

LEAD CONTAMINATION IN DRINKING WATER IN SCHOOLS

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Introduction

- Lead is a contaminant that can be found in drinking water
- Children are the most vulnerable to lead contamination
- Lead can affect children's growth, behavior and learning problems
- Cities are required to test their water every 3 years, but schools are not required to test their water
- Cities only report the lead levels of 90th percentile of all utilities. This doesn't necessarily represent the level of lead of a sink's water
- The distribution of lead contamination at the school level is unknown



Objective

- Client: Washington State Department of Health
- Currently, states don't have large scale lead testing programs for schools due to lack of funding, since they are expensive and hard to implement
- Goal: To identify schools that are at risk of lead contamination in drinking water and prioritize them
- Solution: To build a regression model that predicts the risk of lead contamination of a school

Methodology

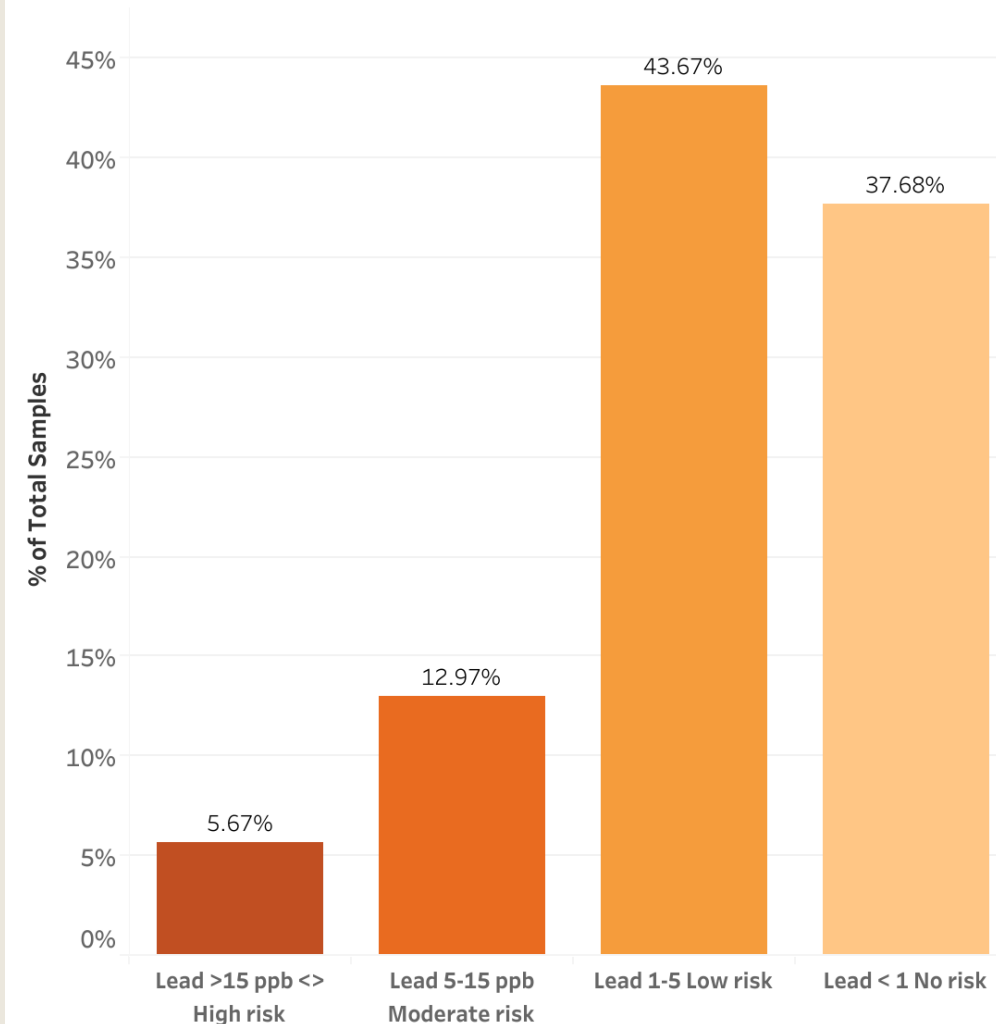
- “Analysis Washington School Water Lead Test Data 2008”
 - 402 schools of all grades participated (13% statewide)
 - 37/39 counties participated
- Directory of schools in WA
 - Title 1 schools, Location



