extreme prematurity or other perinatal issues. 27.8% were due to congenital anomalies, and 12.8% were sleep related deaths.

FIGURE 15. CAUSE OF DEATH BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Each cause of death category suggests different prevention methods. Knowing that the majority of infant mortality in Kent County is due to perinatal issues helps focus efforts on improving the health and wellbeing of the mother.

SUMMARY OF ISSUES

During FIMR Case Review Team meetings, the team reviews over 182 common factors that may either be present in a case, or contributing to the infant's death. This section will focus on the data gathered while reviewing these factors. Not all 182 factors or categories are included in this report as some data is insignificant. The factors are grouped into the following categories:

- PRE/INTER/POSTCONCEPTION CARE
- MEDICAL: MOTHER
- FAMILY PLANNING
- SUBSTANCE USE
- PRENATAL CARE/DELIVERY
- MEDICAL: FETAL/INFANT
- PEDIATRIC CARE
- ENVIRONMENT
- INJURIES
- SOCIAL SUPPORT
- PARTNER/FATHER OF BABY/CAREGIVER
- FAMILY TRANSITION
- MENTAL HEALTH/STRESS
- FAMILY VIOLENCE/NEGLECT
- CULTURE
- PAYMENT FOR CARE
- SERVICES PROVIDED
- TRANSPORTATION
- DOCUMENTATION

SUMMARY OF ISSUES

Pre/Inter/Postconception Care

PRECONCEPTION CARE

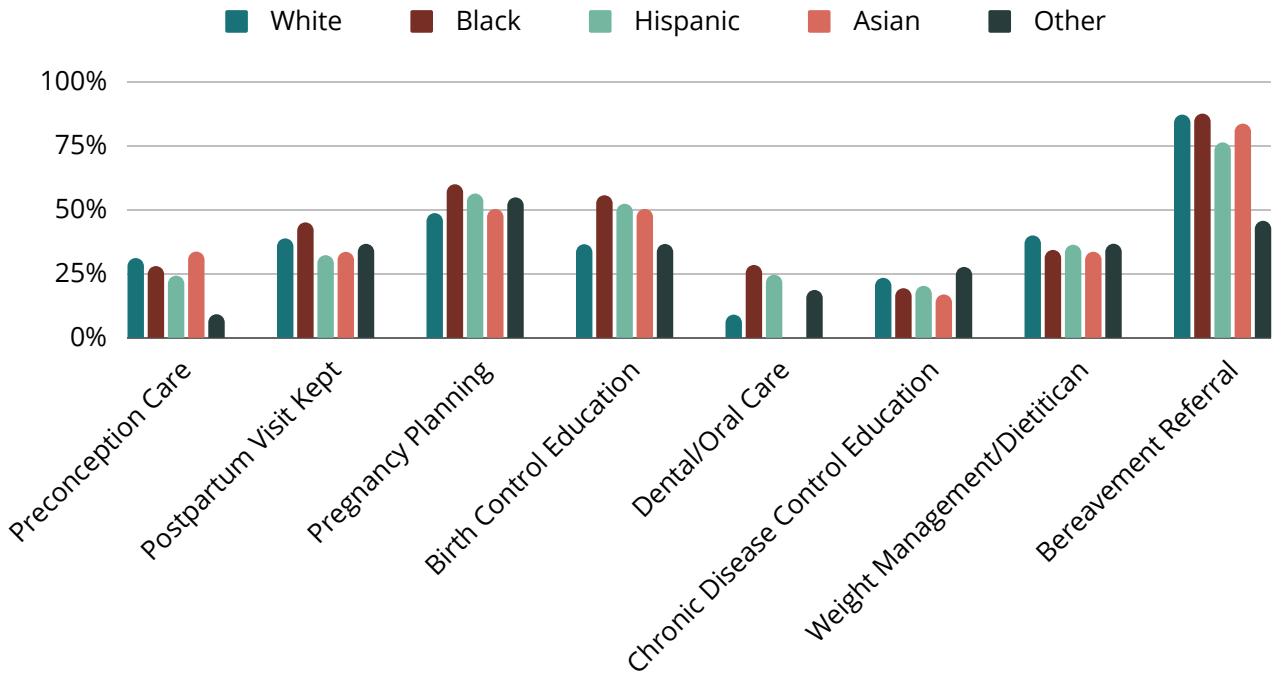
Documentation of a medical checkup prior to pregnancy where pregnancy planning was discussed.

POSTPARTUM VISIT KEPT

The childbearing parent received postpartum care within the first three weeks after delivery.

Figure 16 outlines pre, inter, and post conception care factors compared to the birth mother's race and ethnicity. These factors, with the exception of a bereavement referral, should have occurred prior to, or during the childbearing parent's pregnancy. 27.8% of mothers had preconception care, 38.9% had kept their postpartum visit, and 52.8% had pregnancy planning education.

FIGURE 16. PRE, INTER, AND POST CONCEPTION CARE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Adequate access to healthcare prior to conception helps to ensure that a mother has an intended, healthy pregnancy with limited complications.

SUMMARY OF ISSUES

Medical: Mother

CORD PROBLEMS

Evidence of torsion, nuchal cord, insufficient number of cord vessels, prolapsed cord, cord compression, or other documented problems relating to the umbilical cord.

PLACENTAL ABRUPTION

A condition in which the placenta separates from the inner wall of the uterus before the baby is born.

CHORIOAMNIONITIS

Infection of the membranes surrounding the fetus.

OTHER INFECTIONS

Any significant source of maternal infection, including periodontal, UTI, etc.

PPROM

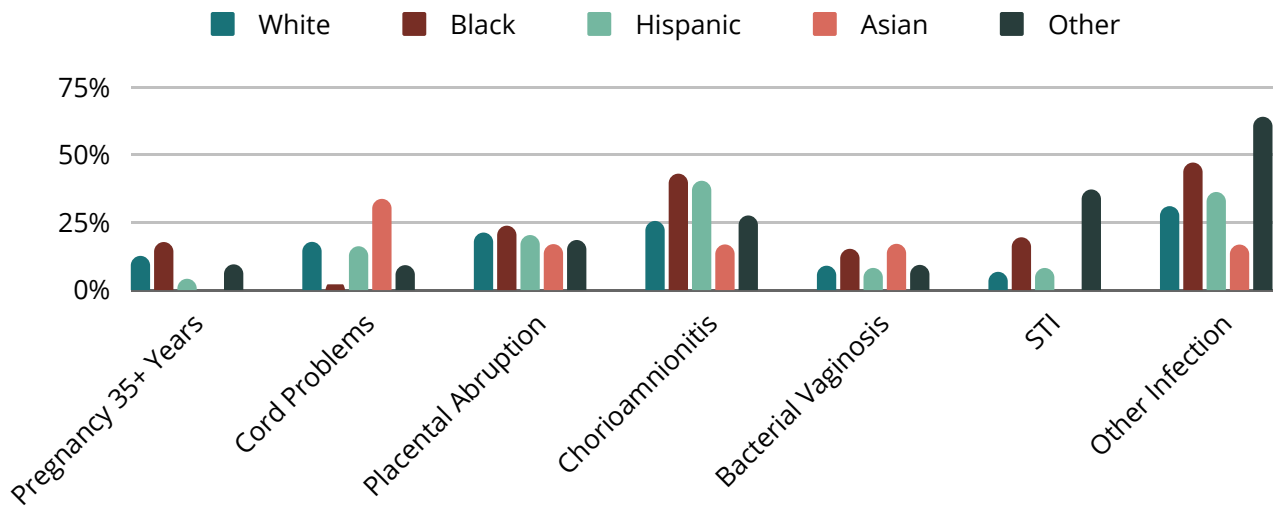
Preterm Premature Rupture of Membranes- Bag of waters ruptured before onset of labor and before 37 completed weeks of gestation.

SUMMARY OF ISSUES

Medical: Mother

Figure 17.1 and 17.2 exhibit factors that pertain to the health of the mother compared to her race and ethnicity. Due to the size of this section, only factors with an occurrence of 10% were included. The factors that occurred most often include obesity, which was present in 38.9% of cases, other infections present in 37.2% of cases, chorioamnionitis in 31.7% of cases, and previous spontaneous abortions in 31.1% of cases. Other less common factors pertaining to a mother's health that are displayed in Figures 17.1 and 17.2 include having a pregnancy at or beyond 35 years of age, cord problems, placental abruptions, bacterial vaginosis, sexually transmitted infections (STIs), having a multiple gestation, being overweight, having a preterm labor, having a close interval pregnancy, less than 18 months apart, and having a first pregnancy less than 18 years of age.

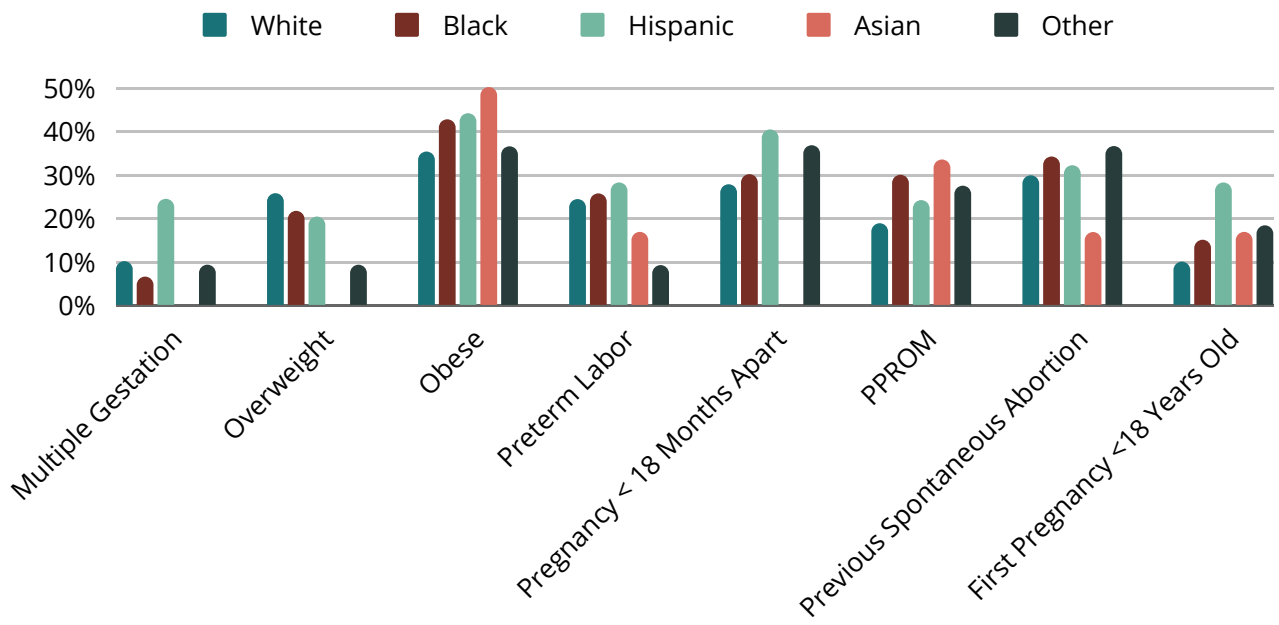
FIGURE 17.1 MEDICAL: MOTHER BY MOTHER'S RACE AND ETHNICITY



SUMMARY OF ISSUES

Medical: Mother

FIGURE 17.2 MEDICAL: MOTHER BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Women with pregnancy complications are twice as likely to have labor complications.[15]
- Both the rate of women entering pregnancy with a preexisting condition and the rate of complications during pregnancy are on the rise.[15]

15.Blue Cross Blue Shield, The Health of America. (2020). (rep.). Trends in Pregnancy and Childbirth Complications in the U.S. Retrieved September 22, 2022, from https://www.bcbs.com/sites/default/files/file-attachments/health-of-america-report/HoA_Maternal_Health.pdf.

