

City of Hamilton 2019 Annual Collision Report



Hamilton
Public Works

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Executive Summary

This report presents an overview of road safety in the City of Hamilton based on the latest five years; 2015- 2019. The analysis was conducted for collisions occurring on the City road network.

The highlights of this report are listed below:

General Collision Trends

The following general collision trends were noted:

- A review of the City's collision data shows that the total number of collisions have been increasing in the past 5 years while the number of fatal and injury collisions have been decreasing over the past 5 years. Although 2019 experienced the highest total number of collisions, the number of fatal and injury collisions was the lowest (1,477) in the past 5 years. The total number of collisions increased by 4.5% annually, while the fatal and injury collisions declined by 7.7% on average in 2015-2019.
- City of Hamilton experiences around 9,500 collisions per year.
- The number of fatal collisions has fluctuated between 12 and 16 without any patterns.
- The majority of collisions (72.4%) occurred on dry surface conditions. Collisions occurred on wet and snow/ice covered road surfaces were 20.1% and 7.1% respectively. This is consistent and even better than provincial averages. The Red Hill Valley Parkway (RHVP), however, experienced a higher percentage (64.1%) of collisions during non-dry road surface conditions than the provincial average. The City resurfaced and installed enhanced road safety features on the RHVP in the latter part of 2019.
- While the majority of collisions occurred during daylight condition (66.5%), this percentage is less than the Province of Ontario (approximately 72%). It is suggested that a review of locations with over-representation of collisions during dark conditions be conducted.
- Single Motor Vehicle (SMV) collisions constituted 35.6% of total collisions on road sections followed by rear-end collisions (29.6%). This is an indication that several engineering countermeasures (e.g. review of curves and left turn lanes) and increased enforcement activities can improve road safety across the City.
- Rear-end collisions were the largest type of collisions (38.6%) at signalized intersections. This is consistent with other jurisdictions and the Province of Ontario. The second largest type of collision is sideswipe (19.7%). It appears that the City of Hamilton experienced an unusually high proportion of sideswipe collisions at signalized intersections.

Temporal Trends

The following temporal trends were noted:

- The largest number of collisions occurred during the months of November, December, and January.
- The months June, July, September, and October experienced the highest numbers of fatal and injury collisions based on 2015-2019 collision data.

- More collisions and most fatal and injury collisions occurred during Fridays compared to any other day of week in the City of Hamilton. This observation holds true in the Province of Ontario. Additional resources in the form of enforcement and educational campaigns can be devised for Fridays to potentially improve safety.
- During weekdays, there is a strong correlation between the peak periods of traffic and the number of collisions. In Hamilton, most collisions regardless of their severity occurred in the PM peak of traffic (4:00 PM – 6:00 PM), mid-day peak of traffic (around noon), and AM peak of traffic (8:00 AM – 9:00 AM).
- The pattern of collisions during the weekend are different from the weekdays. The number of collisions during weekends were much smaller than weekdays and the hours with the largest number of collisions were spread from 10:00 AM to 6:00 PM.

Spatial Trends

The following spatial trends were noted:

- A review of locations with a high frequency of fatal and injury collisions during the past 5 years show that a more detailed review of the Upper James corridor is advisable to improve safety along this corridor.
- The intersection of Dundurn at Main experienced the highest number of fatal and injury collisions (27 fatal and injury collisions during 2015-2019)
- The road section along Queenston between plaza entrance & Nash experienced the largest number of fatal and injury collisions (8 fatal and injury collisions during 2015-2019).
- The intersection of Kenilworth at Main experienced the highest number of fatal and injury pedestrian collisions.
- 53.4% of all collisions occur at intersections. Among those, 58.6% occur at signalized intersections, and 30.9% occur at stop-controlled intersections.

Vulnerable Road Users

The following trends and observations were noted for pedestrian and cyclist collisions:

- The number of pedestrian collisions has fluctuated between 245 and 295 in the past 5 years. In 2018 and 2019, the City experienced 245 pedestrian collisions which were the lowest in the past 5 years.
- The number of cyclist collisions decreased from 2016 to 2019 with 2019 experiencing the lowest number of cyclist collisions (128).
- The largest number of pedestrian collisions occur in the month of January. In most Ontario municipalities, the largest number of pedestrian collisions occurs in November.
- The largest number of cyclist collisions occur from May to September.
- The largest number of pedestrian and cyclist collisions occur on Tuesdays.

- 89.7% of pedestrian collisions result in an injury, and 1.8% of pedestrian collisions result in a fatality.
- 79.1% of cyclist collisions result in an injury, and 0.3% of cyclist collisions result in a fatality.
- 69.2% of pedestrian collisions occur at intersections, and among those, 63.2% occur at signalized intersections. It is important to identify the common risk factors for pedestrians at signalized intersections and midblock locations. These risk factors can assist in the identification of countermeasures to improve pedestrian safety.
- 63.2% of cyclist collisions occur at intersections among those, 50% occur at signalized intersections.
- A review of driver actions involved in pedestrian and cyclist collisions show that 42.7% and 25.9% of drivers failed to give the right of way to pedestrians and cyclists respectively. Additionally, 11.7% of drivers committed improper turns in cyclist collisions.
- In 23.9% of pedestrian collisions at road sections (non-intersection locations), pedestrians were walking on road shoulders or sidewalks. This observation can potentially be used to add or improve sidewalks.

Driver Behaviour

The following road user collision trends were noted:

- Distracted driving was a contributing factor to 16.6% of fatal and injury collisions.
- Drug and alcohol were a contributing factor in 2.6% of fatal and injury collisions.
- Speeding accounted for 18% of all police reported collisions in the City of Hamilton. The percentages of speed related collisions on the LINC and the RHVP are 56% and 37.5% respectively.



Disclaimer and Explanation

Self-Reporting of Collisions

The use of the term “reported” or “police reported” collision refers to a collision attended by a member of the Hamilton Police Service who filled out the standard Provincial reporting form.

In June 2003, Hamilton Police Services adopted a system of Collision Reporting Centres (CRC) for the City of Hamilton. These “one stop reporting centres” allow citizens who are involved in property damage collisions that do not involve damage to private, municipal, or highway property, to file a report based on their own information only, at the nearest CRC office. These collisions are referred to as “self-reported” collisions.

As a result of the introduction of self-reporting, there has been a significant decrease in the total number of collisions reported by police officers, and the statistics in this report reflect this. This is to be expected as the onus for reporting property damage collisions was shifted from the police officers to the Collision Reporting Centres.

In this report, all charts and statistics are based on the total collisions (police reported and self-reported collisions).

Collision Data Accuracy and Completeness

The City of Hamilton maintains a database together with Hamilton Police Services of collisions involving motorized vehicles, cyclists, and pedestrians. The database contains information on all recorded collisions from 2008 onward. The data and information in this report is for informational purposes only. While the City strives to provide accurate information, errors may be present and information may not be complete. Accordingly, the City makes no representation as to the accuracy of the information or its suitability for any purpose and disclaim any liability for omissions or errors that may be contained therein.

Between the preparation of the 2018 and 2019 Annual Collision Reports, the City of Hamilton transitioned to a new collision database management system. This effort included an in-depth check of the quality and accuracy of past data. As a result of that process, some statistics of past years in this report may differ from the same statistic reported in the 2018 Annual Collision Report and other past documents.

Introduction

The City of Hamilton is situated in Southern Ontario at the westerly end of Lake Ontario. The population of the City of Hamilton is 536,930 (2016 Statistics Canada Census).

The City of Hamilton road system contains the full spectrum of road types: multi-lane, one-way and two-way arterials, residential local and collector streets, medium and high-speed rural two-lane roads and an 80/90 km/h limited access parkway system.

The geographic area for analysis includes all roads within the Hamilton municipal boundaries, excluding provincially controlled roadways: Queen Elizabeth Way (mainline), Highway 6, Highway 8 from Highway 5 northerly, Highway 5 between Highway 6 and Highway 8/52, Highway 403, on-ramps and off-ramps to Highway 403. Collisions occurring on service roads to the Queen Elizabeth Way are included. Only collisions on city streets or sidewalks are recorded – private property collisions are not included.

This report provides insight into the trends, patterns, and characteristics of collisions occurred on the City road system. This report can assist in identifying potential safety issues and initiating the conversation to identify mitigative actions to improve safety for all road users of all ages.

Road safety is a complex and multidisciplinary subject. In the City of Hamilton, many professionals work together to provide a safe transportation system to our residents. These professionals include law enforcement, engineers, planners, public health nurses, student transportation services, transit operators, and educators who work together to provide a safe transportation system to our residents. In fact, the Hamilton Strategic Road Safety Program and Vision Zero Action Plan 2019 – 2025 was approved in 2019. The City's Vision Zero plan is a holistic approach to improve road safety through evaluation, engineering, enforcement, education, and engagement.

This report provides statistics based on 2015-2019 collision data. Appendix A provides 2019 collision statistics for the City of Hamilton. Appendix B and Appendix C provide 2019 collision statistics for Lincoln M. Alexander Parkway and Red Hill Valley Parkway respectively.



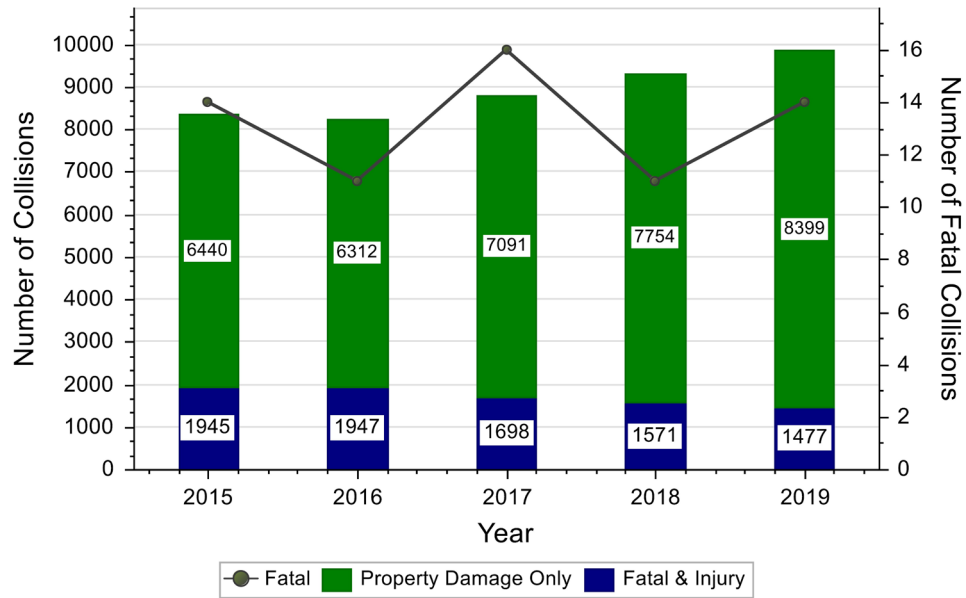
Section 1

Five Year Collision Trends (2015 to 2019)



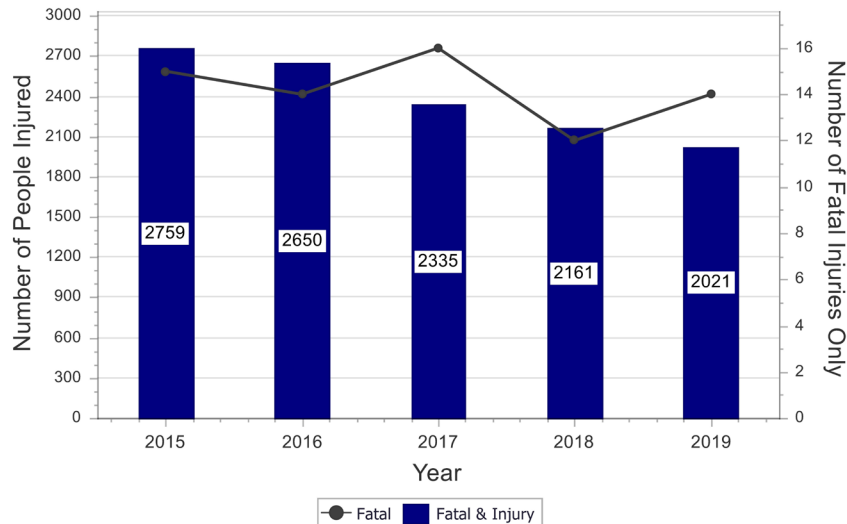
Frequency and Severity

A review of the City's collision data shows that the total number of collisions continuously increased in the past 5 years while the number of fatal and injury collisions consistently decreased in the same time period. Although, 2019 experienced the highest total number of collisions (9,876), the number of fatal and injury collisions was the lowest (1,477) in the past 5 years. The number of fatal collisions fluctuated between 11 and 16 in the past 5 years where the highest occurred in 2017. The ratio of fatal and injury collisions to the total collisions in Hamilton is consistent with the similar value for the Province of Ontario.

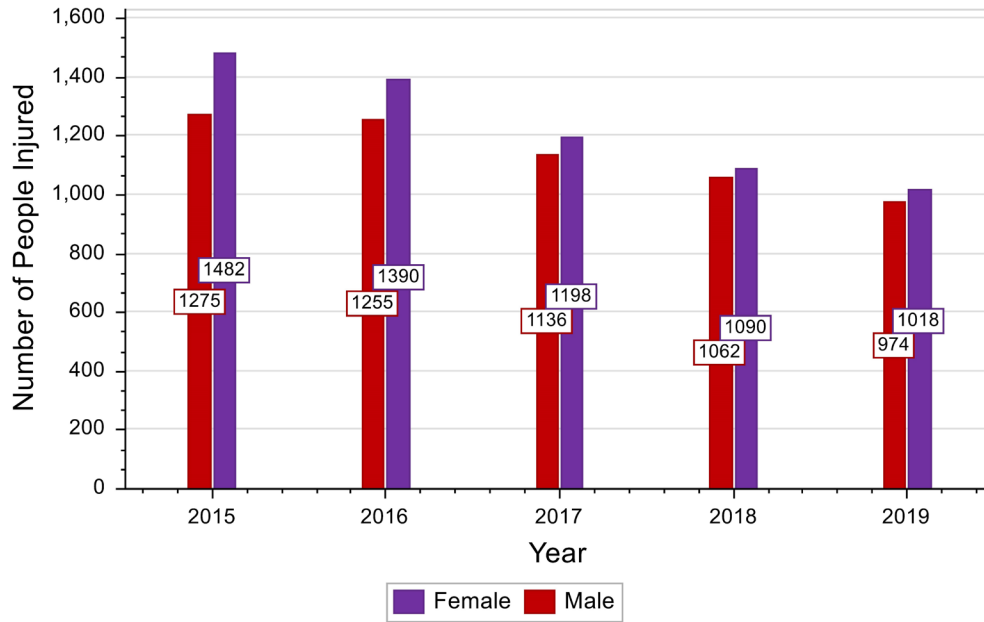


Collisions Frequency (2015-2019)

The number of people injured in collisions consistently decreased in the past 5 years. In 2019, 2,021 people were injured in 1,477 collisions and among those, 14 people were fatally injured. A review of those injured in collisions driver passenger show that the number of females injured in collisions is slightly higher than the number of male individuals injured. In 2019, 52% of the injured were female.



Fatality and Injury Frequency, 5 Years (2015-2019)

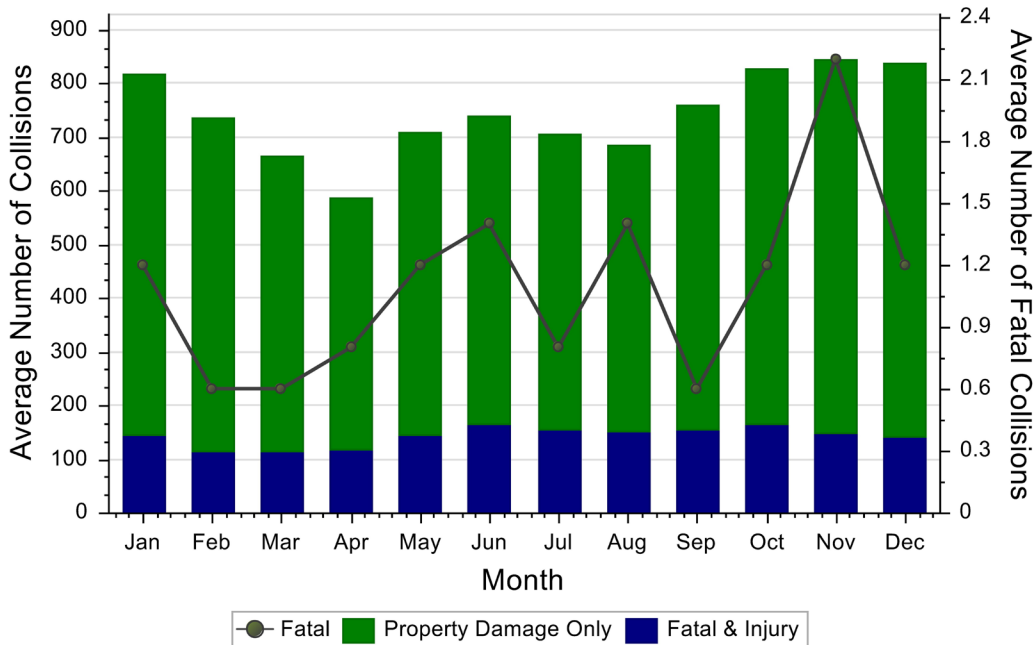


Fatality and Injury Frequency by Gender, 5 Years (2015-2019)

Month, Day, and Time of Collisions

The largest number of collisions occurred during the months of November, December, and January. In fact, 28% of total collisions (2015-2019) took place during these three months which is consistent with provincial averages.

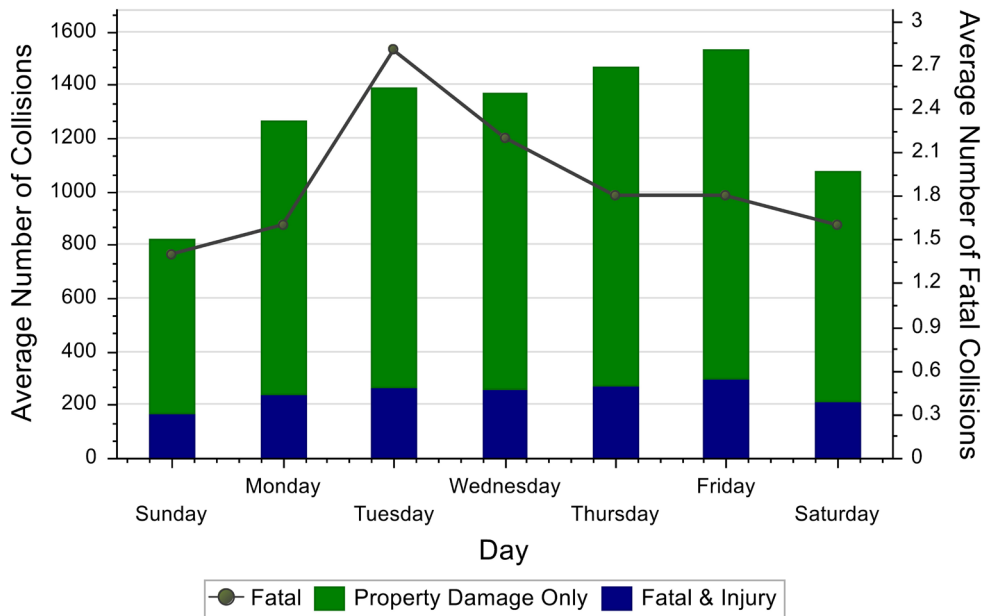
The months of June, July, September, and October experienced the highest numbers of fatal and injury collisions based on 2015-2019 collision data.



Collisions by Month, 5 Year Average (2015-2019)

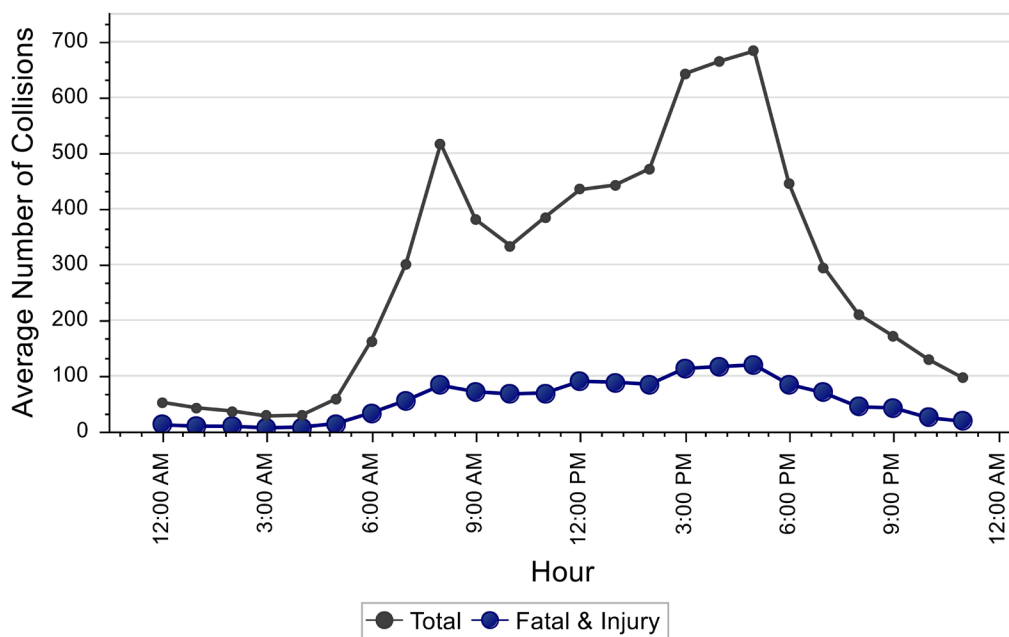
- City of Hamilton experiences around 9,500 collisions per year.
- Average number of fatal and injury collisions is 1,728 collisions per year over the last 5 years.
- The number of fatal and injury collisions have been decreasing in the past 5 years with 2019 experiencing the lowest number of fatal and injury collisions (1,477).
- The number of people injured in collisions has consistently decreased in the past 5 years.
- In 2019, 2,021 people injured in 1,477 collisions among those 14 people were fatally injured.
- Consistently larger number of females are injured compared to males.

More collisions and most fatal and injury collisions occurred during Fridays compared to any other day of week in the City of Hamilton. This observation holds true in the Province of Ontario. Additional resources in the form of enforcement and educational campaigns can be devised for Fridays to potentially improve safety.



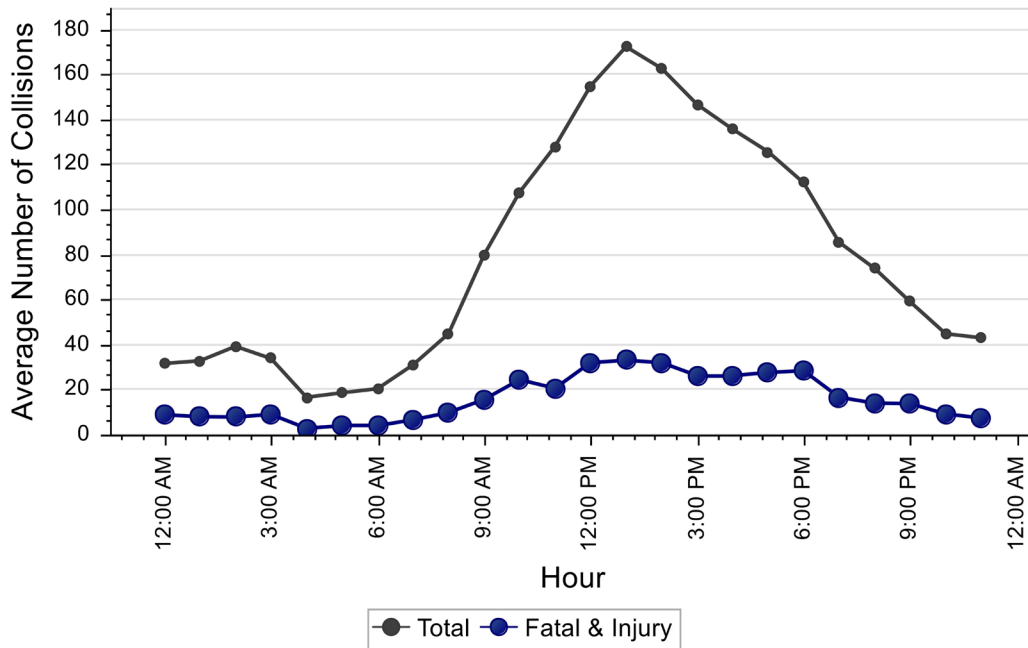
Collisions by Day-of-Week, 5 Year Average (2015-2019)

During weekdays, there is a strong correlation between the peak periods of traffic and the number of collisions. In Hamilton, most collisions regardless of their severity occurred in the PM peak of traffic (4:00 PM – 6:00 PM), mid-day peak of traffic (around noon), and AM peak of traffic (8:00 AM – 9:00 AM).



Weekday Collisions by Time-of-Day, 5 Year Average (2015-2019)

The pattern of collisions during the weekend are different from the weekdays. The number of collisions during weekends was much lower than weekdays and the hours with the largest number of collisions were spread from 10:00 AM to 6:00 PM.



Weekend Collisions by Time-of-Day, 5 Year Average (2015-2019)

Collisions By Road Surface and Lighting Conditions

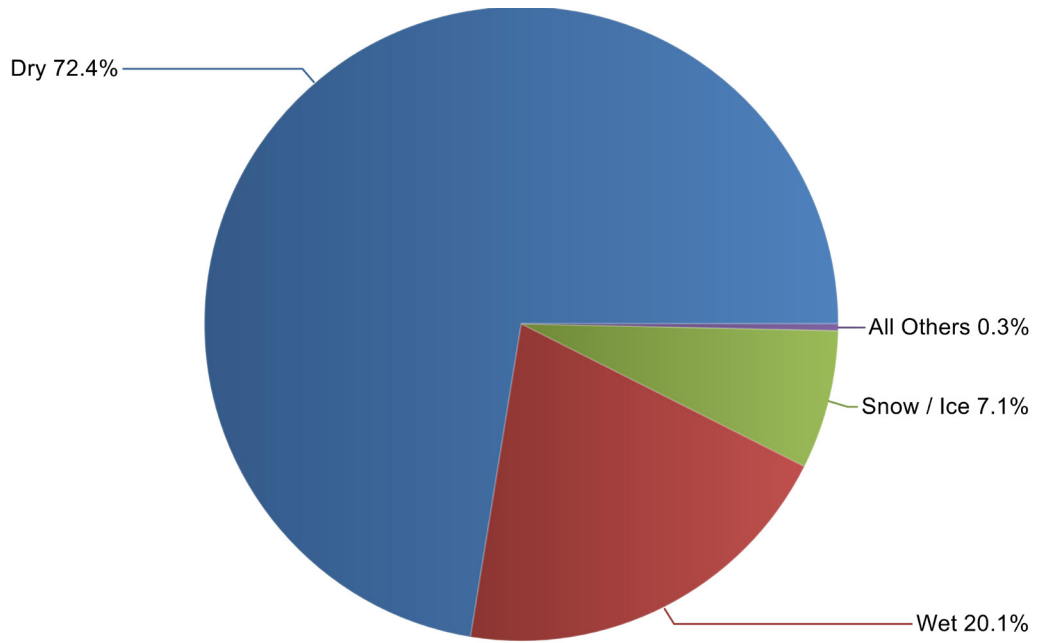
Water, ice, or snow reduce the friction between tires and the road surface. The reduced friction can contribute to collisions. A road and drainage designed according to standards in conjunction with proper road maintenance ensures that the rain run-off is quickly drained from the road surface. The City of Hamilton spends significant resources to ensure that our roads are properly maintained during Ontario’s harsh winters and that road surfaces are cleared of snow and ice according to provincial standards and best practices.

The majority of collisions (72.4%) occurred on dry surface conditions. Collisions that occurred on wet and snow/ice covered road surfaces were 20.1% and 7.1% respectively. These percentages are similar to other jurisdictions in Ontario.

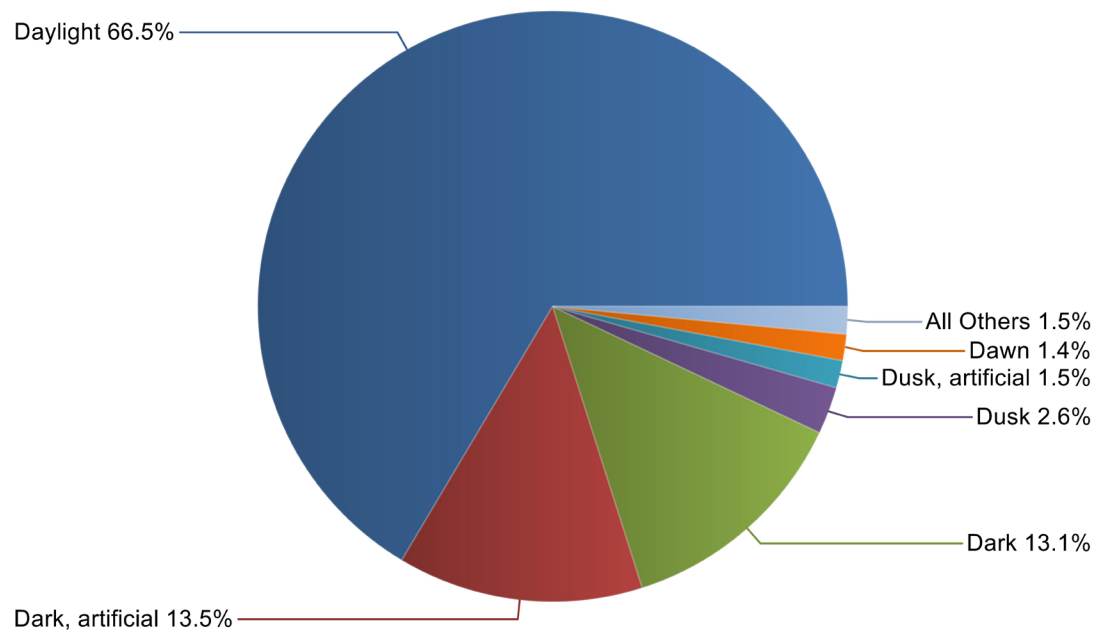
While the majority of collisions occurred during daylight conditions (66.5%) in 2015-2019, this percentage is smaller than that of the Province of Ontario (approximately 72%). It is suggested that a review of locations with over-representation of collisions during dark conditions can be beneficial to improve the number of collisions during dark conditions.



- The majority of collisions (72.4%) occurred on dry surface conditions.
- Collisions occurred on wet and snow/ice covered road surfaces were 20.1% and 7.1% respectively.
- 66.5% of all collisions occurred during day light conditions. This number is smaller than typical values for Ontario.



Collisions by Road Surface Condition, 5 Years (2015-2019)

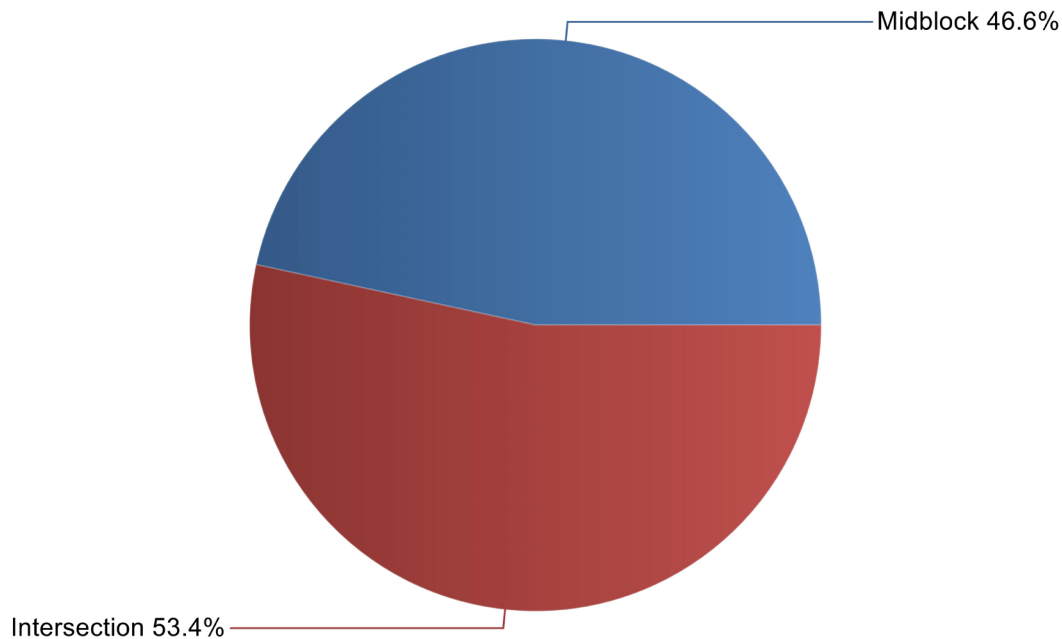


Collisions by Lighting Condition, 5 Years (2015-2019)

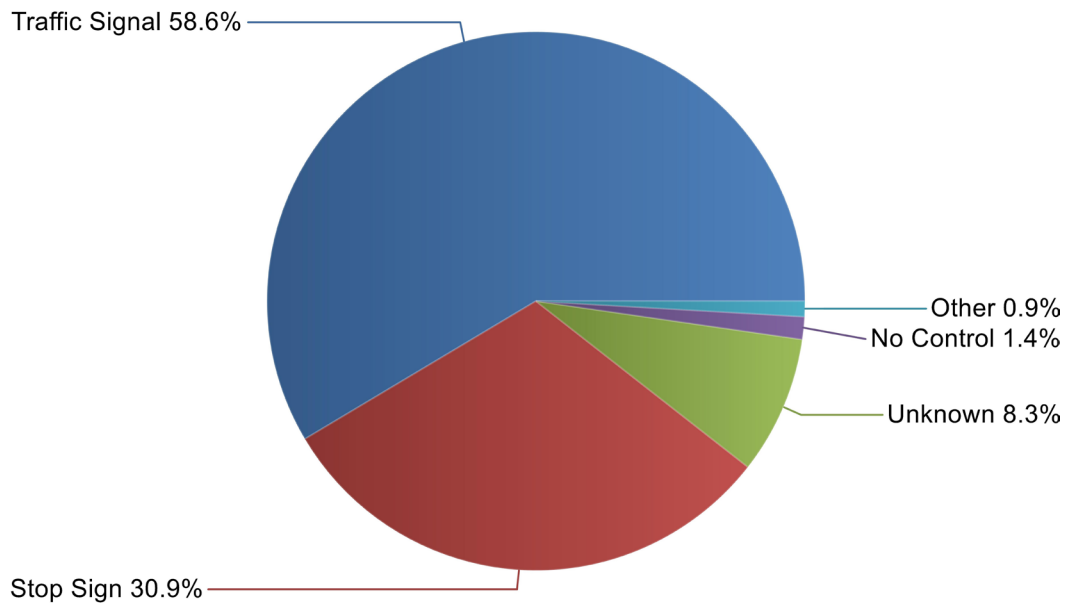


Collision Impact Type by Site Type and Traffic Control

Collisions that occurred at intersections or were intersection - related constituted more than half of total collisions (53.4%). This observation is consistent with other municipalities as intersections are major conflict points in a transportation network. Among those intersection collisions, more than half took place at signalized intersections. This observation shows that signalized intersections should be one of the priority areas in the City of Hamilton.



Collisions by Location, 5 Years (2015-2019)



Intersections Collisions by Traffic Control Type, 5 Years (2015-2019)

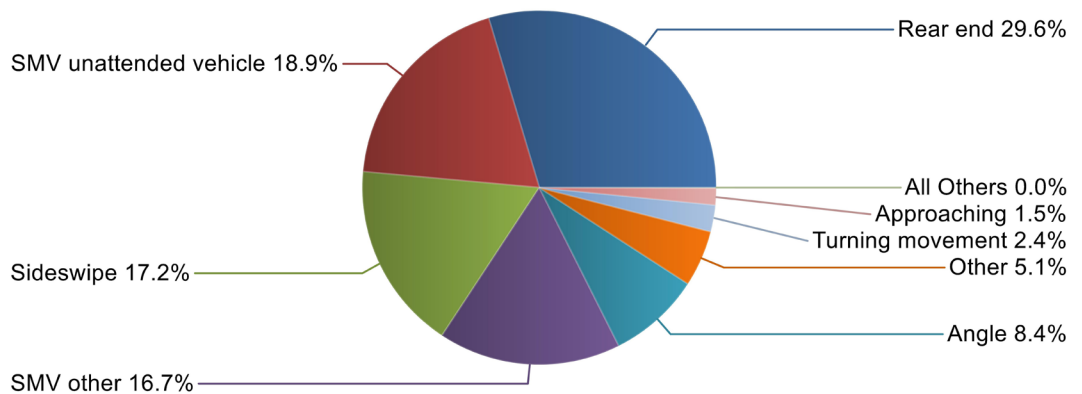
- 53.4% of all collisions occurred at intersections. Among those, 58.6% occurred at signalized intersections and 30.9% occurred at stop controlled intersections.
- Rear-end collisions were the largest type of collisions (38.6%) at signalized intersections followed by sideswipe collisions (19.7%).
- It appears that the proportion of sideswipe collisions at signalized intersections are unusually high.
- Angle collisions were the largest type of collisions (28.5%) at stop controlled intersections followed by rear end collisions (27.9%).
- 35.6% of total collisions on midblocks are SMV collisions followed by rear-end collisions (29.6%).

A review of fatal and injury collisions at intersections and midblocks shows that more fatal collisions occurred on midblocks but more injury collisions happened at intersections.

| Location | Intersections | Midblocks |
|----------|---------------|-----------|
| Fatal | 39.4% | 60.6% |
| Injury | 56.0% | 44.0% |

Distribution of Collisions by Location (2015-2019)

Single Motor Vehicle (SMV) collisions (SMV unattended and SMV other ¹) constituted 35.6% of total collisions on midblocks followed by rear-end collisions (29.6%). This is an indication that several engineering countermeasures (e.g. review of curves and left turn lanes) can improve road safety across the City.

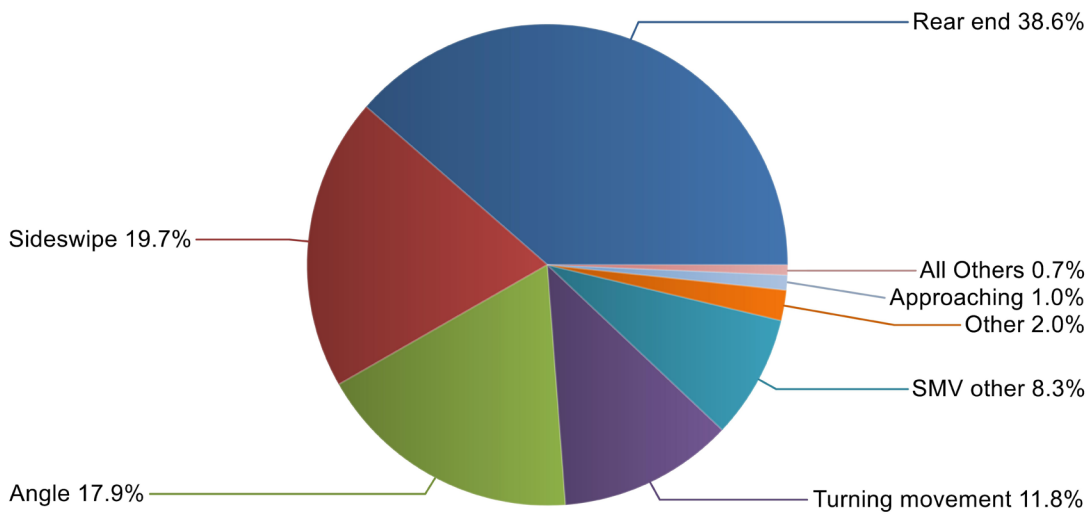


Midblock Collisions by Initial Impact Type, 5 Years (2015-2019)

Rear-end collisions were the largest type of collisions (38.6%) at signalized intersections. This is consistent with other jurisdictions and the Province of Ontario. The second largest type of collision is sideswipe at signalized intersections (19.7%) followed by angle collisions (17.9%). In most municipalities, the percentage of angle collisions is the second largest at signalized intersections. It appears that the City of Hamilton experienced usually high proportion of sideswipe collisions at signalized intersections.

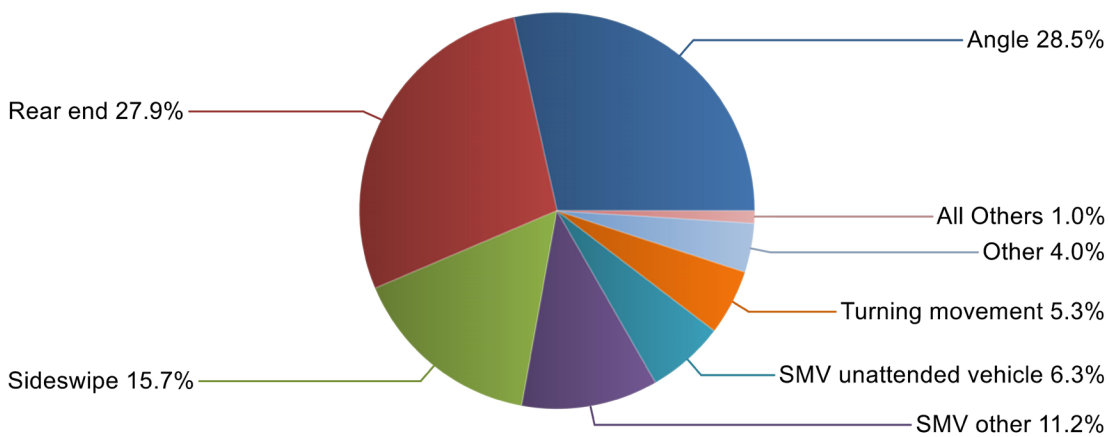
1 - Single motor vehicle (SMV) unattended collisions occur when a vehicle strikes a vehicle unattended by its driver. Include parked, stopped, disabled, abandoned and runaway vehicles, provided it was not under the car and control of a driver. Does not include vehicles stopped for traffic or standing while loading or unloading passengers or cargo.

Single motor vehicle (SMV) other refers to collisions where a single motor vehicle initially collides with a fixed object, pedestrian or animal.



Signalized Intersection Collisions by Initial Impact Type, 5 Years (2015-2019)

At stop controlled intersections, angle collisions were the largest type of collisions (28.5%) followed by rear-end collisions (27.9%). It appears that there might be an opportunity to holistically review stop controlled intersections for potential signalization.



Stop Controlled Intersection Collisions by Initial Impact Type, 5 Years (2015-2019)



High Frequency Locations

A review of locations with high frequency of fatal and injury collisions during the past 5 years show that a more detailed review of the Upper James corridor is advisable to improve safety along this corridor. The report is prepared and released on a confidential basis in the month of 2019.

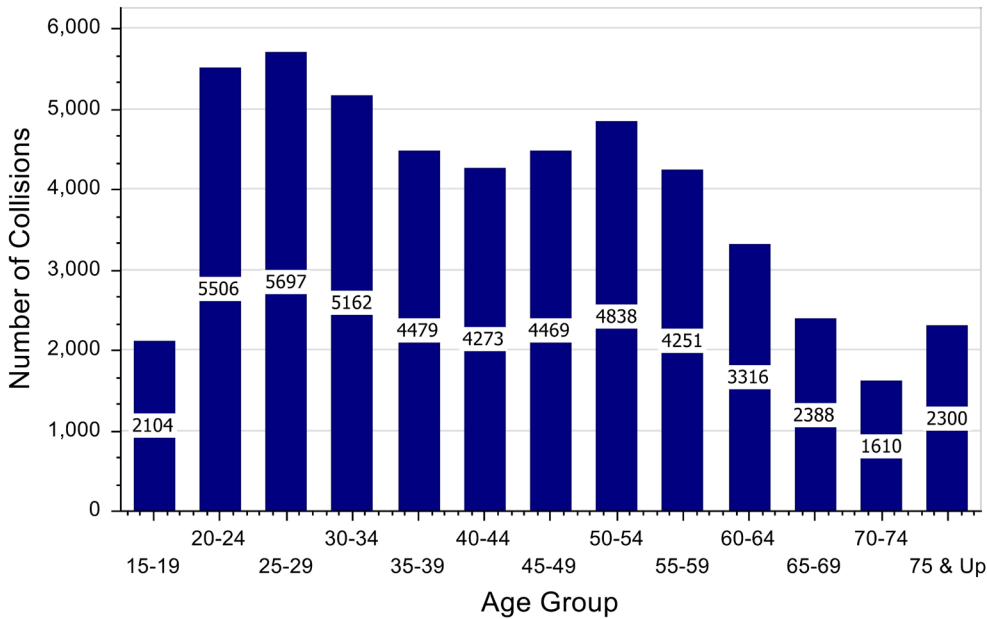
Intersections with Highest Frequency of Fatal and Injury Collisions, 5 Year Average (2015-2019)

| Description | Collision Frequency |
|---|---------------------|
| Dundurn St S at Main St W | 27 |
| John St S at Main St E | 27 |
| Main St E at Victoria Av S | 26 |
| Kenilworth Av N at Main St E | 25 |
| King St E at Victoria Av S | 24 |
| Main St E at Wellington St S | 24 |
| Mohawk Rd E at Upper Wentworth St | 23 |
| North Service Rd at Ramp North Service to QEW Toronto | 22 |
| Mohawk Rd W at Upper James St | 22 |
| Dundurn St S at King St W | 21 |
| Parkdale Av S at Queenston Rd | 21 |

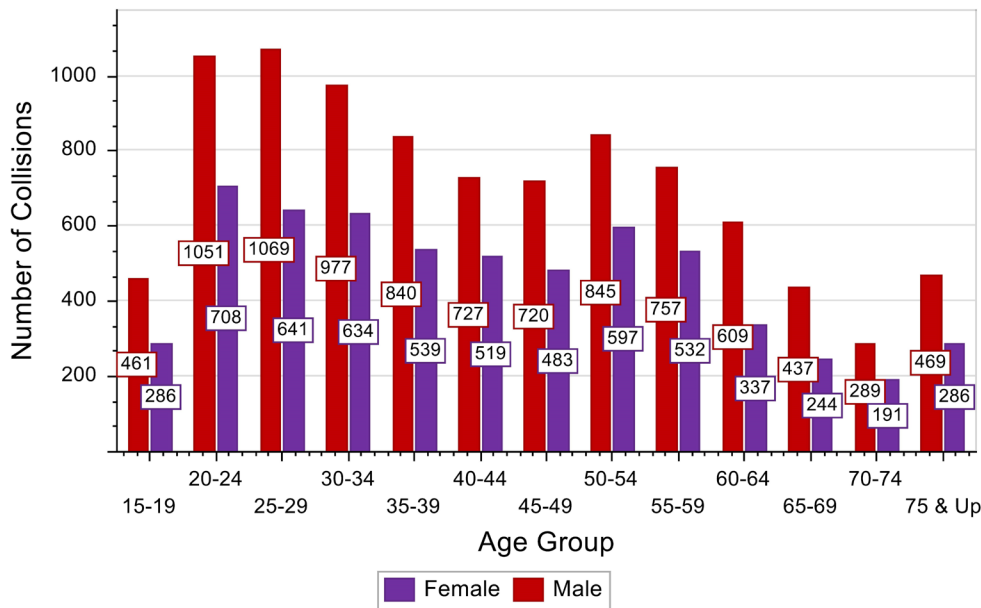
Midblocks with the Highest Frequency of Fatal and Injury Collisions, 5 Year Average (2015-2019)

| Description | Collision Frequency |
|---|---------------------|
| Queenston Rd Between plaza entrance & Nash | 24 |
| Upper James St Between Mohawk & Lotus | 22 |
| Upper James St Between Stone Church & Plaza Entrance | 22 |
| RHVP NB between Ramp Greenhill WB to RHVP NB & Railway Bridge | 19 |
| RHVP NB between Ramp RHVP NB to King & Ramp King to RHVP NB | 18 |
| Upper Gage Av between Mohawk & Foley | 17 |
| Upper James St between Hester & Jameston | 15 |
| Upper James St between Ramp Upper James Nb to Linc EB & Blossom | 15 |
| RHVP SB between Ramp Barton to Rhvp Sb & Queenston | 14 |
| Upper James St between Rymal & Kennedy | 13 |
| Rymal Rd E between Upper Sherman & Eva | 13 |

Research shows that among the three factors of drivers, roads, and vehicles, drivers have the largest contribution to collisions. A review of the ages of all drives involved in collisions show that more than 32% of all drivers age were between 20 and 35 years old. Also, significantly more number of male drivers are involved in collisions than female drivers.



