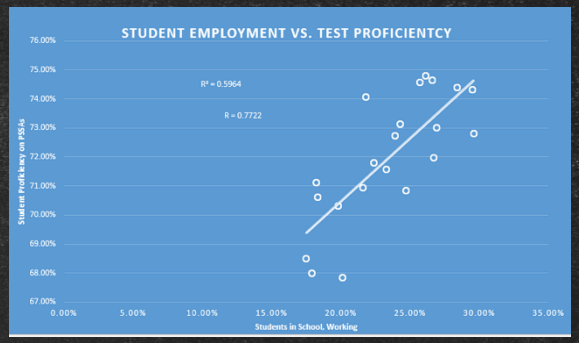
Does student employment affect test scores?

Essential Question: Do simultaneous student employment and high school enrollment affect performance on standardized testing scores such as the ACT and SAT?

Challenges:

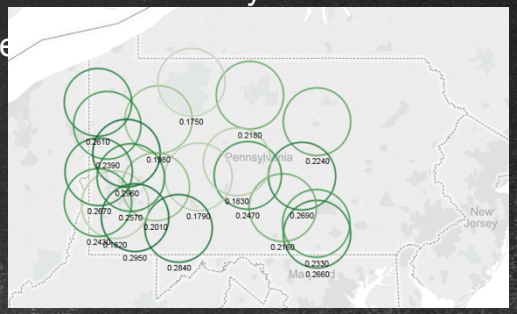
- Finding comparable data sets and sorting statistics appropriately by school districts and counties
- Using VLookup in Exce



Above: Correlation between Employment and Proficiency

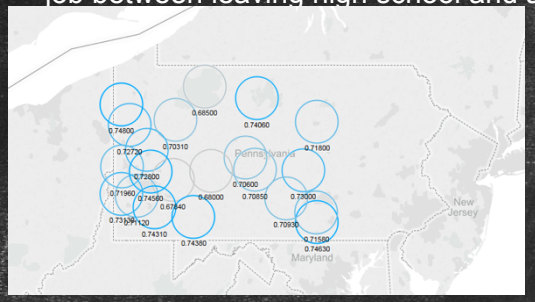
Background Information:

- Following the passage of the No Child Left Behind Act in 2002, annual state spending on standardized testing rose from $423 million to nearly $1.1 billion in 2008, a 160% increase in six years, compared to only a 19.22% increase in inflation.
- According to the US Bureau of Labor Statistics, in 2010, 97% of all young adults in the United States have held a job between leaving high school and age



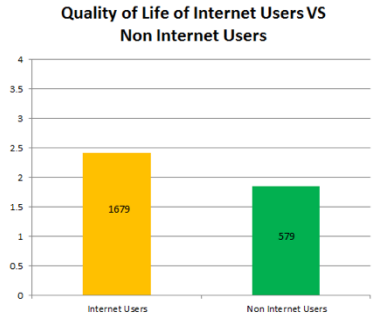
Left: Student Employment per County

Right: PSSA Proficiency Level per County



Parker Chambers, Andrew Cihon-Scott, Harrison Cook, Sadie Filipowski, Hunter Jaecke, Chloe Mellon, Ben Nahum
Avonworth High School Team 1

DOES TECHNOLOGY USAGE AFFECT QUALITY OF LIFE?



Average quality of life of internet users: 2.41

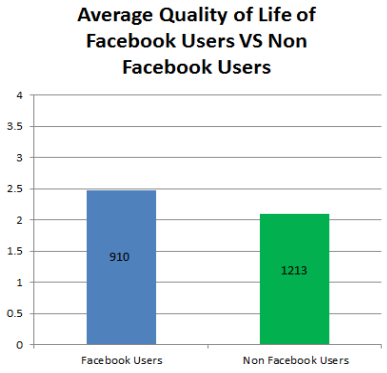
Standard deviation: 1.17

Average quality of life of non internet users: 1.84

Standard deviation: 1.34

Average Age of Subject: 51
Average Age of Technology Users: 47
Average Age of Non-Technology Users: 65

On these graphs: 5 represents an "excellent" quality of life and 1 represents a "poor" quality of life



Standard Deviation: 1.42

Average quality of life of Facebook users: 2.47

Standard Deviation: 1.73

Average quality of life of non Facebook users: 2.08

- Using a survey from Pew Research Center, we compared the self reported quality of life between 2260 technology users and non users
- After conducting a two-sample t-distribution test with an alpha level of .05, we found: if we assume that the the averages are equal then there is a 6.8E-19 % chance that a sample taken in the exact same way would reveal the same result; therefore, we can conclude that the quality of life for a technology or Facebook user is higher

Conclusion: After viewing multiple data sets, we found that internet usage does indeed give an increase to overall quality of life

By: Ben Houser, Richard Danylo, Prosper Tjelmeland, Andy Chrvala, and Twesha Modi

Mitigating Violent Crime: An Investigation

Bethel Park High School - Team 1

Emily Augustine, Akhil Rajasekar, Sean McClaine, David Erzen, Carolyn Vona, Max Reese & William dePoutiloff

Sponsor: Lee Cristofano

The Situation

How do crime rates in Allegheny County correlate with other aspects of the city? Moreover, which factors/aspects are most indicative of violent crime rates? With the recent debates and political controversy over the issue of crime, we felt an in depth analysis of the situation was warranted.

The Data

	A	C	D	E	F	G	H	I	J	K	L
1	Township/Borough	violent crimes/100k	% completed hig	median housel	unemploymer	difference in earni	average people	rent occupied	median age	average test sc	Pop Change
2											
3	Aspinwall	0	94.6	63708	3	11099	2.1	55.1	38.3	n/a	-149
4	Avalon	449	84.7	34880	4.1	-1220	1.9	49	43.6	n/a	-530
5	Baldwin	305	88.8	51271	5.3	13048	2.4	23.3	44.2	n/a	-59
6	Bellevue	348	88.3	40325	6.1	7942	2.1	60.3	38.9	n/a	-400
7	Ben Avon Heights	0	98.8	136250	4.2	70730	2.4	0.7	42.6	n/a	-20
8	Bethel Park	77	93.9	68176	4.3	17963	2.3	19.5	45.5	0.88	-1159
9	Braddock	156	73.4	22885	7.3	6003	2.6	62.8	32.3	0.39	-742
10	Brentwood	18	90.5	48006	4.6	6244	2.1	37.5	40	n/a	-793
11	Bridgeville	136	89.2	42083	5.9	4910	2	37.4	45.6	0.76	-189
12	Carnegie	264	87.9	40307	6.2	7257	2.1	47.9	41.5	0.7	-416
13	Castle Shannon	96	88.7	51754	3.3	5441	2.1	37.9	42.5	n/a	-291
14	Cheswick	0	93.2	57000	1.5	20214	2.1	11.4	49.4	0.84	-102
15	Churchill	300	96.1	75179	4.1	11288	2.5	7.4	51.7	n/a	-525
16	Coraopolis	567	83.8	33643	5	8443	2.2	48.4	41.2	0.77	-430
17	Crafton	298	95.1	47222	2.7	3467	2.1	45.9	38.1	n/a	-733
18	Dormont	222	91.2	50726	3.8	3404	2.1	44.9	38.5	n/a	-718
19	East McKeesport	37	87.3	38750	4.1	11288	2	34.1	42	n/a	-367
20	East Pittsburgh	139	86	30036	5.9	-3295	2.6	65.4	32	n/a	-306
21	Edgewood	258	94.2	65707	2.8	14517	1.9	27	41.3	n/a	-306

Data | Population Change | Test Scores | High School Completion | Median Household Income | Unemployment | Difference in M

Data was gathered and compiled from multiple sources regarding the following city aspects: median household income, population change, family size, high school test scores, high school completion rates, unemployment rates, median age, difference in median earnings of males and females, number of parks, and percentage of rent occupied homes.

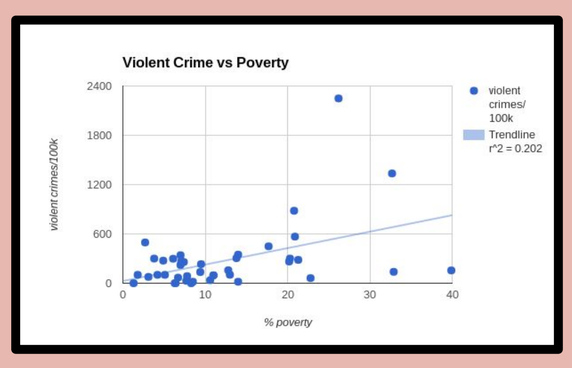
Challenges

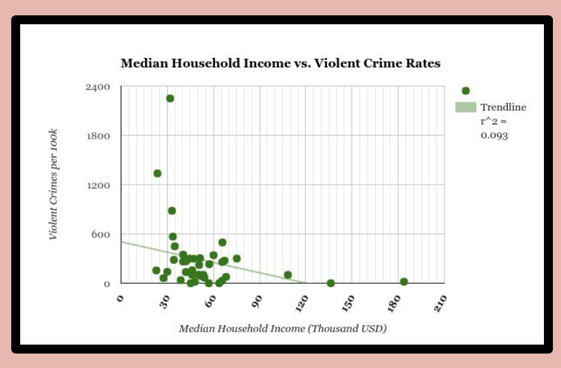
1. Determining what data should be obtained for this project.
2. Obtaining the data to be used in the project - Where to find it?
3. Cleaning the data for use in the project - How can we make the data useable?
4. Determining which correlations between the chosen factors and violent crime rates were suggestive and significant.
5. Making a data-driven social policy recommendation.

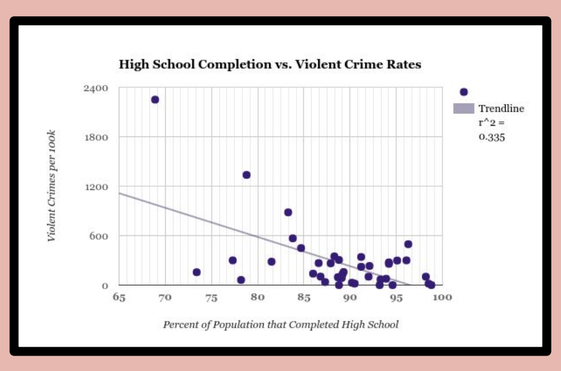
The Correlations

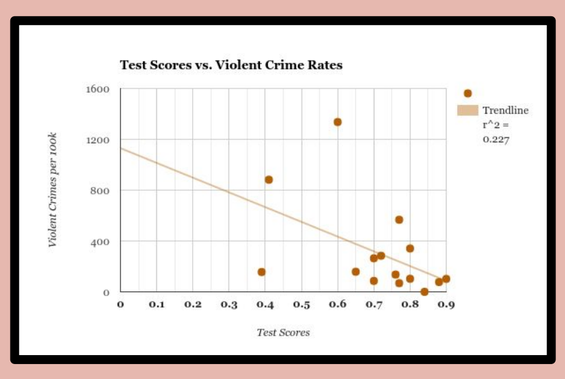
Economy/Income

In general, as income increased and poverty decreased, violent crime rate decreased. Areas with better socioeconomic statuses tended to have less violent crime.







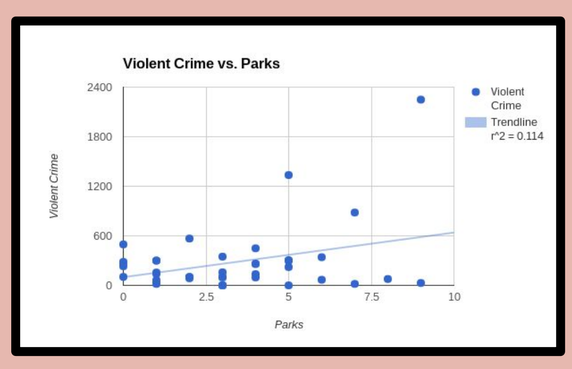


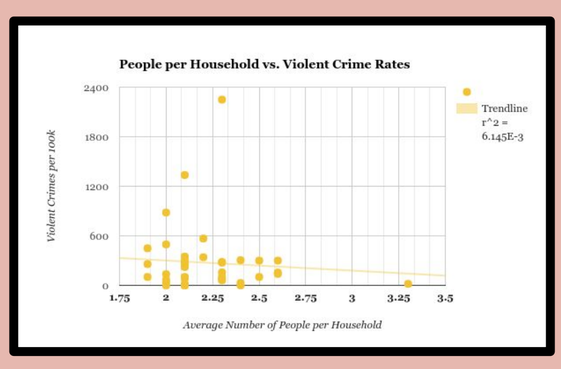
Education

In general, as high school test scores and completion rates decreased, violent crime rates increased. This indicates that the quality of education that students receive at a younger age might affect an area's violent crime rate.

Neighborhoods

As the number of parks increased, the rate of violent crime increased. The number of people per household showed little correlation with violent crime rates.



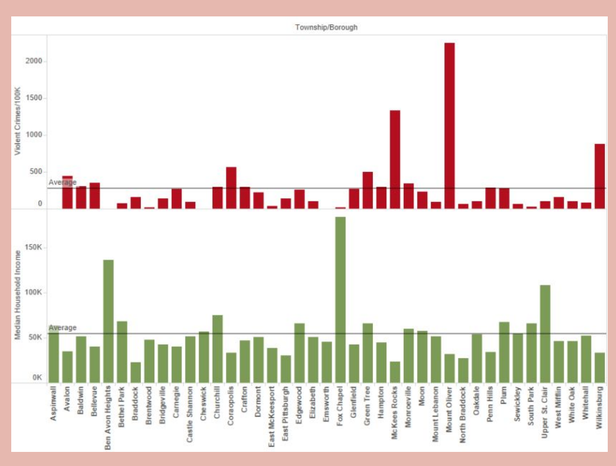


The Conclusion

Data analysis allowed us to create visualizations representing community investments and their effects on said community. We were able to determine changes that have helped a community so that they may be continued and implemented elsewhere. We were also able to find changes that have not helped, or in fact have negatively affected a community, so that those changes might be avoided. Two factors that had the strongest correlation with violent crime rates were: high school completion rate and test scores. Therefore, we make the following

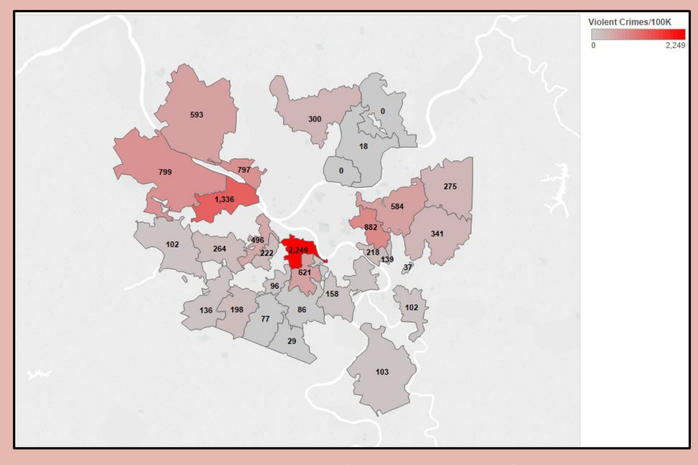
Policy Recommendation: We believe that the most effective way for a community to combat violent crime rates is to focus on creating a good educational environment for its young residents. Neighborhoods should focus their effort on improving the quality of education within the area and implement policies to encourage and allow students to complete their high school education.

Average Income vs. Violent Crime Rate

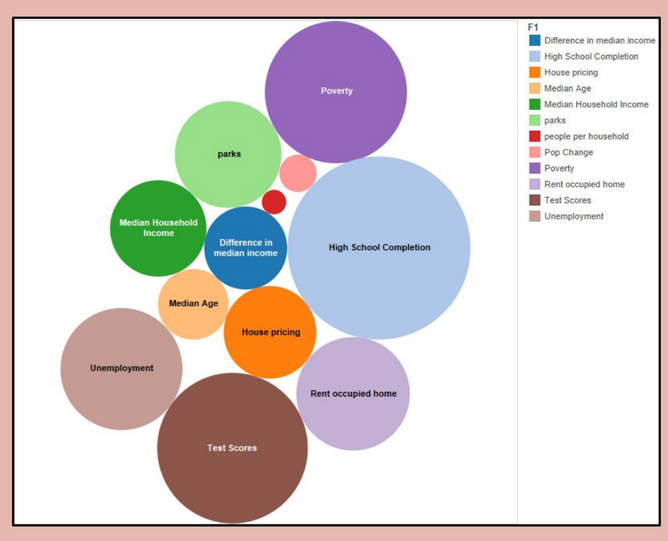


This graph compares the average household income to violent crime rates. In general, neighborhoods with higher income have lower violent crime rates. For example, Fox Chapel has a very large average income and a very low violent crime rate. Mount Oliver has a very small average income and a very high violent crime rate.

Violent Crime by ZIP



R^2 Correlation Values



Concussions and the NFL -- BPHS Team C

Tarush Bahl, Maggie Wolf, Noah Friday, Travis Glaser, Justin Nath, Cassidy Deleo, Robbie Morosetti

Concussions have become a major health issue over the past few years. There is no hotter topic in the field of sports. The recent movie, *Concussion*, coupled with the statements from top NFL officials admitting to the connection between football and traumatic head injuries. Even now, with all the modern advancements in technology and medicine, there are still not many reforms made to not only limit the amount of concussions suffered, but also reduce the recovery time to get back to the activity. Our goal is to come up with actions that we can implement to not only make reforms in NFL, but also into programs at the high school level.

Our team attempts to determine the factors that affect the initial concussion, recovery time, and the recurrence of concussion at the general population and NFL level.

"The answer to that question is certainly yes," Jeff Miller's, NFL's senior vice president for health and safety, reply when asked if there is a connection between football and CTE.

Terminology

TBI- Traumatic Brain Injury- A blow or jolt to the head or a penetrating head injury that may disrupt the normal function of the brain

Concussion- a pathophysiological injury; a complex internal injury resulting from a low velocity disturbance or shaking of the brain it is a subset of a TBI or a mild TBI;I it is not a structural impairment, but rather a functional disturbance. A typical concussion causes symptoms that resolve shortly after. In severe cases symptoms will continue and prolong for hours, days, etc...

Epidemiology- Branch of medicine that deals with incidence, distribution, and possible control of diseases and other factors relating health

CTE- Chronic Traumatic Encephalopathy- a progressive degenerative disease found in people who have had a severe blow to the head

UNC- Unaffiliated Neurological Consultant- Helps in the process of examining the players for a concussion

Madden Rule- Player shall have his helmet taken off of him and escorted to the locker room

INC- Independent Neurological Consultant- Decides if players can return to full participation.