SUMMARY OF ISSUES

Family Planning

UNWANTED PREGNANCY

Childbearing parent did not want to be pregnant then or any time in the future.

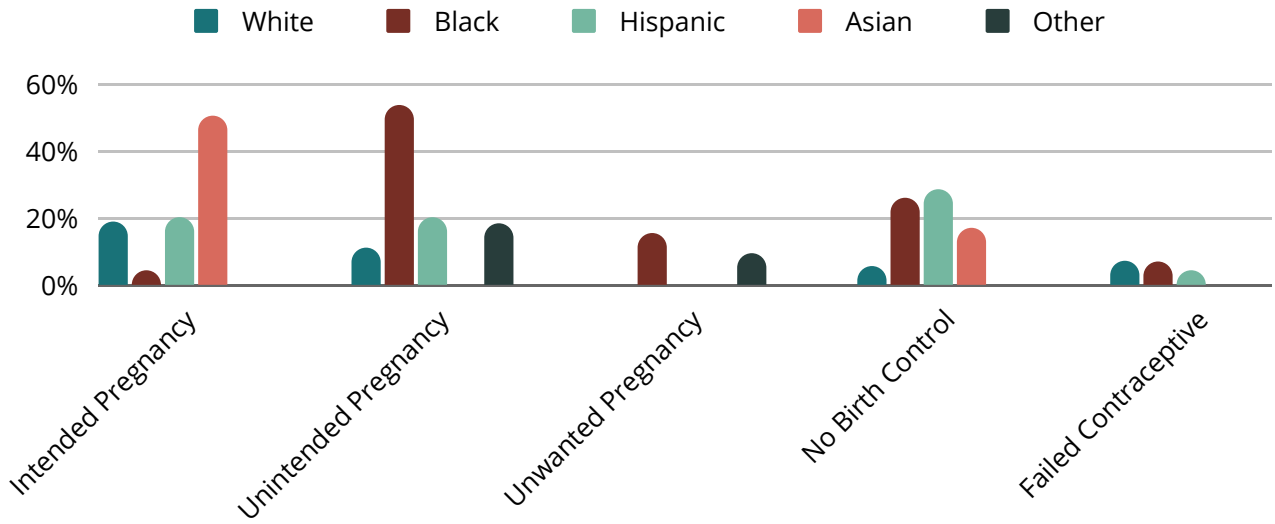
UNINTENDED PREGNANCY

Childbearing parent did not want to be pregnant at that time.

Figure 18 summarizes Family Planning factors compared to the race and ethnicity of the birthing mother. Data for family planning comes from the mother's medical chart and maternal family interview and is often times unknown. From the data that could be found, large disparities were seen. Asian mothers (50%) were the most likely to report having intended pregnancies, while Black mothers were more likely to have unintended (53.2%) and unwanted (14.9%) pregnancies. Black mothers (25.5%) and Hispanic mothers (28%) were the most likely to not utilize birth control at the time of conception.

> **"I had just gotten off of the birth control method I was using and I did not think I could get pregnant at that time."**
>
> A Michigan Mother

FIGURE 18. FAMILY PLANNING BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Contraceptive use decreases the prevalence of unintended or unwanted pregnancies by allowing women to better control the timing of their pregnancy and increases infant survival by spacing out pregnancies, giving the mother's body enough time to heal. [16]
- Health disparities like unequal access to healthcare or insurance to cover the cost of contraceptives creates barriers to its use. [16]

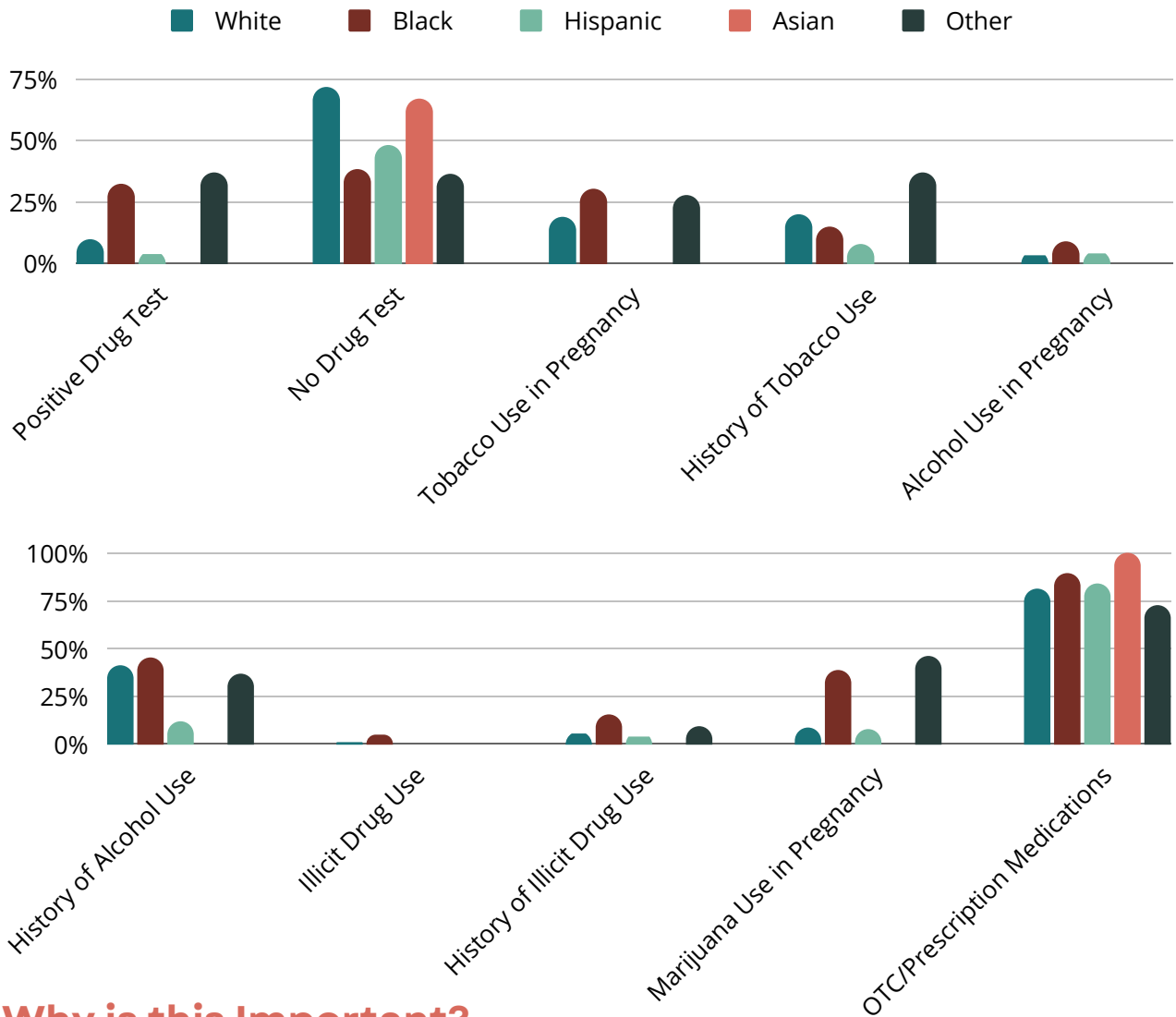
16. Molitoris, J., Barclay, K., & Kolk, M. (2019). When and Where Birth Spacing Matters for Child Survival: An International Comparison Using the DHS. Demography, 56(4), 1349–1370. https://doi.org/10.1007/s13524-019-00798-y

SUMMARY OF ISSUES

Substance Use

Figure 19 outlines any substance use of the birth mother before, during, and after her pregnancy and around the time of the infant's death. Disparities in drug testing is evident as Black mothers (31.9%) and other race mothers (36.4%) were more likely to have positive drug tests, while the majority of White mothers (71.4%) and Asian mothers (66.7%) did not receive a drug test.

FIGURE 19. SUBSTANCE USE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Substance use during pregnancy is shown to increase the rate of premature and low birthweight infants along with other pregnancy complications. Infants may also be born with Neonatal Abstinence Syndrome (NAS), requiring longer hospital and NICU stays.[17]

17. Medicaid and CHIP Payment and Access Commission. 2020. Chapter 6: Substance Use Disorder and Maternal and Infant Health. [online] Available at: <https://www.macpac.gov/wp-content/uploads/2020/06/Chapter-6-Substance-Use-Disorder-and-Maternal-and-Infant-Health.pdf> [Accessed 24 August 2022].

SUMMARY OF ISSUES

Prenatal Care/Delivery

STANDARD OF CARE NOT MET

Prenatal assessment or treatment did not meet commonly accepted obstetric practice standards.

INADEQUATE ASSESSMENT

Prenatal providers did not appropriately assess for certain conditions or circumstances.

LATE ENTRY TO PRENATAL CARE

First prenatal visit (excluding nurse visit) occurred after the 12th week of gestation.

