

GOV670 Final Project Memo

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Introduction

The tendency of 311 calls to change in both frequency and nature as neighborhoods gentrify is well-documented, but less is known about whether a city's responsiveness to these calls changes as well. We are interested in studying the relationship between gentrification and resolution time for non-emergency calls in Washington, DC. We would like to know whether resolution times for 311 complaints and service calls vary by census tract, whether that variation correlates with certain socioeconomic indicators, and whether resolution times have improved for census tracts where gentrification has occurred. Whereas most academic studies and journalistic reports on gentrification and 311 calls have examined neighborhood conflict and quality-of-life complaints resulting in cultural displacement and/or police exposure (see, for example, Reza (2022), Beck (2020), NYU Web Communications (2015), Vo (2018), Misra (2018), Harris, Rigolon, and Fernandez (2020), and Laniyonu (2018)), our project looks at a wider variety of calls, most of which are unlikely to engender a police response, and focuses on whether gentrification has led to a less equitable distribution of city resources.

Research Questions

- Do resolution times for specific types of 311 complaints and service calls, such as those related to pothole repair, graffiti, snow removal, sidewalk repair, missed trash collection, parking violations, and rodent treatment vary by census tract?
- How do resolution times correlate with gentrification-relevant socioeconomic indicators, such as housing costs and educational attainment of residents (specifics TBD)?
- Have resolution times decreased in census tracts that have experienced gentrification (definition TBD)? Can we detect a causal link between gentrification and improved resolution times?

Data

- 311 call data from 2009 – 2011 and 2015 – October 15, 2022, obtained from <https://opendata.dc.gov/>
 - Note: Data from 2012 through 2014 exists, but we have not been able to download it due to a website error.
 - Variables of interest may include service code description, resolution time, service order status, priority, agency, date, and location variables.
- American Community Survey data from 2009 – 2021, obtained from <https://www.census.gov/programs-surveys/acs>
 - Variables of interest may include median home value, median rent, median household income, adults over 25 with a Bachelor's degree, poverty rate, vacancy rate, and demographic variables.

Methods

We are considering various measures of gentrification. One measure we are studying is the two-test approach used by Governing for its “Gentrification in America Report” in 2015, which involved first determining which census tracts were candidates for gentrification, based on having median household incomes and median home values that were relatively low for the metro area, and then determining which tracts had actually been gentrified, based on experiencing increases in Bachelor’s degree attainment and home values that were relatively large (Maciag 2015). Once we have settled upon a gentrification measure, we plan to use ACS data to classify census tracts as gentrified or not gentrified. We will then combine these classifications with 311 data in order to examine the relationship between gentrification status and resolution time, as well as between changes in gentrification status and changes in resolution time. By comparing changes in resolution times in census tracts that have gentrified to those in census tracts that have not (for the same service code over the same time period), we also hope to infer whether gentrification is responsible for helping to shift priority to more advantaged neighborhoods.