Myth	Fact
• Concussions can only be suffered as direct blow to the head	• Concussion may be caused from blow to somewhere other than head as long as impact is transmitted to the head.
• Concussion only occurs when there is loss of consciousness	• 90% of concussions occur without a loss of consciousness
• Everyone is at the same risk for a concussion	• Age, gender, and medical history all affect one's susceptibility to obtaining a concussion
• All concussions and treatment are alike	• No 2 concussions are the same
• You must be placed in a dark room to recover	• Different treatments based on symptoms
• Concussions always cause long-term brain damage	• Some inherent conditions put you at a higher risk at another concussion
• Helmets can prevent concussions	• Long-term issues from concussions only occur when the concussion is poorly managed

Helmets

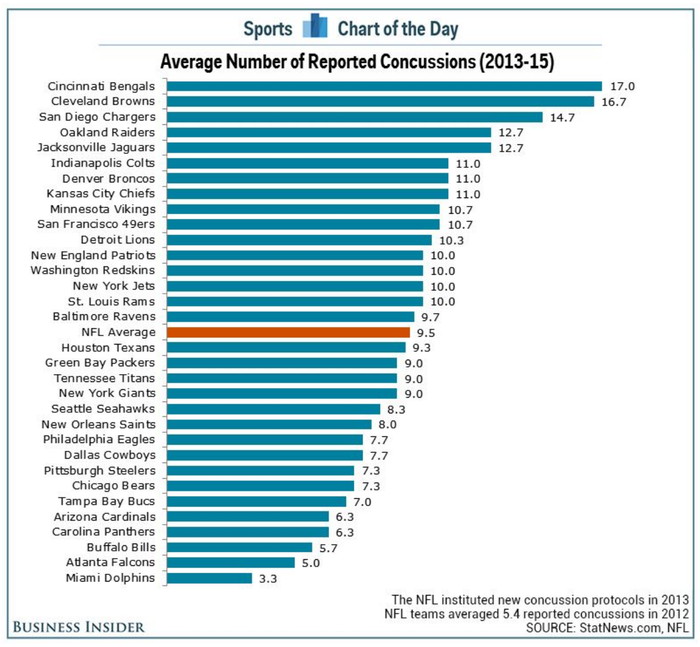
- Before the 1930's football was played with long hair and just incorporated shoulder pads
- The fabric pads inside the helmet to distribute impact in 1917
- Plastic helmets used in 1940
- Space age rigid Polycarbonate alloy plastic helmets and vinyl coated steel alloy face masks were the norm in the 1980s and 1990s
- Vicis deformable helmet by the University of Washington (video of evolution of helmet based on current technological developments)
  - https://youtu.be/bOhaicBRj9c

"It's absurd [to] say there's a relationship [between] CTE and playing football." - Jerry Jones, Dallas Cowboys owner.

Data sets

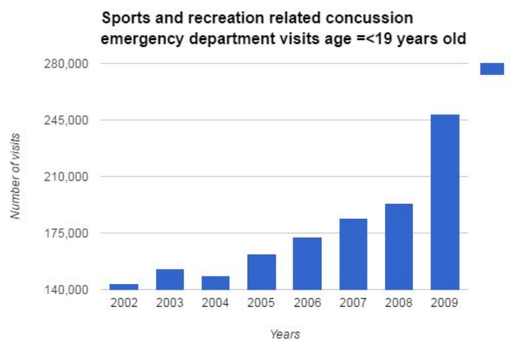
We used various sources to find our data, including government websites, official NFL reports, and other online databases. These include: 2015 NFL Health Reports, CDC database archives, 2011 Canada Concussion Statistics, ESPN news articles, and others.

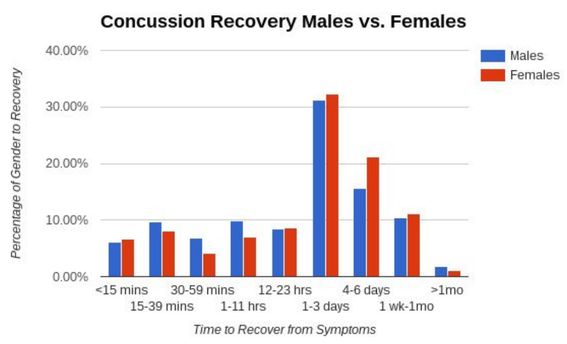
http://horizon.parachutecanada.org/wp-content/uploads/2015/12/2013-Spring-Concussions-In-Canada.pdf
http://static.nfl.com/static/content/public/photo/2015/10/10/0ap3000000553505.pdf
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3017493/
https://nflcommunications.com/Documents/NFL%202015%20Injury%20Data.pdf
http://www.cdc.gov/traumaticbraininjury/data/rates_ed_bysex.html

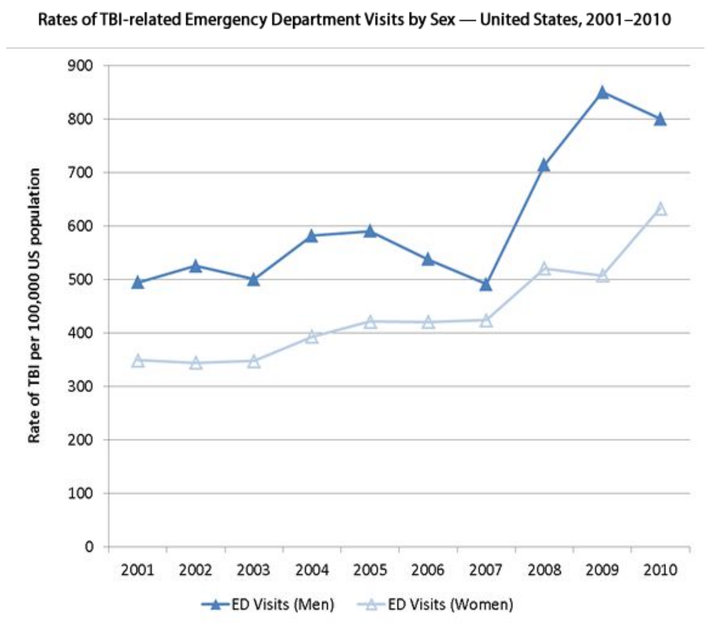


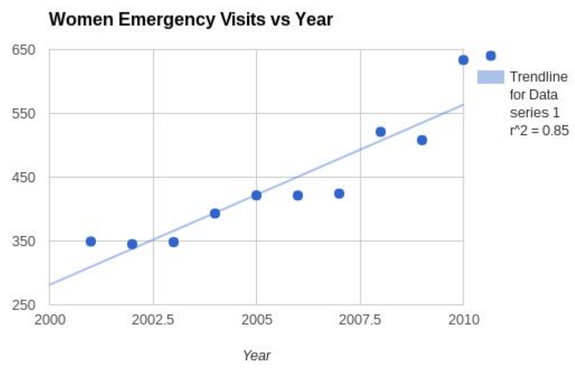
Males usually recover from concussions quicker than females. More males recover in 30 minutes to 11 hours. More females recover in 12 hrs to 1 month.

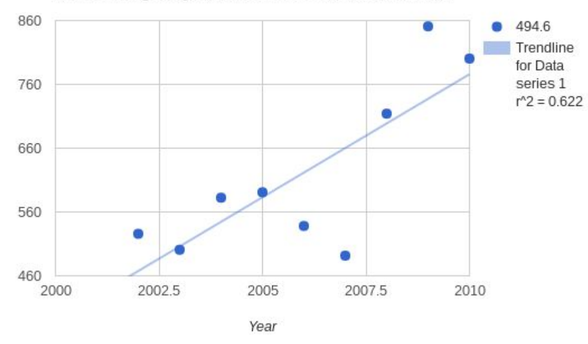
Women are more likely to receive a concussion due to their weak muscles and different head and neck structures.



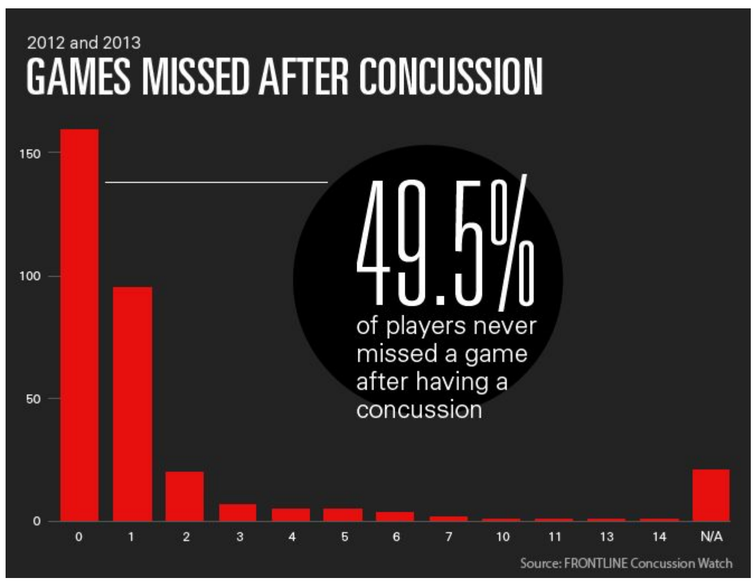








"I suffered the 3rd and 4th concussions of my career this past season and I am walking away from the game I love to preserve my future health. - AJ Tarpley, 23, Former Buffalo Bills Linebacker. One of many players who either retire prematurely or suffer serious head trauma due to playing football.



Policies to be implemented as a result of our research

Youth Policies

-Stricter enforcement of rule (hit to the head) violations in sports beginning at High School or younger level

NFL Protocols

-Further suspension or punishment after a NFL player violates concussion rule (ie Vontaze Burfict playoffs 2015)

Helmet Technology

-Joint task force between the sports management and insurance companies

- Refocus helmet development to absorbing and dissipating the energy of a collision

Online Degrees VS Brick and Mortar College – Return on Investment

Bethel Park High School – Team 2

Alyssa George, Aubree Stewart, Tammy Stugan, and Sabrina Tatalias

Research Question

Do high school graduates of Allegheny County have a better return on their investment when taking the online college, or traditional brick-and-mortar college campus, route?

We decided to research if traditional brick and mortar colleges, or online colleges have a better return on investment for students. We hope this research will help future students make the best decision for their college experience.

Challenges

We faced various conflicts when finding data. For example, many colleges gave very little information when we contacted them. Additionally, colleges would only display what made their college look good to the public online. These statistics were very commonly vague when they were not as reliable. Finally, we struggled to find employment rates in the first year after undergraduate school. This goes hand in hand with how colleges want their college to look superior to others.

Data Sources

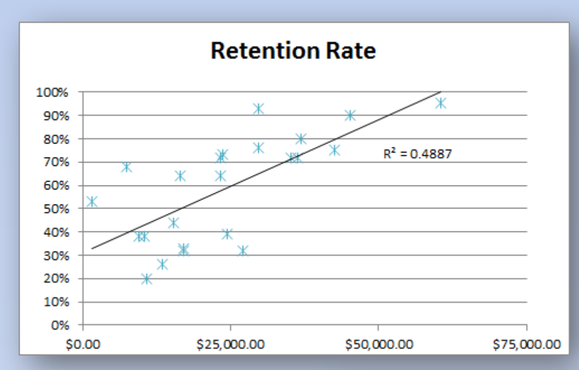
To find the most accurate data we called and emailed the different brick and mortar and online colleges. Also, we used online sites such as *Naviance;* which is a website high school students can use to get information different colleges. *NerdWallet*, was also very helpful when seeing the return on investment with different colleges.

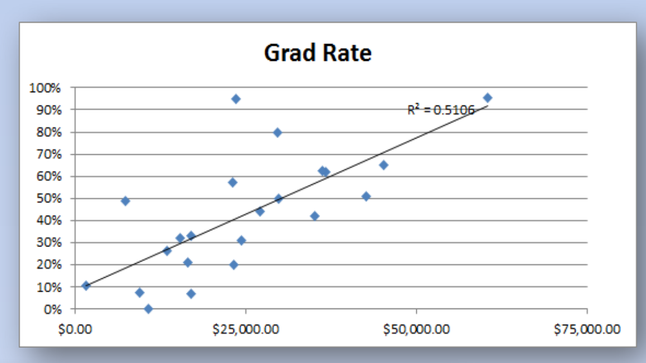
Data Set Examples

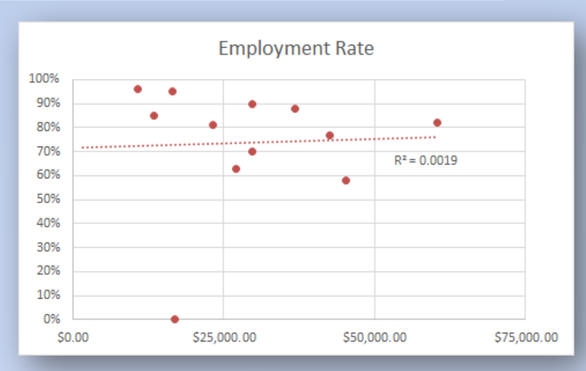
College	B&M vs. Online	In state Tuition per year	Room & Board	Tuition + Room and Board
University of Pittsburgh	B&M	$18,192.00	$11,536.00	$29,728.00
Community College of Allegheny County	B&M	$1,571.25	$0.00	$1,571.25
Carnegie Mellon University	B&M	$48,030.00	$12,400.00	$60,430.00
Duquesne University	B&M	$33,778.00	$11,418.00	$45,196.00
Penn State Greater Allegheny	B&M	$12,718.00	$10,548.00	$23,266.00
Robbert Morris University	B&M	$26,330.00	$10,440.00	$36,770.00
Point Park University	B&M	$25,980.00	$3,770.00	$29,750.00
Carlow University	B&M	$25,956.00	$10,314.00	$36,270.00
Chatham University	B&M	$32,234.00	$10,368.00	$42,602.00
La Roche College	B&M	$24,750.00	$10,324.00	$35,074.00
Art Institute Pittsburgh	B&M	$17,632.00	$9,450.00	$27,082.00
Pittsburgh Technical Institute	B&M	$14,900.00	$8,253.00	$23,153.00
Bradford School	B&M	$13,980.00	$9,635.00	$23,615.00
Devry University	Online	$13,380.00	$0.00	$13,380.00

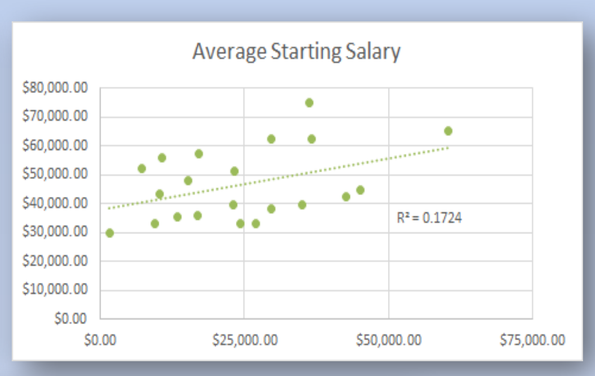
A collaborative spreadsheet was create in Google Docs

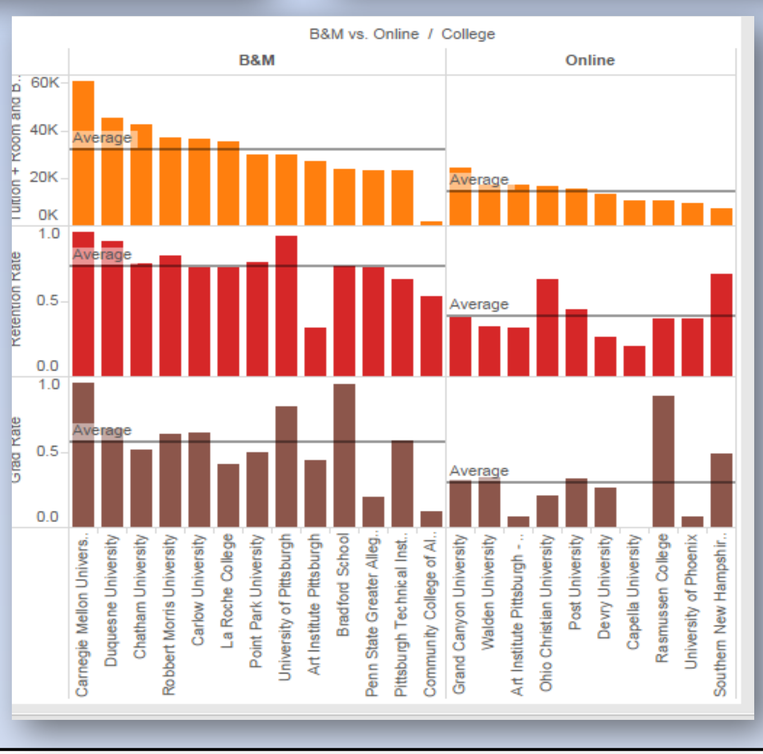
Visualizations

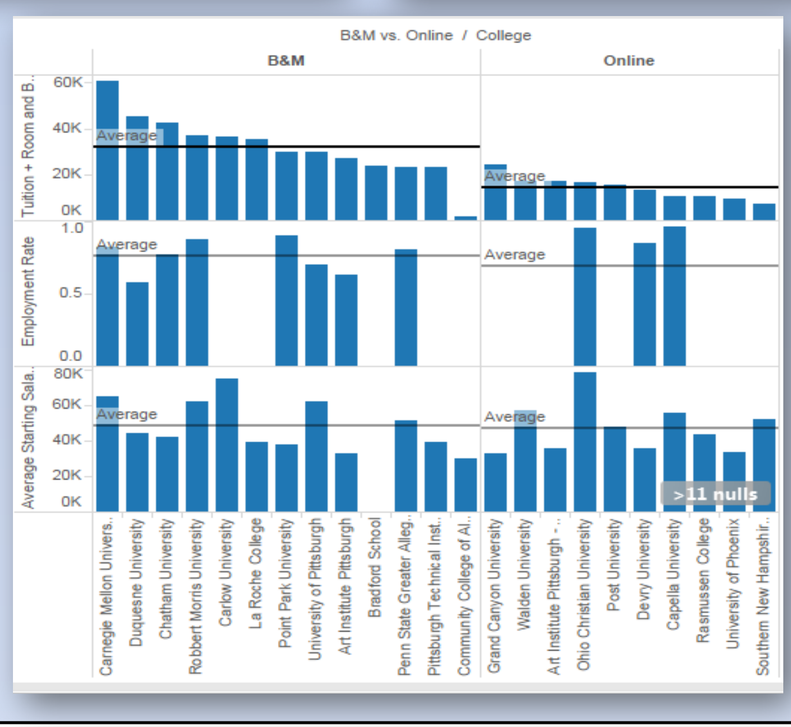












Summary

- There is a moderate, positive, correlation between total cost of tuition + room and board and retention rate and graduation rate.
- Employment rate and Average Starting Salary have a week positive correlation with tuition + room and board.
- Employment rate was difficult to find. This may be due to colleges with low employment placement rates not wishing to share their data.
- Online schools and brick-and-mortar schools tend to have a similar starting salary.
- The largest difference between the two types of colleges was the retention rate. More students tend to come back to brick-and-mortar after their freshmen year, and go on to graduate.

