

Ottawa

FATAL COLLISION REVIEW COMMITTEE

2020 Annual Report

Regional Supervising Coroner's Office
Ottawa Police Services
City of Ottawa – Traffic Services
Ottawa Public Health



OTTAWA POLICE SERVICE
SERVICE DE POLICE D'OTTAWA
A Trusted Partner in Community Safety
Un partenaire fiable de la sécurité communautaire



MESSAGE FROM THE REGIONAL SUPERVISING CORONER

The coroner's motto is "We Speak for the Dead to Protect the Living". On behalf of Ottawa's Fatal Collision Review Committee, it is my hope this Report will help speak for those who have perished on Ottawa's roads from 2017 until 2020 and contribute to improved safety in our community.

The Fatal Collision Review Committee (FCRC) was established in 2017 and has representation from the Ottawa Police Service, the City of Ottawa Traffic Services, Ottawa Public Health, and the Regional Supervising Coroner's office. Their expertise is combined to quickly analyze each fatal collision in the city, and over time to collect and analyze data to recognize any important trends or issues.

The goal of the FCRC is not to determine findings of law or guilt. The FCRC's goal is to make recommendations to improve safety and prevent death on our municipal roads.

Reviews conducted by the FCRC include a comprehensive analysis of the collision itself, with consideration given to mechanical, environmental, structural, policy and human factors which can cause or contribute to preventable collisions. Since the inception of the FCRC, the committee has reviewed 84 collisions, involving 92 deaths and generated a number of recommendations.

This report with its findings and recommendations will be shared with stakeholders who hold an interest in Ottawa's road safety and is available upon request. Information sharing has as its goal the prevention of future deaths in similar circumstances.

I would like to take this opportunity to thank the current and past chairs of the FCRC during this time (Officers Francois D'Aoust, Peter Jupp, Cameron Graham), past members who have shared their expertise (Suzanne Woo, Isobel Granger, Marc Desjardins, Riley Carter, Rob Wilkinson), the current members of the FCRC (Philippe Landry, Krista Tanaka, Craig Roberts, Dr. Brent Moloughney, Officers Mike Herasimenko and Stephanie Andrascik, John Wambombo, Cathy Kourouma) and also Mr. Zac Brydges, Ms. Jessica Maxwell and Robyn Robertson (TIRF) who have contributed to the construction of this report.

DEFINITIONS

A variety of key terms common in road crash datasets are used to describe the crash data in this report. Definitions for each of the terms are provided below to aid with data interpretation.

Driver: A person who operates a vehicle that requires a certain class of licence to operate that vehicle such as cars, trucks, motorcycles, etc.

Fatal collision: A collision between a motor vehicle and another vehicle, or road user, in which at least one involved person sustained an injury that resulted in death within 30 days of the collision.

Fatality or death: Death of a person resulting from the injuries sustained within 30-days of the fatal collision. There can be more than one fatality in a fatal collision.

Major injury: An injury sustained by a person involved in a collision that resulted in the injured person being transported to and admitted to the hospital.

Reportable collision: A collision in which damage to the vehicles involved exceeded \$2,000 or one in which an injury occurred.

Rider: A person who operates a vehicle not requiring a licence to operate such as a bicycle or e-Bike.

Vulnerable road user: A person using one of several alternative modes of transport which lack the outer protective shell of a vehicle such as pedestrians, motorcyclists, cyclists, e-bike riders, and others.

EXECUTIVE SUMMARY

The Fatal Collision Review Committee (FCRC), established in 2017 in Ottawa, is a multi-agency initiative which operates under the mandate of the Coroner's Act and is comprised of members representing the Ottawa Police Service, the City of Ottawa Traffic Services, Ottawa Public Health, the Eastern Regional Supervising Coroner's Office, and others as required.

The data presented in this report are from 84 fatal collisions, resulting in 92 deaths, that occurred on City of Ottawa roadways and private property from 2017 to 2020. An overview of key findings by collisions, road user deaths and drivers involved in the collisions, were compared to various population data to help place findings from the analysis of fatal crashes in context.

Collisions

There were 84 fatal collisions reviewed by the FCRC between 2017 and 2020. More than half (52%) involved only motor vehicle occupants (i.e., drivers or passengers) whereas the remaining 48% involved vulnerable road users. In particular, approximately one-quarter (26%) involved pedestrians and 13% motorcyclists. Cyclists were involved in five percent of fatal collisions and four percent involved e-bike riders. A comparison of fatal collisions to reportable collisions revealed vulnerable road users were over-represented in fatal crashes. In other words, vulnerable road users are more likely to be killed in crashes. This is due to several factors including the lack of the protective exterior of a vehicle and the fact the human body is less likely to survive collisions involving higher speeds. The youngest and oldest road users are also more likely to be killed in these collisions.