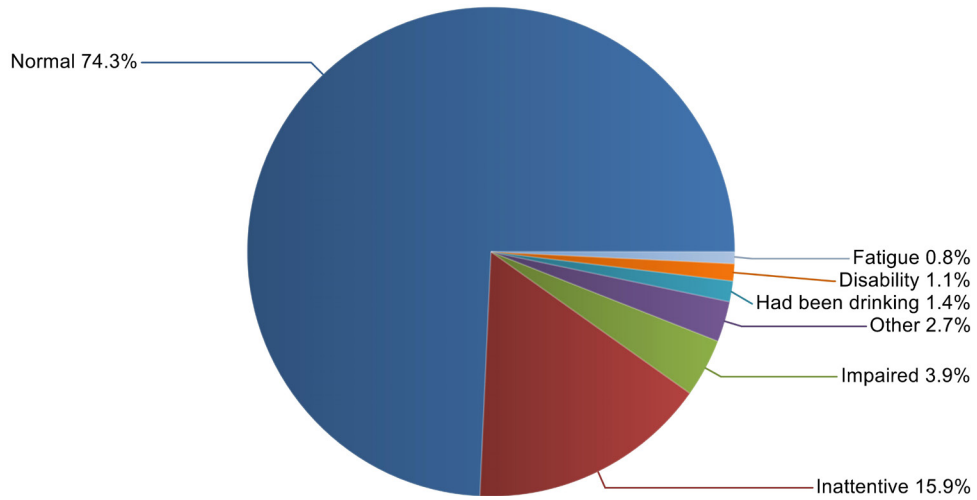
Collisions by Driver Age, 5 Years (2015-2019)



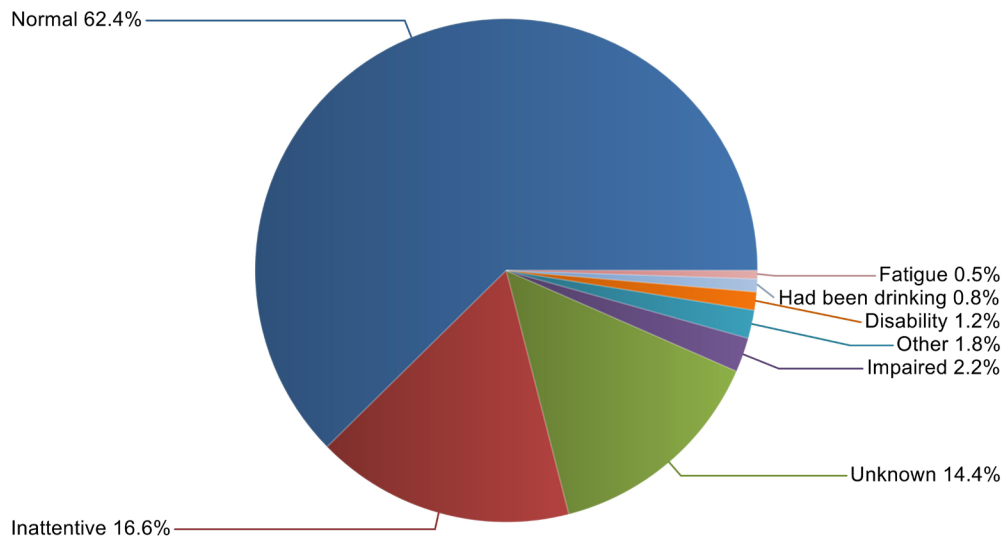
Collisions by Driver Age and Gender, 5 Years (2015-2019)



Distracted driving is one of the leading contributing factors to collisions in many jurisdictions including the Province of Ontario. It is difficult to identify whether a driver, cyclist, or pedestrian was distracted at the time of a collision. Based on the observations made by the police officers, in 15.9% of all collisions and in 16.6% of fatal and injury collisions, drivers were inattentive (distracted) in 2015-2019. It is quite conceivable that the actual percentage of distracted driving collisions is likely higher.

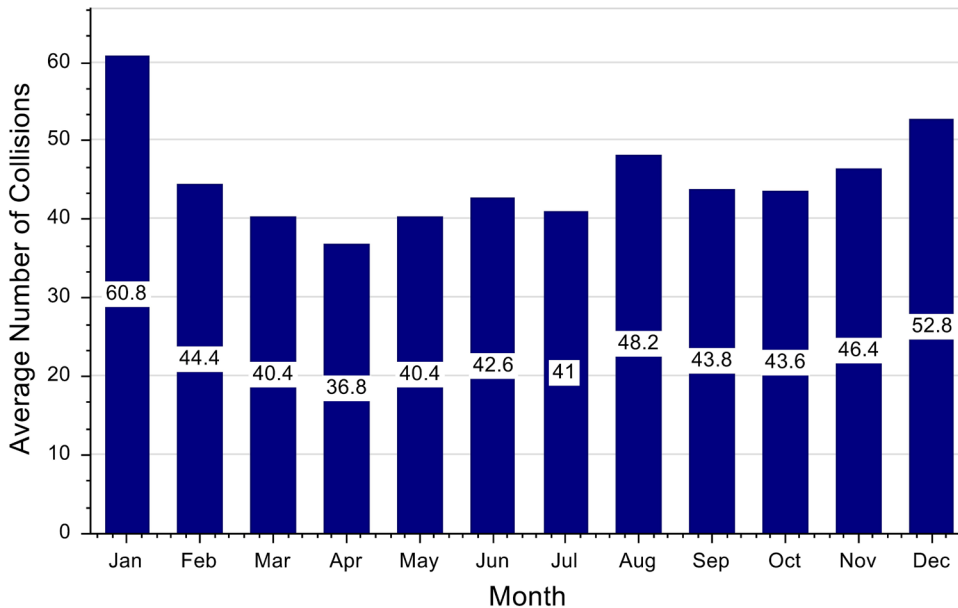


Collisions by At-Fault Driver Condition, 5 Years (2015-2019)

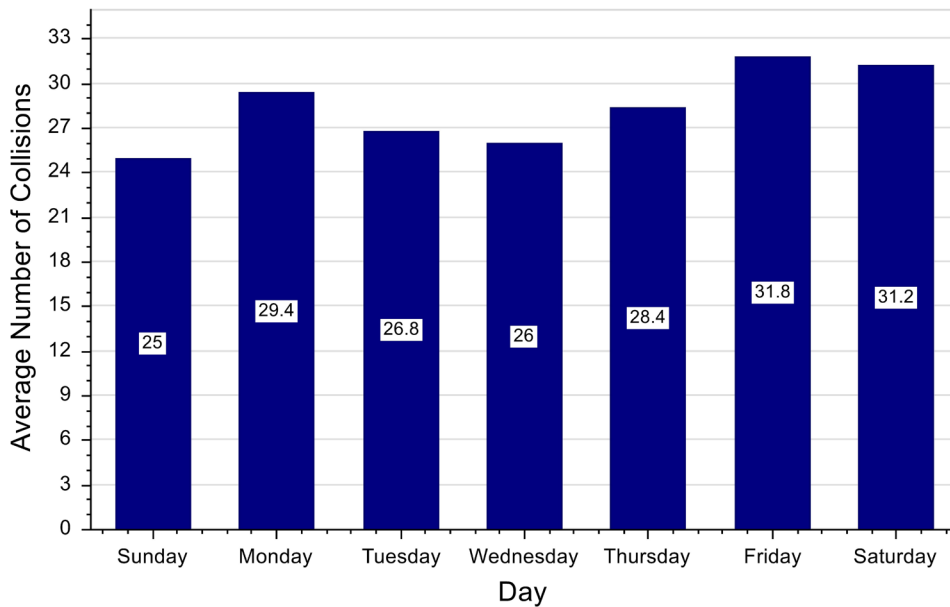


Fatal and Injury Collisions by At-Fault Driver Condition, 5 Years (2015-2019)

Several factors might contribute to drivers losing control and resulting in collisions including distraction, speed too fast for conditions, road surface conditions, lack of adequate warnings, vehicles mechanical deficiencies, among others. It appears that the months of January and December experienced the largest number of collisions resulting from drivers losing control. Also, these types of collisions more often occurred on Fridays and Saturdays. Overall, the lost control type collisions constitute 15.5% of all police reported collisions in the City of Hamilton.

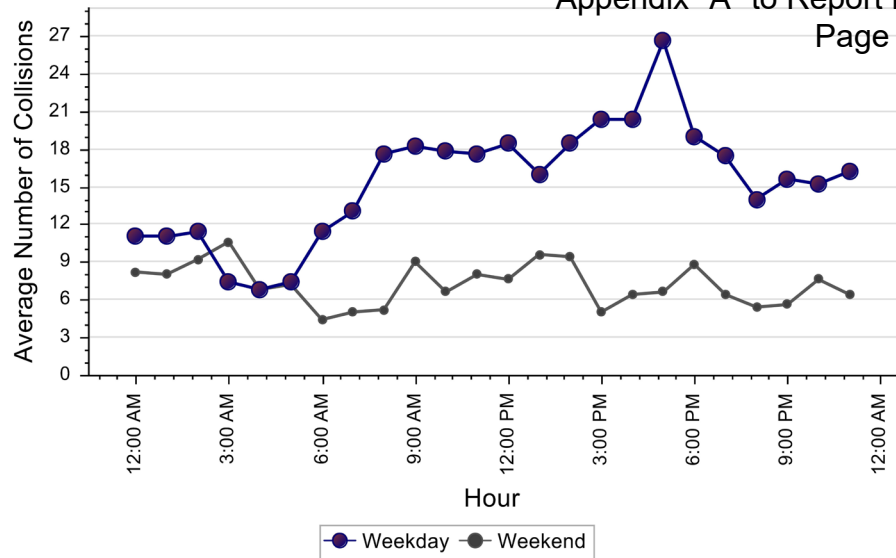


Lost Control Collisions by Month, 5 Years Average (2015-2019) - Police Reported



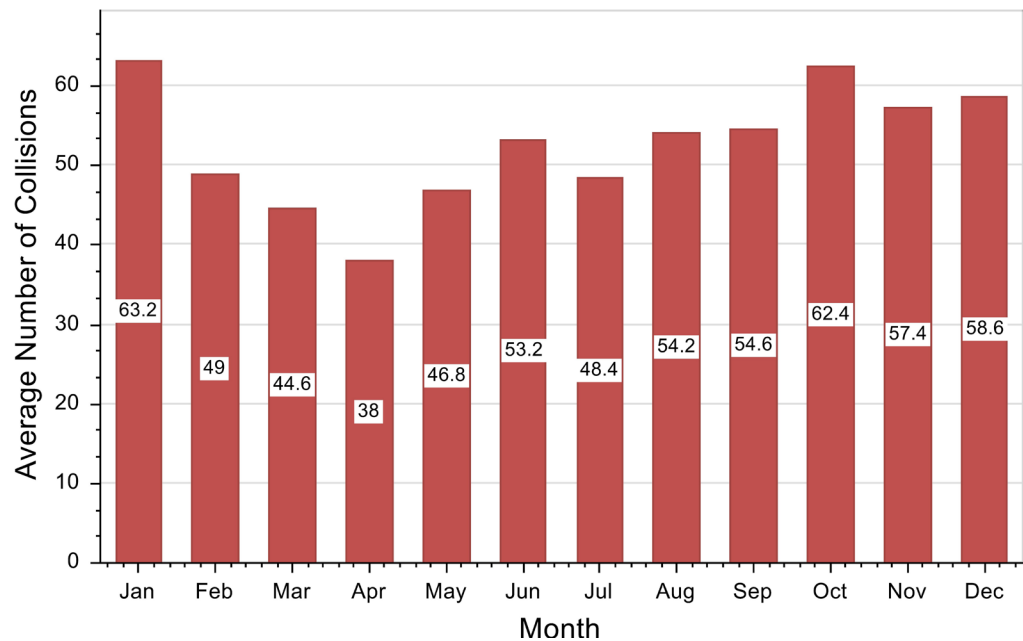
Lost Control Collisions by Day-of-Week, 5 Year Average (2015-2019) - Police Reported





Lost Control Collisions by Time-of-Day, 5 Years Average (2015-2019) - Police Reported

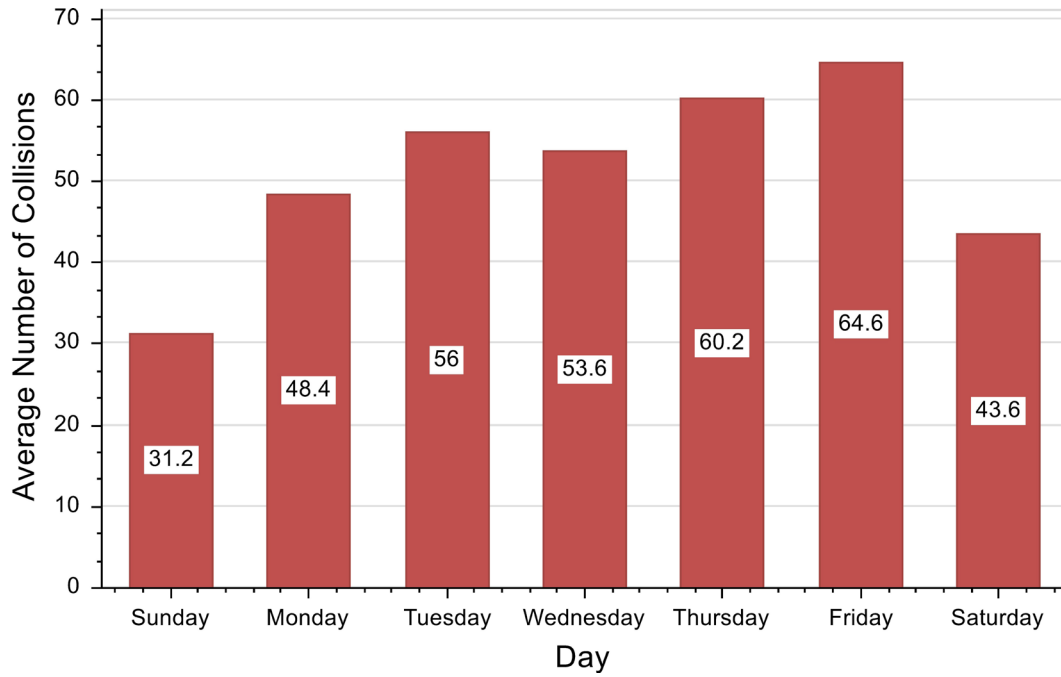
If the police officer attending to a collision scene reported that at least one of the drivers involved in the collision committed (1) following too close, (2) speed too fast, or (3) exceeding speed limit, the collision is categorized as a speed related collision. These factors are all an indication of aggressive driving where drivers choose speeds too fast for road surface conditions, congestion, or road geometry. It appears that speeding related collisions were 18% of police reported collisions in 2015-2019. The months of January and October experienced the largest number of speeding related collisions. Safety can potentially be improved by an increased speed enforcement during these two months.



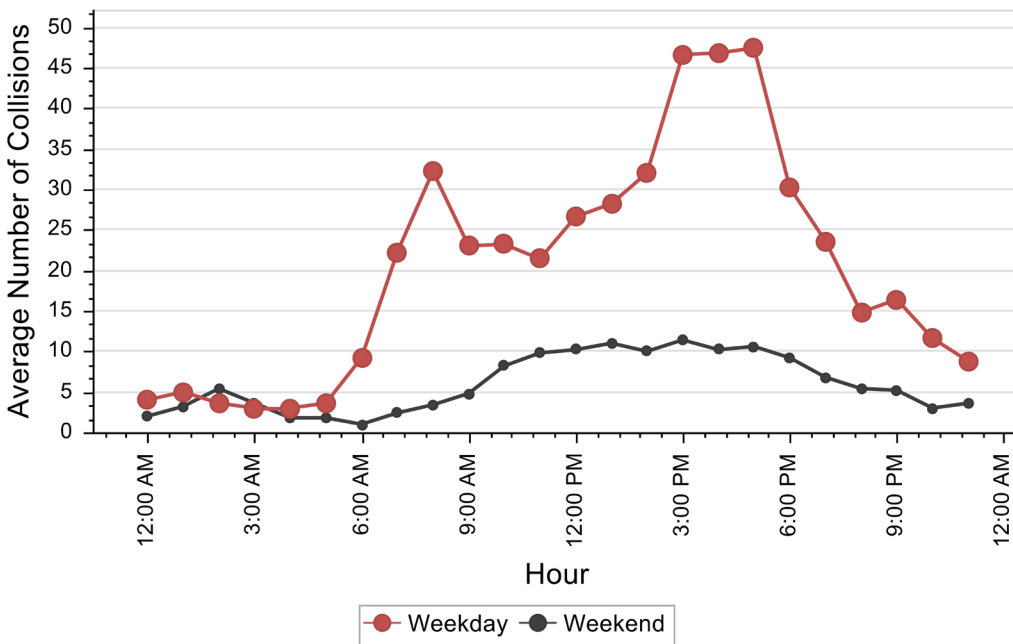
Speed Related Collisions by Month, 5 Year Average (2015-2019)

- 32% of all drivers were 20-35 years old.
- Drug and alcohol contributed to 5.3% of all collisions in 2015-2019.
- Drug and alcohol contributed to 2.6% of fatal and injury collisions in 2015-2019.
- In 16.6% of fatal and injury collisions, drivers were inattentive (distracted).
- Months of January and December experienced the largest number of lost control type collisions.
- In 15.5% of police reported collisions, drivers lost control of their vehicle.
- Speeding related collisions account for 18% of all police reported collisions.



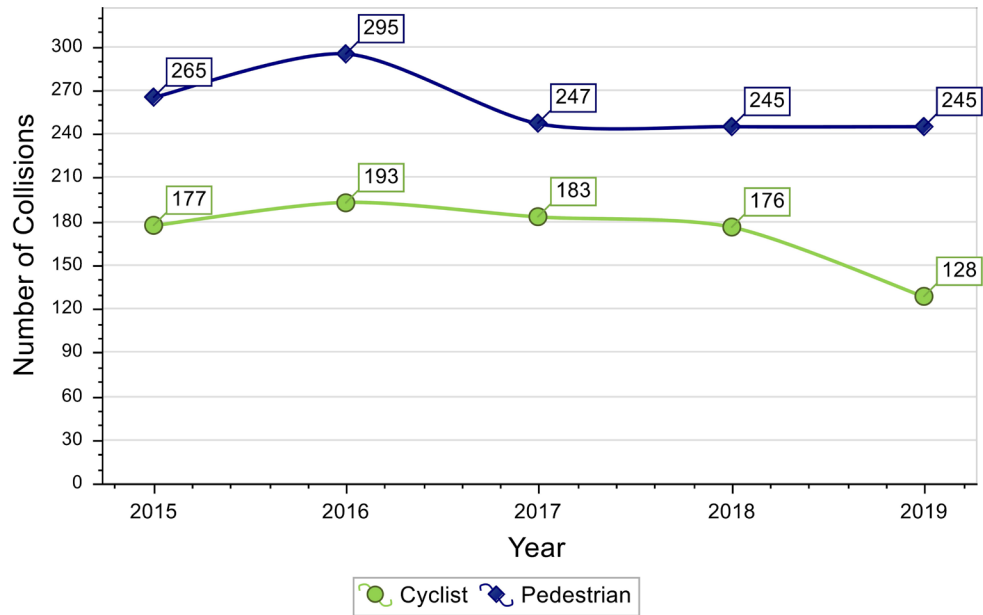


Speed Related Collisions by Day -of-Week, 5 Year Average (2015-2019)



Speed Related Collisions by Time-of-Day, 5 Year Average (2015-2019)

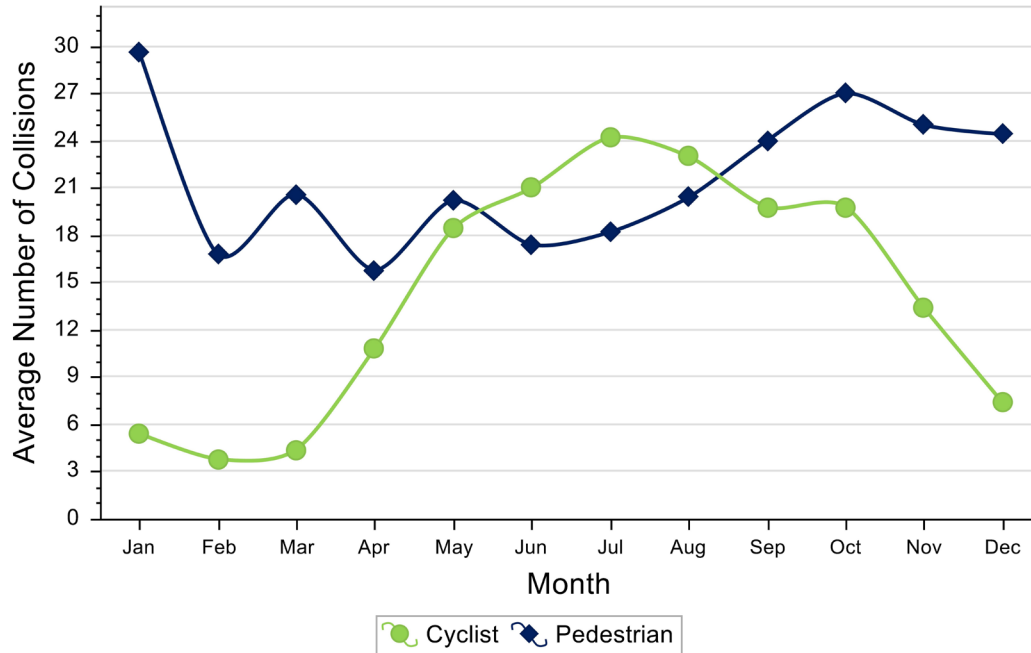
Pedestrians and cyclist collisions often result in injury or fatality. The City of Hamilton strives to create a safe road network for pedestrians and cyclists. It appears that the number of pedestrian collisions has fluctuated between 245 and 295 in the past 5 years. In 2018 and 2019, the City experienced 245 pedestrian collisions which were the lowest in the past 5 years. The number of cyclist collisions decreased from 2016 to 2019 with 2019 experiencing the lowest number of cyclist collisions (128). Hamilton has invested in cycling infrastructure in the past few years which might have resulted in this decreasing trend in the number of cyclists.



Collisions Involving Pedestrians and Cyclists (2015-2019)

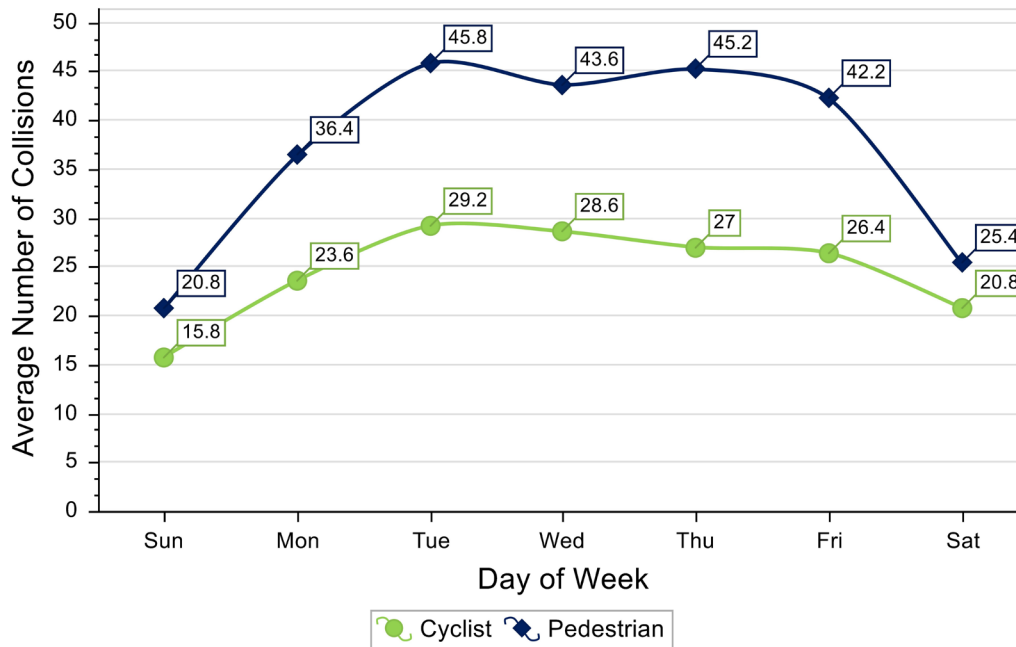
The largest number of pedestrian collisions occurred in the month of January followed by October in 2015-2019. In most Ontario municipalities, the largest number of pedestrian collisions occurs in November. The largest number of cyclist collisions occurred from May to September when the highest number of cyclists ride on the City’s transportation system.

Tuesdays experienced the largest numbers of pedestrian and cyclist collisions among all days of a week in 2015-2019.

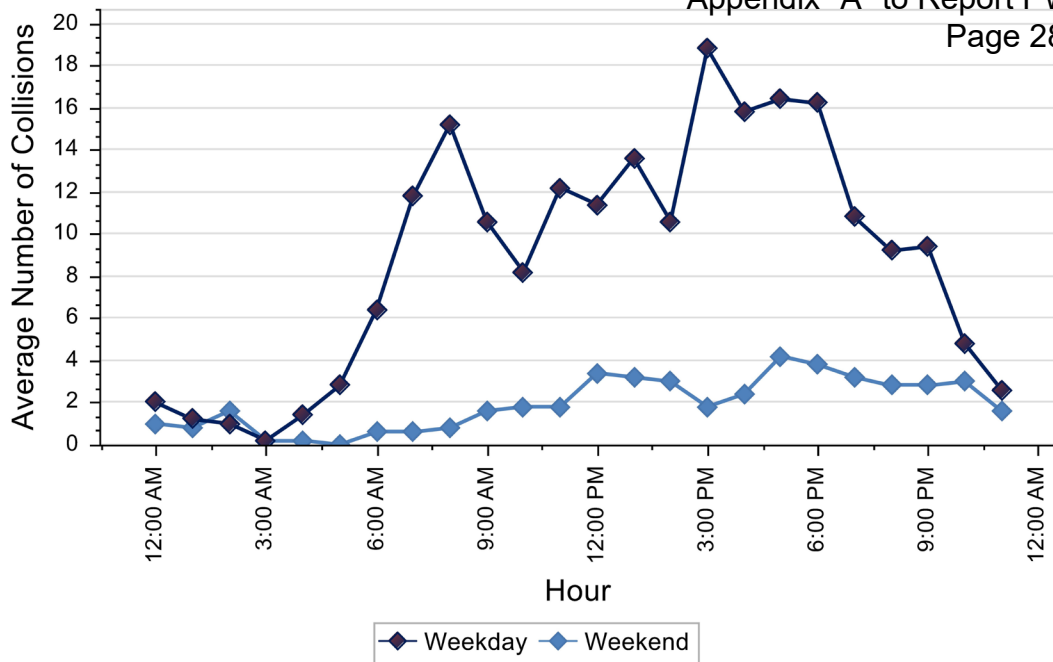


- 245 pedestrian collisions occurred in 2019.
- 128 cyclist collisions occurred in 2019, the lowest in the past 5 years.
- January and October experienced the largest number of pedestrian collisions.
- May to September experienced the largest number of cyclist collisions.

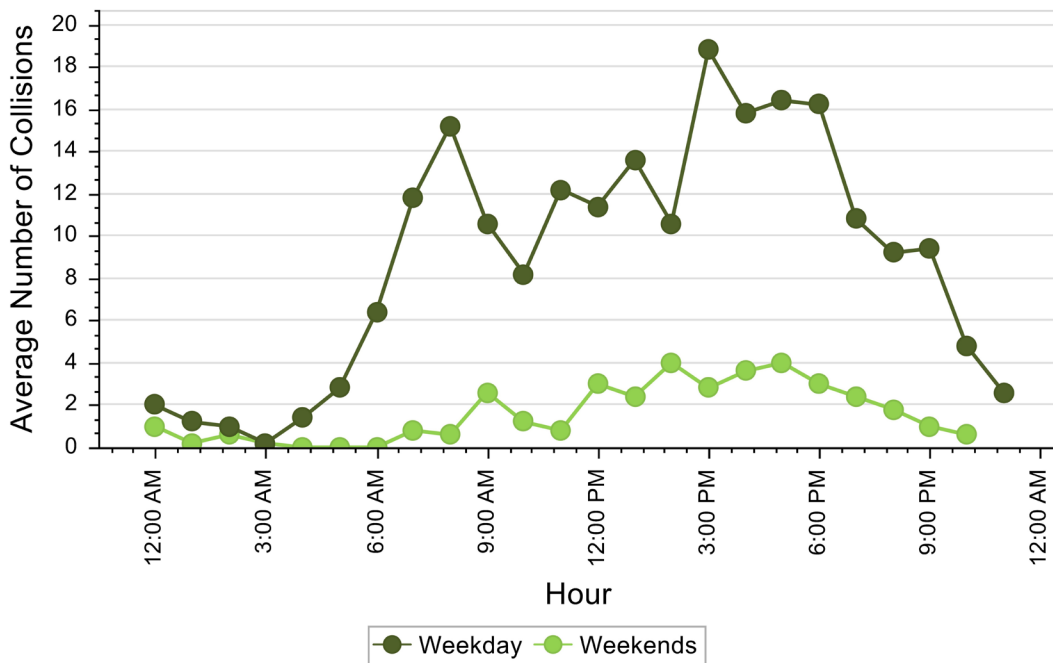
Collisions Involving a Pedestrian or Cyclist by Month, 5 Year Average (2015-2019)



Collisions Involving a Pedestrian or Cyclist by Day-of-Week, 5 Year Average (2015-2019)

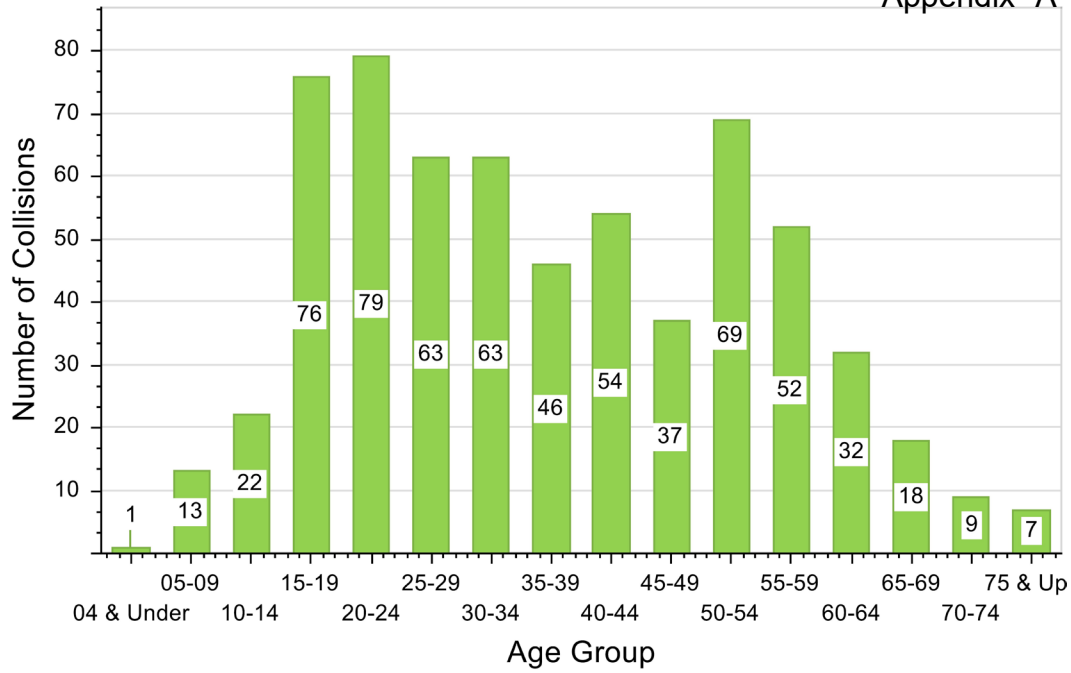


Collisions Involving a Pedestrian by Time of Day, 5 Year Average (2015-2019)



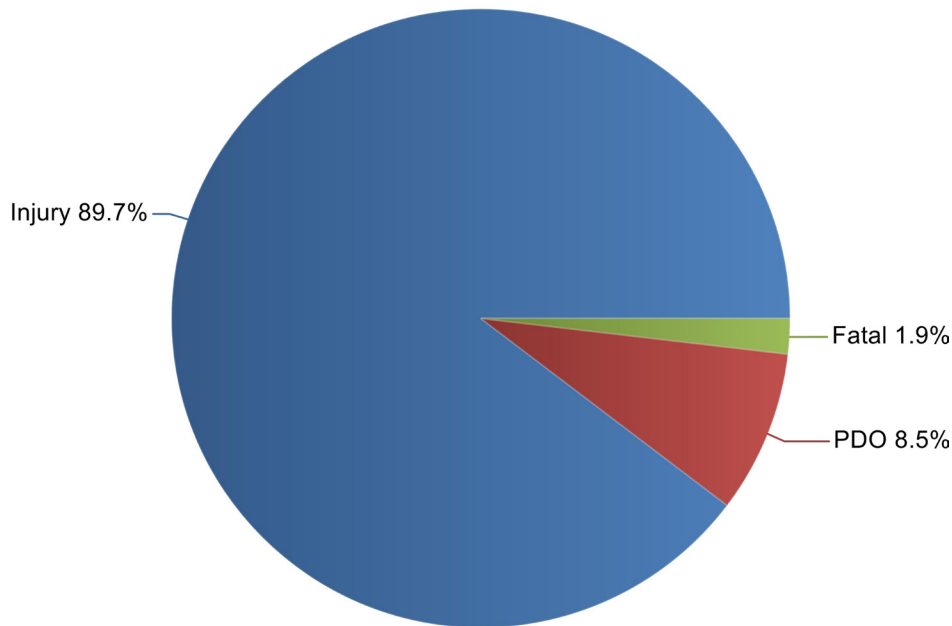
Collisions Involving Cyclist by Time of Day, 5 Year Average (2015-2019)

The cyclists in the age group of 20-24 experienced the largest number of cyclist collisions followed by 15-19 and 50-54 age groups.

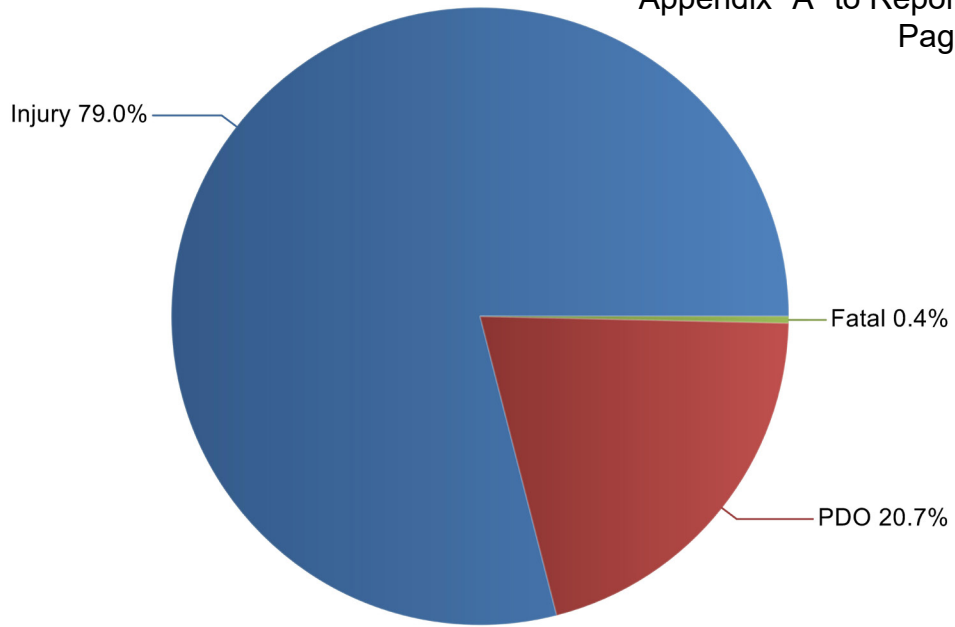


Cyclist Collisions by Cyclist Age, 5 Years (2015-2019)

Almost 90% of all pedestrian collisions resulted in injury in 2015-2019 while 1.8% resulted in fatality. 79.4% of all cyclists involved in a collision sustained injury (including 0.3% fatal injury).

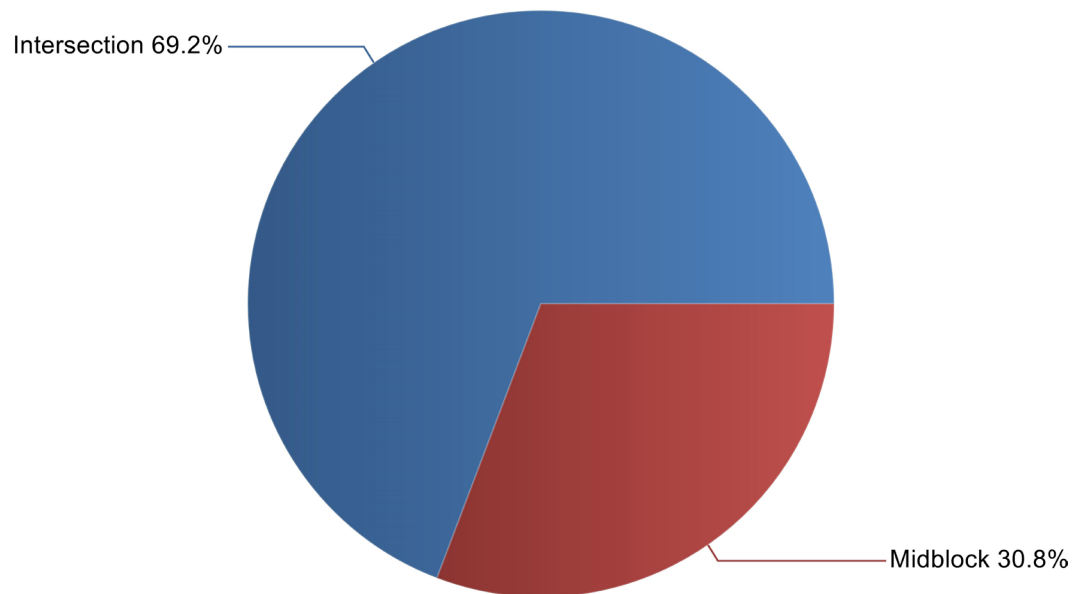


Collision Involving Pedestrian by Severity, 5 Year Average (2015-2019)

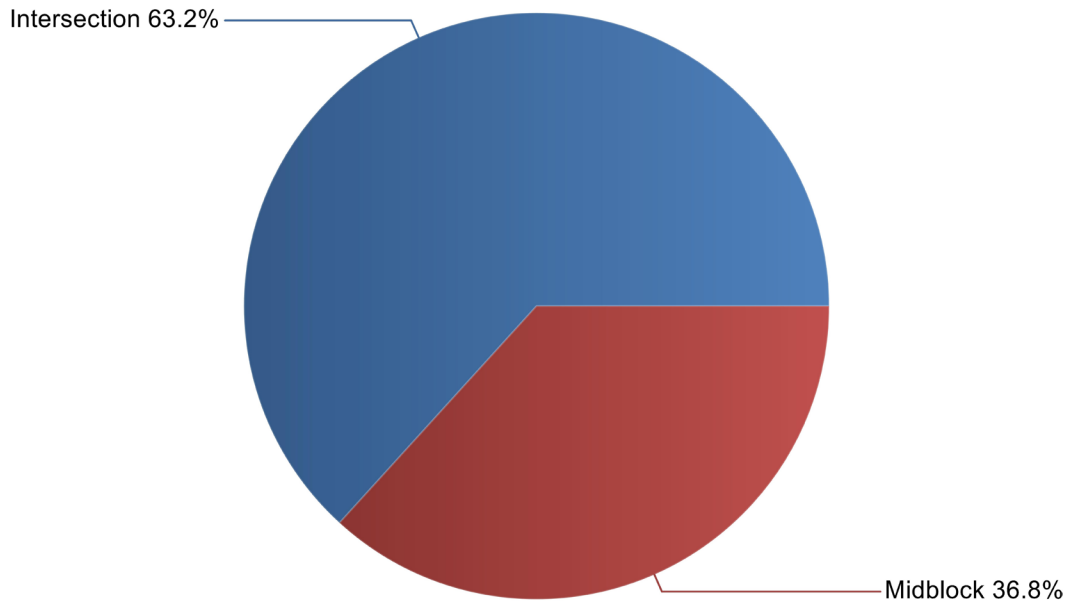


Collision Involving Cyclist by Severity, 5 Year Average (2015-2019)

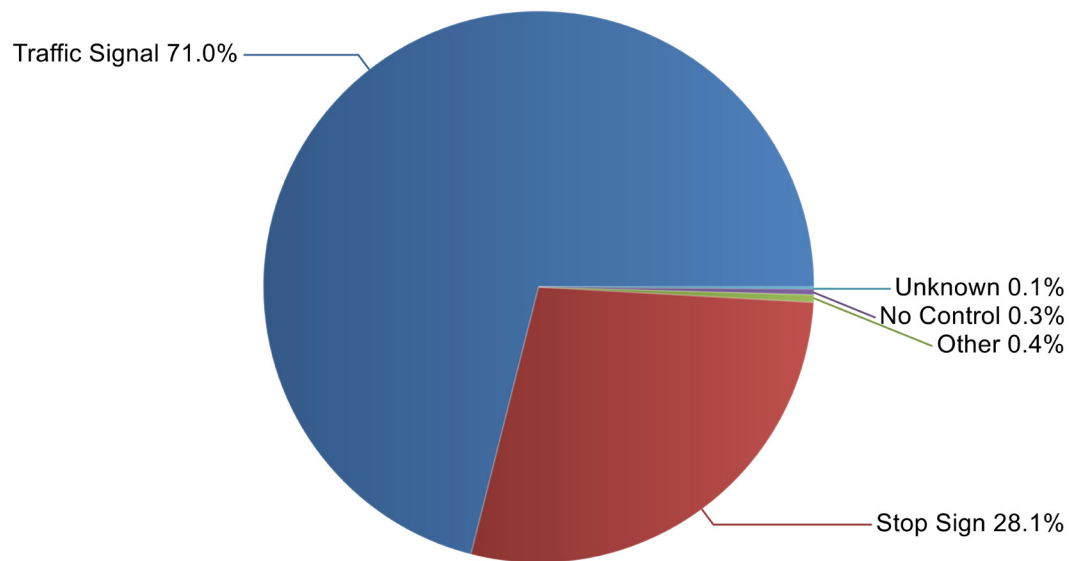
A majority of pedestrian and cyclist collisions occurred at intersections (69.2% and 63.2% respectively). Among those pedestrian collisions occurred at intersections, 71% occurred at signalized intersections while 28.1% took place at stop controlled intersections. 50% of cyclist collisions occurred at intersections happened at signalized intersections. This percentage for those occurred at stop controlled intersections is 47.4%.



