

Objective

- Based on collision data analysis, surface creative ideas that will help reduce accidents in Brooklyn.

Dataset

- Bigquery-public-data:new_york.nypd_mv_collisions
- Analysis based on 2013 - 2017 data.
- See appendix for data assumptions and methodology.

Audience

- Brooklyn City Council and Urban Safety Leaders

Executive Summary: Ideas to reduce motor vehicle accidents and achieve Vision Zero (e.g. zero fatalities from motor vehicles in Brooklyn)

Brooklyn Motor Vehicle Accidents Overview

- Total number of police reported accident injuries have dropped by 29% and fatalities have dropped by 39% (2013 vs 2017). Yet, there's still room for improvement as 41 people were killed in 2017 (10 person increase from 2016).
- In 2017, roughly half of the fatalities from motor vehicle accidents were pedestrians.
- The three most common contributing factors to accidents with injuries were driver inattention/distraction, failure to yield right-of-way, and traffic control disregarded (2017). It's likely that cell phone usage while driving is influencing these driver errors.

Ideas to increase safety for Brooklyn community members (with a core focus on pedestrian safety):

1. Launch targeted education / solutions for neighborhoods that are in areas with high density of pedestrian injuries.
2. On main roads with high pedestrian risk, install community influenced artwork that highlights driving safety best practices.
3. Around the most dangerous intersections, increase police visibility and utilize a branded social media hashtag (i.e. #BrooklynVisionZero) to further crowdsource safety improvement ideas.
4. Increase ticketing and laws for distracted driving. Provide citizens free *safety branded* phone accessories for completing distracted driving education courses.
5. Establish bike safety SWAT team to address safety improvement needs around Williamsburg Bridge and B. Q. Expressway.

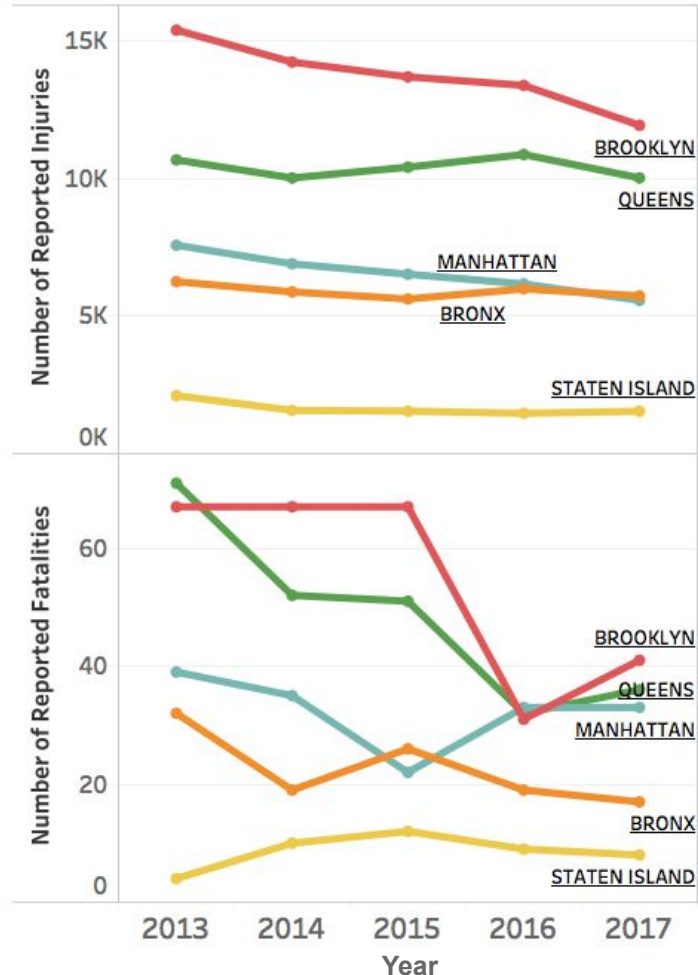
With Vision Zero initiatives across New York City, progress has been made on lowering the number of fatalities and injuries from motor vehicle collisions.

In Brooklyn, we see a gradual decline year over year in total number of reported injuries.

2016 was the five year low in motor collision fatalities. However, in 2017 the trend reversed with 10 more fatalities than 2016.

Incorporate learnings from 2016 to inform future safety measures.