When looking at where collisions are occurring geographically, the area inside the Greenbelt shows the percentage of fatal collisions being lower than expected based on the share of reportable collisions in those areas, while outside the Greenbelt, the percentage of fatal collisions is higher. The rural area has the highest percentage of fatal collisions, representing over one third (37%) of all fatal collisions and only nine percent of all reportable collisions.

Looking at the time of year fatal collisions occurred, the warmer months between April and

September saw an over-representation of fatal collisions when compared to reportable collisions, with the exception of August. There were also more than expected fatal collisions occurring on Friday, Sunday and Mondays and during the evening (19:00-22:59) and over-night (23:00 – 5:59) periods.

Road User Deaths

There were 92 road users killed in the 84 collisions reviewed by the FCRC. Persons aged 55 years and older were over-represented when compared to persons involved in reportable collisions as well as Ottawa population estimates. Similarly, older age vulnerable road users were also more likely to be killed. However, an examination of motor vehicle occupants killed in road crashes indicated younger persons aged 16-19 years represented a larger proportion of fatalities (10%) as compared to the Ottawa population (5%).

Males were over-represented as fatalities when compared to those involved in reportable collisions and the Ottawa population, and this finding is generally consistent with national data sources. Slightly more than two-thirds (68%) of the 92 road users killed in fatal crashes were male. In comparison, males accounted for 57% of those involved in reportable collisions and 49% of the Ottawa population.

Drivers in Fatal Collisions

A total of 128 drivers were involved in the 84 fatal collisions reviewed by the FCRC. Persons operating vehicles that did not require a licence to operate it (i.e., cyclists, e-bike riders, construction equipment operators) at the time of the collision were excluded from analysis.

Age. The age distribution of drivers showed drivers aged 25-34 and 45-54 were over-represented in fatal collisions as compared to licenced driver populations. This may be due to a combination of factors including greater risk-taking and higher levels of driver exposure. Comparing the age distribution of drivers involved in fatal collisions to reportable collisions revealed those aged 45 years and older were over-represented as well and this may again be due to higher levels of exposure and perhaps some over-confidence in driving ability.

Sex. Almost three-quarters (70%) of drivers involved in fatal collisions were male. The age groups with the largest percentage of male drivers involved in fatal collisions were those aged

16-34 (85% male) and 75 years and older (88% male). In addition, 91% of motorcyclists involved in fatal collisions were male. Males accounted for 89% of drivers with a motorcycle licence.

Driver Licence & Status. Comparing the licence type held by the drivers involved in fatal collisions, those holding higher class licences that allows the holders to drive larger vehicles were over-represented with 16% holding A, B, C, D, E and/or F licences vs. 4% of the licenced driver population in the province. Novice drivers (G1 and G2) were under-represented as drivers in fatal collisions when compared to the licenced driver population (9% vs. 14%).

Prior Convictions. The number of previous convictions for traffic related offences either under the Highway Traffic Act (e.g., speeding, red light running, etc.) or Criminal Code of Canada (e.g., drinking and driving, dangerous driving, fail to remain, etc.) for each driver was considered as part of the FCRC review of each collision. 19% of drivers had 10 or more previous convictions.

Speed. The speed travelled by 109 of the 128 drivers was determined for the collisions reviewed by the FCRC. Speeding is defined as a driver travelling over the speed limit of the roadway. Of the 109 drivers for whom speed information was available in the investigation, 45% were engaged in speeding. Of the 49 speeding drivers, 31 were travelling at 20 km/h or more over the speed limit and were deemed to be engaged in excessive speeding, with five of the drivers travelling at 80 km/h or more over the speed limit. The highest driver speed was 135 km/h over the speed limit of the roadway.

Alcohol and/or Drug Use. A third of the fatal collisions reviewed by the FCRC involved one or more road users with a drug or alcohol level in their system felt to be compatible with impairment.

Tetrahydrocannabinol (THC, cannabis) was considered a factor in 19% of fatal collisions, cocaine (and its breakdown products) was a factor in seventeen (17) or 20% of fatal collisions and ethanol (alcohol) was a factor in sixteen (16) or 19% collisions. Impaired road users often had more than one of these substances present at the time of collision.

