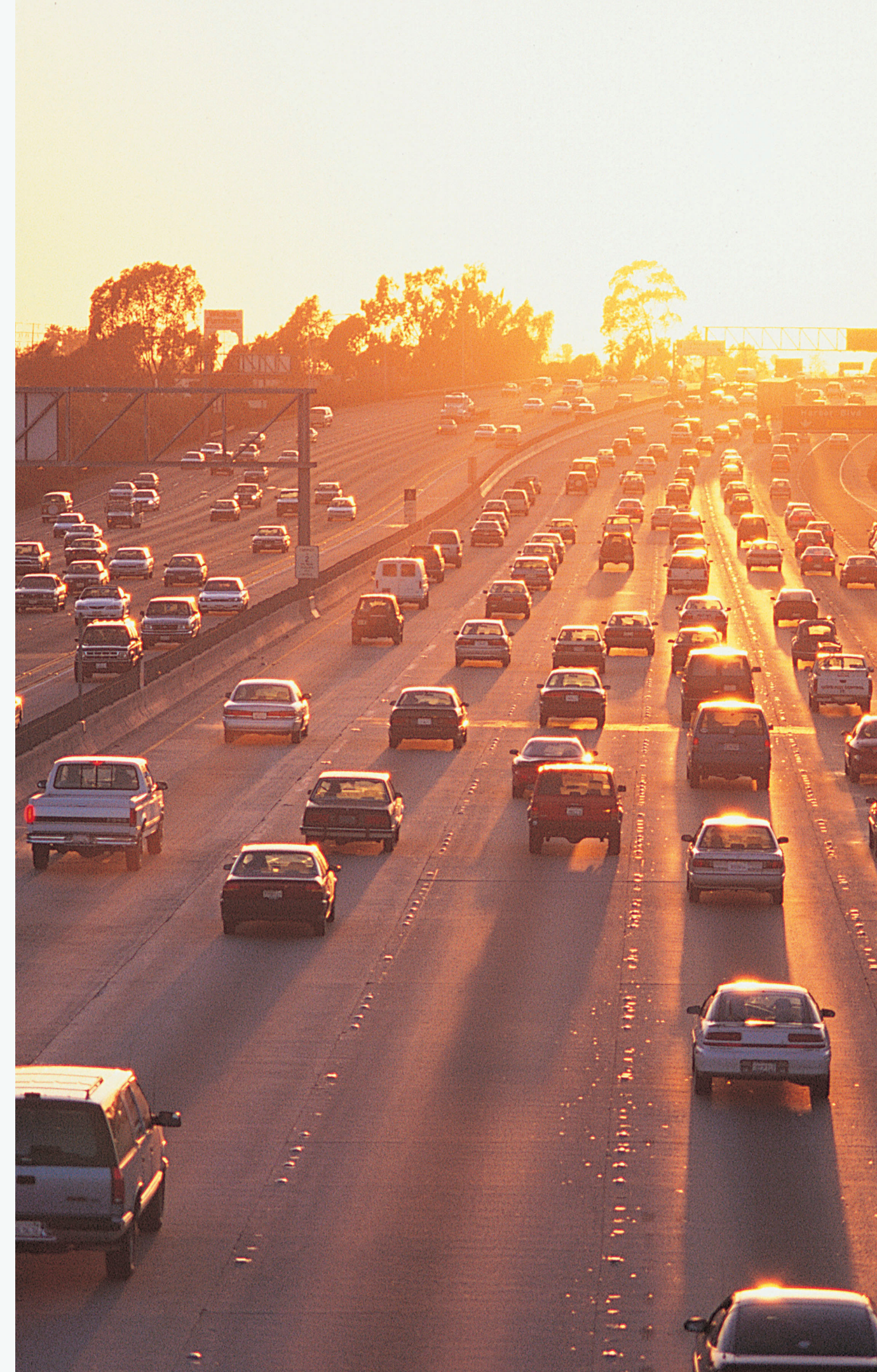


AN IN-DEPTH ANALYSIS INTO MOTOR VEHICLE COLLISIONS FROM 2014-2017

# Making Brooklyn Roads **Safer**

A Presentation to the Brooklyn City Council  
by Jessica Uwoghiren  
29-Apr-2021





# Executive Summary

From 2014 – 2017, Brooklyn had **190,883** collisions which accounted for ~22% of total collisions in New York. Here are some key insights:

211

deaths



53,427

injuries

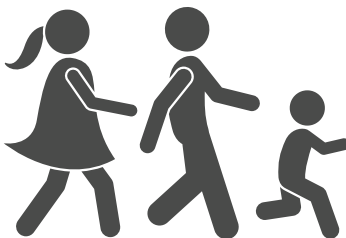


131

avg. collisions  
per day



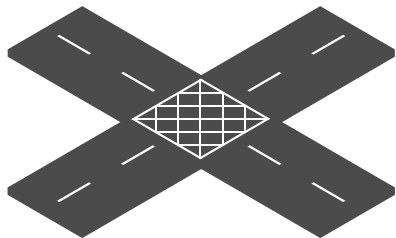
61%  
of total deaths  
were **pedestrians**



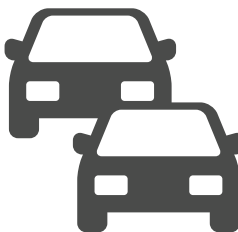
Top 3  
Contributing  
factors



Distracted Driver



Failure to yield Right of way

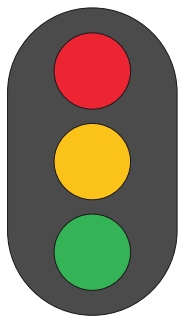


Backing unsafely

## What can we do?



Provide incentives to individuals and companies to help reduce number of motor vehicles plying the roads.

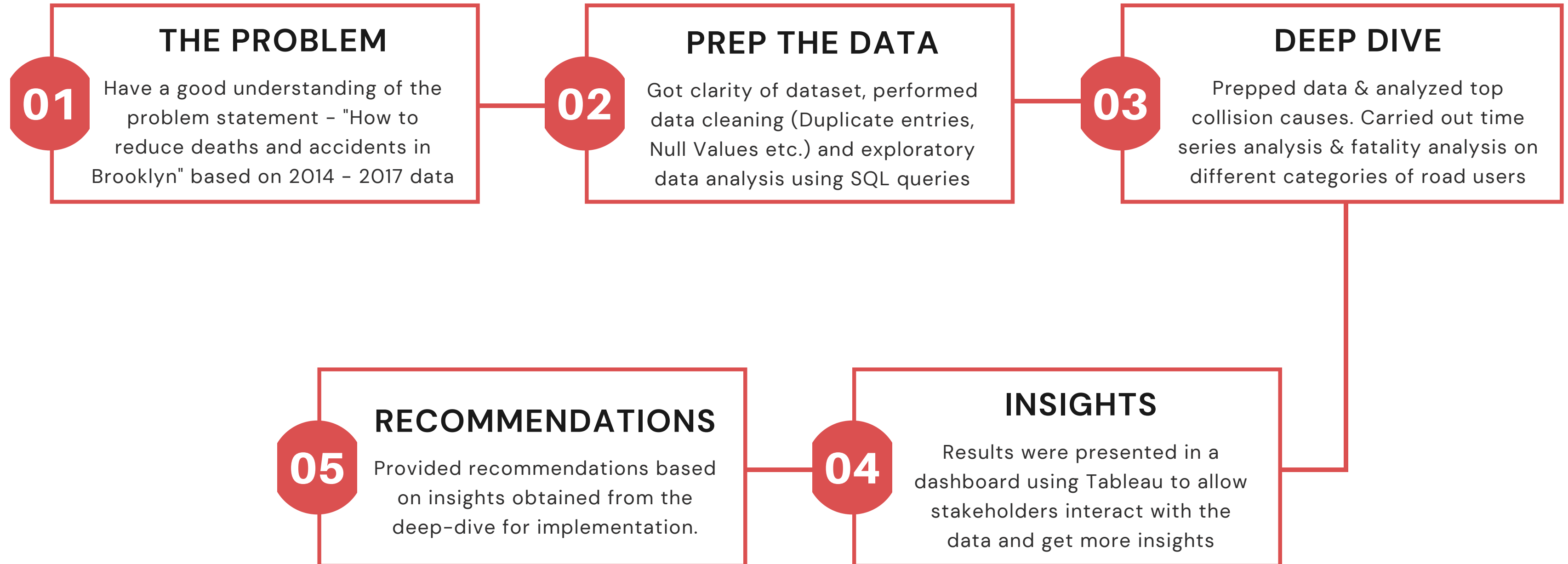


Begin implementation of short-term solution in collision-prone zones such as Zip code areas – 11239 & 11229.