Injury / Fatality Volume by NYC Borough



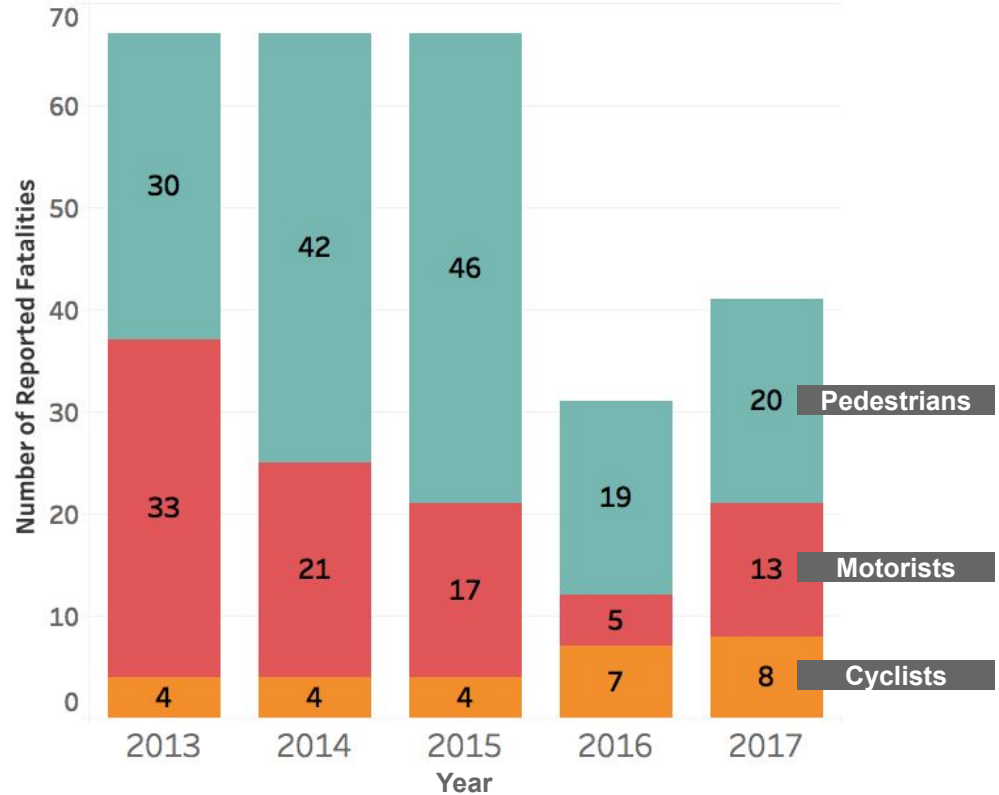
¹ Brooklyn is the largest borough by population (2.65M in 2017).

Pedestrians are at the highest risk of being killed in a motor vehicle collision.

On average, between 2013 and 2017, 57% of accident fatalities were pedestrians.

Given finite resources to reduce accidents, it's recommended to **prioritize enhancing pedestrian safety as the core focus of new projects/legislation.**