Recommendations

The mandate of the FCRC is to promptly facilitate the sharing of information between the members following fatal collisions to better understand the contributing factors to those collisions and to determine if any recommendations for engineering modifications, enforcement campaigns or education initiatives can be made to prevent future deaths.

Between 2017 and 2020, the FCRC made 13 engineering recommendations and three education recommendations related to individual collisions. Enforcement was undertaken as needed to address contributing factors associated with the collisions. The 13 engineering recommendations were site specific and consisted of review and/or implementation of signage, signal timing, or temporary traffic calming measures as well as, in three cases, geometric modifications through the City's existing road safety programs. The education recommendations included one site specific outreach activity related to pedestrian safety as well as two broader initiatives for impaired driving and pedestrian safety.

Systemic recommendations, arising from an analysis of the data as a whole, are the following:

To the City of Ottawa:

- The City should develop a comprehensive strategy to reduce speeds on Ottawa roads.
- The City should conduct an in-depth review of collisions involving road users aged 55 years and older.

To the Ottawa Police Service:

- Ottawa Police Service should continue targeted enforcement for peak crash periods to help curb risk-taking associated with fatal collisions.

To the Ottawa Police Services and the City of Ottawa:

- Ottawa Police Service and Safer Roads Ottawa should work collaboratively to increase enforcement and education about the risks associated with alcohol and drug-impaired driving.

To the Ministry of Transportation Ontario (MTO):

- MTO should ensure enhanced data collection and analysis of e-bike fatalities and

collisions in Ottawa and Ontario to increase understanding of risks and identify appropriate preventive measures.

To the Fatal Collision Review Committee and the Ministry of Transportation Ontario:

- FCRC and MTO should work collaboratively to conduct further comparisons of the prevalence of drivers in fatal collisions with prior convictions and suspensions to drivers in the general population.

TABLE OF CONTENTS

Message From The Regional Supervising Coroner	i
Definitions	ii
Executive Summary	iii
Collisions	iii
Road User Deaths	iv
Drivers in Fatal Collisions	iv
Recommendations	vi
Introduction	1
Collisions.....	2
Total collisions	2
Road user types.....	3
Crash severity.....	4
Temporal factors in collisions.....	6
Road User Deaths	16
Age	17
Sex	23
Drivers In Fatal Collisions	24
Age	25
Sex	27
Licence Status & Class.....	28
Previous Convictions	30
Speeding	31
Drug or Alcohol Use.....	33
Recommendations	35
Individual recommendations	35
Recommendations based on cumulative data	36
Conclusion	39
References	40

INTRODUCTION

Fatal collisions have tremendous costs for victims, their families, employers and communities as a whole. In Ottawa, Ontario, more than 20 people are killed in preventable traffic collisions each year, making road safety an important priority for everyone.

In 2017, the Fatal Collision Review Committee (FCRC) was established to take a closer look at the circumstances involved in fatal collisions and identify key factors as well as trends. Data collection and analysis are essential to guide the development of solutions to mitigate and prevent these collisions.

The FCRC is a multi-agency initiative which was formed and operates under the authority of the Coroner's Act. The purpose of the FCRC is to facilitate the prompt sharing of information between its members following fatal collisions to improve understanding about contributing factors in those collisions. Their role also includes identifying recommendations, if any, for roadway, enforcement campaigns and public education initiatives to prevent future deaths.¹ The Committee was established in 2017 and includes members representing the Ottawa Police Service, the City of Ottawa, Ottawa Public Health, the Eastern Regional Supervising Coroner's Office, and others as required based on the nature of each collision.

This report is the first to be released by the FCRC. It contains information about fatal collisions occurring between 2017 and 2020 on City of Ottawa roadways and private property. It does not include collisions occurring on provincial or federal roadways (such as 400-series highways and National Capital Commission Roads) within the City. The report also references some general collision statistics obtained from the City's collision database which contains data captured by police agencies as part of Motor Vehicle Collision Reports (MVCRs) documenting reportable collisions in the province of Ontario.

This report analyses data about contributing factors identified during the review of fatal collisions. Definitions for key terms used to describe the data are located in the glossary in

¹ The complete Terms of Reference for the FCRC is available in Appendix A.



the front of this report. The data are meant for discussion purposes only and to supplement the collision data typically available to road safety practitioners in order to help guide decisions related to engineering, enforcement or education initiatives. The data in this report is shared in a manner that respects the confidential and private nature of individual collision circumstances discussed by the FCRC. Observations identified in the data summaries have not undergone statistical validation.