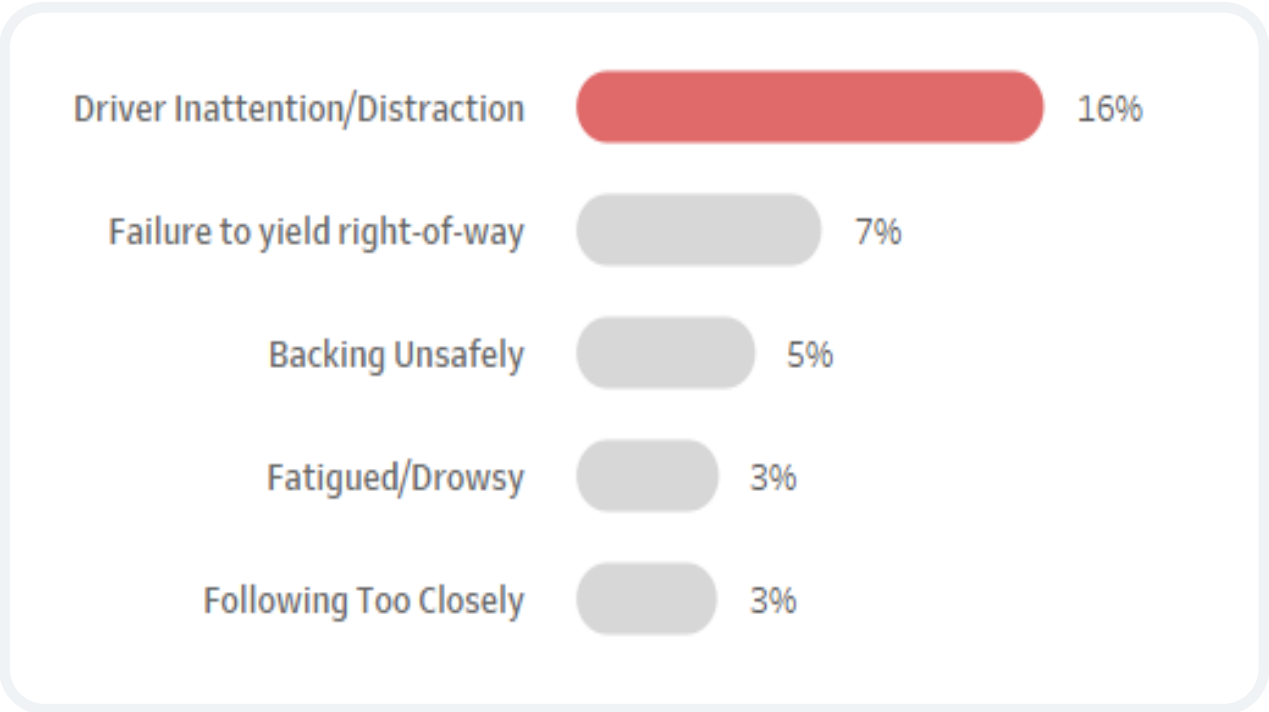
Increased frequency of driver retraining and stringent fines for repeat offenders.