INAPPROPRIATE USE OF THE ED

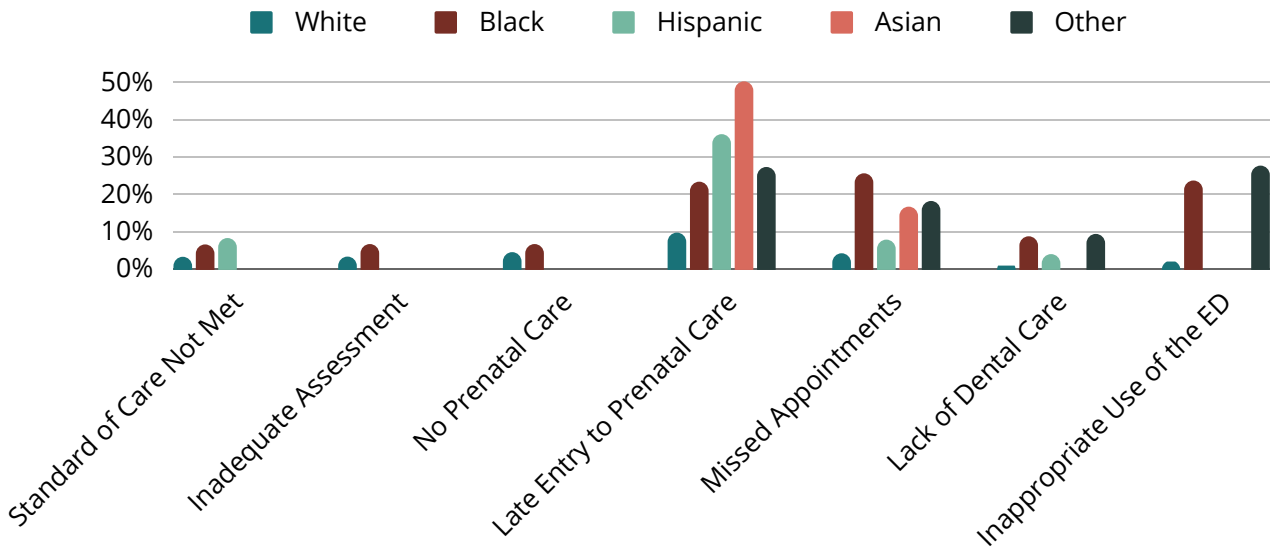
Multiple visits to the ED to treat conditions that could have been handled by an attending physician, either general practitioner or OB doctor.

SUMMARY OF ISSUES

Prenatal Care/Delivery

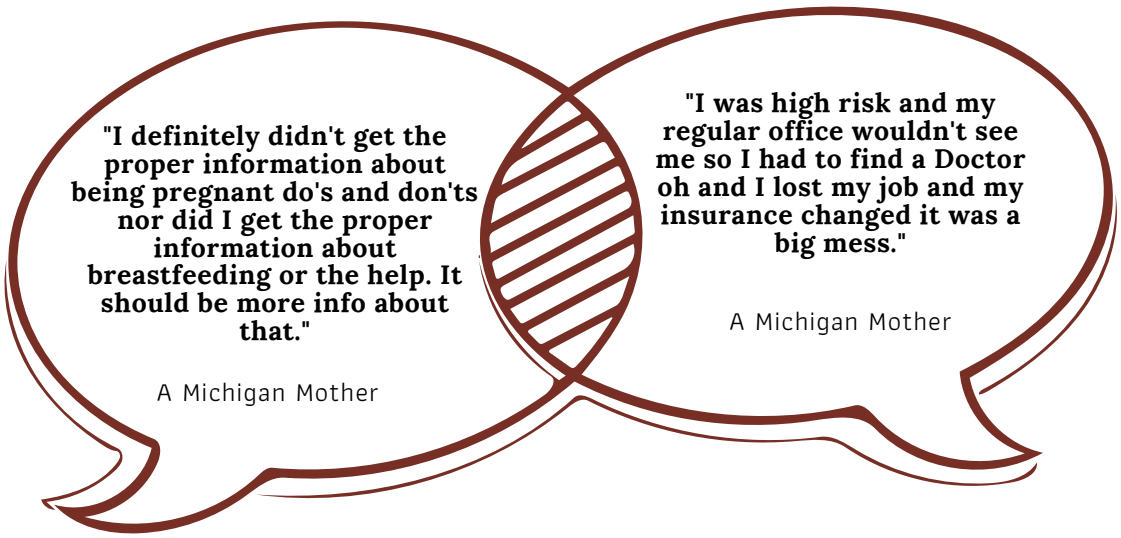
Figure 20 exhibits prenatal care and delivery factors that can be present in or contribute to infant death compared to the birth mothers race or ethnicity. Asian mothers were most likely (50%) to have a late entry into prenatal care, Black mothers (25.5%) had higher percentages of missed prenatal appointments, and Black mothers (23.4%) and other race mothers (27.3%) were most likely to inappropriately use the ED.

FIGURE 20. PRENATAL CARE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Prenatal care is necessary to address health concerns and provide education and resources to families. Existing disparities in access to care such as transportation or payment for care exacerbate other factors such as the ones listed above.

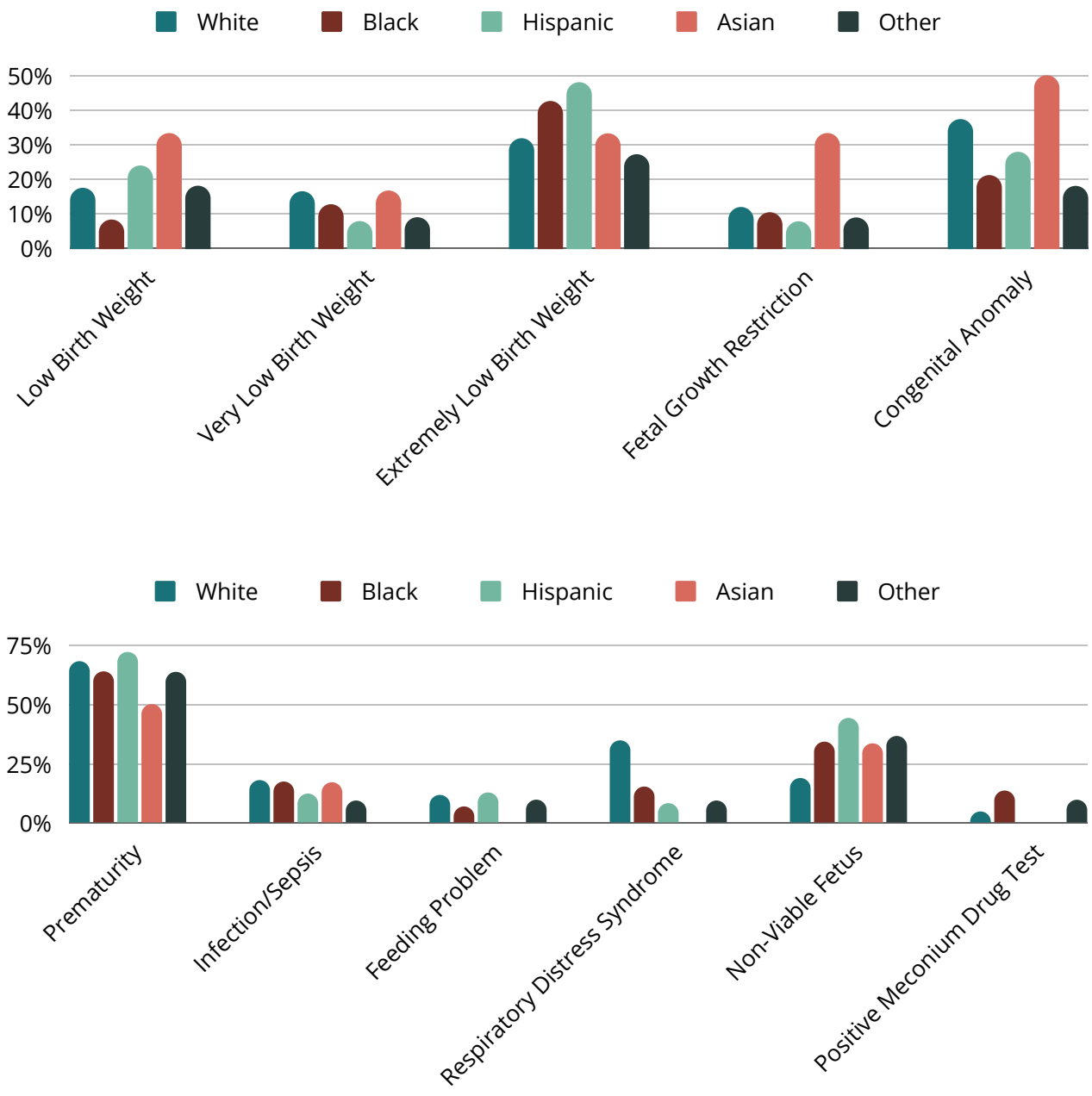


SUMMARY OF ISSUES

Medical: Fetal/Infant

Figure 21 summarizes factors of the infant's medical health that are present or contributing to the infant's death compared to the mother's race and ethnicity. Again, this section highlights the disparity in mothers who give birth to infants with an extremely low birth weight. 48% of Hispanic and 42.6% of Black mother's infants were born less than 750 grams, compared to 31.9% of White mothers, 33.3% of Asian mothers and 27.3% of other race mothers. Black mothers also had the highest percentages of having an infant born with a positive meconium drug test at 12.8%, which can be contributed to the disparity in choosing which mothers to drug test.

FIGURE 21. MEDICAL FETAL INFANT BY MOTHER'S RACE AND ETHNICITY



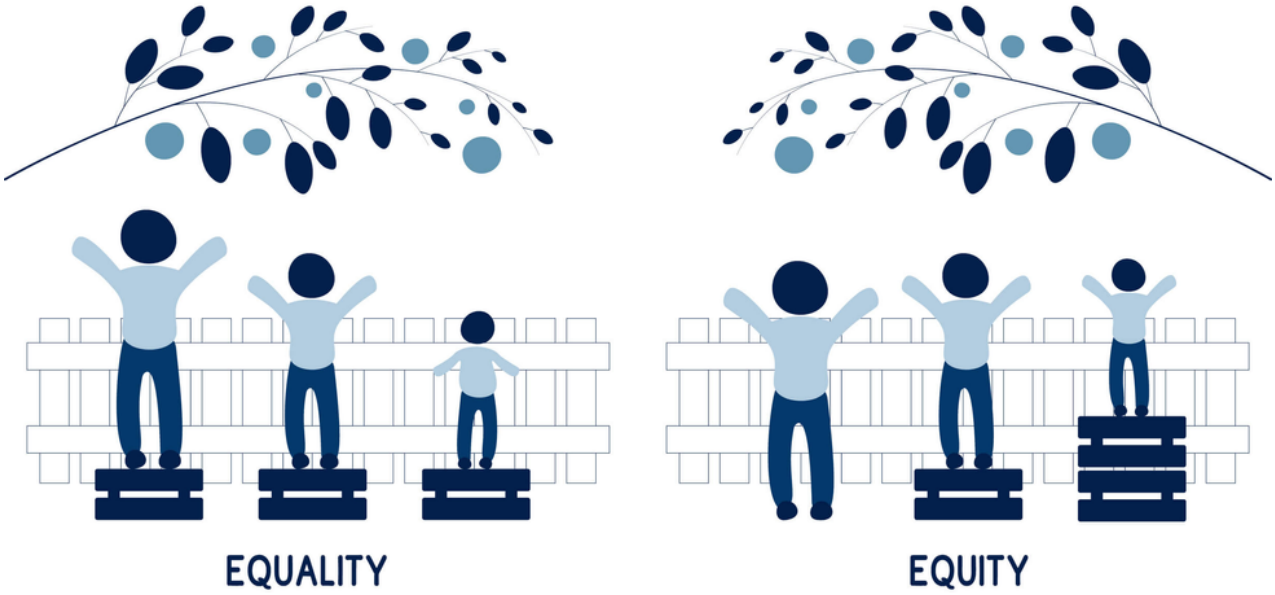
SUMMARY OF ISSUES

Medical: Fetal/Infant

Why is this Important?