Lead levels in water samples from sinks

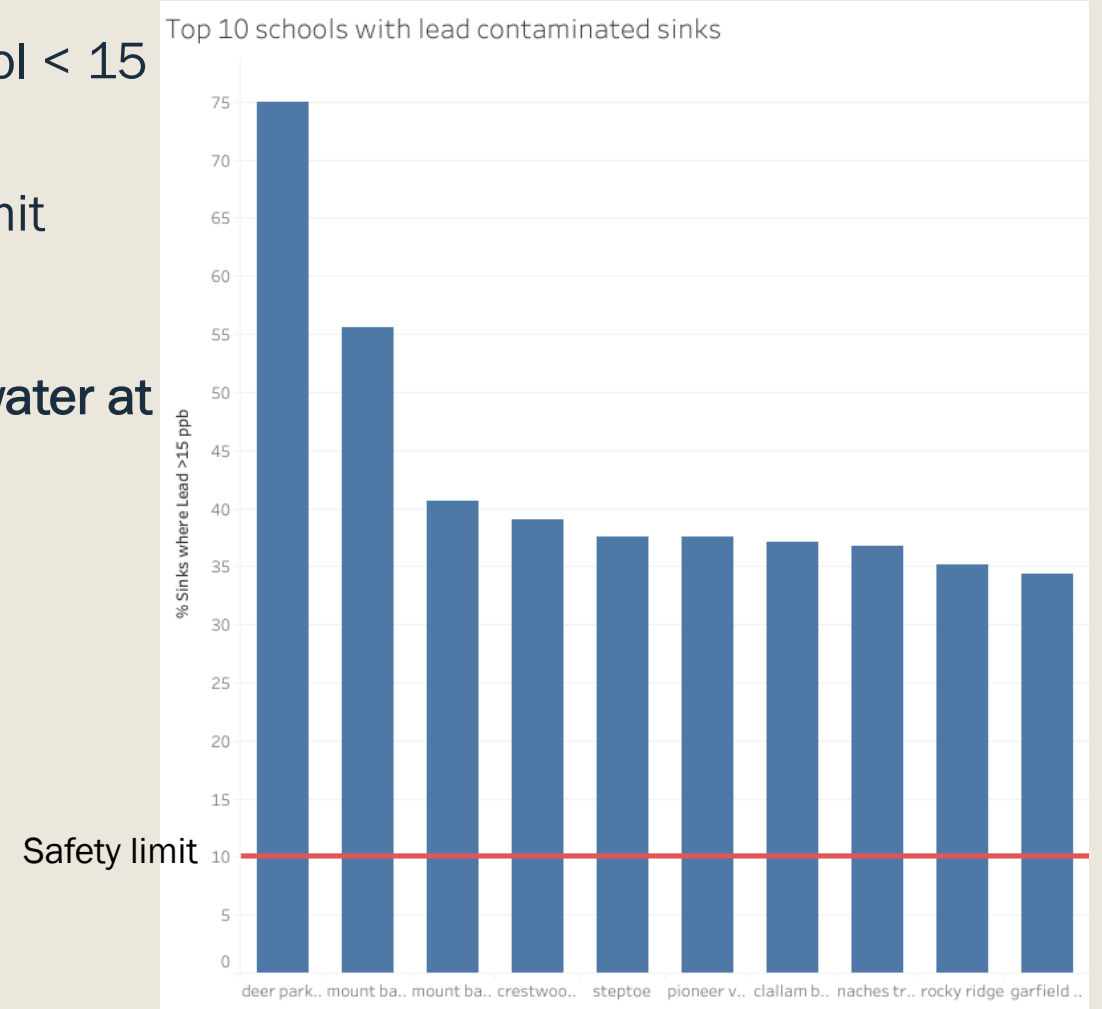
- Lead was measured in drinking water:
- 62% of sinks have lead and only 38% didn't have lead
- 6% of sinks have lead > 15 ppb and need to be shutdown
- 13% of sinks have lead > 5 ppb and need to be addressed
- Lead at the school level is a problem

