



# Are we drowning on unknown amounts of chemicals?

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## Abstract

The purpose of our project is to see if the water we consume daily can affect us by damaging our own body knowing that some contaminants can cause many diseases like cancer, kidney problems, nerve damage, bone diseases and many other you wish wouldn't be true. We need water daily for survival. We wish to know what our water contains, is the water quality bad, are there things we should be concerned about our water and how its textures, like smell, taste and color should be. Not everyone has water purifiers at home; does their unfiltered water meet the established EPA standards? Can these elements in water harm us in our interior and exterior body? We collected water samples from the Westside, Central, Northeast, and Far Northeast in El Paso TX. From these regions we collected two different samples one from the kitchen Faucet and one from the restroom faucet. After collecting our samples from houses and one from a park we analyzed for pH, EC other chemical and physical parameters we measured with YSI in the field. We analyzed anion and cation concentrations of five elements: Chlorine, Lead, Arsenic, Nitrate and benzene with Ion Chromatography (IC), Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) and the Gas Chromatography Mass Spectrometry (GCMS). By using these tools we were able to find out the average of how much of a chemical the water in a region in El Paso TX contained.

## Introduction

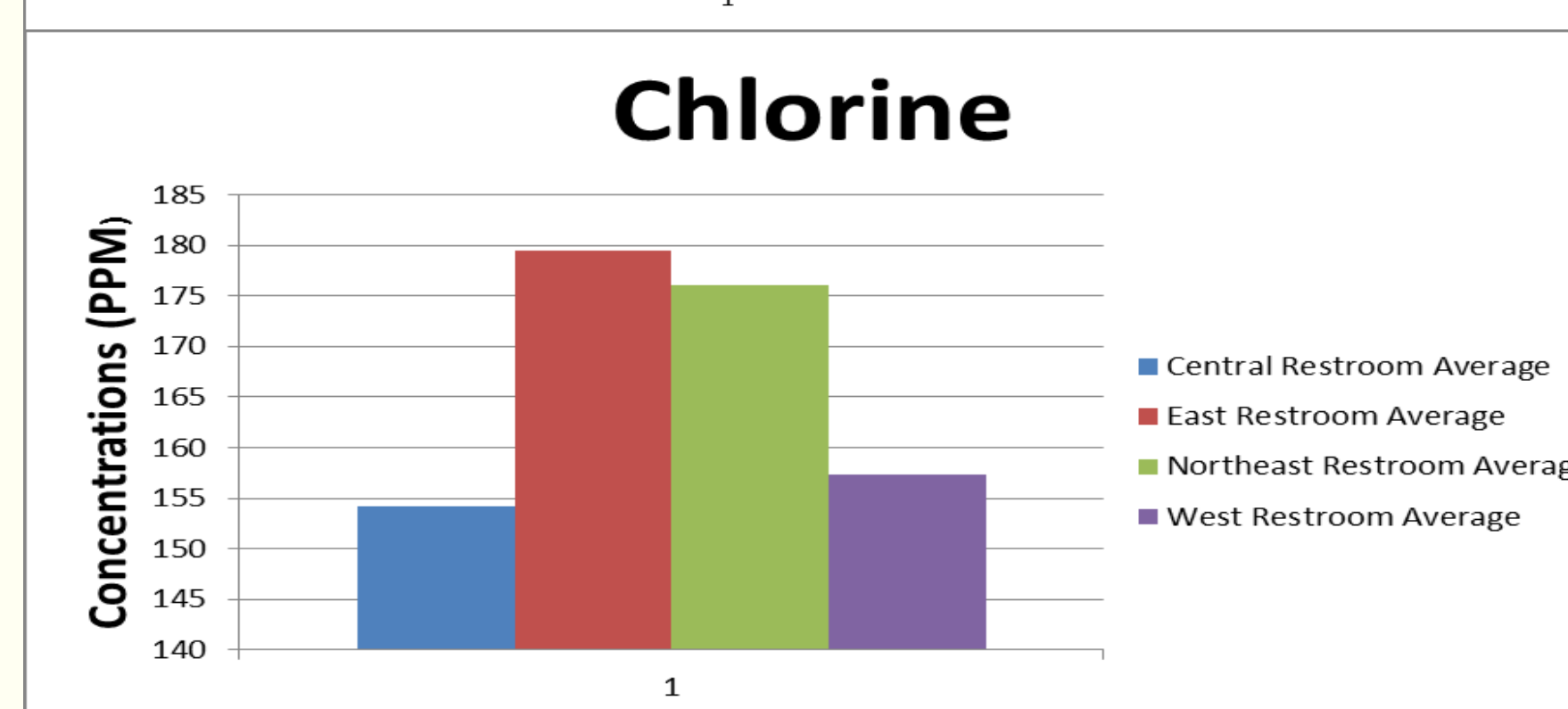
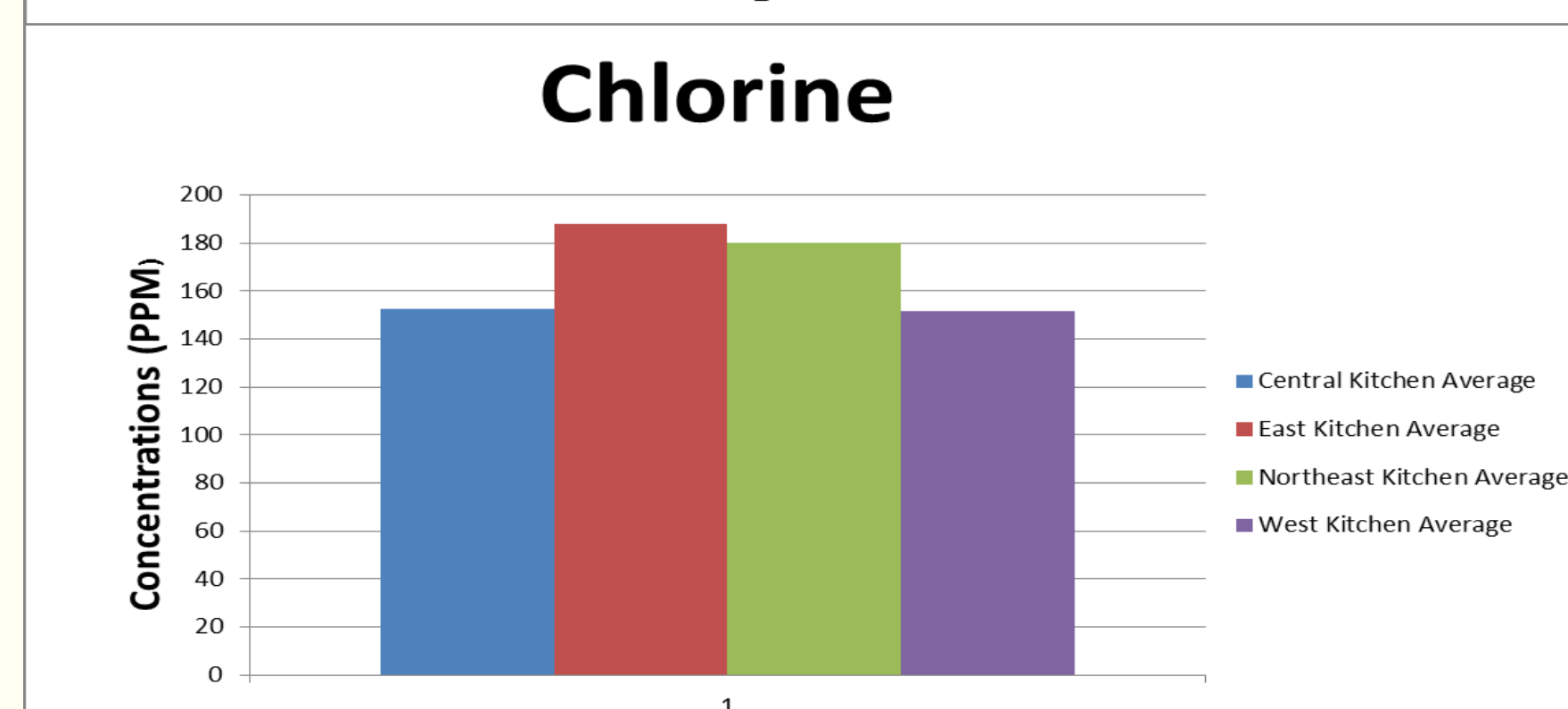
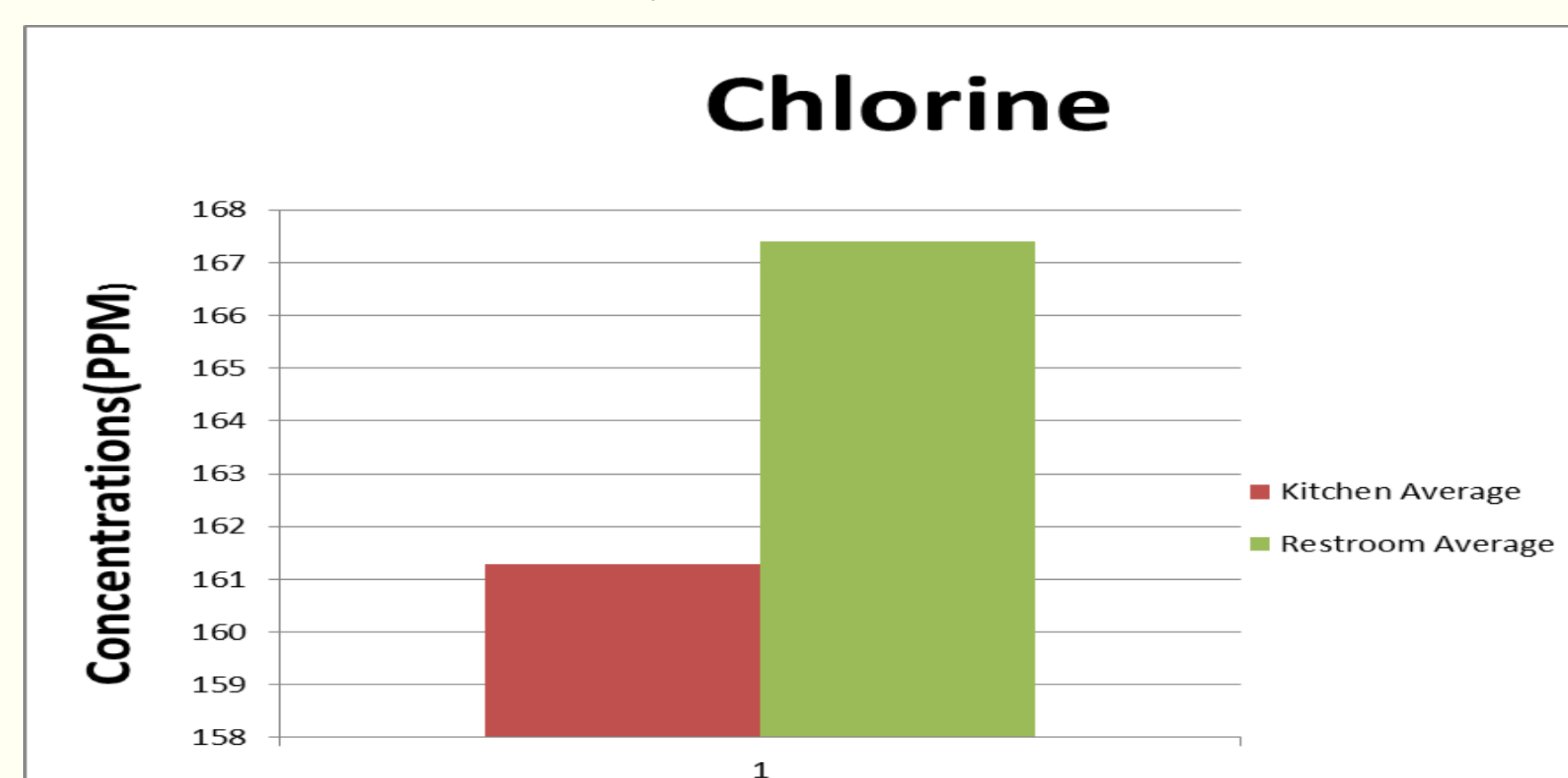
We chose to investigate if our water is contaminated with chemicals such Chlorine, Nitrate, Arsenic, Lead and Benzene. Other cities, countries and states around us are not able to drink directly from "tap water because its distribution in piping systems are poorly built like in Atlanta, some have poor water treatment systems like in Albuquerque because they exceed national standard for arsenic and exceed proposed national standard for radon and some have no real source water protection from contaminations in their water systems like Fresno " stated at ([www.nrdc.org](http://www.nrdc.org)) "Albuquerque's groundwater is becoming seriously depleted; Fresno's groundwater is highly susceptible to contamination. In Atlanta, Chicago, Detroit, Houston, Los Angeles, New Orleans, Newark, Philadelphia, Phoenix, San Diego and Washington, D.C., source water is threatened by runoff and industrial or sewage contamination. Water supplies in Baltimore, Fresno, Los Angeles, New Orleans, San Diego and several other cities are vulnerable to agricultural" stated at ([www.nrdc.org](http://www.nrdc.org)). We wanted to find out if the water we consume daily can affect us. If chemicals like Chlorine, Nitrate, Arsenic, Lead and Benzene exist in our water and have high concentrations, they can cause serious human health issues like cancer, anemia, kidney problems, high blood pressure and for infants and children it could cause delays in physical or mental development. If other cities experience similar problems with their tap water we can also face these health issues and precautions by comparing them with the EPA drinking water standards we have.