- "The cycle of residential segregation, educational disadvantage, income inequality and the resulting environmental exposure to unclean air and water must be interrupted to make significant progress in eliminating disparities in birth outcomes."[18]

- Health equity is achieved when every person is able to live the healthiest life possible, no matter who they are, where they live, or how much money they make.[19]



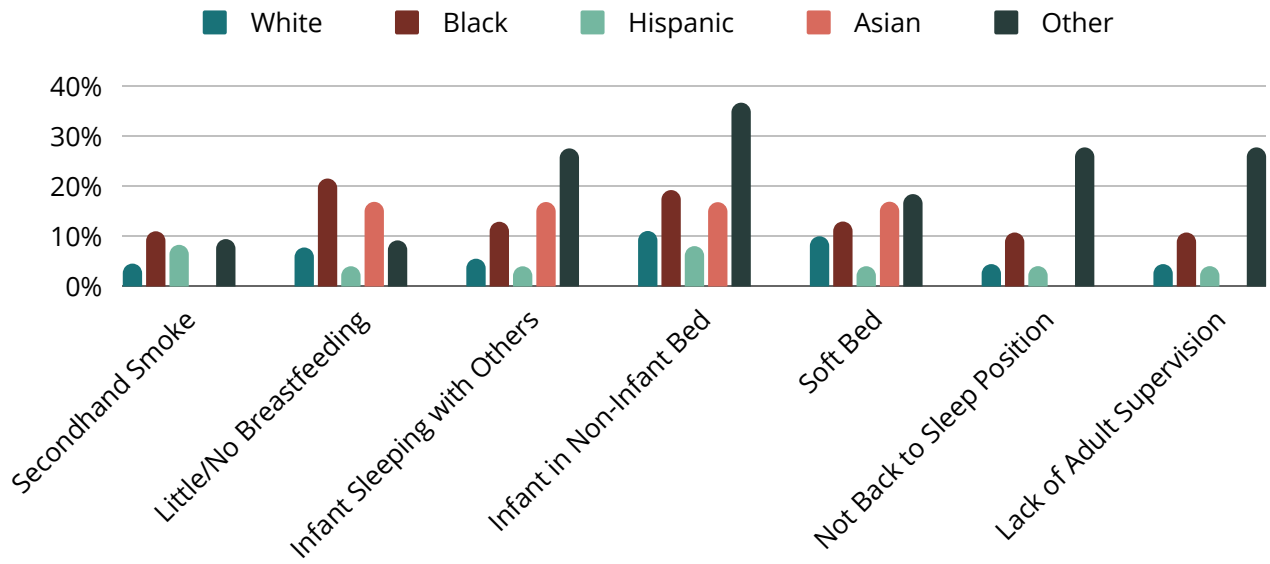
18. Burris, H. H., & Hacker, M. R. (2017). Birth outcome racial disparities: A result of intersecting social and environmental factors. Seminars in perinatology, 41(6), 360–366. https://doi.org/10.1053/j.semperi.2017.07.002
19. Health equity: What it Means and Why it Matters. Advance Care Planning (ACP) Decisions. (2022, May 7). Retrieved September 23, 2022, from https://acpdecisions.org/health-equity-what-it-means-and-why-it-matters/

SUMMARY OF ISSUES

Environment

Figure 22 examines the environment the infant was living in, including where the infant slept and how they were fed. This information is difficult to gather as it is not frequently reported in medical records. While only 11.1% of mothers had little or no breastfeeding, a disparity can be seen in that Black mothers were the most likely to have little or no breastfeeding at 21.3% compared to 7.7% of White mothers. When looking at sleeping environments, 14.4% of infants were placed in a non-infant bed, 8.9% of infants were sleeping with other people, and 10.6% of infants were placed on soft beds. Black, Asian, and other race mothers were most likely to bed-share, place their infant in a non-infant bed, on bed too soft, or not on their back.

FIGURE 22. ENVIRONMENT BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Infants who are born premature, before 37 weeks gestation, or at a low birth weight have an increased risk of dying due to sleep-related causes. [20]
- 1/3 of Sudden Unexpected Infant Death Cases could be prevented if maternal smoking was eliminated. [21]

20. Centers for Disease Control and Prevention (CDC) SUID Case Registry – 2010 to 2018, Michigan Public Health Institute, 2020.
21. Maged, M., & Rizzolo, D. (2018). Preventing sudden infant death syndrome and other sleep-related infant deaths. JAAPA : official journal of the American Academy of Physician Assistants, 31(11), 25–30. https://doi-org.ferris.idm.oclc.org/10.1097/01.JAA.0000546475.33947.44

SUMMARY OF ISSUES

Environment

"The "Back is Best" campaign should be revisited. Safe alternatives should be offered because some babies simply will NOT sleep on their backs. It is very frustrating as a parent when this won't work and the medical community has nothing else to offer. They might as well told me to "sleep my baby standing up"-- a complete physical impossibility."

A Michigan Mother

"I tried not to sleep with my baby. But in the first 2 months she would not sleep by herself, she and I slept side by side on couch her to the outer edge, this scared me but I had no other option I needed to sleep too."

A Michigan Mother

"I work in Forensic Pathology and I deal with the most tragic outcome of unsafe sleep. I went into my pregnancy already knowing how to keep my baby safe while sleeping. However, the information given to me about it in the hospital was not given in a manner or time that was helpful. If I hadn't already known I'm not sure it would have been okay. Bombarding a woman with a plethora of information in the hormonal/exhausting few hours post partum probably isn't the best way to distribute information."

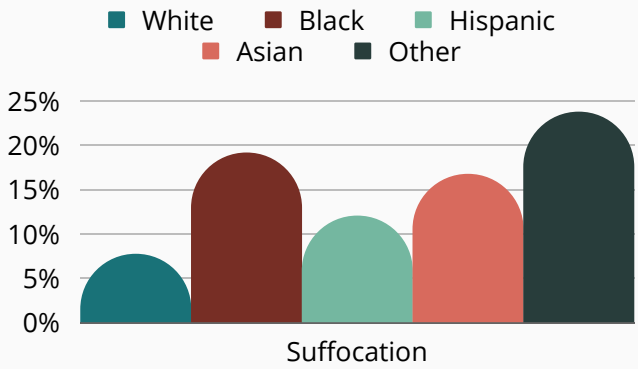
A Michigan Mother

SUMMARY OF ISSUES

Injuries

FIGURE 23. INJURIES BY MOTHER'S RACE AND ETHNICITY

Figure 23 shows the prevalence of suffocation in the infant death cases that were reviewed. Almost always, the suffocation is contributed to unsafe sleeping environments. Other race mothers (27.3%), Black mothers (19.1%) and Asian mothers (16.7%) had higher percentages of infant suffocation compared to 7.7% of White mothers and 12% of Hispanic mothers.



Why is this Important?

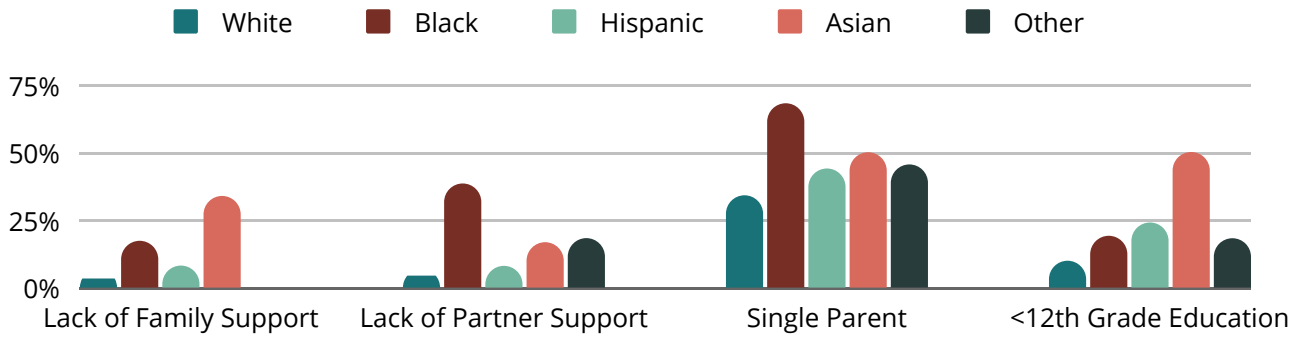
- Unsafe sleep deaths are the most preventable cause of death. Prevention includes educating all parents and caregivers on how to place an infant safely to sleep, but also looks at indirect factors such as a lack of partner or family support, lack of supportive services and resources, or mental illness that may increase the likelihood of placing an infant in an unsafe sleeping environment.

SUMMARY OF ISSUES

Social Support

Figure 24 examines the social support of the birthing mother. Of the 180 infant death cases reviewed, 45.6% of mothers were found to be single parents with Black mothers (68.1%) being the most likely. Black mothers also had the highest percentages of a lack of partner support at 38.3% while Asian mothers were the most likely to have a lack of family support at 33.3%.

FIGURE 24. SOCIAL SUPPORT BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Mothers who have a lack of social support from their partners or other family members have higher rates of postpartum depression and overall stressors.[22]

"It was very important to me to breastfeed as long as possible. My employer did not offer paid & maternity leave so I had to back to work full time very soon. I dried up and became extremely depressed. I do not believe that it benefits anyone to have a country where women have to make this choice. My husband also had a hard time having to return to work full time after only a couple of unpaid days with his newborn."

A Michigan Mother

"I wish I had more support in breastfeeding."