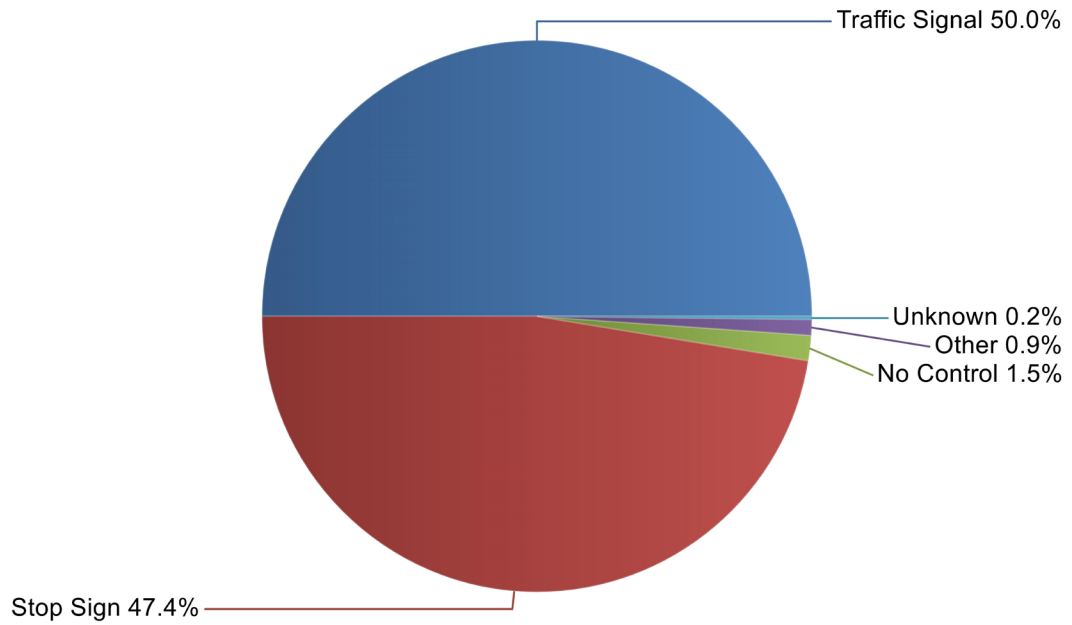
Collision Involving Pedestrian by Location, 5 Year Average (2015-2019)



Collision Involving Cyclist by Location, 5 Year Average (2015-2019)



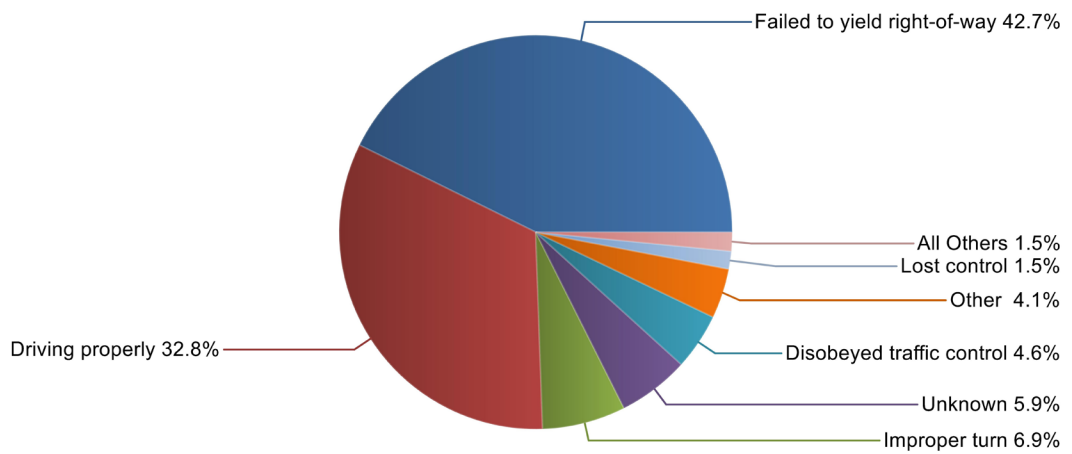
Collision Involving Pedestrian by Intersection Control Type,
5 Year Average (2015-2019)



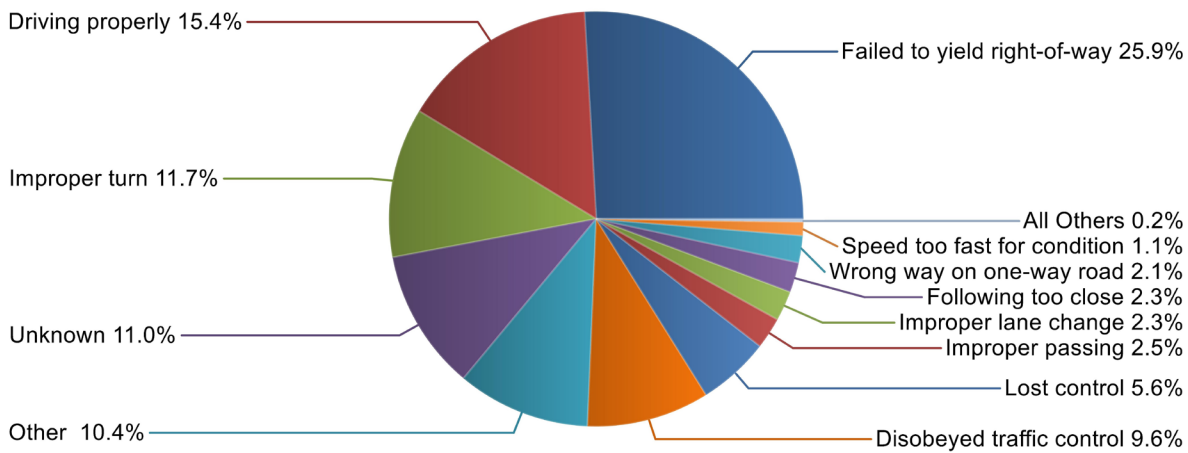
Collision Involving Cyclist by Intersection Control Type, 5 Year Average (2015-2019)

A review of driver actions involved in pedestrian and cyclist collisions show that 42.7% and 25.9% of drivers failed the right of way to pedestrians and cyclists respectively. Additionally, 11.6% of drivers committed improper turns in cyclist collisions.

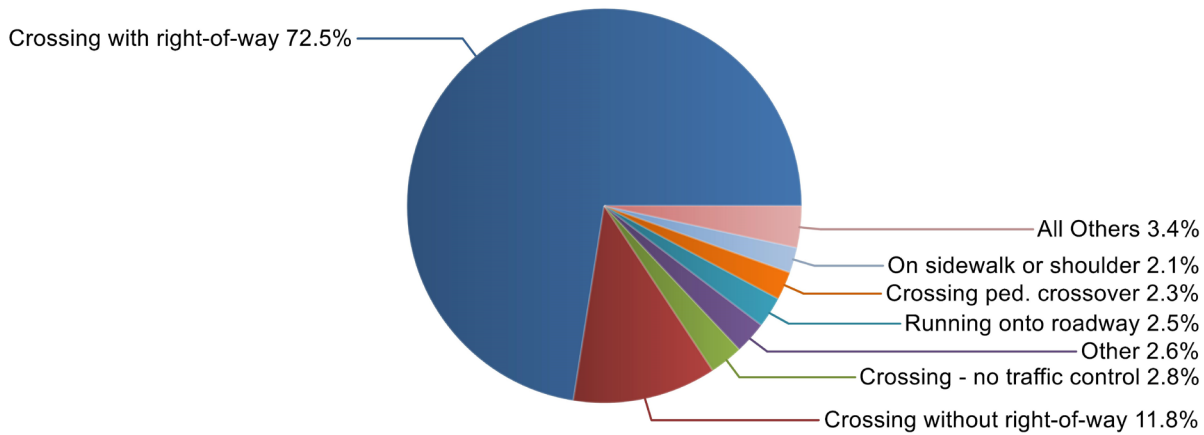
In 23.9% of pedestrian collisions at midblocks (non-intersection locations), pedestrians were walking on road shoulders or sidewalks. This observation can potentially be used to add or improve sidewalks. Also, in 21.9% of pedestrian collisions at midblock locations, the pedestrian did not have right of way (i.e. jay walking). The City of Hamilton has invested in deploying midblock pedestrian crossovers. It is suggested that the City continue these efforts guided by the collision data. In 11.7% of cyclist collisions, the cyclists failed to yield the right of way to vehicles.



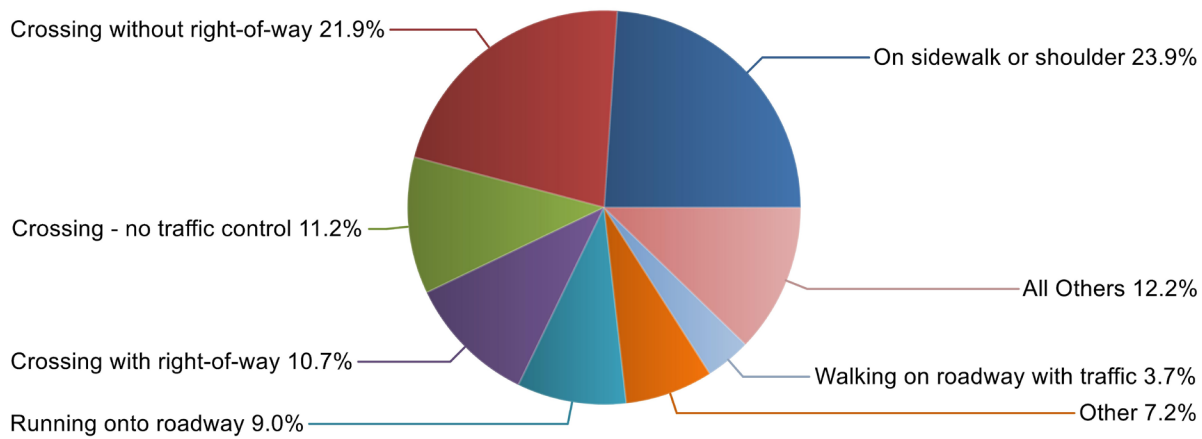
Pedestrian Collisions by Driver Action, 5 Years (2015-2019)



Cyclist Collisions by Driver Action, 5 Year (2015-2019)

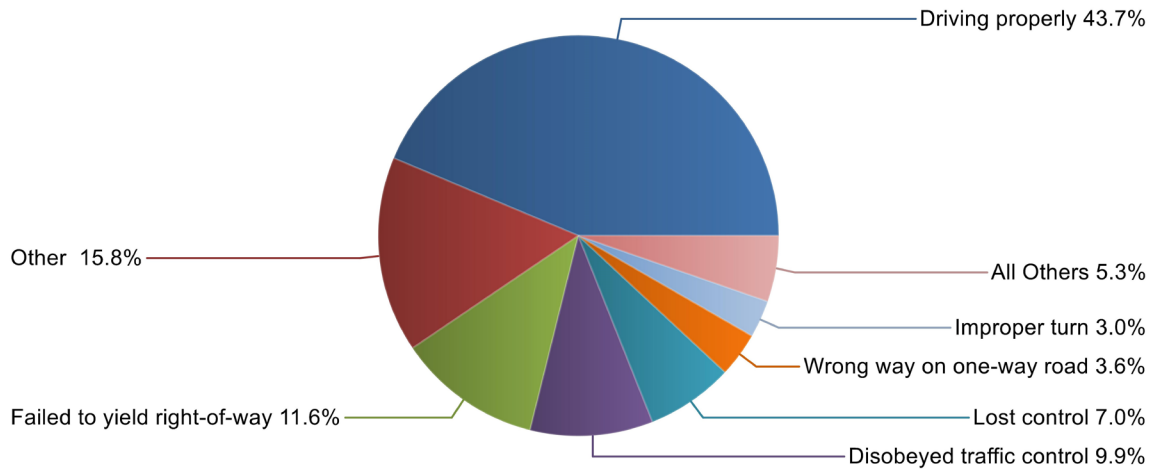


Intersection Pedestrian Collisions by Pedestrian Action, 5 Year (2015-2019)



Midblock Pedestrian Collisions by Pedestrian Action, 5 Year (2015-2019)





Cyclist Collisions by Cyclist Action, 5 Year (2015-2019)

Intersections with the Highest Frequency of Pedestrian Fatal and Injury Collisions, 5 Year Average (2015-2019)

| Description | Collision Frequency |
|--------------------------------|---------------------|
| Kenilworth Av N at Main St E | 9 |
| Dundurn St S at King St W | 8 |
| Dundurn St S at Main St W | 7 |
| Main St W at Queen St S | 8 |
| Barton St E at Lottridge St | 7 |
| Main St E at Wentworth St S | 7 |
| Main St E at Victoria Av S | 7 |
| John St S at Main St E | 7 |
| Barton St E at Wellington St N | 7 |

Midblocks with the Highest Frequency of Pedestrian Fatal and Injury Collisions, 5 Year Average (2015-2019)

| Description | Collision Frequency |
|--|---------------------|
| Barton St E between Ferguson & Wellington | 5 |
| Barton St E between Nash & Kenora | 4 |
| Wentworth St N between Cannon & Bristol | 4 |
| King St W between Caroline & Hess | 4 |
| Queenston Rd between Nash & plaza entrance to West of Nash | 3 |
| Macnab St S between King & Main | 3 |
| Barton St E between Victoria & East | 3 |
| King St W between New & Dundurn | 3 |

**Intersections with the Highest Frequency
of Cyclist Fatal and Injury Collisions, 5 Years (2015-2019)**

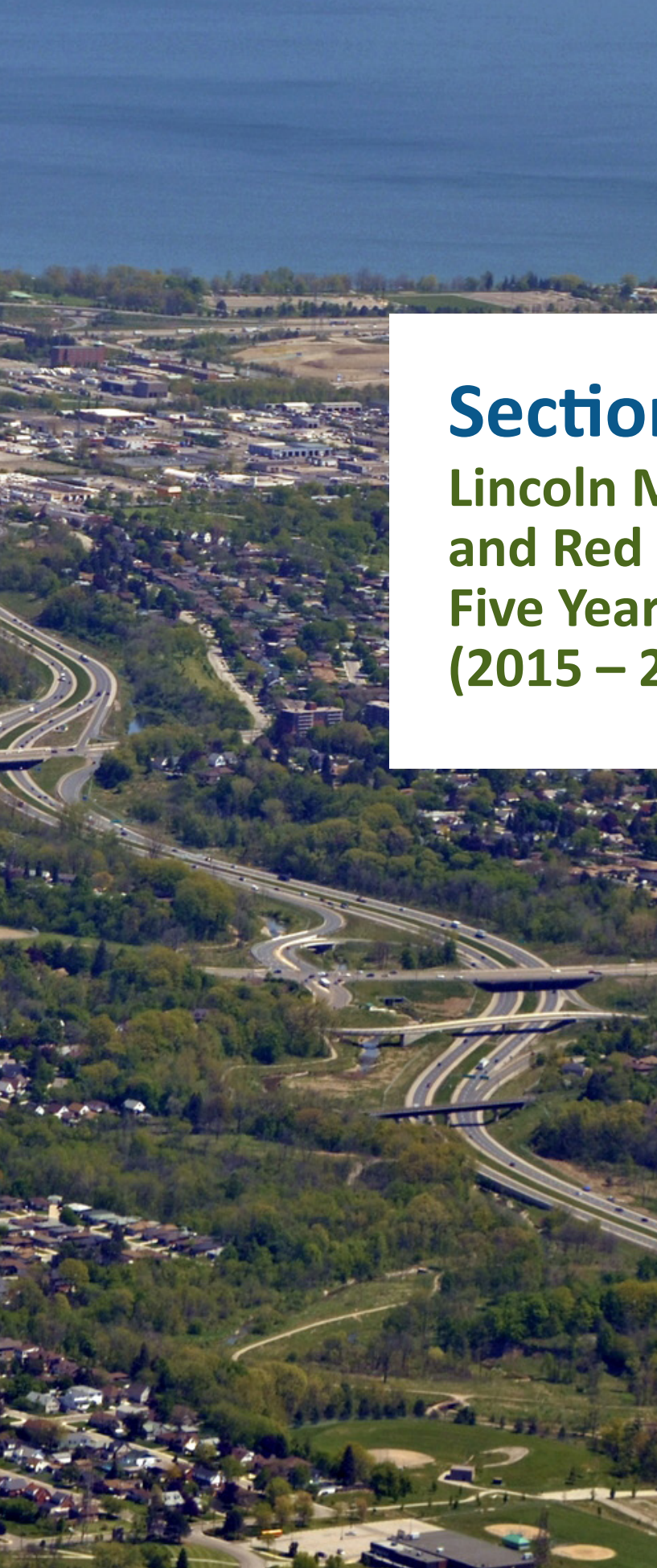
| Description | Collision Frequency |
|--|---------------------|
| Cannon St E at Wellington St N | 6 |
| Cannon St E at Mary St | 6 |
| Queenston Rd at Ramp Queenston EB to RHVP NB | 5 |
| Ashley St at Cannon St E | 5 |
| Barton St E at Centennial Pkwy N | 4 |
| Barton St E at Robins Av | 4 |
| Cannon St E at Wentworth St N | 4 |
| Cannon St E at Emerald St N | 4 |

**Midblocks with the Highest Frequency
of Cyclist Fatal and Injury Collisions, 5 Years (2015-2019)**

| Description | Collision Frequency |
|---|---------------------|
| Main St W between Major Road Bridge & Macklin | 3 |
| Barton St E between Parkdale & Woodward | 3 |
| Cannon St E between Wellington & West | 3 |
| King St W between Paradise & Longwood | 3 |
| Stone Church Rd W between Private & Upper Paradise | 2 |
| Barton St E between Centennial & Covington | 2 |
| Barton St E between Private & Lake | 2 |
| Barton St E between Brockley & Bellmanor | 2 |
| Queenston Rd between Private & Lake Avenue | 2 |
| Twenty Rd W between Garth & Silverbirch | 2 |
| Claremont Access between Major Road Bridge & Claremont Access | 2 |
| Barton St E between Elgin & Ferguson | 2 |
| Barton St E between Ferguson & Wellington | 2 |
| Cootes Dr between Main & Ramp Main Wb to Cootes Nb | 2 |
| Ottawa St N between Barton & Private | 2 |
| Parkdale Av N between Dunsmure & Roxborough | 2 |
| Barton St E between Connaught & Gage | 2 |
| King St E between Walnut & Ferguson | 2 |
| King St E between Ferguson & Spring | 2 |
| York Bv between Bay & Caroline | 2 |
| Bay St S between Main & George | 2 |
| Main St W between Bay & Caroline | 2 |
| King St W between New & Dundurn | 2 |
| Dundurn St S between King & Main | 2 |
| Wilson St between Catharine & Mary | 2 |
| King St W between North Oval & Marion | 2 |

Section 2

Lincoln M. Alexander Parkway and Red Hill Valley Parkway Five Year Collision Trends (2015 – 2019)

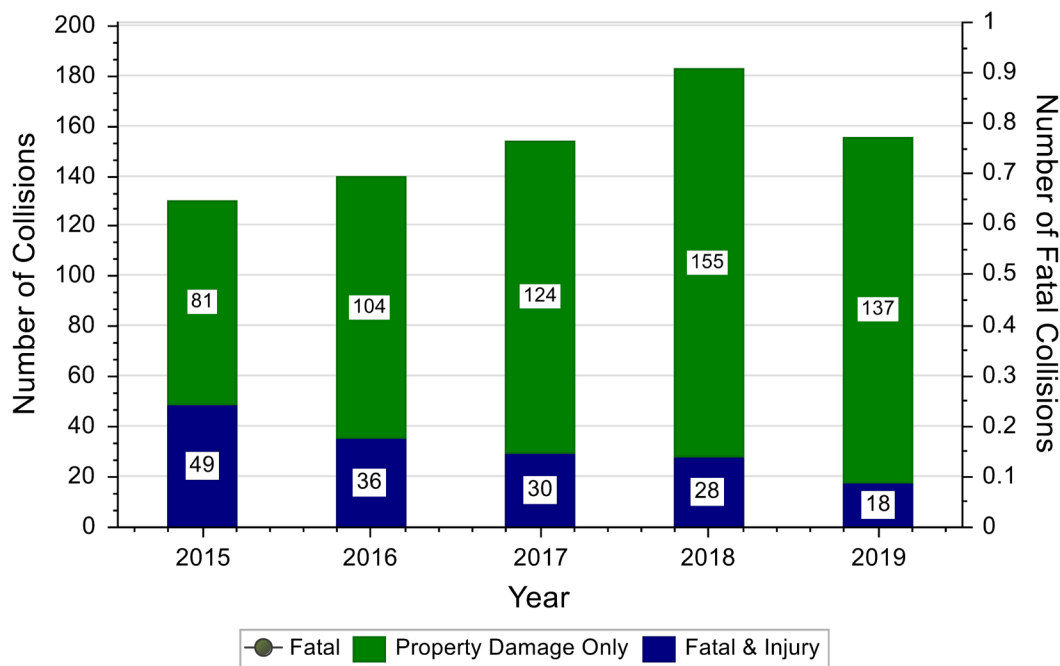


The Lincoln M. Alexander Parkway (LINC) is an important inter-City commuter connection between several major north/south arterials in the upper City's road network. The road also serves as a connection between Highway 403 and Red Hill Valley Parkway (RHVP)/ the Queen Elizabeth Way (QEW). The LINC was opened to traffic in 1997 with five full access interchanges and the posted speed limit of 90 km/hr.

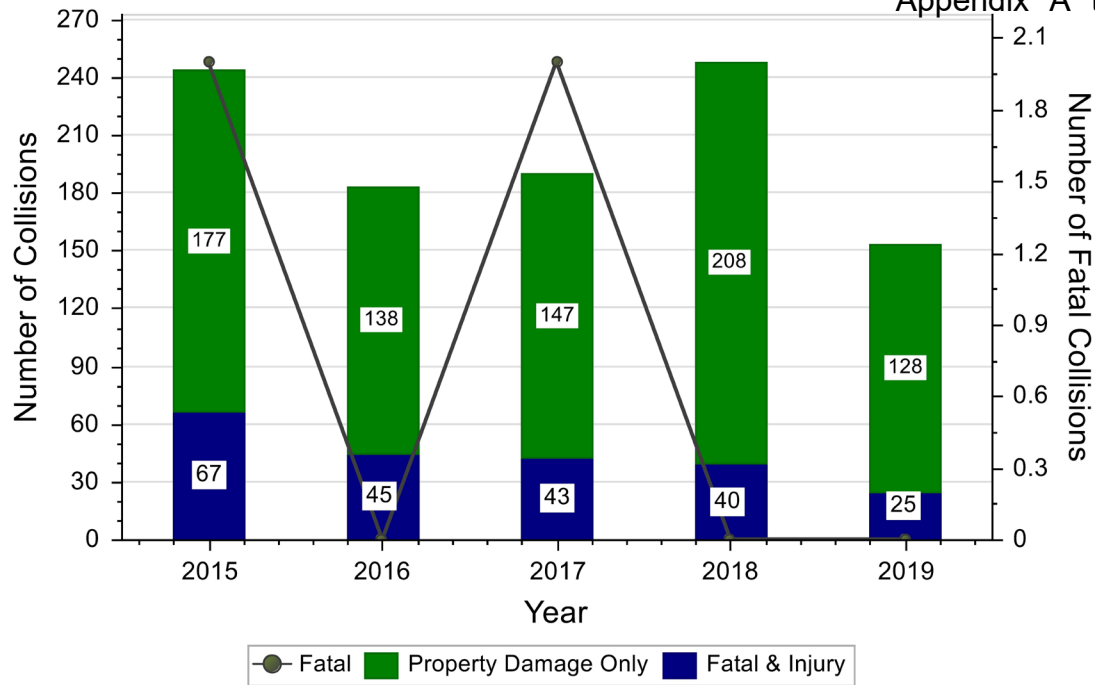
The RHVP forms part of a continuous connection from Highway 403 and the QEW in conjunction with the LINC. The RHVP was opened to traffic in 2007. The RHVP serves both intra-city traffic and inter-city traffic connecting the City to Niagara Region and South West Ontario. The RHVP includes six full access interchanges of various design types. In February, 2019, the City reduced the posted speed limit from 90 km/hr to 80 km/hr on the RHVP, between the Greenhill and Barton interchanges.

Frequency and Severity

A review of the severity of collisions over the latest five years (2015-2019) revealed that the frequency of fatal and injury collisions is decreasing on the LINC and the RHVP. The total number of collisions on the LINC and the RHVP has an upward trend. It should be noted that the RHVP was completely closed for three months in the summer in one direction for resurfacing and the implementation of road safety enhancement. As a result, the number of collisions on the LINC and particularly on the RHVP during 2019 should be treated within this context.



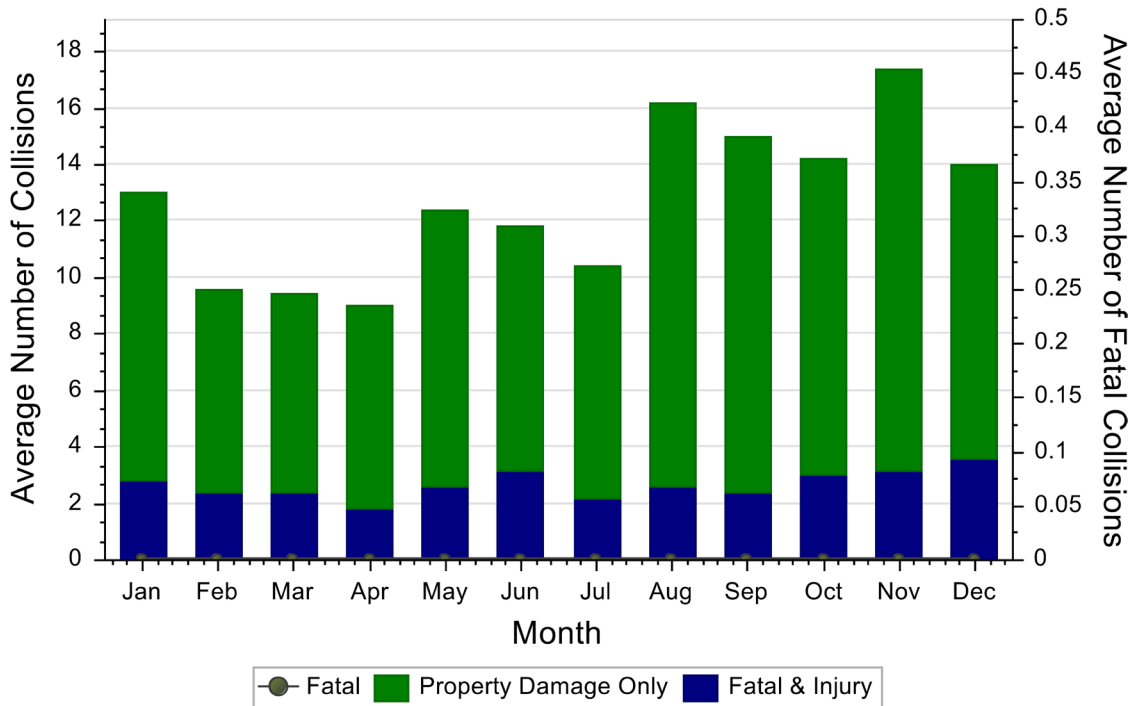
Collisions Frequency - LINC (2015-2019)



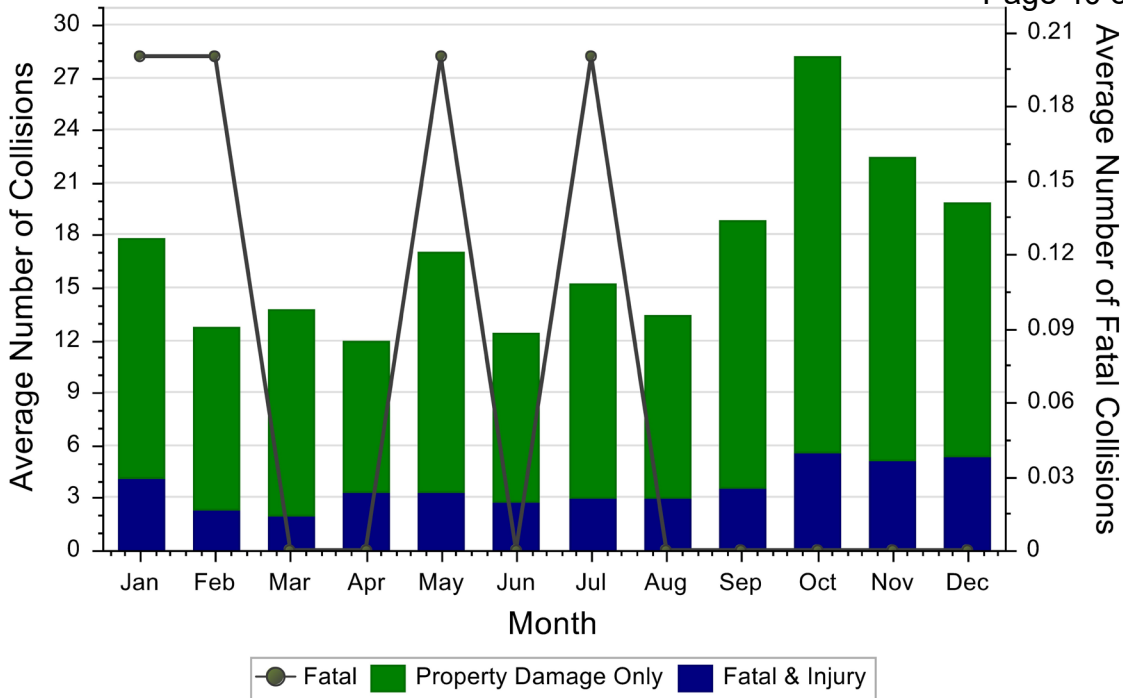
Collisions Frequency - RHVP (2015-2019)

Month, Day, and Time of Collisions

The largest number of collisions on the LINC took place in the month of November while the largest number of collisions occurred during the month of October on average during 2015-2019.

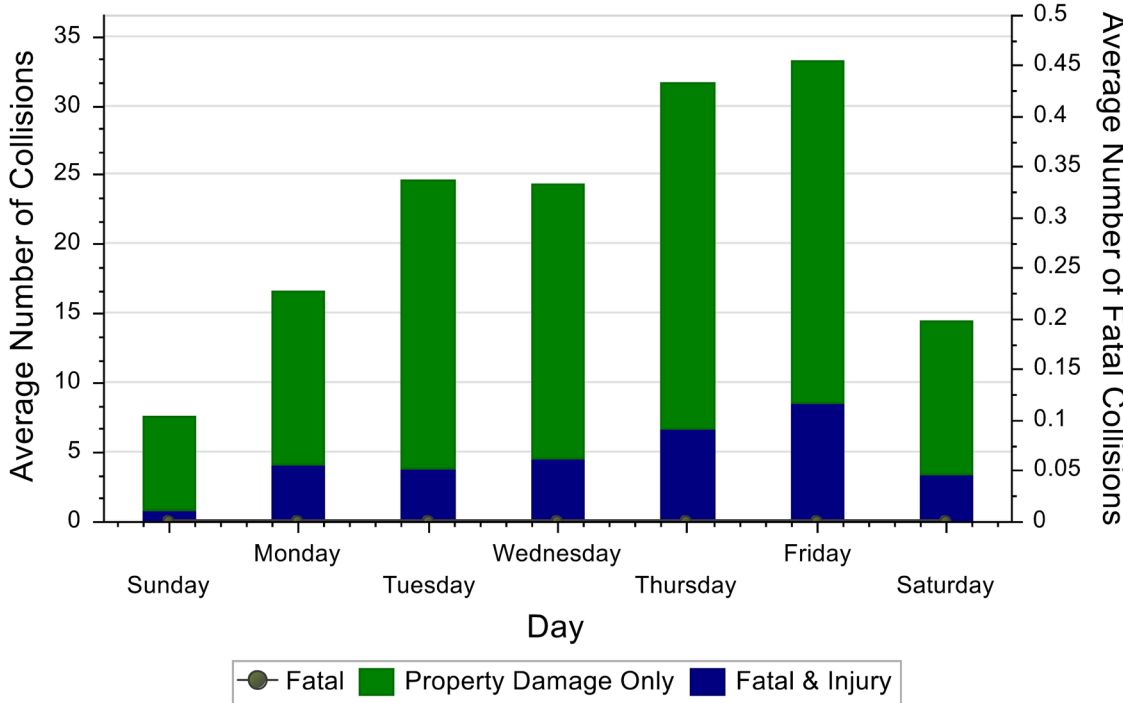


Collisions by Month, 5 Year Average - LINC (2015-2019)

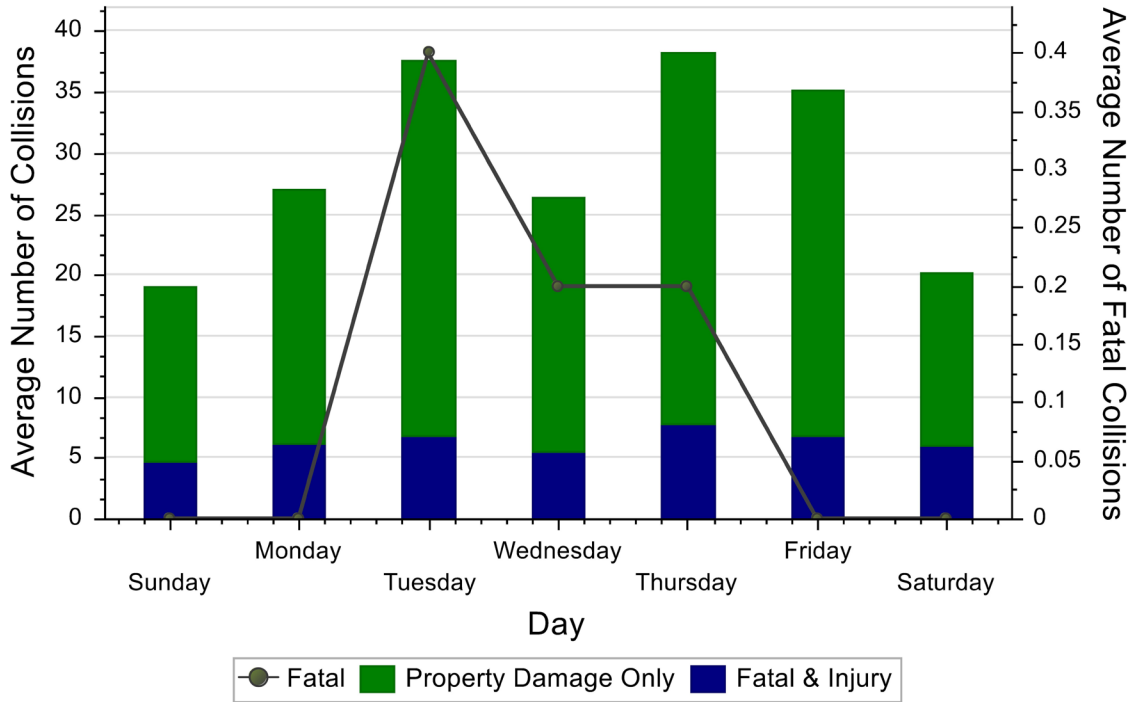


Collisions by Month, 5 Year Average - RHVP (2015-2019)

Similar to other places in Hamilton, Fridays had the largest number of collisions on the LINC but Tuesdays on the RHVP.

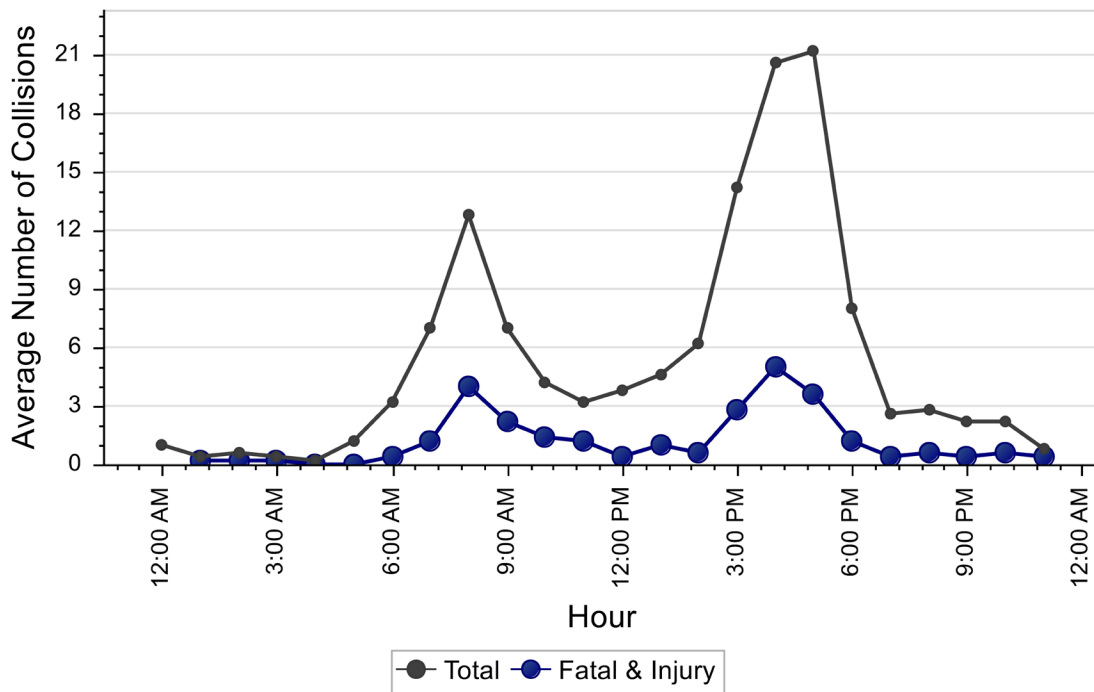


Collisions by Day -of-Week, 5 Year Average - LINC (2015-2019)

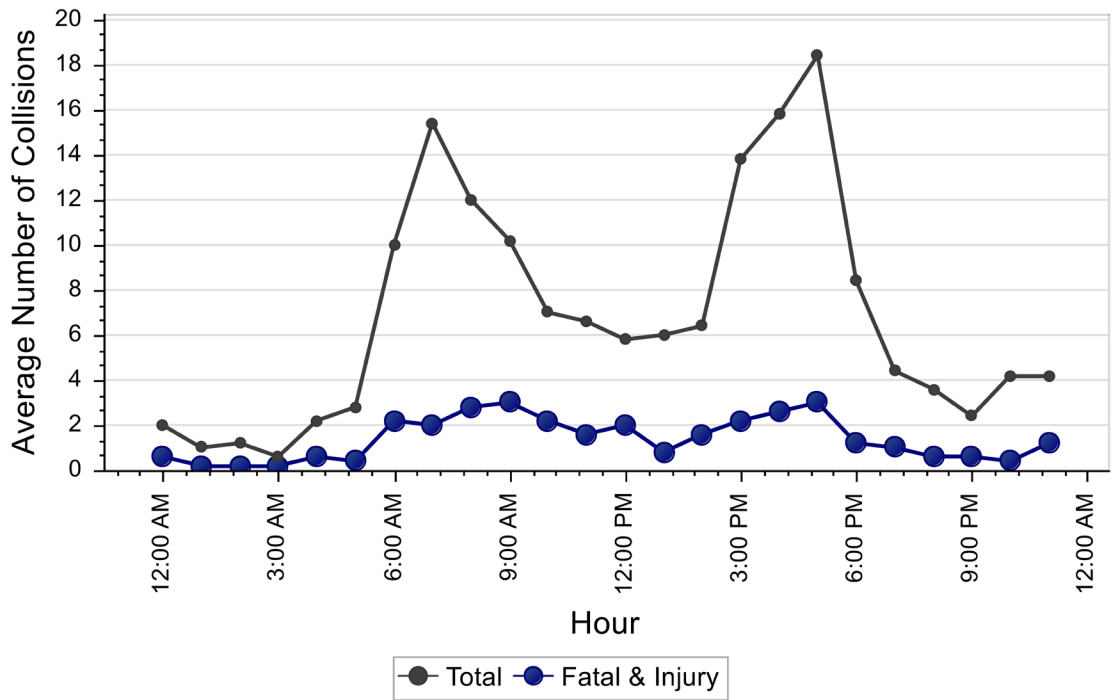


Collisions by Day -of-Week, 5 Year Average - RHVP (2015-2019)

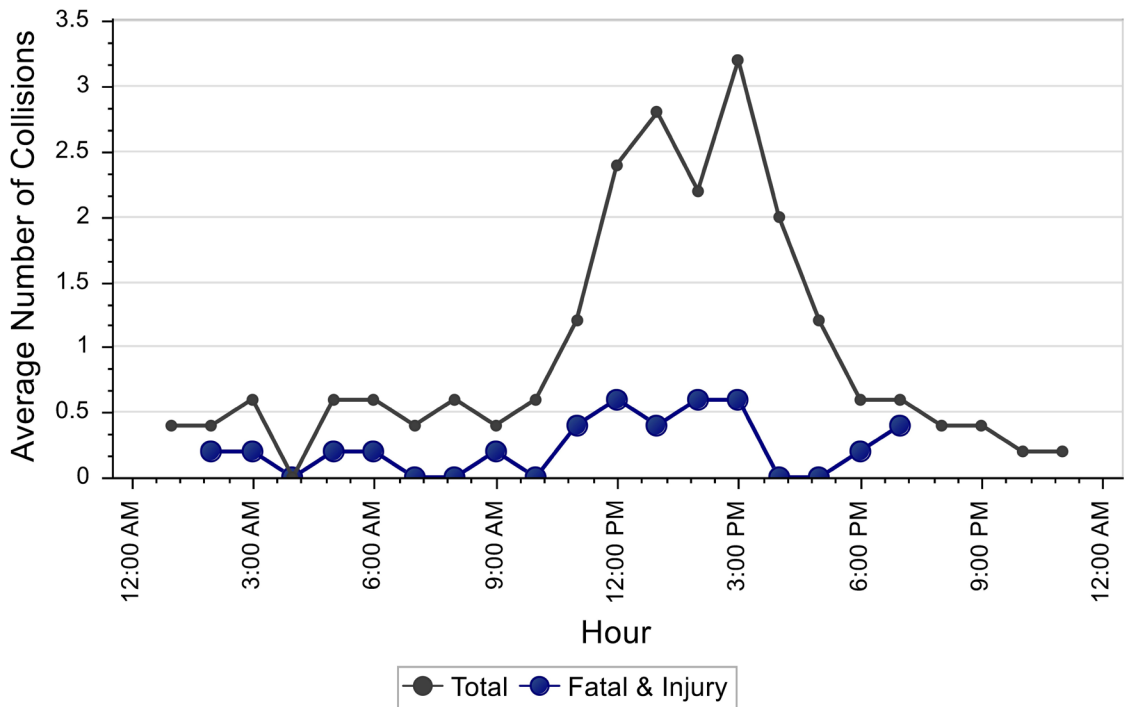
There was a clear correlation between the time of collisions and the typical peak hours of traffic during weekdays on the LINC and RHVP. The time of collisions during weekend did not follow any particular pattern. This observation is consistent with other places in the City of Hamilton.



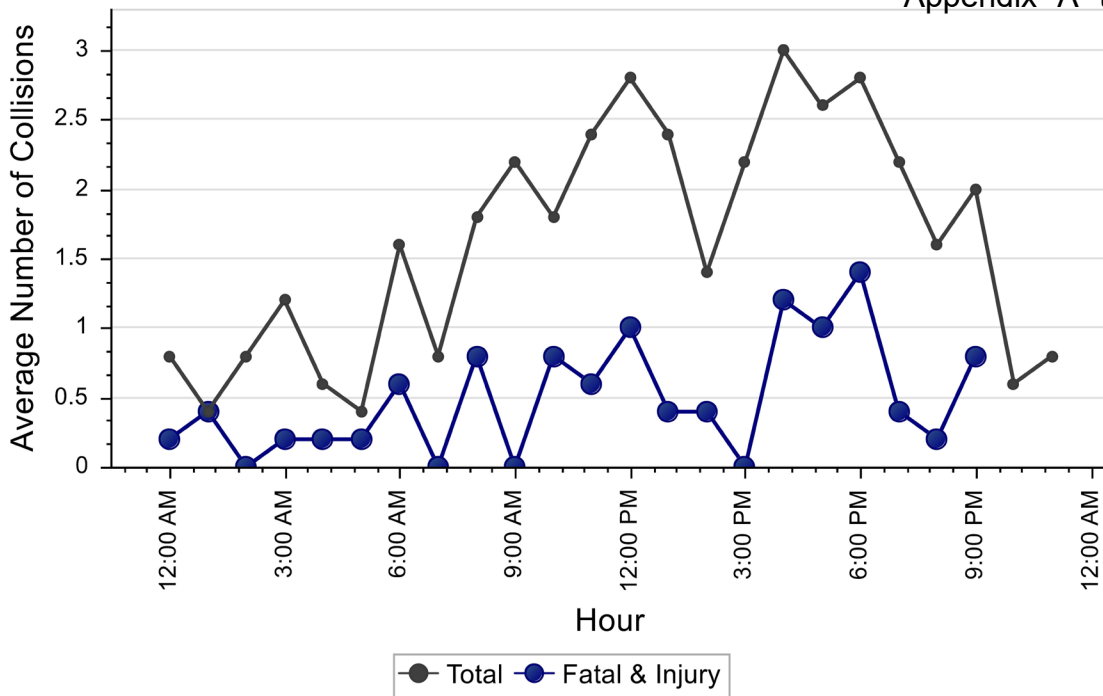
Weekday Collisions by Time-of-Day, 5 Year Average - LINC (2015-2019)



Weekday Collisions by Time-of-Day, 5 Year Average - RHVP (2015-2019)



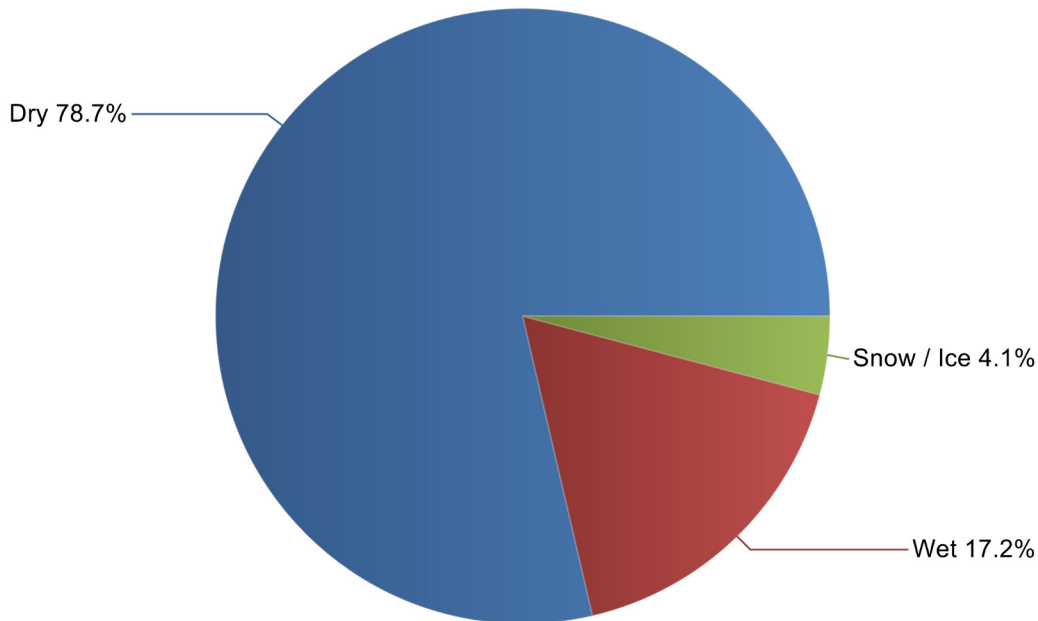
Weekend Collisions by Time-of-Day, 5 Year Average - LINC (2015-2019)



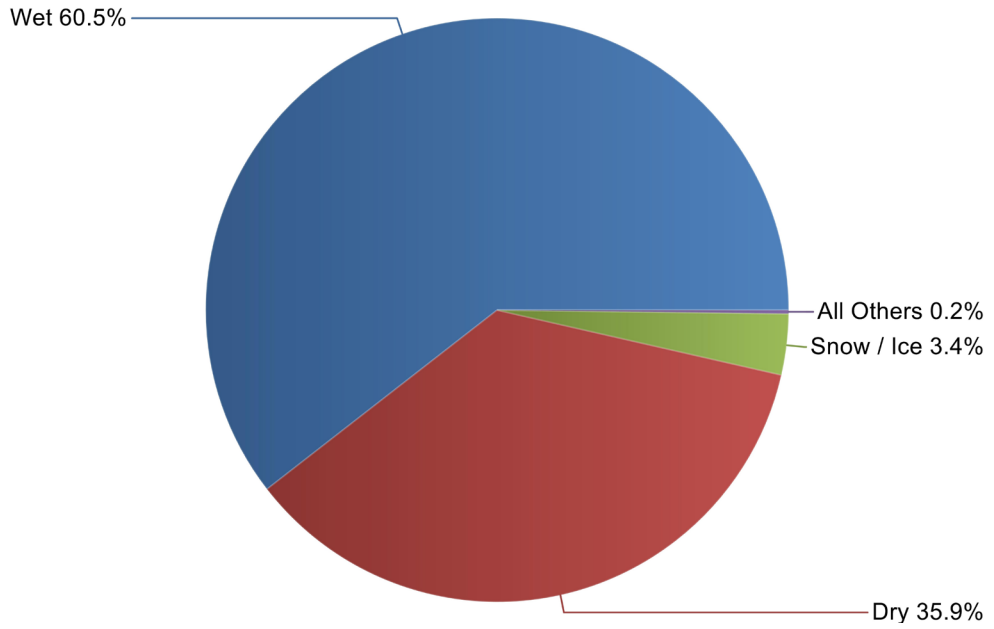
Weekend Collisions by Time-of-Day, 5 Year Average - RHVP (2015-2019)

Collisions by Road Surface Condition

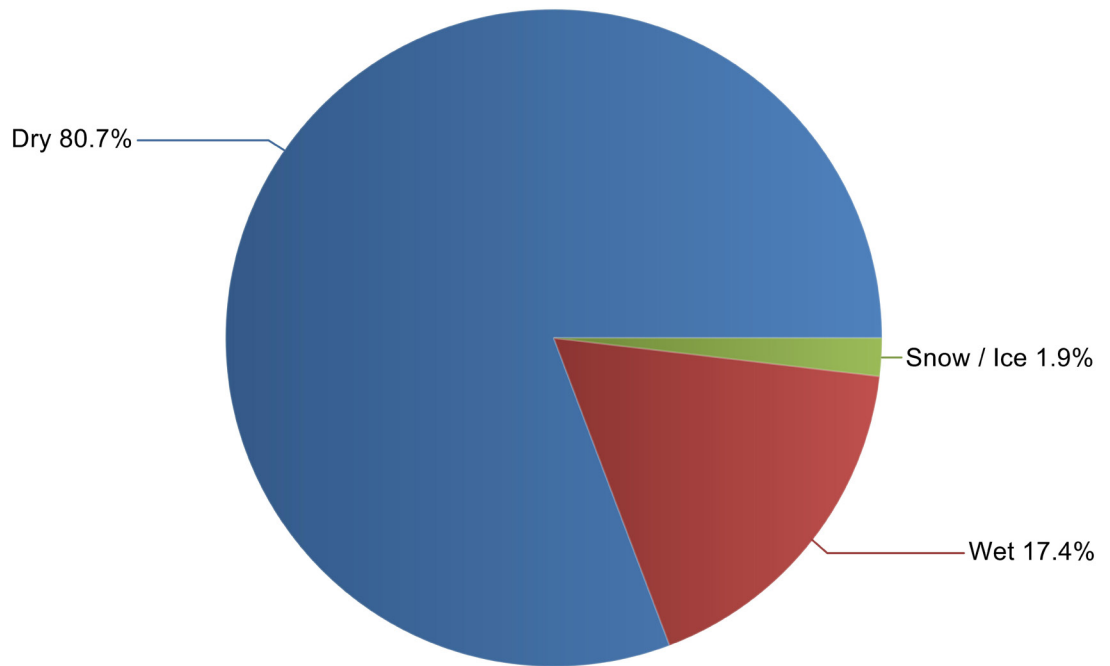
A review of collisions based on their road surface conditions clearly show a higher number of collisions during wet and snow/ice conditions on the RHVP than the provincial average. In fact the majority of collisions on the RHVP occurred on non-dry road surface condition. The City has recently resurfaced the RHVP and this trend should be monitored in the next few years. The number of collisions during non-dry conditions on the LINC are consistent with provincial averages and did not reveal any unusual trends.