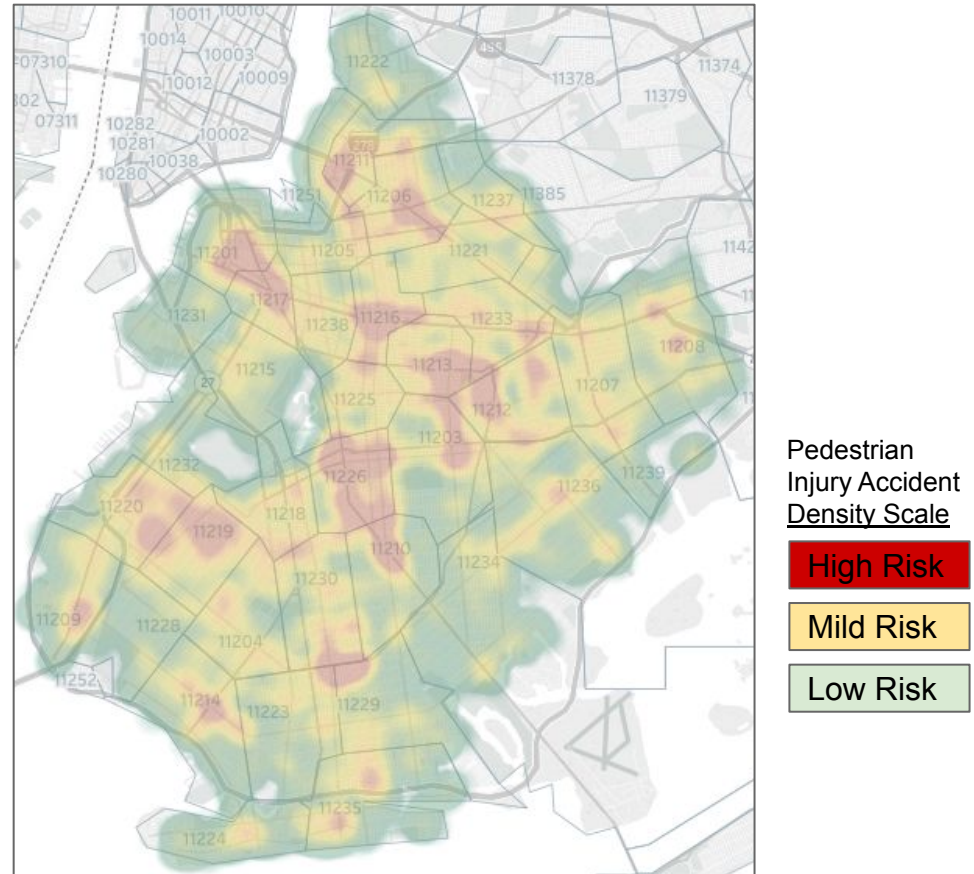
Brooklyn Motor Collision Fatalities



Launch targeted education / solutions for neighborhoods that are in areas with high risk/density of pedestrian injuries.

- 1) Partner with social media influencers on pedestrian safety education campaigns.
- 2) For older demographics, design targeted mail education resources + hand out resources in the community.
- 3) Continue school education programs on street crossing safety.
- 4) Embed flashing sensors in the crosswalk that warn peds of an oncoming vehicle. Use sound alarms/sensors to alert jaywalkers of illegal behavior.

Brooklyn Zip Codes Heatmap
Reported Accidents with Pedestrian Injuries (2015 - 2017)