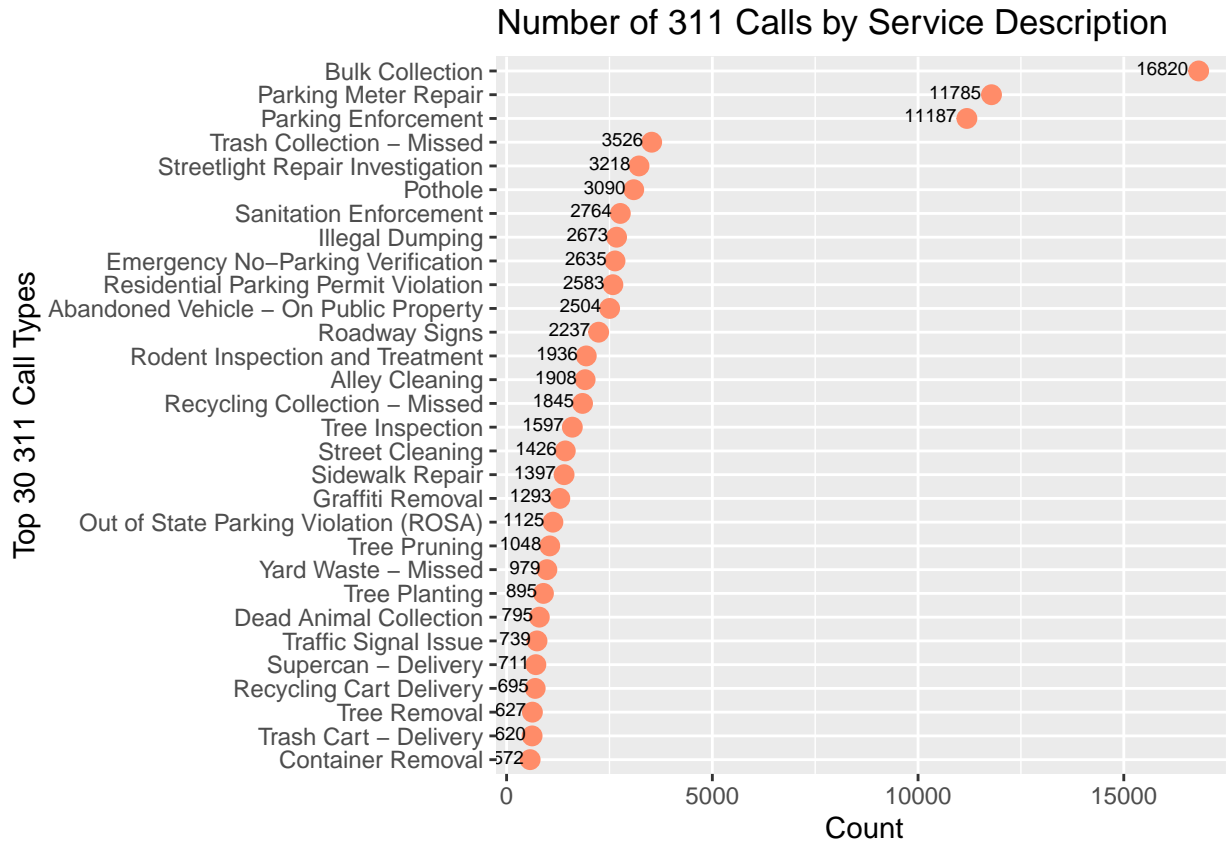
Preliminary Exploration

For our preliminary analysis, we took a subset of our data, comprising a sample of 100,000 observations from 2015, 2018, and 2021, which we are using to generate hypotheses. We will not use this subset in the final analysis.

```
## Rows: 100,000
## Columns: 16
## $ YEAR                <dbl> 2021, 2018, 2018, 2021, 2015, 2015, 2018, 2018,~
## $ SERVICECODEDESCRIPTION <chr> "Bulk Collection", "Residential Parking Permit ~
## $ ORGANIZATIONACRONYM   <chr> "DPW", "DPW", "DDOT", "DPW", "DDOT", "DPW", "DP~
## $ ADDDATE               <dtm> 2021-05-28 13:08:22, 2018-12-17 18:35:09, 2018~
## $ RESOLUTIONDATE        <dtm> 2021-06-04 17:28:12, 2018-12-18 01:14:51, 2018~
## $ RESOLUTIONTIME        <Duration> 620390s (~1.03 weeks), 23982s (~6.66 hours~
## $ SERVICEORDERSTATUS    <chr> "Closed", "Closed", "Closed", "Closed", "Closed~
## $ SERVICEORDERDATE      <dtm> 2021-05-28 13:08:22, 2018-12-17 18:35:09, 2018~
## $ SERVICEDUEDATE        <dtm> 2021-06-05 03:59:00, 2018-12-18 18:35:00, 2018~
## $ PRIORITY              <chr> "Standard", "Standard", "Standard", "Standard",~
## $ STREETADDRESS         <chr> "5920 6TH STREET NE", "2011 4TH STREET NE", "30~
## $ ZIPCODE               <dbl> 20011, 20002, 20003, 20002, 20019, 20016, 20007~
## $ LATITUDE              <dbl> 38.96217, 38.91740, 38.88536, 38.90430, 38.8955~
## $ LONGITUDE             <dbl> -76.99927, -77.00033, -76.99617, -76.98429, -76~
## $ MARADDRESSREPOSITORYID <dbl> 5904, 52959, 803626, 64703, 12123, 266855, 2238~
## $ WARD                  <dbl> 4, 5, 6, 5, 7, 3, 2, 6, 2, 1, 2, 5, 6, 2, 2, 4,~
```