Summary of lead levels found in water samples



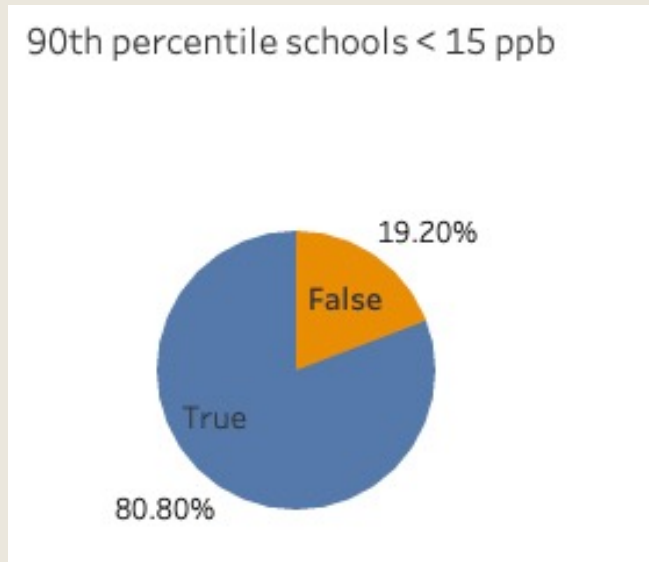
Top 10 schools with high lead levels

- Safety limit: 90% of all samples within a school < 15 ppb of lead
- These 10 schools are way above the safety limit
- Deer park: 75% of sinks are not safe
- Students don't have access to safe drinking water at the school level



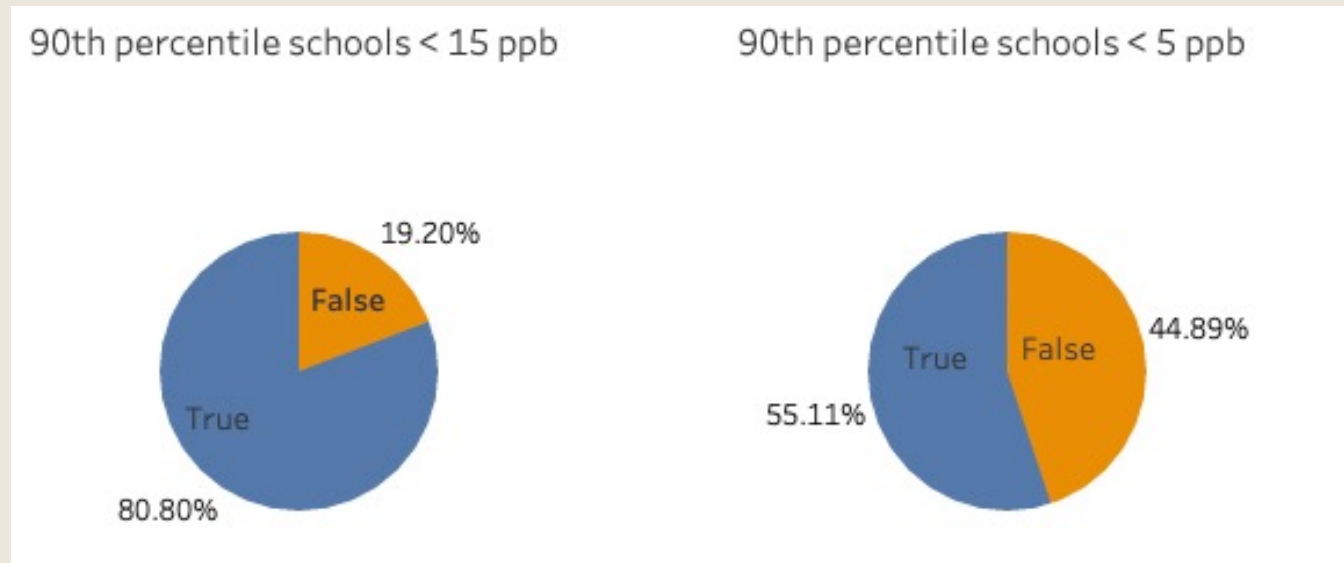
Access to safe drinking water in schools

