**Project 3 Analysis: 311 Incident Reports in NYC**

**Part 1: Introduction**

311 is a line that is supported in many places in the United States and Canada that provide access to non-emergency municipal services. It is intended to divert routine inquiries and non-urgent community concerns from 911 to 311, keeping the emergency line open for actual emergencies. The purpose of our project is the analyze data from New York City’s 311 line over the first trimester of this year (Jan-Mar). We attempt to accomplish this by looking at the highest complaints called into 311, and breaking it down by the boroughs and agencies that respond. We then lastly look at the resolution rates to see the successfulness that the NYC’s 311 line produces.

**Part 2: Top 10 Complaints of 311 Calls**

For our project analysis, we utilized the Python library sodapy, designed to interact with the Socrata Open Data API. Socrata provides a platform for governments and organizations to publish open data sets, which was crucial for our analysis of New York City's 311 service data. This library proved invaluable in accessing and analyzing the public service data effectively.

New York City's 311 service handles a vast range of service requests, totaling 794,354 incident reports for the first trimester of this year (Jan-March). Note that this number reflects reported incidents, not calls, which would be even higher.

The top 10 types of complaints during this period:

1. **Illegal Parking**: 123,083
2. **Heat/Hot Water**: 106,450
3. **Noise - Residential**: 68,498
4. **Blocked Driveway**: 43,067
5. **Unsanitary Condition**: 28,192
6. **Street Condition**: 19,016
7. **Abandoned Vehicle**: 17,625
8. **Pumping**: 17,406
9. **Plumbing/Plaster**: 17,331
10. **Noise/Street/Sidewalk**: 15,722

These numbers align with broader trends reported in the media. For instance, the New York Times article, "Parking in NYC Really Is Worse Than Ever" (October 2023), highlights the challenge of parking in a city with over 2.2 million registered cars and roughly 3 million parking spots. Additionally, NYC's stringent heat and hot water regulations contribute to the high number of related complaints. Noise complaints, despite regulatory changes in 2007, remain prevalent.

Examining the data by month, January emerges as the busiest with 287,200 incidents. February and March show slightly lower totals, with 240,454 and 266,699 incidents respectively.

The fluctuation in complaints aligns with seasonal patterns:

* **January**: Peak in complaints related to heat/hot water due to cold weather.
* **February**: Illegal parking tops the list, with heat/hot water complaints remaining significant.
* **March**: A drop in heat/hot water complaints is observed as the weather warms, while noise-residential complaints increase.

An analysis was conducted of the average response times for the top complaints:

* **Illegal Parking** **and** **Noise**: Average response time of approximately 2 hours.
* **Heat/Hot Water**: Average response time of about 20 hours.
* **Plumbing/Plaster** and **Unsanitary Conditions**: Average maximum response time ranges from 19 to 23 days.

These response times reflect the priority given to more urgent complaints like illegal parking and noise, compared to less critical issues.

Our analysis reveals significant insights into the patterns and priorities of NYC's 311 service requests. Understanding these trends helps in better resource allocation and response strategies for the city's public services. The use of the sodapy library was instrumental in providing a comprehensive view of the data, emphasizing the importance of effective tools in data analysis for public services.

**Part 3: Calls Per Borough**

When looking at the structure of New York City itself, it is important to note that NYC is broken down into five boroughs, Brooklyn, Queens, Manhattan, Bronx, and Staten Island. During this analysis, we broke down the call volume per borough, in the first trimester of this year (Jan-Mar), the following was found:

* **Brooklyn**: 247,148 calls
* **Queens**: 190,308 calls
* **Manhattan**: 165,901 calls
* **Bronx**: 162,956 calls
* **Staten Island**: 27,423 calls
* **Unspecified**: 618 calls

Looking at the data, it can be seen that Brooklyn had the highest volume of calls and Staten Island had the least. Brooklyn is a highly populated part of NYC that deals with a lot of tourism and has many locals living there. Considering that the top four boroughs, Brooklyn, Queens, and Manhattan, and the Bronx have the highest volume of calls, aligns with the amount of tourism and the dense population of the areas. Staten Island, also known as “the Forgotten Borough”, has the least amount of calls, due to the nature that it is more residential, and not as wealthy or tourism-friendly than the other three boroughs.

It is important to note that 618 calls, labeled unspecified, were made to NYC 311. This indicates that 618 calls were placed to NYC 311 that did not have a specified location, therefore no borough could be identified. Although the calls are important, it does not provide any additional information to our data, or skew it in any way, therefore, the unspecified calls were left out for our analysis.

After looking at the overall call volume of each borough, we believed that it was necessary to look at the specific calls for each borough. Overall, the complaint type called the least amongst all five boroughs were those dealing with inspections, permits, and safety enforcement of construction sites. Per each borough, the top five complaint types are as follows:

**Brooklyn**:

* **Illegal Parking**: 47,599 complaints
* **Heat/Hot Water**: 26,906 complaints
* **Noise – Residential**: 20,500 complaints
* **Blocked Driveway**: 16,436 complaints
* **Unsanitary Conditions**: 8,458 complaints

**Queens**:

* **Illegal Parking**: 36,358 complaints
* **Blocked Driveway**: 17,947 complaints
* **Heat/Hot Water**: 15,756 complaints
* **Noise- Residential**: 13,720 complaints
* **Abandoned Vehicle**: 6,980 complaints

**Manhattan**:

* **Heat/Hot Water**: 23,341 complaints
* **Illegal Parking**: 17,072 complaints
* **Noise – Residential**: 14,808 complaints
* **Noise – Street/Sidewalk**: 6,538 complaints
* **Noise – Commercial**: 5,370 complaints