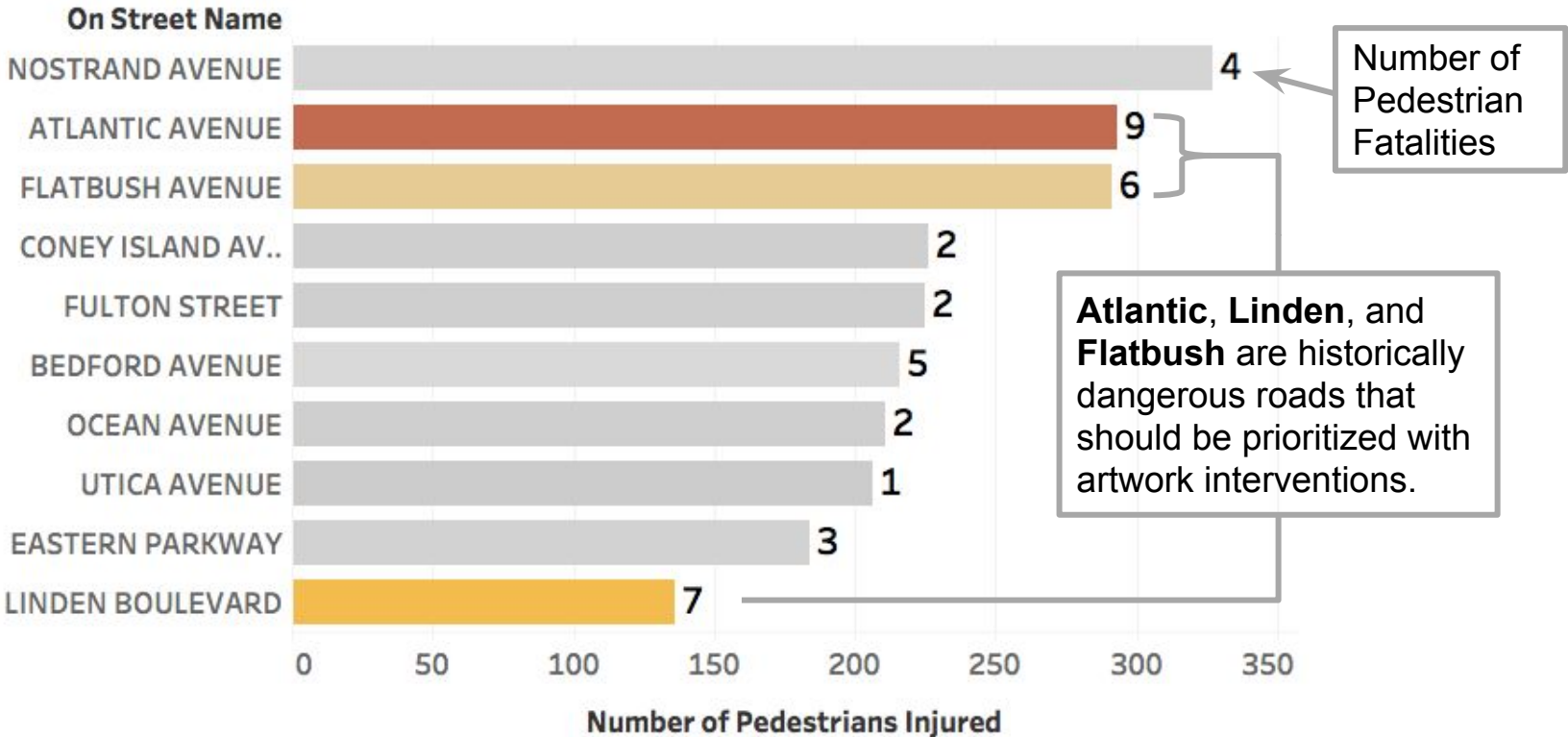


¹ See appendix for more granular view of top 20 zip codes with the most reported pedestrian injuries.

² Detailed street names can be viewed in the Tableau dashboard that would be shared with city council.

On roads with high pedestrian risk, install community influenced artwork that highlights driving safety best practices.

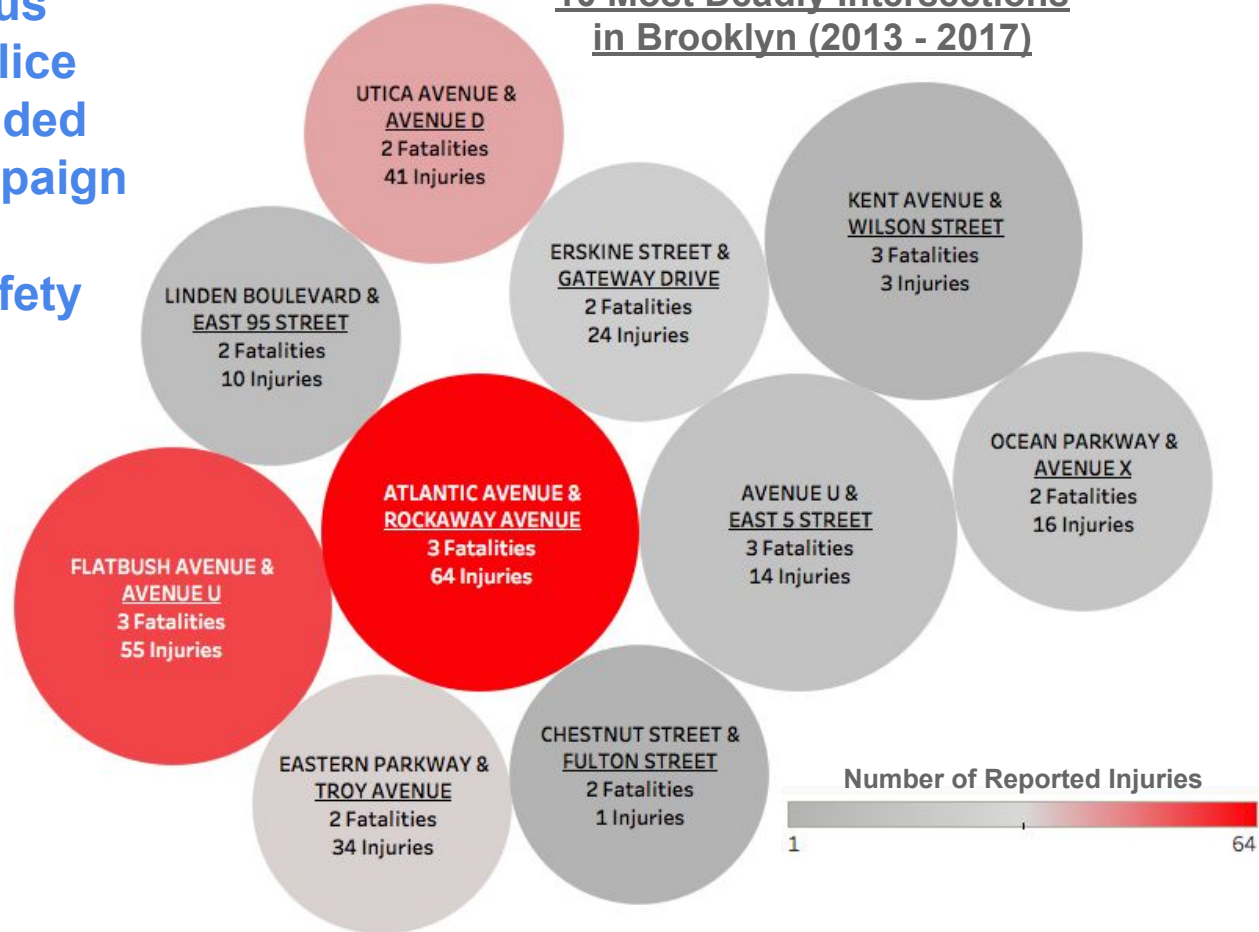
Most Dangerous Streets for Pedestrians in Brooklyn (2013 - 2017)