Policy

NATIONAL COLLEGIATE LEVEL POLICY

- Require colleges to publish their data (avg. starting salary, employment rate, etc.)
- Make this data more accessible to prospective students
- Make the information easy to find, even for people that are not good at using computers
- This can only improve college academics and career services for post-graduation (Ex: add an alumni network)

HIGH SCHOOL LEVEL POLICY

- Guidance counselors should still recommend brick-and-mortar as first option for college
- Let students know they can still get a good job at less prestigious brick-and-mortar schools

Correlation Between High School Dropout Rates and Crime in School Districts
Team 1 Central Catholic High School

The Problem:

- Correlation between Allegheny County school district's dropout rates and crime rate in those school districts.

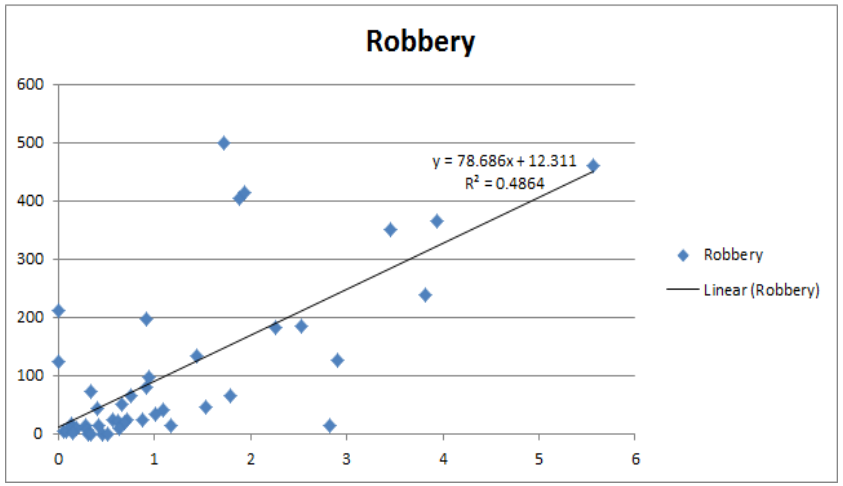
Background Information:

- Last year a team analyzed the correlation between the number of school extracurriculars offered and the school district's crime rate. However, what if young people are not in school in the first place?

Data Sources:

- Crime Rates for school districts were collected from the Allegheny County Sherriff's department
- Dropout Rates for school districts in Allegheny County were collected from the Pennsylvania Department of Education

- Organize and analyze data using Microsoft Excel to find correlations



Correlation to Dropout	R^2 Value
Homicide	0.2232
Sex Related Crimes	0.0803
Robbery	0.4864
Assaults	0.4645
Property Offenses	0.1883
Arson	0.3288
Drug Violation	0.1211

Conclusion:

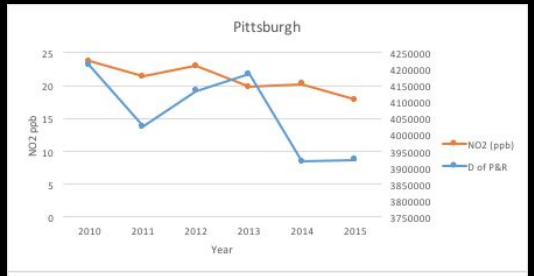
- According to the data we gained and compared. We can suggest that there is no probable cause between drop out rates and crime in the Pittsburgh Area. Our correlations did not show any significant connections across any of our crime statistics.
- It was found that there is a 0.55 R^2 value between dropout rates and economically disadvantaged areas

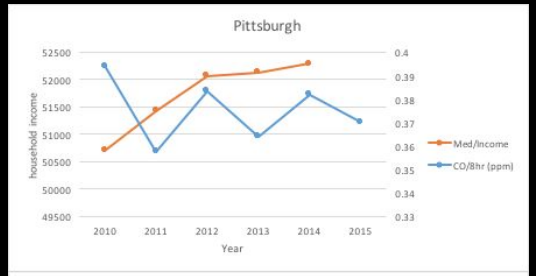
Suggested Solution:

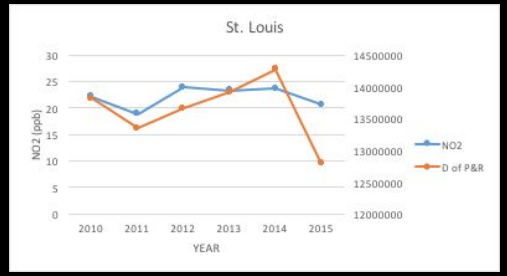
- Although no correlation was found in our data. It is our groups idea that if programs were implemented to improve financial stability. This could remove the drive for crime like theft and other consequential actions to occur.

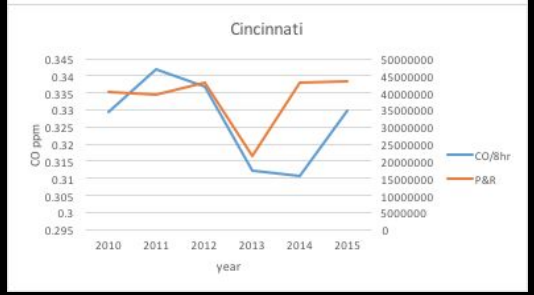
The Department of Park and Recreations Impact on Pollution

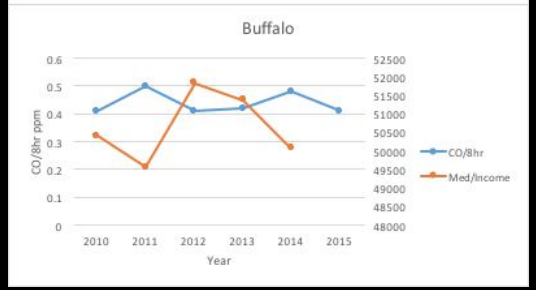
Jackson Kaib, John Lynch, Ryan Nguyen, Timothy Leisenring - Pittsburgh Central Catholic High School











METHODS

BRAIN-STORM

COLLECT & ORGANIZE DATA

VISUALIZE DATA

ANALYZE DATA

- Resources
  - http://pittsburghpa.gov/information/budget
  - https://www.stlouis-mo.gov/government/departments/budget/documents/upload/FY15-ADP-Parks-as-adopted-2.pdf
  - https://www3.epa.gov/airdata/ad_data_daily.html
  - http://www.city.cleveland.oh.us/sites/default/files/forms_publications/2015Budget.pdf
  - https://www.wunderground.com

Analysis

- Changes in the median income of a city does not appear to affect pollutant concentrations
- No2 is concentration is consistently higher than that of co2 in cities

Conclusions

- Increased funding in the department of parks and recreation will not directly result in better air quality

Challenges Faced While Using Data

Inconsistent data- cities inconsistent collection of pollutants made it hard to find reliable data from one location over a five year period

Averages - The five year time table required the creation a lot of data manipulation and file conversions

Multiple Cities - Multiple collection points extending the time it took to collect data

Correlation Between Number of National Merit Scholar semifinalists and income per Household in allegheny county districts

Introduction

We chose to do a study on the impact of wealth in a community on standardized tests scores by relating average income to semifinalists in the National Merit program per school district in Allegheny County

Methods

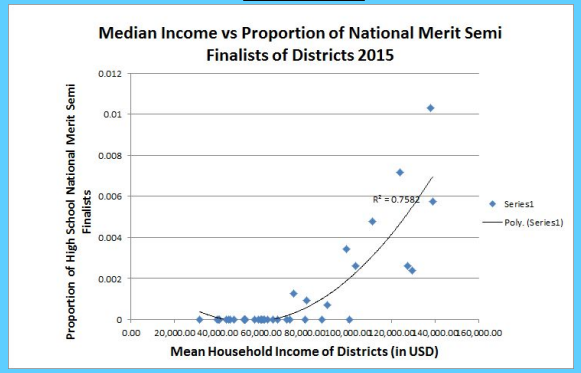
SAT

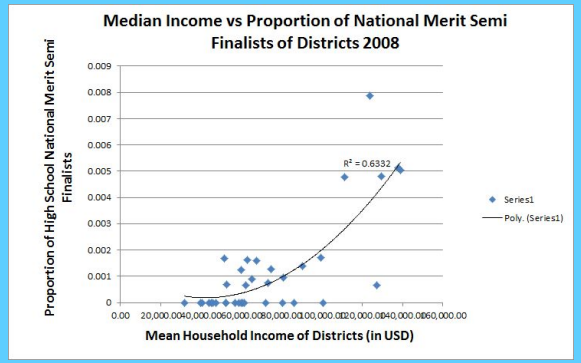
Step 1: Find the number of national merit scholars per school in 2008 and 2015

Step 2: Find population of high schools per district. Find proportion of high schoolers that are merit scholars to eliminate the confounding variable of magnitude.

Step 3: Research average income per household of districts in Allegheny County

Results





Analysis/Conclusions

As we collected data on the number of National Merit scholar semifinalists per school district/ public high school vs. the household incomes of each school district in the years 2008 vs. 2015. Due to the nature of the National Merit scholar program itself, there were a large handful of schools who had little to no semifinalists, but as the income seemed to increase, the number of semifinalists seemed to increase showing a correlation following an exponential line of best fit. In addition, we used this data to make several different conclusions about changes in PA Education policy and attempted to find other contributing factors.

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Allegheny County Public School Districts

Pittsburgh Post-Gazette

Public School Review

ProximityOne Pennsylvania School District Demographic Profiles
http://proximityone.com/pa_sdc.htm

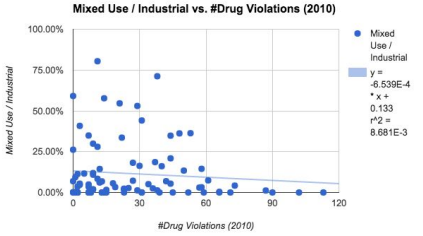
Drug Violations vs. Zoning in Pittsburgh

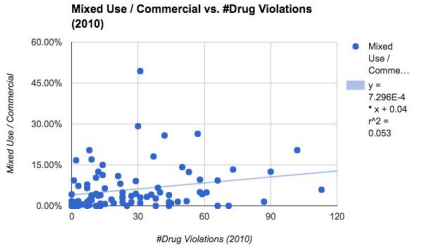
Our Problem

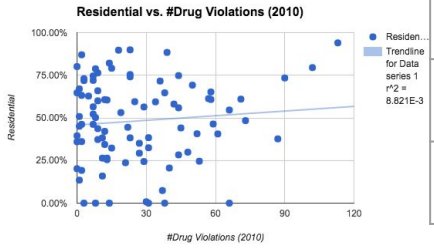
Our team chose to look at the correlation between drug violations and zoning in Pittsburgh. Drug violations are the leading cause of incarceration in the US. Whether or not we agree with incarceration due to drug violations, these cost the US billions annually. In 2010, when this data was collected, the Office of National Drug Control Policy reported that the U. S. federal government spent over $15 billion dollars in 2010 on the "War on Drugs." We wondered if city planners and officials should consider policies to limit drug violations when coming up with zoning to limit the huge amount of money spent on drug violations.

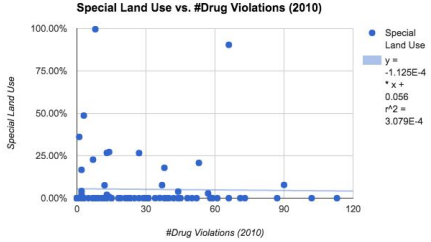
Our Results

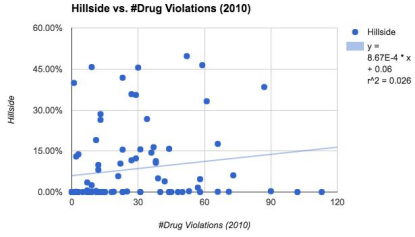
In terms of our results, both commercial zoning and open space are associated with more drug violations, with a p value of less than .05. Open space was incredibly statistically significant, with a p value of approximately .0136. We conclude that these two places are the most statistically significant because they are the places where people are more likely to be caught with drugs, as opposed to Industrial buildings where people are probably less likely to have drugs at work, and residential zoning, where people are less likely to get caught if they have drugs.

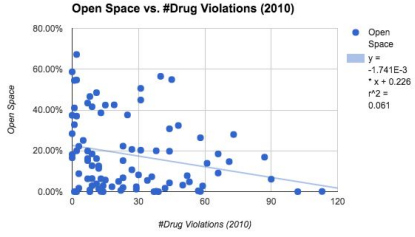












Statistical Significance

Mixed Use/ Industrial	r^2=8.681E-3	p=0.20553490
Special Land Use	r^2= 3.079 E-4	p=0.43877608
Mixed Use/ Commercial	r^2=.053	p=0.02006498
Hillside	r^2=.026	P=0.07651798
Open Space	r^2=.061	P=.01360034
Residential	r^2=8.821E-3	P=0.20369892

Ellis Team 2:
Pei Pei Barth Wu. Genell Jasper, Xinran Zheng, Louise Finnstrom

Reasoning Behind High Infant Mortality Rates in Pittsburgh

Oakland Catholic Team 2
Maura Sheedy, Emma Lowry, Abbey LoBello, Julianne Sorek, Adison Staskiewicz, Susana Liao, Julia Lewand

BACKGROUND

"Regional Insights: A poor outlook for babies in Pittsburgh"

"Racial divide persists in Pittsburgh's infant mortality rate"

"[U.S. News and World Report's annual listing of best hospitals for 2015-2016]... cites UPMC's top 10 ranking in six medical specialties: ear, nose and throat; gastroenterology and GI surgery; orthopedics; gynecology (Magee-Womens Hospital); psychiatry; and rheumatology"

PROBLEM

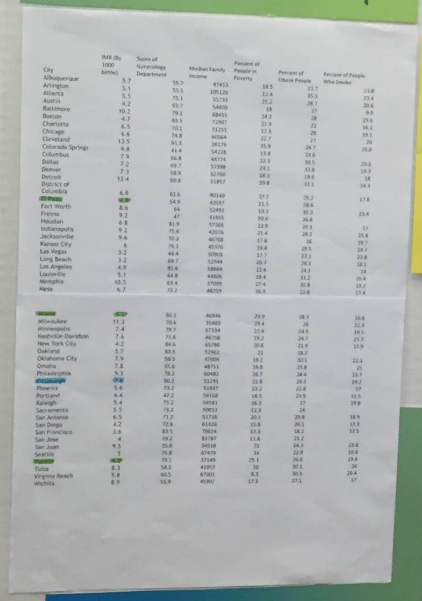
The abnormally high infant mortality rates in Pittsburgh, a well developed city with award winning medical facilities.

We find this an important socioeconomic issue currently due to the fact that Pittsburgh boasts prestigious medical care and was even ranked Most Livable City of 2014. How can an area named the most livable city also have a very high infant mortality rate?

DATA SET

- 2008-2012 Allegheny County infant mortality
- 2003-2007 Allegheny County infant mortality
- Obesity and Infant Death in Pittsburgh as one of cities
- Healthy Start study featuring Pittsburgh as one of cities
- Highest IMR Cities Hospital Ranking
- Magee Women's Hospital Ranking
- Pittsburgh Regional Hospital
- Country rates overall
- Best Hospitals for Gynecology rate
- Best Hospitals for infant mortality rate

SPREADSHEET



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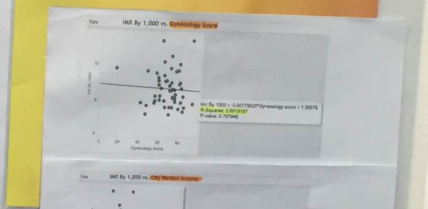
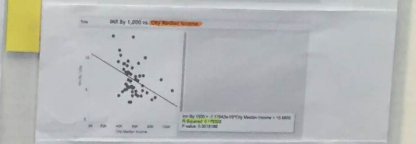
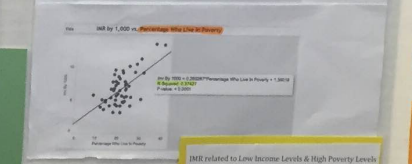
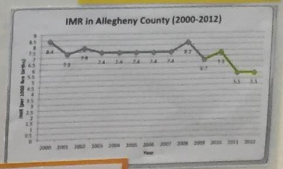


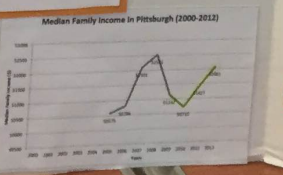




IMR related to Low Income Levels & High Poverty Levels



Increase in Income Parallels Drop in IMR (2009-2012)



Causes of IMR in Pittsburgh

CONCLUSION

Based on our findings, infant mortality rates plummeted from 2009-2012, paralleling the increase in the median income during the period. Thus, it is necessary to raise the income of the city residents to combat infant mortality. Ways to reduce poverty and increase income, that specifically improve the fate of newborns include:

- Advocating for mandatory paid maternity leave and sick days for mother so that mothers can stay healthy and able to work to support themselves and their babies.
- Endorsing a longer maternity leave to ensure maternal care for newborns and infants.
- Supporting pay equity for females to prevent poverty.
- Providing access to preschool and daycare for disadvantaged children to provide them with the beginnings of a safe and healthy life.

CHALLENGES

1) Finding data from years past 2012 was extremely difficult because such data sets do not exist on the sites we used within Allegheny County.
2) Finding specific characteristics of mothers from the hospitals in the area due to patient confidentiality.
3) Determining one specific recommendation or solution to combat the issue due to the many different socioeconomic and other factors involved in the complexity of infant mortality.

EFFECT OF GENTRIFICATION ON CRIME

Lidia Signorella, Annie Trainer, Mary Cumpston, Mulin Chen, Lauren Clutter, Cassie Moats, Gbemisola Ogunyemi, Kennedi Wade | **Oakland Catholic High School**

INTRODUCTION

Research Question

Do neighborhoods that have been gentrified in the Pittsburgh area (i.e. East Liberty and Lawrenceville) have lower crime rates compared to Pittsburgh overall?

