Data Analysis

Exploratory Data Analysis (EDA)

1. Number of unique restaurants per borough:

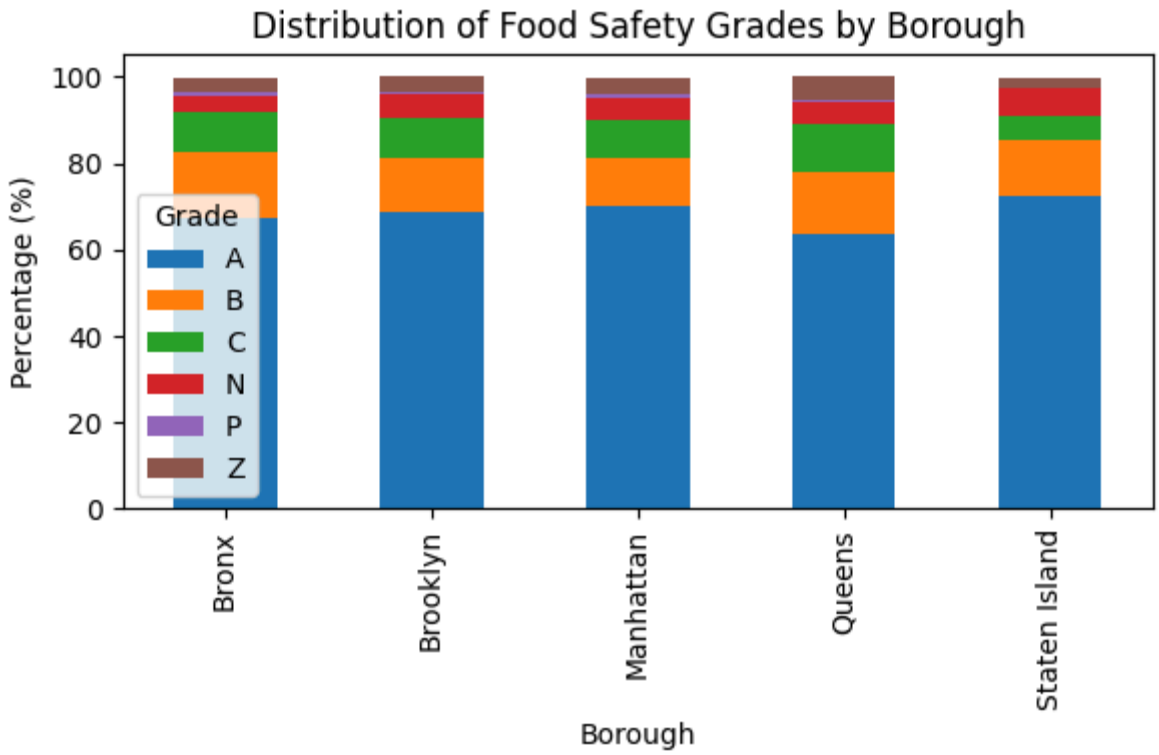
Borough	Count
Manhattan	10411
Brooklyn	6807
Queens	6103
Bronx	2335
Staten Island	976

2. Number of inspections per borough:

Borough	Count
Manhattan	106750
Brooklyn	74015
Queens	71514
Bronx	26621
Staten Island	26621

Borough-level Comparison

Question 1: How do food safety results differ in the five boroughs?



Average number of inspections per borough:

Borough	**Count**
Manhattan	3.38
Brooklyn	3.40
Queens	3.68
Bronx	3.48
Staten Island	3.24

This graph reveals that Queens has the lowest percentage of A ratings and also the highest percentage of ungraded restaurants. This is surprising since from the exploratory analysis earlier, Manhattan has the highest number of restaurants and inspections, followed by Brooklyn, then Queens.

Looking within the violation, all boroughs have around 52-54% of critical (violations are those most likely to contribute to food-borne illness) vs. non-critical violations, so it does not appear that a specific borough has worse violations.

When looking at how many violations are issued per inspection on average, Queens also has the highest average number of violations. This is consistent with previous analysis that shows Queens has the lowest percentage of A ratings.

Question 2: Is it related to demographic profiles such as population density?

In terms of demographic data (source: https://popfactfinder.planning.nyc.gov/explorer/cities/NYC), Queens has the second-highest population, following Brooklyn among the five boroughs. However, it also has the second-highest median age (39.1 years vs. 36.8 years for NYC). Queens is also widely viewed as the most culturally diverse county in the U.S., and the combination of high median age and population indicates that Queens might have a higher number of small, independent, immigrant-owned restaurants. These establishments often operate in older, smaller kitchens, which could contribute to the lowest percentage of A rating.