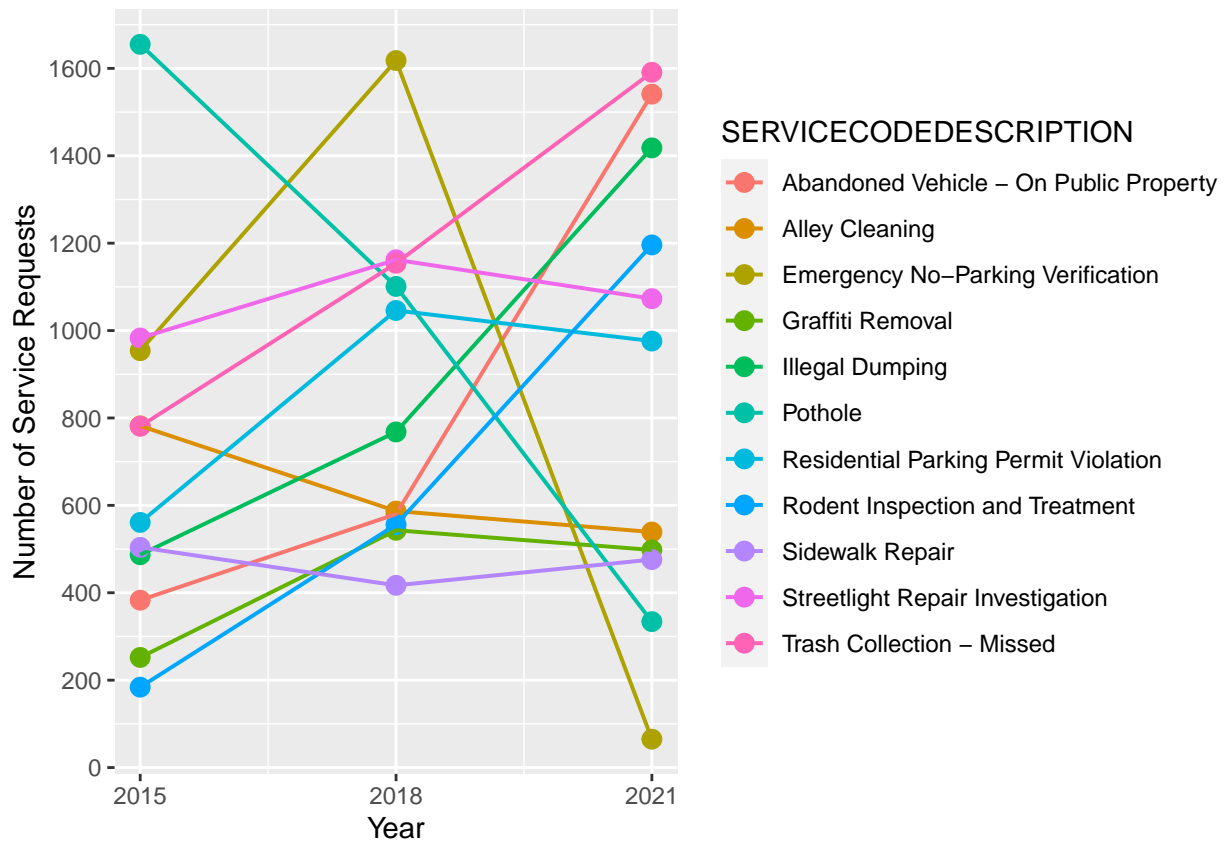
Initial findings

Common 311 call types



There are many other call types to examine but this provides an idea of the types of service requests that occur most frequently in the sample. One of the reasons we are not focusing on neighbor-conflict complaints (such as noise) is that the DC 311 data do not capture this.