A Michigan Mother

22. Corrigan, C. P., Kwasky, A. N., & Groh, C. J. (2015). Social Support, Postpartum Depression, and Professional Assistance: A Survey of Mothers in the Midwestern United States. The Journal of perinatal education, 24(1), 48–60. https://doi.org/10.1891/1058-1243.24.1.48

SUMMARY OF ISSUES

Mental Health/Stress

MULTIPLE STRESSES

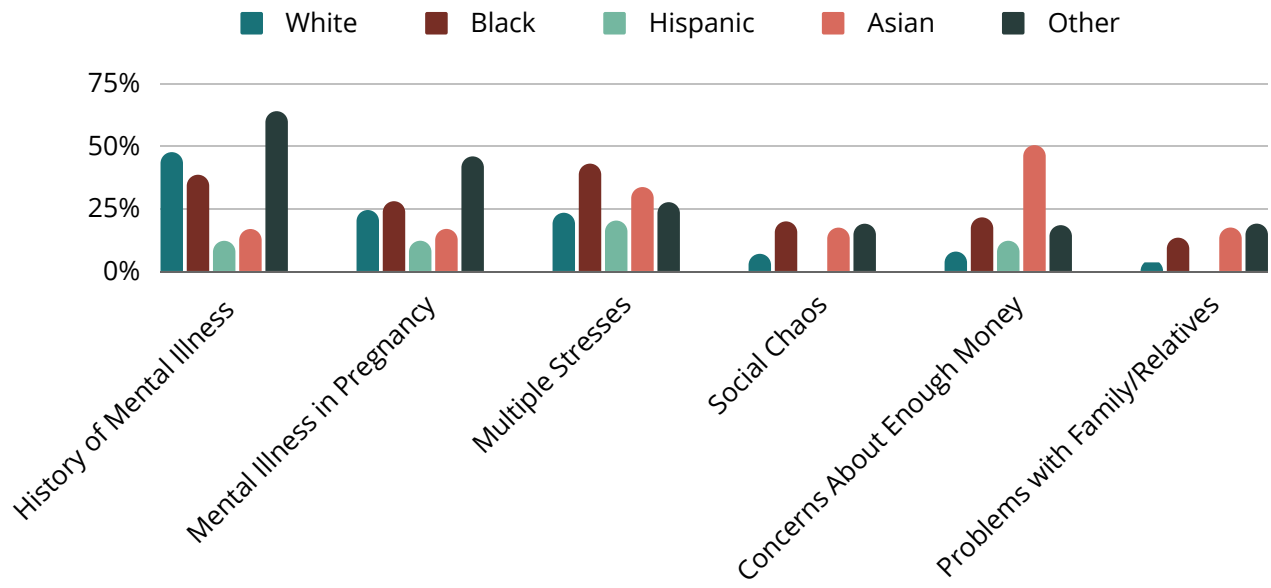
The childbearing parent experiences three or more family, economic, environmental, or other stresses during pregnancy or while the infant is alive.

SOCIAL CHAOS

The childbearing parent's history suggests social interactions and social support systems are destructive and/or disruptive of functional stability making it difficult for her to function in life.

Figure 25 outlines mental health factors that may be present before, during or after pregnancy. 40% of mothers had a history of mental illness while 24.4% had a mental illness during pregnancy. Black mothers were more likely to have multiple stressors (42.6%) and social chaos (19.1%) while Asian mothers (50%) had the highest percentages of concerns about money.

FIGURE 25. MENTAL HEALTH AND STRESS BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Maternal anxiety and depression are risk factors for preterm delivery and low birth weight infants as mental illness can alter the intrauterine environment, lead to poorer maternal health, contribute to the misuse of substances, and decrease a woman's ability to manage aspects of her pregnancy.[23]

23. Adane, A. A., Bailey, H. D., Marriott, R., Farrant, B. M., White, S. W., Morgan, V. A., & Shepherd, C. C. (2020). Role of maternal mental health disorders on stillbirth and infant mortality risk: A protocol for a systematic review and meta-analysis. BMJ Open, 10(5), e036280. https://doi-org.ferris.idm.oclc.org/10.1136/bmjopen-2019-036280

SUMMARY OF ISSUES

Mental Health/Stress

"I stressed a lot of my pregnancy due to the health of my baby, relationships, and finding a new place before my new baby was born."

A Michigan Mother

"During my postpartum check-up I took a depression scale, my Dr. told me I scored moderately high but did not offer any support or referrals or suggestions for helping me. I feel like postpartum depression is not taken seriously enough in our society."

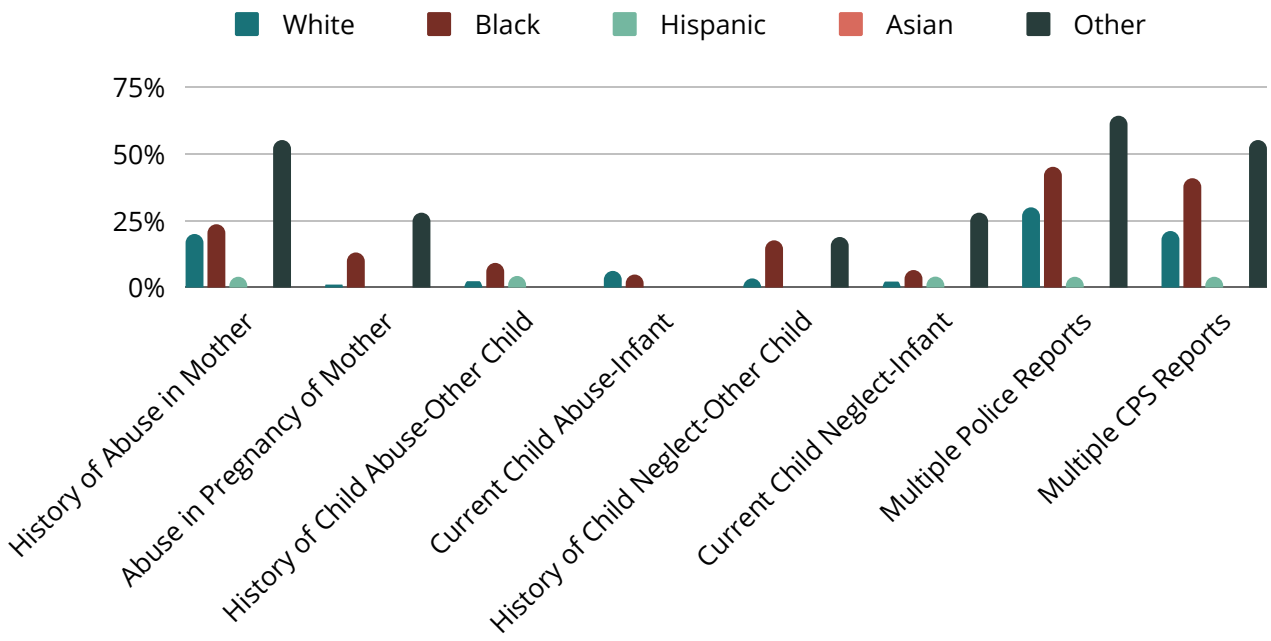
A Michigan Mother

SUMMARY OF ISSUES

Family Violence/Neglect

Figure 26 outlines family violence factors that were identified in the infant death cases. It is likely these factors are largely underreported. 31.1% of families had multiple police reports, 25% had multiple CPS reports, and 20% of mothers had a history of abuse. Of these factors, Black mothers and other race mothers experienced them more often. 27.3% of other race mothers and 12.8% of Black mothers experienced abuse during pregnancy, 63.6% of other race mothers, and 44.7% of Black mothers had multiple police reports, and 54.5% of other race mothers and 40.4% of Black mothers had multiple CPS reports.

FIGURE 26. FAMILY VIOLENCE AND NEGLECT BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- Domestic violence is more prevalent among pregnant women than preeclampsia or gestational diabetes.[24]
- While violence and neglect can happen in any family, greater risk is placed on those with a low socioeconomic status, lower education, young age, prior history of abuse, or substance use.[24]
- Infants and children who witness or experience abuse and neglect have the potential for poorer health outcomes and long-term effects such as mental illness, sleep disorders, or cognitive impairments.[24]

24. Huecker MR, King KC, Jordan GA, et al. Domestic Violence. [Updated 2022 Jul 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499891/

SUMMARY OF ISSUES

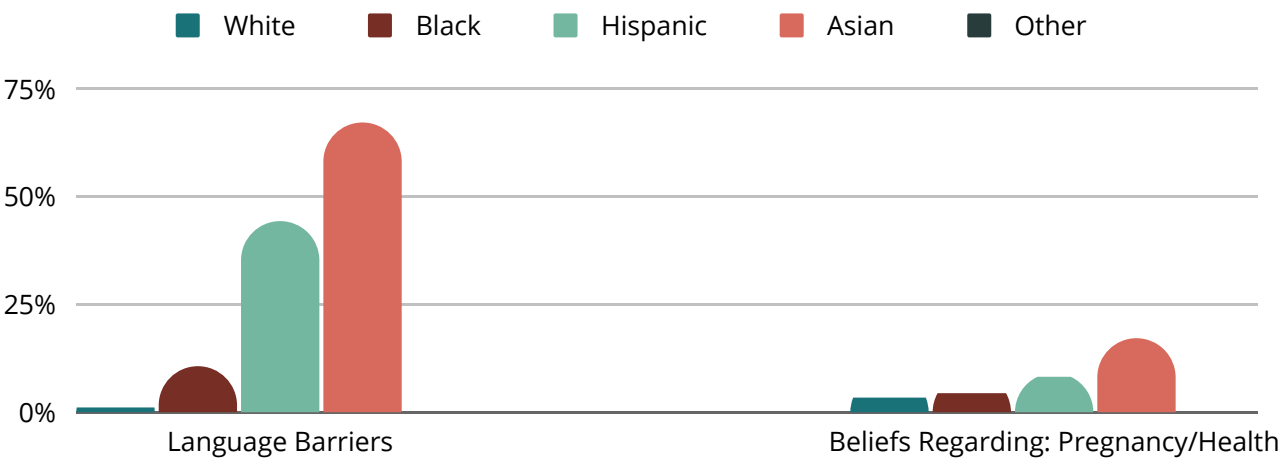
Culture

BELIEFS REGARDING: PREGNANCY AND HEALTH

The childbearing parent or principal caretaker of the infant exhibited health beliefs inconsistent with standard medical practice.

Figure 27 summarizes cultural factors that may be present in infant death cases. Asian and Hispanic mothers were more likely to experience these barriers, which may be attributed to their higher percentage of being born outside of the US, as found in the demographic section of the report. 66.7% of Asian mothers and 44% of Hispanic mothers experienced a language barrier, and 16.7% of Asian had different beliefs about pregnancy and health.

