NYC RESTAURANT INSPECTION ANALYSIS

INFORMATION VISUALIZATION PROJECT WITH TABLEAU

Prepared by:

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SUMMARY:

This project was initially an assignment for the New York University's Information Visualization course, which I consequently recapitulated for deeper analysis.

In this project, I demonstrate my analysis using data visualization assets transformed from NYC's Restaurant Inspections data originally released by NYC DOHMH. For a primary purpose in the course assignment, the data was retrieved from Kaggle which covers the inspection data from Jan. 1, 2010 to Aug. 29, 2017 with 18 variables for 399,918 observations. Visualizations were created in Tableau and they are published in Tableau Public.

Through this presentation, my visualizations discover the genesis of NYC's restaurant industry through the inspection records in temporal and geographical scale and help stakeholders consider the impact of the inspection program in their daily routine.

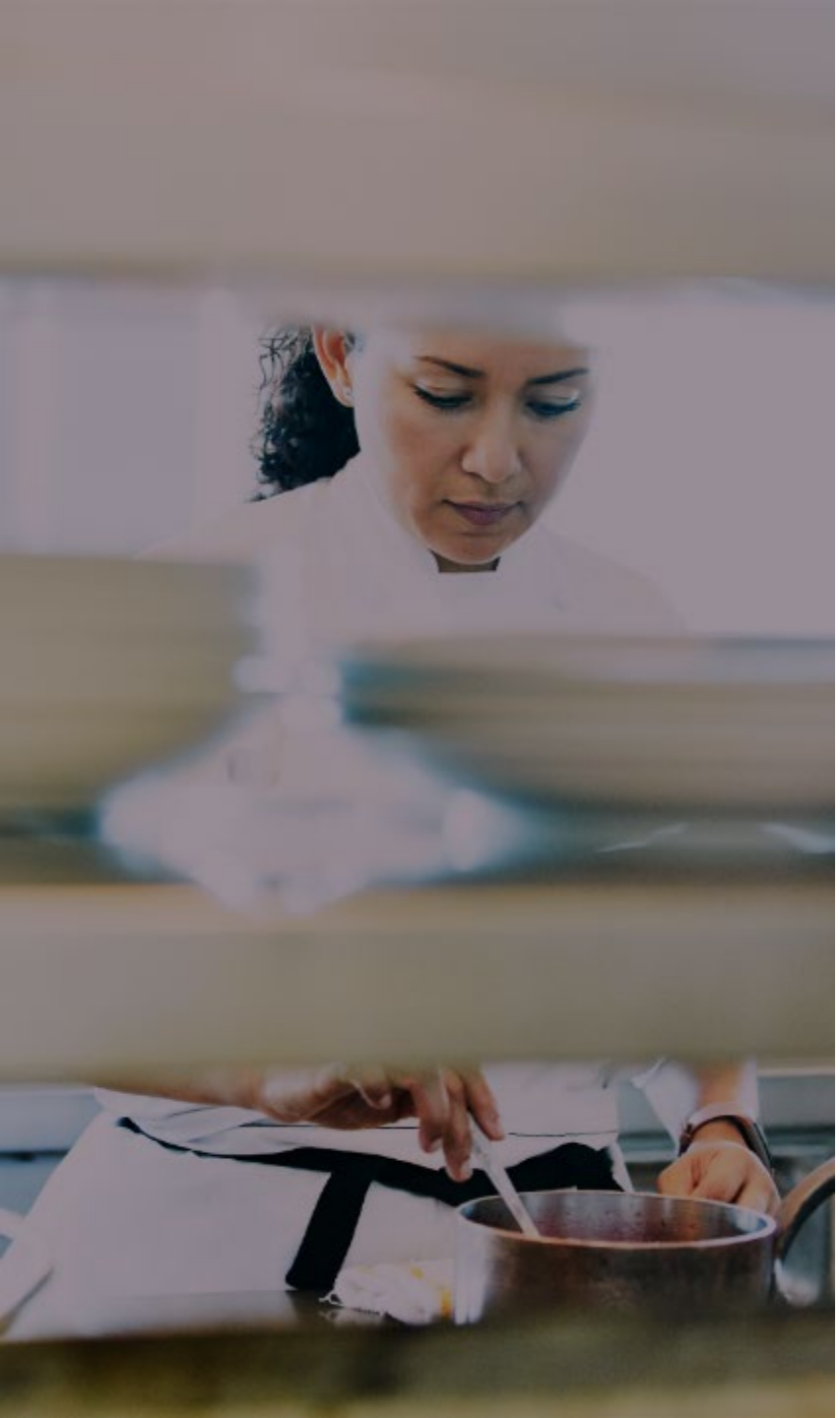
KEY TAKEAWAYS:

1. why there are spikes in number of inspections
2. the differences/proximities in trends by boroughs
3. geographical features for certain cuisine types
4. inspection scores by cuisine types
5. violation details by cuisine types

VARIABLES USED IN THIS PROJECT:

CAMIS	This is a unique identifier for the entity (restaurant)
DBA	This field represents the name (doing business as) of the entity (restaurant)
BORO	Borough in which the entity (restaurant) is located. NOTE: There may be discrepancies between zip code and listed boro due to differences in an establishment's mailing address and physical location
BUILDING	This field represents the building number for the entity (restaurant)
STREET	This field represents the street name at which the entity (restaurant) is located.
ZIPCODE	Zip code as per the address of the entity (restaurant)
PHONE	Phone number
CUISINE DESCRIPTION	This field describes the entity (restaurant) cuisine.
INSPECTION DATE	This field represents the date of inspection. NOTE: Inspection dates of 1/1/1900 mean an establishment has not yet had an inspection

ACTION	This field represents the action that is associated with each restaurant inspection.
VIOLATION CODE	This field represents each violation associated with a restaurant inspection.
VIOLATION DESCRIPTION	This field describes the violation codes
CRITICAL FLAG	Critical violations are those most likely to contribute to foodborne illness.
SCORE	Total score for a particular inspection; updated based on adjudication results.
GRADE	This field represents the grade associated with this inspection. Grades given during a reopening inspection are derived from the previous re-inspection.
GRADE DATE	The date when the grade was issued to the entity (restaurant)
RECORD DATE	The date when the webextract was run to produce this data set
INSPECTION TYPE	A combination of the inspection program and the type of inspection performed



QUESTION 1:

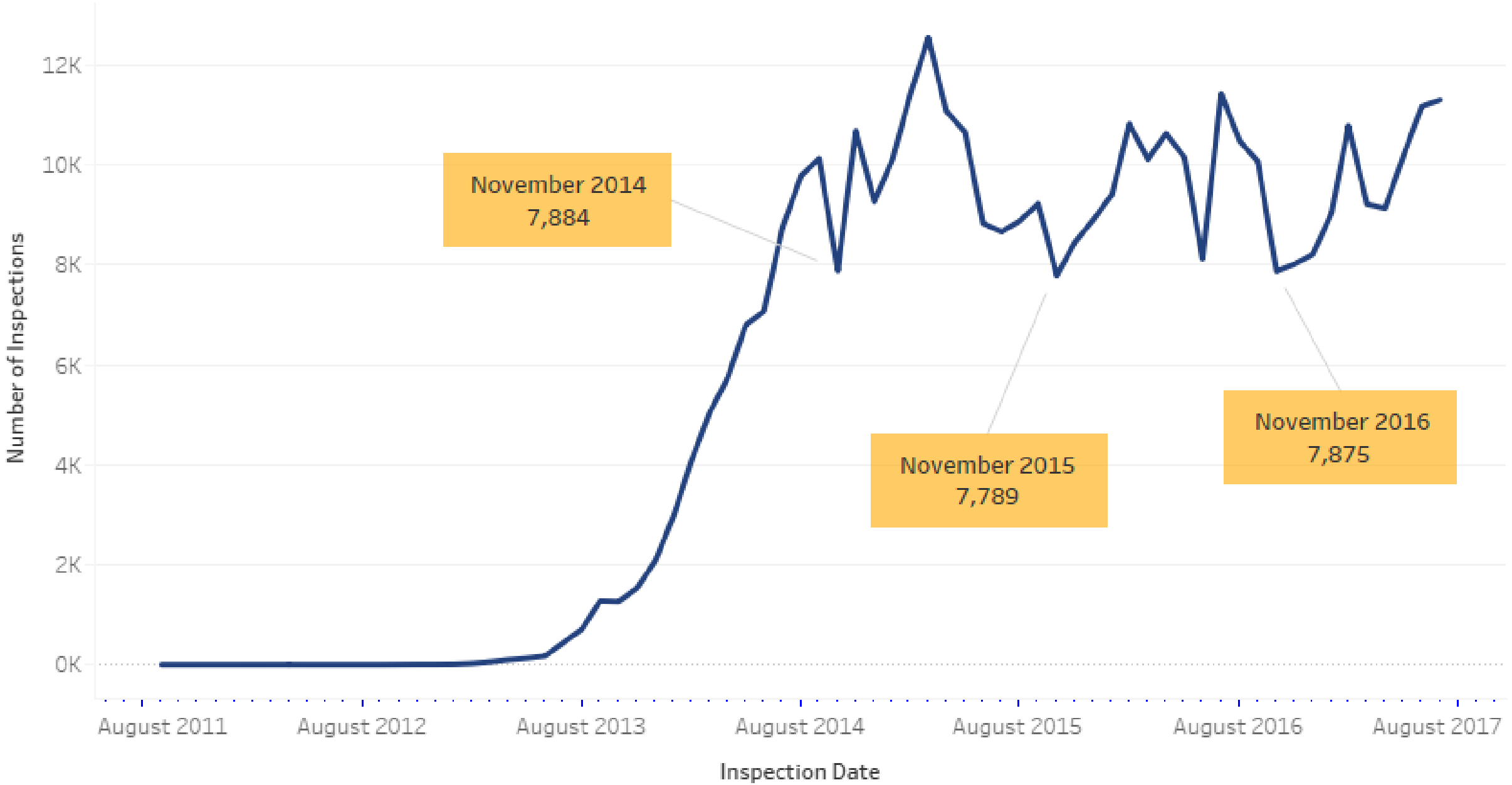
How does the number of inspections change over time?

Does the number of inspections increase or decreate over time?

Are there any peak times?

Is there any seasonal effect (like inspections being more common during cretain seasons or months)?

Q1: Number of Inspections



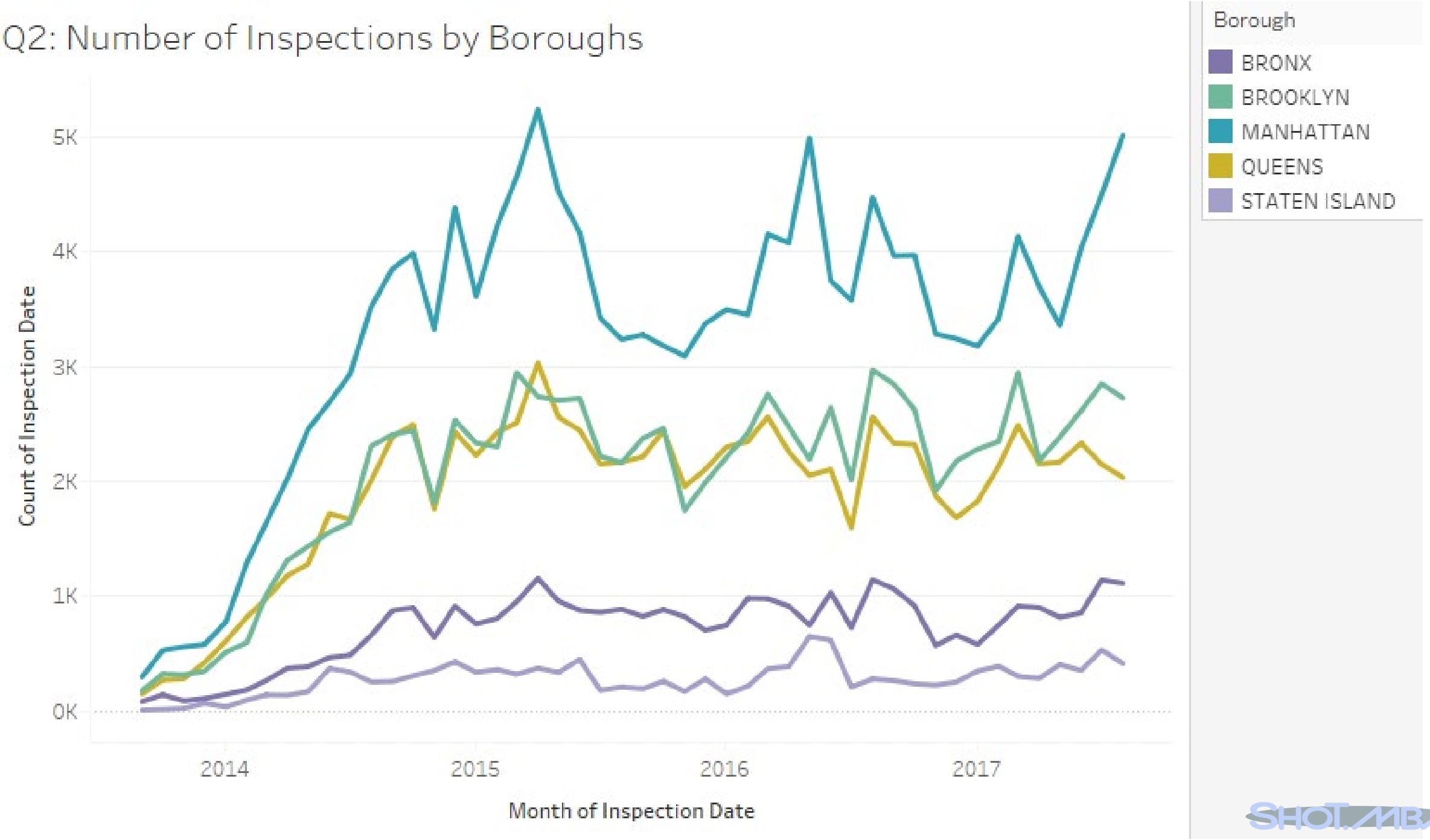
The visualization shows the number of restaurant inspections apparently started increasing in the last half of 2013. Around that time there was a vote on a legislative package to reform the City's restaurant inspection system casted by the City Council and the bills were passed of which includes to improve the lines of communication between the Department of Health and Mental Hygiene (DOHMH) and restaurant owners. It is thus safe to say the drastic increase of inspections into 2014 onwards is strongly correlated with a result of an effort of DOHMH's Consultative Inspection Program.