# Analysis Approach



# Key Insights

Top 5 collisions causes



*\*85% of collisions were caused by "unspecified" reasons*

Interpretation of results

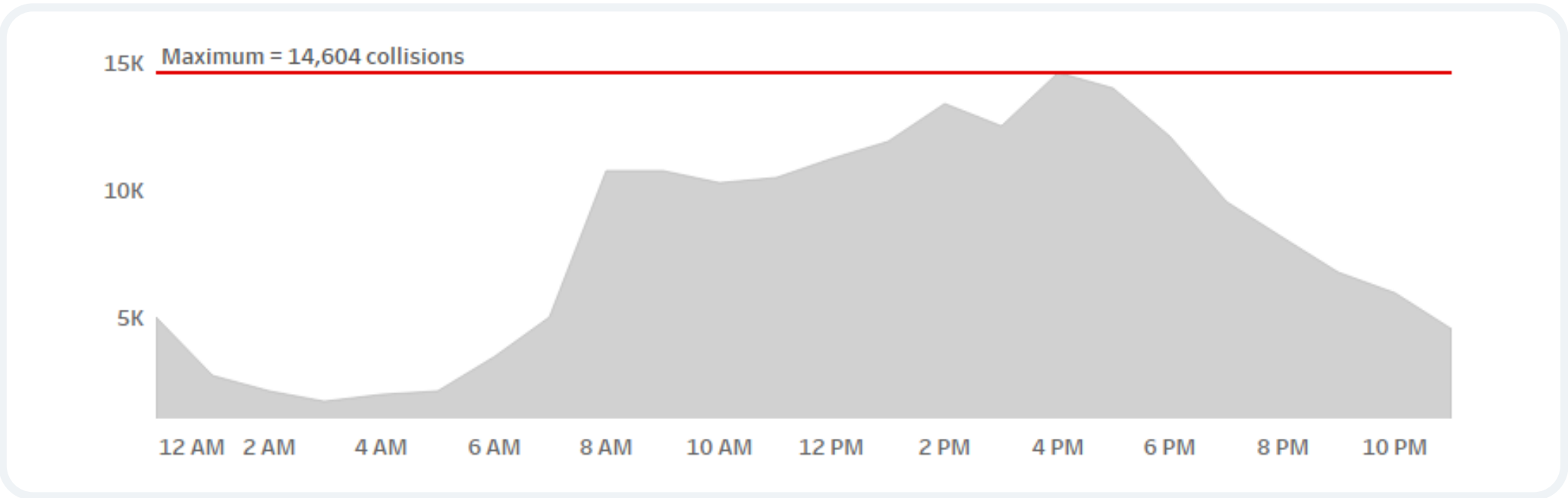
Below are some key insights from the analysis of collisions in the City of Brooklyn from 2014 – 2017

- The top 5 specified causes were Driver errors with "Driver Inattention" leading to 16% of collisions
- 11236 was the Zip Code with most collisions (7,311) & deaths (16) while 11233 had the highest death rate – 4 deaths for every 1000 collisions that occurred
- Most accidents occurred at 4PM & 5PM ("rush hour") accounting for 15% of the total collisions. Friday had the most collisions (29,537)
- Pedestrians were the most vulnerable of road users having 61% of all deaths, followed by motorists

Zip Codes with highest deaths per 1000 collisions

Zip Code	Collisions	Deaths	Death per 1000 collisions
11239	1,056	4	4
11229	4,418	15	3
11214	4,458	11	2
11236	7,311	16	2
11235	5,250	11	2

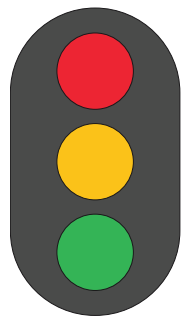
Total Collisions by time of day



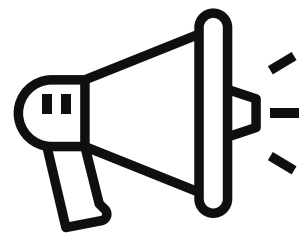
# Recommendations

Based on the analysis carried out, below are a few recommendations for the Brooklyn City Council to consider implementing:

## Short – Medium Term



Focus on high collision-prone areas such as 11236, 11229 and 11239 in terms of prioritizing new projects like traffic lights or street signs



Increased road-usage sensitization for pedestrians especially and other road users



Increased frequency of driver re-training as against status quo and more stringent fines for repeat offenders

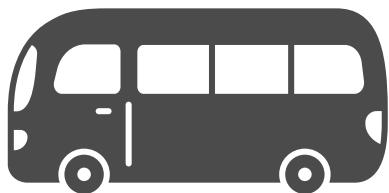


Deploy more traffic wardens on days with higher collision rates

## Long Term



Provide a more robust and efficient Public transit system to encourage usage by commuters