**Bronx**:

* **Heat/Hot Water**: 39, 312 complaints
* **Illegal Parking**: 18,466 complaints
* **Noise – Residential**: 17,944 complaints
* **Unsanitary Conditions**: 9,521 complaints
* **Blocked Driveway**: 6,367 complaints

**Staten Island**:

* **Illegal Parking**: 3,580 complaints
* **Street Conditions**: 2,466 complaints
* **Noise – Residential**: 1,524 complaints
* **Abandoned Vehicle**: 1,142 complaints
* **Heat/Hot Water**: 1,135 complaints

As it can be seen with this data, across all five boroughs, heat/hot water and illegal parking are amongst some of the highest complaints per borough. As stated earlier, this is due to the high levels of tourism and population of New York City, as well as the inefficient energy production of the city.

**Part 4: Calls Per Agency**

We did an analysis of the various agencies responding to 311 calls in New York City. In order to understand which agencies we are working with, we used value\_counts to help identify how many agencies are involved with NYC 311 and the volume of complaints each agencyreceived within the first three months of 2024.

From the results, the agencies with the highest call volumes are:

* **New York City Police Department (NYPD)**: 316,884 complaints
* **Housing Preservation & Development (HPD)**: 228,164 complaints
* **New York City Department of Sanitation (DSNY)**: 65,662 complaints

Taking a closer look at these three agencies, we will present the different types of complaints each agency received and examine their trends over the first trimester of 2024. To do this, a data frame was created for each agency, listing the various complaints and their counts. Next, we created data frames to track the occurrence of each complaint over time.  
  
The NYPD received the most complaints about illegal parking, totaling 123,083 in just three months. The NYPD intervenes the most in Brooklyn for illegal parking and residential noise. For blocked driveway complaints, they are most active in Queens. It takes the NYPD an average of two hours to resolve illegal parking complaints, an hour for residential noise complaints, and two hours for blocked driveway complaints. Given the volume of calls, they are quite efficient in resolving these issues

This was followed by residential noise with 68,498 complaints and blocked driveways with 43,067 complaints. Analyzing these over time, we see that illegal parking and residential noise complaints fluctuate but follow a similar pattern from January 1st to April 1st. Blocked driveway complaints remain relatively stable. This analysis is reflecting the consistent nature of these issues in NYC.  
  
HPD's most common complaint was about heat/hot water, with 106,450 complaints, followed by unsanitary conditions at 28,192, and plumbing issues at 17,406. The HPD intervenes the most in the Bronx for all of the top three complaints. It takes the HPD an average of 20 hours to resolve heat/hot water complaints. For plumbing and unsanitary conditions, the average maximum response time ranges from 19 to 23 days. These response times are reasonable for issues that cannot be addressed in just a few hours.

Considering we’re looking at the first trimester of the year, the high number of heat/hot water complaints aligns with the colder months. It would be interesting to compare this trimester with the current one to see if the complaint types shift. Notably, there was a significant spike in heat/hot water complaints around the second week of January, coinciding with a temperature drop to 17°F on January 24th, according to AccuWeather. The other complaint categories remained stable.  
  
For DSNY, the top four complaints were derelict vehicles (12,412 complaints), dirty conditions (11,357 complaints), illegal dumping (7,105 complaints), and missed collection (7,020 complaints). The DSNY intervenes the most in Brooklyn for all of these complaints. It takes the DSNY an average of 31 hours to resolve derelict vehicle complaints, five hours for dirty condition complaints, and 16 hours for illegal dumping complaints. They seem to be quite effective at handling these issues.

Most of these complaints are related to trash. Over the three months, derelict vehicles and illegal dumping complaints fluctuated but followed a consistent pattern. Dirty condition complaints varied significantly, with spikes in early January and early March. Missed collection complaints alternated between high and low until stabilizing in March.

This analysis leads us to a current issue: Should NYC get trash cans? Our analysis of trash collection shows that 60% of trash is collected on schedule, 20% is delayed, 13.3% is not in effect, and 6.7% is suspended. This means 40% of trash collection is not being done correctly, resulting in trash remaining on the streets. It seems evident that implementing trash cans could be a beneficial solution for NYC.

**Part 5: Resolution Rates**

**Part 6: Conclusion**

In conclusion, New York City’s 311-line received a high number of calls in just the first trimester of this year alone. Amongst those calls, it is well noted that per borough the highest complaint was illegal parking and heat/hot water. This can be seen by the natural density and population of New York City itself. Amongst those answering calls of service by 311, NYPD had the highest call volume, due to noise complaints and illegal parking. Sanitation in NYC, specifically trash, is also a big issue, especially in recent years, making DSNY one of the top three agencies responding to 311 calls. Looking at the resolution rates of the agencies and 311 as a whole, it can be seen that amongst all boroughs and agencies, that they do have a high rate of success. This shows that 311 is not only crucial to the citizens of NYC but shows that it could be implemented elsewhere, in order to provide citizens with assistance of non-emergent municipal tasks.

**Part 7: Data Ethics**

The data we used was from New York City’s Open Data 311 which does not give out any names, gender, or information of the person that is calling. It gives out the relative location and the complaint type. This ensures that no private information or data is given to the general public, and keeps those that call the 311 line a sense of comfort. Since this data is able and meant to be used for public access, no ethics are involved, as all important and private data is not shown, and only general information relating to the call is released. This ensures proper collection of data and security.