Another remark is that despite there are random spikes throughout years, the number of inspection dropped in November for three years in a row (2014 to 2016). We can assume this is due to the month has a Thanksgiving Day holiday for which most American families cook at home including inspectors', and lots of restaurants are closed nearly half of the Thanksgiving week. It should not be a surprise to anyone that fewer restaurant inspections are scheduled in November.

QUESTION 2:

Is there any difference in how the number of inspections changes over time in the 5 different boroughs of New York City?

Q2: Number of Inspections by Boroughs



From the visualization in Q1, we know the inspection program started in late 2013, so I omitted the pre-inspection program dates for this plot.

Even though the number of inspections differs by boroughs, they draw similar curves over time. Considering the total number of restaurants by boroughs according to a contributor to Quora which denotes: Manhattan – 10,625; Brooklyn – 6,646; Queens – 5,999; The Bronx – 2,396; and Staten Island 976 as of 8/23/2018, the hierarchy of the number of inspections in this visualization reflects the number of total restaurants.

Q2 (2): Total Number of Inspections

Month of Inspection Date	
July 2017	August 2017
11,173	11,307

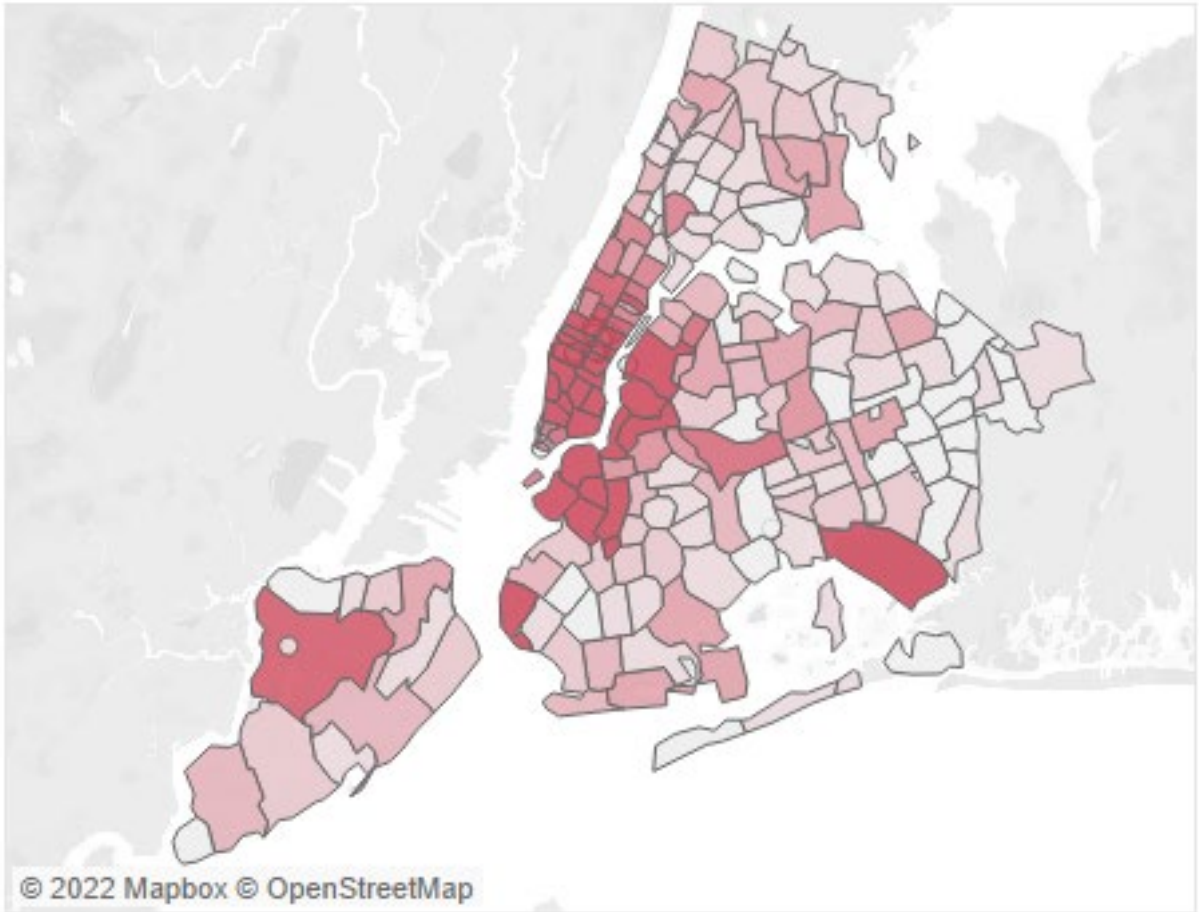
Besides above, we see the number of inspections in Manhattan increased at the end of this data period in Aug. 2017, while others decreased. This may be conditional, though, as the total number of inspections (all 5 boroughs) did not have a major impact compared to the previous month (merely 1.2% of increase).

QUESTION 3:

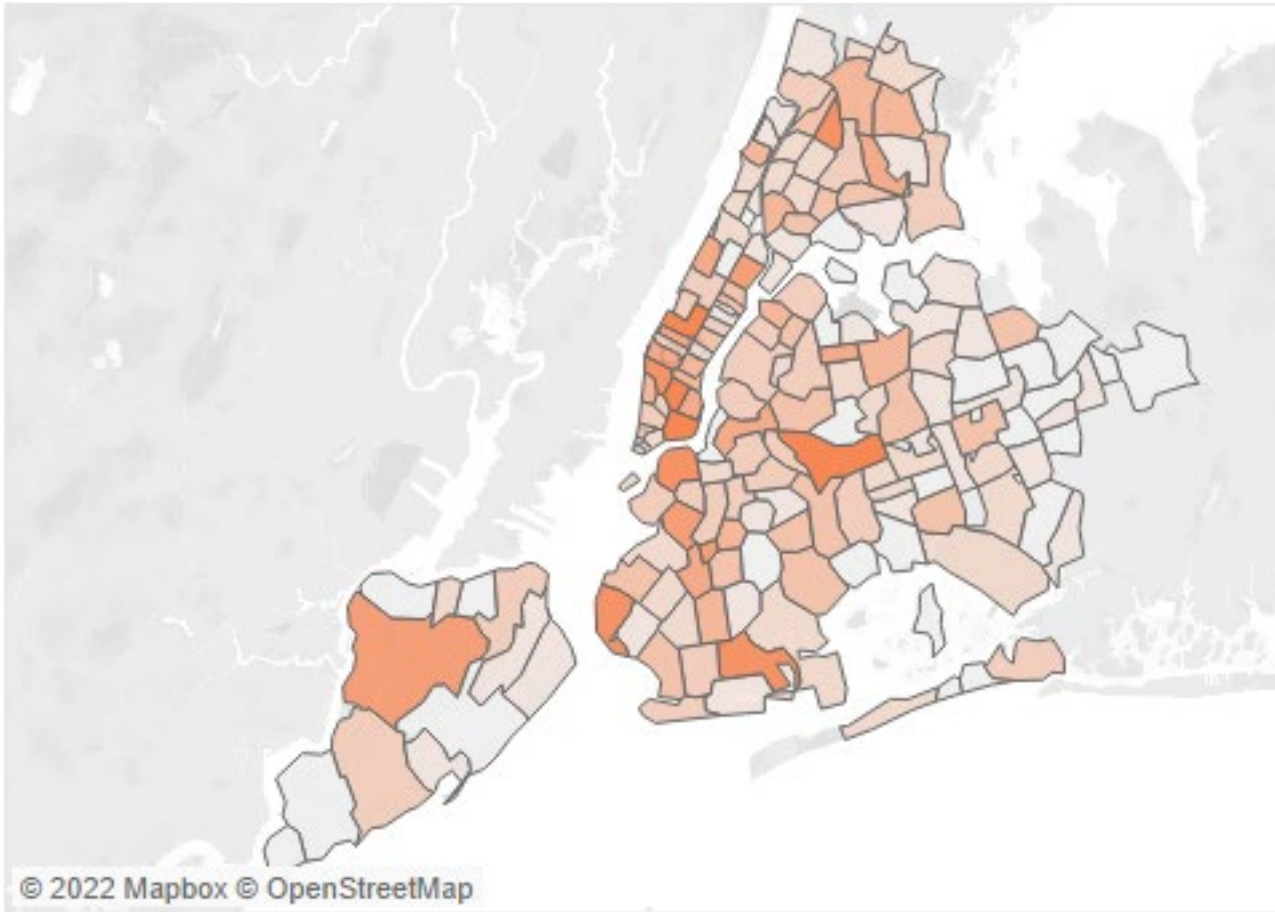
How are cuisines types distributed across the New York City area?

Are there geographical areas where certain cuisines tend to concentrate (that is, are there any areas where certain cuisines are more prevalent than others)?

