It Takes A Village:
Analyzing Factors Influencing Pediatric Vital Signs in Ohio

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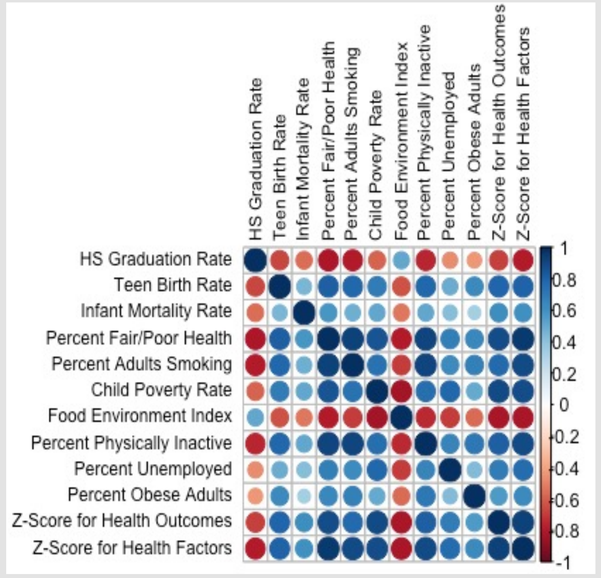
Linear Regression
I developed a linear model to predict the rates of each pediatric vital sign. I applied stepwise selection to identify the most significant predictor variables for each model, ensuring optimal model performance and interpretability.

Decision Trees & Random Forest
I created a decision tree model to generate predictive groupings for each vital sign, identifying key non-linear relationships between variables. I used random forests, consisting of 100 decision trees, to improve prediction accuracy and identify the most important variables across all iterations.

K-Means Clustering
I conducted a clustering analysis to group counties with similar characteristics. The elbow method was used to determine the optimal number of clusters, highlighting regional patterns in pediatric vital signs.

Correlation Plot



Key Findings & Insights

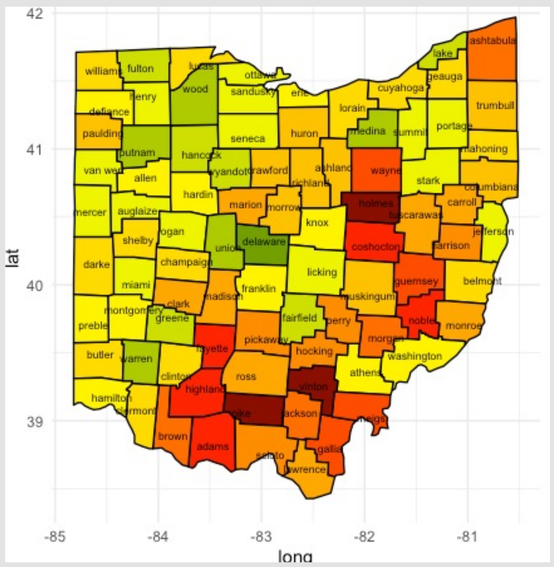
Mental Health & Infant Mortality
- Strong correlation between mental health provider availability and lower infant mortality rates.
- Underserved areas with limited mental health services face higher maternal and child health risks.

Socioeconomic Factors & Health Disparities
- Housing instability and poverty are strongly linked to poor pediatric outcomes.

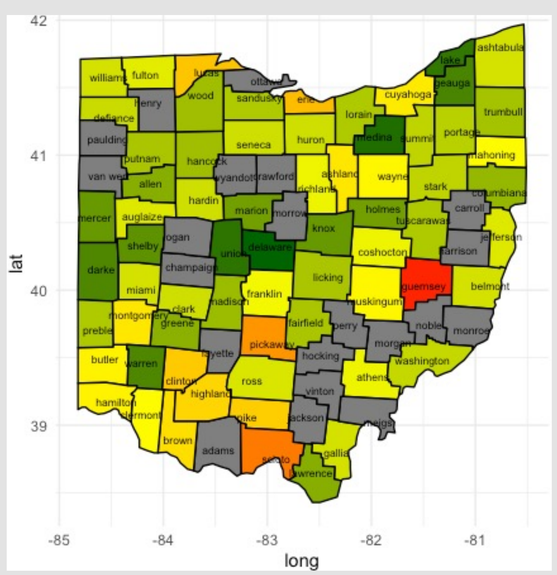
Education, Health, & Outcomes
- Educational outcomes, analyzed through high school graduation rates, are influenced by health behaviors, teen birth rates, and economic stability.
- Integrating public health initiatives with educational intervention can close achievement gaps.

Overall Conclusion
- Ohio's child health challenges are interconnected across healthcare, education, & socioeconomic systems.
- Region-specific, collaborative policies that address root causes--such as mental health access, housing stability, and educational support--can drive equitable outcomes for children & families statewide.

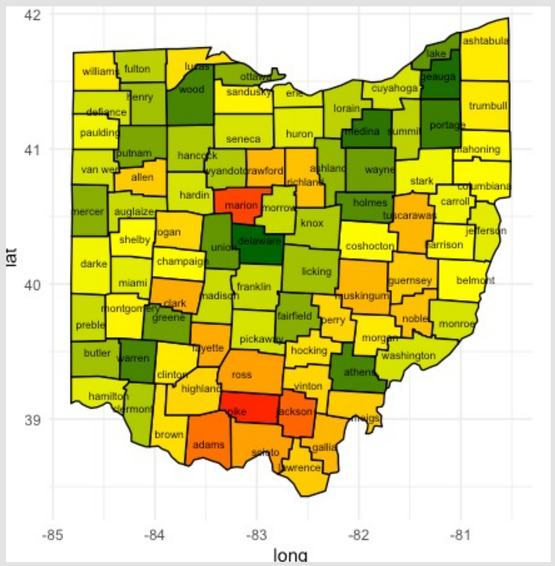
High School Graduation



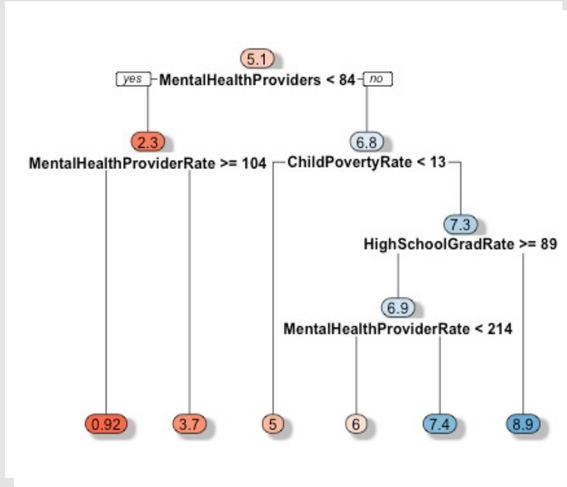
Infant Mortality



Teen Births



Infant Mortality Regression Tree



The geographic analysis of the vital signs reveals distinct yet interconnected patterns across Ohio. Urban and suburban counties demonstrate higher graduation and lower teen birth rates, reflecting the positive influence of greater educational resources and economic opportunities. However, these same urban areas often face higher infant mortality rates, highlighting the disparities in health outcomes. In contrast, rural counties generally struggle with lower graduation rates, higher teen birth rates, and infant mortality. It seems the more southern counties of Ohio are struggling the most with vital signs. Delaware county had the best rate of each vital sign. Outliers emerge, as seen in the graphs. Together, these patterns emphasize the complex interplay between geography as well as socioeconomic and health factors across the state.

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