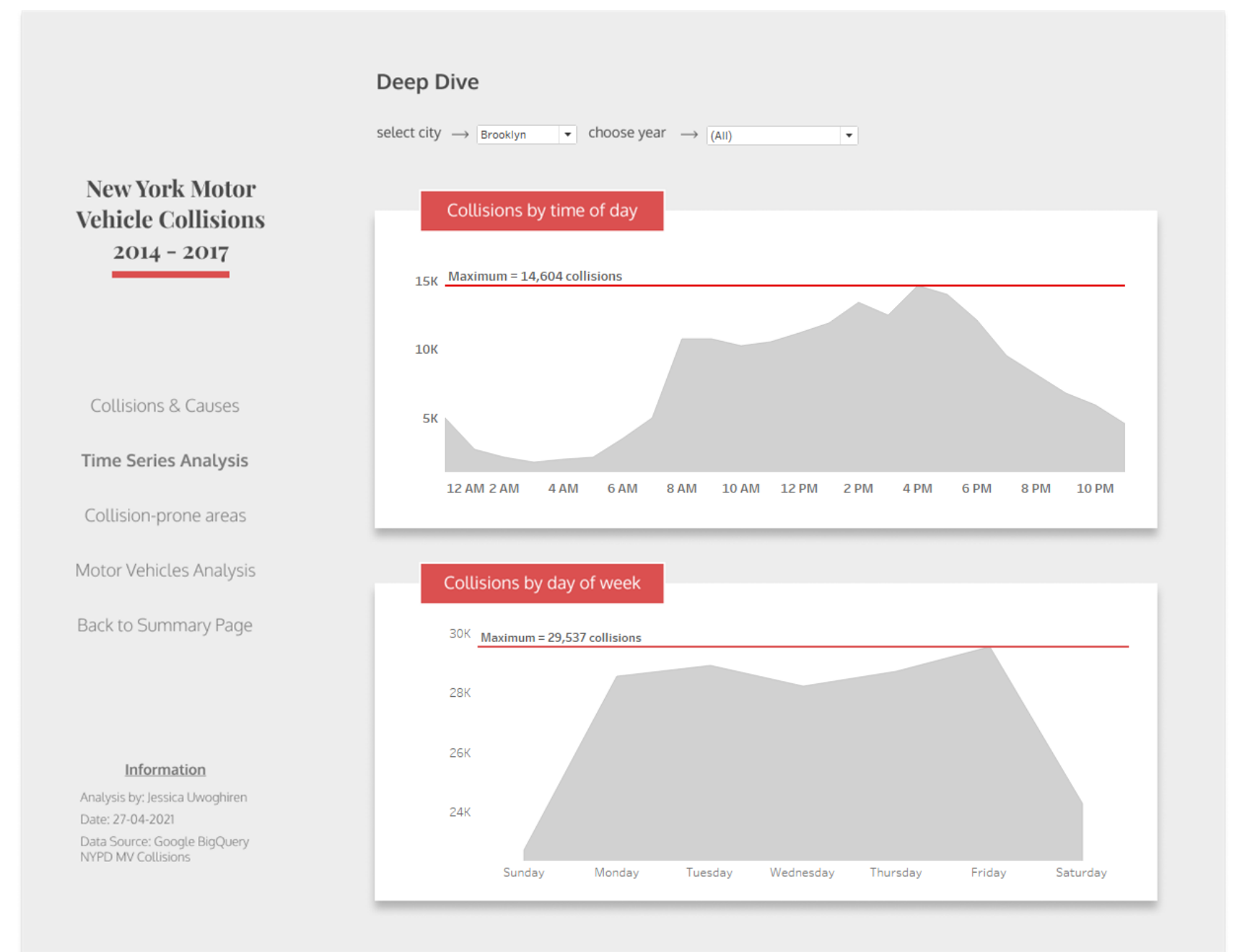
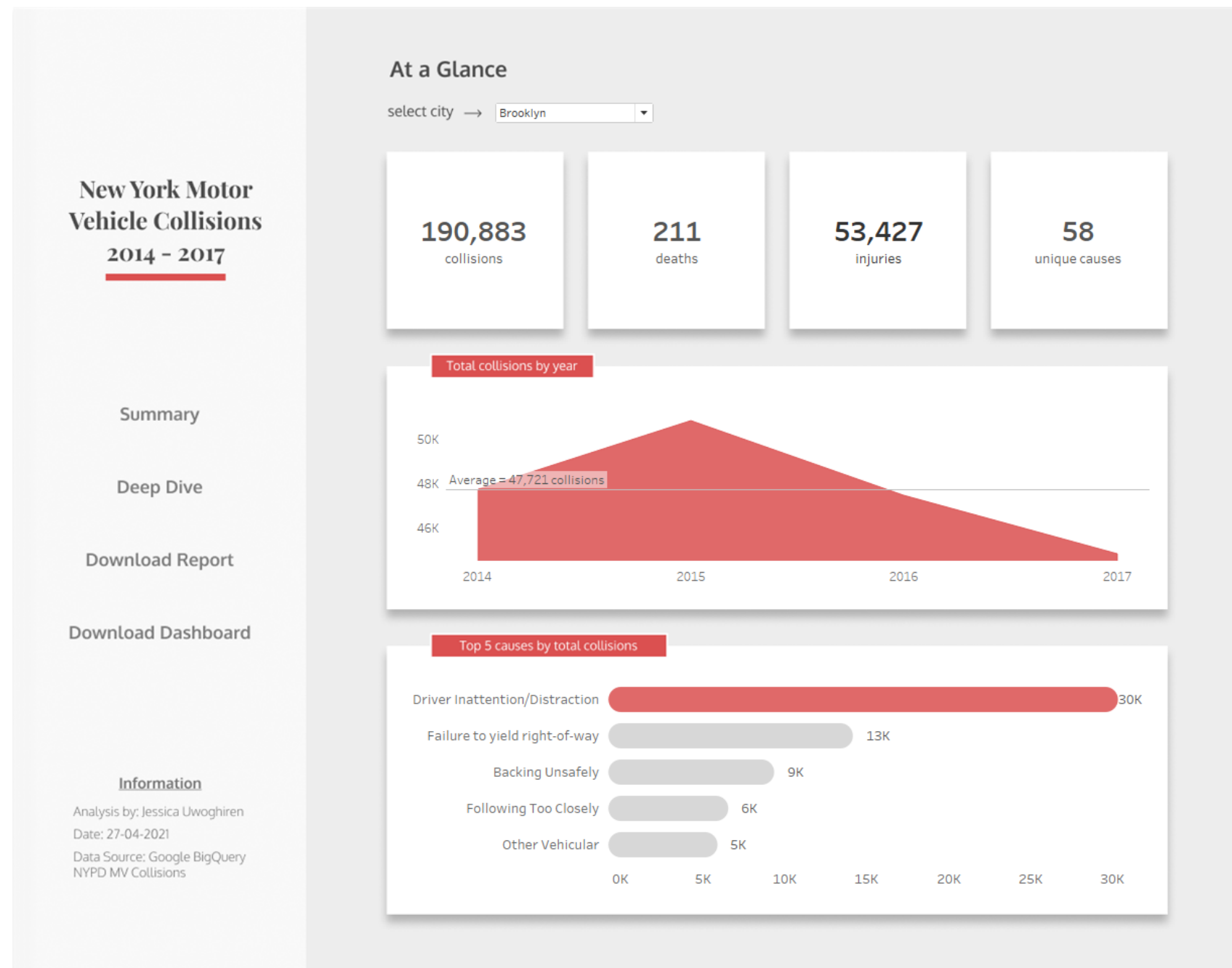
Liaise with companies to provide staff-buses or introduce car-pooling ideas.  
*\*One staff bus can save 10 – 15 cars on the road*