Background Information

- **Gentrification** is defined as the revitalization of old and deteriorating neighborhoods, specifically by improving housing and general living conditions, which in turn brings an influx of middle-class or affluent people and new businesses to the areas.
- → **Factors that determine gentrification** are: a change in population, emergence of new businesses, and an increase in the median income and property values to define gentrification in a neighborhood
  - Note: Middle class income ranges from $25,000-$100,000

Methods

1 Collect data
- US Census information from 1990, 2000, 2010
- The Pittsburgh Bureau of Police Annual Reports

2 Pinpoint time period of the beginning gentrification
- Lawrenceville: 2006
- East Liberty: 1999
- (Control) Homewood: never occured

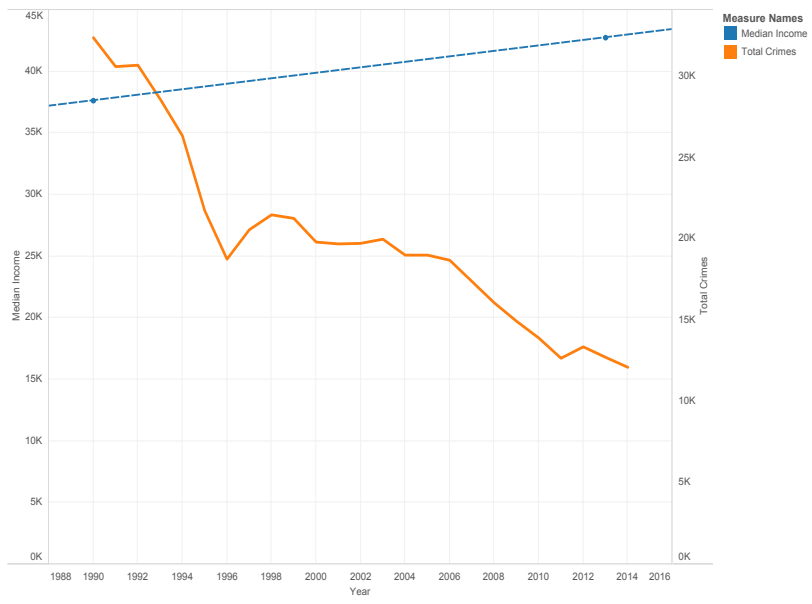
3 Visualize data using Tableau
- compare median income and crime rate yearly

4 Analyze data to determine effects
- Compare total crimes yearly from before to gentrification process

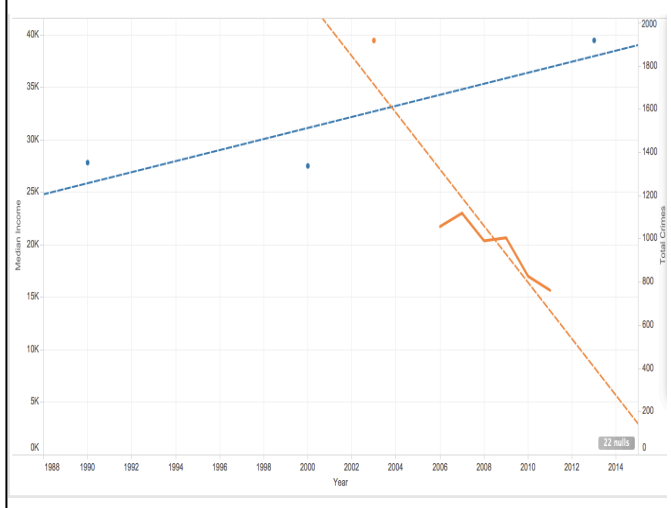
Data: Crime vs. Median Income

*all dashed lines are trend lines

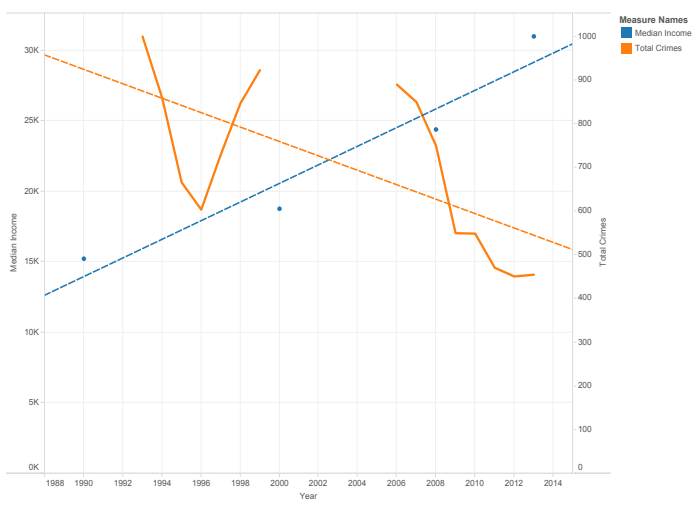
For Pittsburgh Overall



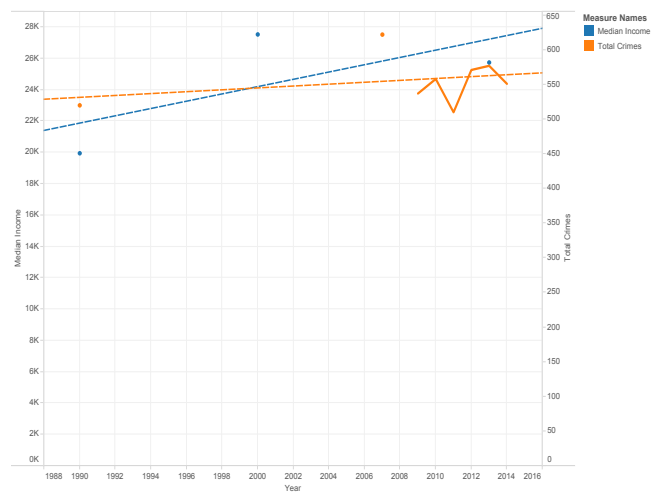
Crime vs. Median Income Lawrenceville



Crime vs. Median Income East Liberty



Crime vs. Median Income Homewood



Analysis and Conclusions

- Upon analysis of the visualizations, an obvious correlation between gentrification and decreased neighborhood crime exists, proving the value of gentrification.
- While the median income of citizens in both Lawrenceville, East Liberty, and Homewood increased, only crime decreased in Lawrenceville and East Liberty as they underwent gentrification.
- As crime in Pittsburgh decreased, there is a possible correlation between gentrification of Lawrenceville and East Liberty to an overall decrease in crime in Pittsburgh.

Challenges Faced While Using Data

- Inability to access the Pittsburgh Bureau of Police Annual Report prior to 2007
- The lack of consistent data involving past property values in neighborhoods

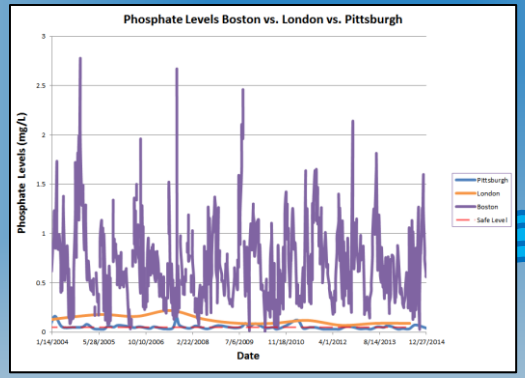
From Rivers to Pipes: The Story of Pittsburgh's Water Quality

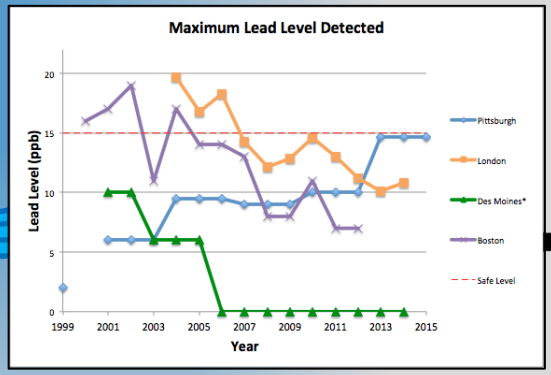
How does Pittsburgh's overall water quality compare to other cities worldwide?

Looking at water quality in Pittsburgh, London, Des Moines, and Boston

Drinking water quality: Lead levels

River water quality: Phosphate levels





Challenges

- Availability of applicable data that tells our story
- Inconsistent water quality reporting
- Identification of story

Summary

- Pittsburgh's nitrate and phosphate levels are safe and comparably better to other cities.
- However, even with advancements in modern technology, lead levels in the drinking water of Pittsburgh is reaching a dangerous level and are not improving at the rate other cities.

Predictions

Lead Level (ppb) = -1272.31 + 0.64(year)

According to our prediction, if this trend continues we expect the lead levels in Pittsburgh to reach 24.33 ppb by the year 2016 which is far above the recommended levels.

Recommendations

- Des Moines has added phosphates to the water which coats the pipes to prevent lead from leaching.
- Pittsburgh could follow Des Moines' protocol by treating water and implementing a corrosion control program.
- The City of Pittsburgh could replace pipes that are increasing the lead levels in our drinking water.

Race and Number of Drug Arrests

Introduction

- What exactly is the correlation between black populations and drug incarceration?
- In order to answer this question, we used The New Jim Crow and multiple databases.
- We expected to find that the correlation between blacks and drug incarceration rates to be positive but we found that for Pittsburgh the correlation is very weak.

Neighborhood	% Black	% White	Drug Arrests (20	Population		Drug Arrests per
Bon Air	0%	100%	14	936	0.014957265	1495.726496
West End	0.50%	97%	14	254	0.05511811	5511.811024
Wind gap	0.90%	98.30%	3	1,369	0.002191381	219.138057
Carrick	3%	90%	51	1,676.00	0.030429594	3042.959427
Central Oakland	3.60%	83.10%	27	4,928	0.005478896	547.8896104
Banksville	4.40%	81.60%	7	3,228	0.002168525	216.8525403

Methods

Gathering Data

We looked at 30 different neighborhoods of Pittsburgh. From each town we collected data on Median Income, Demographics, Drug Arrests, and Population.

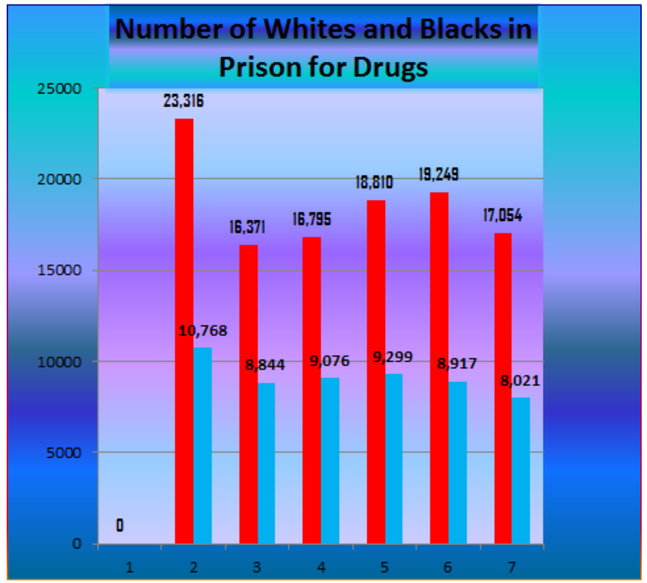
Hypothesis

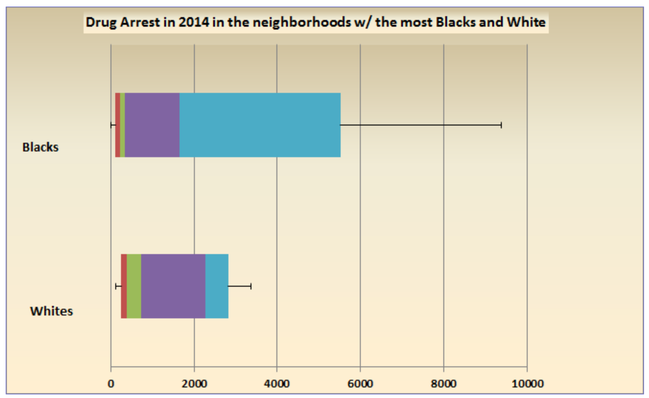
We expected a positive correlation between the number of blacks in a neighborhood and drug arr ts.

Analysis

That throughout the years 1995 to 2012 there was a dramatic change in how black people were arrested and treated to how white people were arrested and treated. Also that the data doesn't really match to the New Ji Crow.

Presentation



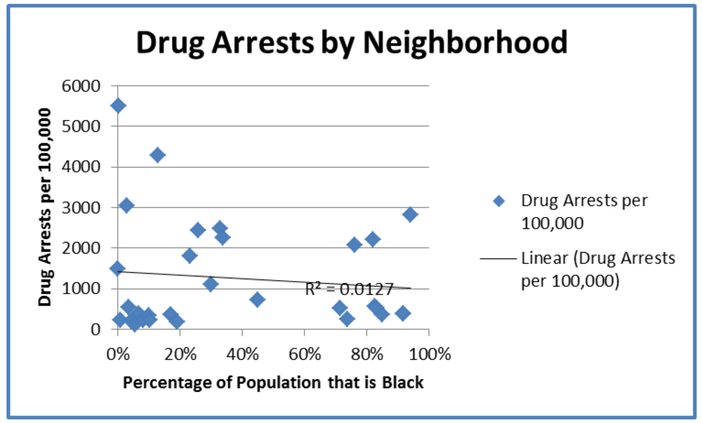


~Hypothesis~

Based on our research from *The New Jim Crow*, we learned that blacks have higher drug incarceration rates than whites.
Black people make up roughly 13% of the United States population, and white people make up 64%. "Black people make up 40% of the prison population, and white people 39%. Therefore, even though there are roughly five times as many white people as black people in this country, blacks and whites are incarcerated in equal numbers. But the fact that black people are incarcerated five times as frequently as white people does not mean black people commit five times as many crimes .
There is a stereotypical belief that black commit more crimes, but this is not the case. "In fact, studies indicate that people become increasingly harsh when an alleged criminal is darker and more stereotypically black. They are more lenient when the accused is lighter and appears more stereotypically white."(Alexander 107) If a white and black were to commit a similar crime a black person will more likely be sentenced to prison and the white person is more likely to receive probation or community service. " black people and white people smoke marijuana at similar rates, yet black people are 3.7 times as likely to be arrested for marijuana possession." (Farbota 2016) There is a stereotypical belief that black commit more crimes, but this is not the case.

Conclusion and Issues

- **The New Jim crow is a nationally based research but we are focusing on Pittsburgh.**
- **We really don't know how many black people got arrested for drugs--we just know how many people got arrested in general**
- **The way we picked the neighborhoods could have had more structure**



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Impact Cell Phone Signals Have on Honey Bees

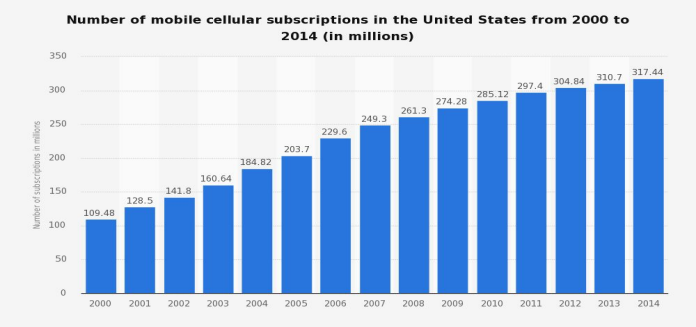
Introduction

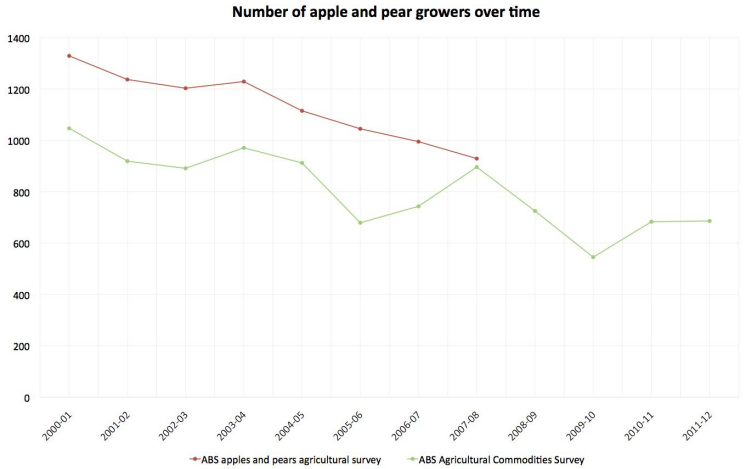
Cell phone frequencies can interfere with honey bee navigation. Without a functioning navigation system, honey bees become disoriented and cannot return to their hives, which decreases their population as they cannot survive alone. A decrease in honey bee population results in a decrease in flora pollination, eventually causing a decline in plant life heavily dependent on honey bee pollination.

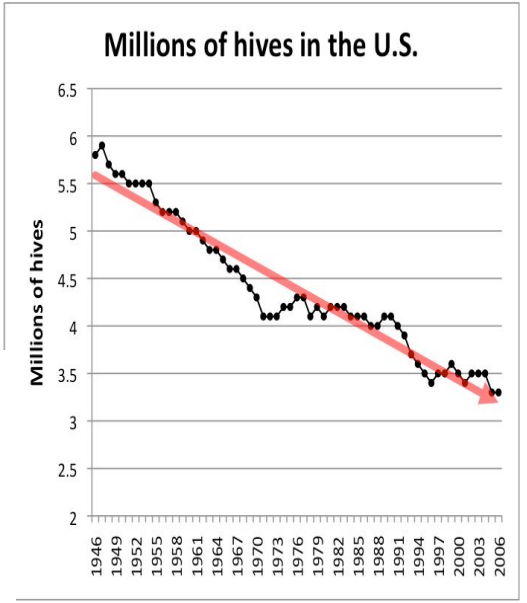
Conclusions/Analysis

In 2000s, the use of cell phones throughout the US skyrocketed. At the same time, the bee population decreased by 60%, whereas it had only fluctuated by 3% in the previous 10 years. Flora population dependent on honeybee pollination, including apples, onions, almonds, broccoli, and carrots, have decreased proportionally to the increase of cell phone use.

