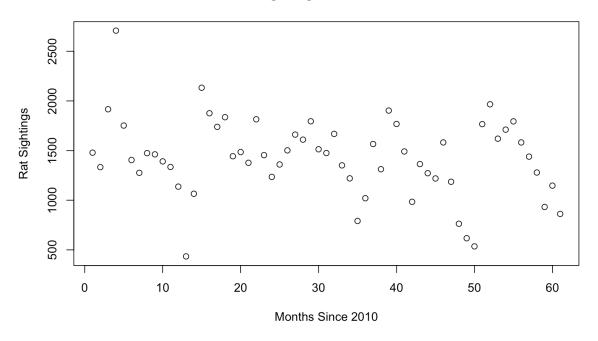**Part 1. Descriptive Statistics and Figures**
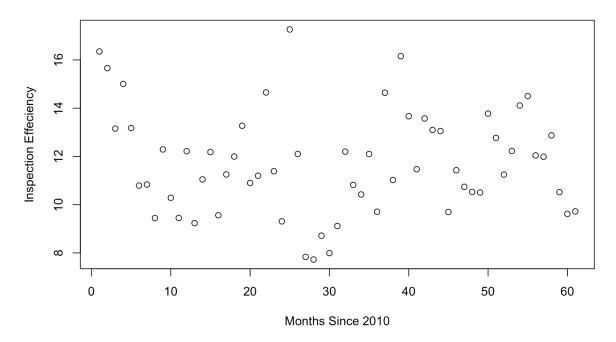**a.)**

Total Sightings Over Five Years

b.)

How Effective Inspections Are

c.) These are the zip code hot spots for rat sightings

	ZipCode	Frequency
1	10457	6802
2	10458	6258
3	10456	4975
4	10468	3975
5	11221	3895
6	10453	3547
7	11237	3029
8	10452	2992
9	10467	2516
10	11206	2421

Part 2

a.)

Top 20 Rat Sighting Zip Codes Prior to 2012

> prior_frame

	ZipCode	Frequency
1	10457	2044
2	10456	1687
3	10458	1667
4	11221	1317
5	10453	1102
6	10468	1065
7	11237	953
8	10031	924
9	10002	893
10	11206	876
11	10032	859
12	10009	857
13	10472	851
14	10459	798
15	11216	775
16	11238	766
17	11211	745
18	11217	740
19	10013	705
20	10452	676

Top 20 Rat Sighting Zip Codes Post 2012

> post_frame

	ZipCode	Frequency
1	10457	3671
2	10458	3521
3	10456	2488
4	10468	2361
5	10452	1983
6	10453	1974
7	11221	1827
8	10467	1442
9	11237	1404
10	10009	1278
11	10460	1214
12	11206	1208
13	10002	1070
14	11216	1057
15	10029	1047
16	10033	1035
17	10025	1032
18	10027	898
19	10032	888
20	10472	801

Top 20 Rat Sighting Zip Codes Sandy Related Incidents

> rat_frame

	ZipCode	Frequency
1	10025	14
2	10456	7
3	11207	7
4	11237	6
5	11221	5
6	10027	4
7	10453	4
8	10458	4
9	10467	4
10	11222	4
11	11368	4
12	10014	3
13	10022	3
14	10023	3
15	10031	3
16	10452	3
17	10460	3
18	11201	3
19	11212	3
20	11216	3

b.) Based upon these calculated top zip codes with most frequent rat sightings it seems that there were less rats seen, however this number seemed to then increase drastically in the years after.

Part 3

```
Call:
glm(formula = Rodent_Violation ~ AvgSighting + Month + Year,
    data = restaurant_inspection)

Deviance Residuals:
    Min       1Q    Median       3Q       Max
-0.09465  -0.08287  -0.07474  -0.06853   0.94863

Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.002953   0.108905   0.027 0.978364
AvgSighting     -0.014858   0.003319  -4.477 7.57e-06 ***
MonthAugust     -0.014177   0.002345  -6.045 1.50e-09 ***
MonthDecember    0.001661   0.002363   0.703 0.481972
MonthFebruary    0.009370   0.002447   3.829 0.000129 ***
MonthJanuary     0.009687   0.002434   3.980 6.89e-05 ***
MonthJuly       -0.017662   0.002358  -7.492 6.82e-14 ***
MonthJune       -0.009175   0.002305  -3.981 6.87e-05 ***
MonthMarch       0.007923   0.002263   3.500 0.000465 ***
MonthMay        -0.006703   0.002273  -2.949 0.003190 **
MonthNovember   -0.002694   0.002445  -1.102 0.270486
MonthOctober    -0.009492   0.002273  -4.177 2.96e-05 ***
MonthSeptember  -0.013233   0.002320  -5.704 1.17e-08 ***
Year2011         0.070142   0.111992   0.626 0.531111
Year2012         0.081384   0.108911   0.747 0.454911
Year2013         0.082062   0.108895   0.754 0.451095
Year2014         0.080937   0.108894   0.743 0.457321
Year2015         0.082058   0.108893   0.754 0.451114
Year2016         0.070978   0.108906   0.652 0.514574
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

These results support the second argument that people are seeing rats but inspectors are not finding them at their homes because they are at restaurants as shown by the negative coefficient for AvgSighting. My guidance for the city would be to use the rodent inspection data in order to determine what restaurants within a given zip code have rodent problems, rather than using the data to determine what houses have rodent problems.