- Recommendation: for each school, 90% of all samples should be below 15 ppb.
- Personal recommendation: 90% of all samples should be below 5 ppb.



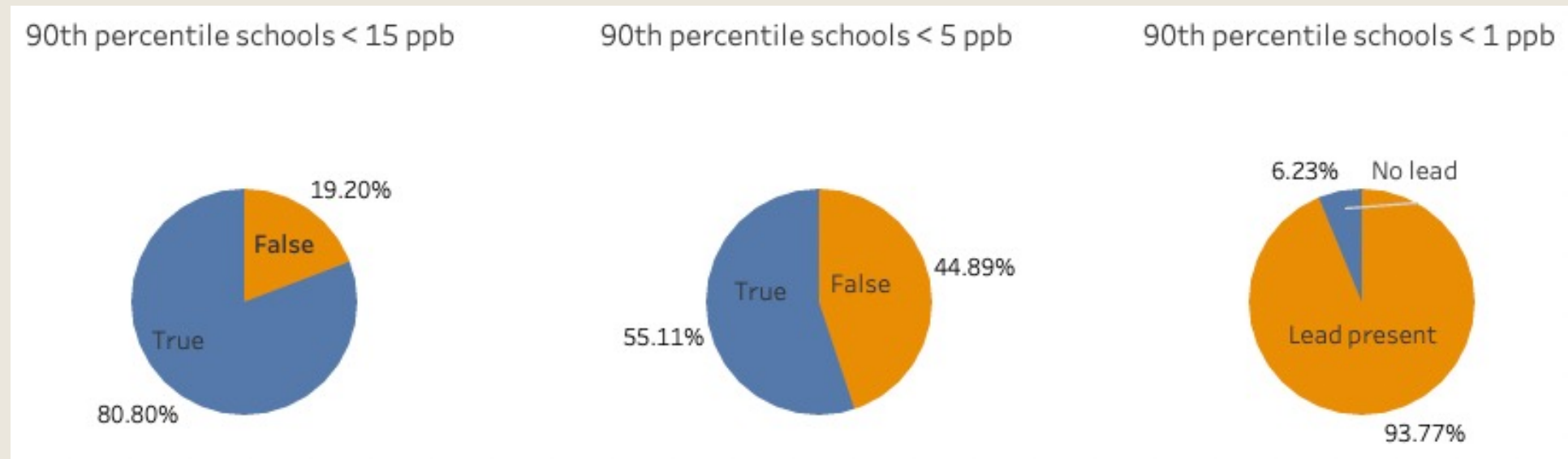