COLLISIONS

Collisions on the road involving passenger vehicles, light and heavy-duty transport vehicles, motorcycles and other active transportation modes (e.g., cycling, e-bikes and walking) negatively impact communities every day. While roads are designed to be forgiving of driver errors, the reality is that crashes still occur every day, ranging from the most serious incidents resulting in death, to major and minor injuries crashes, and those involving property damage only. Research has shown driver error or condition is an important factor in a large majority of these collisions, and these collisions have significant direct and social costs for families, for employers, and for communities (NHTSA, 2015).

The good news is that many of these collisions are also preventable. Examination and analysis of collisions and the factors contributing to them can help guide the development of education and mitigation measures to eliminate fatal and serious injury crashes. An overview of the magnitude and seriousness of collisions on Ottawa roads is provided below for this purpose.

Total collisions

There were 47,660 reportable collisions and 95 fatal collisions on City of Ottawa roadways between 2017 and 2020. Eleven of these fatal collisions were determined to involve mental health and medical conditions which cannot be addressed through typical road safety mitigation measures. As such, while they are deemed preventable tragedies, they are beyond the scope of this report and excluded from this analysis.



The majority (80) of 84 fatal collisions² involving actionable contributing factors included in the analysis for this report occurred on City of Ottawa roadways; four occurred on private property. A total of 92 persons were killed in these collisions.

On average, there were slightly more than 13,000 reportable collisions on City of Ottawa roadways with 22 resulting in fatal injury each year between 2017 and 2019. In 2020, the number of reportable collisions declined by approximately 34% and fatal collisions were down by approximately 23%.

To place these data in context, the City of Ottawa also monitored traffic volumes at several key intersections to gauge the impact of various COVID restrictions put in place since March 2020. These volumes were compared to traffic volumes from previous years to measure the impact of these restrictions on travel behaviour. The data revealed significant fluctuations in traffic volumes in accordance with provincial pandemic restrictions limiting trips outside the home. Between March and December 2020, traffic volumes were generally lower than the same period over previous years. This is consistent with declines reported across other North American jurisdictions and may have contributed to a reduction in collisions. In addition, a national poll of drivers in September 2020 by the Traffic Injury Research Foundation revealed a significant increase in respondents who reported walking (12%) and cycling (152%) (Vanlaar et al. 2020). As such, the analysis with respect to the 2020 data year should be interpreted with this fact in mind.

Road user types

Collisions can involve a number of different types of road users. For the purposes of this report, the collisions were classified by road user type based on the road user who suffered the fatal injury in the collision. In this dataset, there were no collisions in which more than one type of road user suffered a fatal injury.

More than half of these fatal collisions (44) involved only motor vehicle occupants (i.e., drivers or passengers) and approximately one-quarter (22) involved pedestrians. Motorcyclists,

² Fatal collisions on Ottawa roadways exclude fatalities occurring on the 400-series highways.



cyclists and e-bike riders accounted for smaller numbers of collisions at 11, four and three respectively. Fatal collisions involving different types of road users are presented in Table 1.

