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Geographical Analysis of Sudden Infant Death Syndrome (SIDS) and Associated Risk Factors in Douglas County, Nebraska

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Background: Sudden Infant Death Syndrome (SIDS) is defined as an unexplained death of a child less than one year of age with no identifiable cause. Known risk factors of SIDS include preterm delivery, female sex, pregnancy complications, low birth weight (<2500 g), and poor prenatal care.

Significance of Problem: In the United States, SIDS is the most common cause of death in infants between one month and one year of age, with approximately 2500 infant deaths caused by SIDS each year. The incidence of SIDS has decreased by more than 50% in recent years, yet SIDS remains higher than the national mortality rate every year since the campaign began in 1994, except in 2008, 2010 and 2011. Questions: How is SIDS distributed geographically? Is SIDS associated with other factors, such as inadequate prenatal care, tobacco use during pregnancy, and low birth weight?

Methods: SIDS mortality rates and known risk factors of SIDS, such as inadequate prenatal care, tobacco use during pregnancy, and low birth weight, were geographically mapped in Douglas County, Nebraska using geographical information system (GIS) technology. Data was obtained from the Health Data and Vital Statistics branch of the Douglas County Health Department using birth and death certificates from 2005-2014. Statistical analysis was performed using SAS software version 9.4 (SAS Institute Inc., Cary, NC). Pearson’s chi-square test and Spearman correlations were used to calculate the associations between SIDS mortality and other known risk factors. Analysis was calculated using a 0.05 significance threshold.

Results: The incidence of SIDS in Douglas County is significantly lower than the national rate, and the risk factors were significantly different from the best performing regions in Douglas County. By addressing modifiable risk factors such as access to early prenatal care and smoking cessation in areas of demonstrated need, the incidence of preterm births, low birth weights and SIDS in Douglas County could eventually decrease over time.

Conclusions and Future Direction: Known risk factors for SIDS include inadequate prenatal care, tobacco use during pregnancy, prematurity, and low birth weight. Analysis of these risk factors in Douglas County demonstrated a positive correlation between SIDS mortality rates with low birth weight and with prematurity. Additional analysis calculated a negative correlation between SIDS mortality rates with the percentage of women receiving prenatal care in the first trimester. Thus, a strategy that aims to lower the rate of SIDS in Douglas County should focus on more accessible first trimester prenatal care and smoking cessation during pregnancy, especially for patients in the East Northeast and West Northeast regions, where these risk factors were significantly different from the best performing region in Douglas County. By addressing modifiable risk factors such as access to early prenatal care and smoking cessation in areas of demonstrated need, the incidence of preterm births, low birth weights and SIDS in Douglas County could eventually decrease over time.

Further analysis using GIS technology to identify locations where prenatal services are currently offered may partially explain why access to early prenatal care is lower in certain regions of Douglas County. Future research should extend the analysis of Douglas County performed here to the entire state of Nebraska, with the ultimate goal to lower SIDS mortality rates to meet national rates and, eventually, the Healthy People 2020 target of 0.05%.

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