## Material

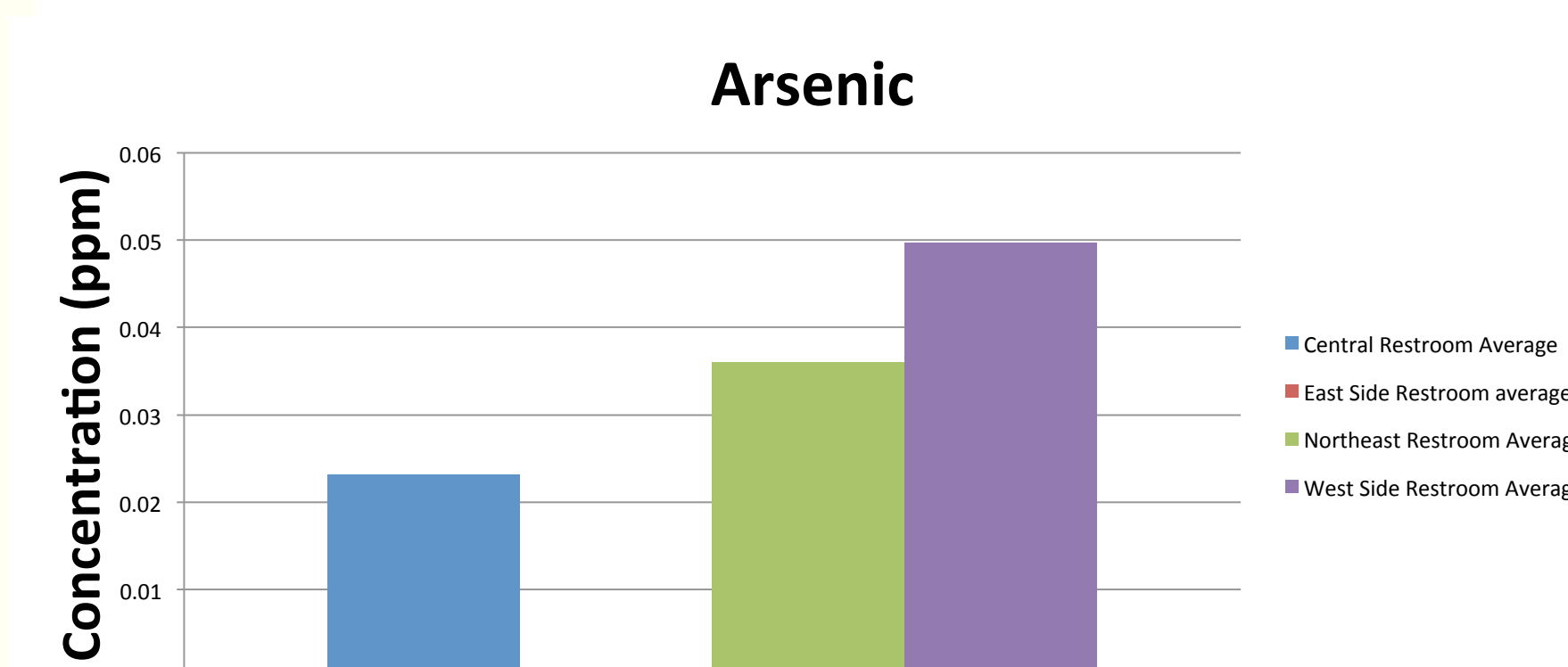
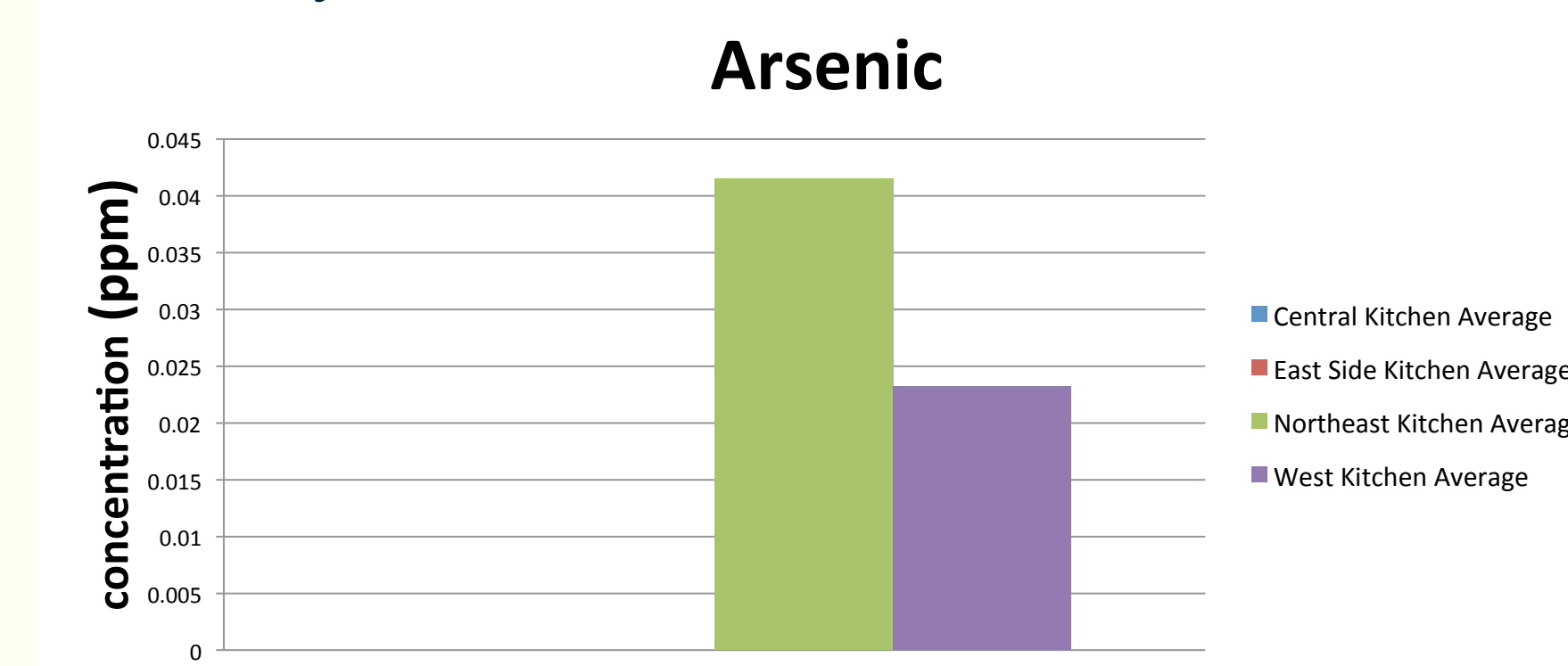
- Ion chromatography
- Inductivity Coupled Plasma-Optical Emission Spectrometry
- Gas Chromatography Mass Spectrometry
- Water Samples from different regions in El Paso TX (Northeast, Central, West side and East side)