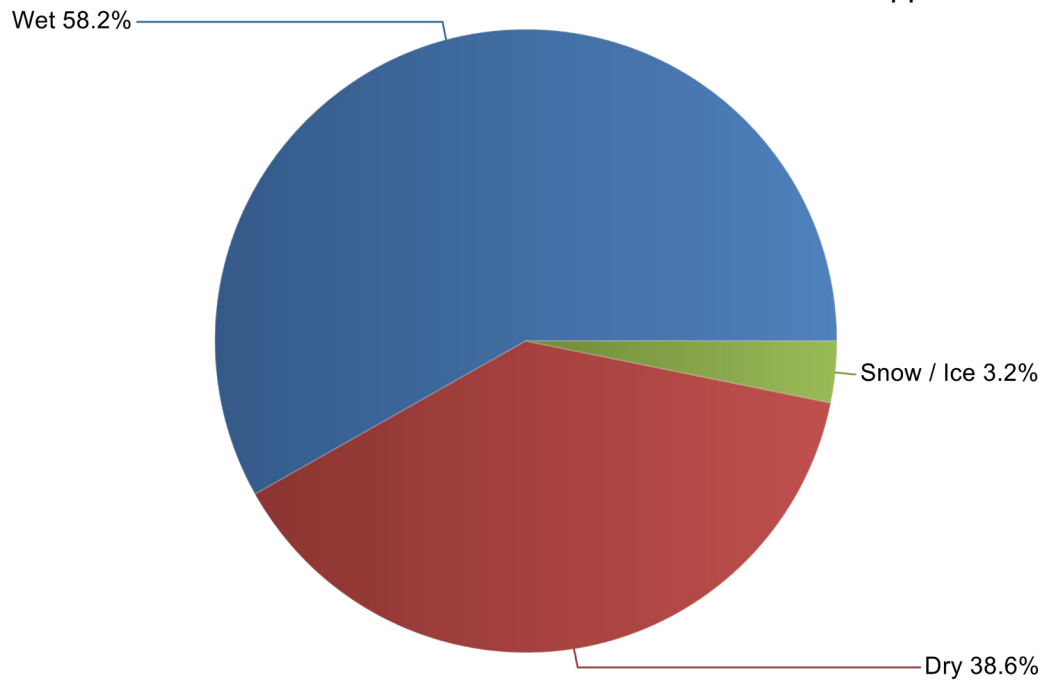
Collisions by Road Surface Condition, 5 Years - LINC (2015-2019)



Collisions by Road Surface Condition, 5 Years - RHVP (2015-2019)

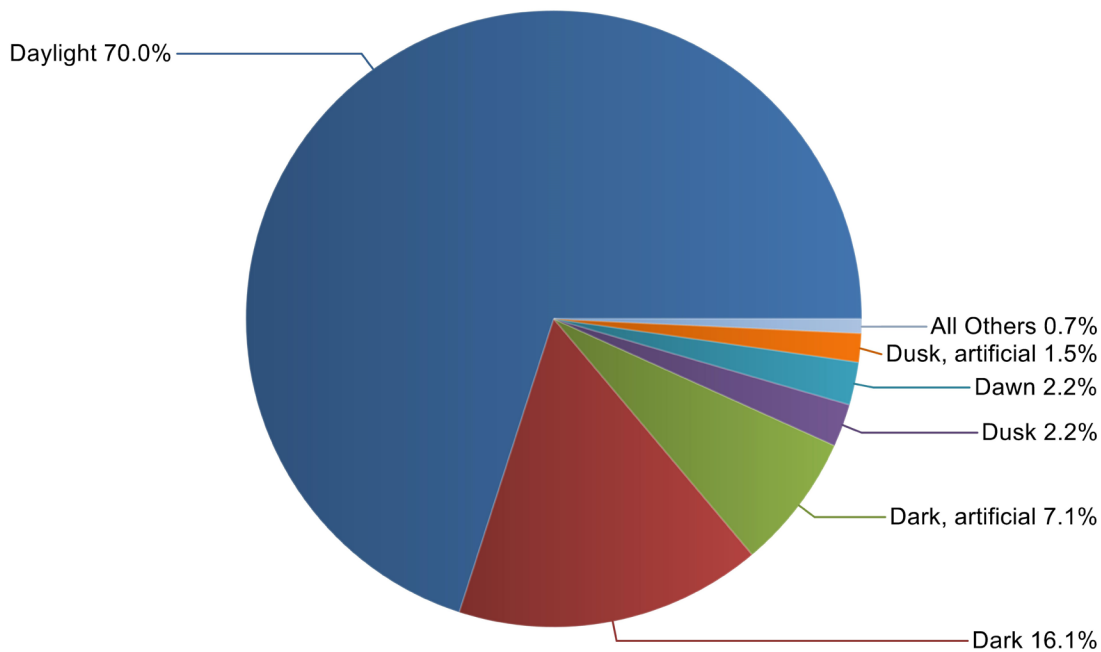


Fatal Collisions by Road Surface Condition, 5 Year Average - LINC (2015-2019)

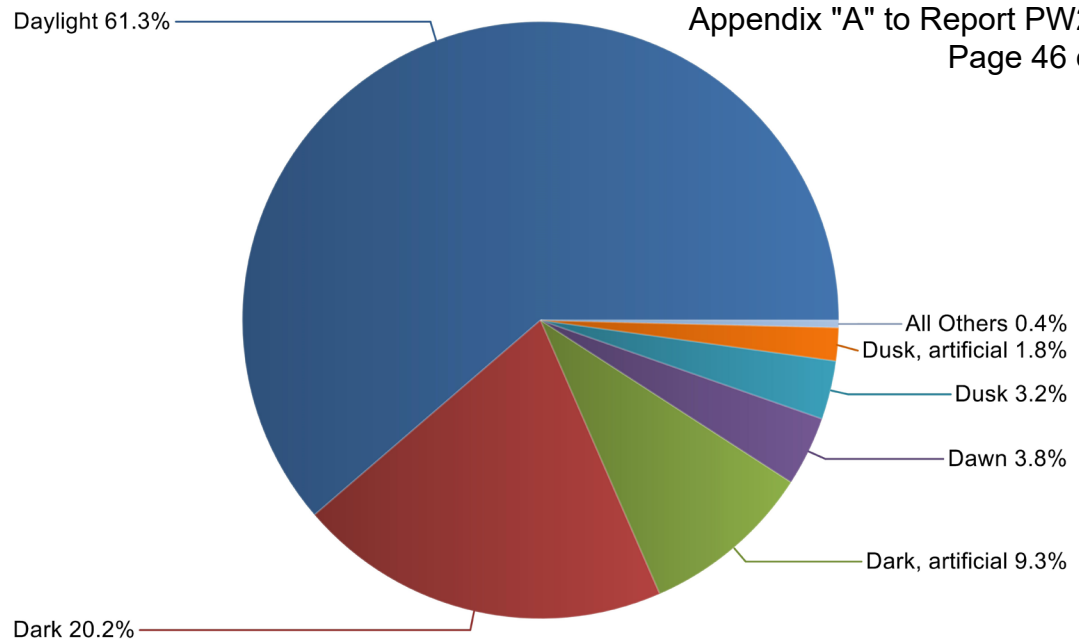


Fatal Collisions by Road Surface Condition, 5 Year Average - RHVP (2015-2019)

The number of collision occurred on the RHVP during the dark conditions is more than the City of Hamilton and provincial averages. However, the number of collisions occurred on the LINC were consistent with the City of Hamilton statistics.



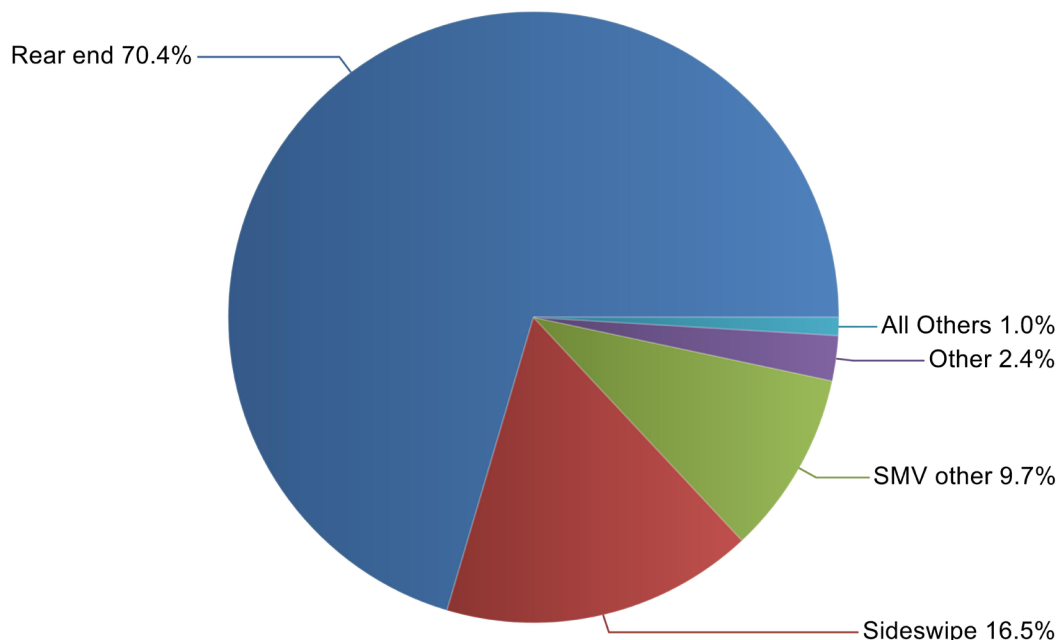
Collisions by Lighting Condition, 5 Years - LINC (2015-2019)



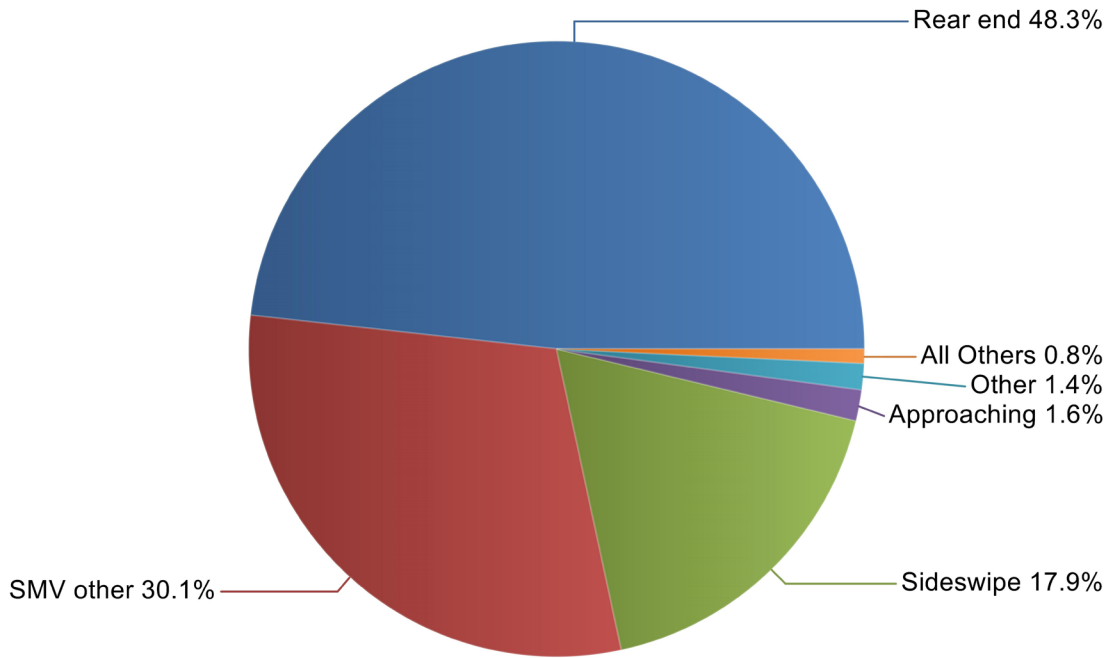
Collisions by Lighting Condition, 5 Years - RHVP (2015-2019)

Collisions by Impact Type

The prominent collision impact type on the LINC and the RHVP was rear end (70.4% and 48.3% respectively). The difference between the percentage of rear end type collisions on the LINC and the RHVP clearly shows the difference between operations of these two highways. The LINC experiences recurring congestion and the high percentage of rear end can be the result of the congestion. On the RHVP, single motor vehicle collisions constitute the second highest collision type.



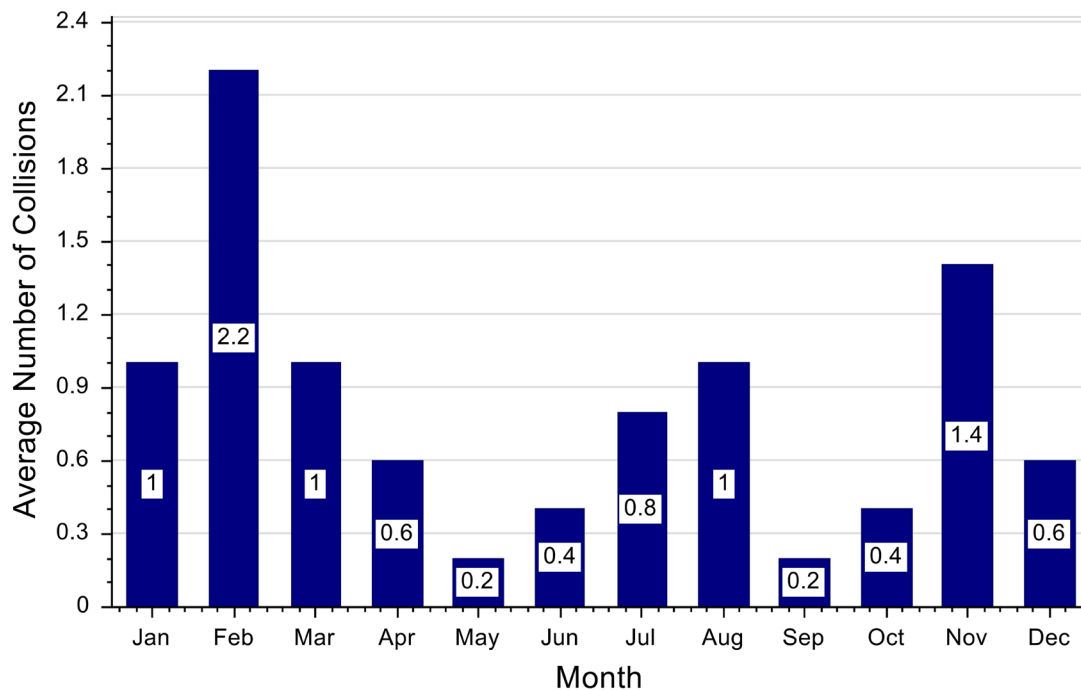
Collisions by Initial Impact Type, 5 Years - LINC (2015-2019)



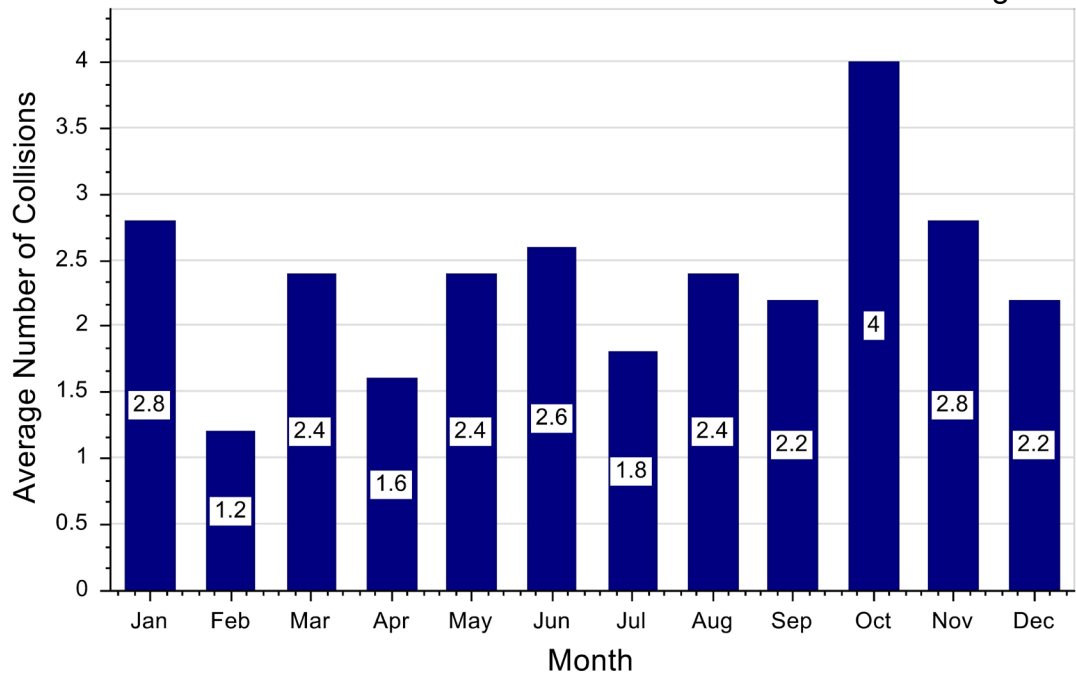
Collisions by Initial Impact Type, 5 Years - RHVP (2015-2019)

Drivers

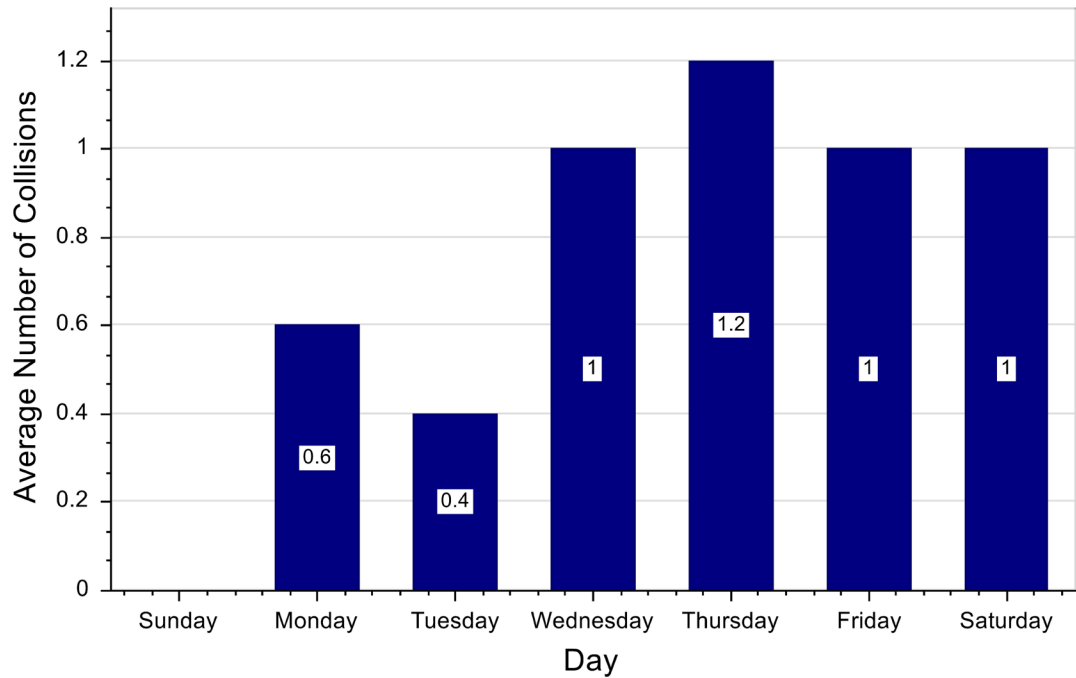
In 23% of all police reported collisions on the LINC at least one driver lost control during 2015-2019. On the RHVP, however, in 34% of all police reported collisions, at least one driver lost control.



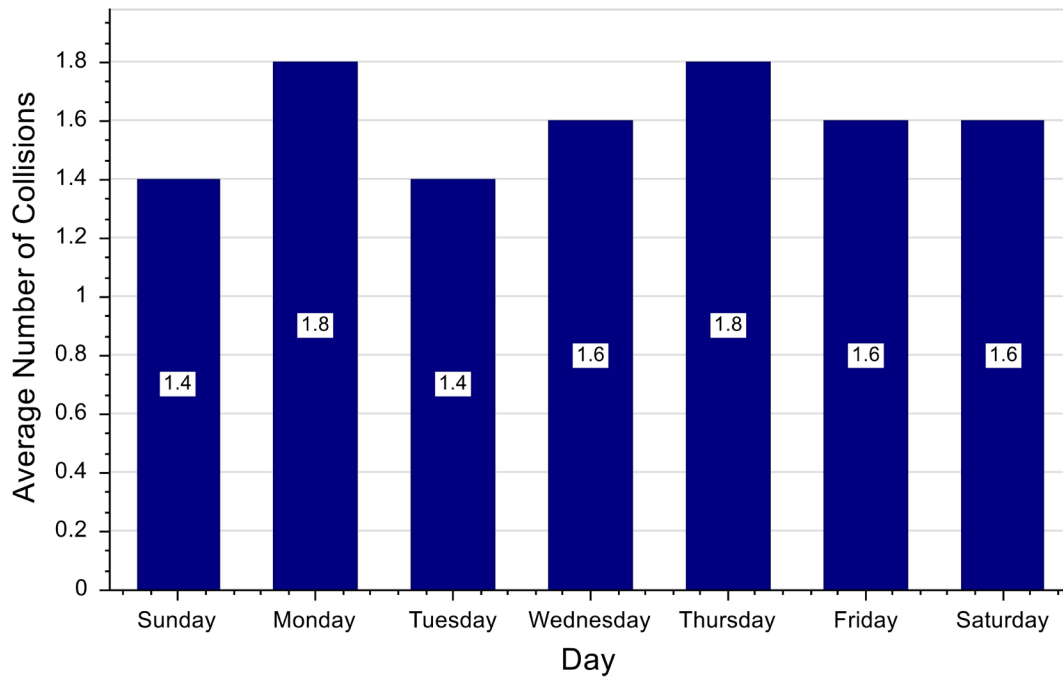
Lost Control Collisions by Month, 5 Year Average - LINC (2015-2019)



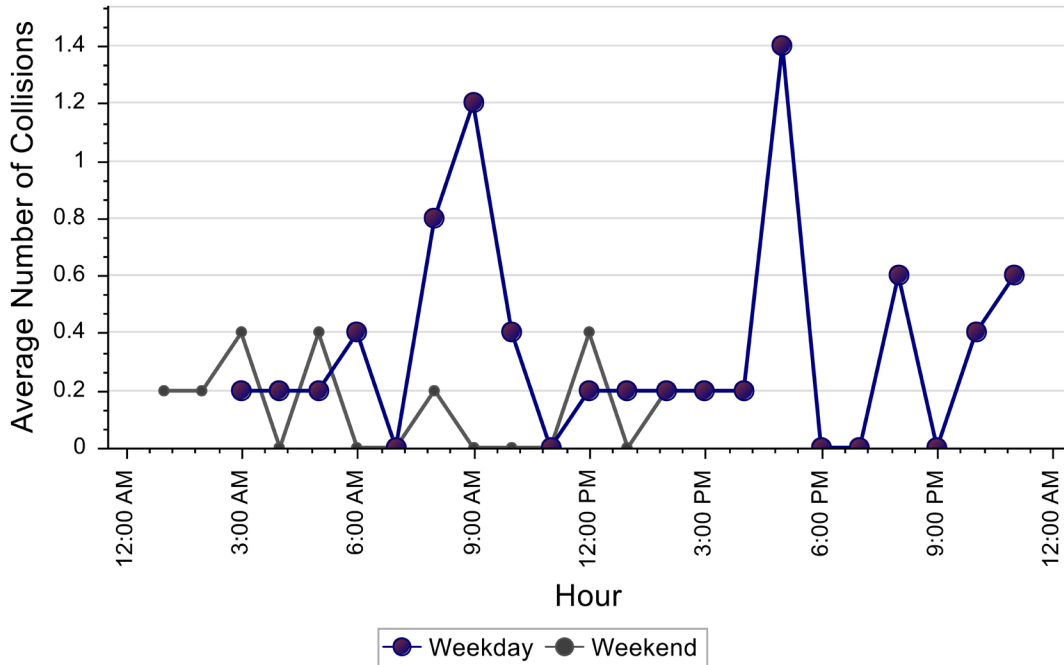
Lost Control Collisions by Month, 5 Year Average - RHVP (2015-2019)



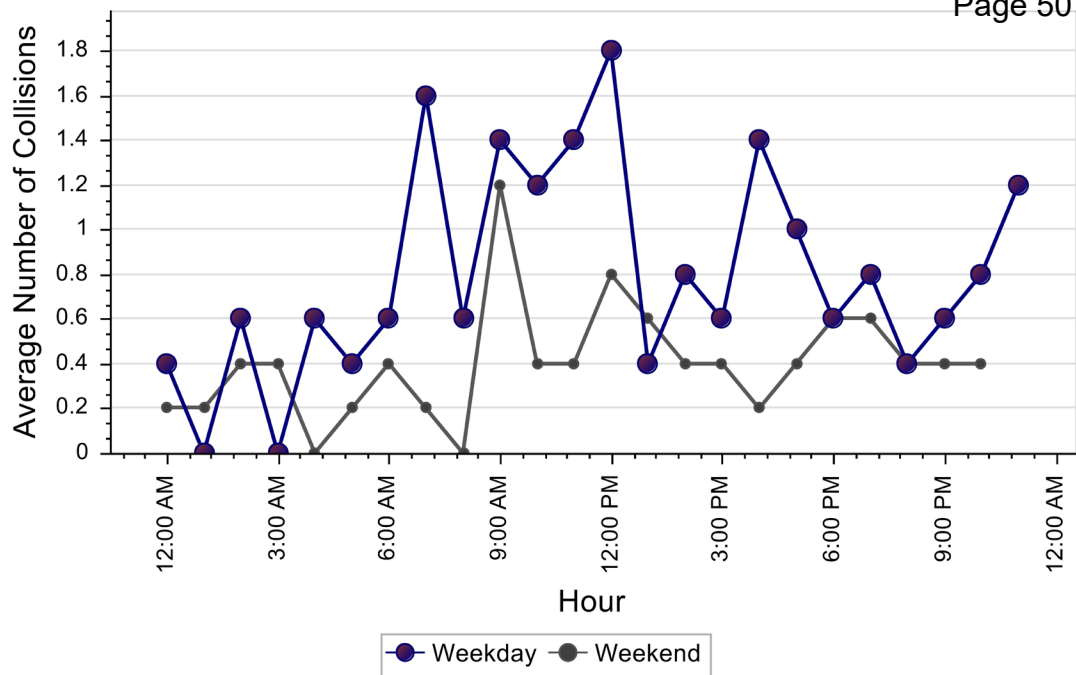
Lost Control Collisions by Day-of-Week, 5 Year Average - LINC (2015-2019)



Lost Control Collisions by Day -of-Week, 5 Year Average - RHVP (2015-2019)

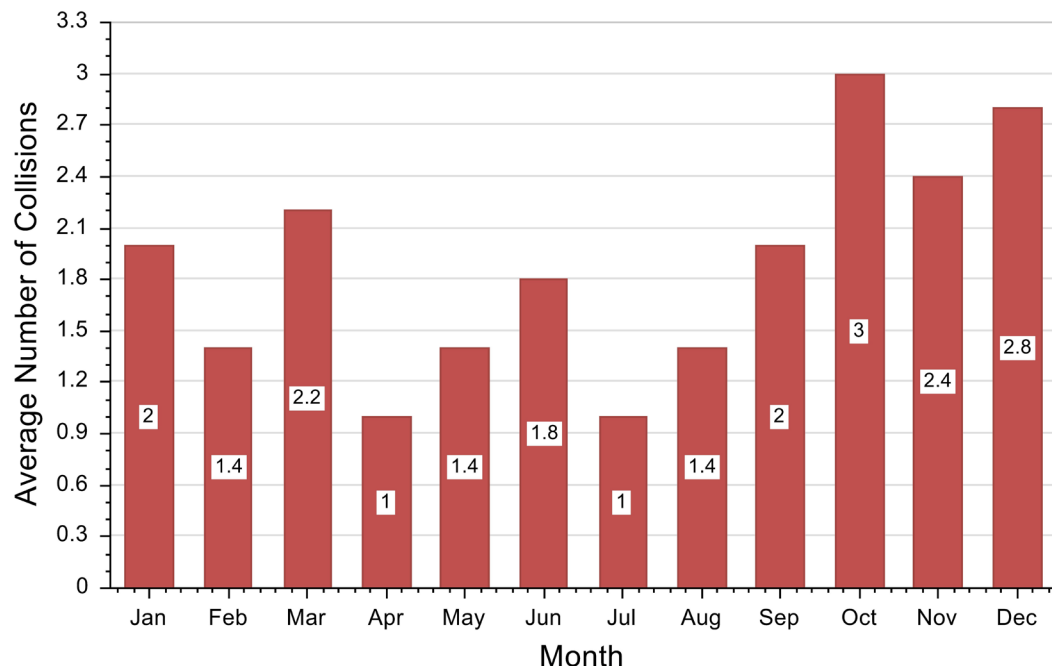


Lost Control Collisions by Time-of-Day, 5 Year Average - LINC (2015-2019)

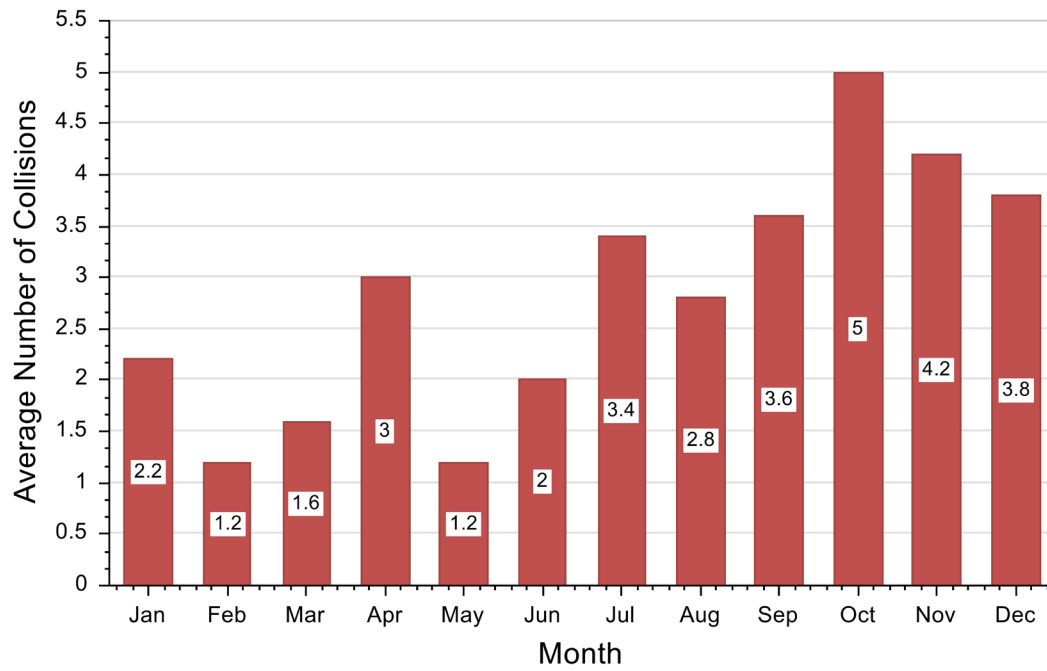


Lost Control Collisions by Time-of-Day, 5 Year Average - RHVP (2015-2019)

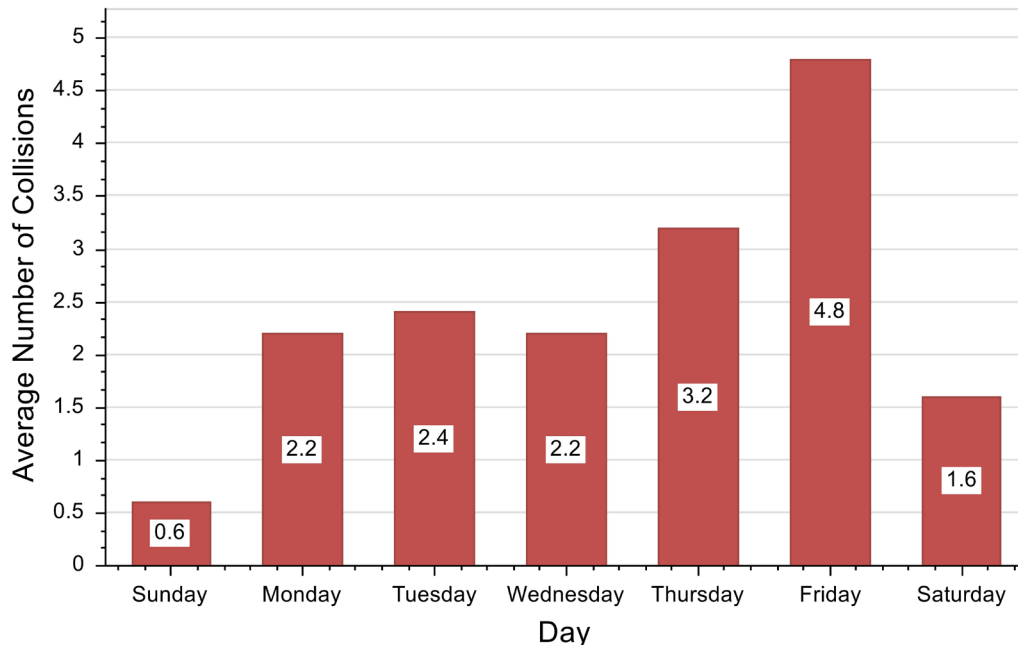
The RHVP has experienced more speeding related collisions compared to the LINC but the proportion of speed related collision on the LINC is higher than the RHVP (56% on the LINC and 37.5% on the RHVP).



Speed Related Collisions by Month, 5 Year Average - LINC (2015-2019)

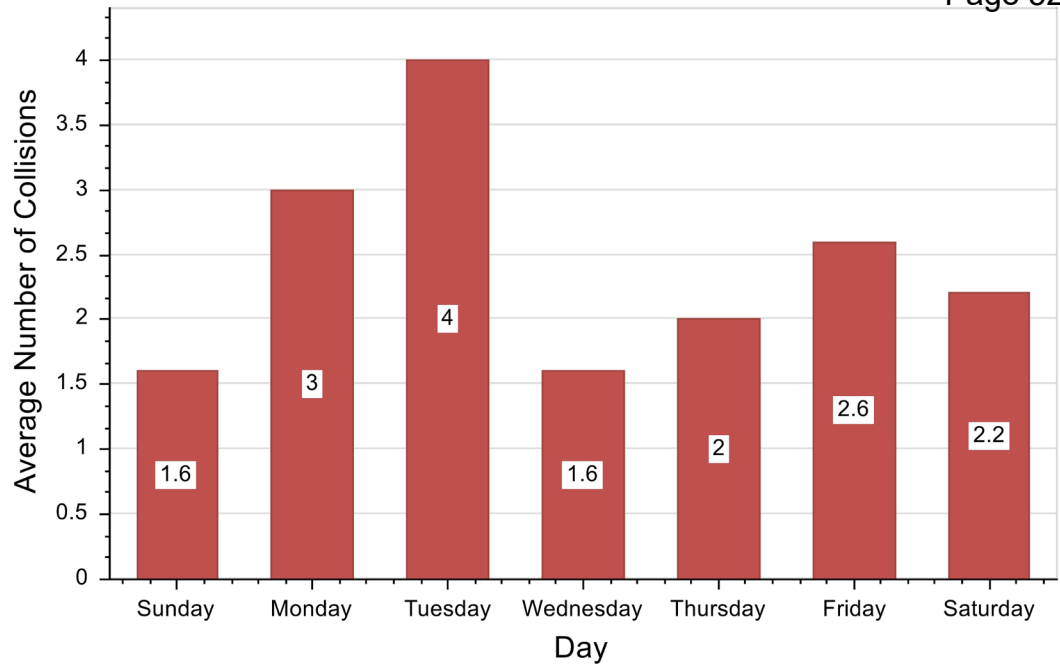


Speed Related Collisions by Month, 5 Year Average - RHVP (2015-2019)

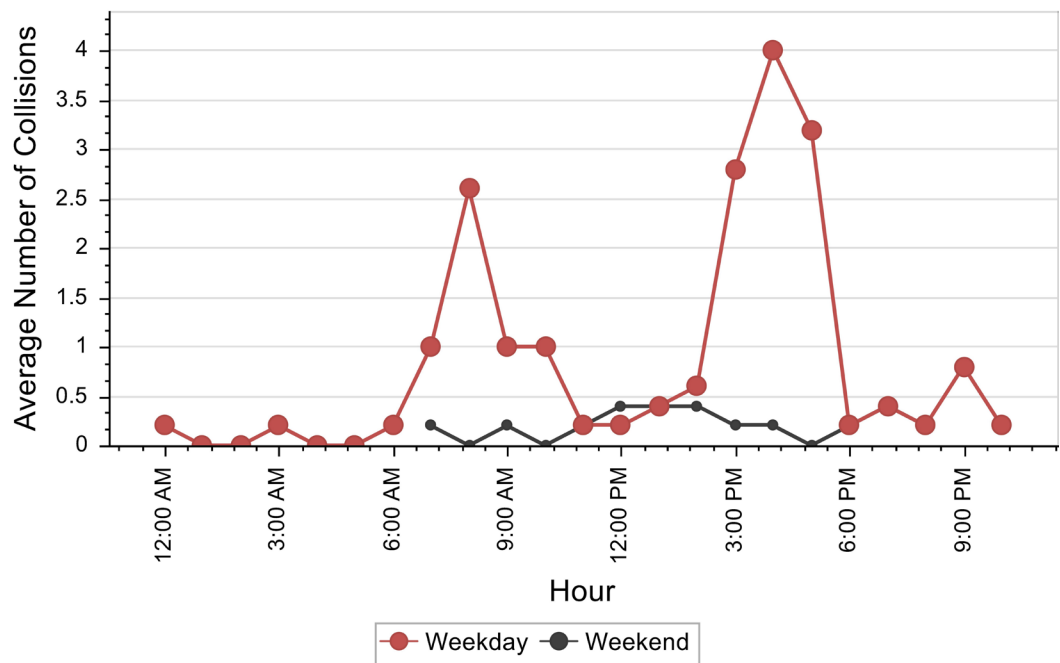


Speed Related Collisions by Day -of-Week, 5 Year Average - LINC (2015-2019)

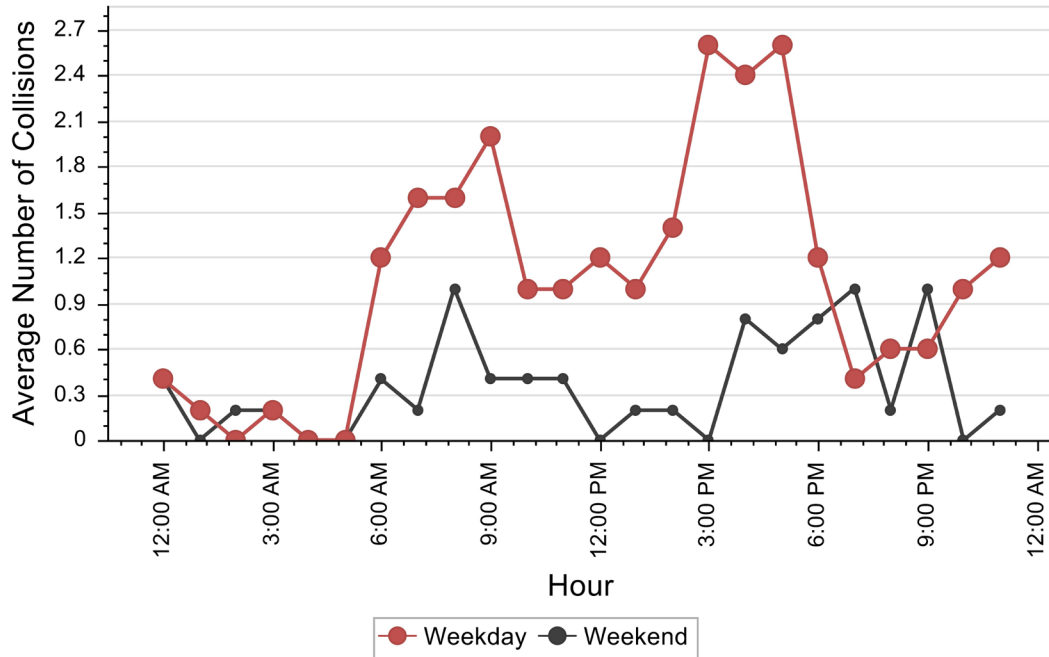




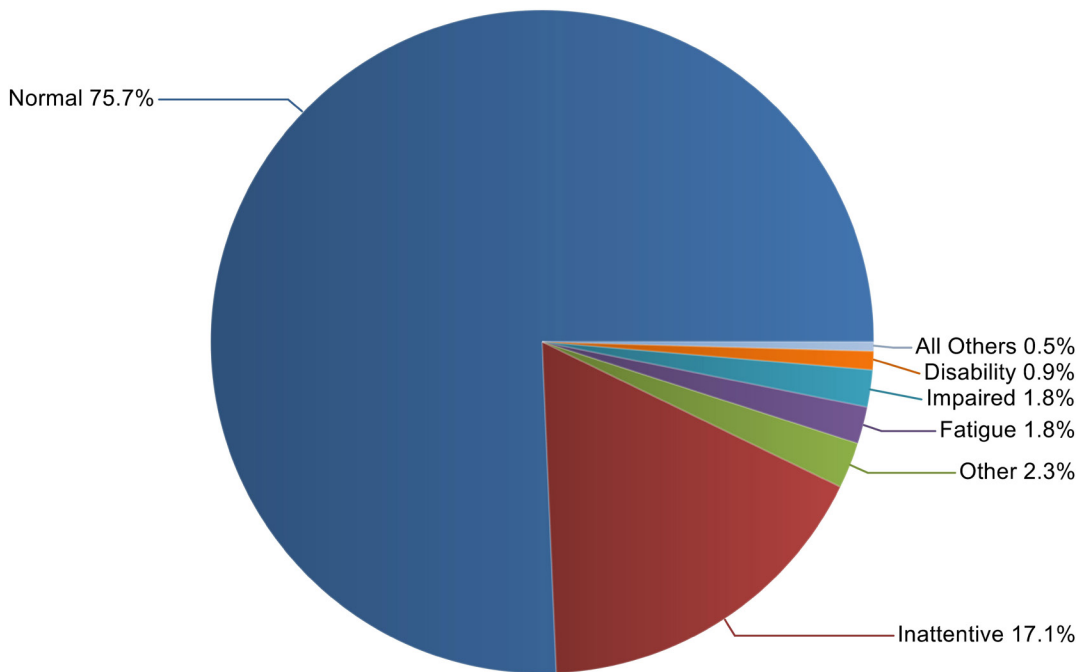
Speed Related Collisions by Day -of-Week, 5 Year Average - RHVP (2015-2019)