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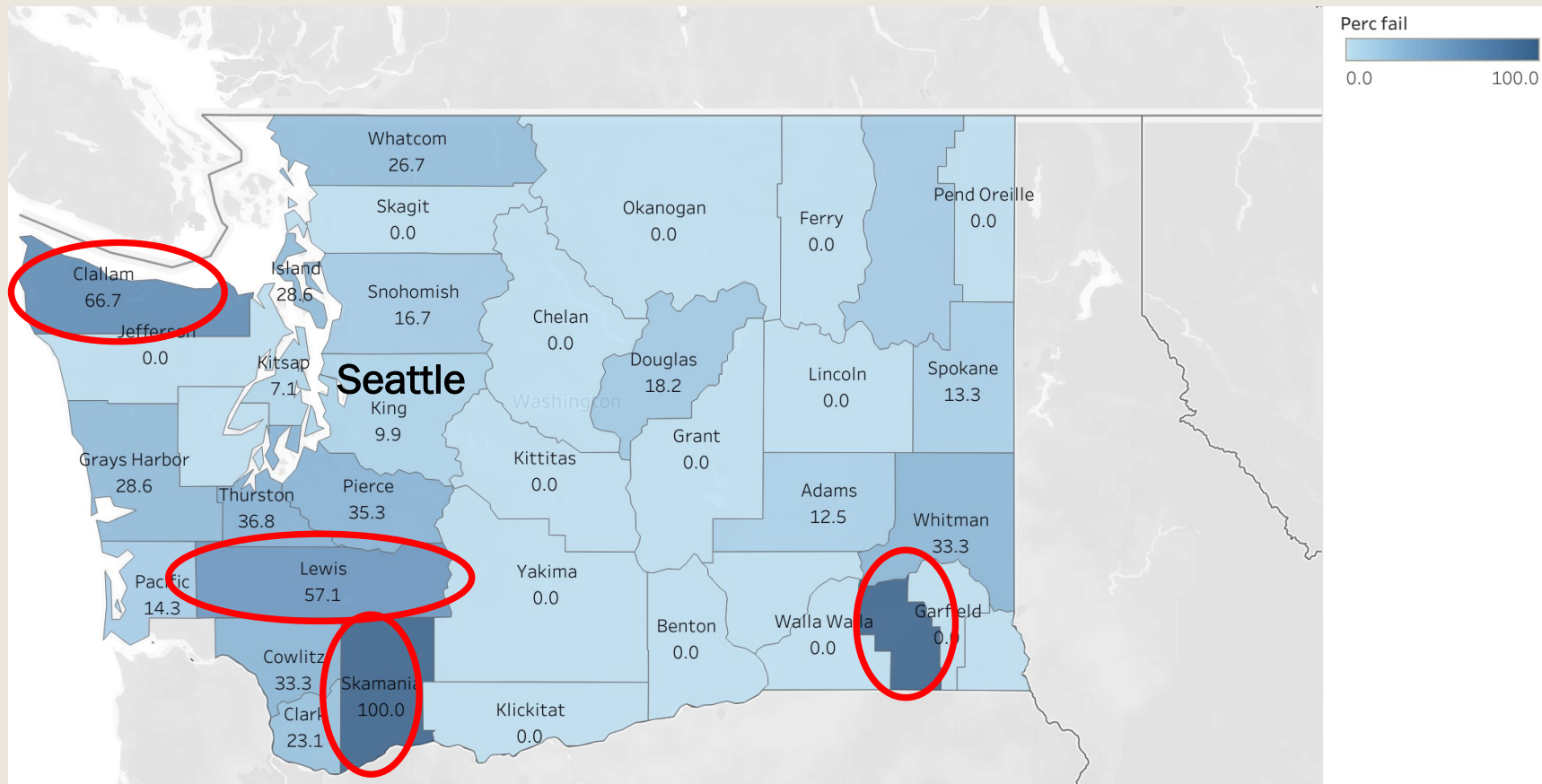
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Lead in drinking water statewide