Table 1: Fatal Collisions by Road User Type, 2017 - 2020

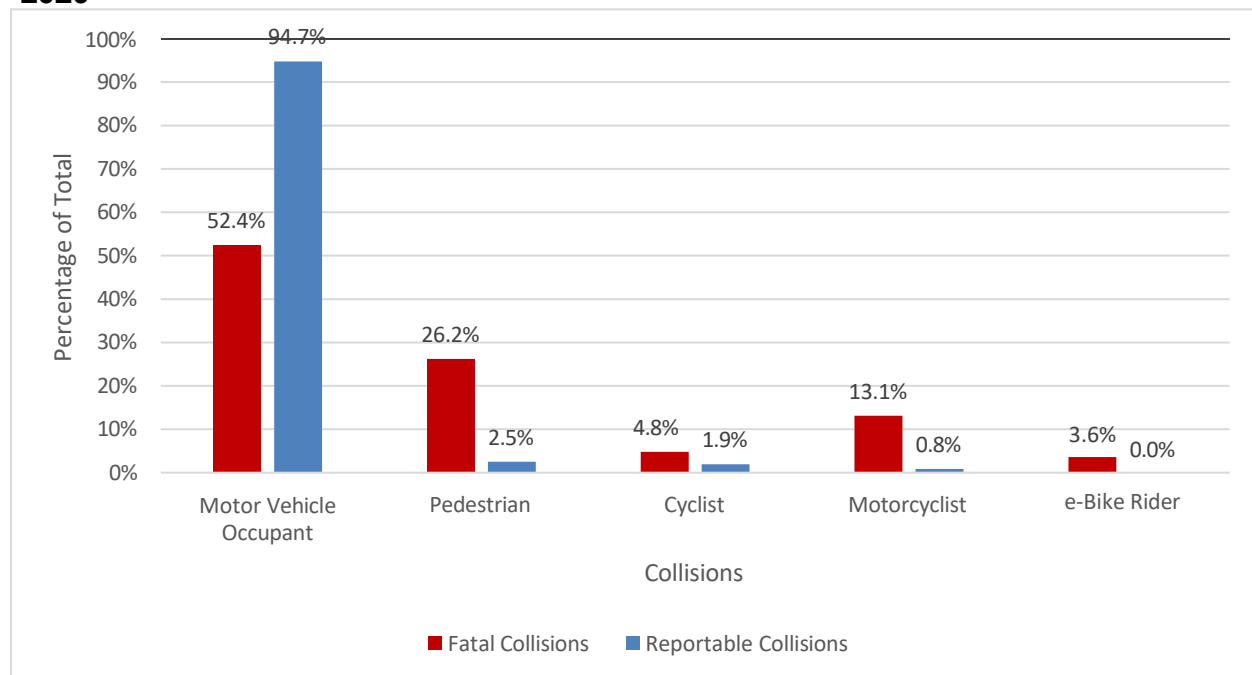
Road User Type	Number of Fatal Collisions				
	2017	2018	2019	2020	Total
Motor vehicle occupant collisions	17	13	5	9	44 (52%)
Pedestrian collisions	4	6	9	3	22 (26%)
Cyclist collisions	0	0	3	1	4 (5%)
Motorcyclist collisions	2	2	5	2	11 (13%)
e-bike rider collisions	0	0	1	2	3 (4%)
Total	23	21	23	17	84 (100%)

Crash severity

Fatal collisions involve the most severe injuries (i.e., death) and are generally much smaller in number compared to all reportable collisions. Of the total reportable collisions for all roadways within the City of Ottawa (including those under provincial and federal jurisdiction) between 2017 and 2020, on average 1% of collisions resulted in fatal and major injuries, while 99% resulted in minimal, minor and property damage only collisions.

For this reason, comparing the distribution of fatal collisions, classified by road users, to the distribution of reportable collisions, by road user, helps to put the severity of collisions for each type of road user in context. A larger percentage of fatal collisions than reportable collisions for each road user type means more severe outcomes are likely to occur in those collisions. Figure 1 summarizes fatal and reportable collisions occurring annually on City roadways by road user type from 2017 to 2020.



Figure 1: Distribution of Fatal and Reportable Collisions by Road User Type, 2017 - 2020

Annually, fatal collisions represented less than 1% (approximately 0.18%) of total reportable collisions between 2017 and 2020 on City roadways. An examination of the distribution of fatal collisions by road user type revealed motor vehicle occupants accounted for slightly more than half (52%) of fatal collisions as compared to 95% of reportable collisions. In other words, motor vehicle occupants are less likely to be killed in crashes and this is generally due to the fact vehicles provide the highest level of engineered protection.

Conversely, pedestrians and motorcyclist collisions accounted for a much larger percentage of fatal collisions than reportable collisions. For example, motorcycle collisions represented just 1% of all reportable collisions but 13% of all fatal collisions reviewed by the FCRC. The same is true for cyclists who are also over-represented in fatal collisions (4.8%) compared to all reportable collisions (1.9%), as well as e-bike riders who represented up to 4% of fatal collisions compared to 0.04% of reportable collisions. However, it is noted that the number of reportable collisions involving e-bike riders is likely under-reported because e-bikes are not identified as a specific vehicle class on the provincial Motor Vehicle Collision Report (MVCR),

and instead they are coded as bicycles. At this time, City of Ottawa can only identify e-bike collisions if it is noted in the comment section of the MVCr. However, due to growing concern with respect to the possible misuse of e-bikes and their collision involvement, the FCRC agreed it was important to begin tracking e-bike collisions separately as a result of observations from the FCRC review of road fatalities.

Temporal factors in collisions

Collision location, seasonal weather conditions, and other temporal factors such as day of week and time of day provide important insight into high-crash and high-risk conditions which are useful to inform the implementation of preventive measures. This section explores several of these factors which is useful to guide the selection and use of various crash reduction strategies.

