Present and Contributing Medical Factors Leading to Infant Death in Kent County Michigan, 2016-2020

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Introduction

Background

- Within the United States, 5.6 infants per 1,000 die before their first birthday, the state of Michigan reported a rate of 6.53 deaths in 2020, higher than the National Average and higher than the Healthy People 2030 goal of 5.0 (CDC, 2022).
- Although there has been a decline in infant mortality rates in Michigan since 2005, Michigan must highlight what the causes of death are to further increase education and preventative measures (CDC,2021).
- Kent County completes yearly summaries highlighting causes of deaths and treatment to care options for Infant Mortality. This summary has not been completed sense 2017.
- Without current interpretable information, new recommendations cannot be made on current trends of infant deaths.

Objective

- Describe trends in medical conditions and health status of infant deaths before the age of one for the education of medical professionals within Kent County, Michigan. The goal is to better understand infant birth and death outcomes and health related conditions so that local hospital systems and private practices can better provide care for their patients.

Methods

Study Design

- This is a Retrospective Descriptive Study including 184 Infants born and deceased within Kent County, Michigan between 2016 and 2020. Cases were identified via Vital Records and Electronic Medical Records (EMR). Through the Kent County Health Department Fetal Infant Mortality Review team, case summaries were reviewed, and health outcomes were identified via an established code book.

Study Variables

- This study included infant health outcomes identified as prematurity, birthweight (low, very low, and extremely low), respiratory distress syndrome (RDS), non-viable fetus, congenital anomalies, sepsis/infection, fetal growth restriction (FGR), and meconium positive drug test. These variables were then further identified to be present or contributing to the infant death case. Present refers to the infant having the condition and contributing is deemed as the health outcome played a role in the death of the infant.
- Race of the infants mother and year the infant died was recorded to allow demographic comparisons.

Statistical Analysis

- Using SAS and SPSS, analysis was completed to identify descriptive statistics for all present and contributing health outcomes for each year. A One-way Anova was used to analyze significance between health outcome and race of the mother. A Pearson correlation and relative risk assessment was conducted to understand relationship between the health outcomes.

Results

- One Way Anova test compared the race of the infant's mother and birth outcome. There were no significant results to report.
- Pearson correlation coefficients were compared among each birth outcome.
- The results of the Pearson correlation analysis showed that a premature infant was strongly positively associated with VLBW (.913), ELBW (.702) and positively weakly associated with RDS (.341).
- The relative risk assessment showed infants who have been born premature have a higher risk of being ELBW (RR=66.6, 16.43-257.13), VLBW (RR=9.1, 2.44-33.24)), and diagnosed with RDS (RR=1.64, 1.16-2.33) compared to infants born full term.


Figure 1. *Infant Deaths By Race and Ethnicity of Mothers in Kent County Michigan, 2016-2020*
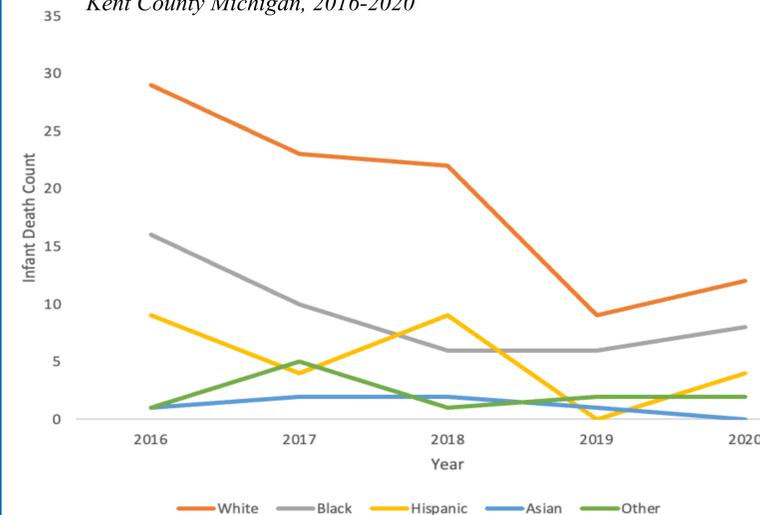
Table 1. *Pearson Correlation Coefficients of Prematurity Outcomes and other Analyzed Birth outcomes*