## Methods

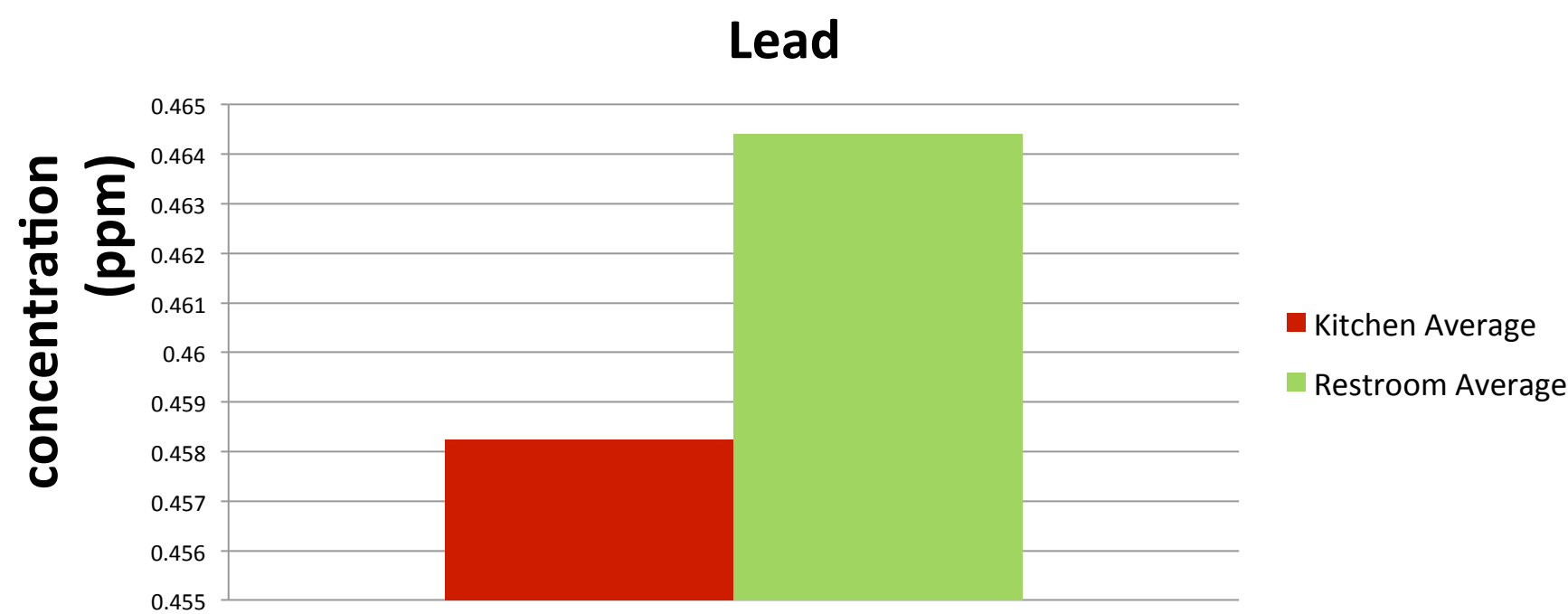
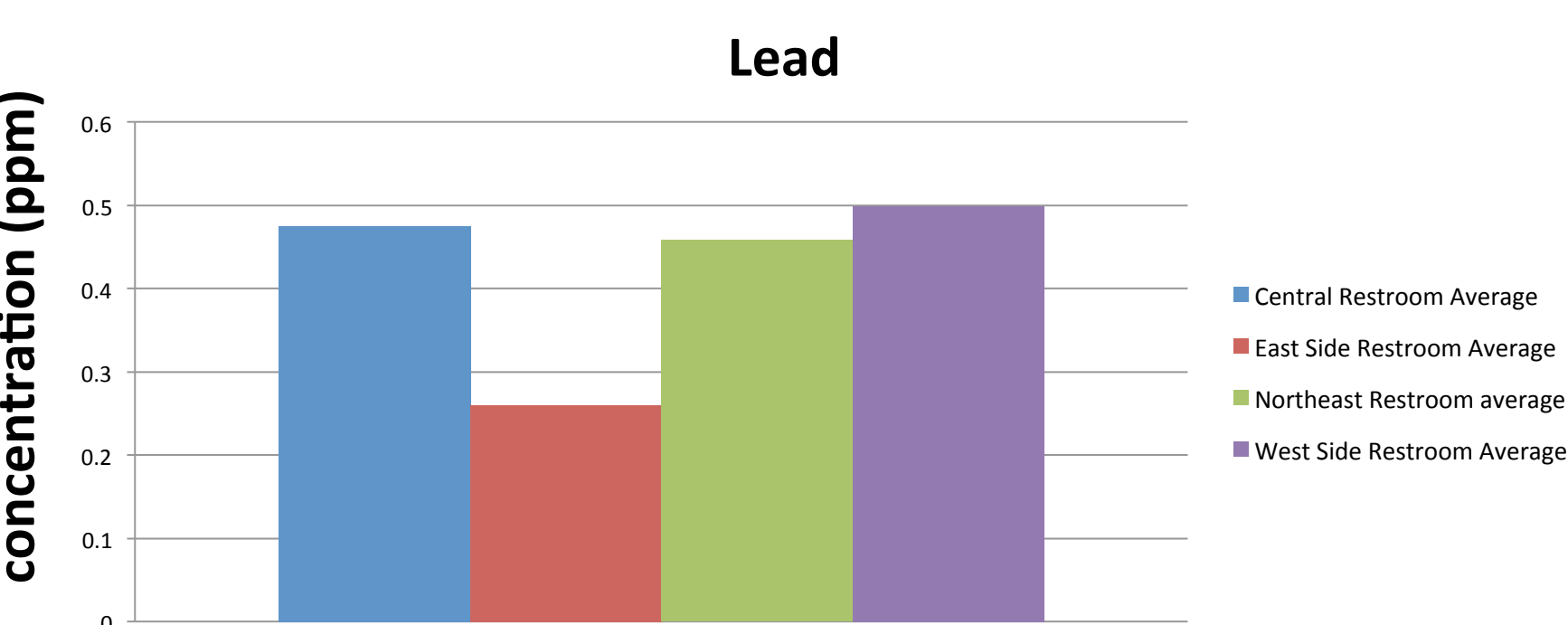
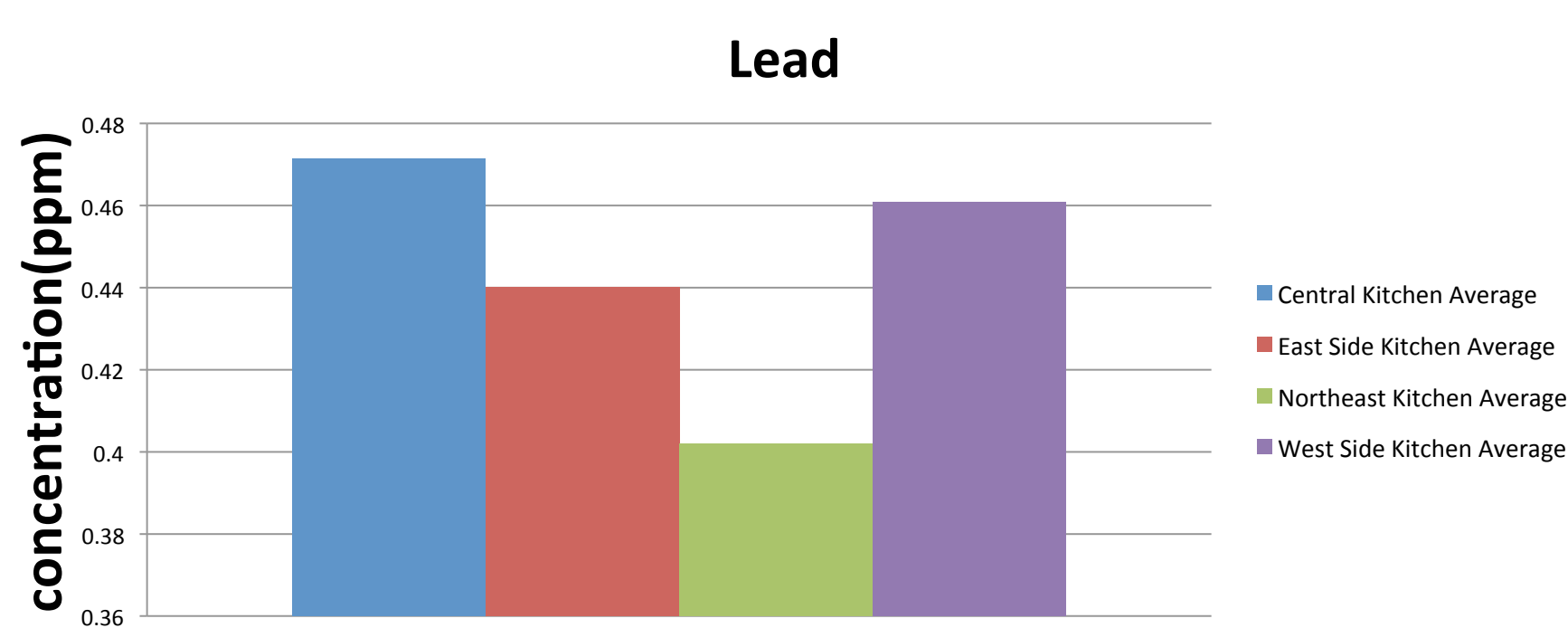
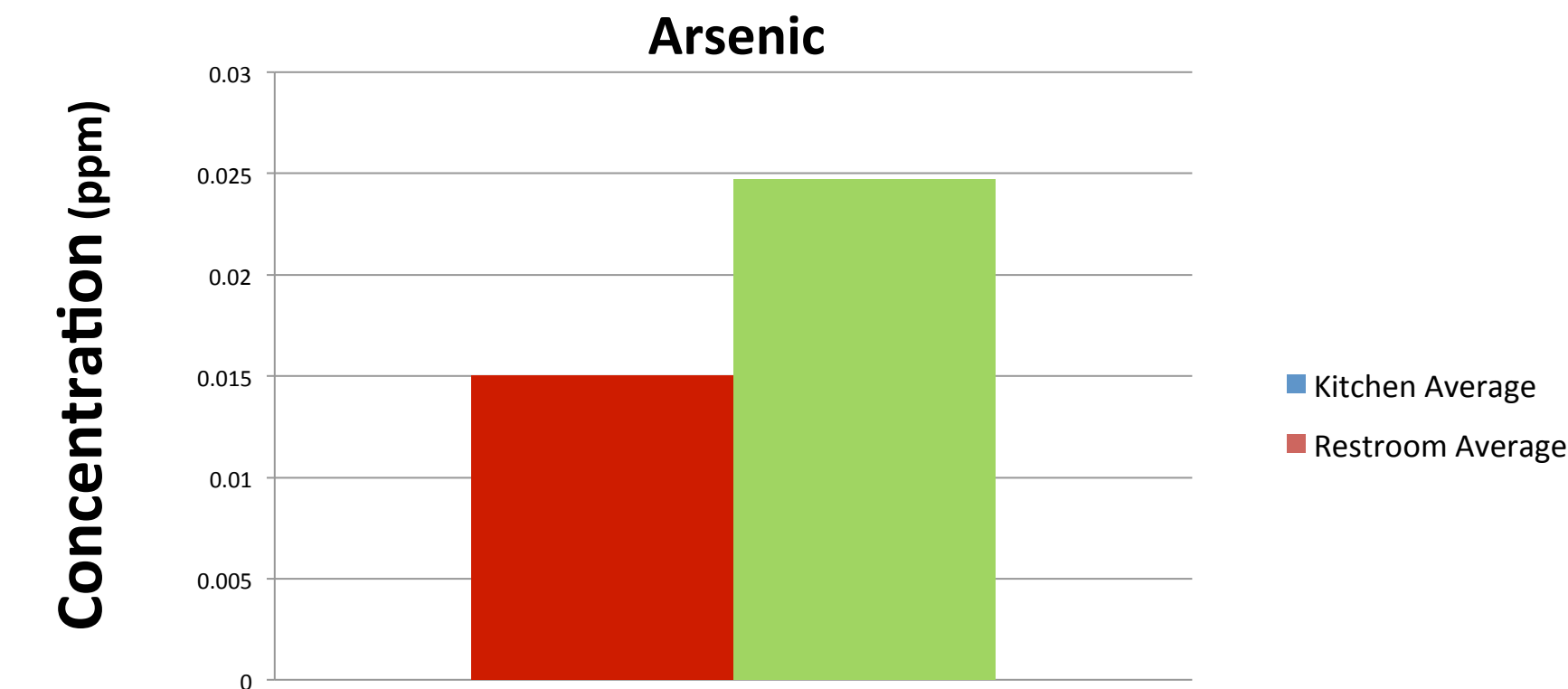
After Finishing collecting all our samples we used the YSI to measure , we put our collected samples with 2% of nitrate acid into 1.5mL IC vials into the IC to collect anions. After we saw the results, we had to look at which ones were in the EPA National Primary Drinking Water Regulations standards. Later we used the left over water in the centrifuge tubes for the ICP-OES which collects cat ions to also find what elements it contained. Later we used the GCMS to measure organic compounds but only for four samples and found out that it contained Acetone and Benzene.