- Data from 37 out of 39 counties
- Schools in 51% of counties have lead above safety limit
- Schools in 45% of the counties have no lead present
- Lead is a problem on the county level

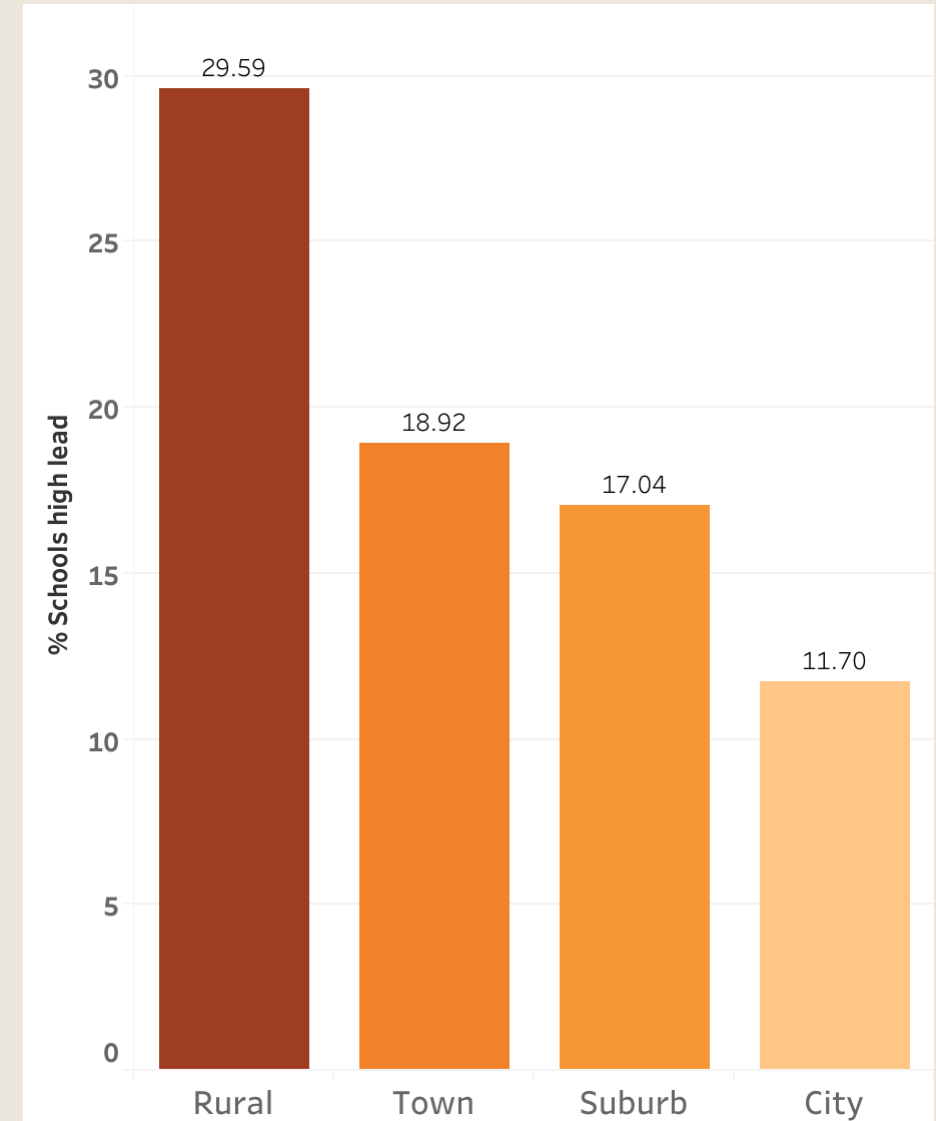


Top 4 counties with high lead

County	Schools participated	School high lead	Location
Skamania	1	1 (100%)	Rural
Columbia	1	1 (100%)	Rural
Clallam	3	2 (67%)	Rural
Lewis	14	8 (57%)	Rural