Visualizations







References

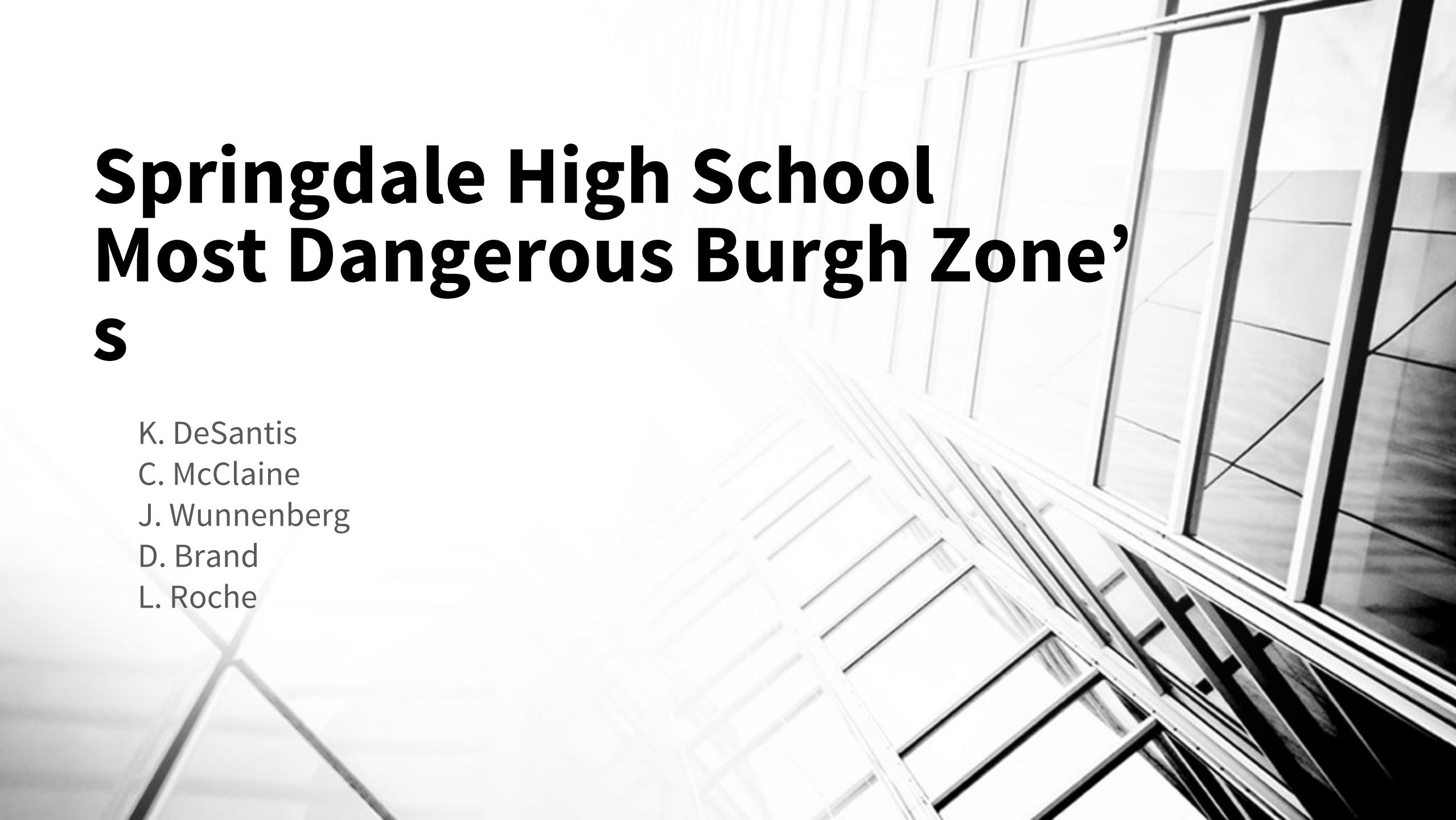
Google Trends
Congressional Research Service
-Renee Johnson
Pew Research Center
-Lee Rainie
-http://apal.org.au/statistics/
-Statista

Ryan Vent, Courtney Phoennik, Rachel Schuman, Jake Ponikvar, and Katie Kenawell

South Fayette High School

Springdale High School Most Dangerous Burgh Zone’s

K. DeSantis
C. McClaine
J. Wunnenberg
D. Brand
L. Roche



OUR QUESTION?

- WHAT ARE THE SAFEST COMMUNITIES FOR TOURISTS/REGULARS TO VISIT IN THE CITY OF PITTSBURGH?

PITTSBURGH IS DIVIDED INTO **6 ZONES**

ZONE 1
Allegheny Center
Allegheny West
Brighton Heights
California-Kirkbride
Central North Side
Chateau
East Allegheny
Fineview
Manchester
Marshall-Shadeland
Northview Heights
North Shore
Perry North
Perry South
Spring Garden
Spring Hill-City View
Summer Hill
Troy Hill

ZONE 2
Bedford Dwellings
Bluff
Central Business District
Central Lawrenceville
Crawford Roberts
Lower Lawrenceville
Middle Hill
Polish Hill
Strip District
Terrace Village
Upper Hill
Upper Lawrenceville

ZONE 3
Allentown
Arlington
Arlington Heights
Beltzhoover
Bonair Carrick
Duquesne Heights
Knoxville Mount
Oliver City Mount
Washington
Overbrook Saint
Clair South Shore
South Side Flats
South Side Slopes

ZONE 4
Central Oakland
Glen Hazel
Greenfield Hays
Hazelwood
Lincoln Place New
Homestead North
Oakland Point
Breeze Point
Breeze North
Regent Square
Shadyside South
Oakland Squirrel
Hill North Squirrel
Hill South
Swisshelm Park
West Oakland

ZONE 5
Central Oakland
Glen Hazel
Greenfield Hays
Hazelwood
Lincoln Place New
Homestead North
Oakland Point
Breeze Point
Breeze North
Regent Square
Shadyside South
Oakland Squirrel
Hill North Squirrel
Hill South
Swisshelm Park
West Oakland

ZONE 6
Banksville
Beechview
Brookline
Chartiers City
Crafton Heights
East Carnegie
Elliott Esplen
Fairywood
Oakwood
Ridgemont
Sheraden West
End Westwood
Windgap

WHAT WE DID

- PITTSBURGHPA.GOV
  - OUR SOURCE
- TOOK THE DATA FROM PART 1 CRIMES RECORDED 2014
- SPLIT UP THE PART 1 CRIMES
  - HOMICIDE
  - RAPE
  - ROBBERY/BURGLARY/THEFT
- ANALYZED THE DATA FOR EACH ZONE AND PUT THEM INTO GRAPHS TO SEE WHICH ZONES HAD THE MOST PART 1 CRIMES
  - AGGRAVATED ASSAULT
  - MOTOR VEHICLE THEFT

ADDITONAL DATA

Zone 1

Part 1 Crimes	Allegheny Center	Allegheny West	Brighton Heights	California-Kirkbride	Central North Side	Allegheny	Fineview	Manchester	Shadeland	Northview Heights	North Shore	Perry North	Perry South	Spring Garden	City View	Summer Hill	Troy Hill	Overall Sum
Homicide	0	0	1	0	0	1	1	0	1	4	0	1	0	0	1	0	1	11
Rape	1	0	0	0	3	1	0	1	1	1	1	0	7	0	3	0	0	19
Robbery/Burglary/Theft	85	38	204	35	147	199	24	61	166	69	97	100	104	29	55	15	76	1504
Aggravated Assault	9	2	28	8	22	33	13	18	36	5	7	18	59	5	21	3	7	294
Motor Vehicle Theft	3	2	14	0	5	9	2	3	11	4	6	13	12	0	6	0	3	93
Arson	1	1	4	2	2	1	1	1	5	1	1	4	10	2	2	1	2	41

Zone 2

Part 1 Crimes	Dwellings	Bluff	Business	Lawrenceville	Roberts	Lawrenceville	Middle Hill	Polish Hill	Strip District	Terrace Village	Upper Hill	Lawrenceville	Overall Sum
Homicide	2	0	0	0	1	0	2	0	1	0	2	0	8
Rape	1	4	7	3	1	0	4	2	1	0	0	1	24
Robbery/Burglary/Thef	42	98	802	124	81	86	65	21	122	56	36	59	1592
Aggravated Assault	17	23	35	4	15	4	16	0	9	8	4	5	140
Motor Vehicle Theft	3	8	14	5	5	3	5	5	8	4	3	1	64
Arson	0	1	2	0	1	4	2	0	0	0	2	1	13

Zone 3

Part 1 Crimes	Allentown	Arlington	Arlington Heights	Beltzhoover	Bonair	Carrick	Duquesne Heights	Knoxville	Mount Oliver	Mount Washington	Overbrook	Saint Clair	South Shore	South Side Flats	South Slide Slopes	Overall Sum
Homicide	1	0	0	2	0	2	0	5	0	0	0	0	0	0	1	11
Rape	0	1	0	0	0	3	0	0	0	2	0	1	0	0	0	7
Robbery/Burglary/Theft	107	39	15	62	6	326	37	152	11	279	89	2	39	651	134	1949
Aggravated Assault	20	7	9	21	2	64	2	47	1	27	9	1	7	51	16	284
Motor Vehicle Theft	5	3	0	7	4	24	2	13	0	16	4	1	1	31	13	124
Arson	7	2	1	8	0	8	1	5	2	4	1	0	0	6	4	49

Zone 4

Part 1 Crimes	Central Oakland	Glen Hazel	Greenfield	Hays	Hazelwood	Lincoln Place	New Homestead	North Oakland	Point Breeze	Point Breeze North	Regent Square	Shadyside	South Oakland	Squirrel Hill North	Squirrel Hill South	Swisshelm Park	West Oakland	Overall Sum
Homicide	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Rape	5	1	1	0	0	0	0	2	1	0	0	0	0	0	1	0	2	13
Robbery/Burglary/Theft	201	14	108	8	115	40	2	189	115	89	16	450	95	120	255	12	105	1934
Motor Vehicle Theft	6	7	3	1	32	4	0	4	3	7	0	15	15	0	8	0	8	113
Aggravated Assault	1	1	6	0	6	3	0	4	5	3	0	23	3	4	9	1	8	77
Arson	3	0	2	0	8	0	2	0	0	0	0	0	2	0	2	0	1	20

Zone 5

Part 1 Crimes	Bloomfield	East Hills	East Liberty	Friendship	Garfield	Highland Park	Homewood North	Homewood South	Homewood West	Larimer	Lincoln-Lemington	Morningside	Stanton Heights	Overall Sum
Homicide	1	1	3	0	5	0	4	7	1	2	2	0	1	27
Rape	2	1	4	0	0	2	5	2	0	0	3	0	0	19
Robbery/Burglary	268	68	403	63	97	148	167	135	56	100	282	47	39	1873
Agg Assault	21	15	37	3	20	16	51	50	8	36	44	3	2	306
Motor Vehicle Th	14	14	22	8	7	13	19	16	4	11	25	1	3	157
Arson	2	4	2	2	1	5	10	12	4	3	1	2	0	48

Zone 6

Part 1 Crimes	Banksville	Beechview	Brookline	Chartiers City	Crafton Heights	East Carnegie	Elliot	Esplen	Fairywood	Oakwood	Ridgemont	Sheraden	West End	Westwood	Windgap	Overall Sum
Homicide	0	0	1	0	1	0	2	1	0	0	0	3	1	0	1	10
Rape	1	2	1	0	4	0	2	0	1	0	0	0	1	0	0	12
Robbery/Burglary/Theft	57	155	216	10	56	8	74	25	12	19	15	214	21	59	11	952
Agg Assault	1	18	31	4	17	0	12	1	13	1	0	32	5	1	2	138
Motor Vehicle Theft	0	4	15	2	7	0	2	1	2	0	0	17	1	1	1	53
Arson	1	1	1	0	0	0	1	0	1	0	0	3	0	0	1	9

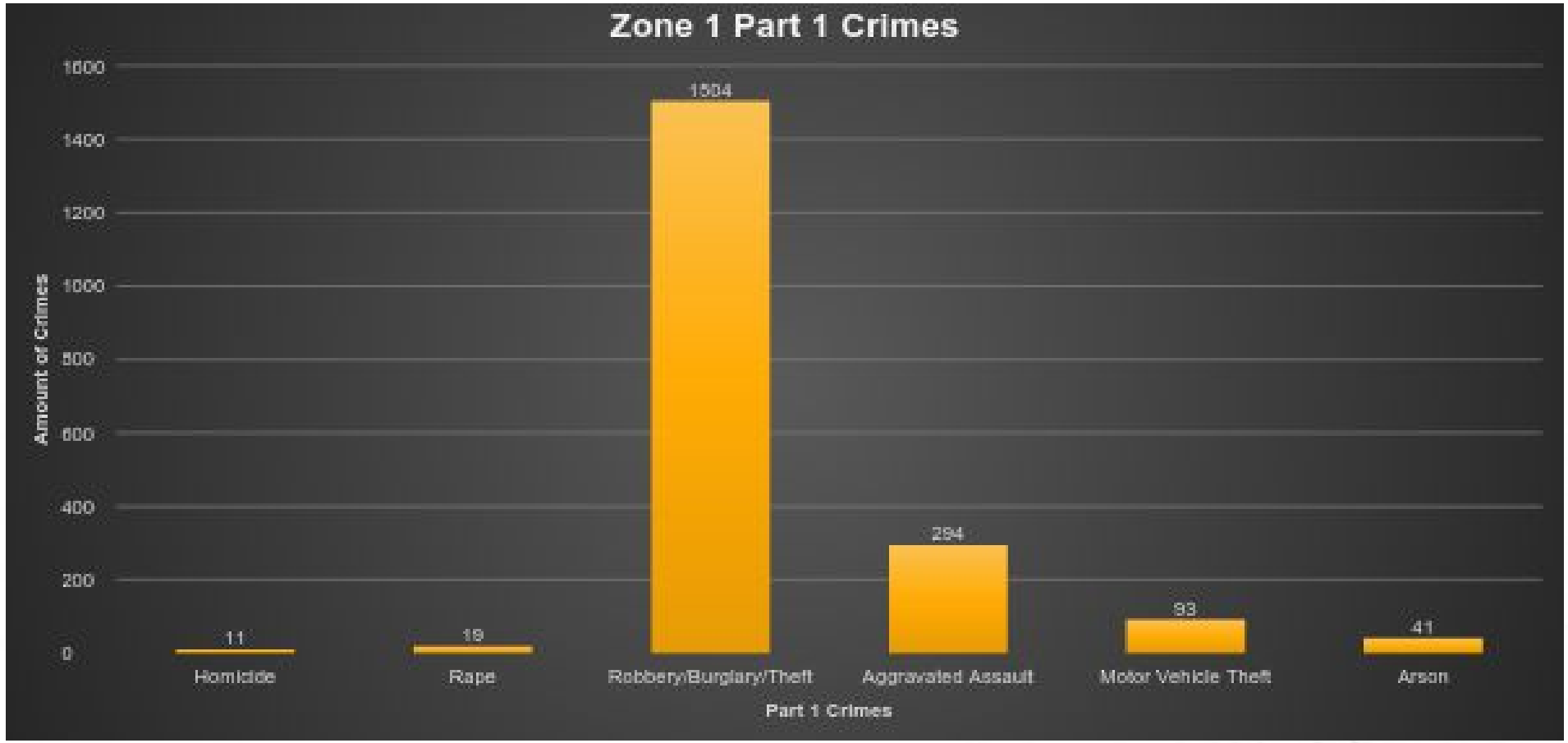
Conclusion

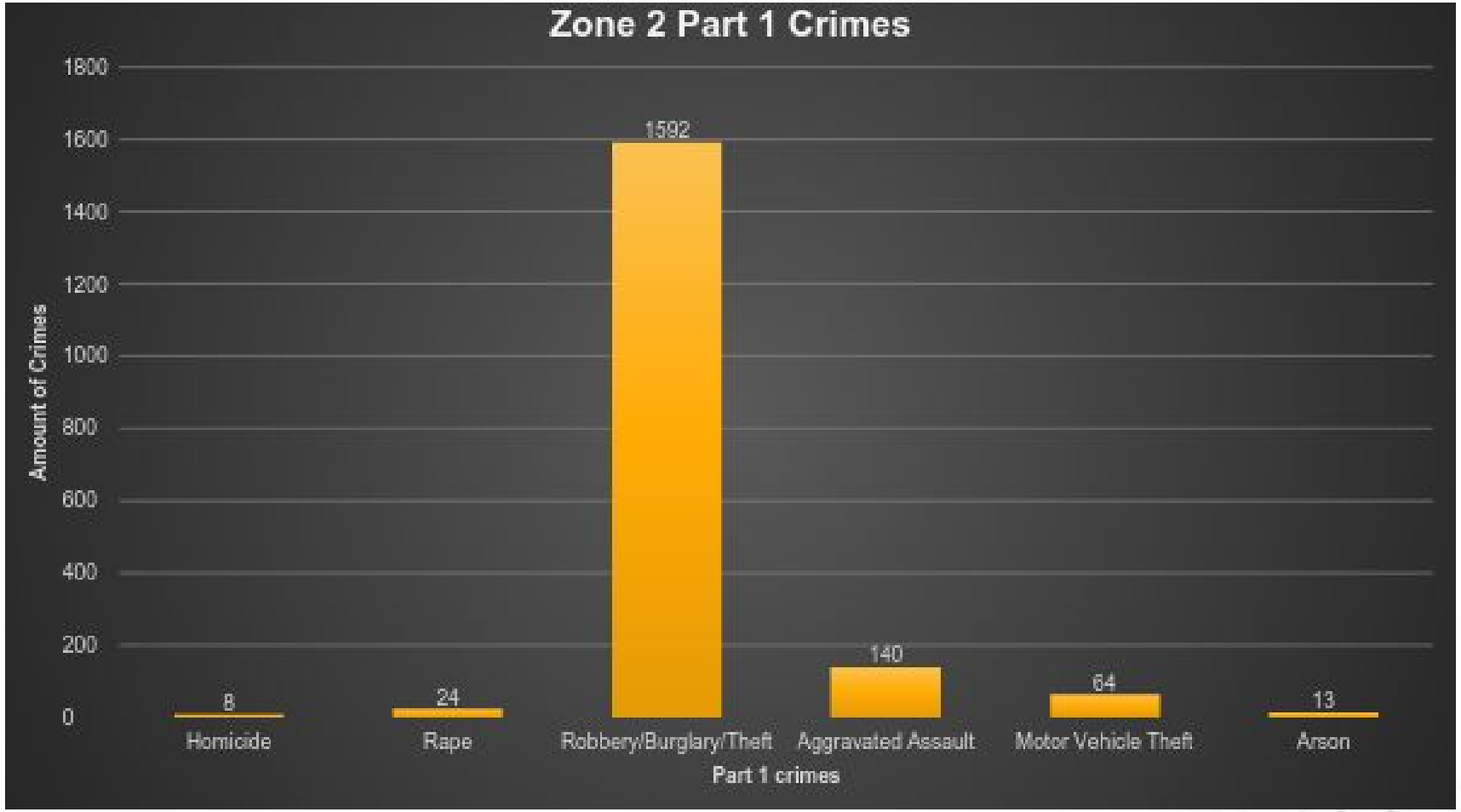
- **Zone 5** has the highest amount of **Overall** Part 1 Crimes in 2014
- **Zone 5** has the highest amount of **Homicides** in 2014
- **Zone 2** has the highest amount of **Rapes** in 2014
- **Zone 3** has the highest amount of **Robbery/Burglary/Theft** in 2014
- **Zone 5** has the highest amount of **Aggravated Assault** in 2014
- **Zone 5** has the highest amount of **Motor Vehicle Theft** in 2014
- **Zone 3** has the highest amount of **Arson** in 2014