Around the most dangerous intersections, increase police visibility and utilize a branded social media hashtag campaign (i.e. #BrooklynVisionZero) to further crowdsource safety improvement ideas.

- Community members could share a photo on social media and tag the photo with the safety branded hashtag.
- The post description could contain the safety improvement idea. Each month Brooklyn city council could share prizes or spotlight top ideas.

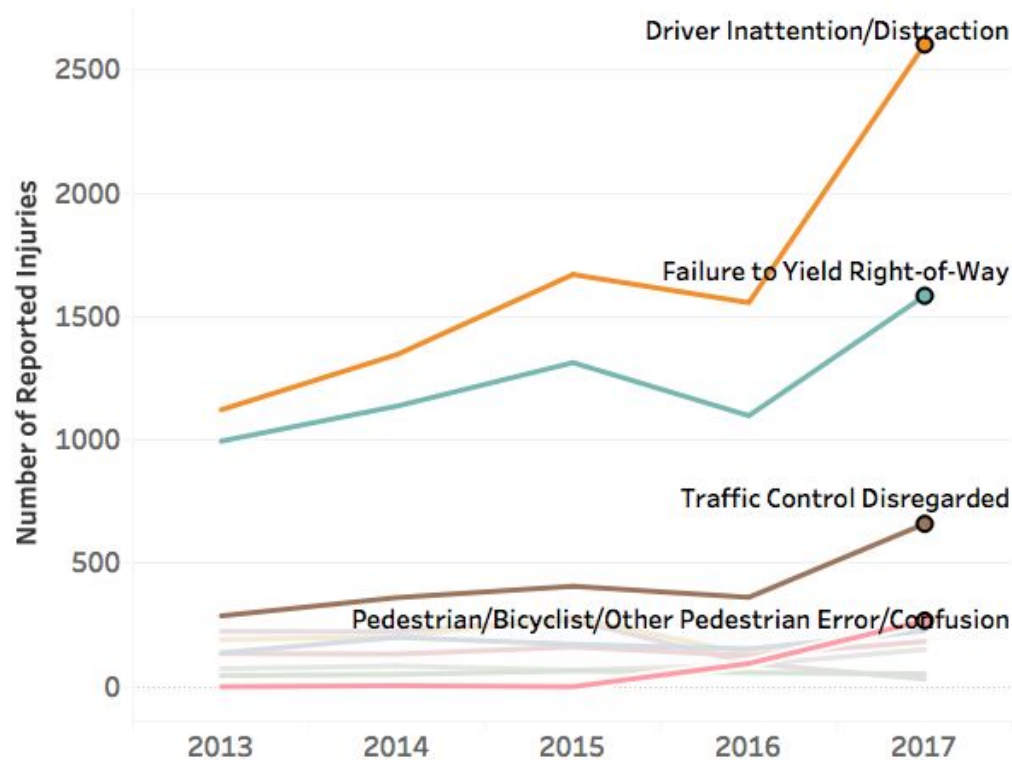
10 Most Deadly Intersections in Brooklyn (2013 - 2017)



¹ Fatalities and injuries represent an aggregate of (Motorists, Cyclists, Pedestrians).