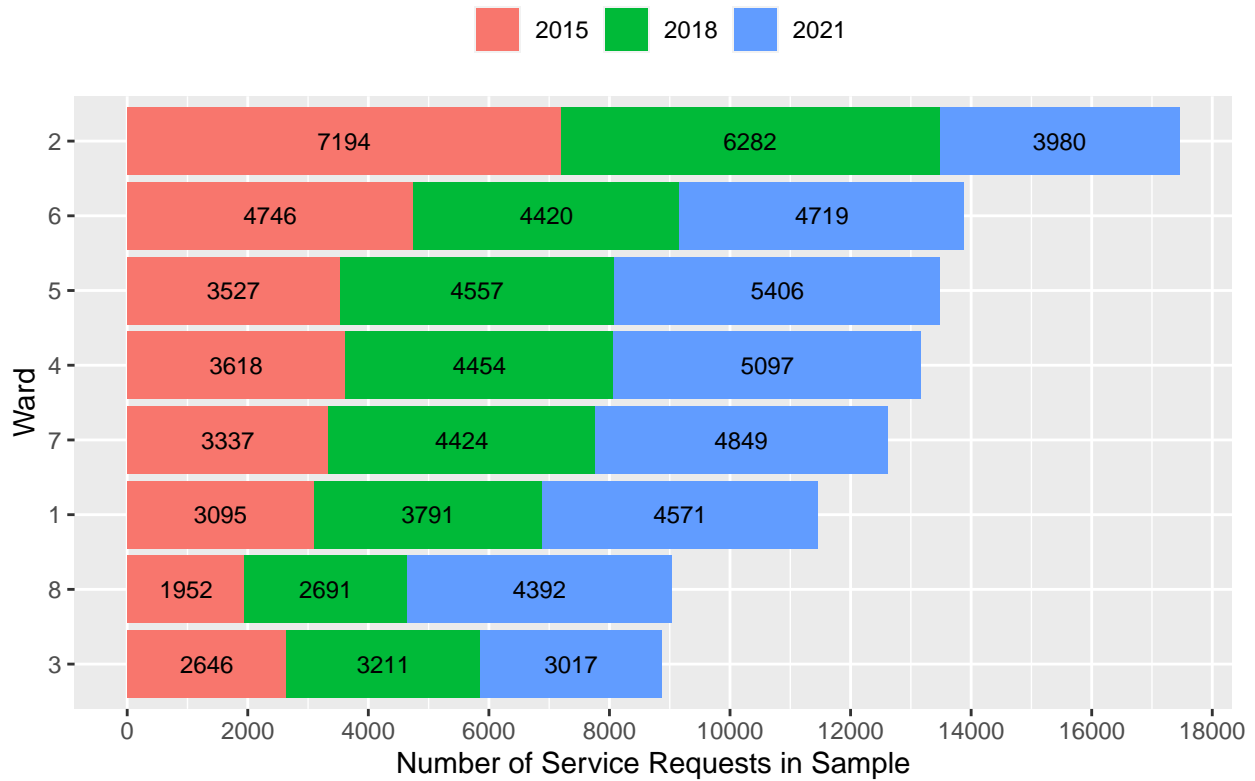
Trends in 10 selected service requests



While we are not necessarily concerned with frequency of service calls by type, we did experiment with visualizing trends in call types that we thought might be associated with gentrification. This chart is for the whole city; later, we will investigate by neighborhood (census tract).