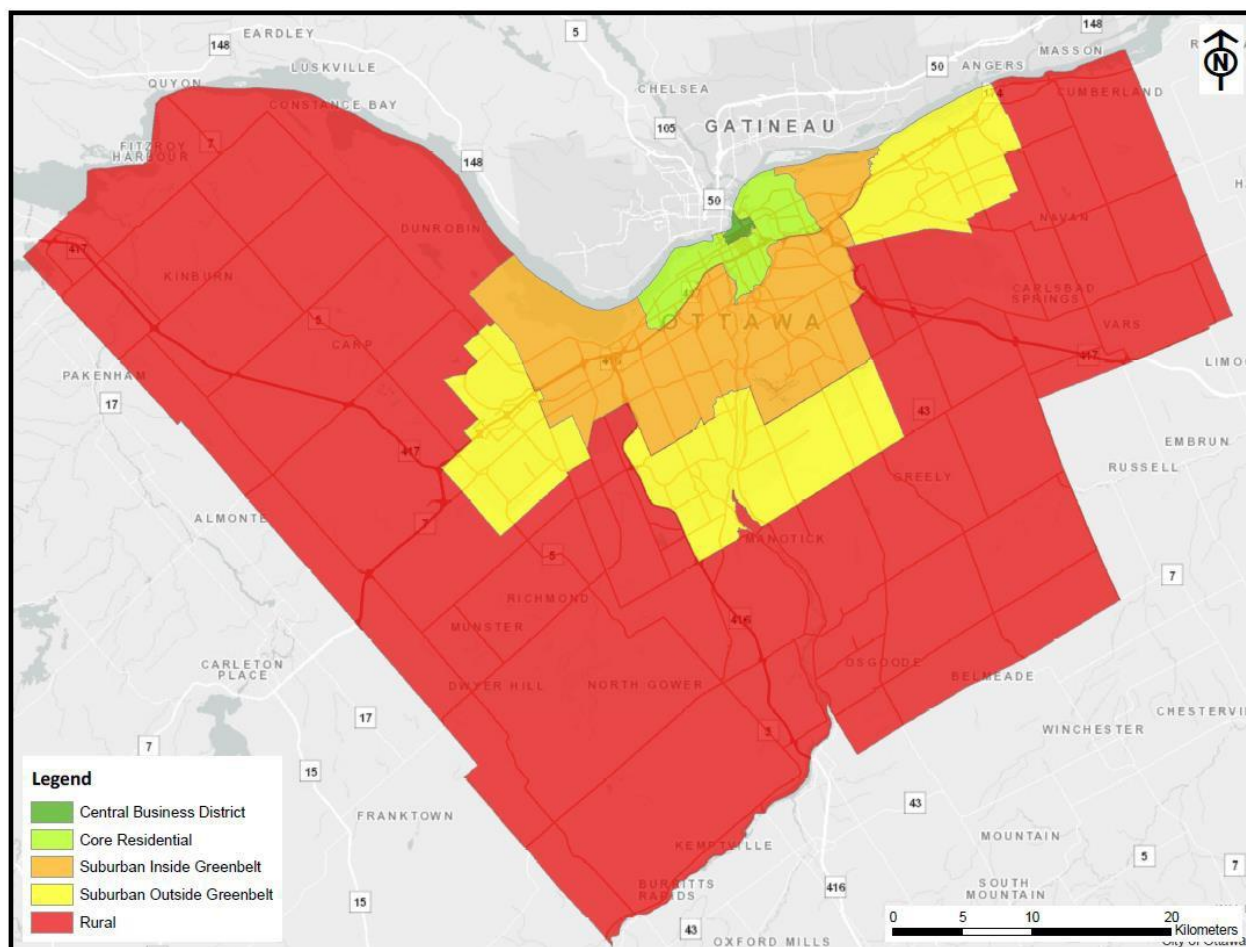
Geographic areas

Crashes recorded in the City of Ottawa are analyzed according to five geographic areas which have distinct land use and transportation characteristics. These areas are designated:

- Central business district
- Core residential
- Suburban inside the Greenbelt
- Suburban outside the Greenbelt
- Rural

The central business district represents the urban core and is characterized by high density commercial or residential land uses, high levels of multi-modal travel and lower speeds resulting from greater traffic congestion and more constrained conditions. Moving outward from the downtown core, other areas are increasingly represented by lower density land use with rural areas having the lowest density. In addition, areas become increasingly more car-centric with fewer alternative travel modes and greater travel speeds on roads. Figure 2 contains a map delineating the boundaries of each geographic area. Table 2 summarizes the number of fatal collisions occurring annually in each of them.