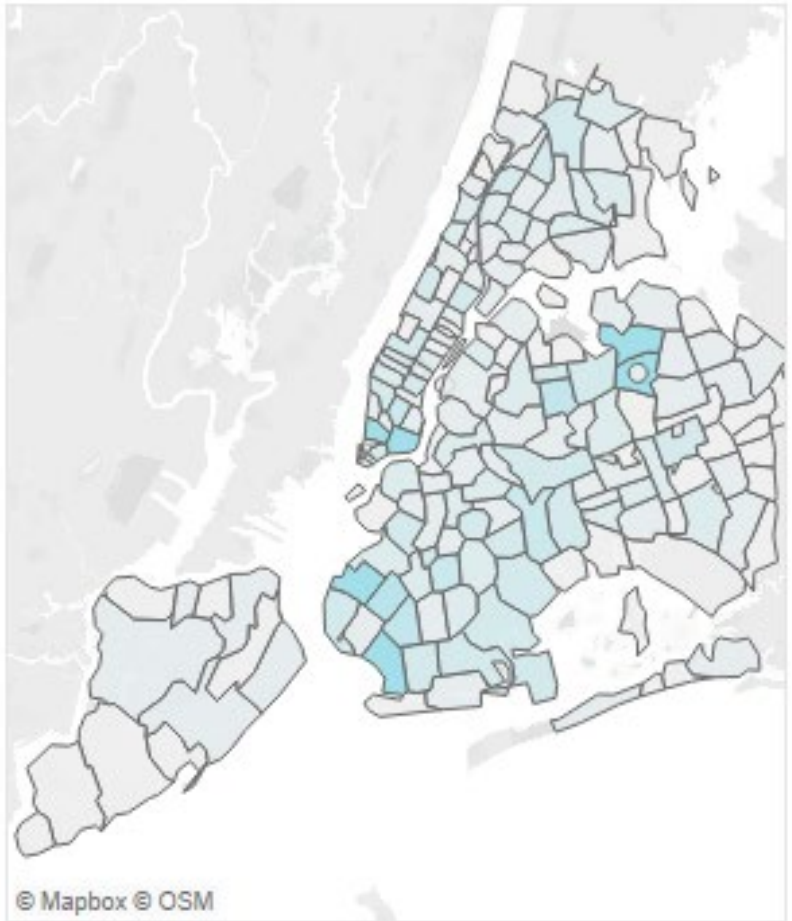
Q3: American



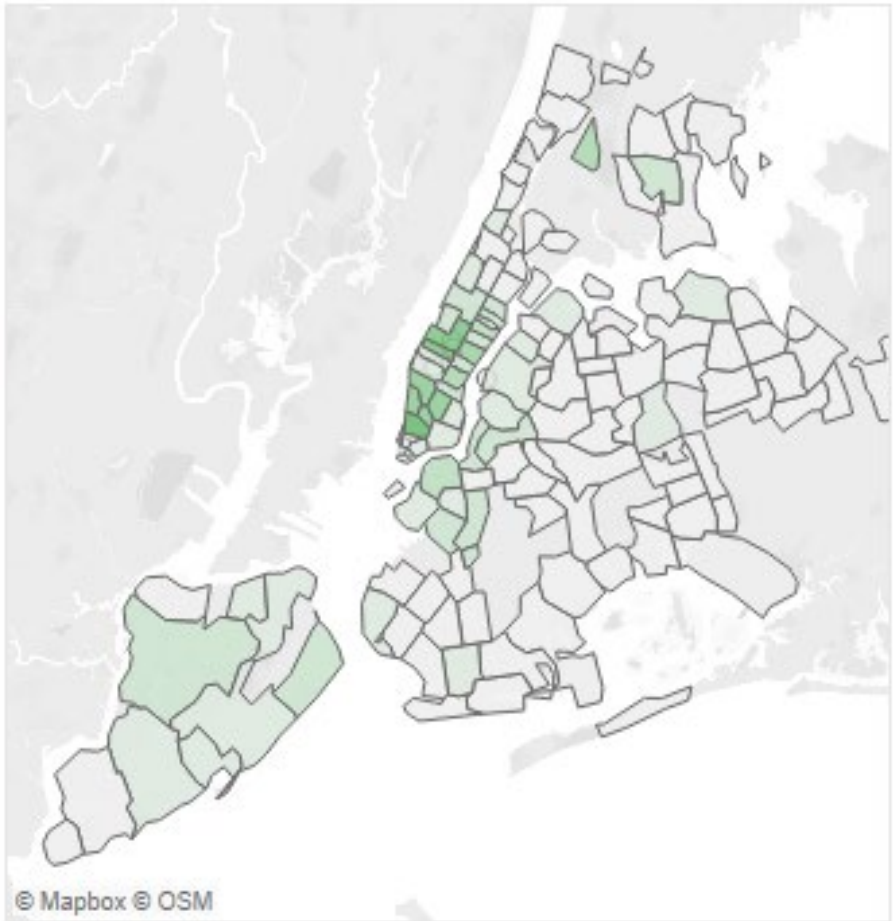
Q3: Pizza



Q3: Chinese

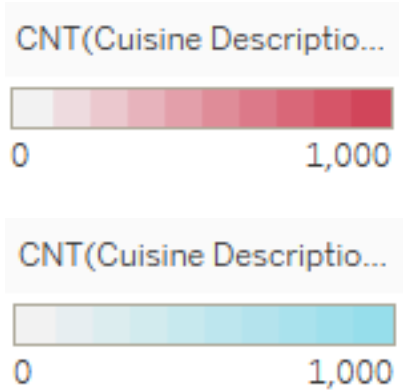


Q3: Italian



Q3: Latin

To answer the question, I focused on the top 5 most frequent cuisine types out of 84 filtering by the number of records. Those cuisine types are; “American”, “Chinese”, “Italian”, “Latin”, and “Pizza” in the maps colored by density. Density scale ends at 1000 for each map (means the area with over 1000 restaurants are in 100% solid color) instead of having each map have their own scales, as to see the concentration fairly across the city.



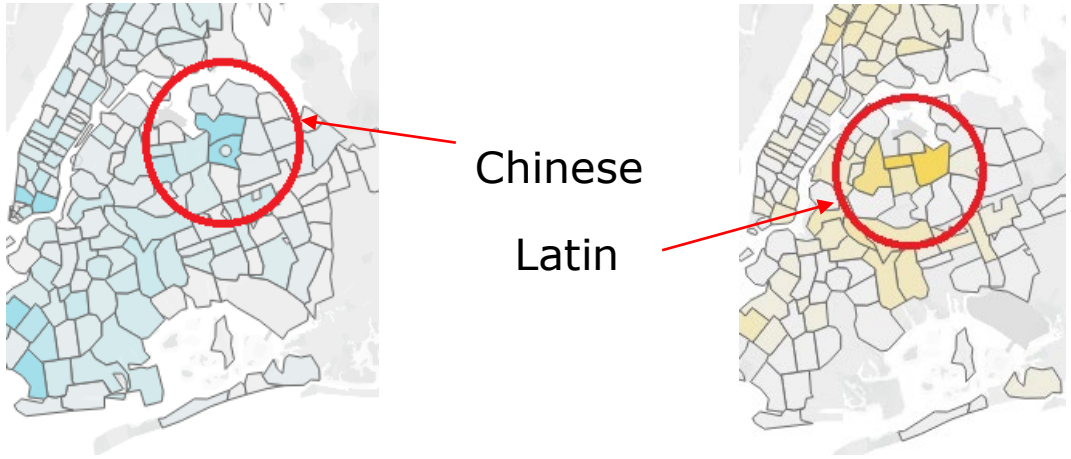
In the first page, American and Pizza restaurants seem to be relatively evenly distributed within the whole city by overall popularity of the areas.

Other three types on the contrary, show different trends for each cuisine type in the next page maps. For example, Chinese restaurants appear more in the China Town, Bay Ridge in Brooklyn, and some parts in Queens, whereas Italian restaurants appear more in lower Manhattan, and Latin restaurants are more prevalent in Queens and Bushwick area.

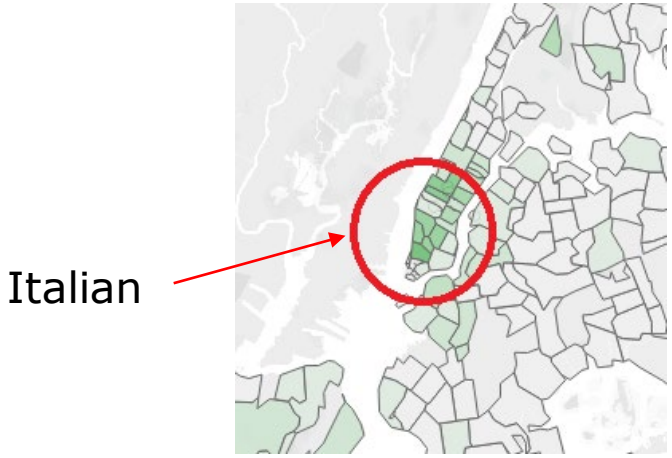
This demonstrates that unlike American or Pizza restaurants, the restaurants with ethnic features are distributed not depending on overall population of each segmented area but solely depending on demographics of the area.

That said, it may be wise you visit Flushing area in Queens when you're deciding which to eat between Chinese and Latin, or visit lower Manhattan for Italian dishes to have more options.