	Prematurity		
	n	r	P-Value
ELBW	66	0.702	<.001**
VLBW	24	0.913	<.001**
RDS	37	0.341	.039*
Sepsis	20	0.126	.597
FGR	16	0.022	.937
Congenital Anomaly	33	-0.267	.134
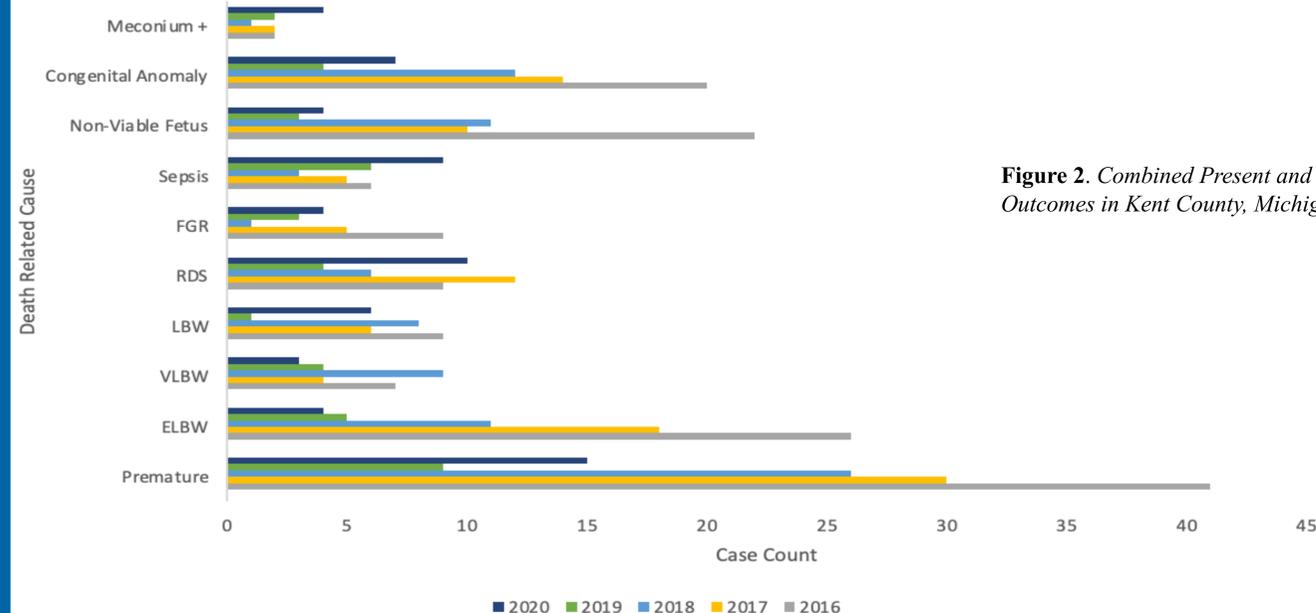
Figure 2. *Combined Present and Contributing Birth Outcomes in Kent County, Michigan, 2016-2020*

Discussion

Strengths

- The data was extracted from EMR and vital records for 5 years between 2016-2020. This allowed for valid results to be extracted for analysis. The use of this information allowed for quick data collection and low-cost methods.

Limitations

- Limitations for this study include inconsistent samples for each year and race of the infant's mother. The use of the FIMR team could also lead to subjective opinions of health outcomes of the infant. For this specific study, the congenital anomalies were also generalized to one large category to keep anonymity. Without this information on specific birth defects, more analysis could not be completed. Lastly, by using vital records and EMR, records were not included that involved non-hospital births and deaths.

Future Research

- Further research should focus on the impact of SES and prenatal appointments on health outcomes of the infant. Specified Congenital Anomalies should be analyzed to identify differences in race and environmental factors.

Conclusion

- Positive correlations between prematurity, and VLBW, ELBW, and RDS were identified. This is to be expected as the last trimester allows for the most fetal growth and RDS develops due to lungs not being fully developed, producing less surfactant resulting in trouble breathing (Sandeva & Uchikov, 2021).
- The state is seeing a decline in the rates of birth outcomes, proving progress towards identifying outcomes sooner and being better equipped to treat them.
- The results of this study will be used to further guide recommendations to the State Health Department to better treat the Kent County Area through the integration of medical institutions, CPS, first responders, and students working to continuously lower the mortality rate.

References

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