Figure 2: Geographic Areas within the City of Ottawa**Table 2: Fatal Collisions by Geographic Area, 2017 - 2020**

Geographic Area	Number of Fatal Collisions				
	2017	2018	2019	2020	Total
Central business district	1	0	1	0	2 (2%)
Core residential	1	2	3	2	8 (10%)
Suburban inside Greenbelt	7	5	7	4	23 (27%)
Suburban outside Greenbelt	3	5	9	3	20 (24%)
Rural	11	9	3	8	31 (37%)
Total	23	21	23	17	84 (100%)

Year-over-year, the number of fatal collisions occurring in each area is quite variable. Since

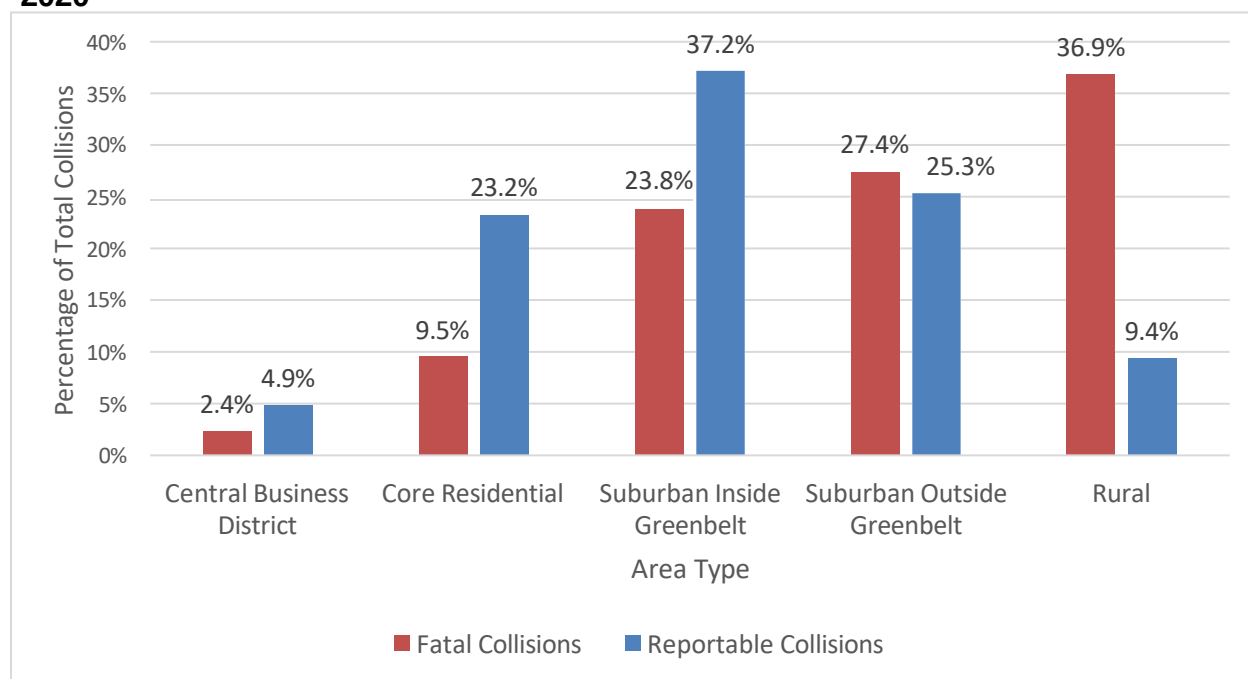
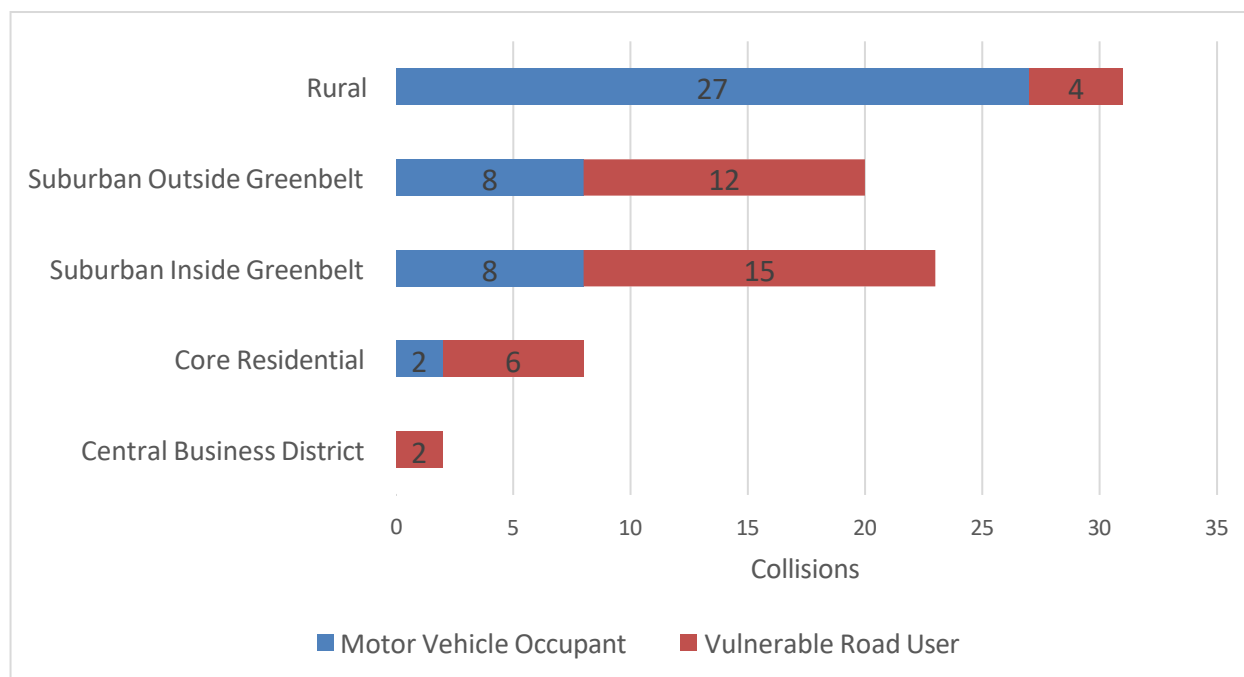
the number of fatal collisions is relatively small, it is important to consider these variations in terms of numbers instead of percentage changes to aid with the interpretation of these fluctuations.