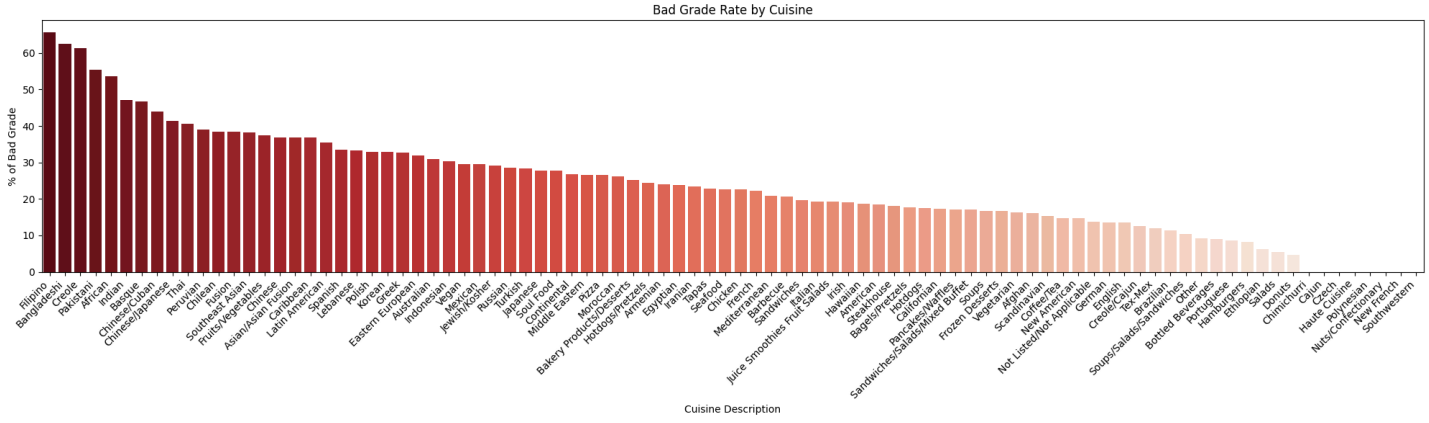
Violation Patterns

Question: Do restaurants generally improve after multiple inspections?
The analysis here only looks at restaurants that have consecutive inspection visits to see if inspection grade improves and declines after the initial visit. Surprisingly, most restaurants stay the same, with a small number of restaurants improved and an even smaller portion declined.

Change	Percentage
No Change	95.1%
Improved	2.9%
Declined	2%

Cuisine-specific Analysis

Question: Are some cuisines more likely to receive critical violations or bad grades?



Cuisine Type	Critical Violation %	Bad Grade %
Filipino	55.9	65.7
Bangladeshi	60.3	62.6

Creole	60.0	61.3
Pakistani	58.2	55.4
African	57.8	53.7
Indian	58.0	47.2
Basque	46.8	46.7
Chinese/Cuban	59.2	43.9
Chinese/Japanese	57.8	41.4
Thai	56.7	40.7
Peruvian	56.4	39.0
Chilean	47.2	38.5
Fusion	53.6	38.4
Southeast Asian	57.9	38.2
Fruits/Vegetables	43.1	37.5

In this analysis, bad grade % shows the percentage of restaurants that have grades below A in a specific cuisine, while critical % shows the percentage of restaurants that receive critical violations. Interestingly, it's possible for a restaurant to receive a critical violation but still receive an A rating. For example, Czech restaurants have the highest percentage of critical violations, yet all the restaurants have A ratings. This might be due to it having a small sample size (only 15 restaurants in the whole city).

However, this raises an interesting question for customers: Is an A rating a reliable indicator of whether a restaurant can achieve this even with critical violations (as a reminder, critical violations are those most likely to contribute to food-borne illness)? Therefore, this analysis combines both metrics for the audience to understand and weigh in on their preference.

Seasonality

Question: Are there seasonal or holiday-related spikes in food safety violations?

Percentage of critical violations by season:

Change	**Percentage**
Summer	54.2%
Fall	53.8%

Spring	53.1%
Winter	52.9%

Count of inspections by season:

Change	**Percentage**
Spring	77638
Fall	77085
Summer	71784
Winter	62267

Despite spring being the season with the highest inspection count, summer has the highest percentage of restaurants receiving critical violations, and winter has the lowest percentage.

This is most likely due to food spoilage is very sensitive to temperature, and higher summer temperatures can accelerate spoilage if food is not stored properly.