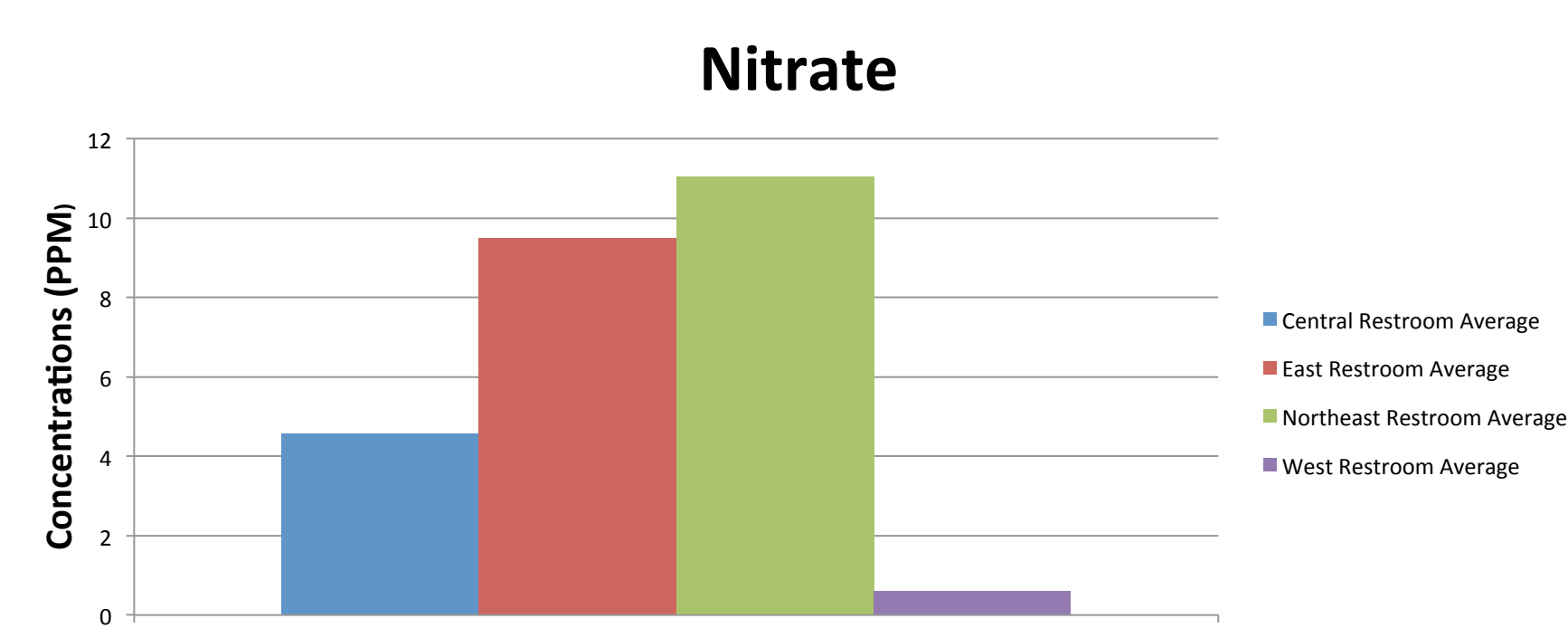
To much chlorine in your water may cause Eye/nose irritation; stomach discomfort