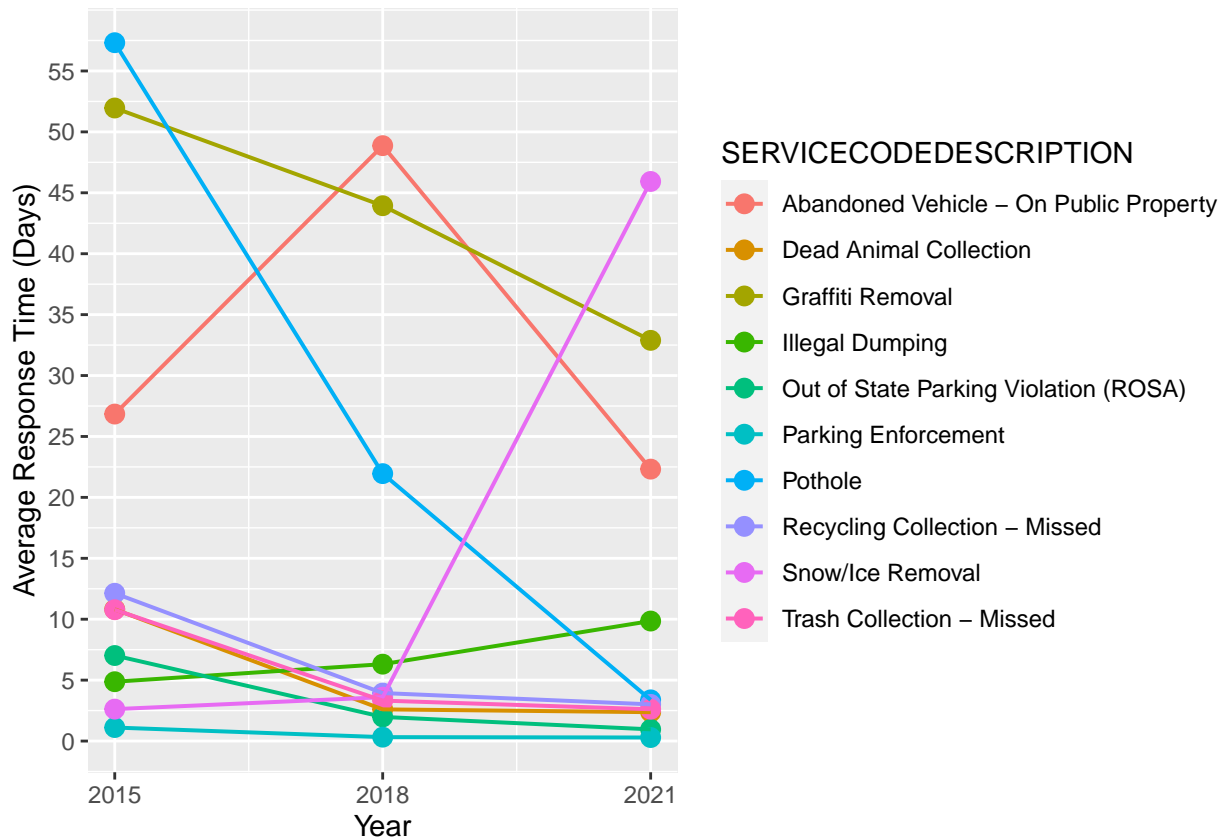
Trends in the number of service requests by ward