Provide incentives to reduce number of motor vehicles on the road  
*\*Also reduces carbon foot-print of Brooklyn*

# APPENDIX

# Appendix A – Tableau Dashboard (2/5 views)



Link to complete Tableau Dashboard – <https://tabsoft.co/3ubBPlI>

# Appendix B1 – SQL Queries on GCP Big Query for EDA

EARLIES... X

RUN

SAVE

SCHEDULE

MORE

This query will process 1 GB of data

```
1 SELECT MIN(timestamp) as EarliestDate
2 FROM `bigquery-public-data.new_york_mv_collisions.nypd_mv_collisions`
```

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.0 sec elapsed, cached)

Job information

Results

JSON

Row	EarliestDate
1	2012-07-01T00:05:00

Obtain earliest date in dataset

LATEST... X

RUN

SAVE

SCHEDULE

MORE

This query will process 1 GB of data

```
1 SELECT MAX(timestamp) as LatestDate
2 FROM `bigquery-public-data.new_york_mv_collisions.nypd_mv_collisions`
```

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.0 sec elapsed, cached)

Job information

Results

JSON

Row	LatestDate
1	2021-04-23T23:55:00

Obtain latest date in dataset

TOP 20 C... X

TOTAL C... X

RUN

SAVE

SCHEDULE

MORE

```
1 SELECT COUNT(*) FROM `bigquery-public-data.new_york_mv_collisions.nypd_mv_collisions`
```