Increase ticketing and laws for distracted driving. Provide citizens free *safety branded* phone accessories for completing distracted driving safety course.

Top 10 Reported Contributing Factors to Accidents with Injuries



- Highlighted are four accident contributing factors that are increasing in reported frequency vs previous years.
- It's likely that mobile phone usage is influencing the rise of these *distraction related* driver / pedestrian errors.
- Increase ticketing/law robustness for mobile phone usage while driving and crossing streets.
- Incorporate mobile phone distractions as a segment of the driving safety course.

¹ Reported injuries represent an aggregate of (Motorists, Cyclists, Pedestrians).

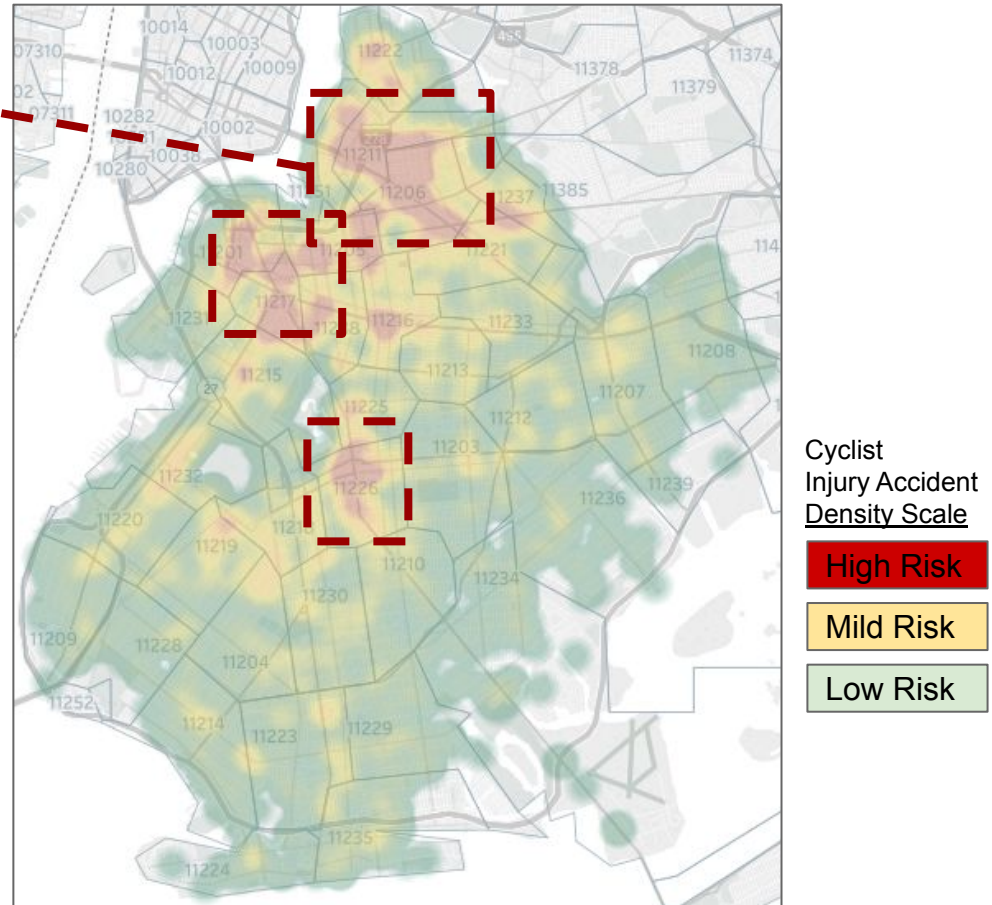
Establish bike safety SWAT team to address safety improvement needs around Williamsburg Bridge and B. Q. Expressway.