Number of Service Requests by Ward

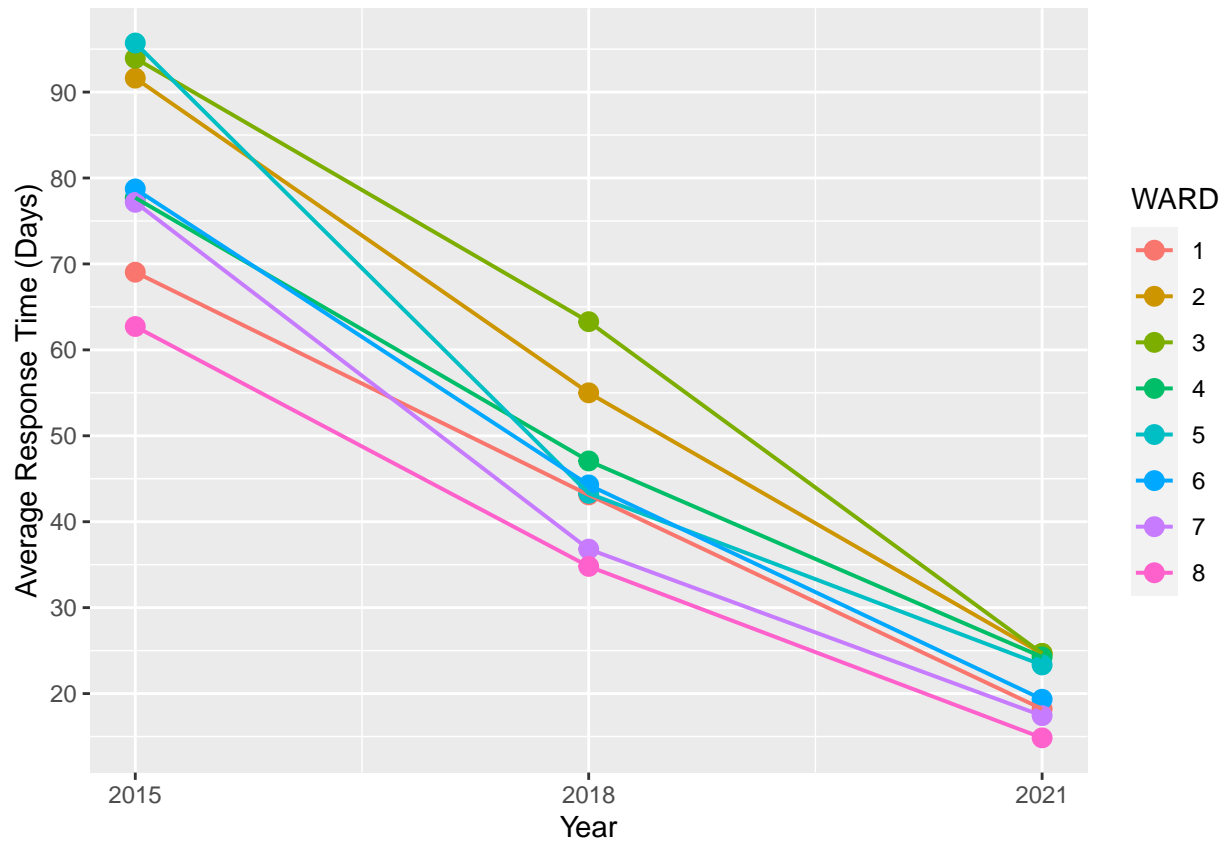


Since we have not yet started to examine specific census tracts and their socioeconomic indicators, we looked at wards in order to start exploring the data's geographic dimensions. Here we can see that Ward 2 generated the largest number of service requests in the sample, but the number of requests went down steadily between 2015 and 2018, and then again between 2018 and 2021. Conversely, Wards 1, 4, 5, 7 and 8 trended in a different direction with regard to volume of service requests.

Trends in response time for selected call types (checking for heterogeneity, first by type of complaint and then by ward (later we will focus on census tracts))



Resolution times for most of the selected call types fell or remained nearly the same, with the exceptions of snow/ice removal, which saw a big jump from 2018 to 2021 (possibly due to outliers, input error, or the pandemic), and illegal dumping, which saw a steady increase in resolution time over that period. It is worth noting that the average resolution time varied significantly depending on the type of service request, with requests involving parking usually being resolved within a day or so and other requests like sidewalk repairs taking months.



Lastly, here we can see that in general the resolution times trended downward in all wards from 2015 to 2018, and then again in 2021. We are curious about why. It is possible that that city has gotten that much better at responding over time? What was trend pandemic-related? Did the definition of “resolution” change?

Next Steps

- Get 311 data for 2012 – 2014
- Decide upon a definition of gentrification

References

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- Vo, Lam Thuy. 2018. "They Played Dominoes Outside Their Apartment for Decades. Then the White People Moved in and Police Started Showing Up." *BuzzFeed News*. <https://www.buzzfeednews.com/article/lamvo/gentrification-complaints-311-new-york>.