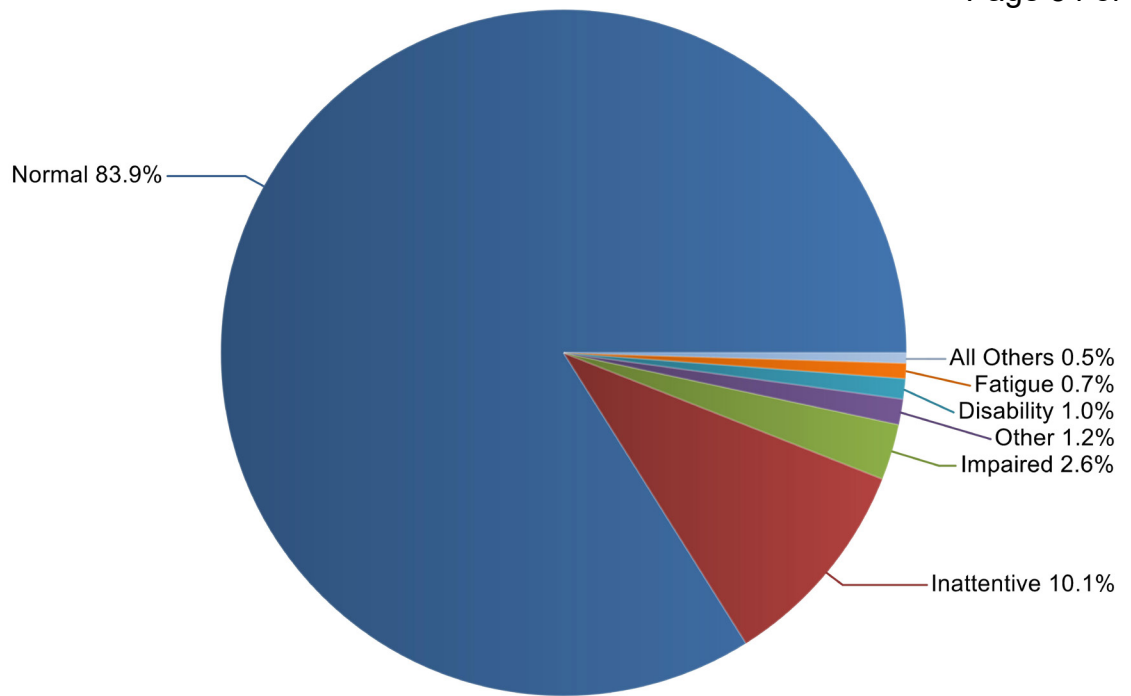
Speed Related Collisions by Time-of-Day, 5 Year Average - LINC (2015-2019)



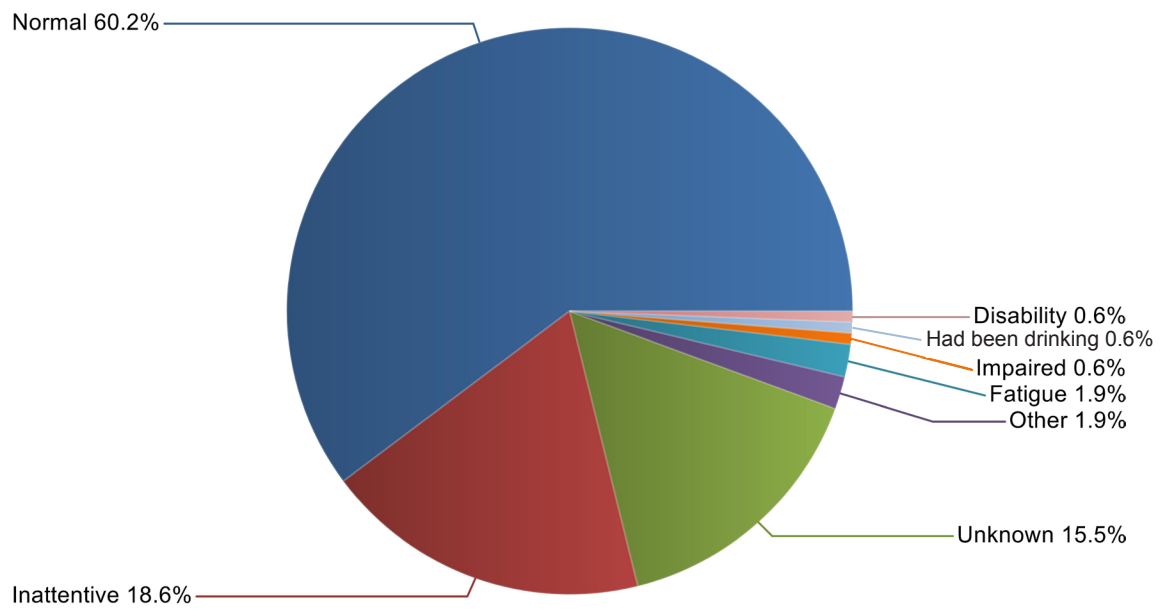
Speed Related Collisions by Time-of-Day, 5 Year Average - RHVP (2015-2019)



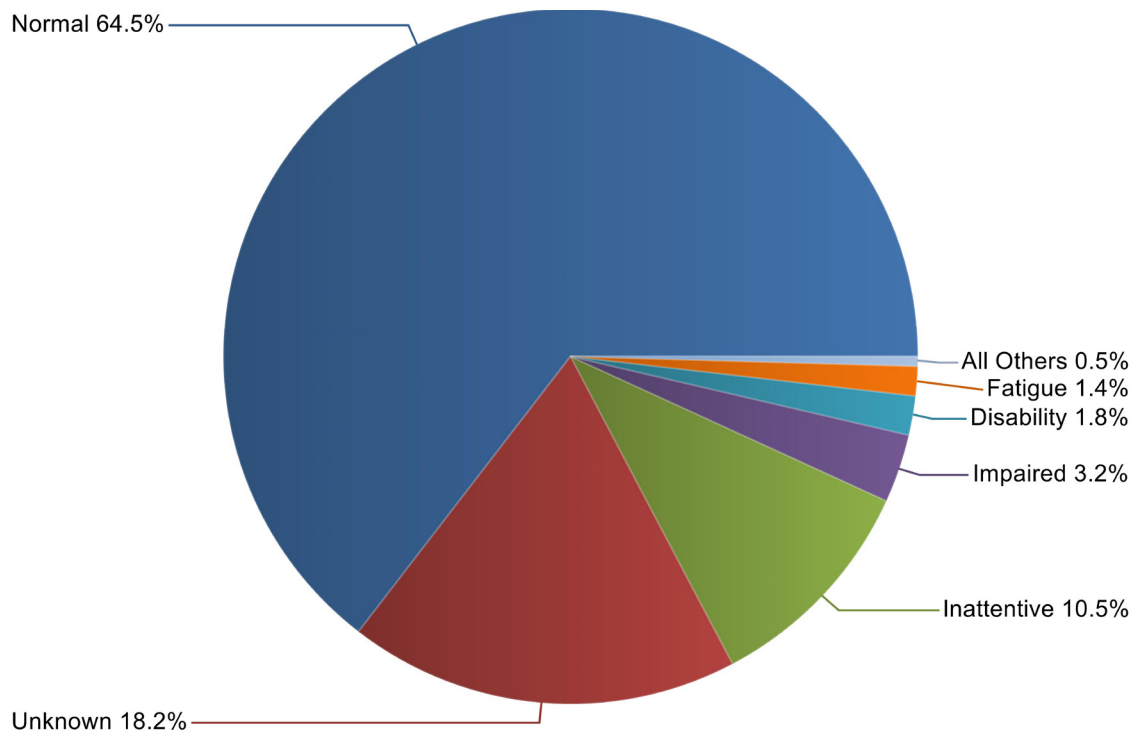
Collisions by At-Fault Driver Condition, 5 Years - LINC (2015-2019)



Collisions by At-Fault Driver Condition, 5 Years - RHVP (2015-2019)



Fatal and Injury Collisions by At-Fault Driver Condition, 5 Years - LINC (2015-2019)



Fatal and Injury Collisions by At-Fault Driver Condition, 5 Years - RHVP (2015-2019)





Section 3

Fatal Collisions

Fatal Collisions


In 2019, the City of Hamilton experienced 14 fatal collisions. A review of the fatal collisions does not reveal any particular pattern. However, the following observations can be made:

- 21% of fatal collisions occurred on rural roadways, and 79% occurred on urban roads.
- 36% of fatal collisions occurred at intersections, and 64% occurred at road sections.
- 7% of fatal collisions occurred on wet road conditions and 93% on dry roadways.
- 71% of fatalities were a result of a single motor vehicle collisions.
- 43% of fatal collisions involved pedestrians.
- 30% of fatal collisions occurred when a driver lost control of the vehicle, 22% from a driver exceeding the speed limit or driving too fast for the condition, and 15% because a driver failed to yield the right-of-way.



Fatal Collisions - 2019

| Date | Location | Weather | Lighting | Surface Condition | Initial Impact | Drv 1 Act | Details |
|------------|---|---------|------------------|-------------------|------------------|------------------------------|--|
| 22-05-2019 | Wilson St W Near Alberton | Clear | Dark | Dry | Ped/Vehicle | Driving Properly | Pedestrian struck by vehicle |
| 02-06-2019 | Upper James St Near Twenty | Clear | Daylight | Dry | Angle | Exceeding Speed Limit | Vehicle exceeding the speed limit struck vehicle exiting from driveway |
| 09-06-2019 | Woodhill Rd Btwn Highway No. 5 & Concession 4 | Clear | Dark | Dry | Smv Other | Lost Control | Driver lost control and struck hydro pole |
| 23-07-2019 | Industrial Dr Btwn Ramp Industrial Wb To Burlington Op & Gage | Clear | Dark, Artificial | Dry | Smv Other | Lost Control | Motorcycle lost control and hit a fence |
| 30-07-2019 | South Service Rd Btwn Green & Millen | Rain | Daylight | Wet | Rear End | Speed Too Fast For Condition | Vehicle exceeding the speed limit rear-end another vehicle |
| 21-08-2019 | King St E Btwn Grosvenor & Ottawa | Clear | Daylight | Dry | Ped/Vehicle | Driving Properly | Pedestrian crossing without right of way struck by vehicle |
| 25-08-2019 | Lincoln M. Alexander Py Eb Off Ramp To Upper James | Clear | Dawn, Artificial | Dry | Smv Other | Other | Driver ran off the road and hit pole |
| 09-10-2019 | Mohawk Rd E at Seven Oaks Dr | Clear | Dark | Dry | Ped/Vehicle | Other | Unknown vehicle struck by pedestrian crossing at uncontrolled intersection |
| 17-10-2019 | Barton St E at Grays Rd | Clear | Dark, Artificial | Dry | Smv Other | Lost Control | Driver lost control due to medical or physical disability |
| 20-11-2019 | Fiddler's Green Rd Btwn Book & Butter | Clear | Dark | Dry | Approaching | Lost Control | Driver lost control and struck a truck driving in opposing direction |
| 21-11-2019 | Highland Rd E at Upper Centennial Py | Clear | Dark, Artificial | Dry | Turning Movement | Failed to Yield Right-Of-Way | Driver turning left without right of way and struck by opposing vehicle |
| 22-11-2019 | Cameron Ave S at King St E | Clear | Daylight | Dry | Ped/Vehicle | Failed to Yield Right-Of-Way | Pedestrian crossing with right of way struck by vehicle |
| 17-12-2019 | Hope Av at Kenilworth Av N | Clear | Dark, Artificial | Dry | Ped/Vehicle | | Pedestrian crossing without right of way struck by vehicle |
| 28-12-2019 | Mohawk Rd E Btwn East 42nd & Palmer | Clear | Dark | Dry | Ped/Vehicle | Exceeding Speed Limit | Motorcycle exceeding the speed limit struck pedestrian crossing road with no control |



Section 4

Red Light Camera Program Statistics

The goal of a Red Light Camera (RLC) program is to target motorists who choose to run red lights, thereby reducing the incidence of this unsafe behaviour and the associated potential for collisions. Research has shown that RLCs significantly reduce the number of angle collisions, but tend to potentially increase the number of rear-end collisions at the beginning of the installation of RLCs. At signalized intersections, angle collisions are more severe than rear-end collisions. Therefore, RLCs are considered as a tool which will reduce the overall severity of collisions at a signalized intersection. Depending on the relative number and type of collisions, not every intersection is a suitable candidate for RLC deployment.

A successful RLC program contributes to driver behaviour changes not only at signalized intersections equipped with RLC but also at all signalized intersections in general. This phenomenon is referred to as the halo or spillover effect. The safety benefits obtained from the halo effect is achieved where (1) the RLCs are ubiquitous and spread in a jurisdiction and (2) enough violators are ticketed to result in driver behavioural change at signalized intersections for the subject drivers and all those who hear about the issued tickets.

The City of Hamilton was one of the original jurisdictions to embark on a RLC program to improve the level of safety on the City's road network through the reduction of red light running related collisions. The City currently has 33 RLCs deployed at 32 intersections (the intersection of Bay St. and Main St. East has two cameras). Among those, the following four intersections were equipped with RLCs in 2019 and 2020:

- King St E & Catherine St
- Main St W & Queen St S
- Barton St E & Ottawa St
- Sanford Ave & Wilson St

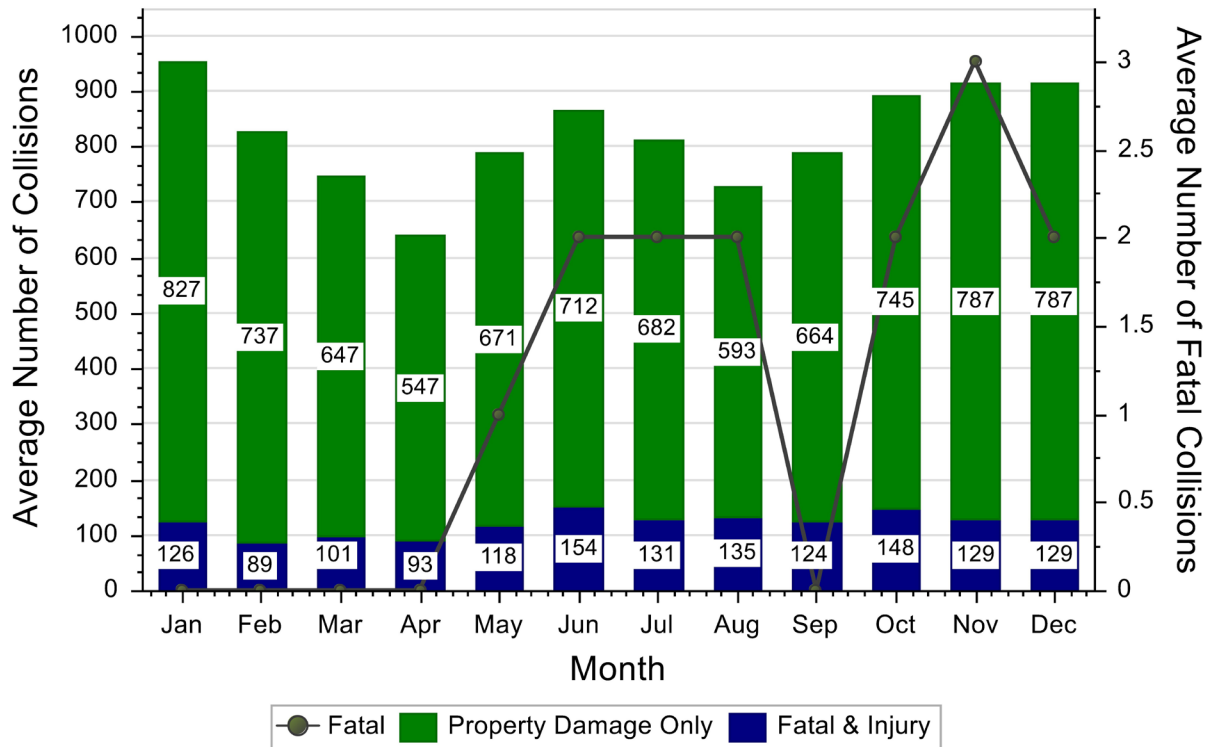
A review of the average annual collision data of the RLC intersections shows that most intersections experience a large number of violations which is ideal in spreading the message and change driver behaviour (increase the halo effect). It appears that there are intersections which do not experience significant violations and do not have a lot of angle collisions. It is suggested that these existing intersections be reviewed and potentially RLCs be moved to other intersections.

| Location | Installation Date | Reported Years | Average Collisions for the Reported Years in the After Period | | | | | Total Violations |
|-----------------------------------|-------------------|----------------|---|----|-----|-------|----------|------------------|
| | | | Total | FI | PDO | Angle | Rear End | |
| Stone Church & Upper Wentworth | 21-07-2008 | 5 | 10 | 2 | 8 | 1 | 6 | 190 |
| Mud & Paramount | 21-07-2008 | 5 | 8 | 2 | 7 | 1 | 6 | 198 |
| Cannon & Hess | 19-08-2008 | 5 | 1 | 1 | 1 | 0 | 1 | 2,094 |
| Burlington & Gage | 19-08-2008 | 5 | 9 | 1 | 8 | 2 | 2 | 245 |
| Dundurn & King | 17-08-2009 | 5 | 36 | 5 | 32 | 3 | 11 | 2470 |
| Dundurn & Main | 17-08-2009 | 5 | 39 | 6 | 33 | 2 | 13 | 1,948 |
| Bay & Main Eastbound | 12-10-2010 | 5 | 18 | 3 | 15 | 4 | 5 | 679 |
| Cannon & Kenilworth | 12-10-2010 | 5 | 8 | 3 | 5 | 5 | 2 | 549 |
| Bay & Main Northbound | 16-10-2012 | 5 | 18 | 3 | 15 | 4 | 5 | 262 |
| Main & Sanford | 16-10-2012 | 5 | 7 | 2 | 5 | 1 | 2 | 991 |
| Brantdale & Upper James | 16-10-2012 | 5 | 4 | 1 | 3 | 1 | 3 | 947 |
| Longwood & Main | 12-11-2013 | 5 | 18 | 3 | 15 | 1 | 8 | 157 |
| Mohawk & Upper Gage | 12-11-2013 | 5 | 19 | 4 | 15 | 2 | 10 | 205 |
| Mohawk & Upper Wentworth | 13-02-2015 | 4 | 20 | 5 | 15 | 2 | 8 | 353 |
| Main & Wellington | 13-02-2015 | 4 | 30 | 5 | 25 | 9 | 8 | 873 |
| Mohawk & Upper Wellington | 05-12-2014 | 5 | 12 | 4 | 8 | 1 | 7 | 554 |
| Fennell & Upper Gage | 28-11-2014 | 5 | 11 | 2 | 9 | 3 | 4 | 152 |
| King & Lawrence/RHVP | 05-12-2014 | 5 | 12 | 2 | 10 | 1 | 6 | 360 |
| King & Macklin | 07-01-2015 | 4 | 5 | 2 | 4 | 1 | 1 | 2146 |
| Charlton & John | 03-08-2017 | 2 | 9 | 3 | 7 | 2 | 4 | 305 |
| Mohawk & Upper Paradise | 03-08-2017 | 2 | 10 | 1 | 9 | 2 | 4 | 299 |
| Hess & York | 30-08-2017 | 2 | 2 | 1 | 1 | 1 | 1 | 879 |
| Dundas & Mill | 14-07-2017 | 2 | 8 | 1 | 7 | 2 | 3 | 1,221 |
| Highway 8 & Green | 14-08-2017 | 2 | 7 | 2 | 5 | 2 | 3 | 689 |
| Twenty Rd at Upper James St | 10-09-2018 | 1 | 11 | 2 | 9 | 1 | 4 | 530 |
| Cannon St at James St | 10-12-2018 | 1 | 9 | 1 | 8 | 2 | 2 | 245 |
| Fennell Ave at Upper James St | 10-09-2018 | 1 | 26 | 1 | 25 | 1 | 8 | 660 |
| Wentworth St at Wilson St | 23-10-2018 | 1 | 11 | 5 | 6 | 2 | 5 | 176 |
| Stone Church Rd at Upper Gage Ave | 10-10-2018 | 1 | 14 | 1 | 13 | 1 | 8 | 455 |

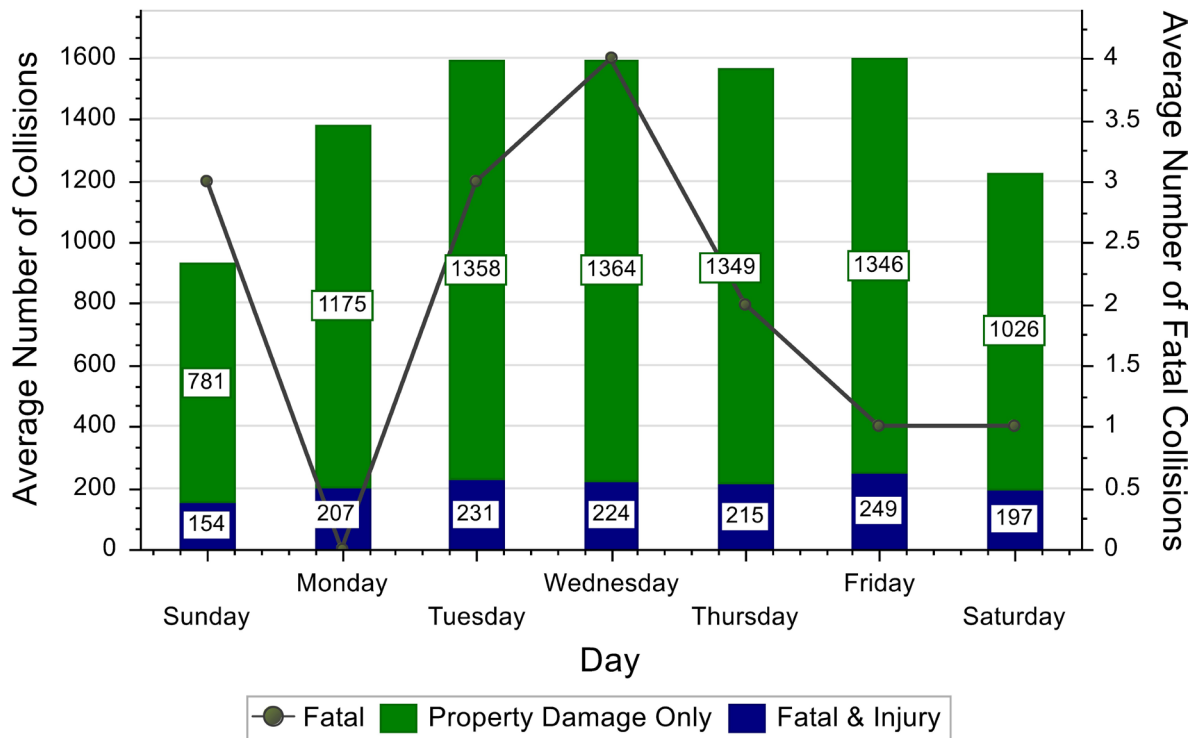
Appendix A

2019 Collisions Statistics

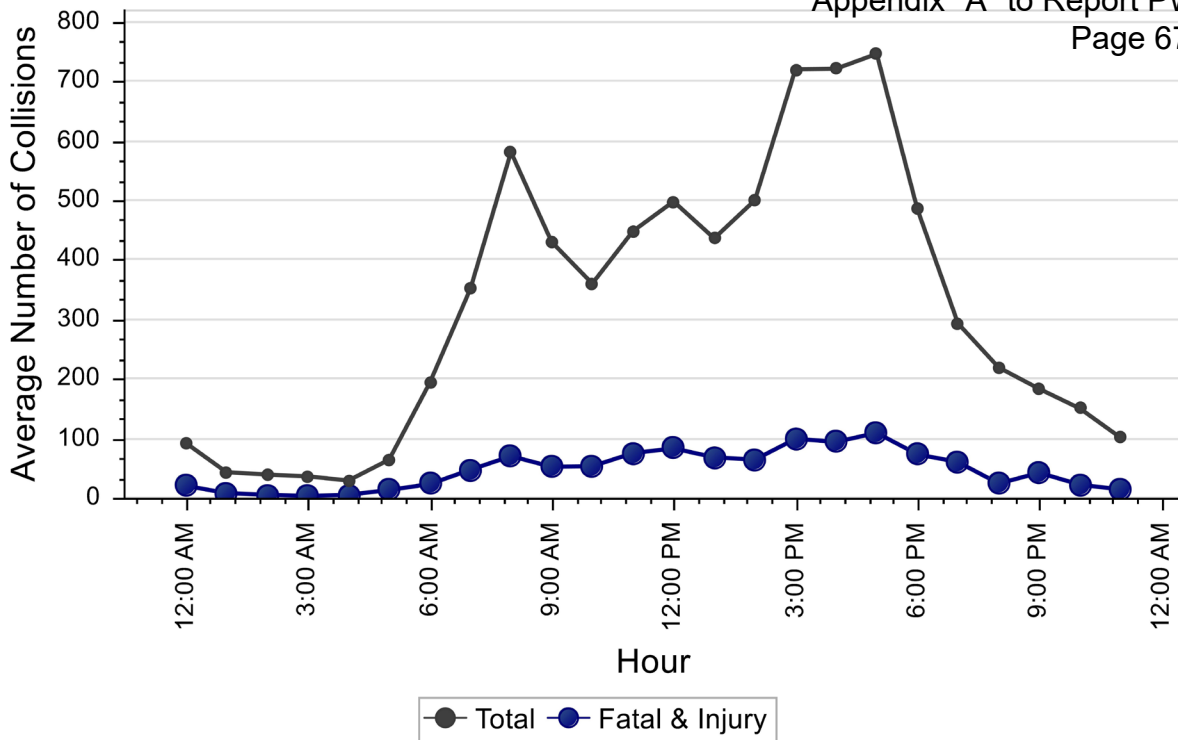
Month, Day, and Time of Collisions



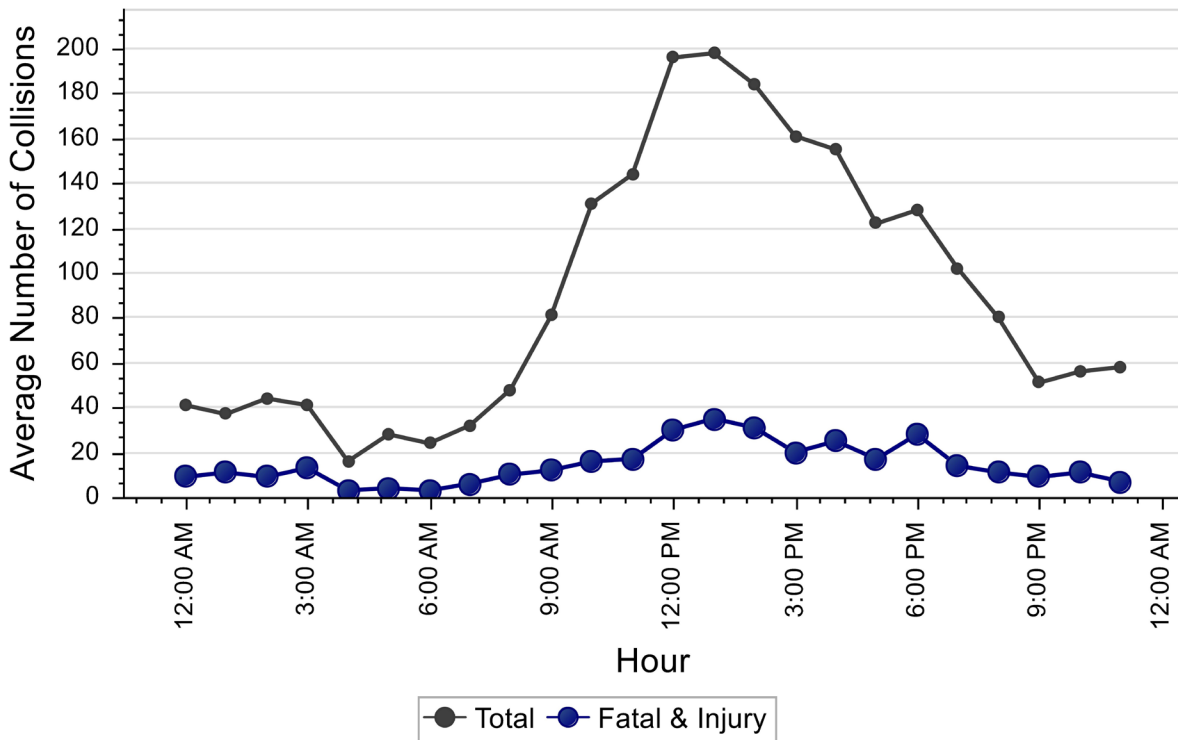
Collisions by Month (2019)



Collisions by Day-of-Week (2019)

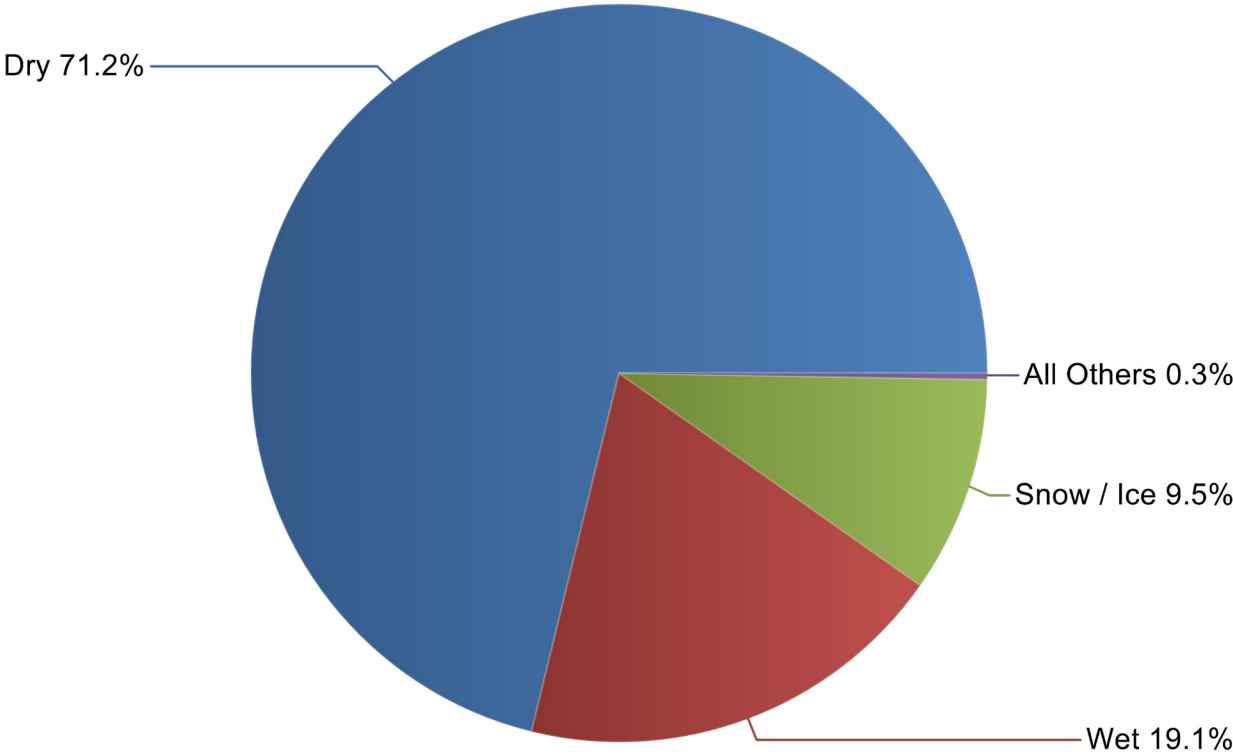


Weekday Collisions by Time-of-Day (2019)

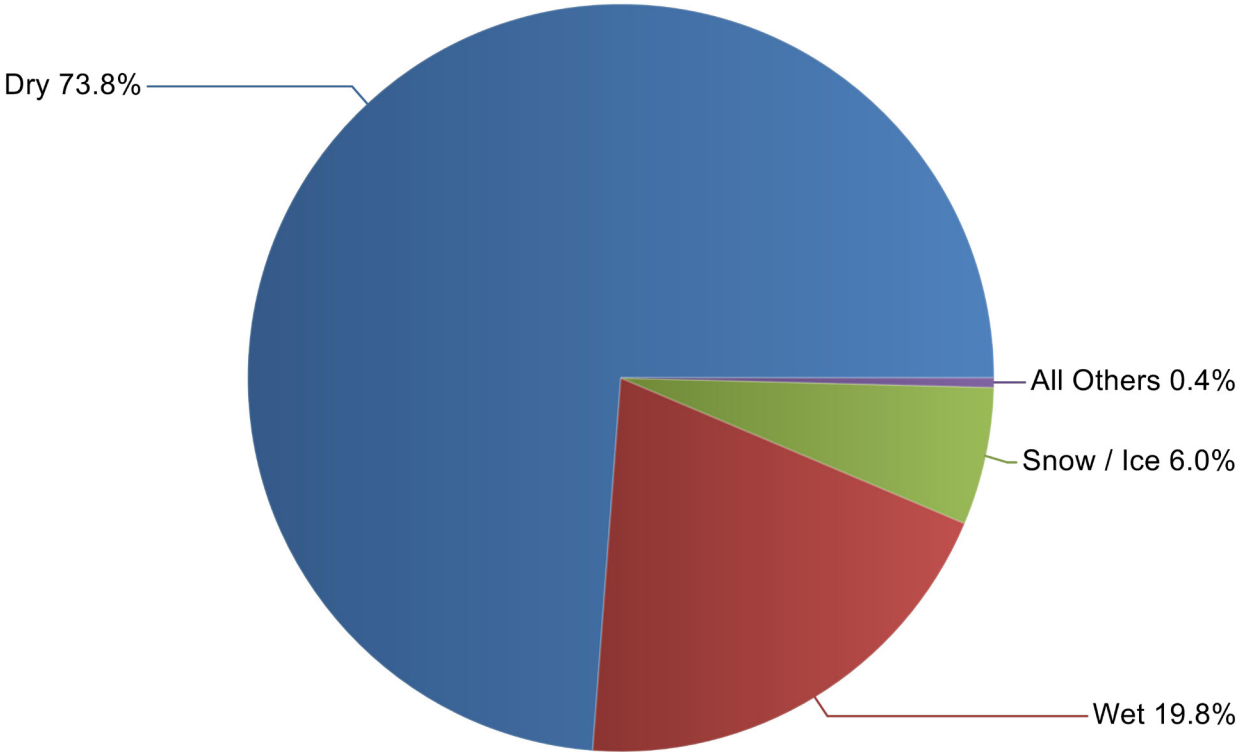


Weekend Collisions by Time-of-Day (2019)

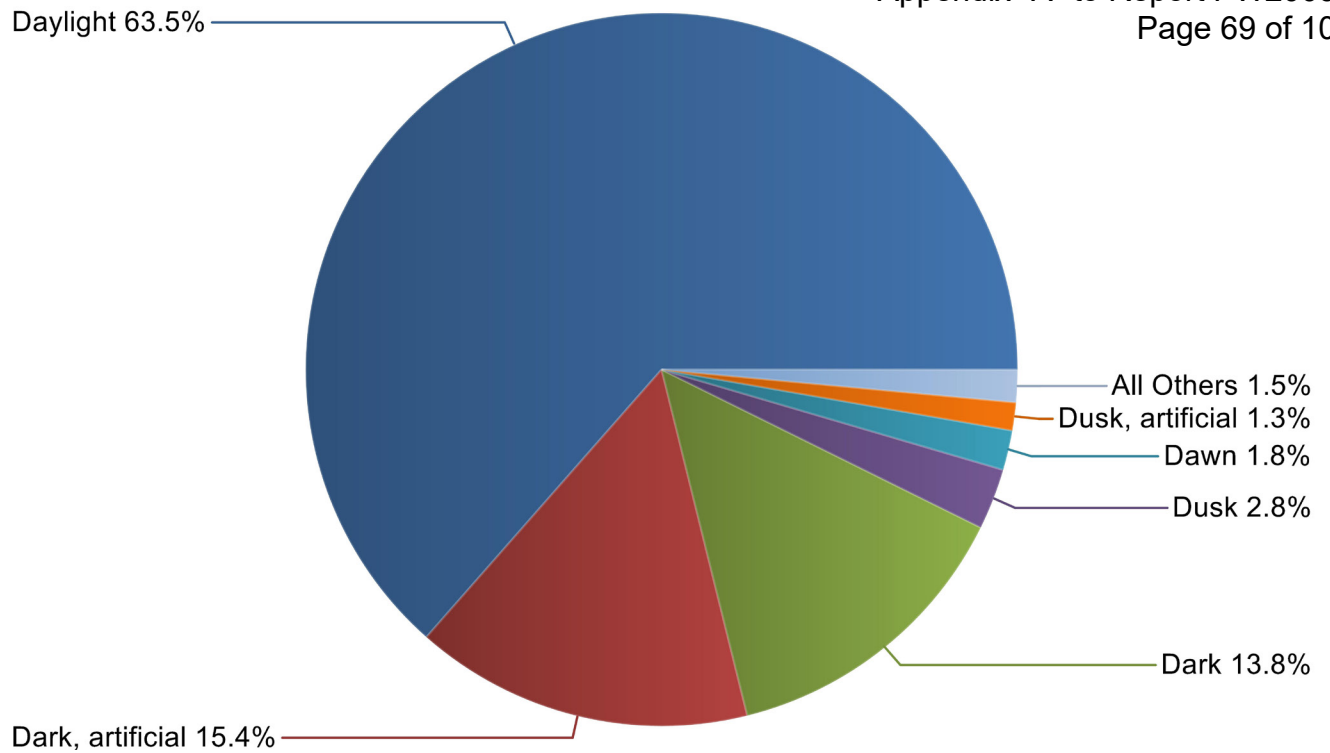
Collisions by Road Surface and Lighting Conditions



Collisions by Road Surface Condition, (2019)

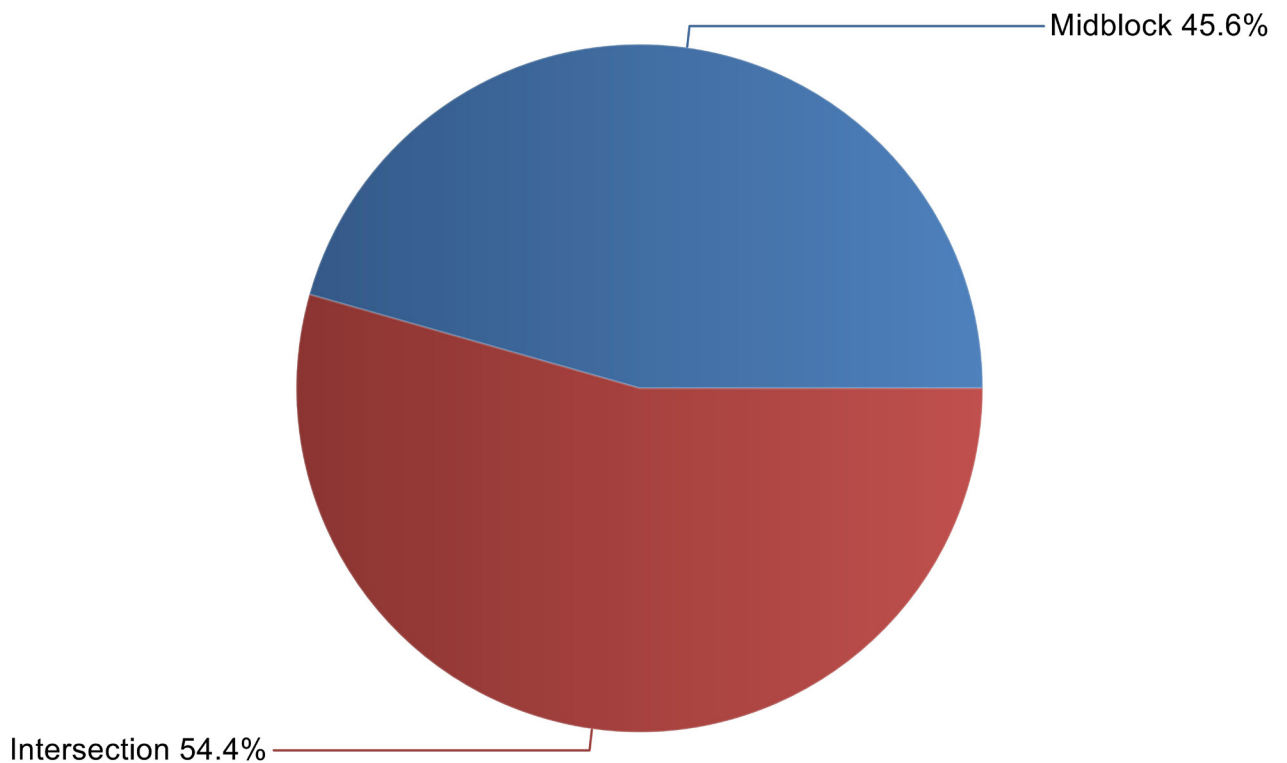


Fatality and Injury Collisions by Road Surface Condition (2019)

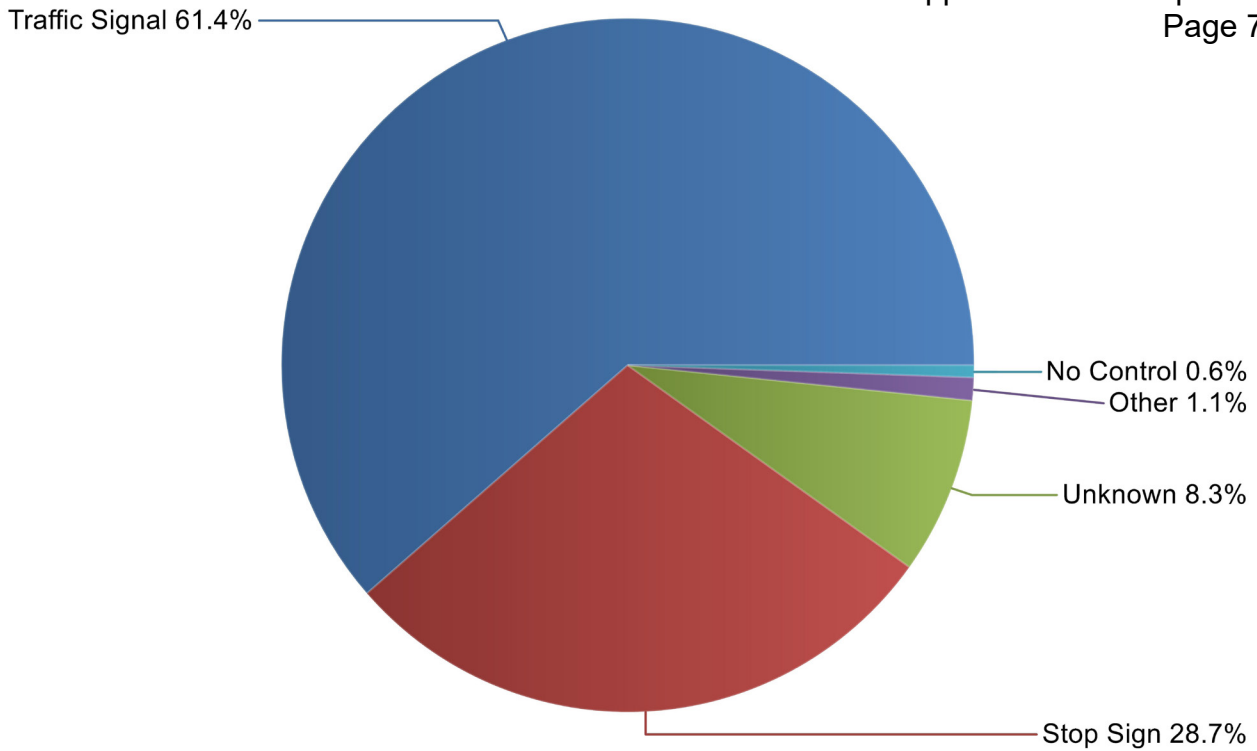


Collisions by Lighting Condition (2019)

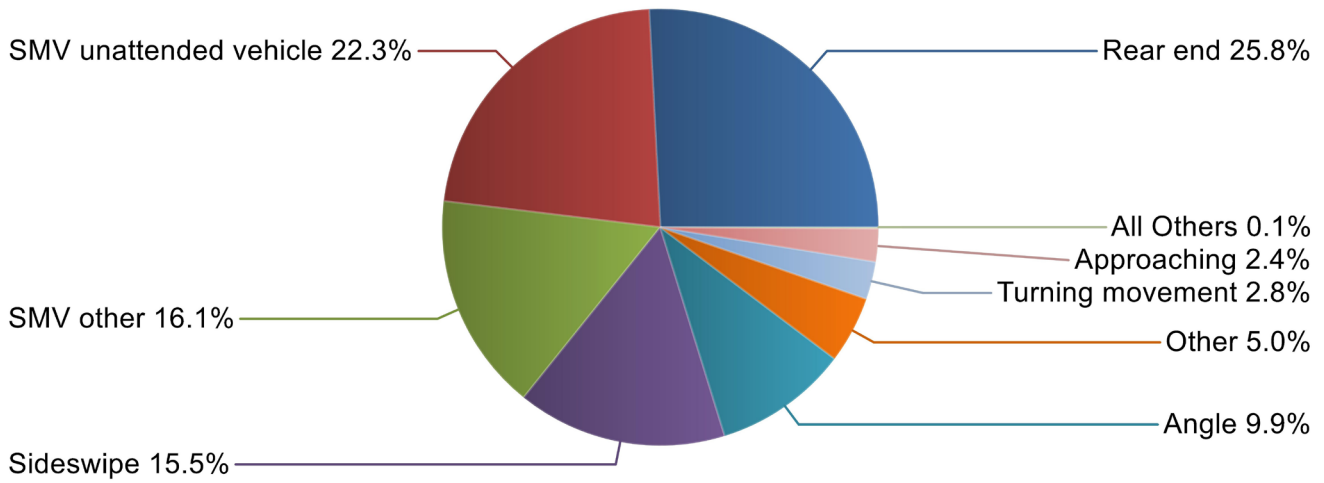
Collision Impact Type by Site Type and Traffic Control