FIGURE 27. CULTURE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- **Cultural and language barriers may cause miscommunication between providers and patients, resulting in adverse outcomes or safety concerns. These barriers may also decrease the quality of care and patient satisfaction.** [25]

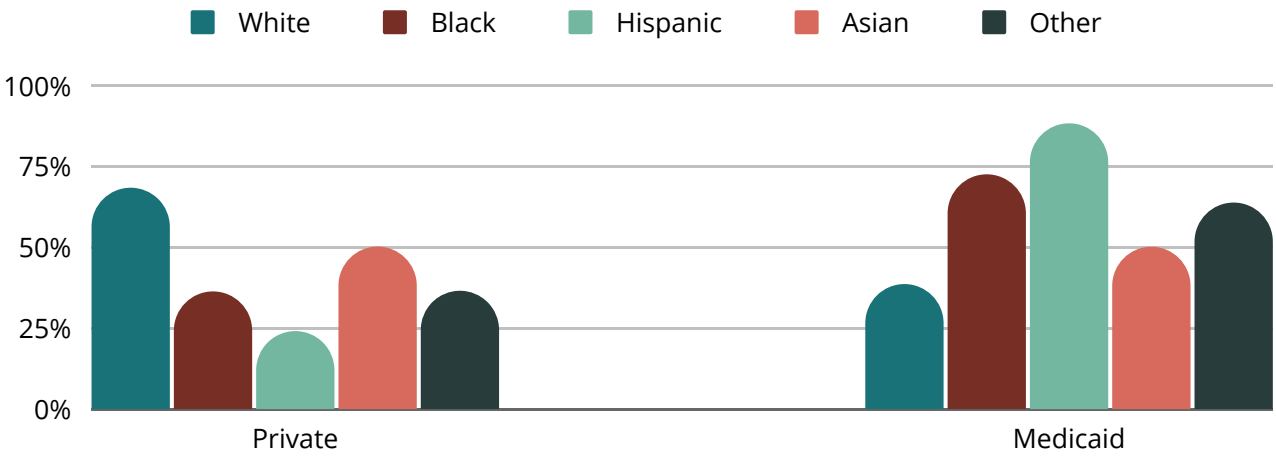
25. Al Shamsi, H., Almutairi, A. G., Al Mashrafi, S., & Al Kalbani, T. (2020). Implications of Language Barriers for Healthcare: A Systematic Review. Oman medical journal, 35(2), e122. https://doi.org/10.5001/omj.2020.40

SUMMARY OF ISSUES

Payment For Care

Figure 28 summarizes the payment for care for the mother and infant during pregnancy, after birth, and around the time of the infants death. This section may differ slightly from the Insurance type listed in the demographics section as many families utilize both private insurance and Medicaid. 56.1% of families had Medicaid, while 51.1% had private insurance.

FIGURE 28. PAYMENT FOR CARE BY MOTHER'S RACE AND ETHNICITY



Why is this Important?

- The risk of infant mortality is approximately 30% lower in women who have private insurance compared to women who have Medicaid insurance. [26]

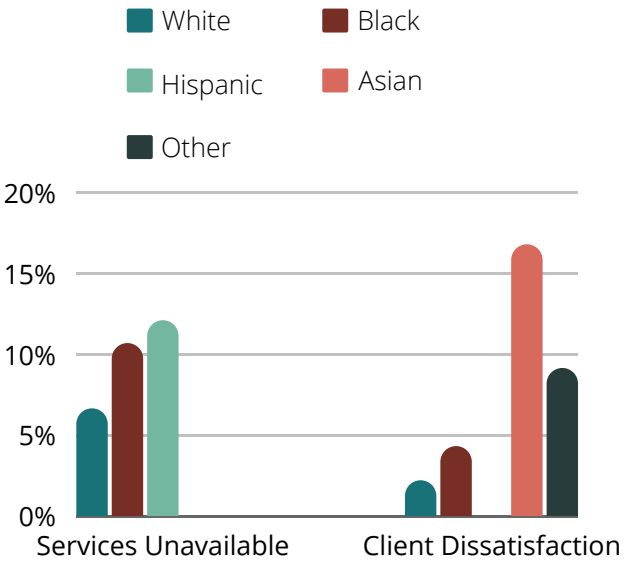
26. Kim, H. J., Min, K. B., Jung, Y. J., & Min, J. Y. (2021). Disparities in infant mortality by payment source for delivery in the United States. Preventive medicine, 145, 106361. https://doi-org.ferris.idm.oclc.org/10.1016/j.ypmed.2020.106361

SUMMARY OF ISSUES

Services Provided

Figure 29 outlines barriers to the services provided to the family. Types of services include prenatal care, pediatric care, home visiting programs, WIC, other social services, etc. This section is widely underreported as it is rarely documented in medical records. 7.8% of families reported not having access to desired services, while 3.3% of families were dissatisfied with the services they received. Black mothers (10.6%) and Hispanic mothers (12%) were most likely to report unavailable services while Asian mothers (16.7%) were more likely to be dissatisfied with the service.

FIGURE 29. SERVICES PROVIDED BY MOTHER'S RACE AND ETHNICITY



"We need more support! I'm financially stable with a wonderful support system including a very hands on partner, and its still hard. We need more follow up for our own health + consistent breastfeeding support."

A Michigan Mother

"My daughter has a milk allergy and she can't have certain products. Her formula is $600 that she goes through in 6 weeks and it is crazy expensive. We tried to get WIC for her formula and we just needed help. I am just disappointed with that and I see people use the help for other things. We work but it's not like we're rich and it's just disappointing that we were denied."

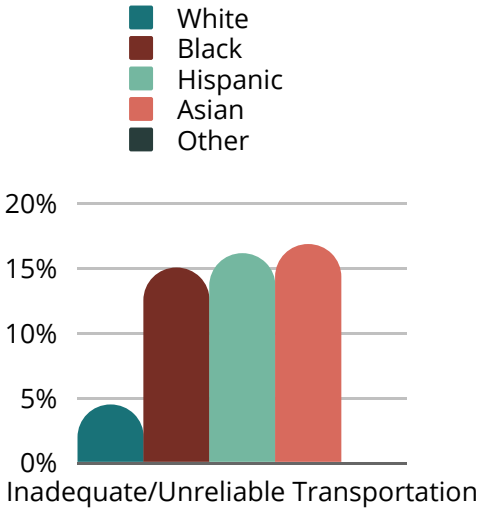
A Michigan Mother

SUMMARY OF ISSUES

Transportation

Figure 30 exhibits transportation barriers. 8.9% of families found that transportation was inadequate or unreliable, with Black mothers (14.9%), Hispanic mothers (16%) and Asian mothers (16.7%) the most likely to experience these barriers.

FIGURE 30. TRANSPORTATION BY MOTHER'S RACE AND ETHNICITY



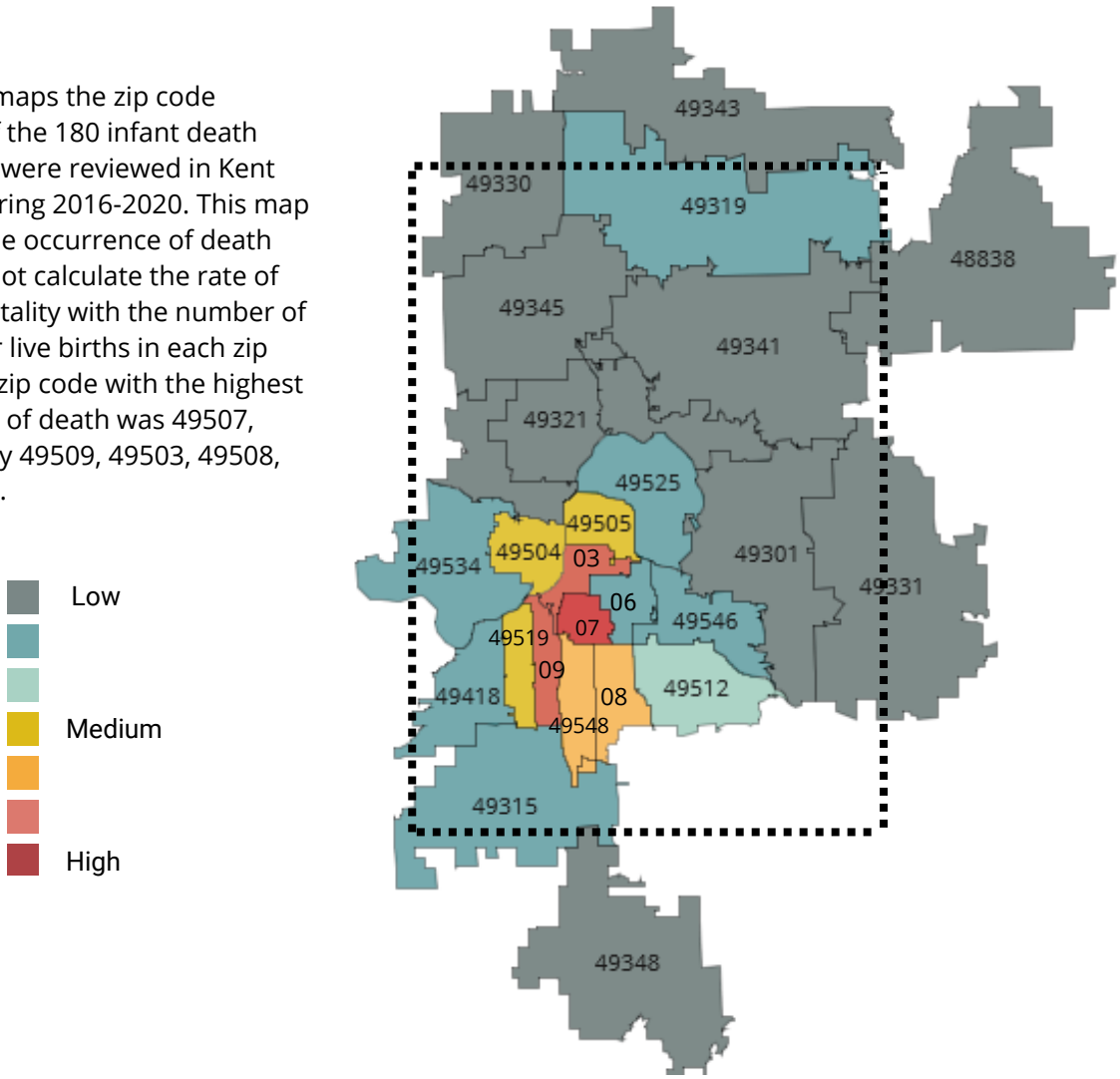
Why is this Important?

- Having inadequate or unreliable transportation can prevent a mother from attending prenatal appointments, pediatric appointments, and can limit employment opportunities.