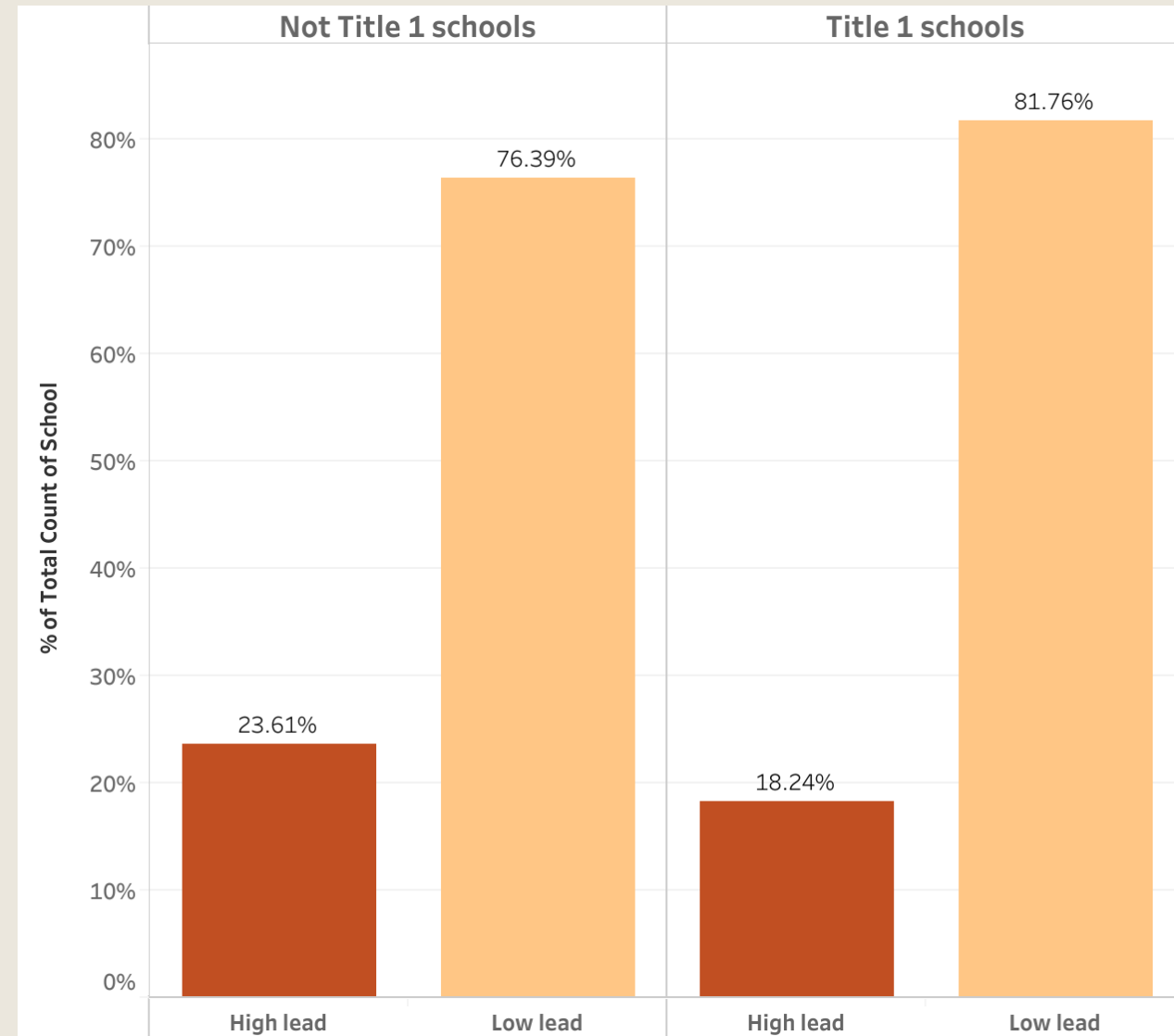
Lead contamination by location

- Schools In rural areas have highest lead contaminations
- Prioritize schools located in rural regions



Title 1 schools risk of lead

- Schools that receive federal funding and at least 40% of students come from low-income families
- Statewide: 63% Title 1 schools
- In this study: 82% Title 1 schools
- Title 1 schools are not at higher risk for lead contaminations



Takeaways

Consideration	Takeaway
School testing	Sample size is too small (13% schools)
Water samples	Lead is present
Schools	More schools need to be tested
Title 1 school	not a factor of lead contamination risk
Location	Rural areas are at higher risk

Conclusion

- This is an immediate problem that needs to be addressed for public health safety
- More testing and data is needed to identify schools that have lead contamination
- Since testing is costly and funding is low, counties with more lead contamination should be prioritized in line of testing
- Counties located in rural areas should be tested more often and prioritized

Future work

- Build a regression model to predict the lead contamination of schools based on features in this proposal
- Add information of age of school building into consideration since most lead contaminations are due to old pipes and fixtures
- Investigate underlying reasons for lead contamination to try and prevent this in the future



THANK YOU!

Questions?

Appendix