Flushing, Queens



Lower Manhattan

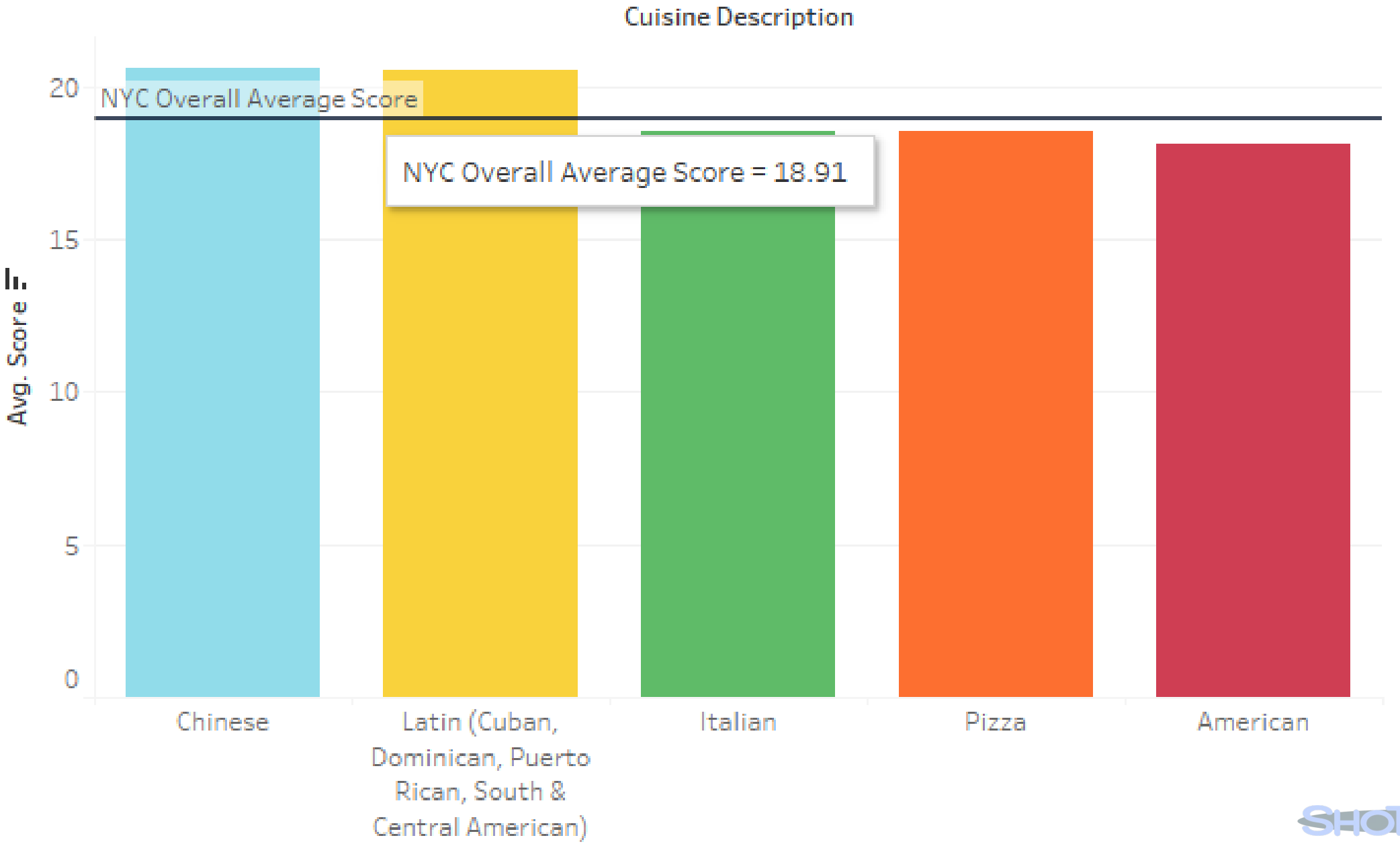


QUESTION 4:

How does the average score compare across different cuisine types?

Are there cuisines that tend to have consistently lower/higher average scores compared to the others?

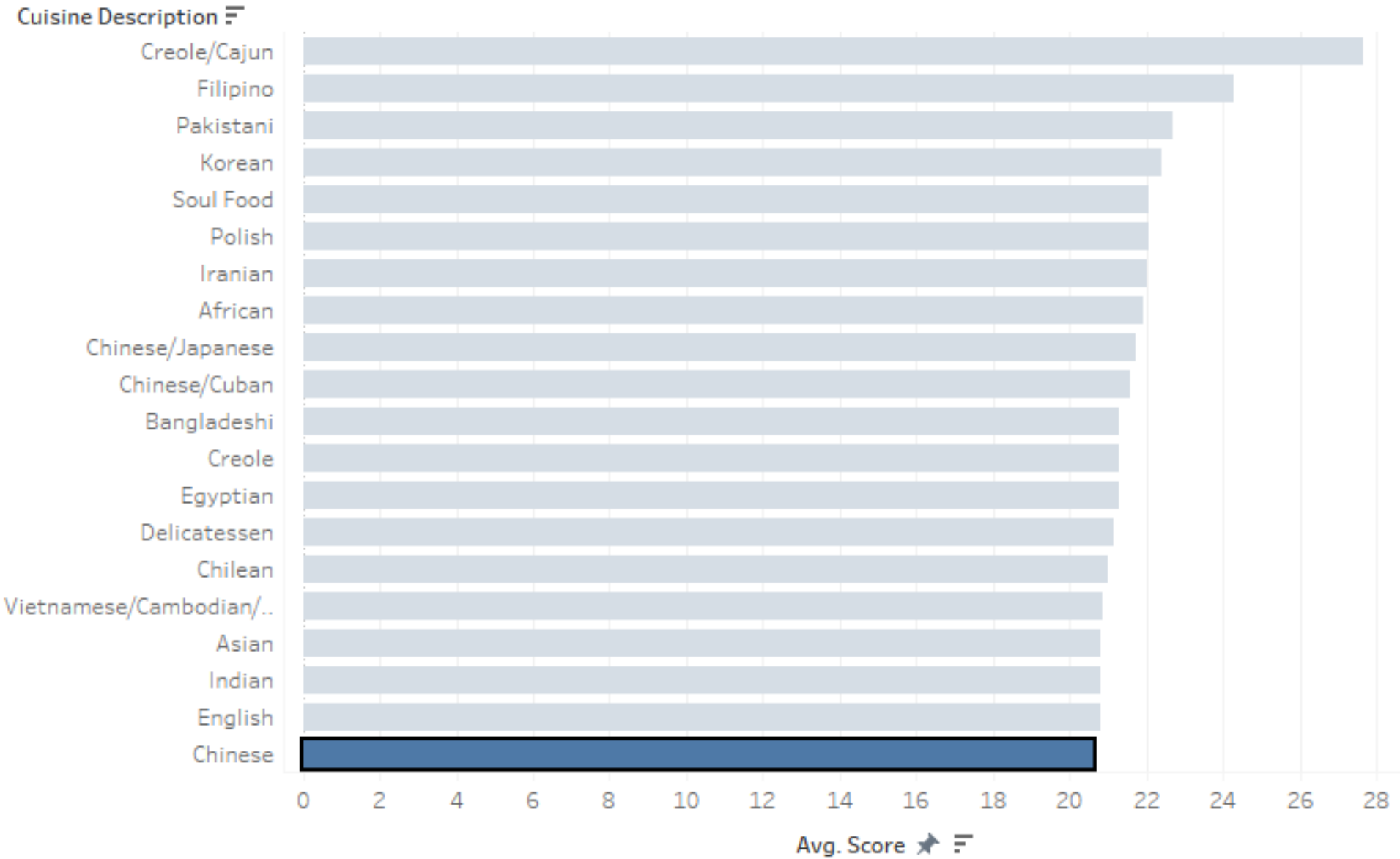
Q4: Average Inspection Score by Cuisine Types



For the same top 5 popular cuisine types from the previous question, according to the visualization, Italian, Pizza, and American restaurants score lower than NYC's overall restaurants average score amongst total 84 cuisine types (18.91 which is also lower than the average of these 5 cuisines (19.27). This indicates being a popular cuisine type does not necessarily mean they have well hygiene standards.

Furthermore, while Chinese restaurant's average score marks the highest of the top 5 popular cuisinses, it merely ranks at 20th in overall average as shown in the next visualization. We would like for the popular/frequent restaurants to be more considerate of health concerns as their food has more chances to get in our bodies.