Brooklyn cyclists fatalities are on the rise.

Year	2013	2014	2015	2016	2017
Fatalities	4	4	4	7	8

- Accidents with cyclist injuries are clustered around three primary high risk hubs.
- As bike/scooter sharing programs grow in adoption, community education and road design safety measures are proactively needed.

Brooklyn Zip Codes Heatmap
Reported Accidents with Cyclist Injuries (2015 - 2017)



Conclusion: Continued focus on pedestrian safety saves lives!

Additionally, measures that improve pedestrian safety also have positive influence on reducing overall frequency of motor vehicle accidents.

Recap of ideas to increase safety for Brooklyn community members:

1. Launch targeted education / solutions for neighborhoods that are in areas with high density of pedestrian injuries.
2. On main roads with high pedestrian risk, install community influenced artwork that highlights driving safety best practices.
3. Around the most dangerous intersections, increase police visibility and utilize a branded social media hashtag (i.e. #BrooklynVisionZero) to further crowdsource safety improvement ideas.
4. Increase ticketing and laws for distracted driving. Provide community members free *safety branded* phone accessories for completing distracted driving education course.
5. Establish bike safety SWAT team to address safety improvement needs around Williamsburg Bridge and B. Q. Expressway.

Appendix

Pedestrian Injury Heatmap Supplemental Resource

High Risk Zip Code Table

Target Intervention Zip Codes: Top 20 Brooklyn Zip Codes by
Number of Reported Pedestrian Injuries (2015 - 2017)

Zip Code	Number of Pedestrians Injured	Number of Pedestrians Killed
11226	452	4
11207	387	6
11212	369	3
11203	344	1
11220	341	0
11213	331	3
11236	321	7
11230	316	2
11219	310	1
11208	298	5
11206	295	0
11204	279	0
11235	266	5
11233	264	8
11211	262	0
11229	260	7
11210	260	1
11214	247	7
11216	246	3
11201	244	3

Data Assumptions and Data Improvements

Data Assumptions

- Data Source: bigquery-public-data:new_york.nYPD_mv_collisions
- Analysis based on data from 2013 - 2017 (incomplete data for 2012 and 2018).
- Some misalignment between aggregate and granular fatality metrics. For this analysis, a derived fatalities metric was used which takes the sum of motorists, cyclists, and pedestrians fatalities.
- Large percent of accident contributing factors are unspecified when the reporting officer is unaware of such factors. It's assumed that the contributing factors reported are still useful in highlighting overall trends influencing accidents.

Data Improvements Ideas

- Using lat and long data, predictive model could be used to fill in borough labels when missing.
- Adding severity of injuries to the dataset would be useful to help drive prioritization of location interventions.
- Adding demographics data on people involved in the accidents would help identify certain segments of the community that are higher risk of injury (which could guide education outreach).

Analysis process used to surface data insights

Question

- Reviewed the analysis question and developed strong grasp on our goal deliverable
- Collected community context outside the data to better inform QA and potential insights

Wrangle

- Accessed the raw data via BigQuery connection from Tableau
- QAed the data to catch any data issues / gaps
- Completed data transformations needed for downstream analysis

Explore

- Summarized, grouped, visualized the data
- Recorded observations along the way

Insights

- Pulled most impactful observations from explore phase to form key ideas + insights
- Built narrative outline using observations and key recommendations

Communicate

- Used insights outline to guide deck structure / slides
- Polished data visualizations and narrative to resonate with city council target audience

Steps to replicate analysis

1. In practice, Tableau notebook would be shared with others to view data exploration and insights.
2. Connect Tableau notebook to BigQuery “nypd_mv_collisions” public data table.
3. The following custom SQL query was used to establish the base dataset for exploratory analysis:

```
SELECT *,  
number_of_cyclist_killed + number_of_motorist_killed + number_of_pedestrians_killed AS killed_derived,  
CASE WHEN on_street_name <> " AND cross_street_name <> " THEN  
  CONCAT(on_street_name, ":", cross_street_name) ELSE NULL END AS intersection  
FROM `bigquery-public-data.new_york.nypd_mv_collisions`  
WHERE EXTRACT(YEAR FROM timestamp) > 2012 AND  
EXTRACT(YEAR FROM timestamp) < 2018
```