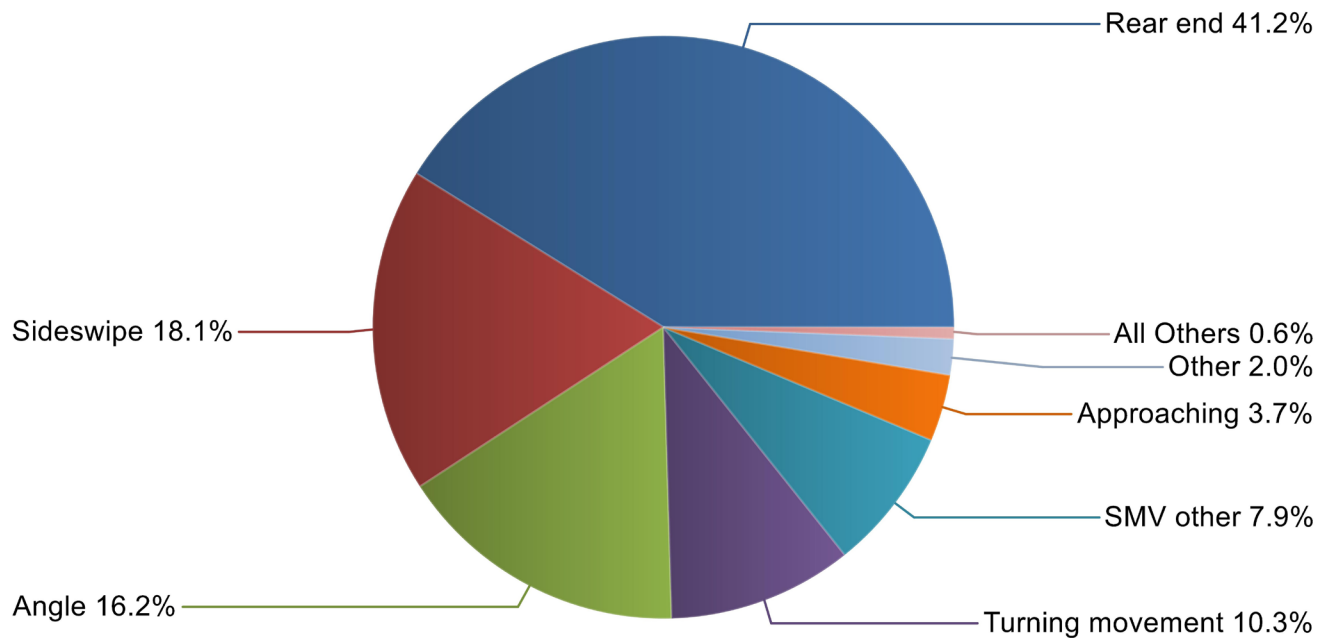
Collisions by Location (2019)



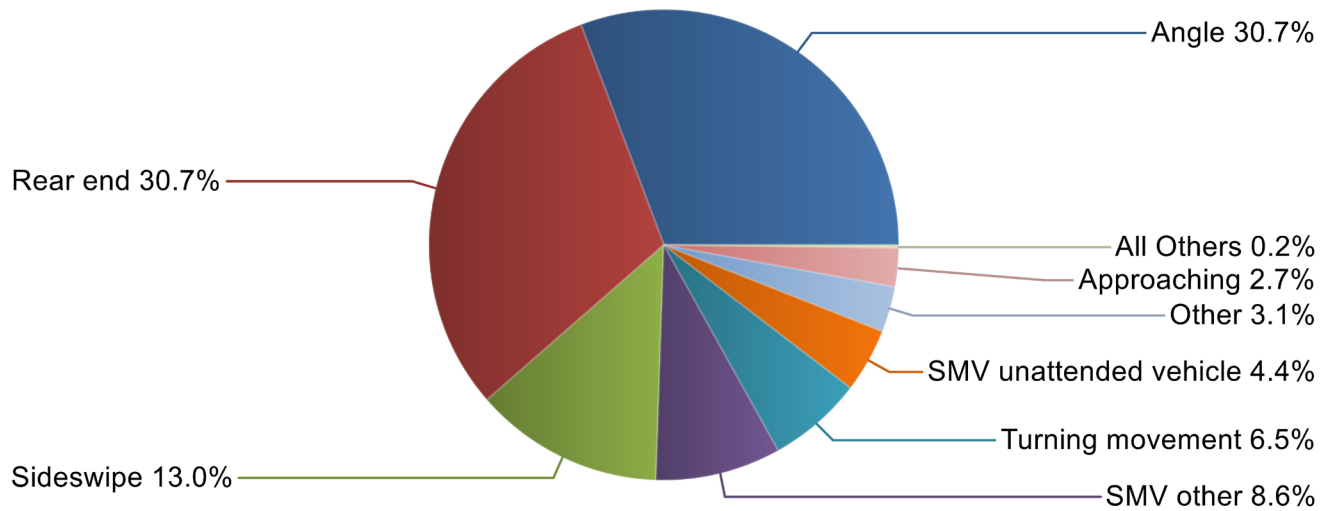
Intersections Collisions by Traffic Control Type (2019)



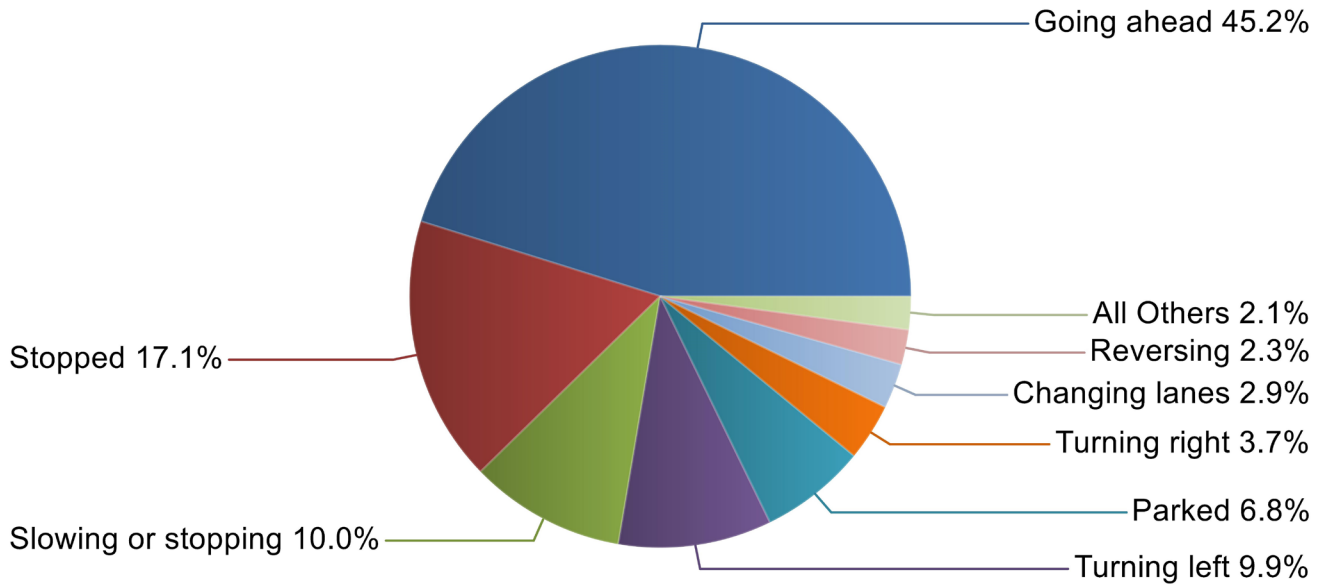
Midblock Collisions by Initial Impact Type (2019)



Signalized Intersection Collisions by Initial Impact Type, (2019)

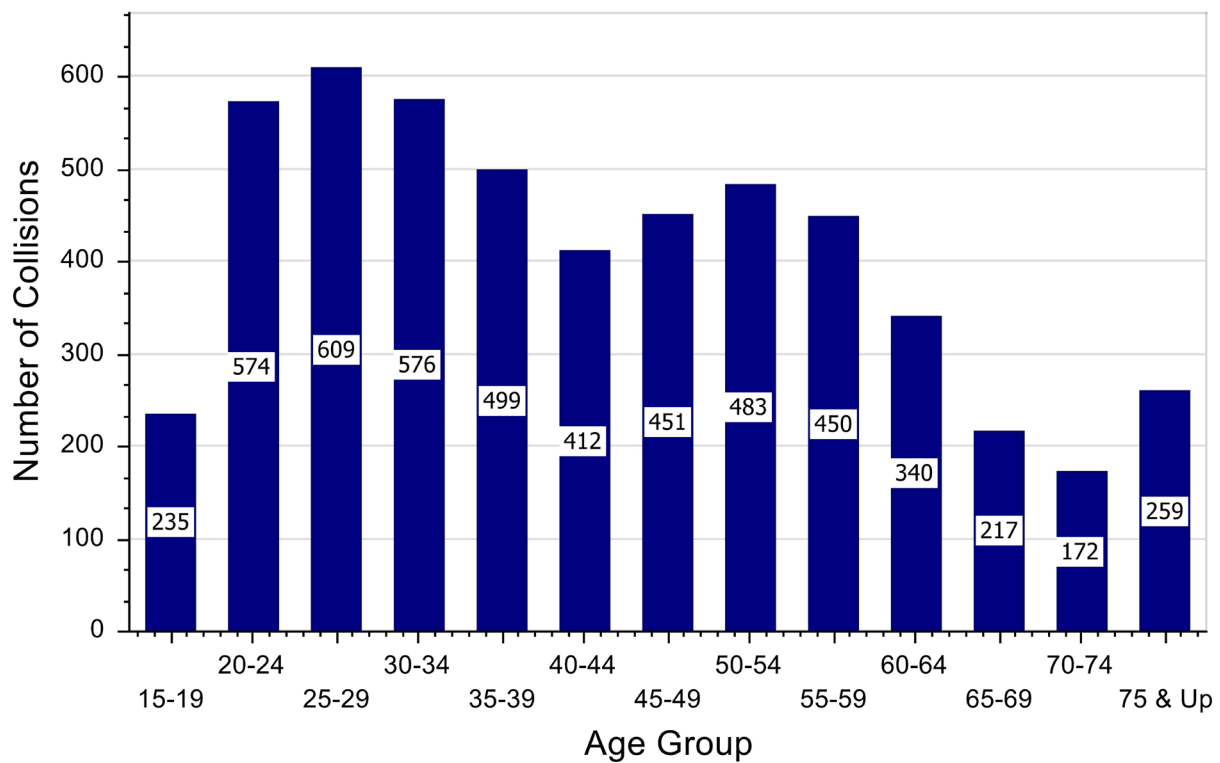


Un-Signalized Intersection Collisions by Initial Impact Type (2019)

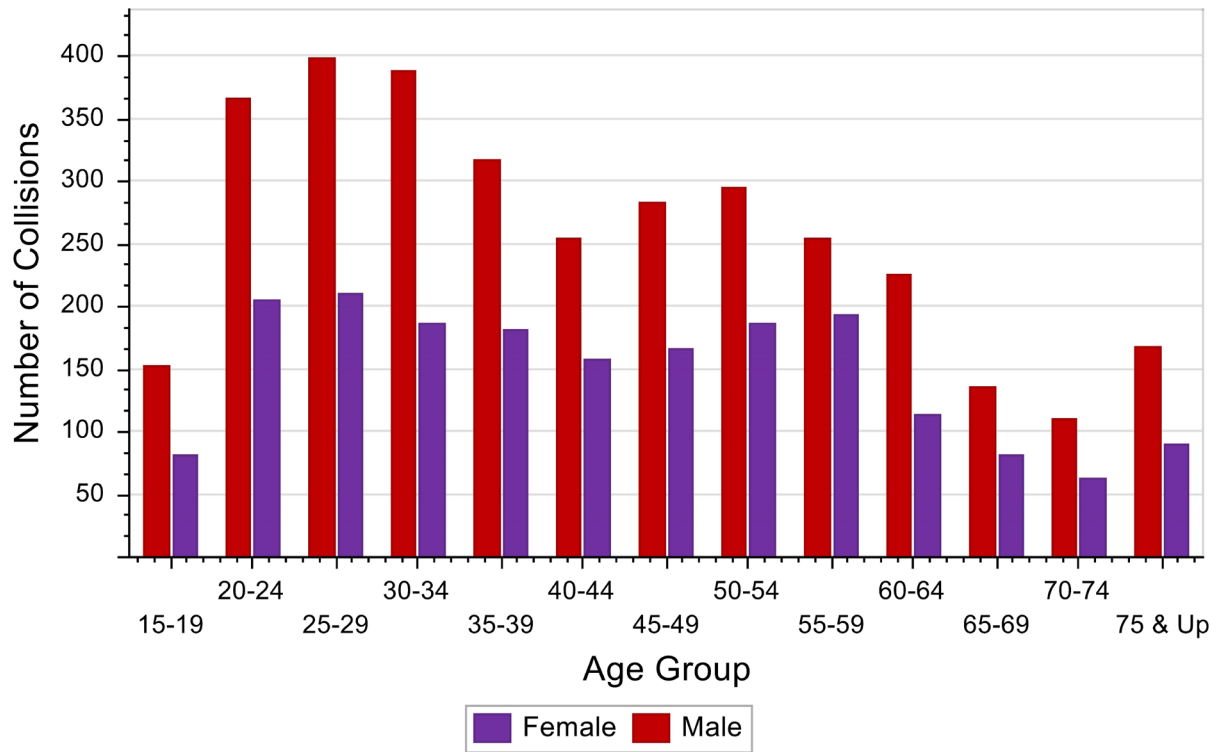


Collisions by Vehicle Maneuver (2019)

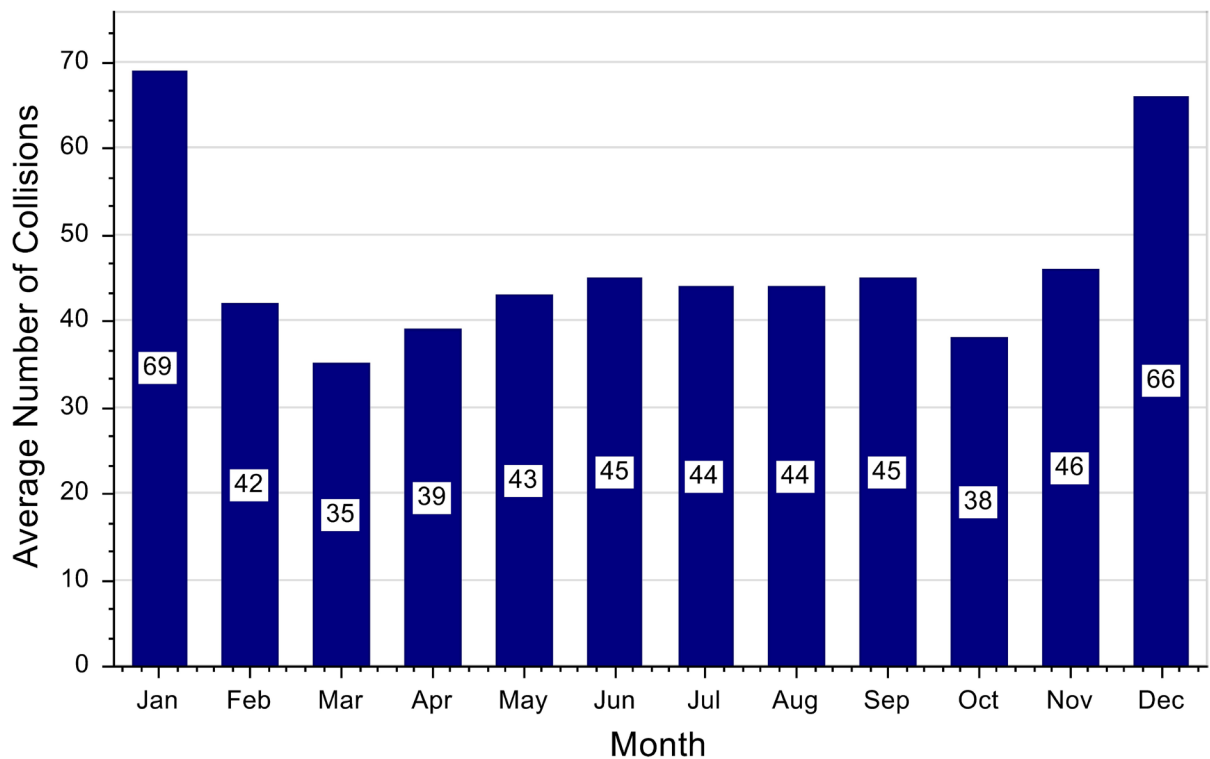
Drivers



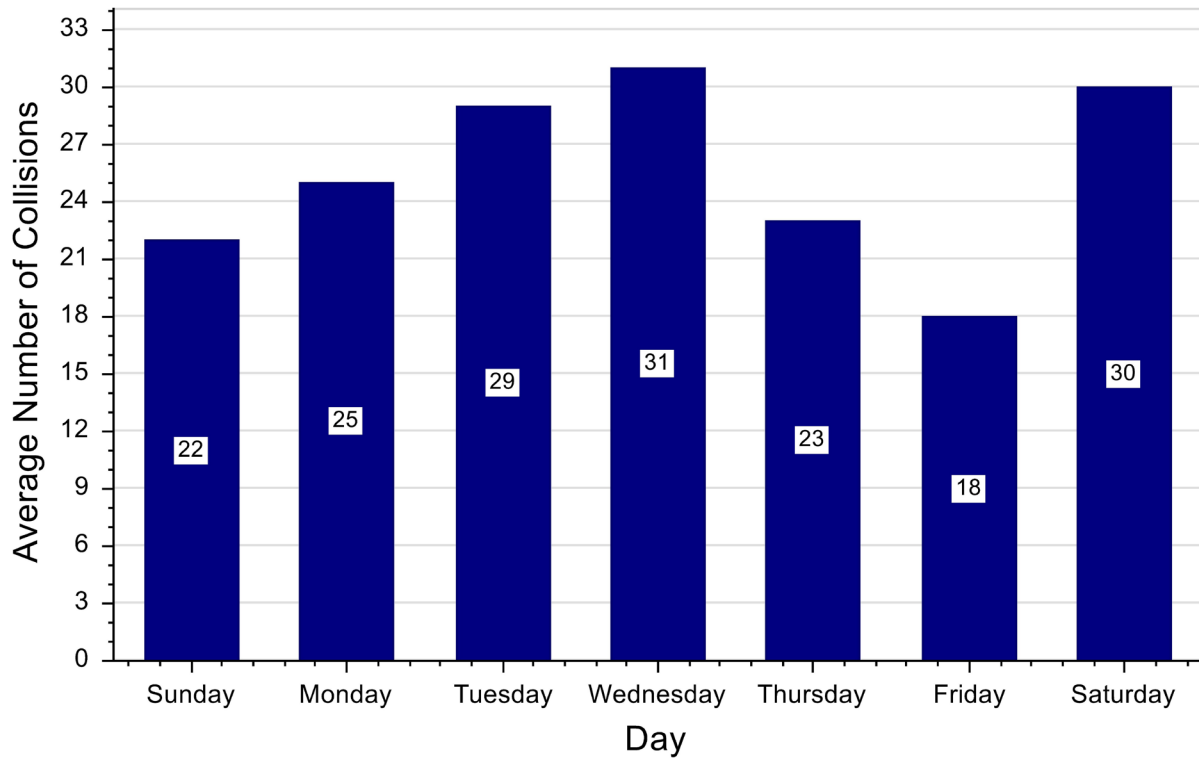
Collisions by Driver Age (2019)



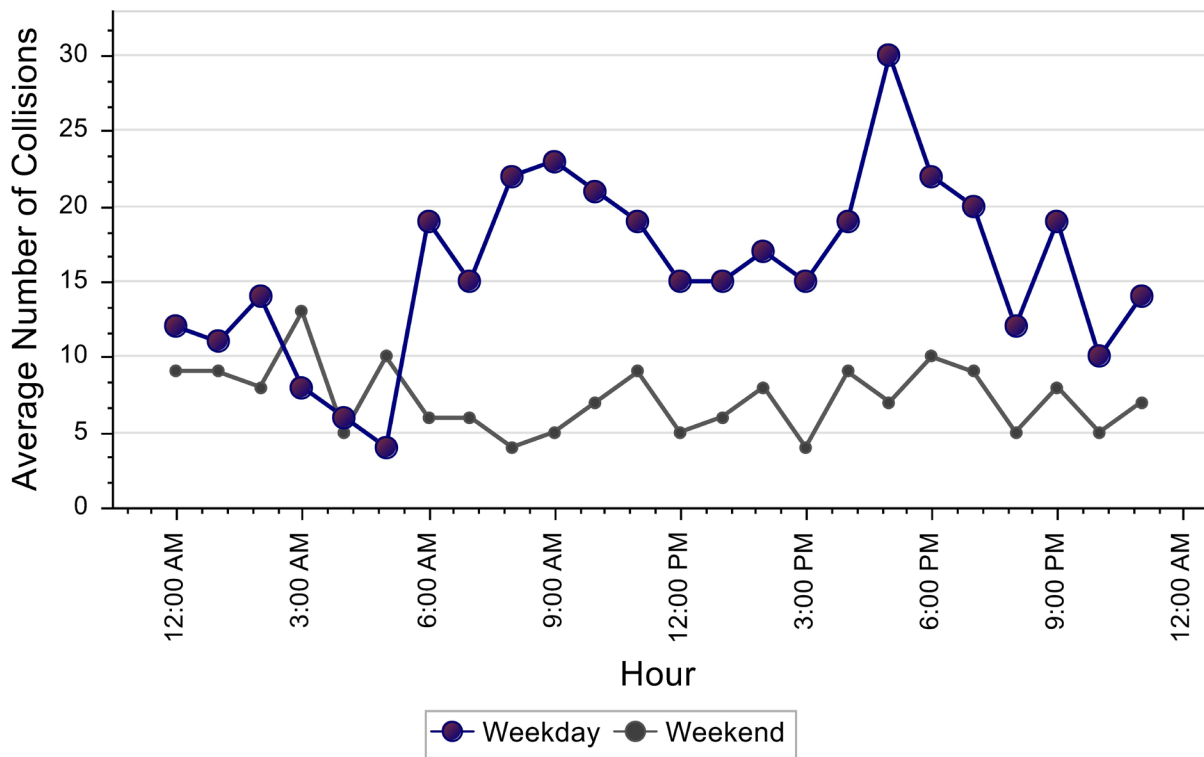
Collisions by Driver Age and Gender (2019)



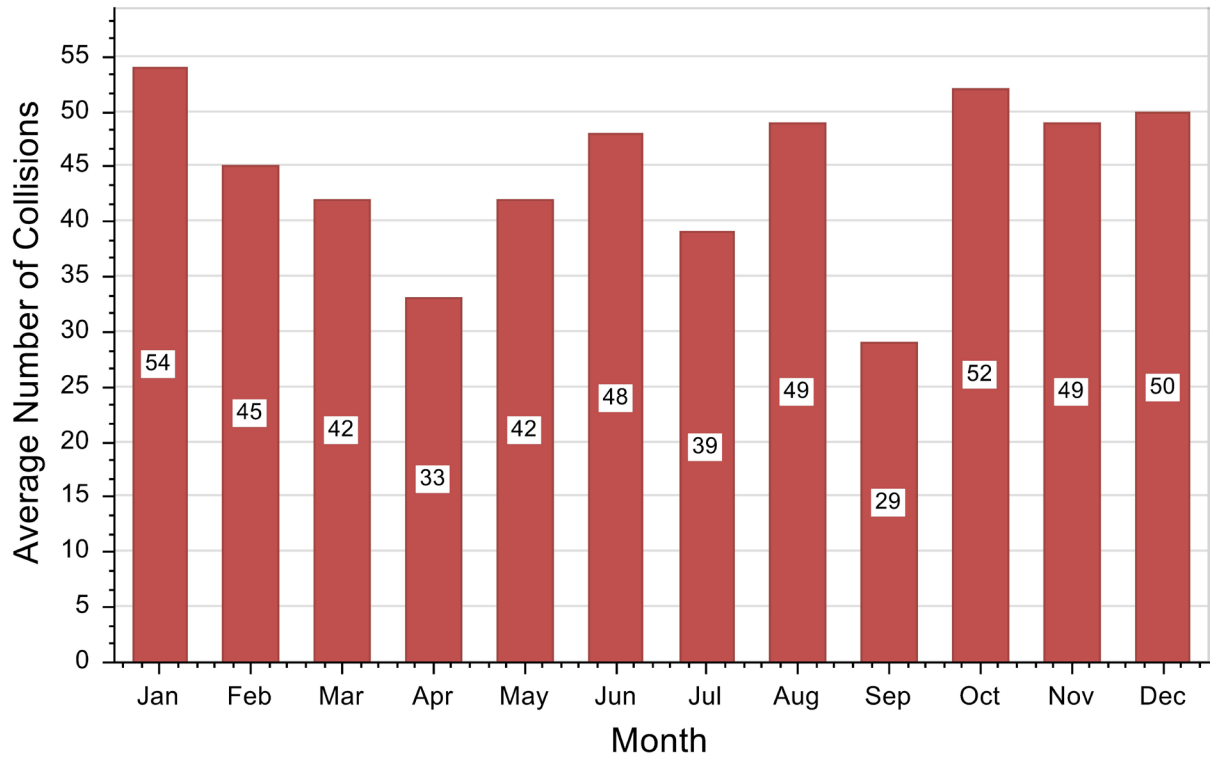
Lost Control Collisions by Month (2019)



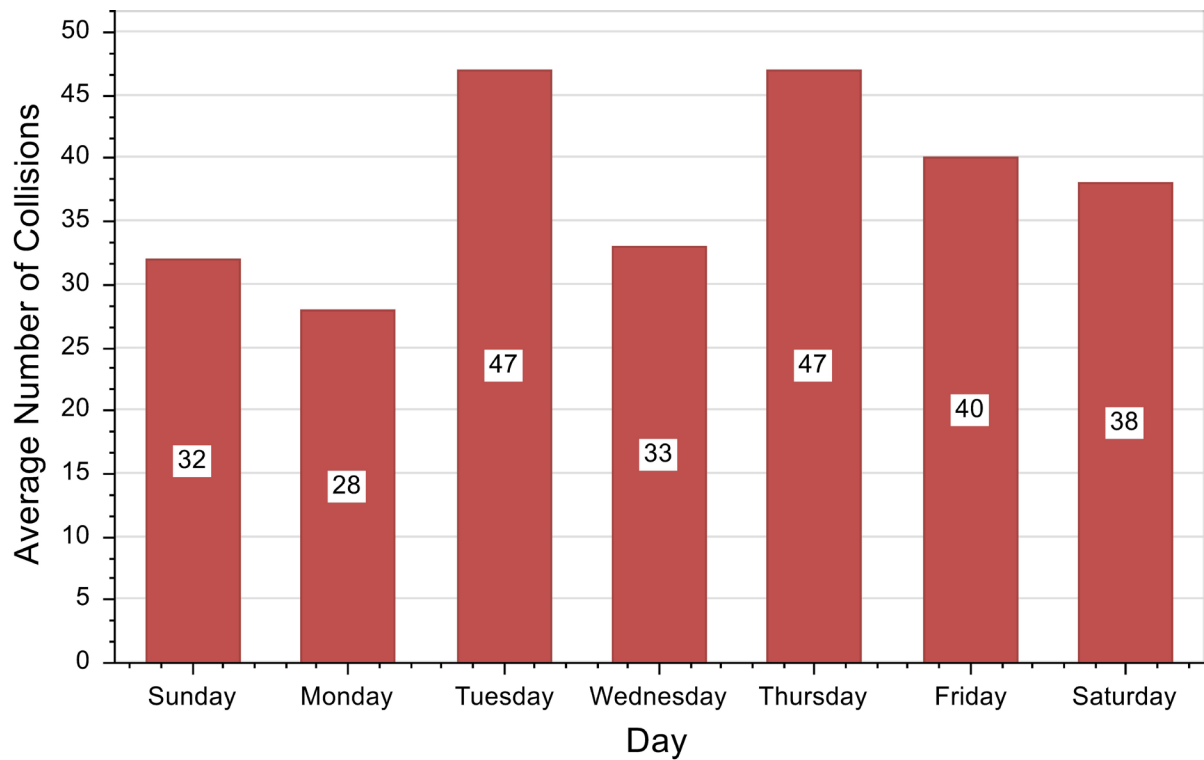
Lost Control Collisions by Day-of-Week (2019)



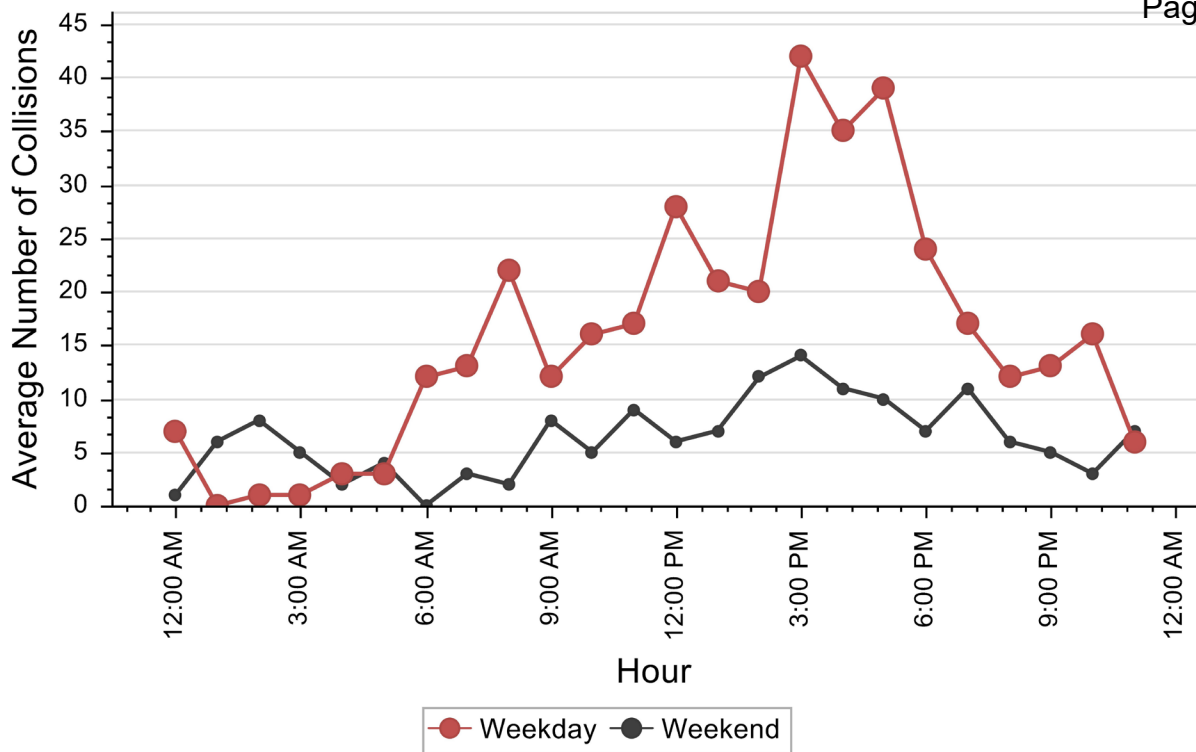
Lost Control Collisions by Time-of-Day (2019)



Speed Related Collisions by Month (2019)



Speed Related Collisions by Day-of-Week (2019)



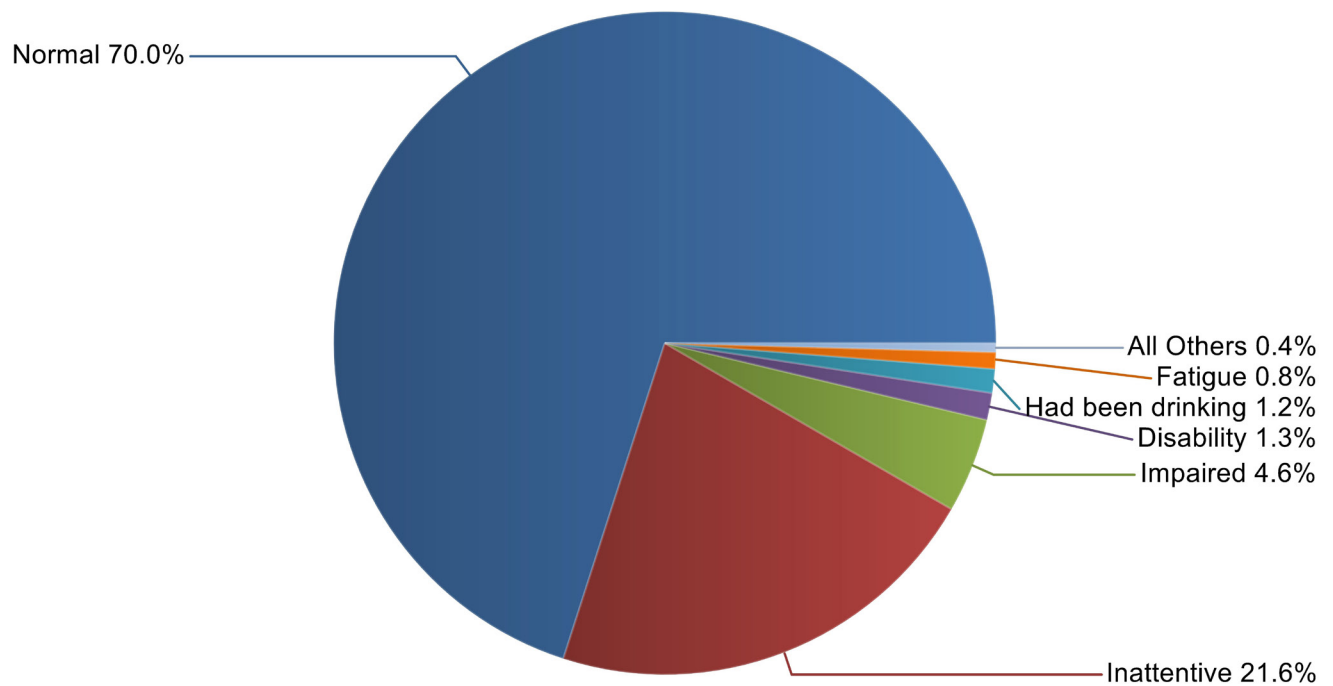
Speed Related Collisions by Time-of-Day (2019)

Intersections with the Highest Frequency of Fatal and Injury Collisions (2019)

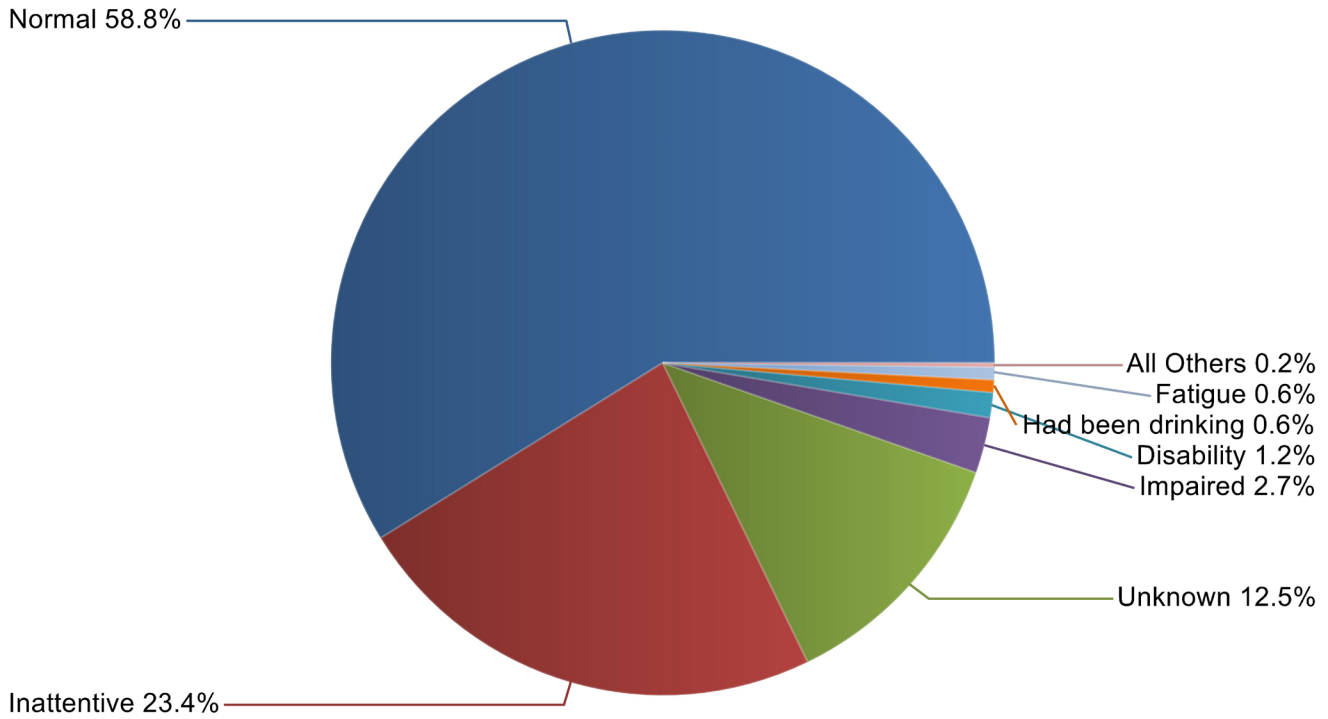
| Description | Municipality | Collision Frequency |
|---|--------------|---------------------|
| John St S at Main St E | Hamilton | 12 |
| Main St E at Victoria Av S | Hamilton | 8 |
| North Service Rd at Ramp North Service To QEW Toronto | Hamilton | 6 |
| Mohawk Rd E at Upper Wellington St | Hamilton | 6 |
| StoneChurch Rd E at Upper James St | Hamilton | 6 |
| Regional 56 Rd at Rymal Rd E | Hamilton | 5 |
| Main St E at Wentworth St S | Hamilton | 5 |
| King St E at Victoria Av S | Hamilton | 5 |
| Paramount Dr at Winterberry Dr | Hamilton | 5 |
| Charlton Av W at Hess St S | Hamilton | 5 |
| Fennel av E at Upper Wellington St | Hamilton | 5 |
| Main St E at Wellington St S | Hamilton | 5 |
| Mohawk Rd W at Upper James St | Hamilton | 5 |

Midblocks with the Highest Frequency of Fatal and Injury Collisions (2019)

| Description | Municipality | Collision Frequency |
|---|--------------|---------------------|
| Upper James St btwn Hester & Jameston | Hamilton | 4 |
| Upper James St btwn Mohawk & Lotus | Hamilton | 4 |
| Upper James St btwn Ramp Upper James NB to Linc EB & Blossom | Hamilton | 4 |
| Queenston Rd btwn Clapham & Greenford | Hamilton | 4 |
| Queenston Rd btwn Plaza Entrance & Nash | Hamilton | 4 |
| Plaza Entrance Rd btwn University & Main | Hamilton | 4 |
| Nash Rd S btwn Queenston & Glen Echo | Hamilton | 3 |
| Rymal Rd E btwn Plaza Entrance & Massena | Hamilton | 3 |
| Upper Gage Av btwn Pemberton & Mohawk | Hamilton | 3 |
| Upper Ottawa St btwn Stone Church & Plaza Entrance | Hamilton | 3 |
| Van Wagner's Beach Rd btwn Plaza Entrance & Nash | Hamilton | 3 |
| Red Hill Valley PY SB btwn Ramp RHVP SB to Queenston & Ramp Queenston to RHVP | Hamilton | 3 |
| Main St E btwn Graham & Houghton | Hamilton | 3 |
| Barton St E btwn Victoria & East | Hamilton | 3 |
| Main St W btwn Queen & Ray | Hamilton | 3 |

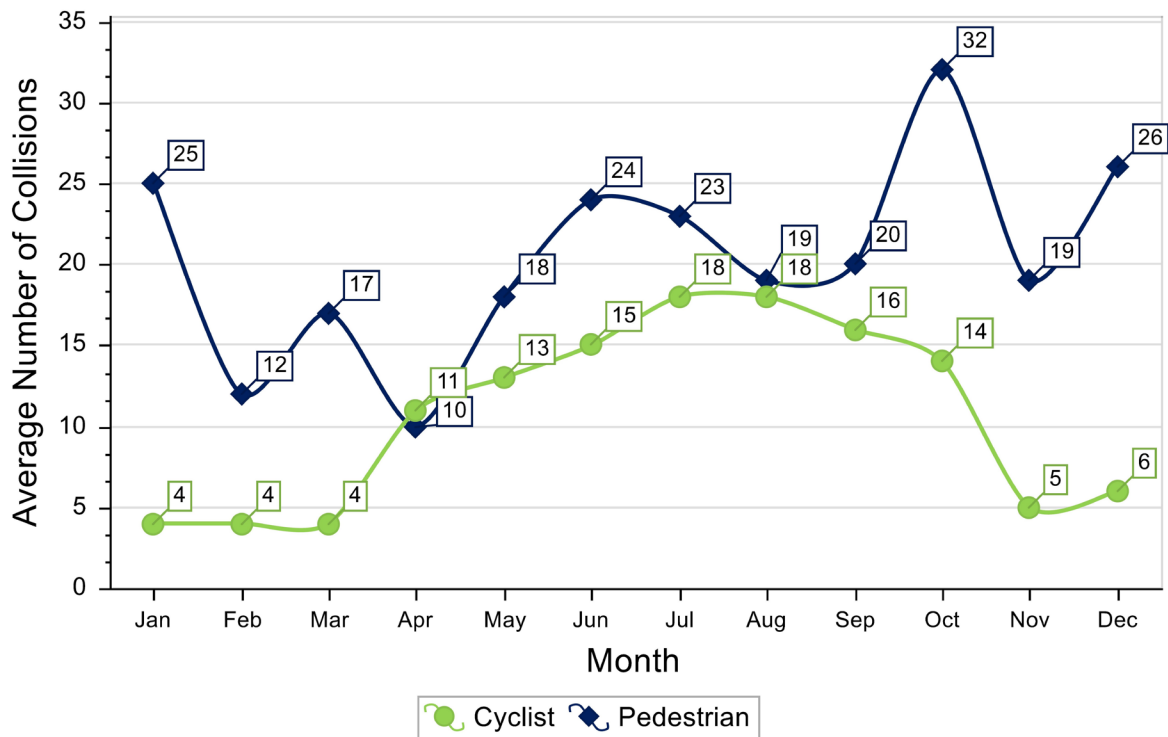


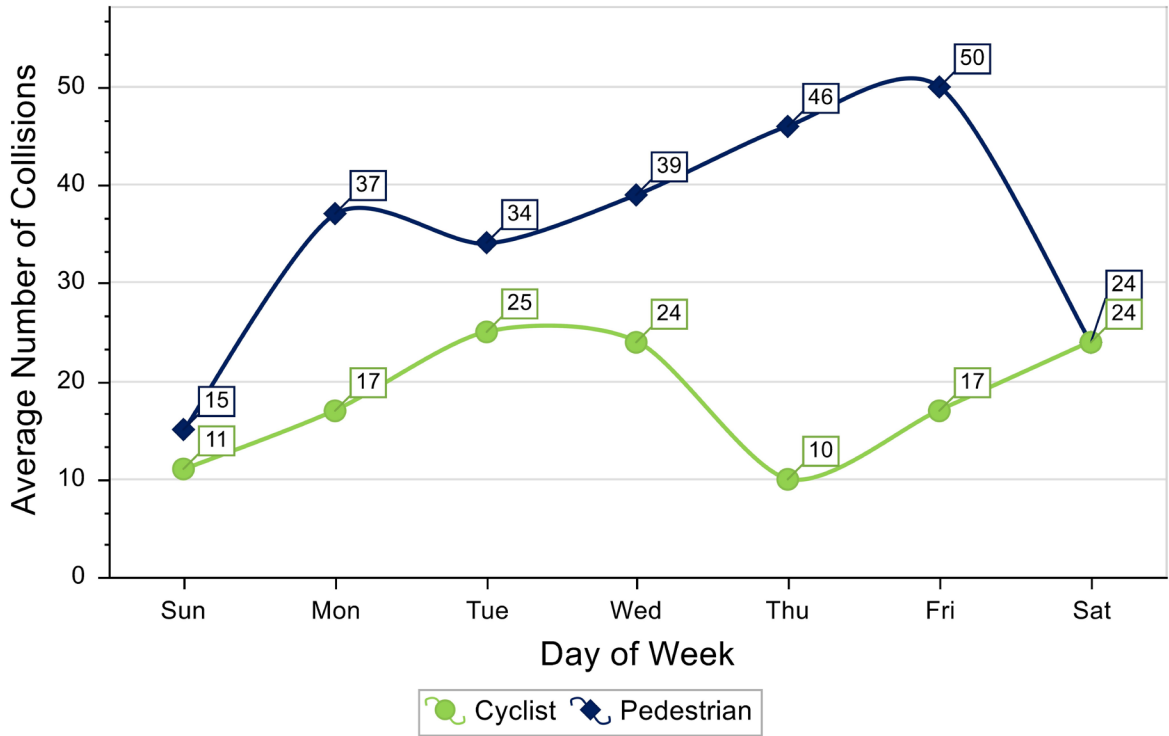
Collisions by At-Fault Driver Condition (2019)