Q4 (3): Average Inspection Score by Cuisine Types

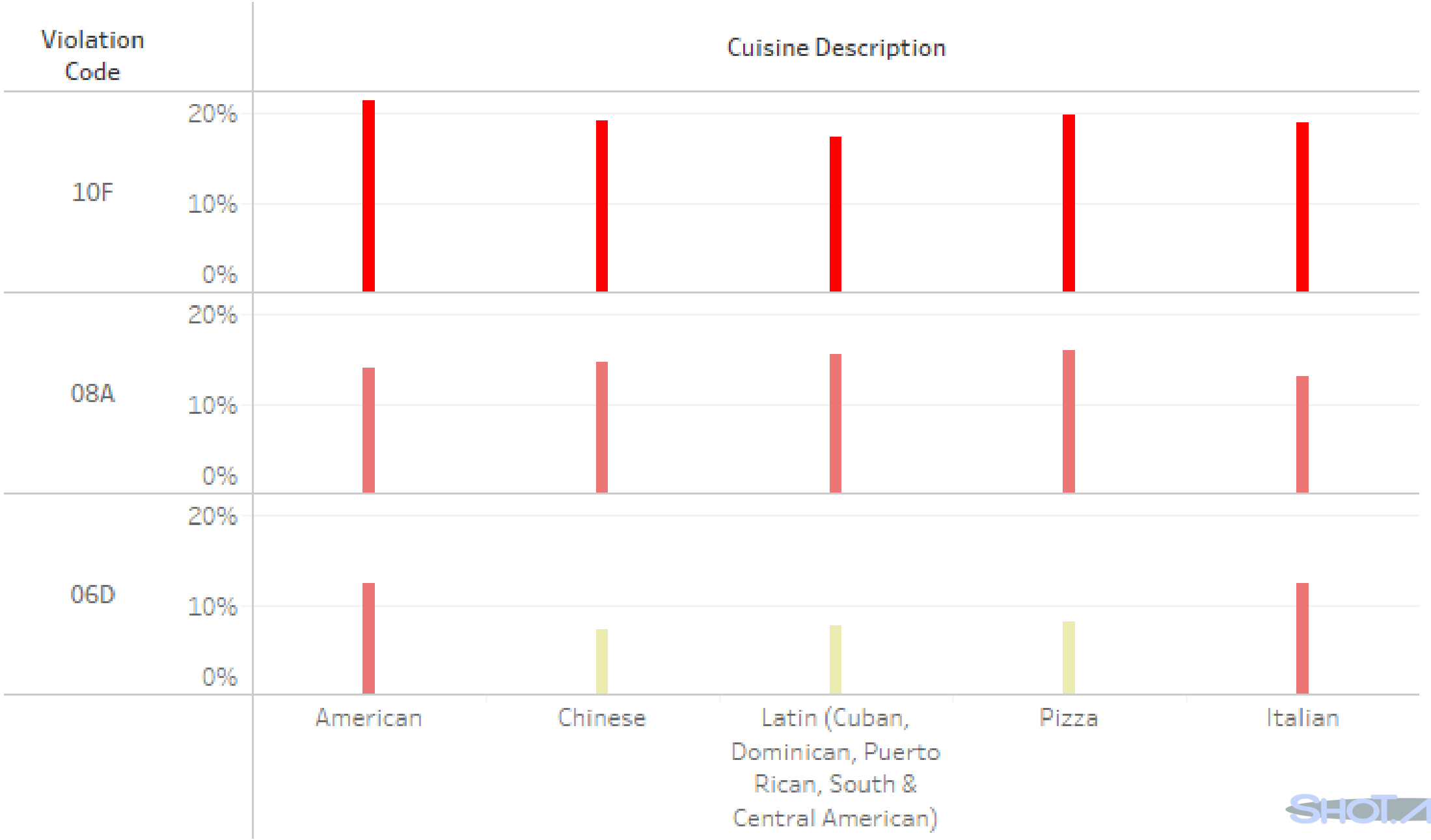


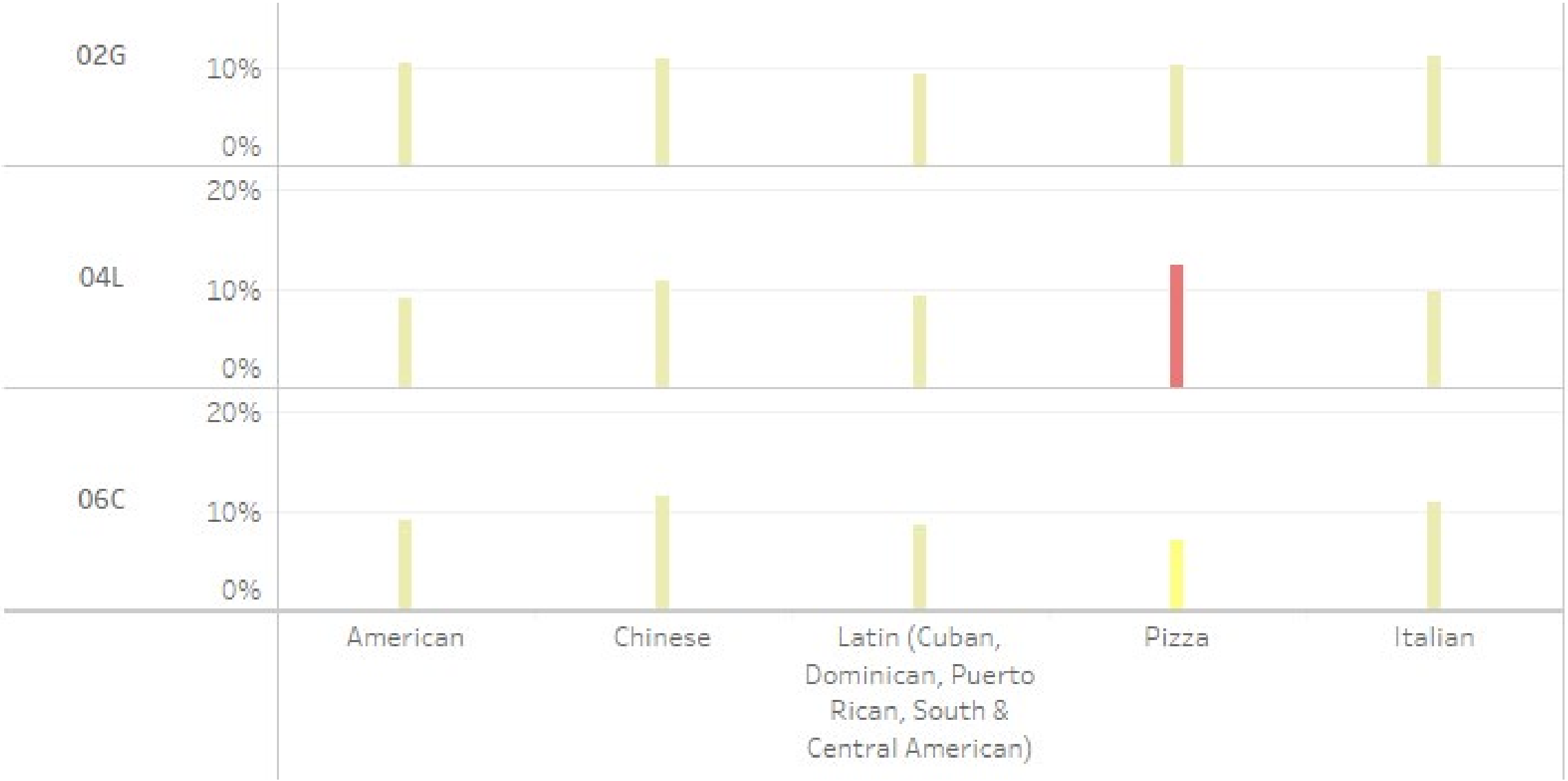
QUESTION 5:

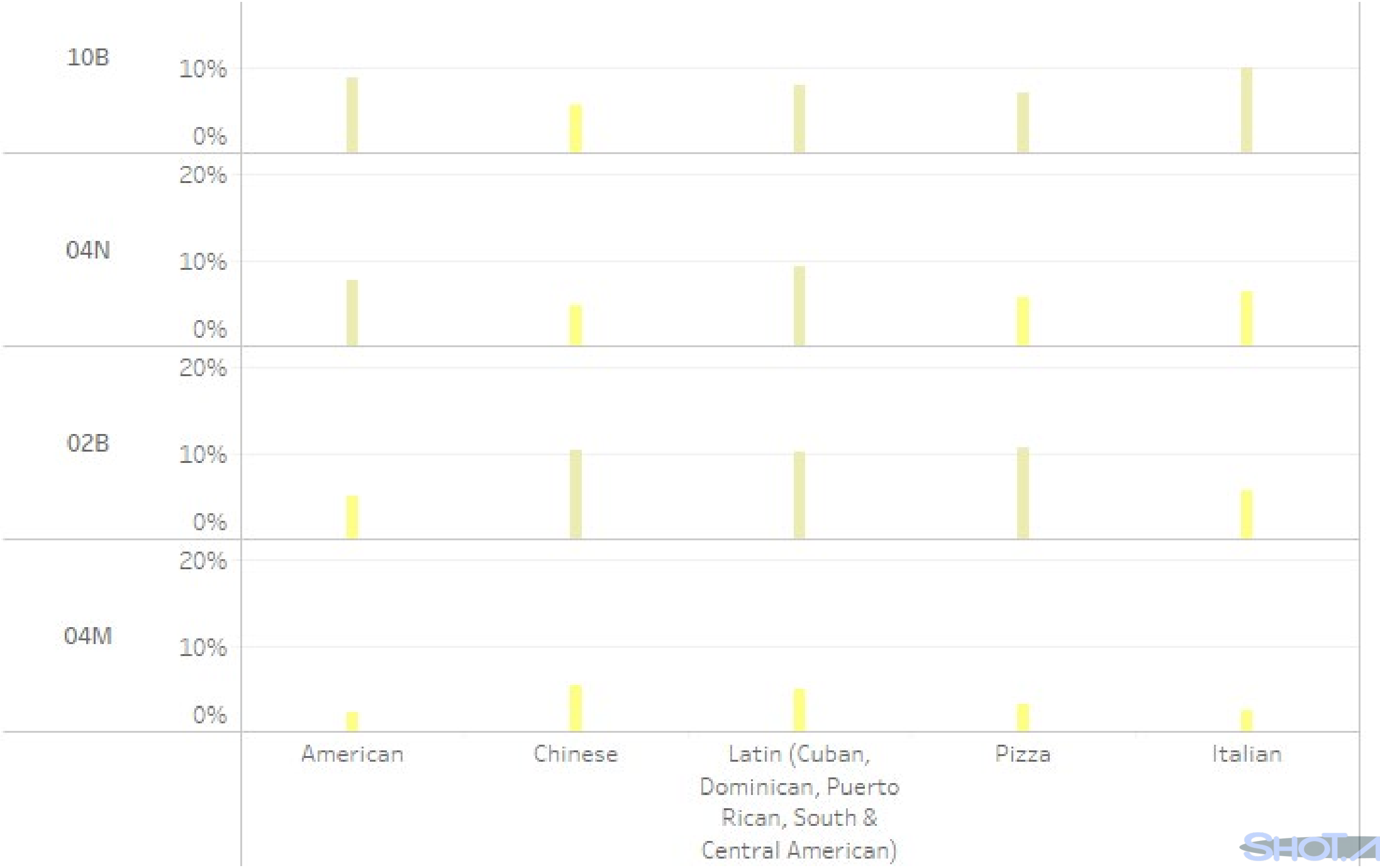
Is there a relationship between cuisine type and violation?

Do some cuisine types tend to have more of some type of violations that other cuisine types?

Q5: Percentage of Violations by Violation Codes




02G
10%
0%
04L
20%
10%
0%
06C
20%
10%
0%
American
Chinese
Latin (Cuban, Dominican, Puerto Rican, South & Central American)
Pizza
Italian


10B
10%
0%
04N
20%
10%
0%
02B
20%
10%
0%
04M
20%
10%
0%
American
Chinese
Latin (Cuban, Dominican, Puerto Rican, South & Central American)
Pizza
Italian

In order to find compatible trends, I chose top 10 violation codes amongst the top 5 cuisines. Each cuisine type shows similar violation code inclination - they are likely to violate with 10F and 08A altogether, and 04M is the least violated code.

One thing to note is that Pizza restaurants have relatively higher rate of 04L violation compared to other cuisine restaurants. For each violation code description, please find the list in the next page and see how a specific violation code for Pizza restaurants corresponds to iconic representaion of NYC.

What you may resort to from this visualization is that the top violation codes do not regard to direct food contract but more like to facility/establishment failures. While we could still demand restaurants' awareness as they are being fined, the violations are not severely directly harmful to human health, so the continuous and strict inspections are expected so that we will not be potentially a witness of critical tragedy.

*Violation codes (NYC DOH)

10F: Flooring improperly constructed and/or maintained, Non-food contact surfaces (wall, ceiling, floors) improperly constructed/maintained, Non-food contact surface (fixtures, decorative material, fans, etc.) not properly maintained or equipment not properly maintained
08A: Conditions conducive to pests, Prevention and control measures not used for pest management, Door openings into the establishment from the outside not properly equipped, Pest monitors incorrectly used, Contract with pest exterminator or record of pest extermination activities not kept on premises
04M: Evidence of roaches
04L: Evidence of mice

Photo credit: forbes.com

CONCLUSION:

The visualizations from NYC Restaurant Inspections data revealed a lot, yet left us with extended questions such as “how do we lower the violation cases for establishment failures?” or “how we can raise awareness with health concerns at numerous number of Pizza or American restaurants in NYC?”

Also, the popular restaurants we observed in this project mostly fell into indoor establishment category for its nature, but we may also explore the hygiene standards of vendor trucks or outdoor food stands down the road because since Covid19 crisis in 2020, people have used more of their services for take-out meals.

As I noted with the visualizations, we should continuously watch the restaurant inspection procedure and results in order to keep ourselves safe and enjoy the variety of food that the city offers.

RESOURCES:

- https://www.kaggle.com/datasets/new-york-city/nyc-inspections
- https://www1.nyc.gov/assets/doh/downloads/pdf/rii/ri-violation-penalty.pdf
- https://council.nyc.gov/press/2013/10/09/435/
- https://www.quora.com/How-many-restaurants-are-there-in-New-York-City/answer/Leonard-Kreicas?ch=10&oid=96531472&share=d97db7d4&srid=uPTrHD&target_type=answer
- https://public.tableau.com/app/profile/shokolatte.tachikawa/viz/CourseraNYUNYCRestaurantInspection_ShokolatteTachikawa/DistributionMap
- https://www.coursera.org/learn/information-visualization-fundamentals