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.1 sec elapsed, cached)

Job information

Results

JSON

Row	fd_
	1773708

Obtain total number of rows in entire dataset



# Appendix B2 – SQL Queries on GCP Big Query for EDA

TOP 20 C... X

DUPLICA... X

RUN

SAVE

SCHEDULE

MORE

1

2

3

4

SELECT unique\_key, COUNT(unique\_key)

FROM `bigquery-public-data.new\_york\_mv\_collisions.nypd\_mv\_collisions`

GROUP BY unique\_key

HAVING COUNT(unique\_key)>1

Query results

Query complete (0.0 sec elapsed, cached)

Job information

Results

JSON

This query returned no results.

Check for duplicate values based on Primary key

TOTAL C... X

TOTAL C... X

RUN

SAVE

SCHEDULE

MORE

1

2

3

SELECT COUNT(\*)

FROM `bigquery-public-data.new\_york\_mv\_collisions.nypd\_mv\_collisions`

WHERE timestamp >= '2014-01-01' and timestamp <= '2017-12-31'

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.4 sec elapsed, 13.5 MB processed)

Job information

Results

JSON

Execution details

Row	f0_
1	884110

Obtain total number of in dataset from 2014 to 2017 for New York

\*TOTAL C... X

COMPO

RUN

SAVE

SCHEDULE

MORE

This query will process 2

1

2

3

SELECT COUNT(\*)

FROM `bigquery-public-data.new\_york\_mv\_collisions.nypd\_mv\_collisions`

WHERE borough = 'BROOKLYN' and timestamp >= '2014-01-01' and timestamp <= '2017-12-31'

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.4 sec elapsed, 24.6 MB processed)

Job information

Results

JSON

Execution details

Row	f0_
1	190883

Obtain total number of in dataset from 2014 to 2017 for Brooklyn

# Appendix B3 – SQL Queries on GCP Big Query for EDA

TOP 20 C... X

COMPOSE NEW QUER

RUN

SAVE

SCHEDULE

MORE

This query will process 49.3 MiB when r

```
1 SELECT contributing_factor_vehicle_1, COUNT(contributing_factor_vehicle_1) as count
2 FROM `bigquery-public-data.new_york_mv_collisions.nypd_mv_collisions`
3 WHERE timestamp >= '2014-01-01' and timestamp <= '2017-12-31'
4 GROUP BY contributing_factor_vehicle_1
5 ORDER BY count desc
6 LIMIT 20
```

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.0 sec elapsed, cached)

Job informationResultsJSON

Row	contributing_factor_vehicle_1	count
1	Unspecified	318783
2	Driver Inattention/Distracted	160394
3	Failure to Yield Right-of-Way	50098
4	Following Too Closely	40395
5	Backing Unsafely	34400
6	Fatigued/Drowsy	31132
7	Other Vehicular	31049
8	Turning Improperly	24374
9	Passing or Lane Usage Improper	18941
10	Passing Too Closely	16963

Top contributing factors to collisions  
for Brooklyn from 2014 to 2017

TOP 20 C... X

COMP

RUN

SAVE

SCHEDULE

MORE

```
1 SELECT contributing_factor_vehicle_1, COUNT(contributing_factor_vehicle_1) as count
2 FROM `bigquery-public-data.new_york_mv_collisions.nypd_mv_collisions`
3 WHERE borough = 'BROOKLYN' and timestamp >= '2014-01-01' and timestamp <= '2017-12-31'
4 GROUP BY contributing_factor_vehicle_1
5 ORDER BY count desc
6 LIMIT 20
```

Query results

SAVE RESULTS

EXPLORE DATA

Query complete (0.7 sec elapsed, 60.4 MB processed)

Job informationResultsJSONExecution details

Row	contributing_factor_vehicle_1	count
1	Unspecified	83680
2	Driver Inattention/Distracted	28015
3	Failure to Yield Right-of-Way	12398
4	Backing Unsafely	7974
5	Fatigued/Drowsy	5292
6	Following Too Closely	5156
7	Other Vehicular	4385
8	Passing Too Closely	4180
9	Turning Improperly	3781
10	Passing or Lane Usage Improper	3350

Top contributing factors to collisions  
for New York from 2014 to 2017