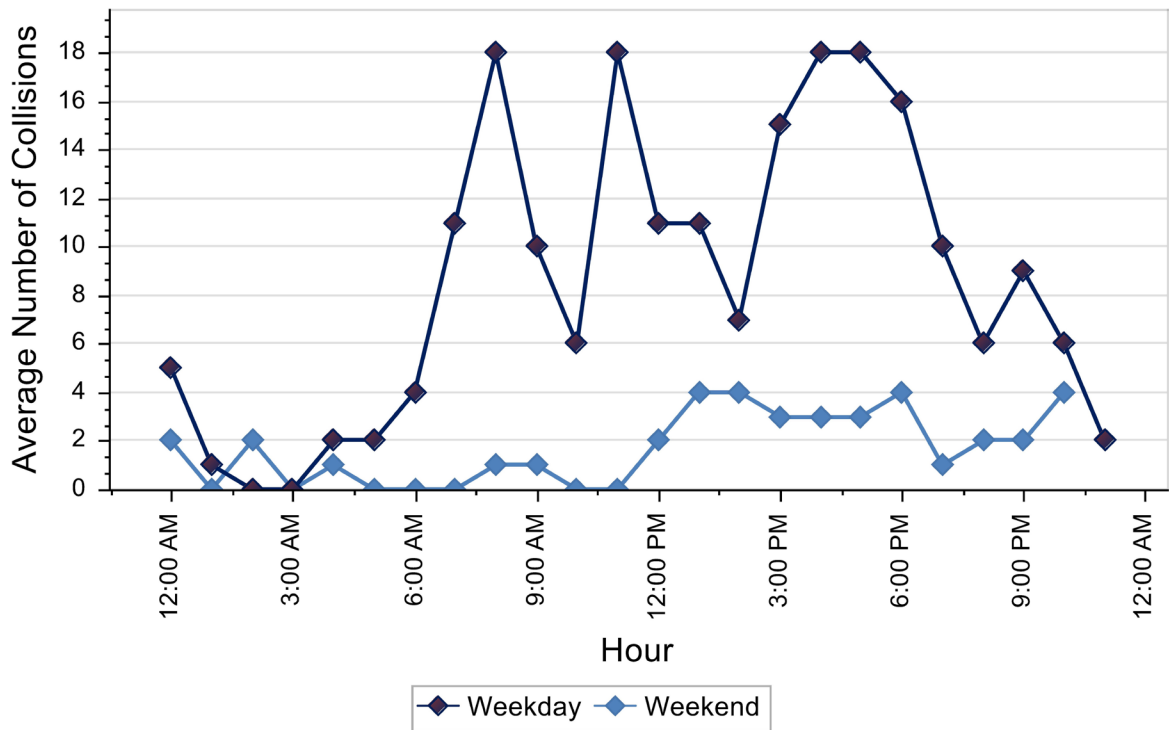
Fatal and Injury Collisions by At-Fault Driver Condition (2019)

Pedestrian and Cyclist Collisions

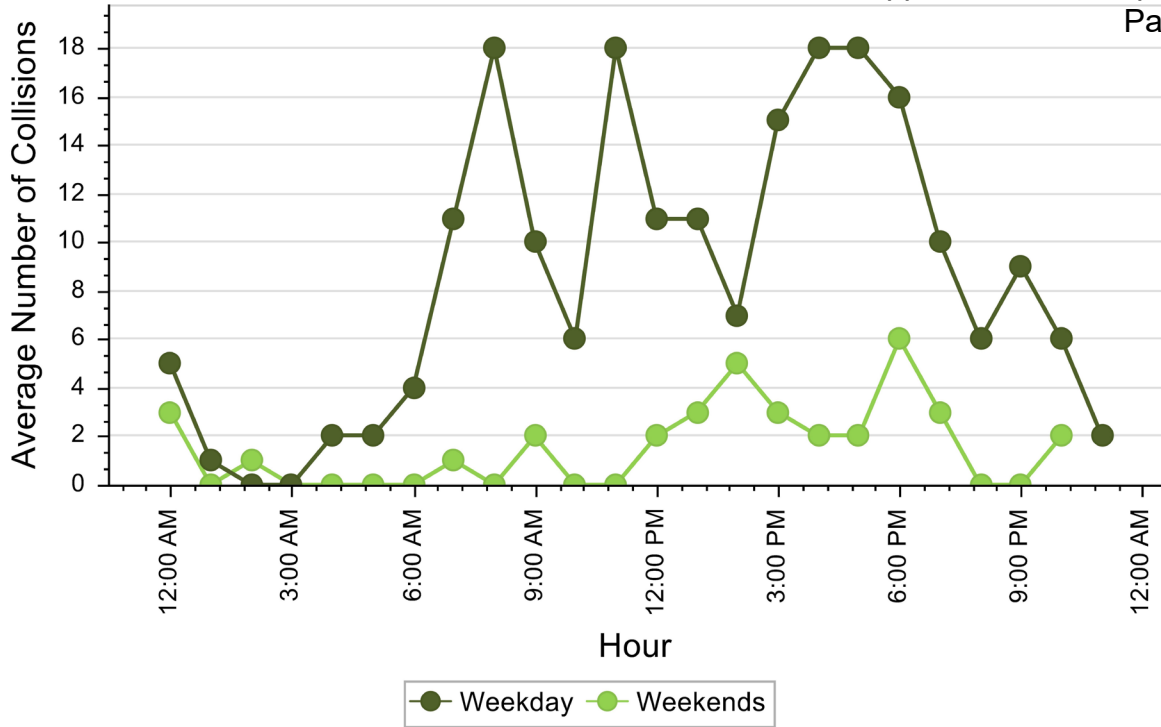




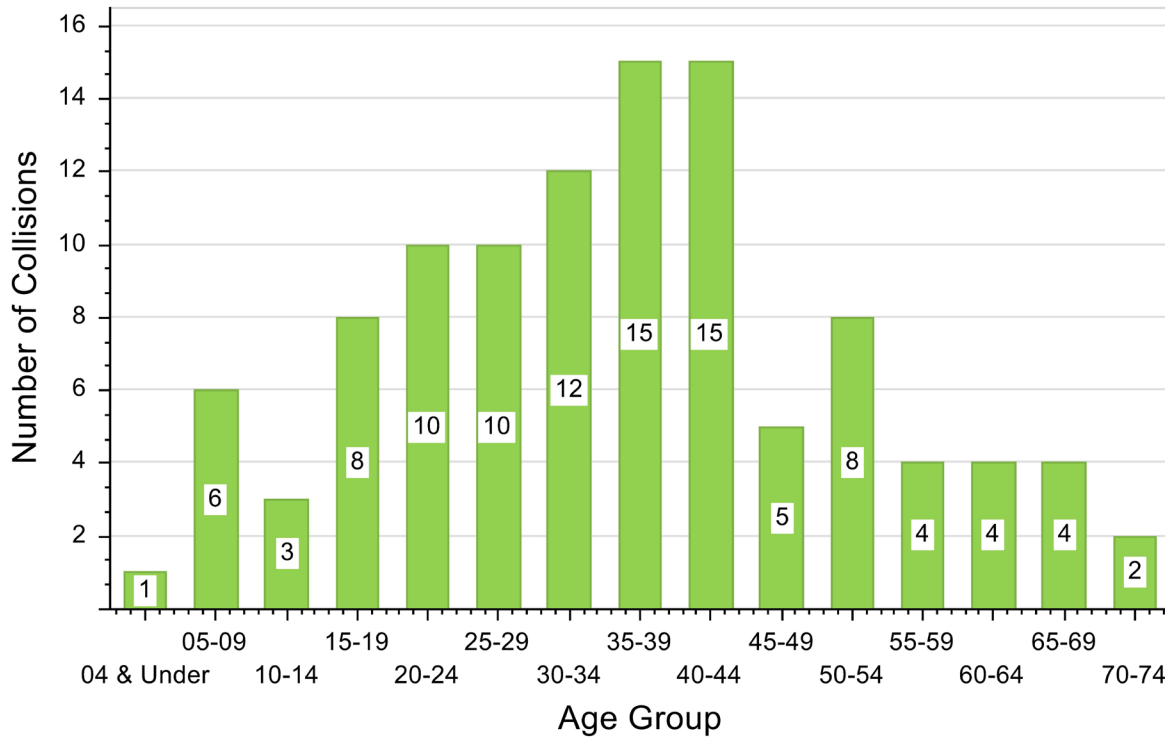
Collisions Involving a Pedestrian or Cyclist by Day-of-Week (2019)



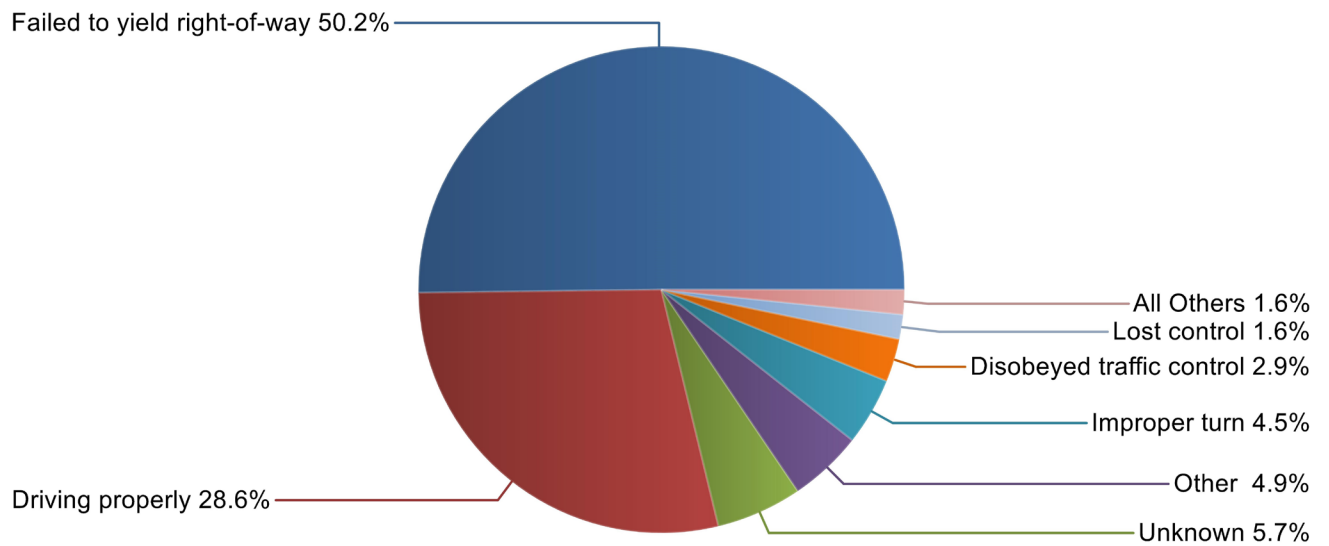
Collisions Involving Pedestrian or by Time of Day (2019)



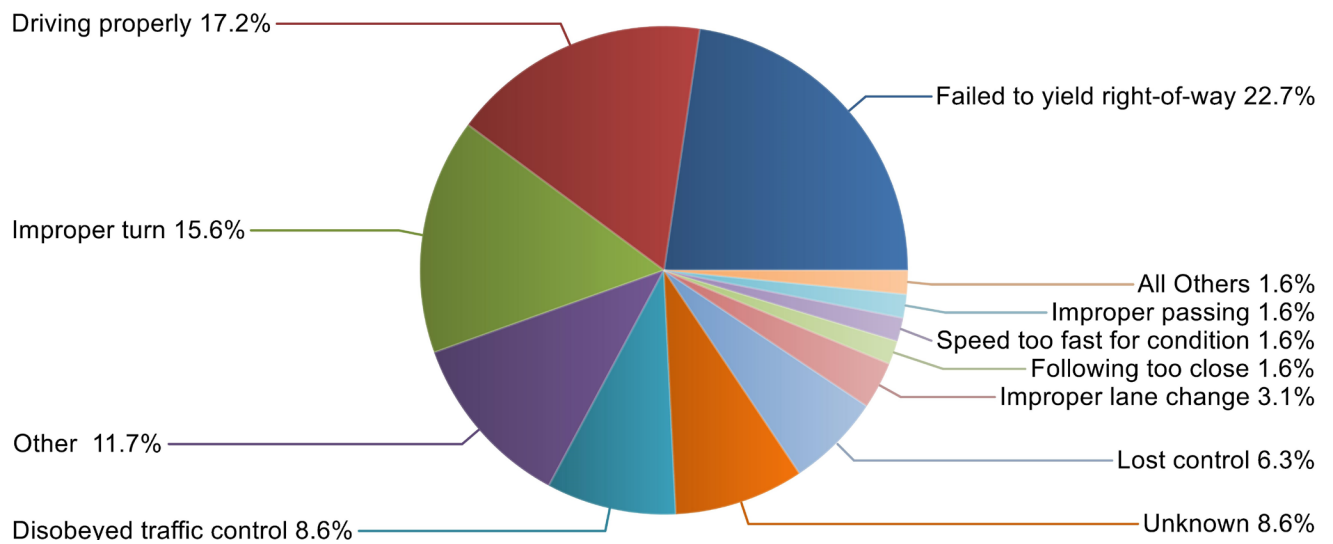
Collisions Involving Cyclist by Time of Day (2019)



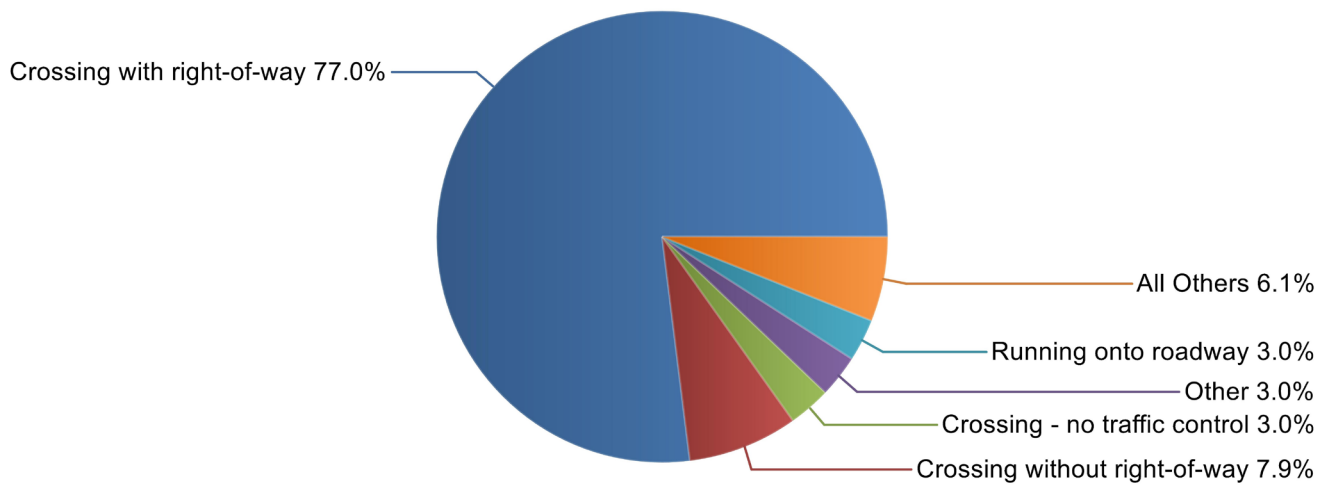
Cyclist Collisions by Cyclist Age:2019



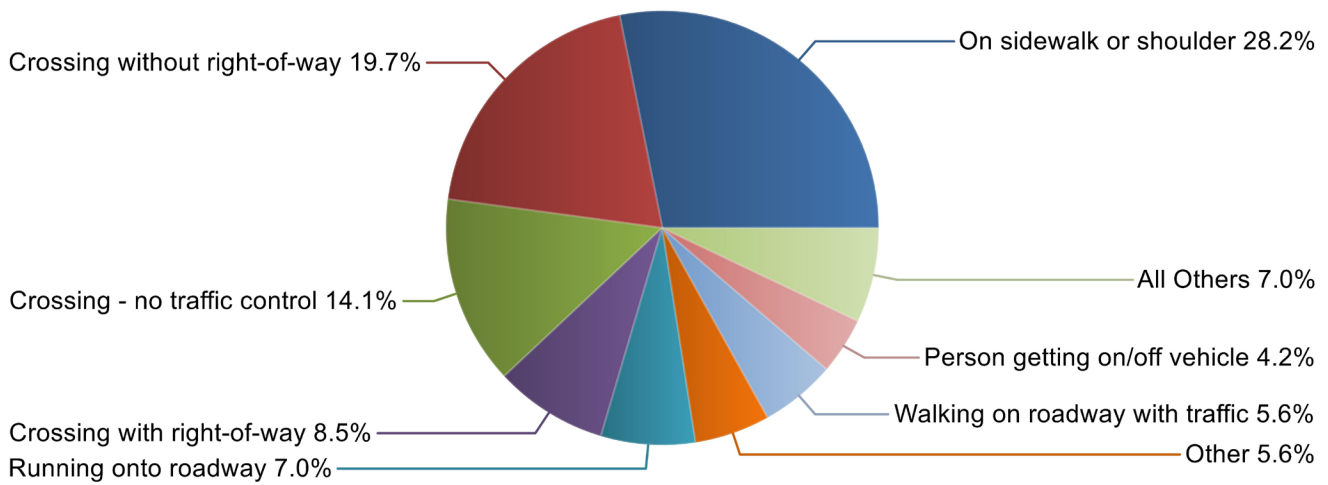
Pedestrian Collisions by Driver Action (2019)



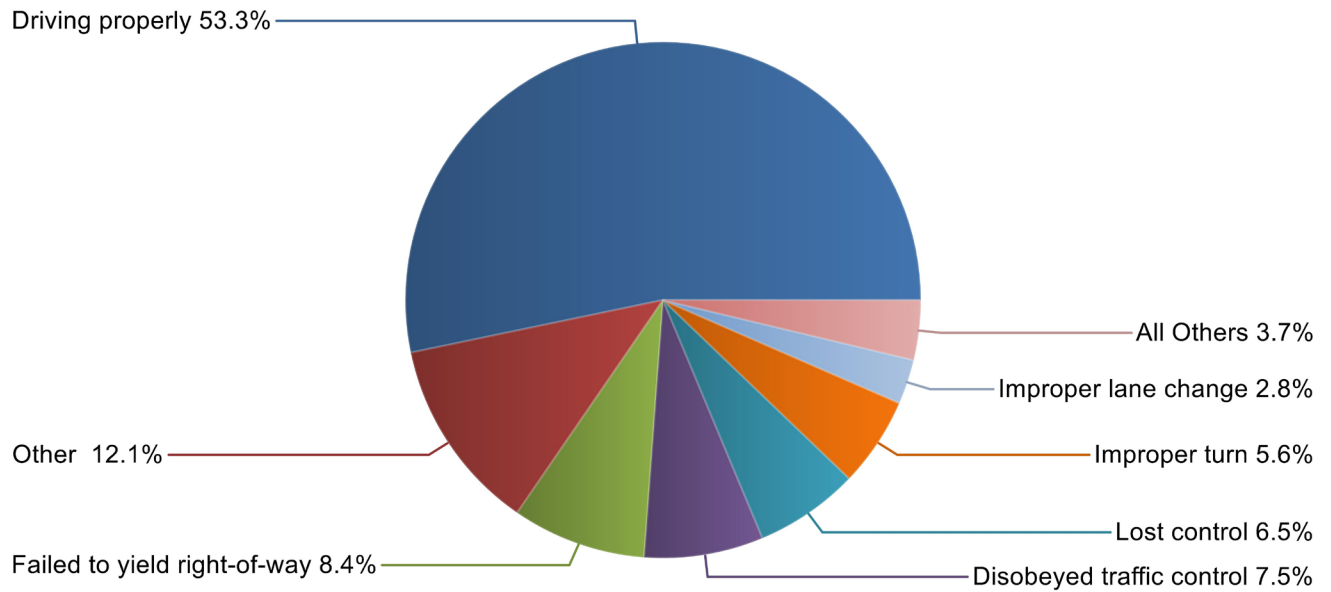
Cyclist Collisions by Driver Action (2019)



Intersection Pedestrian Collisions by Pedestrian Action (2019)



Midblock Pedestrian Collisions by Pedestrian Action (2019)



Cyclist Collisions by Cyclist Action (2019)

Intersections with the Highest Frequency of Pedestrian Fatal and Injury Collisions (2019)

| Description | Collision Frequency |
|------------------------------------|---------------------|
| John St S at Main St E | 5 |
| Main St E at Wentworth St S | 4 |
| Main St E at Victoria Av S | 4 |
| Dundurn St S at Main St W | 2 |
| James St S at Young St | 2 |
| King St E at Victoria Av S | 2 |
| Main St E at Sherman Av S | 2 |
| Larch St at Upper Ottawa St | 2 |
| James St N at Rebecca St | 2 |
| Wellington St N at Wilson St | 2 |
| Catharine St S at Main St E | 2 |
| James St N at King St E | 2 |
| King St W at Queen St N | 2 |
| Cootes Dr at Main st W | 2 |
| Mohawk Rd E at Upper Wellington St | 2 |
| StoneChurch Rd E at Upper James St | 2 |

Midblocks with the Highest Frequency of Pedestrian Fatal and Injury Collisions (2019)

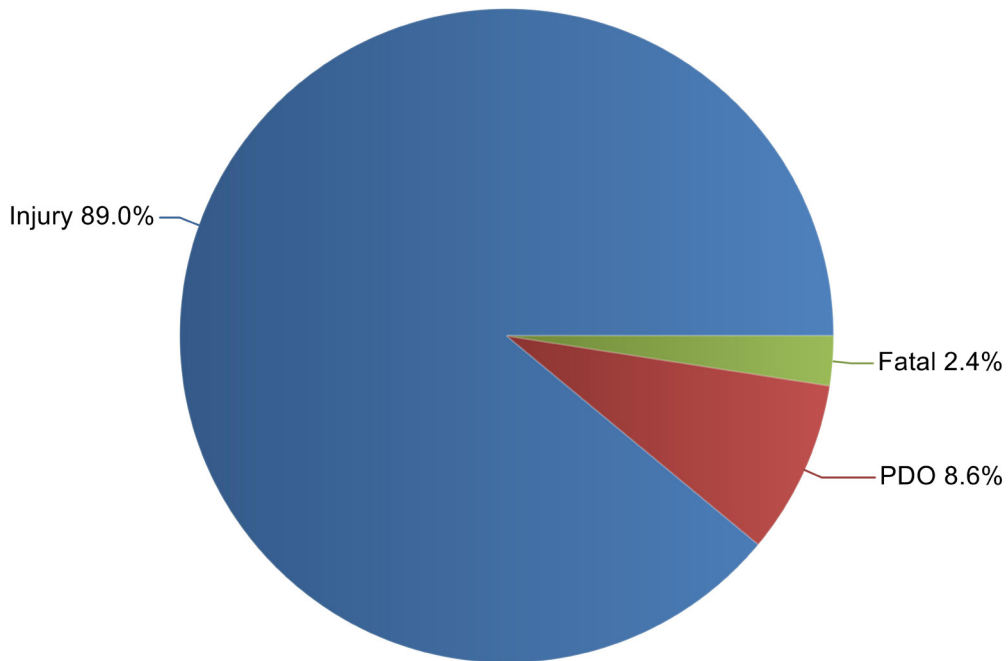
| Description | Collision Frequency |
|---|---------------------|
| Queenston Rd Btwn Plaza Entrance & Nash | 3 |
| Upper Wentworth St Btwn Concession & Crockett | 2 |
| Barton St E Btwn Victoria & East | 2 |

Intersections with the Highest Frequency of Cyclist Fatal and Injury Collisions (2019)

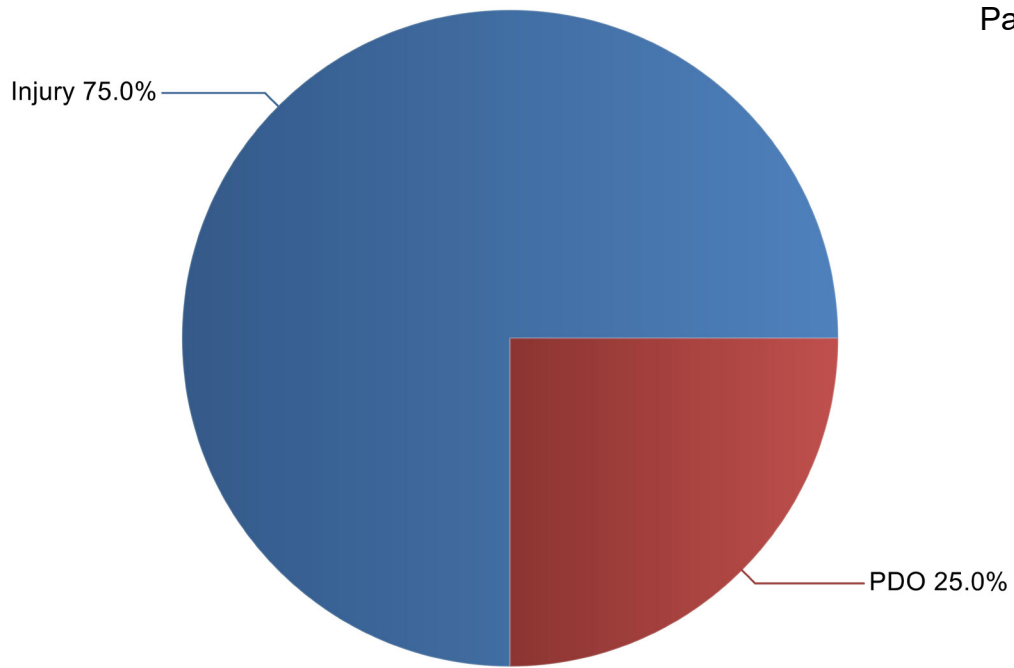
| Description | Collision Frequency |
|--|---------------------|
| Queenston Rd at Ramp Queenston Eb To Rhvp Nb | 3 |
| Dundurn St N at Sunset Av | 2 |
| Cannon St E at Wellington St N | 2 |
| Charlton Av E at John St S | 2 |
| Bay St S at Jackson St W | 2 |

Midblocks with the Highest Frequency of Cyclist Fatal and Injury Collisions (2019)

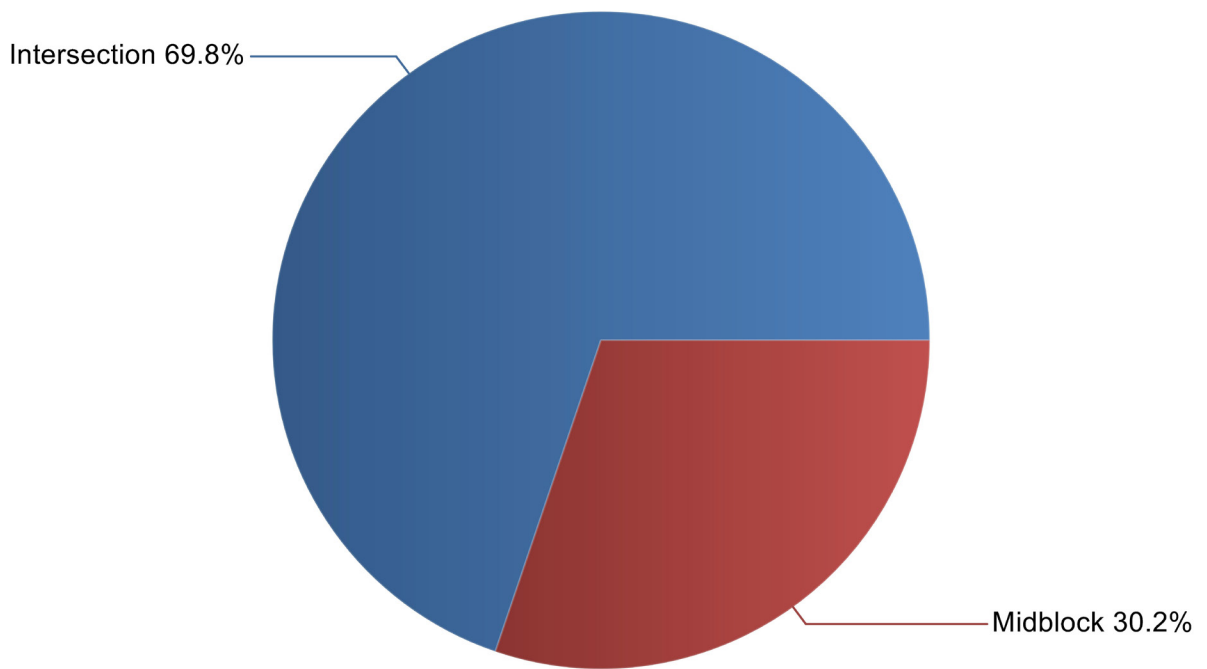
| Description | Collision Frequency |
|--------------------------------|---------------------|
| Bay St S between Main & George | 2 |



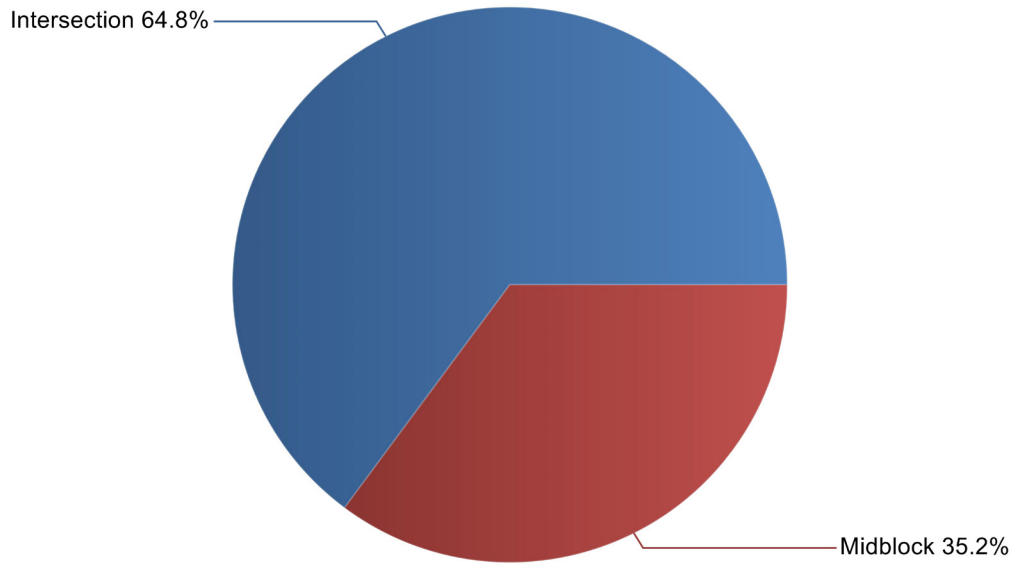
Collision Involving Pedestrian by Severity (2019)



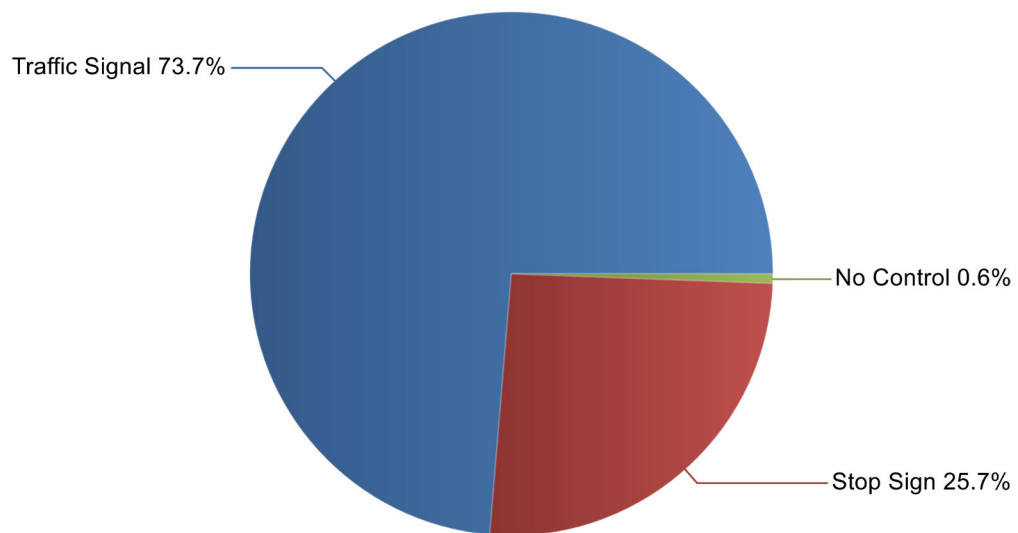
Collision Involving Cyclist by Severity (2019)



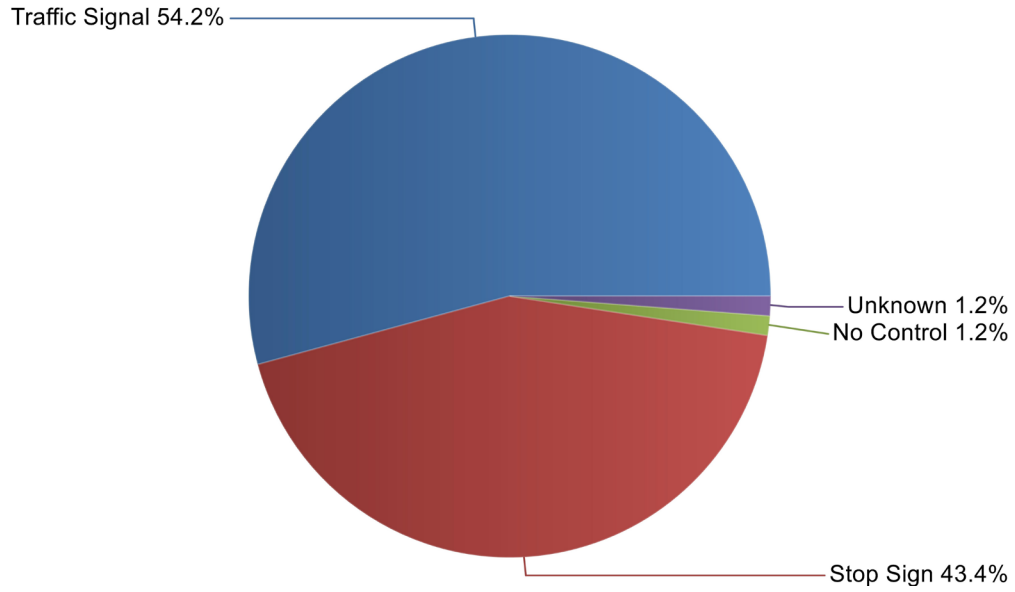
Collision Involving Pedestrian by Location (2019)



Collision Involving Cyclist by Location (2019)

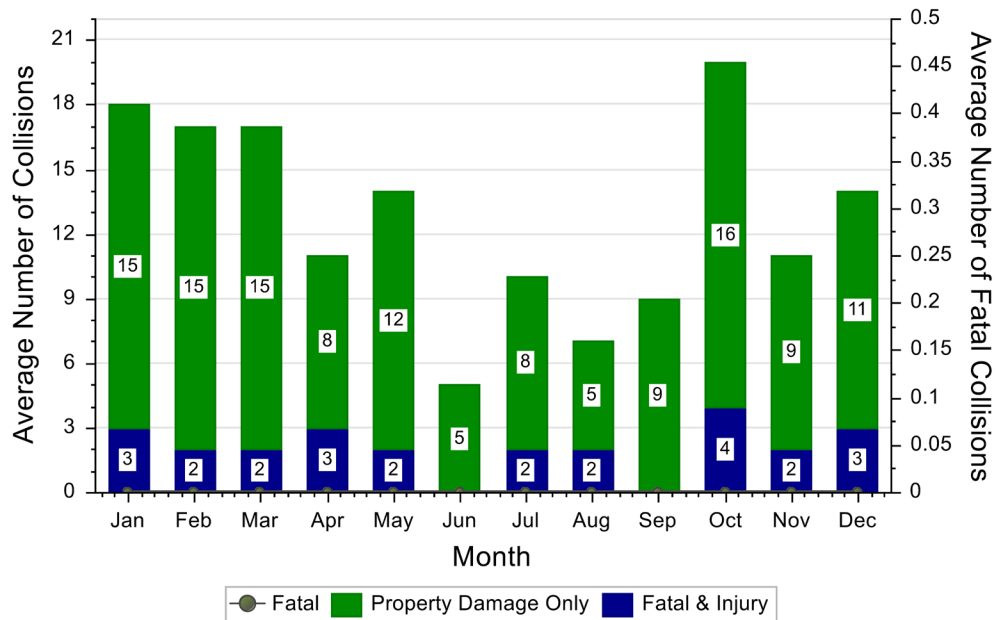


Collision Involving Pedestrian by Intersection Control Type (2019)



Collision Involving Cyclist by Intersection Control Type (2019)

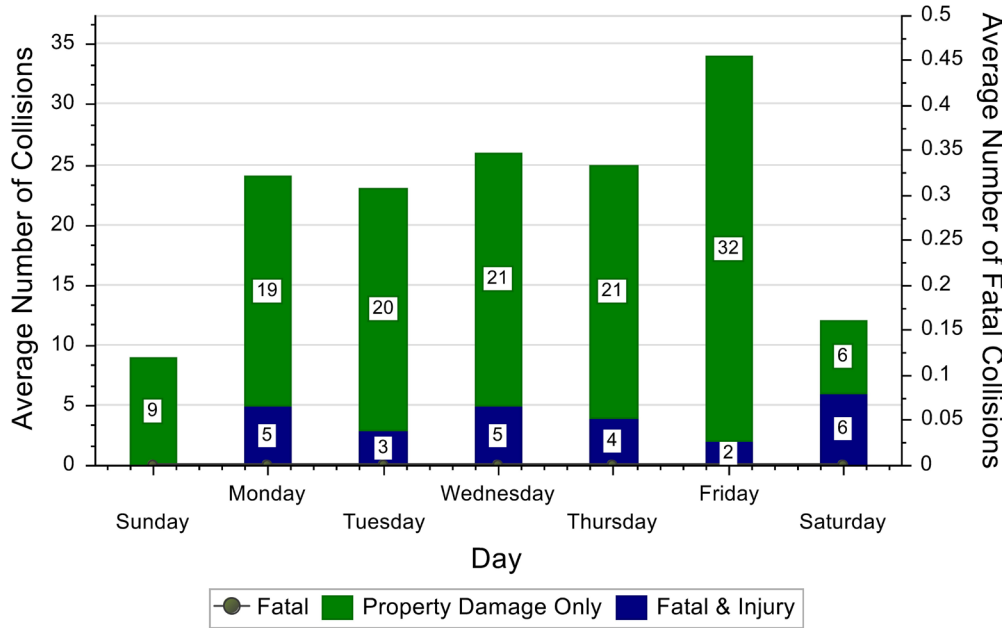
Month, Day, and Time of Collisions



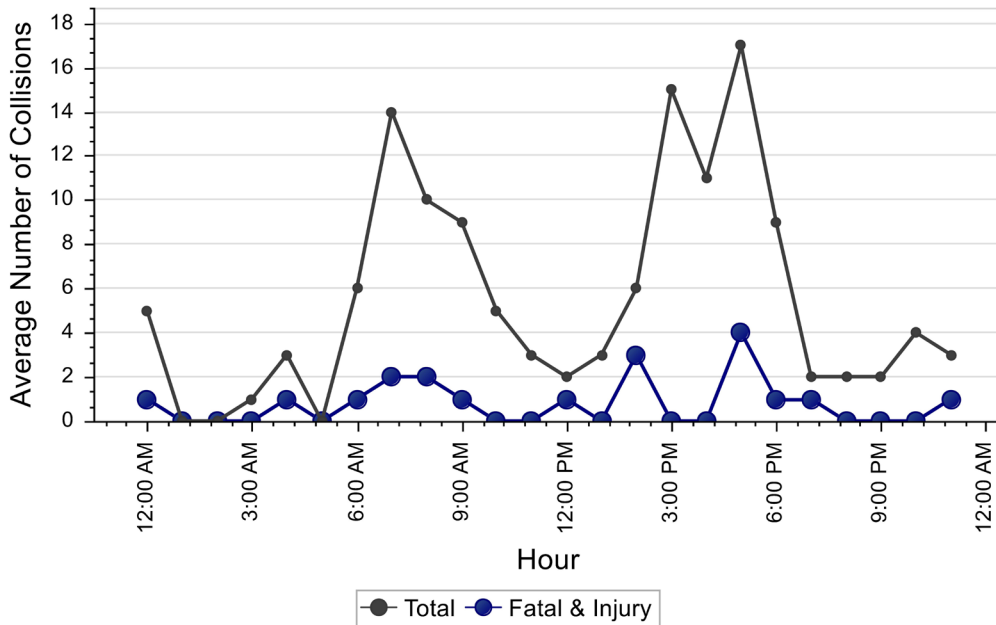
Collisions by Month - RHVP (2019)

Appendix B

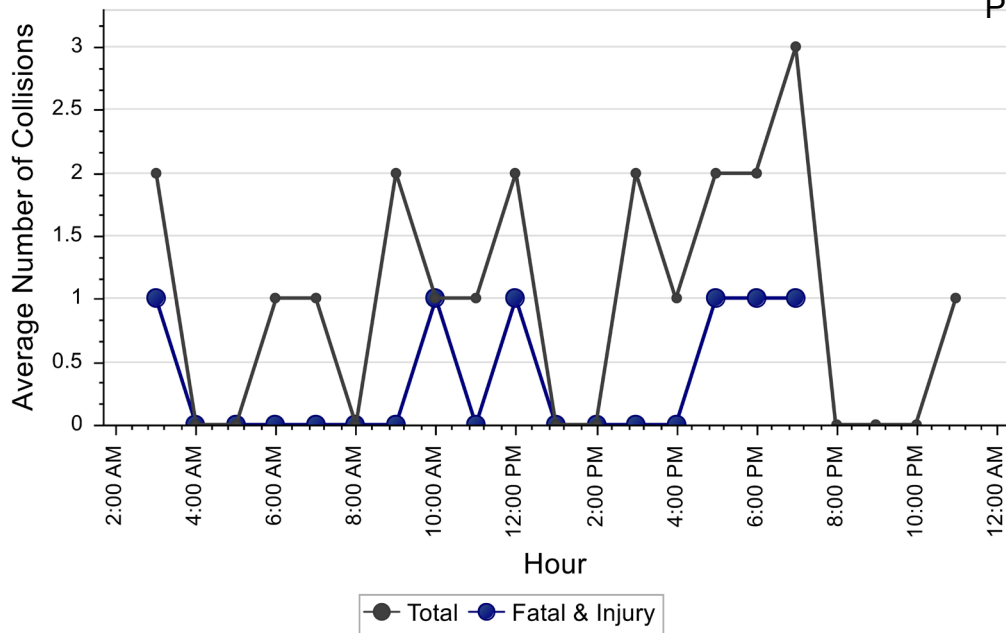
2019 Red Hill Valley Parkway Collisions Statistics



Collisions by Day-of-Week - RHVP (2019)

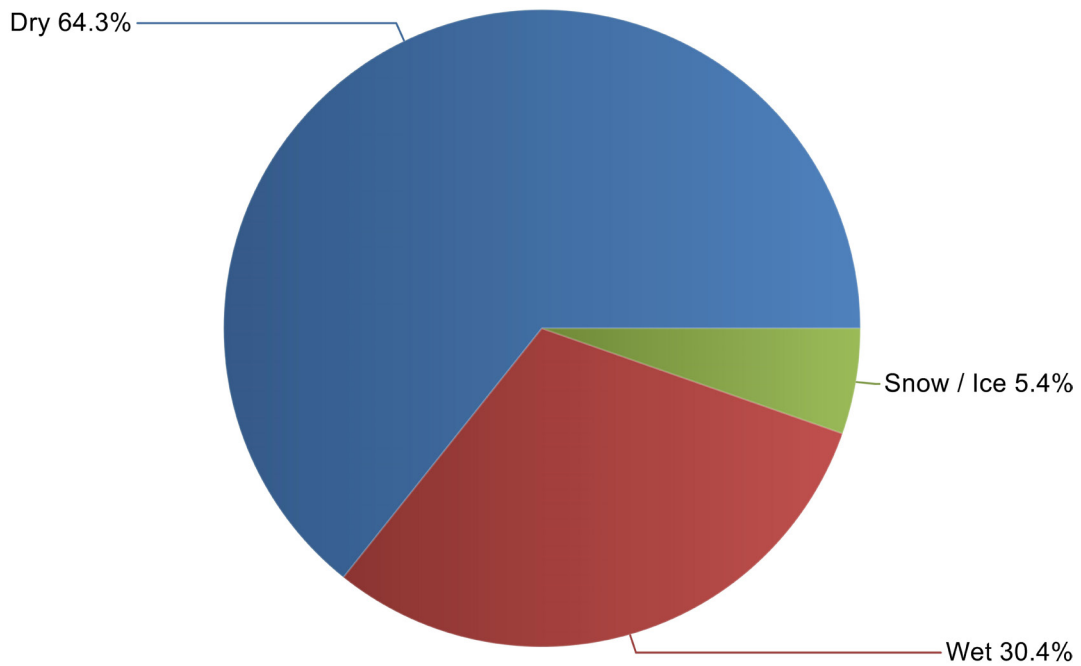


Weekday Collisions by Time-of-Day - RHVP (2019)

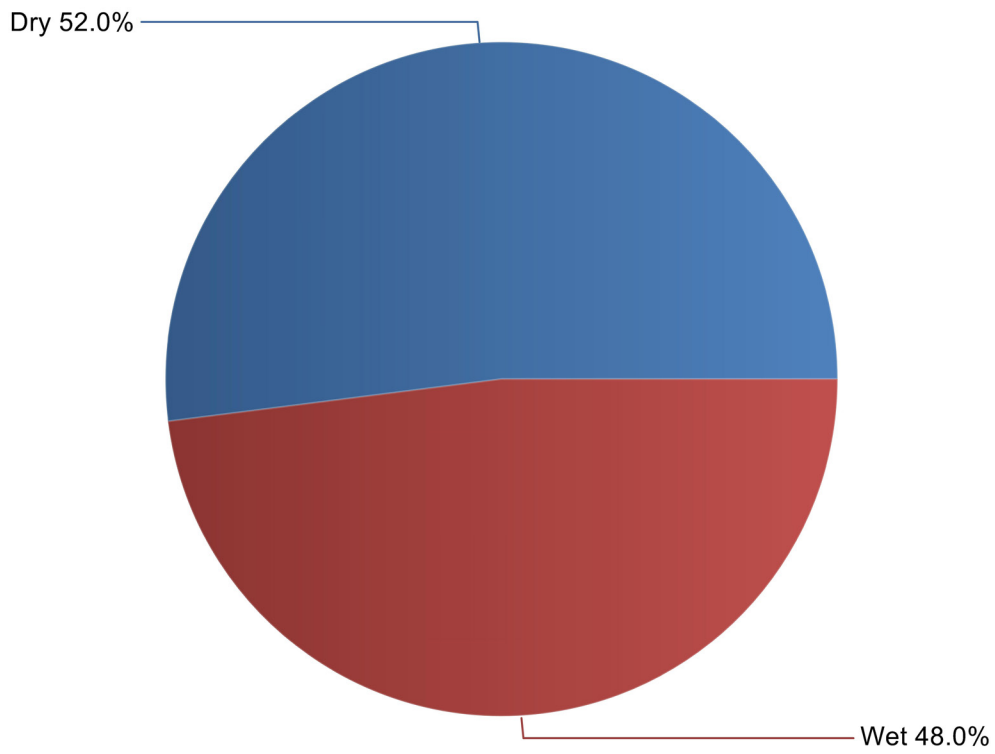


Weekend Collisions by Time-of-Day - RHVP (2019)

