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Spring 5-2-2024

## Michigan Water Supply: Analysis of Health Violations

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# Michigan Water Supply: Analysis Of Health Violations

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## Introduction

The presence of toxins in water sources poses a significant public health challenge. In Michigan, this issue has garnered widespread attention due to its adverse effects on human health and well-being. The contaminants found in water, including but not limited to lead, industrial pollutants, and agricultural runoff, stem from a variety of sources such as aging infrastructure, industrial activities, and agricultural practices. News articles and Government officials have reported the adverse affects and impact toxin exposure has on Michigan residents. However, there is little research examining the relationship between water quality violations and socioeconomic factors like poverty levels. I predict there are more water quality violations in high poverty cities, highlighting potential disparities in access to clean water and underscoring the urgency for equitable solutions.



Figure 1. Environmental Working Group Tap Water Database logo

Figure 2. United States Census Bureau American Community Survey logo

## Methods

- To examine this correlation, I used data from the US Census Bureau American Community Survey which provides a 5-year estimate of poverty status within the cities of Michigan from 2017 to 2022.
- The data from the EWG tap water database contains water utilities that have had safe water drinking violations from April 2019 to March 2021. Points are assigned based on a measure created by the EPA to summarize the degree of noncompliance at a system.
- R was utilized to create a ratio of water quality violations and a ratio of poverty. A linear model was created to demonstrate the relationship between water quality violations and poverty rates.

## Results

My hypothesis entails that as poverty levels increase, there will also be an increase in water quality violations. It was determined through analysis that there is no correlation between water quality violations and poverty levels. Overall, there is a decrease in violations as poverty levels increase. There is one outlier showing a large amount of violations when poverty level is increasing indicating the need for futher research

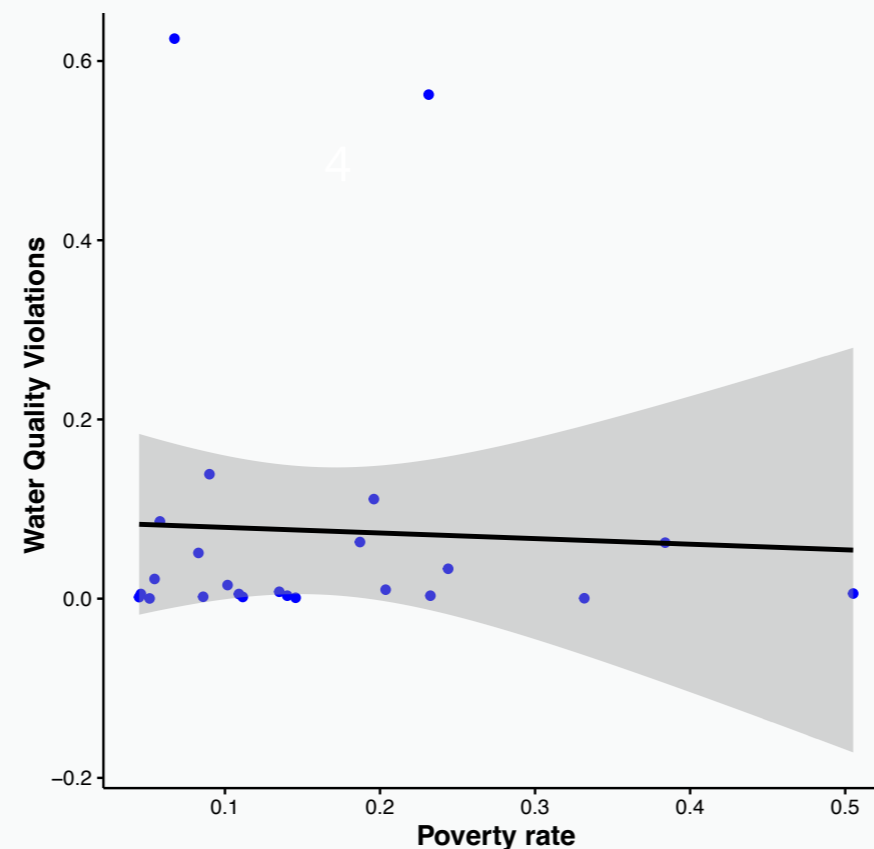


Figure 3.. Percent of water quality violations by poverty rate.

Poverty levels did not have a significant effect on water quality violations. (Anova on LM,  $F = 0.044$ ,  $df = 1, 22$ ,  $p = < 0.05$ ).

## Conclusion

- Health violations in disadvantaged communities, especially in water quality, has been a constant issue in Michigan. However, there is no correlation between utility water quality violations and levels of poverty.
- Future research into more water quality violations within Michigan including the levels of toxins and contaminants in water may help the residents of high poverty neighborhoods better understand the environmental health risks they face and advocate for policies and interventions aimed at improving water quality and public health outcomes in their communities.
- More research investigating other factors such as race, housing and health insurance would be helpful because poverty alone may not influence the water quality violations

## Acknowledgments

This research was supported by Providence College Biology department. I would like to thank Dr. Bonoan for helping to visualize and analyze my data. I would also like to Dr. Rogers for helping me find my data.

## References

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