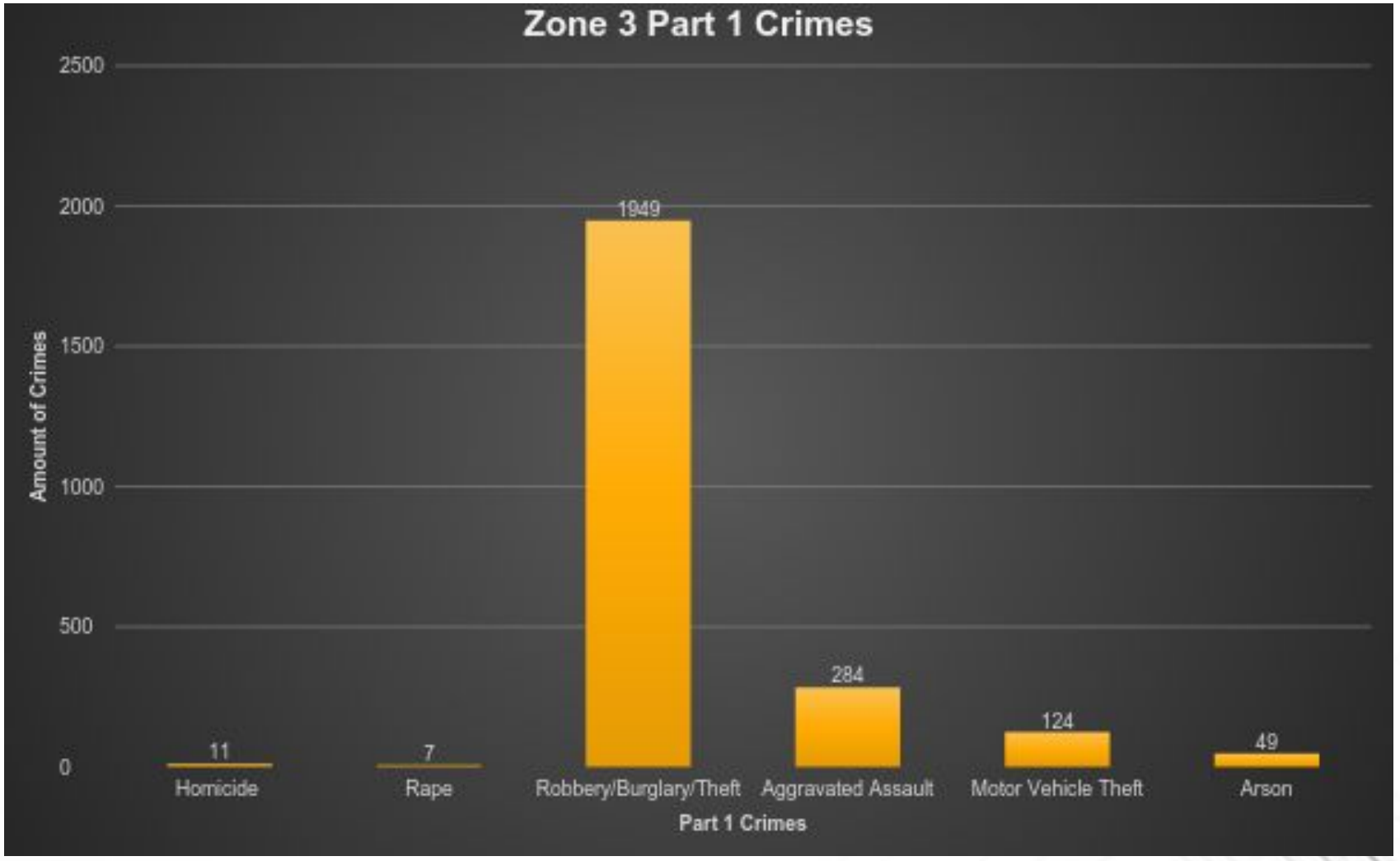
Conclusion (Cont.)

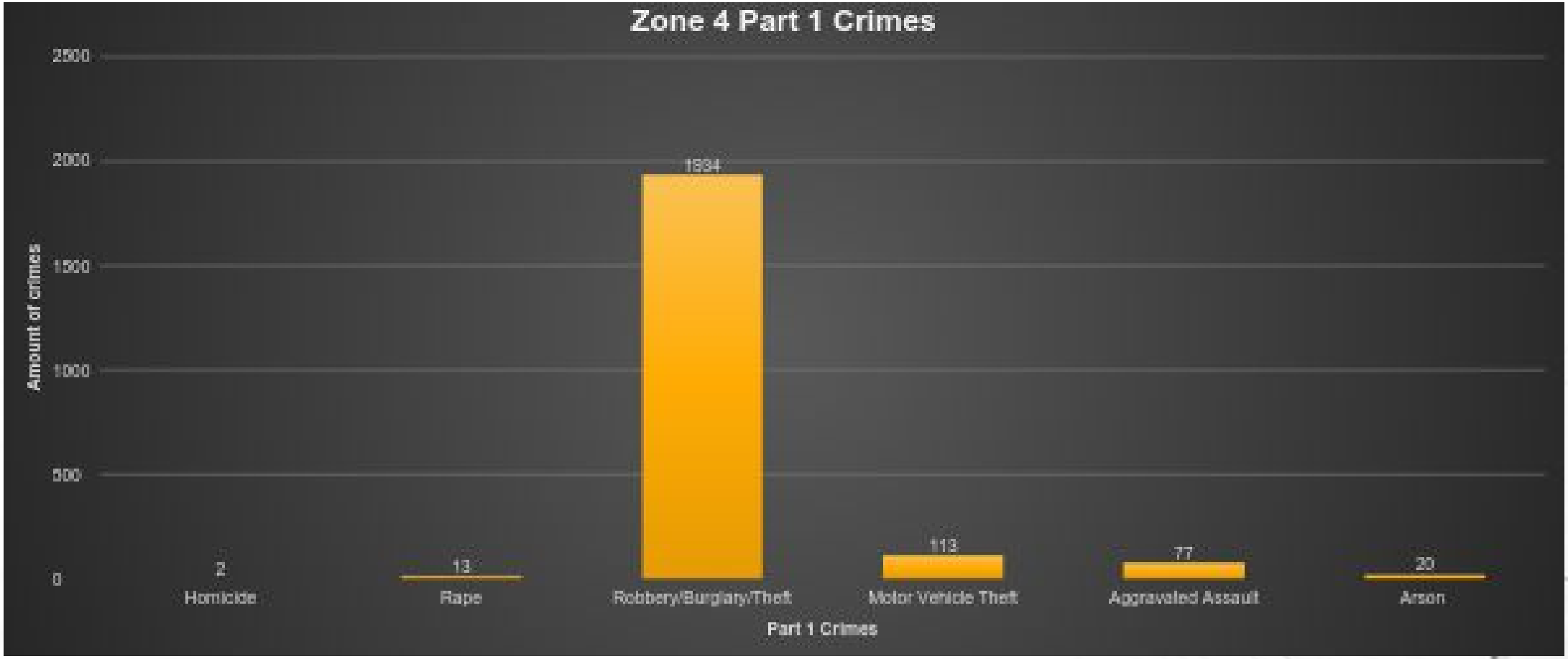
- **Zone 6** has the least amount of **Overall** Part 1 Crimes in 2014
- **Zone 4** has the least amount of **Homicides** in 2014
- **Zone 3** has the least amount of **Rapes** in 2014
- **Zone 6** has the least amount of **Robbery/Burglary/Theft** in 2014
- **Zone 4** has the least amount of **Aggravated Assault** in 2014
- **Zone 6** has the least amount of **Motor Vehicle Theft** in 2014
- **Zone 6** has the least amount of **Arson** in 2014

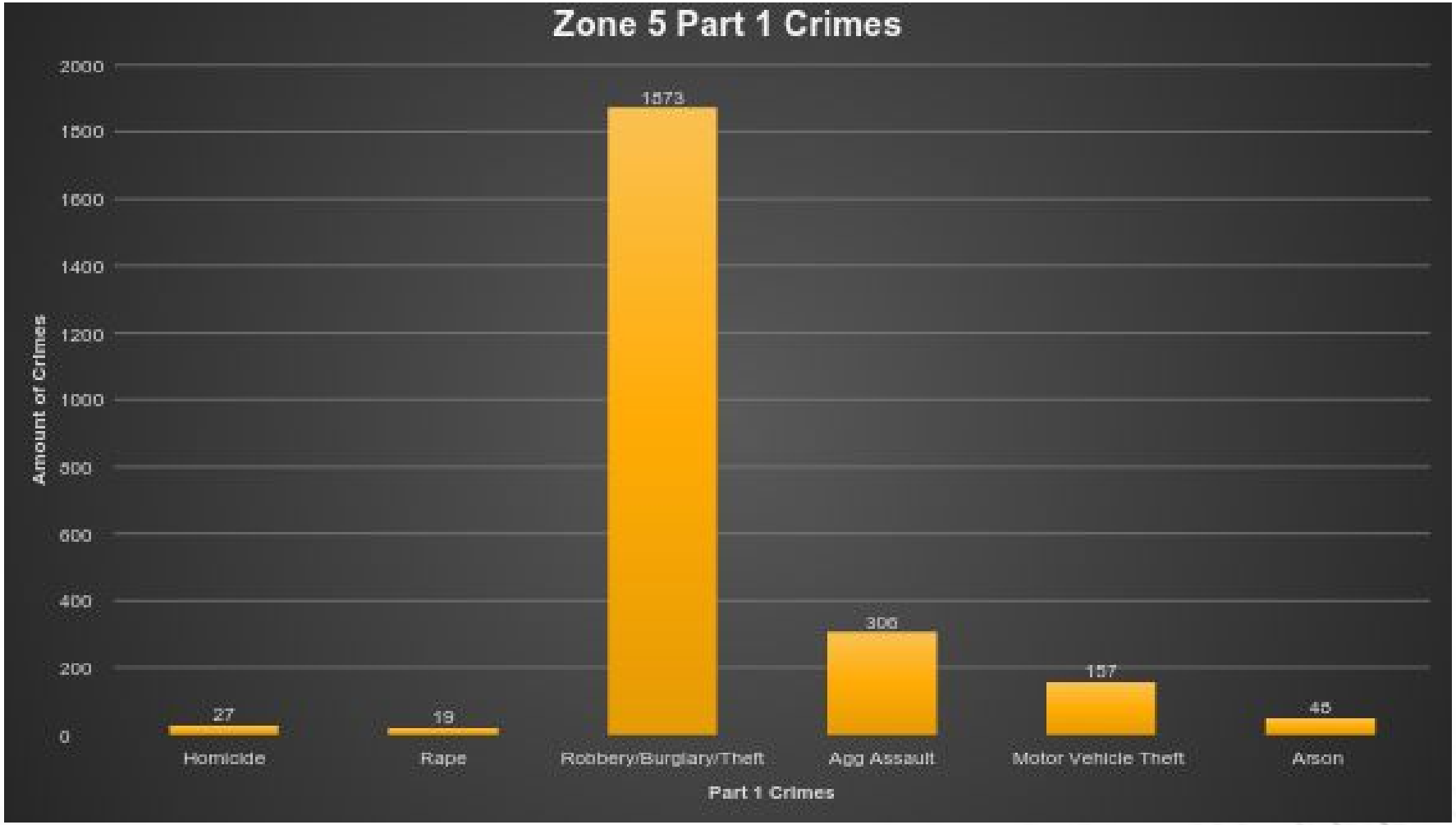
In Conclusion, the safest areas to visit in Pittsburgh are in Zone 6!

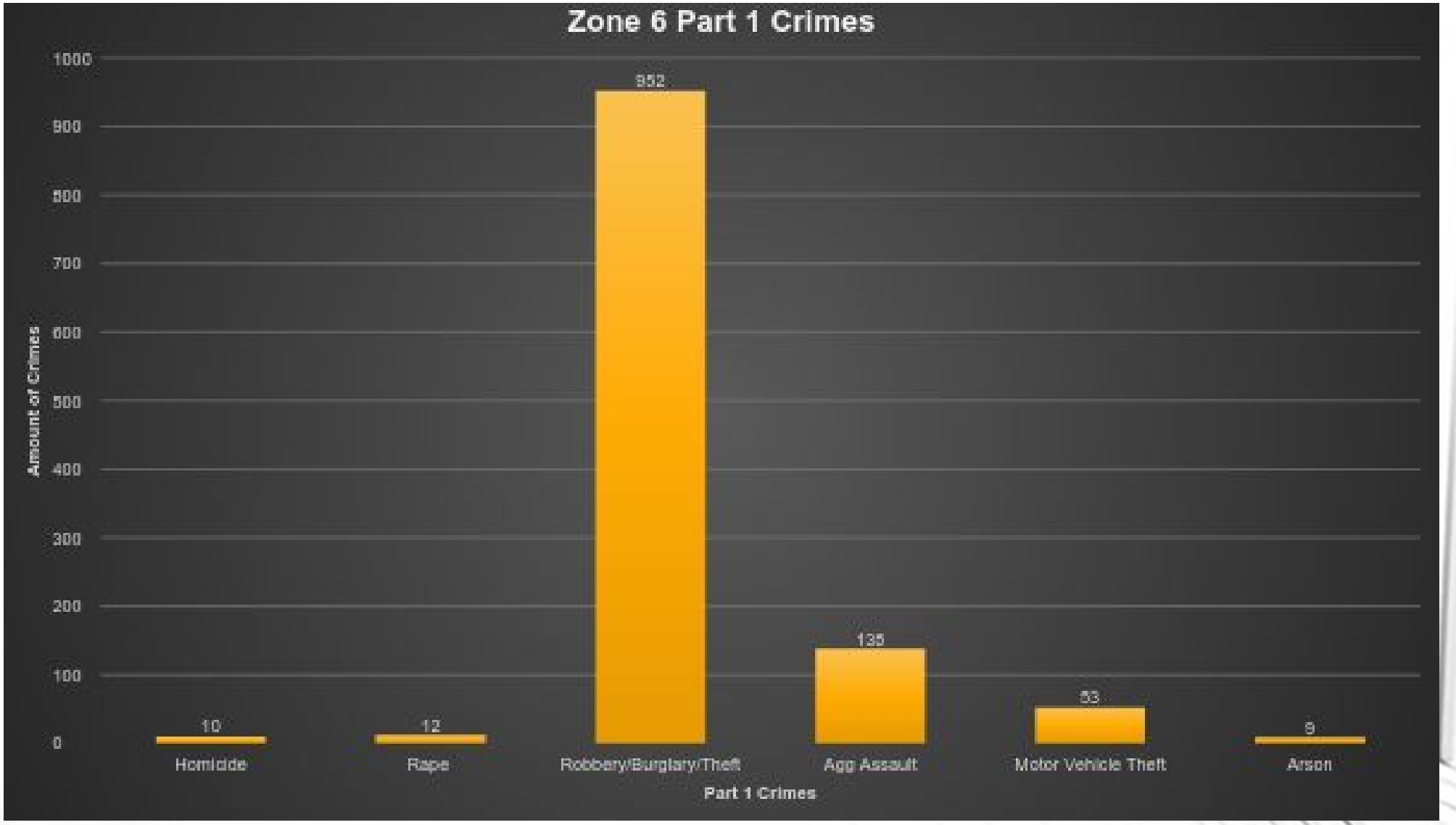

Zone 1 Part 1 Crimes
1600
1400
1200
1000
800
600
400
200
0
Amount of Crimes
11
19
1504
294
93
41
Homicide
Rape
Robbery/Burglary/Theft
Aggravated Assault
Motor Vehicle Theft
Arson
Part 1 Crimes


Zone 2 Part 1 Crimes
1800
1600
1400
1200
1000
800
600
400
200
0
Amount of Crimes
8
24
1592
140
64
13
Homicide
Rape
Robbery/Burglary/Theft
Aggravated Assault
Motor Vehicle Theft
Arson
Part 1 crimes


Zone 3 Part 1 Crimes
2500
2000
1500
1000
500
0
Amount of Crimes
11
7
1949
284
124
49
Homicide
Rape
Robbery/Burglary/Theft
Aggravated Assault
Motor Vehicle Theft
Arson
Part 1 Crimes


Zone 4 Part 1 Crimes
2500
2000
1500
1000
500
0
Amount of crimes
2
13
1834
113
77
20
Homicide
Rape
Robbery/Burglary/Theft
Motor Vehicle Theft
Aggravated Assault
Arson
Part 1 Crimes


Zone 5 Part 1 Crimes
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Amount of Crimes
27
19
1573
306
157
45
Homicide
Rape
Robbery/Burglary/Theft
Agg Assault
Motor Vehicle Theft
Arson
Part 1 Crimes


Zone 6 Part 1 Crimes
1000
900
800
700
600
500
400
300
200
100
0
Amount of Crimes
10
12
952
135
53
9
Homicide
Rape
Robbery/Burglary/Theft
Agg Assault
Motor Vehicle Theft
Arson
Part 1 Crimes

Allegheny County Overdoses

A report by Alyssa Arce

Introduction

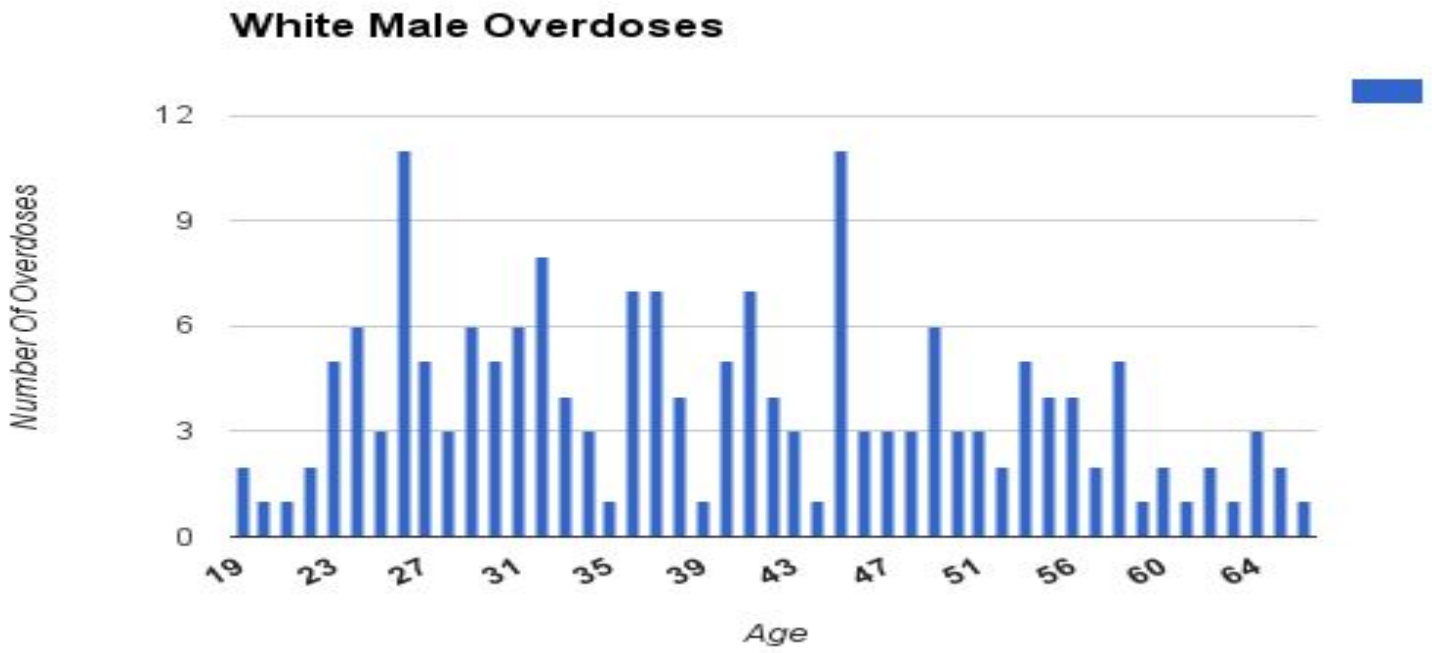
What is the comparison of deaths caused by overdoses in 2013 to 2014 of people with combined characteristics, gender, race and age in the Allegheny County?