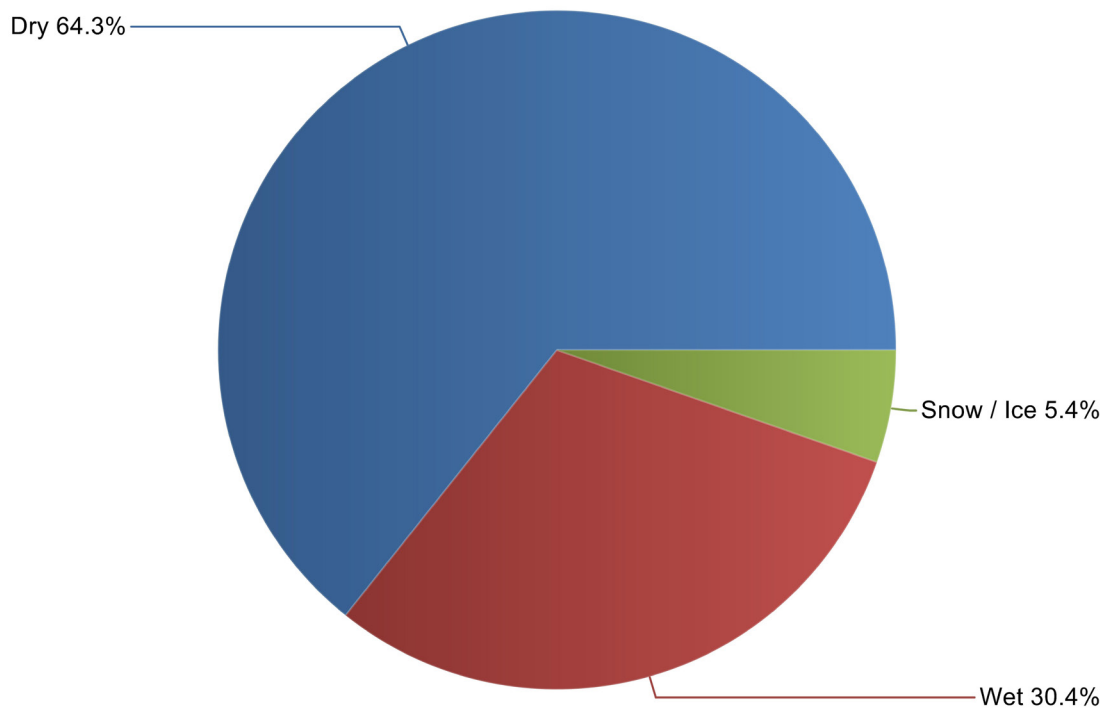
Collisions by Road Surface and Lighting Conditions



Collisions by Road Surface Condition - RHVP (2019)

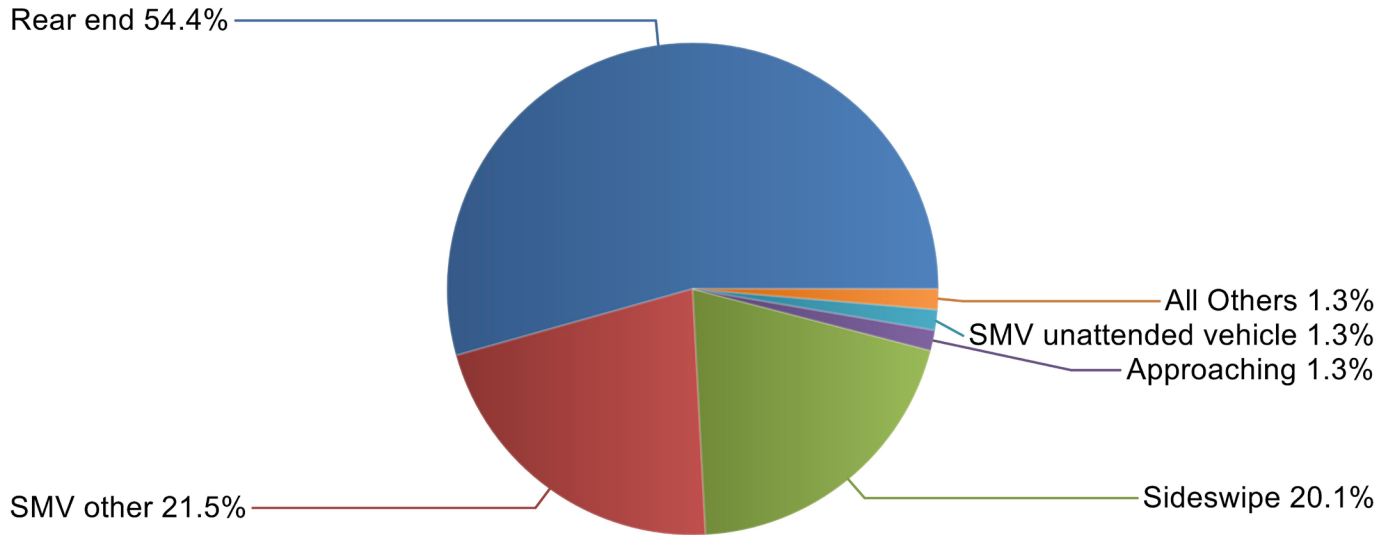


Fatality and Injury Collisions by Road Surface Condition - RHVP (2019)



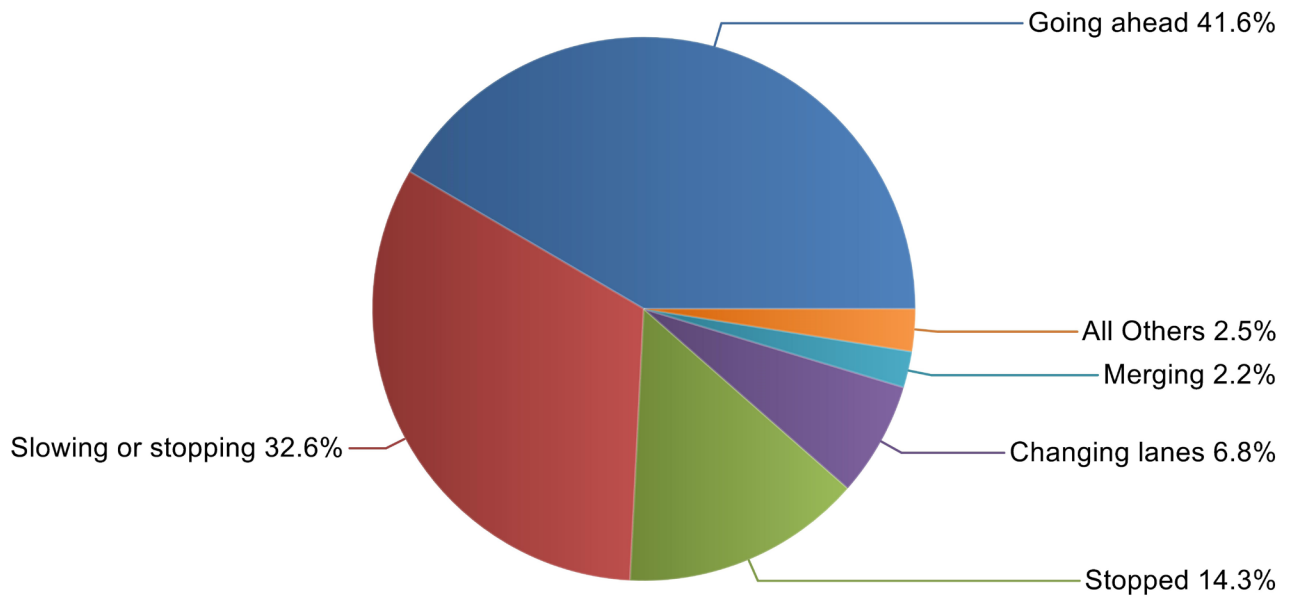
Collisions by Lighting Condition - RHVP (2019)

Collisions by Impact Type

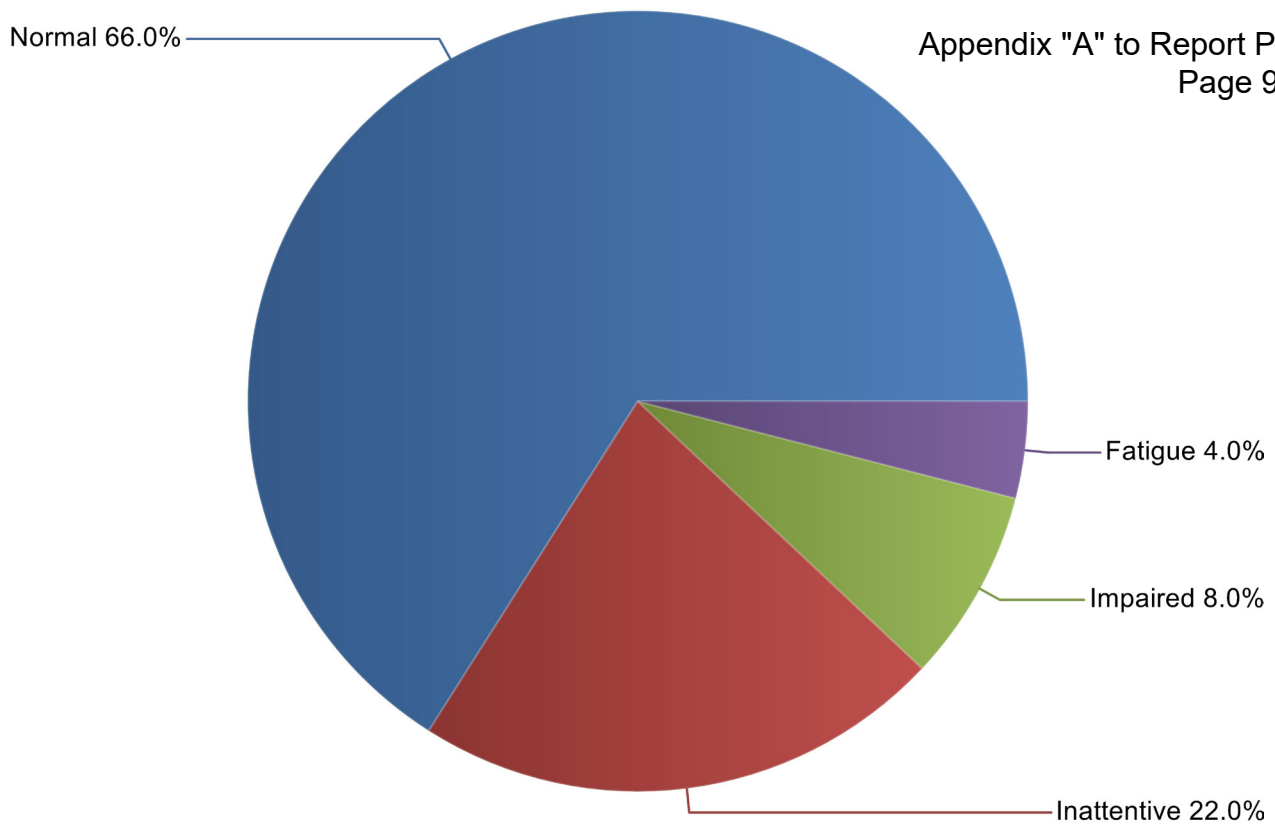


Collisions by Initial Impact Type - RHVP (2019)

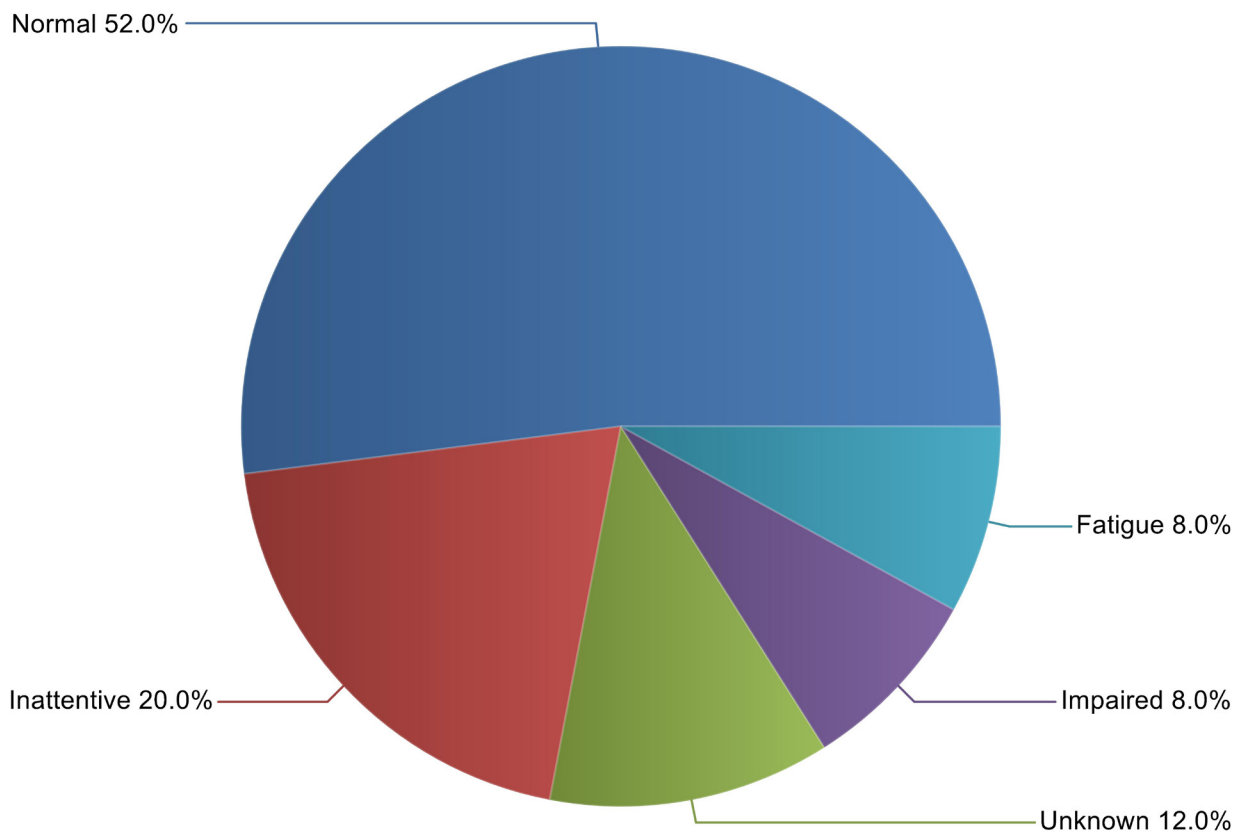
Drivers



Collisions by Vehicle Maneuver - RHVP (2019)

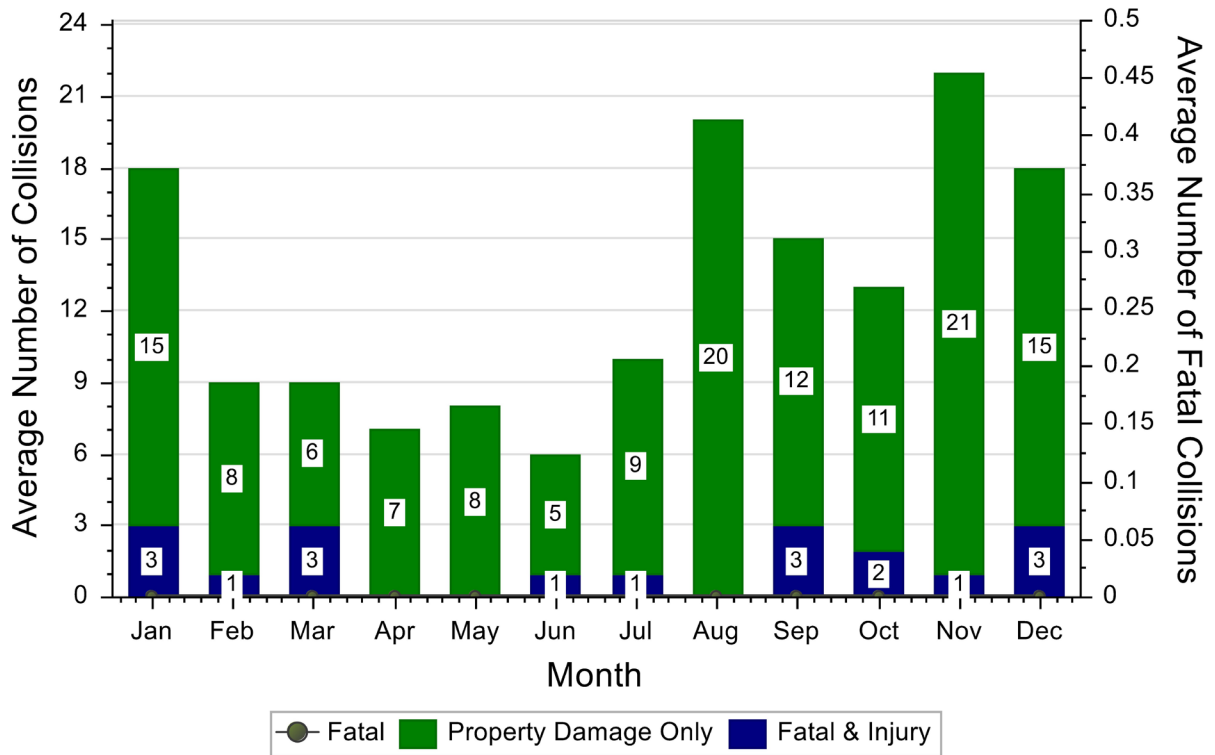


Collisions by At-Fault Driver Condition - RHVP (2019)

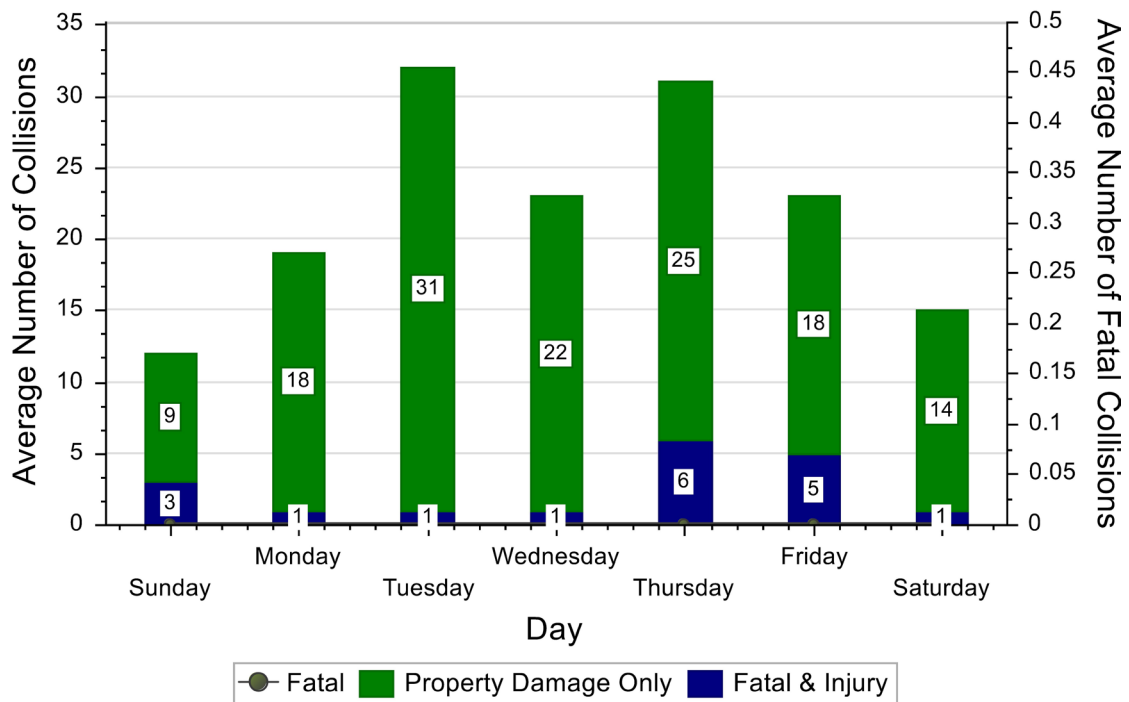


Fatal and Injury Collisions by At-Fault Driver Condition - RHVP (2019)

Month, Day, and Time of Collisions



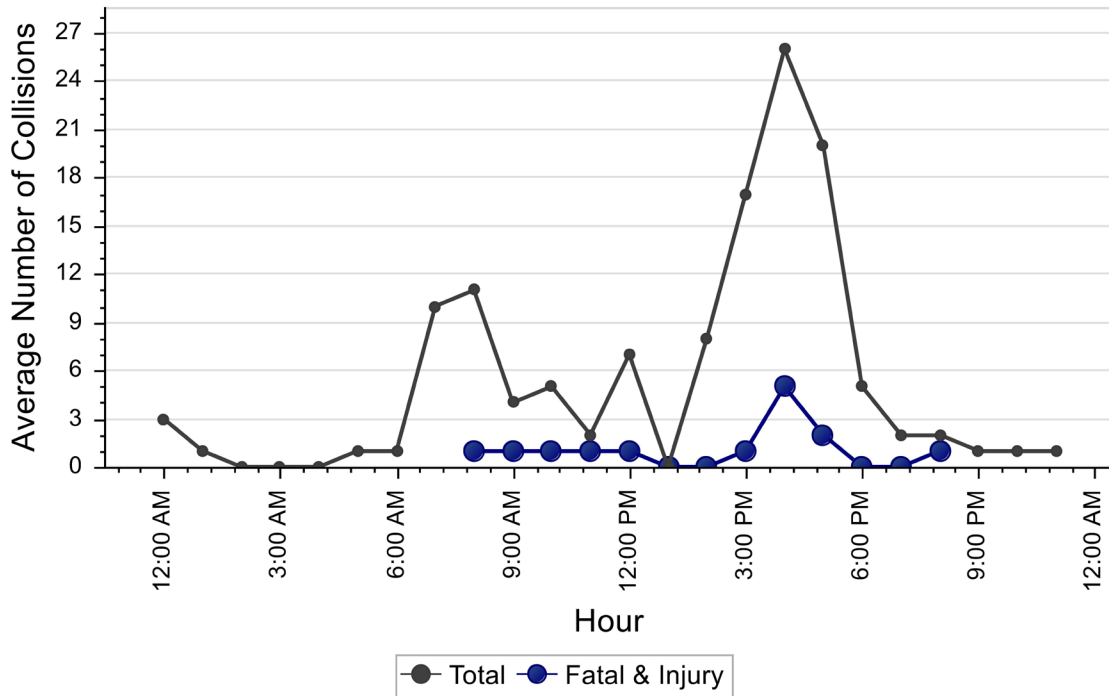
Collisions by Month - RHVP (2019)



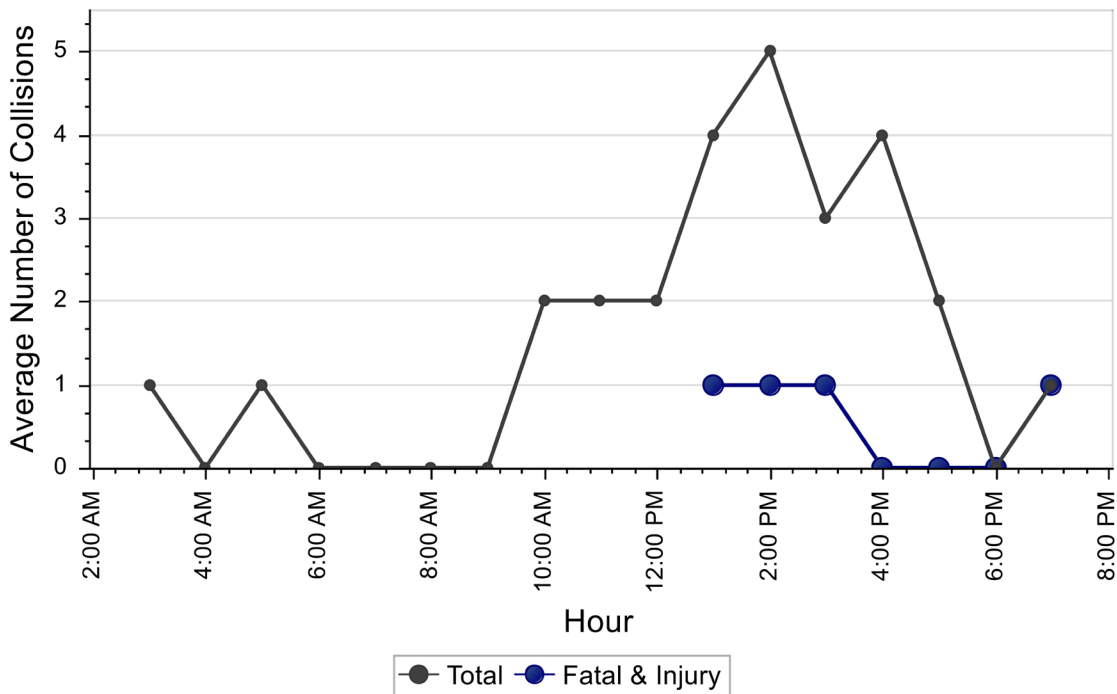
Collisions by Day-of-Week - RHVP (2019)

Appendix C

2019 Lincoln M. Alexander Parkway Collisions Statistics

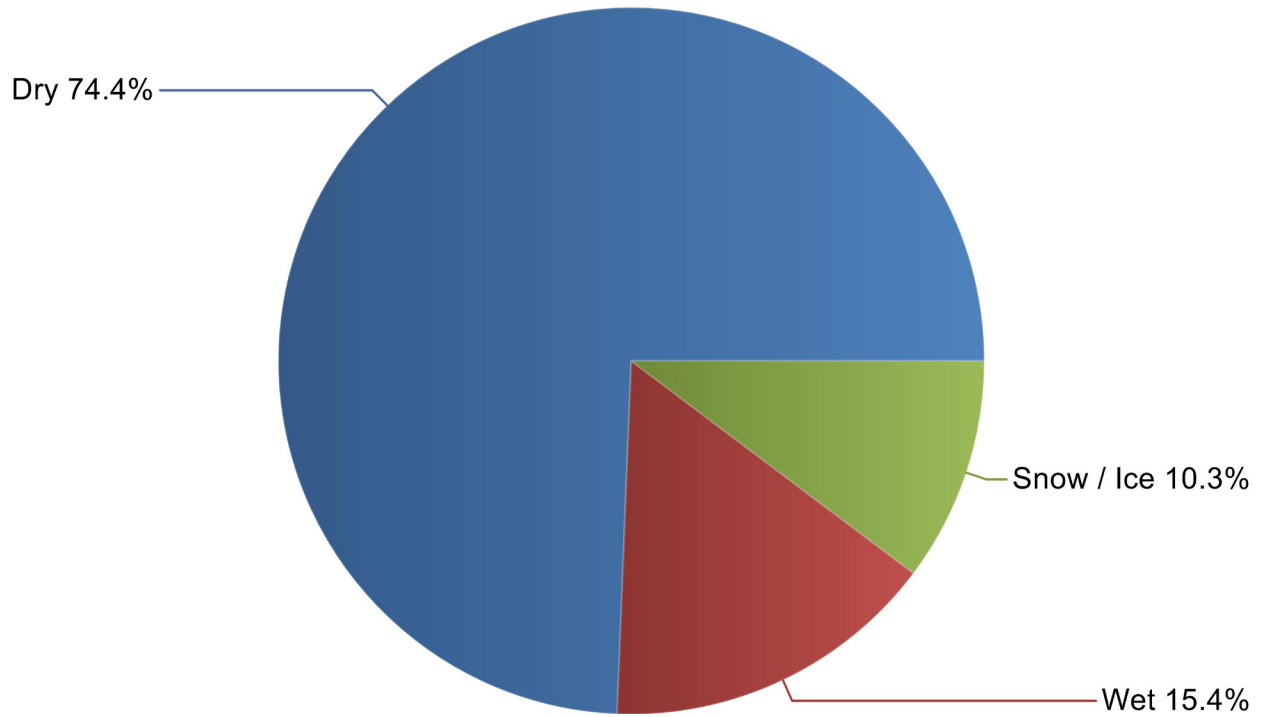


Weekday Collisions by Time-of-Day - LINC (2019)

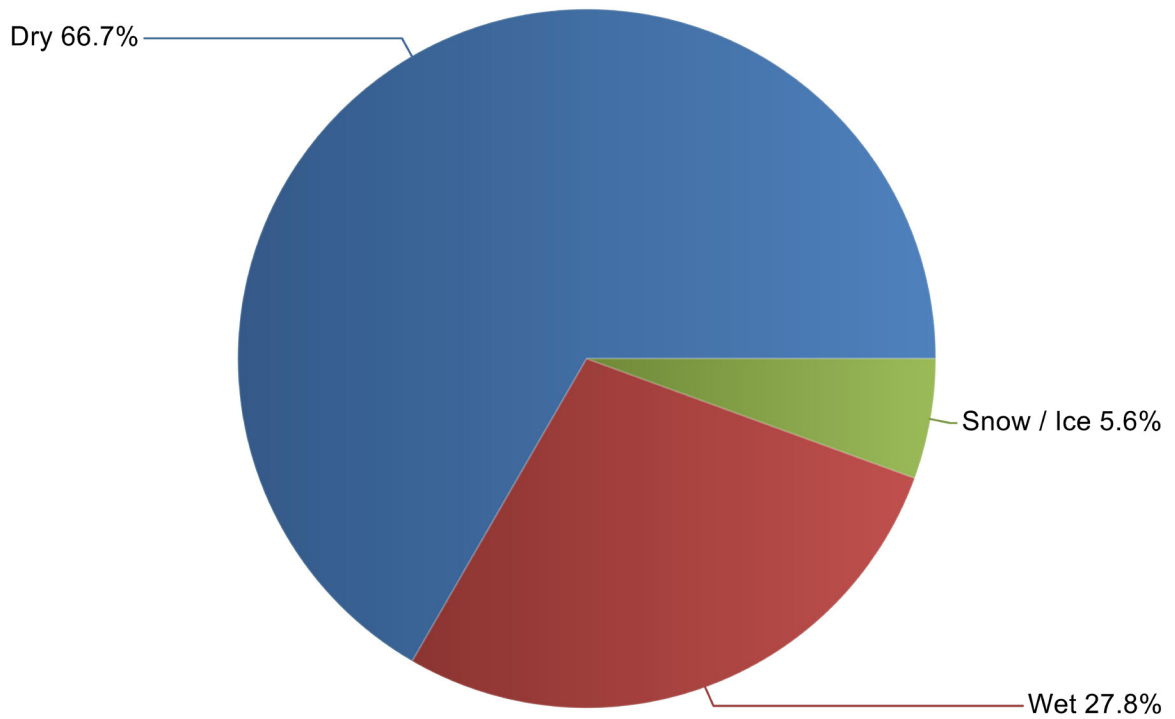


Weekend Collisions by Time-of-Day - LINC (2019)

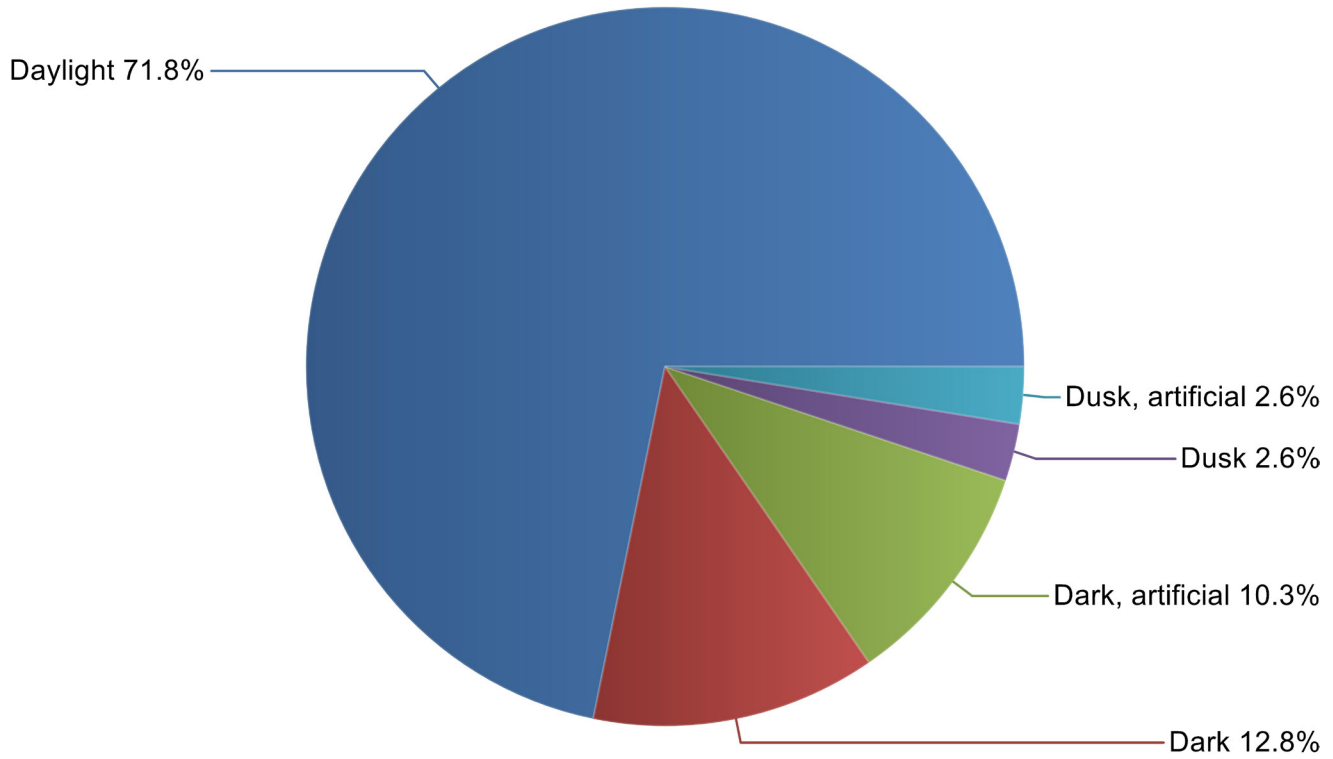
Collisions by Road Surface and Lighting Conditions



Collisions by Road Surface Condition - LINC (2019)

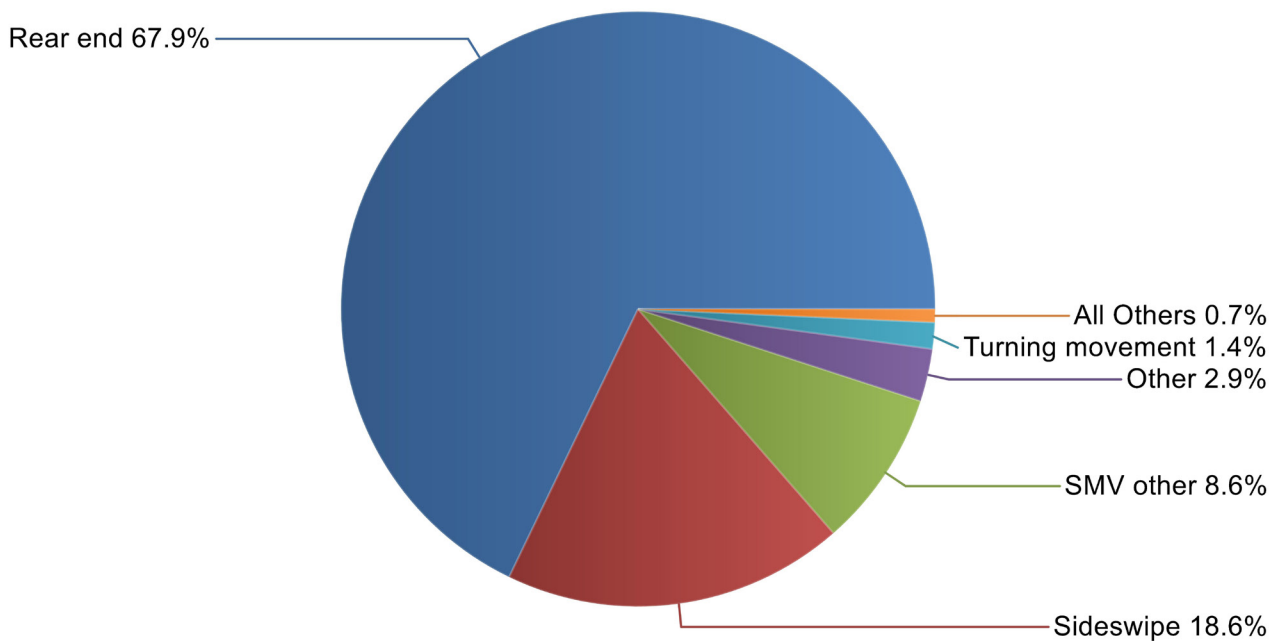


Fatality and Injury Collisions by Road Surface Condition - LINC (2019)



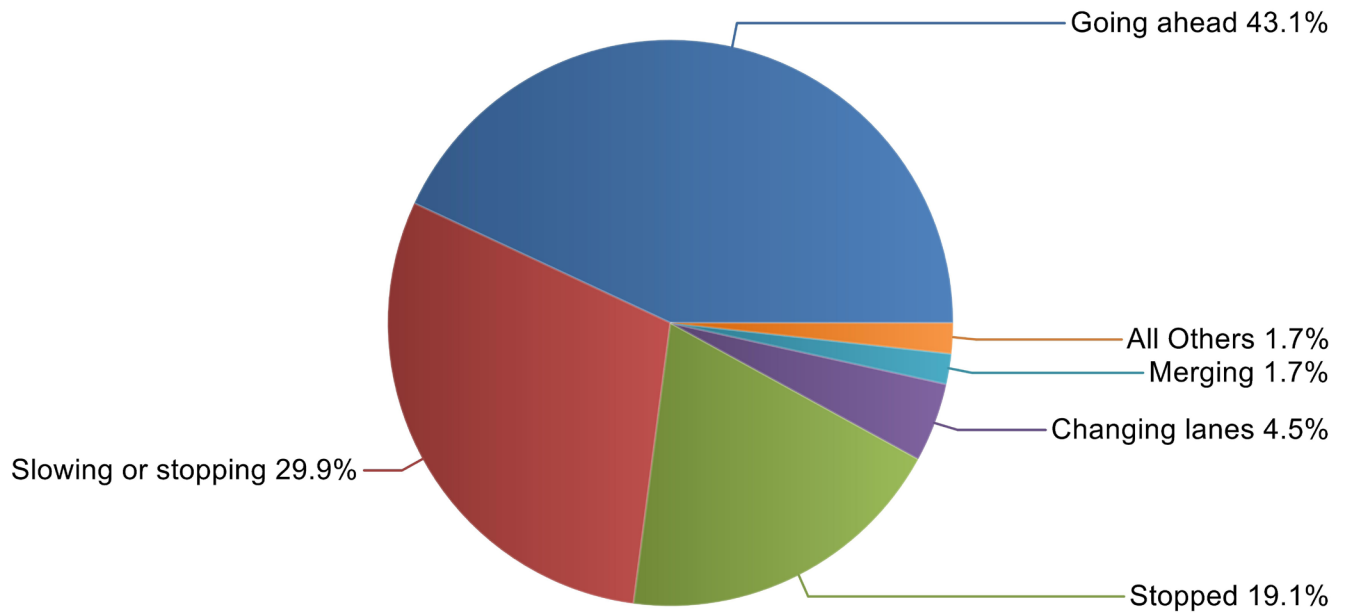
Collisions by Lighting Condition - LINC (2019)

Collisions by Impact Type

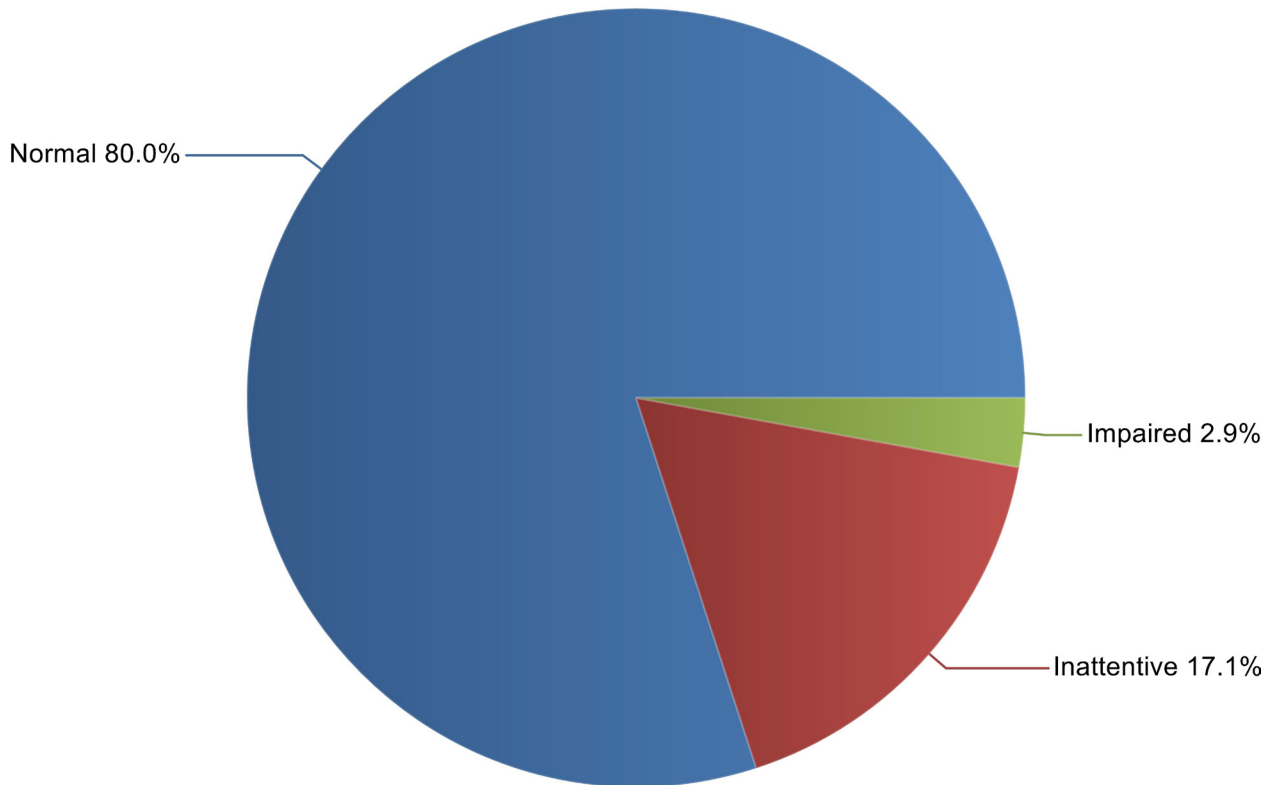


Collisions by Initial Impact Type - LINC (2019)

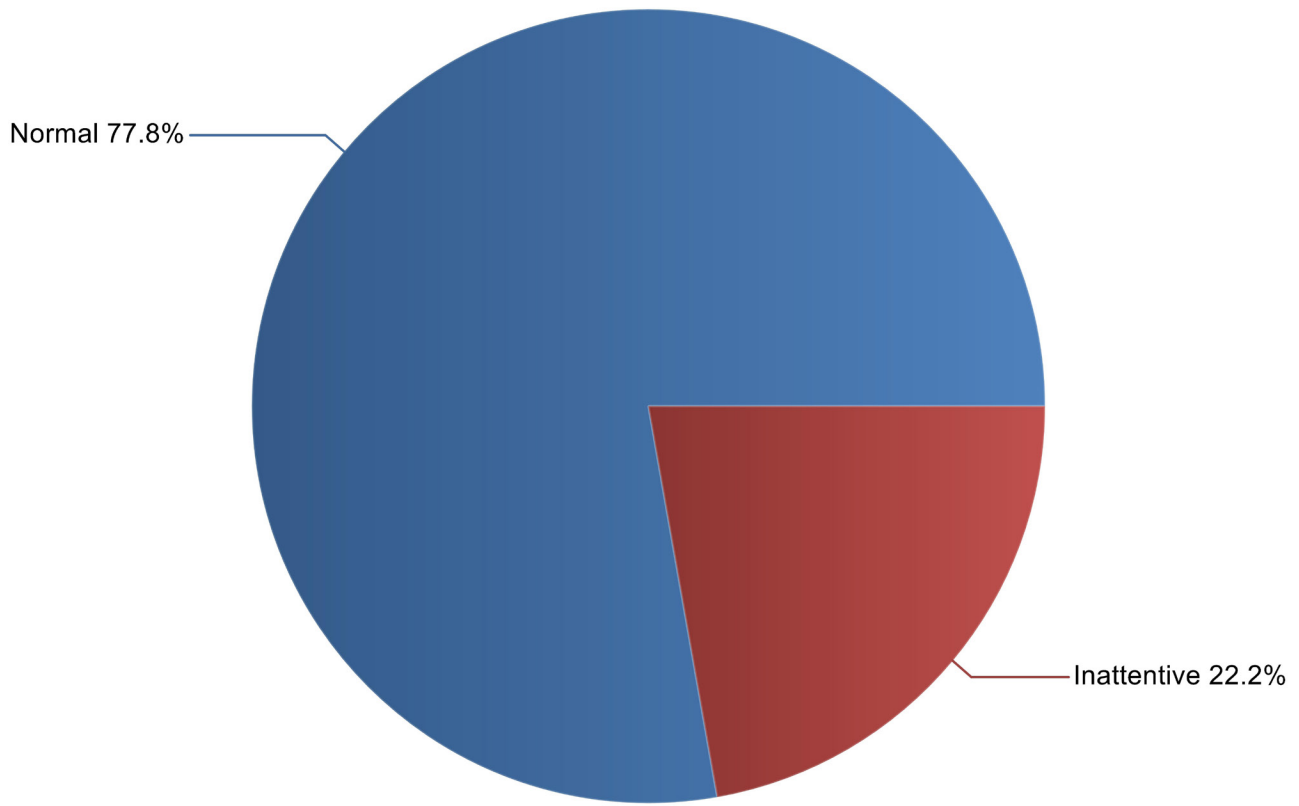
Drivers



Collisions by Vehicle Maneuver - LINC (2019)



Collisions by At-Fault Driver Condition - LINC (2019)



Fatal and Injury Collisions by At-Fault Driver Condition - LINC (2019)