ZIP CODE MAP

FIGURE 31. INCIDENCE OF INFANT DEATH PER ZIP CODE

Figure 31 maps the zip code location of the 180 infant death cases that were reviewed in Kent County during 2016-2020. This map displays the occurrence of death but does not calculate the rate of infant mortality with the number of deaths per live births in each zip code. The zip code with the highest incidences of death was 49507, followed by 49509, 49503, 49508, and 49548.



RECOMMENDATIONS

The following recommendations were created during Case Review Team meetings during the years 2021-2022. They are intended for use within all health systems in Michigan. Each recommendation is grouped by focus area.

IMPROVE CARE COORDINATION AND COMMUNICATION BETWEEN PROVIDERS

-Clear definitions of a Client/Provider relationship will be set to ensure clients are contacted to set up appointments.
-Integrate the transition from pediatric care into OB care by using group meetings to discuss specific patient information.
-Increased collaboration and referrals for high-risk pregnancies to the appropriate level of care.
-Implementation of Private and Medicaid insurance coverage of home births as well as increased education on the risk factors associated with home birth.
-Earlier and increased referrals to Palliative Care services for seriously ill patients with education and understanding that Palliative Care is not reserved for end-of-life care.
-Forensic Pathologist to thoroughly review medical records during death investigations.

IMPROVE POLICIES REGARDING SYSTEMS OF CARE, PREVENTION INITATIVES, SCREENING AND TREATMENT PROGRAMS

-Utilize drug toxicology screening for all pregnant women.
-Review/disperse policy on EMS procedures in transporting patients to the hospital immediately after injury.
-EMS personnel determine fetal well-being via doppler during transport to hospital.
-Additional ultrasound surveillance of pregnant women who have a history of an ectopic pregnancy or miscarriage.
-Implementation of the American College of Obstetricians and Gynecologist's (ACOG) guideline regarding the proper level of Maternal Care.
-Raised awareness and an update in guidelines regarding the importance of thermal regulation and Skin-to-Skin contact of the infant as feasible during EMS transport.
-Update EMS policies and procedures to transport MOB and baby together in one ambulance as feasible, and not delay transport to wait for a second ambulance.
-Implement guidelines and policies on performing placental pathologies.
-Additional investigation and/or examination on all infants who die unexpectedly.
-Implementation of a standardized policy for all Forensic Pathologists on deciding when to perform autopsies.
-Healthcare facilities to follow MDHHS guidelines on having written policies and procedures for prenatal testing of HIV, Hepatitis B, Hepatitis C, and Syphilis.
-Hospital systems to follow patient safety bundles for better treatment of hypertension in pregnancy.
-Medicaid coverage of a Pack N Play for each infant.

RECOMMENDATIONS

IMPROVE MANAGEMENT OF PRE-EXISTING CONDITIONS

-Offer more social support with community health workers, home visitors, doulas, infant metal health, etc. during pregnancy and after birth.
-Utilization of the American College of Obstetricians and Gynecologist's (ACOG) algorithms for treating pregnant women with hypertension.
-All birthing centers to adopt an evidence-based algorithm for fetal heart tone management such as the Obstetrics Initiative Algorithm for the Management of Intrapartum Fetal Heart Rate Tracings.
-Increased education on pregnancy health for childbearing-aged women with diabetes.
-Increased preconception counseling on the implications of diabetes in pregnancy via multiple disciplines such as OB providers, Primary Care Physicians, and/or Endocrinologists, etc.

IMPROVE TRAININGS AND EDUCATION

-Increased education on domestic violence for mandated reporters via mandatory CEU credits in domestic violence.
-Increased education on safe sleep for caregivers and family members.
-Consistent messaging and education on marijuana use during pregnancy and while breastfeeding provided by child welfare workers during home visits.
-Increased education for dispensaries and increased public awareness on the harms of marijuana use during pregnancy, while breastfeeding, and supervising children.
-Increased education on infant safe sleep practices.
-Ongoing education on infant assessment for EMS personnel.

IMPROVE ACCESS TO CARE

-Increased referrals to grief counseling during pregnancy or before the death of an infant with a lethal condition.
-Better/Easier health insurance access to birth control.
-More insurance coverage for prenatal genetic testing.
-Increased awareness of Network180's mobile unit for mental health crisis in the youth.
-More emphasis on CDC's Hear Her campaign.

IMPROVE DOCUMENTATION POLICIES

-Formation of a neonatal code sheet to use during infant codes.

RECOMMENDATIONS

DEVELOP AND IMPLEMENT PREVENTION INITIATIVES, SCREENING, AND TREATMENT PROGRAMS

-Baby Aspirin will be given following ACOG guidelines.
-Resurgence and increased funding of the DOSE (Direct On Scene Education) Program.

ADDRESS SAFETY ISSUES/CONDITIONS

-Increase CPS reporting in the ED when a mother discloses domestic violence.
-WIC to thoroughly discuss with each client where the infant is sleeping and what sleeping environments look like.

ADDRESS SOCIAL DETERMINANTS AND/OR HEALTH EQUITY

-Promotion of team debriefing for first responders after responding to a call, with a focus on identifying preconceived notions that may have contributed to health inequity.

IMPROVE PROVIDER/PATIENT COMMUNICATION

-Implementation of Private and Medicaid insurance coverage of home births as well as increased education on the risk factors associated with home birth.
-Greater utilization of the Association of Women's Health, Obstetric, and Neonatal (AWHONN) "Respectful Care" toolkit.
-Home visiting programs to have access to patient medical records.

NEXT STEPS

ANNUAL FIMR DATA REPORT

The Kent County Fetal Infant Mortality Review program plans to publish yearly reports that summarize new infant mortality data along with updated recommendations created by the case review team. Every three years the FIMR program will publish a larger statistical summary, similar to this report, in order to provide trends that are identified in the data.

ACKNOWLEDGEMENTS

FIRST STEPS KENT: READY BY FIVE EARLY CHILDHOOD MILLAGE

Kent County's FIMR program is funded by the Ready by Five Early Childhood Millage through First Steps Kent. First Steps Kent is an independent nonprofit organization that works with parents, service providers, funders, advocates, and other stakeholders to build a comprehensive early childhood system in Kent County. The Ready by Five Early Childhood Millage provides dedicated and sustainable funding for programs that improve the health, school readiness, and well-being of children under age five. It allows more children and families from across the community to participate in programs that are proven to increase their likelihood of success in school and beyond. For more information, visit https://www.firststepskent.org/millage.

ACKNOWLEDGEMENTS

PREGNANCY RISK ASSESSMENT MONITORING SURVEY

The Michigan Pregnancy Risk Assessment Monitoring System or PRAMS is a project that, with help from partners at the Centers for Disease Control and Prevention (CDC), gathers high quality, population-based data about maternal attitudes and experiences before, during, and after pregnancy. Data collected from this survey helps to improve the health of mothers and their babies throughout the State of Michigan. Thank you to Michigan PRAMS for providing extra insight and context to the trends identified in this report by highlighting individual family experiences. For more information, visit michigan.gov/PRAMS.

ACKNOWLEDGEMENTS

CASE REVIEW TEAM MEMBERS

Marissa Brown, BSN, RN, Kent County Health Department, FIMR Coordinator
Madelyn Hall, BSN, RN, Kent County Health Department, Nurse Family Partnership
Brandi Berry, LLMSW, FIMR Program Supervisor, Kent County Health Department
Debra Rewerts, BSN, RNC Outreach Coordinator, Women's Health
Debbie Cowling, BSN, RN C-EFM, University of Michigan Health-West
Steven Gelfand, MD, Neonatologist, Mercy Health Saint Mary's
Audra Brummel, Infant Health Consultant, Michigan FIMR Coordinator, MDHHS
Alisha deBoer, NP, Neonatology, Spectrum Health
Michelle Koning, NP, Neonatology, Mercy Health Saint Mary's
Laura Turner-Bish, MSW Michigan Department of Health and Human Services
Nirali Bora, MD Medical Director, Kent County Health Department
Nancy Renn-Bugai, CNM, DNP, Spectrum Health
Jeremy Kelly, Paramedic IC, Alpine Township Rescue, Kent
James Betz, Paramedic, IC Grand Rapids Fire Department
Jeanette Prentice, MD, Neonatology, Spectrum Health
Linda Rosetti, MD, FAAP, FACMG, Medical Genetics, Spectrum Health
Stacey Adams, MD, FAAP, Medical Genetics, Spectrum Health
Kelsey Smits, NP, Neonatology, Mercy Health Saint Mary's
Jodi Garvin, DO, Neonatology, Spectrum Health
Brian Stalsonburg, EMT-B, I/C, Rescue and EMS Lieutenant, Alpine Township Fire Department

ACKNOWLEDGEMENTS

COMMUNITY ACTION TEAM: INFANT HEALTH ACTION TEAM

NAME:	ORGANIZATION:
Kristen Gietzen	Alpha Grand Rapids
Monica Marchell	Arbor Circle
Laura Vogelsang	Arbor Circle
Rebecca Judge	Arbor Circle
Susan Chang	Arbor Circle
Debra Rewerts	Arbor Circle
Kelly Emery	AWHONN
Tequia Adams	baby beloved, inc.
Veronica Cook	Baby Scholars
Brian Stalsonburg	Bethany Christian Services
Gail Zandee	Caledonia Township Fire Department
Adejoke Ayoola	Calvin University Department of Nursing
Lyanna Moore	Calvin University Department of Nursing
Mellena Francisco-Sandala	CAN Representative
Leslie Spurrier	Community Rebuilders
Sonia Riley	Community Representative
Pablo Garcia	Community Representative
Carol Hennessy	Community Transformation Center-Bethany
Ben Brower	Kent County Commissioner
Laura Mammen	D.A. Blodgett St. Johns
Deavondre Jones	D.A. Blodgett St. Johns
Kiara Baskin	Dancespire
Kimi Bowman	Day One Doula Collective
Michael Lhamon	Kent County DHS CPS
Sara Johnstin	Kent County DHS CPS
Meredith Cornillie	Early Learning Neighborhood Collaborative (ELNC)
Candace Cowling	Family Futures
Emily VandenBos	Family Futures
Marissa Brown	Fetal Infant Mortality Review
Heather Boswell	First Steps Kent
AC	Garfield Neighborhood Association
Alyssa Veneklase	Gold Coast Doula
Mikisha Pescho	Grand Rapids African American Health Institute (GRAAHI)
Ellen Stuart	Grand Rapids Community College – Nursing Dept. (Ret)
Rachel Siebert	Grand Rapids Housing Commission
Kelli Damstra	Grand Valley State University - Kirkhof College of Nursing
Emily Bemben	Grand Valley State University – Community Clinic
Paula Brown	Great Start Collaborative Kent