Allegheny County Overdoses

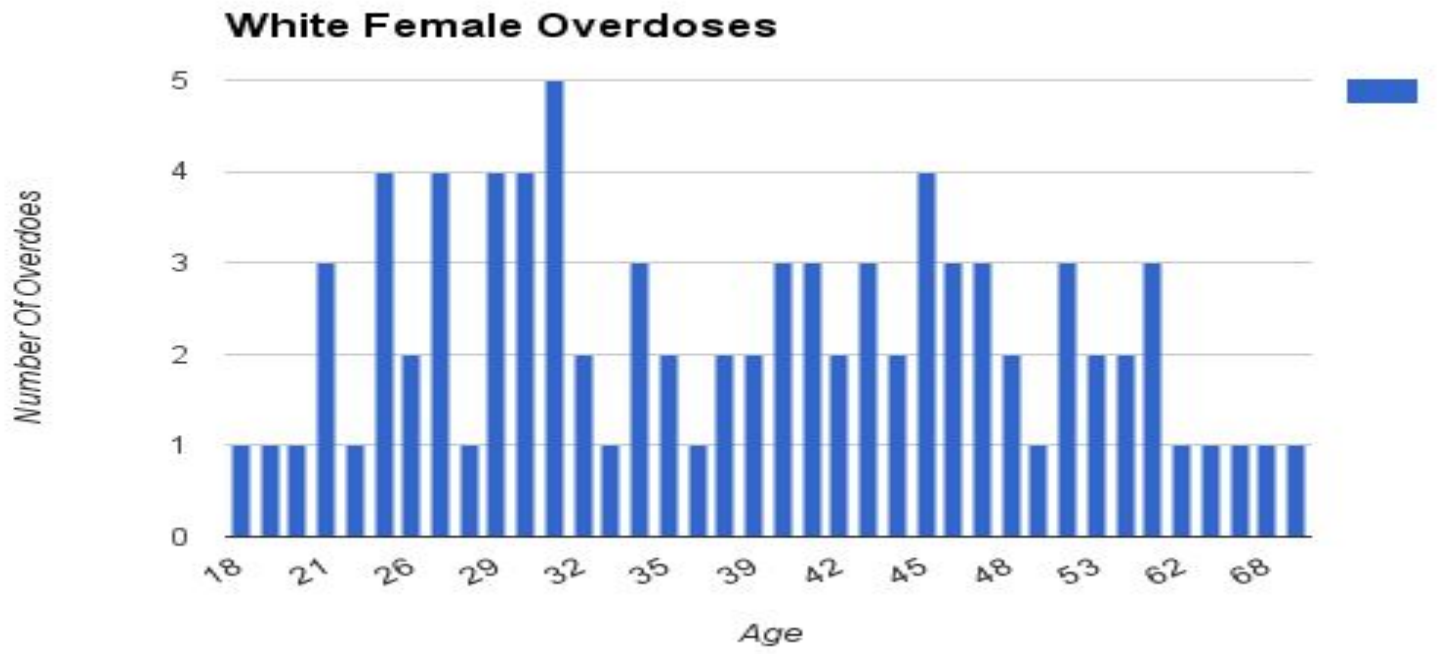
2014

- 307 Drug related overdoses
  - 178 White Males
  - 84 White Females
  - 30 African American Males
  - 15 African American Females

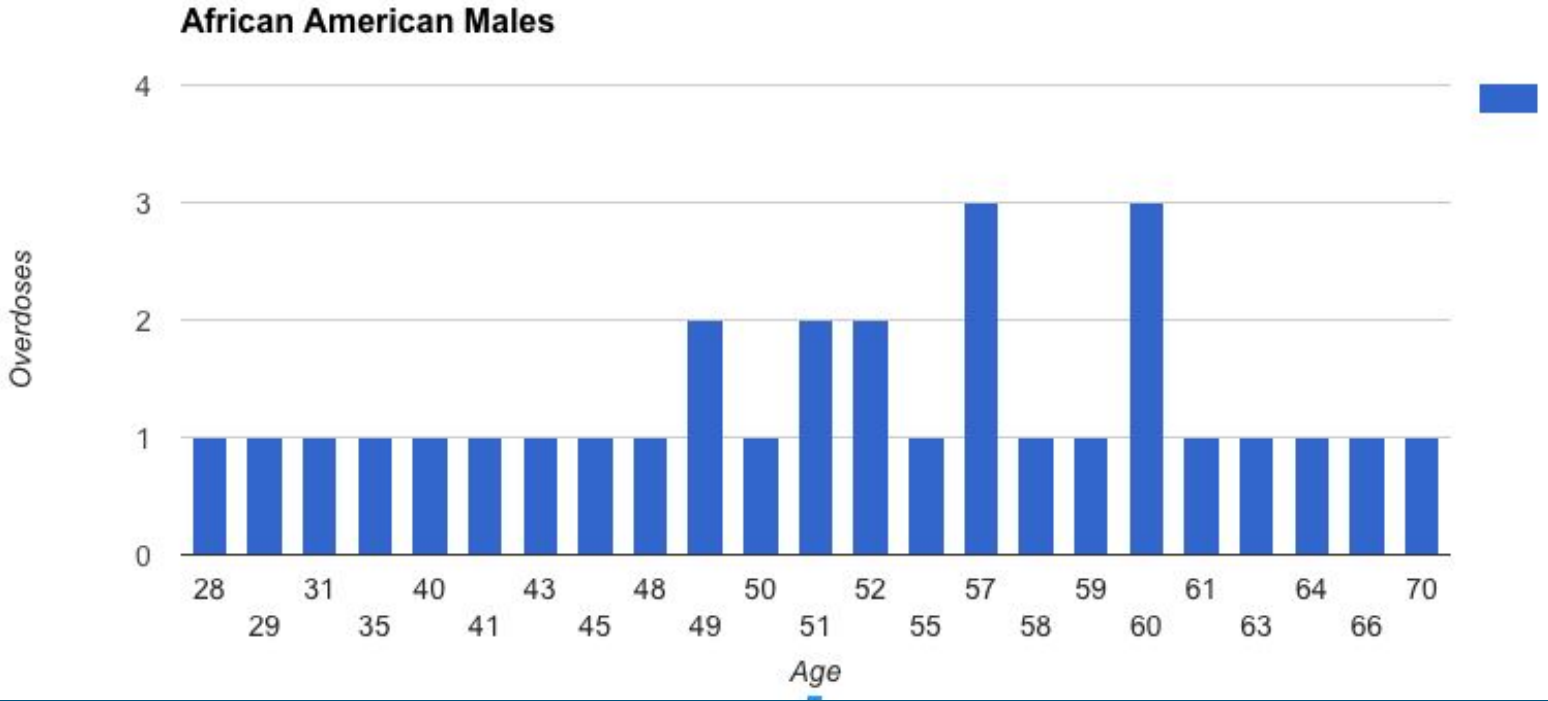
White Male Overdoses



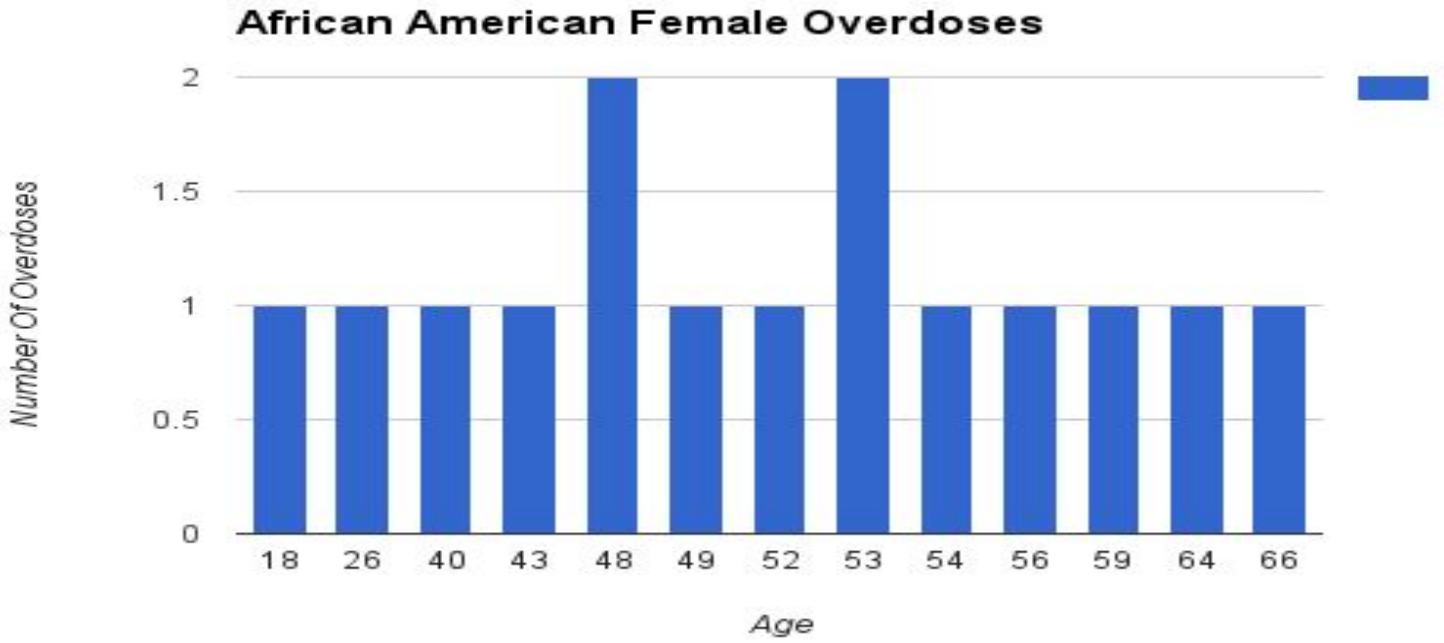
White Female Overdoses



African American Male



African American Female Overdoses



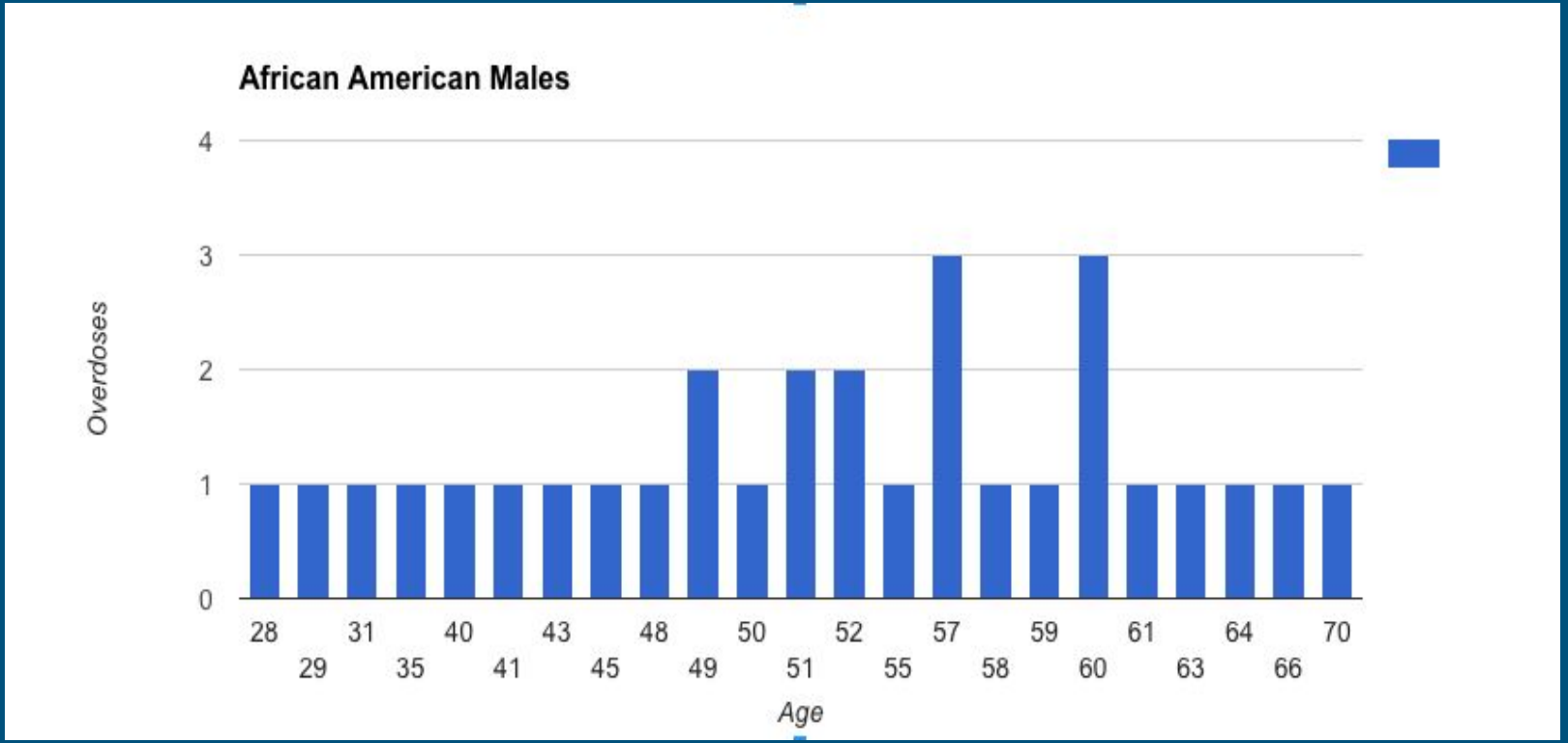
Allegheny County Overdoses

2013

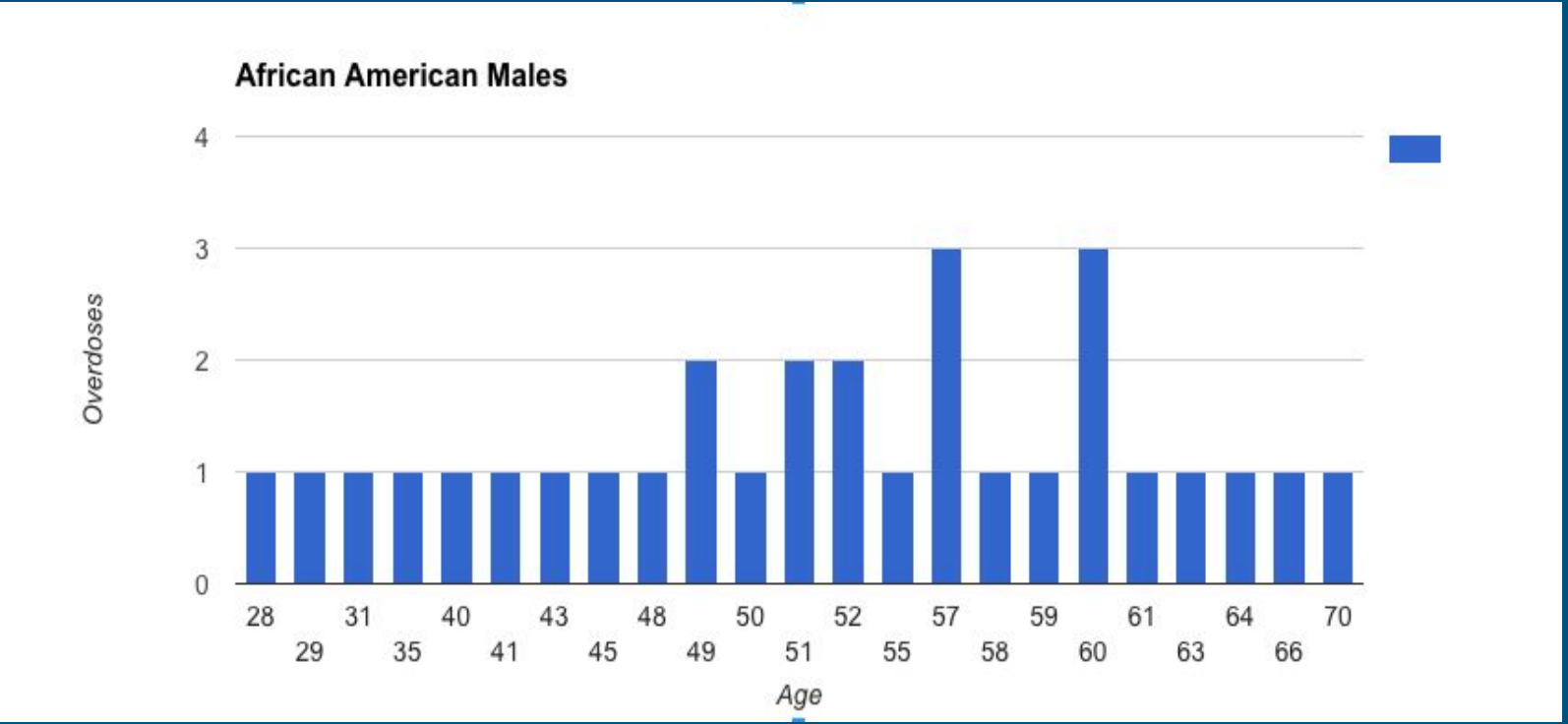
278 Overdoses

- 162 White Men
- 80 White Females
- 28 African American Males
- 7 African American Females
- 1 Hispanic Male