To much arsenic in our water may cause Skin damage or problems with circulatory systems, and may have risk of getting cancer



To much lead in our water may cause delays in physical or Mental development in infants and children, also slight deficits In attention span and learning abilities, kidney problems, high blood pressure in adults.



To much nitrate in water may cause blue-baby syndrome and shortness of breath

Chemicals or Ions	EPA Standard	Our Results (ppm)
Chlorine Restroom Average	4.0 mg/L	167.3 ppm
Chlorine Kitchen Average	4.0 mg/L	161.2 ppm
Nitrate Restroom Average	10 mg/L	7.1 ppm
Nitrate Kitchen Average	10 mg/L	6.6 ppm
Arsenic Restroom Average	0.010 mg/L	0.024 ppm
Arsenic Kitchen Average	0.010 mg/L	0.015 ppm
Lead Restroom Average	0.015 mg/L	0.464 ppm
Lead Kitchen Average	0.015 mg/L	0.458 ppm



Inductively Coupled Plasma-Optical Emission Spectrometry



Ion Chromatography

## Conclusion

Chlorine was found in higher concentrations in all El Paso restroom waters than in kitchens (167.5 ppm, 161.2 ppm). The highest Nitrate concentrations were found in the Northeast kitchen and restroom waters (13 ppm, 11ppm). The highest Arsenic concentrations were found in the West side restrooms and Northeast kitchen waters (0.05, 0.041 ppm). The highest Lead concentrations were found in the Central kitchen waters and West side restrooms (0.47, 0.5 ppm). Boron concentrations were found in both Eastside restroom and kitchen waters (0.193, 0.22 ppm). In some of our Northeast and Central restroom water samples we found Benzene and Benzene (1-methylethyl). According to EPA Standards the concentrations we found are safe, so therefore our concentrations are the same as the EPA standards.

## Next Step

For our future work we will focus more on other places rather than just El Paso TX, to see if their water is contaminated and compare chemicals in their water with ours. We would also research if the water they drink can also affect human health and try to find some methods to decrease health issues in humans drinking water systems.

## References

- EPA.gov
- National primary drinking water regulations.pdf
- Sciencedirect.com
- [www.elsevier.com/locate/jclepro](http://www.elsevier.com/locate/jclepro)
- [www.elsevier.com/locate/watres](http://www.elsevier.com/locate/watres)
- [www.nrdc.org](http://www.nrdc.org)

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We would like to thank all of those who guided us along this experience. Our teachers, family, and classmates who helped us along the way to accomplish our goals. We like to thank those who gave us the opportunity to learn from this internship.