ACKNOWLEDGEMENTS

COMMUNITY ACTION TEAM: INFANT HEALTH ACTION TEAM

NAME:	ORGANIZATION:
Melanie Medema	Great Start Collaborative Kent
Tomarra Richardson	Great Start Collaborative Parent Coalition
Deborah Conley	Head Start of Kent County
David Msafiri	Head Start of Kent County
Joanna Marchena	Health Net of West MI
Jenn Harrod	Health Net of West MI
Chinyere Aririguzo	Health Net of West MI
Barb Hawkins Palmer	Healthy Kent
Alejandra Meza	Hispanic Center of Western MI
Marisol Garcia	Hispanic Center of Western MI
Tracy Schenkel	Kent County Friend of the Court
Kiuan Hearns	Kent County Friend of the Court
Teresa Branson	Kent County Office of Inclusion
Sue Sefton	Kent County Health Department - MIHP
Abby Bishop	Kent County Health Department – WIC
Brie Gabrielle	Kent County Health Department - WIC
Brandi Berry	Kent County Health Department – CSHC/FIMR
Karen Sall	Kent County Health Department – MIHP
Renee Dunwell	Kent County Health Department - MIHP
Cole Williams	Kent County Juvenile Justice Department
Carole Paine-McGovern	Kent School Services Network
Karen Lezan	Kent Intermediate School District
Pastor Lorian Parker-Sims	Kingdome Life Ministries / Deborah House
Mariel Harmon	LINC UP
Laura Buitenhuis	MC3
Claire Titcombe	MDHHS – MIHP Consultant
Joni Detwiler	MDHHS – MIHP Consultant
Christy Buck	Mental Health Foundation of West Michigan
Megan Mayse	Mercy Health Saint Mary's Hospital
Melissa Kuiper	Meridian Health Plan of MI
Lindsay Gross	Michigan Public Health Institute (MPHI)
Nicole DeWitt	Michigan Public Health Institute (MPHI)
Jennifer Raffo	Michigan State University School of Medicine
Carrie Kolhouse	MomsBloom
Kimber Wager	MomsBloom
Latoyia Thomas	MSU Cooperative Extension / HUGS Breastfeeding Café
Denise Herbert	Network180

ACKNOWLEDGEMENTS

COMMUNITY ACTION TEAM: INFANT HEALTH ACTION TEAM

NAME:	ORGANIZATION:
Courtney Fritzsche	Network180
Kyle Hinton	New Visions Counseling
	Nottawaseppi Huron Band of Potawatomi
Emily Skavnak	Nurse Family Partnership – Kent County
Kerrie Van Weelden	Nurtured Path
Dana Evans	Nurtured Path
Latesha Lipscom	Parent Representative
Christina Pocklington	Parent Representative - HVPN
Gretchen Johnson	Pine Rest
Karen Coy	Pine Rest
Marissa Gonzalez	Pregnancy Resource Center
Amy Loftus Tuitel	Priority Health
Jennie Nowak	Priority Health
Rebecca Moorehead	Priority Health
Stephanie Esters	Priority Health
Wesley Morgan	Renewed Counseling Services
Nancy Roberts	Corewell Health Healthier Communities
Heather Glenn	Corewell Health Healthier Communities
Katie McNabnay	Corewell Health Hospital – Baby Friendly Hospital
Pam VanVeen	Corewell Health Hospital – IBCLC
Nancy Renn-Bugai	Corewell Health Hospital
Emilio Zamarripa	Steepletown Neighborhood Services
Peggy Vander Meulen	Strong Beginnings Healthy Start
Bonita Agee	Strong Beginnings Healthy Start
Denise Evans	Strong Beginnings Healthy Start
Celeste Lloyd	Strong Beginnings Healthy Start
Adnoris “Bo” Torres	Strong Beginnings Strong Fathers / Padres Fuentes
Belinda Cunningham	Strong Beginnings Corewell Health
Stacey Figg	The Village Doula GR
Anna Geurkink	U of M Health – West
Debbie Cowling	U of M Health – West
Carla Moore	United Methodist Community House
Dion Ford	Urban League of West MI
Natasha Mueller	Willing to Wait

REFERENCES

1. Murphy SL, Kochanek KD, Xu JQ, Arias E. Mortality in the United States, 2020. NCHS Data Brief, no 427. Hyattsville, MD: National Center for Health Statistics. 2021.

2. State of Michigan Department of Community Health Vital Records & Health Statistics Section. Physicians Handbook on the Reporting of Abortions. (DCH-0819b (3/13)

3. Fetal & Infant Mortality Review. The National Center for Fatality Review and Prevention. (2021, November 16).

4. Driscoll, A. K., & Ely, D. M. (2020, June 25). Effects of Changes in Maternal Age Distribution and Maternal Age-Specific Infant Mortality Rates on Infant Mortality Trends:United States, 2000-2017. Retrieved August 16, 2022, from https://www.cdc.gov/nchs/data/nvsr/nvsr69/NVSR-69-05-508.pdf

5. Tavernise, S., Miller, C. C., Bui, Q., & Gebeloff, R. (2021, June 16). Why American women everywhere are delaying motherhood. The New York Times. Retrieved August 16, 2022, from https://www.nytimes.com/2021/06/16/us/declining-birthrate-motherhood.html

6. The Lancet Child Adolescent Health (2021). Infant and maternal mortality in the USA. The Lancet. Child & adolescent health, 5(1), 1. https://doi-org.ferris.idm.oclc.org/10.1016/S2352-4642(20)30369-2

7. Ely DM, Gregory ECW, Drake P. Infant mortality by maternal prepregnancy body mass index: United States, 2017–2018. National Vital Statistics Reports; vol 69 no 9. Hyattsville, MD: National Center for Health Statistics. 2019.

8. Zajacova, A., & Lawrence, E. M. (2018). The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annual review of public health, 39, 273–289. https://doi.org/10.1146/annurev-publhealth-031816-044628

9. Medicaid and CHIP Payment and Access Commission (MACPAC). 2020. Chapter 5: Medicaid's role in maternal health. In Report to Congress on Medicaid and CHIP. June 2020. Washington, DC: MACPAC.

10. Barr, J. J., & Marugg, L. (2019). Impact of Marriage on Birth Outcomes: Pregnancy Risk Assessment Monitoring System, 2012-2014. The Linacre quarterly, 86(2-3), 225–230. https://doi.org/10.1177/0024363919843019

11. Kalikkot Thekkeveedu, R., Dankhara, N., Desai, J. et al. Outcomes of multiple gestation births compared to singleton: analysis of multicenter KID database. matern health, neonatol and perinatol 7, 15 (2021). https://doi.org/10.1186/s40748-021-00135-5

12. Scommegna, P. (2021, January 21). High premature birth rates among U.S. black women may reflect the stress of racism and health and economic factors. PRB. Retrieved September 23, 2022, from https://www.prb.org/resources/high-premature-birth-rates-among-u-s-black- women-may-reflect-the-stress-of-racism-and-health-and-economic-factors/

REFERENCES

13. Low Birthweight. March of Dimes. (2021, June). Retrieved August 23, 2022, from https://www.marchofdimes.org/complications/low-birthweight.aspx

14. Matoba, N., & Collins, J. W. (2017, August 31). Racial disparity in infant mortality. Seminars in Perinatology. Retrieved September 23, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0146000517300757?via%3Dihub#preview-section-cited-by

15. Blue Cross Blue Shield, The Health of America. (2020). (rep.). Trends in Pregnancy and Childbirth Complications in the U.S. Retrieved September 22, 2022, from https://www.bcbs.com/sites/default/files/file-attachments/health-of-america-report/HoA_Maternal_Health.pdf.

16. Molitoris, J., Barclay, K., & Kolk, M. (2019). When and Where Birth Spacing Matters for Child Survival: An International Comparison Using the DHS. Demography, 56(4), 1349–1370. https://doi.org/10.1007/s13524-019-00798-y

17. Medicaid and CHIP Payment and Access Commission. 2020. Chapter 6: Substance Use Disorder and Maternal and Infant Health. [online] Available at: <https://www.macpac.gov/wp-content/uploads/2020/06/Chapter-6-Substance-Use-Disorder-and-Maternal-and-Infant-Health.pdf> [Accessed 24 August 2022].

18. Burris, H. H., & Hacker, M. R. (2017). Birth outcome racial disparities: A result of intersecting social and environmental factors. Seminars in perinatology, 41(6), 360–366. https://doi.org/10.1053/j.semperi.2017.07.002

19. Health equity: What it Means and Why it Matters. Advance Care Planning (ACP) Decisions. (2022, May 7). Retrieved September 23, 2022, from https://acpdecisions.org/health-equity-what-it-means-and-why-it-matters/

20. Centers for Disease Control and Prevention (CDC) SUID Case Registry – 2010 to 2018, Michigan Public Health Institute, 2020.

21. Maged, M., & Rizzolo, D. (2018). Preventing sudden infant death syndrome and other sleep-related infant deaths. JAAPA : official journal of the American Academy of Physician Assistants, 31(11), 25–30. https://doi.org.ferris.idm.oclc.org/10.1097/01.JAA.0000546475.33947.44

22. Corrigan, C. P., Kwasky, A. N., & Groh, C. J. (2015). Social Support, Postpartum Depression, and Professional Assistance: A Survey of Mothers in the Midwestern United States. The Journal of perinatal education, 24(1), 48–60. https://doi.org/10.1891/1058-1243.24.1.48

23. Adane, A. A., Bailey, H. D., Marriott, R., Farrant, B. M., White, S. W., Morgan, V. A., & Shepherd, C. C. (2020). Role of maternal mental health disorders on stillbirth and infant mortality risk: A protocol for a systematic review and meta-analysis. BMJ Open, 10(5), e036280. https://doi-org.ferris.idm.oclc.org/10.1136/bmjopen-2019-036280

REFERENCES

24. Huecker MR, King KC, Jordan GA, et al. Domestic Violence. [Updated 2022 Jul 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499891/

25. Al Shamsi, H., Almutairi, A. G., Al Mashrafi, S., & Al Kalbani, T. (2020). Implications of Language Barriers for Healthcare: A Systematic Review. Oman medical journal, 35(2), e122. https://doi.org/10.5001/omj.2020.40

26. Kim, H. J., Min, K. B., Jung, Y. J., & Min, J. Y. (2021). Disparities in infant mortality by payment source for delivery in the United States. Preventive medicine, 145, 106361. https://doi-org.ferris.idm.oclc.org/10.1016/j.ypmed.2020.106361