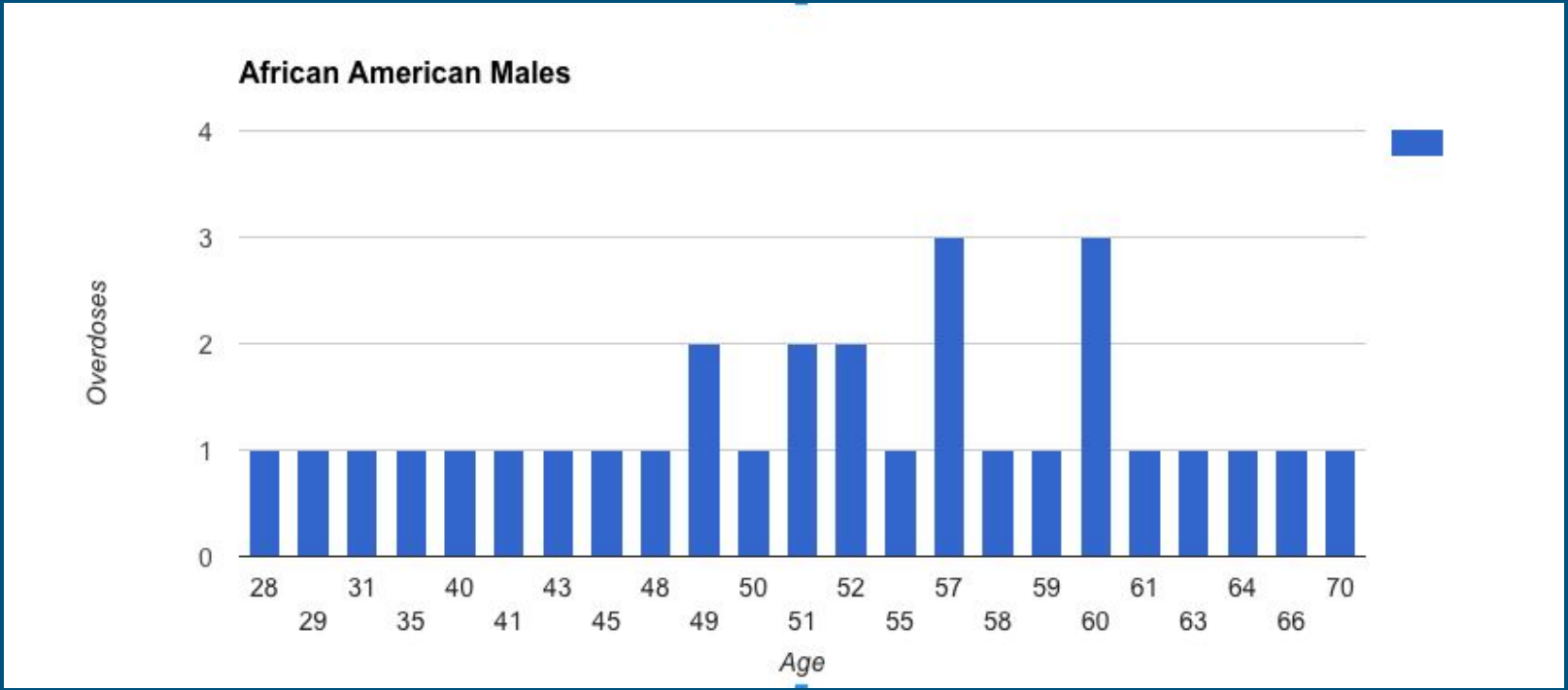
White Male Overdoses



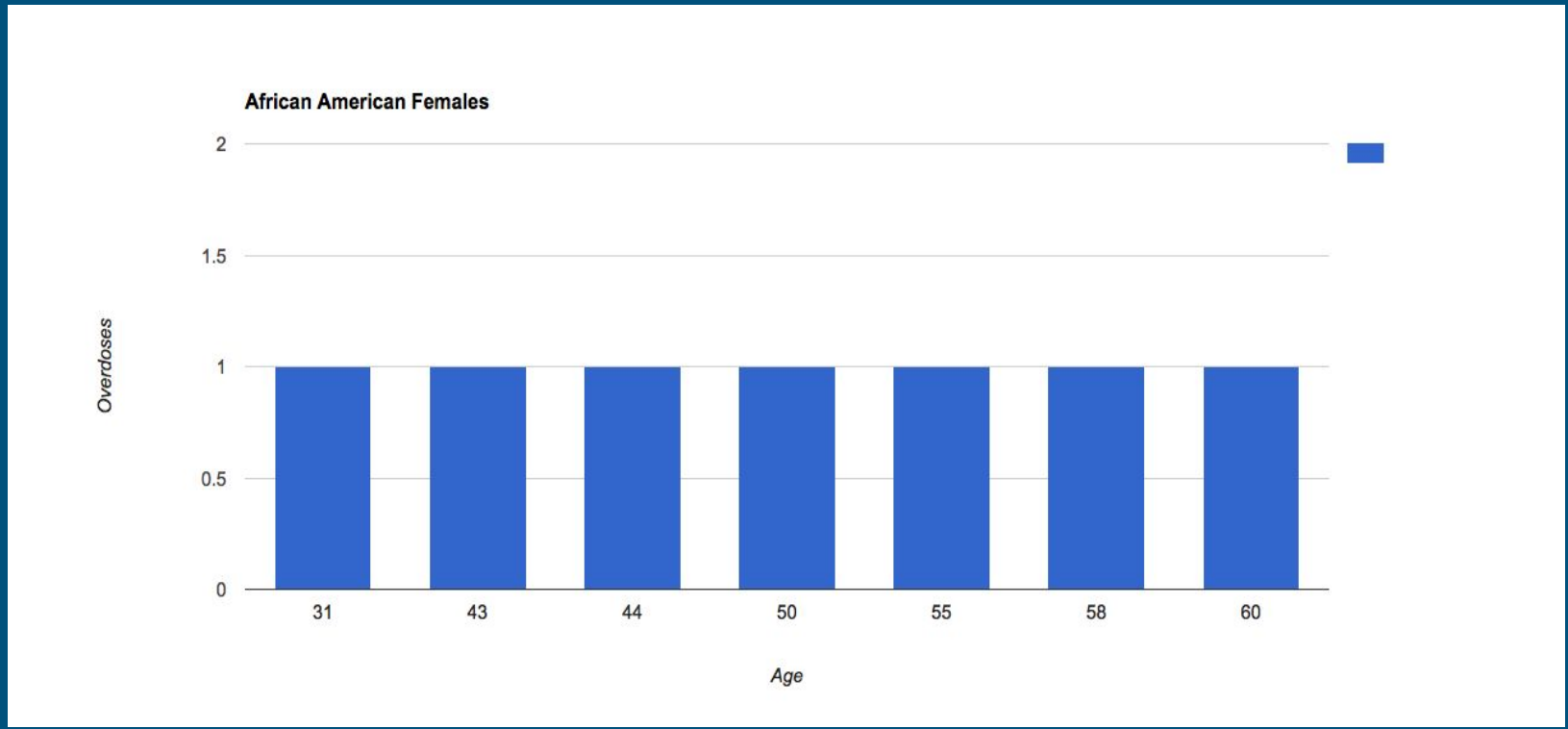
White Female Overdoses



African American Male Overdoses



African American Female Overdoses



2013 vs 2014

2013

278 Drug Related Overdoses

- 162 White Men
- 80 White Females
- 28 African American Males
- 7 African American Females
- 1 Hispanic Male

2014

306 Drug related overdoses

- 178 White Males
- 84 White Females
- 30 African American Males
- 14 African American Females

- 114 in 2014 Involved Heroin
- 149 in 2013 Involved Heroin

Conclusion

From the data provided, it it shown that there was more overdoses in 2014 then 2013. White males in 2014 were the group of people that overdosed the most with 178 overdoses. Then the number of white females was 84. The group of African American male overdoses was 30. Lastly, 15 African American females was the rest of the overdoses of 2014. All these people in 2014 and also in 2013, all used a mixture of drugs. Some only overdosed by using one drug but then other people were using multiple drugs at the time of overdosing.

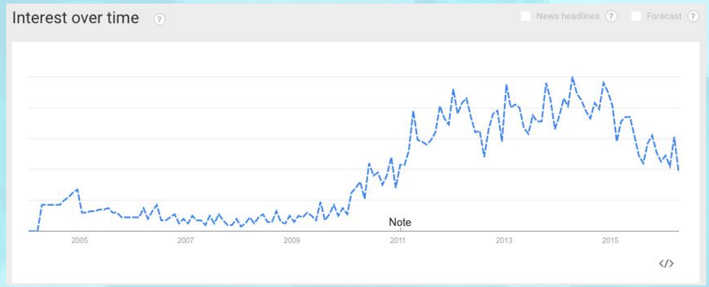
Sources

www.wprdc.org
Allegheny County
Accidental Drug Overdoses

Does Natural Gas Production Correlate with Water Contaminant Levels?

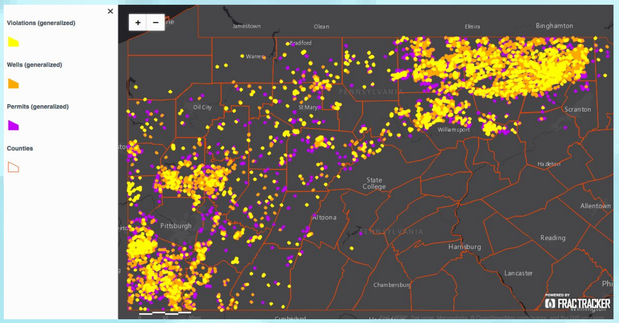
Question/Research

Does the level of natural gas drilling in the cities of Pittsburgh, Washington, and Butler affect the cities' drinking water quality?



Google Trendline depicting the increase in search interest of "Fracking" in Pennsylvania

Data



Visualization: Active Natural Gas Wells in Pennsylvania

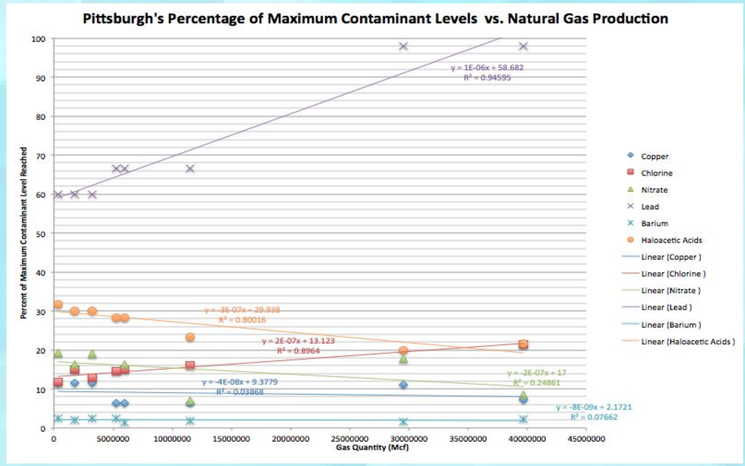
Well Permit #	Period Id	Period End Da	Production Inc	Well Status	Farm Name	Well #	SPUD Date	Gas Quantity (Mcf)
019-21634	15OCTU	10/31/15	Y	ACTIVE	CONCORDIA L	1-679	8/21/09	425
019-21635	15OCTU	10/31/15	Y	ACTIVE	CONCORDIA L	2-679	9/3/09	679
019-21822	15OCTU	10/31/15	Y	ACTIVE	ROBERT A ZAI	1M475	1/26/12	2965
019-21858	15OCTU	10/31/15	Y	ACTIVE	J ALLEN THRO	582-1	8/17/11	2093

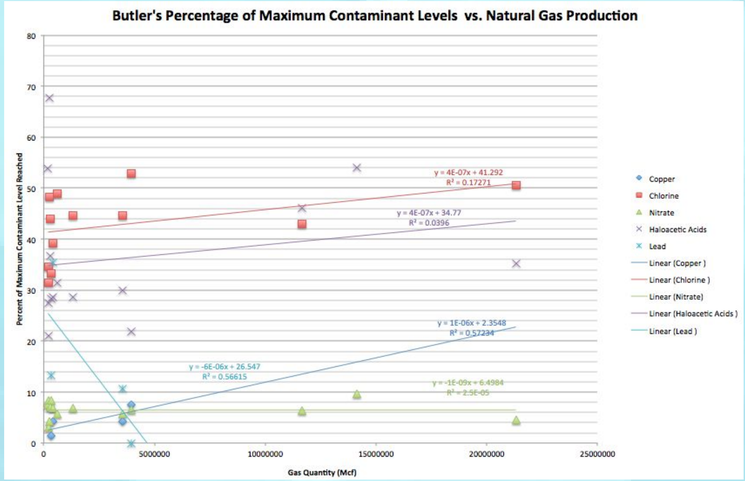
Sample Butler Gas Production Report Data (October 2015)

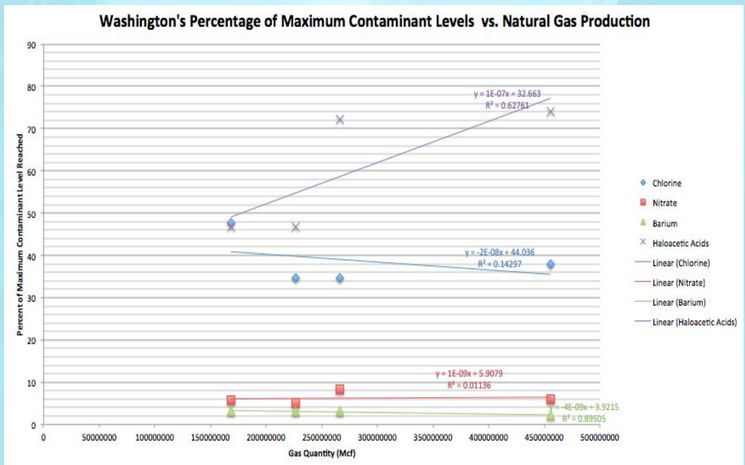
	CONTAMINANT (UNIT OF MEASUREMENT)	VIOLATION (Y / N)	LEVEL DETECTED	RANGE	MCLG	MCL	LIKELY SOURCE OF CONTAMINATION
MICROBIOLOGICAL CONTAMINANTS	Turbidity (a)	N	0.268 (b) 100%	N/A	N/A	TT = 1 NTU for a single measurement. TT = at least 95% of sample ≤0.3 NTU	Soil runoff
	Total Chlorine Residual in Distribution System (ppm)	N	3.20	0.20 - 3.20	(c) 4	(d) 4	Water additive used to control microbes
	Free Chlorine Residual at Entry Point to Distribution System (ppm)	N	0.24	0.24 - 1.10	(c) 4	(d) 4	Water additive used to control microbes
DISINFECTION BYPRODUCTS	Total Trihalomethanes (ppb)	N	(e) 53	21.3 - 127	80	80	Byproduct of drinking water chlorination
	Total Haloacetic Acids (ppb)	N	12	2 - 28	60	60	Byproduct of drinking water disinfection
LEAD & COPPER	Lead (ppb) (f)	N	90th Percentile = 14.7	5 sites above AL (50 sites sampled)	15	AL = 15	Corrosion of household Plumbing systems; erosion of natural deposits
	Copper (ppm) (f)	N	90th Percentile = 0.143	No sites above	1.3	AL = 1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
INORGANIC CHEMICAL CONTAMINANTS	Fluoride (ppm)	N	0.792	(h)	2	2	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
	Nitrate (ppm)	N	1.77	0.0 - 1.77	10	10	Runoff from fertilizers; leaching from sewage; natural deposits
	Nitrite (ppm)	N	0.04	0.0 - 0.04	1	1	Runoff from fertilizers; leaching from sewage; natural deposits
	Barium (ppm)	N	0.031	(h)	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
TOC REMOVAL	Total Organic Carbon (TOC) (% removal) (i)	N	No quarter out of compliance	48 - 59%	M/A	TT = 35%	Naturally present in the environment

Sample Pittsburgh Water Quality Report (2014)

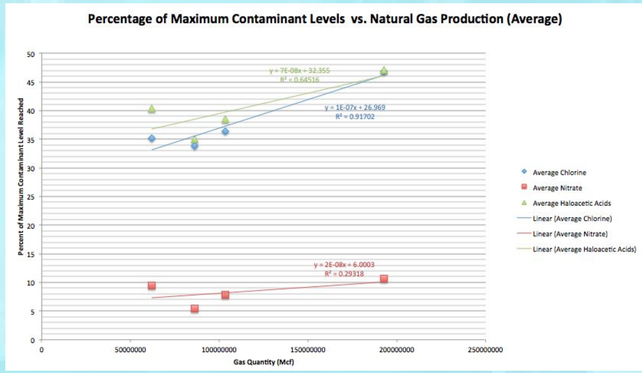
Results







Analysis/Conclusion



Graph depicting shared fracking fluid contaminants across all three counties

Contaminant	R-value
Chlorine	0.96
Nitrate	0.54
Haloacetic Acids	0.80

Correlations strongly depend on the region; for example, Butler and Washington show a strong positive correlation in regards to Haloacetic acids while Allegheny shows a negative correlation.

Our report shows a strong positive correlation between fracking activity and contaminants in our drinking water. If left unchecked, pollutants such as Haloacetic acids can cause negative health effects including an increased risk of cancer.

Challenges in gathering data:

- Not all contaminants were present in all of the reports
- Contaminants might not be tested frequently/regularly
- Difficult to obtain data

Recommendations:

- Well sites should test for the same contaminants every year. For example, some reports were missing lead, a crucial contaminant, for some years. Also, all water quality reports should be localized to a county's website so residents can easily access the data.

Upper St Clair Team A

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