A comparison of the distribution of fatal collisions to reportable collisions is useful to determine whether fatal crashes are equally distributed across all geographic areas based on the percentage of reportable collisions. While one might expect these proportions to be equal, in fact they are not. More than one-third (31) of fatal collisions occur in rural areas, followed by slightly more than one-quarter (27) in suburban areas inside the Greenbelt, whereas the largest proportion of reportable collisions occur in suburban areas inside the Greenbelt, followed closely by core residential areas and suburban areas outside of the Greenbelt. In other words, a larger percentage of fatal crashes occur in less dense geographic areas with higher travel speeds and fewer transportation options. Figure 3 presents a comparison of the percentage of total fatal collisions occurring within each area to the percentage of reportable collisions.

An examination of the collisions classified by road user type in each of these geographic areas is also useful to guide a discussion of prevention strategies and road improvements. In rural areas, a large majority (87%) of fatal collisions are classified as motor vehicle occupant collisions. Figure 4 shows a breakdown of collisions by road user.³ As geographic areas become increasingly dense and closer to the central business district, the percentage of fatalities involving vulnerable road users increases from 60% in the suburban outside Greenbelt area, to 65% in the suburban inside Greenbelt area, to 75% in the core residential to 100% in the central business district.

³ Vulnerable road user collisions were grouped together as numbers were small when spread across the area types.



Figure 3: Distribution of Fatal and Reportable Collisions by Geographic Area, 2017-2020**Figure 4: Fatal Collisions by Geographic Area and Road User, 2017 - 2020**

Notably, all the motorcycle collisions occurred in suburban and rural areas of the city with less congestion and higher travel speeds, while 91% of pedestrian collisions occurred in the core residential and suburban areas with higher levels of road congestion. A total of four cyclist collisions occurred in the following areas: one in the central business district, one in the core residential and two occurring in the suburban outside the Greenbelt. All the fatal e-bike rider collisions occurred in the suburban inside the Greenbelt area.

Seasonal distribution of collisions

The largest number of fatal collisions occurred in July and September, with larger numbers of fatal collisions reported in June, April, May and January. Conversely, the fewest number of fatal collisions were reported in the last quarter of each year from October to December. This distribution is very similar to national statistics with more fatal collisions occurring in Spring, Summer and early Fall and fewer collisions occurring in late Fall and winter months. It has been suggested that drivers are inclined to take more risks in good weather conditions with clear, dry roads whereas they drive more cautiously in poor weather and winter conditions when roads tend to be wet and/or slippery (Brown et al., 2021). The frequency of fatal collisions by the month of the year is shown in Table 3.

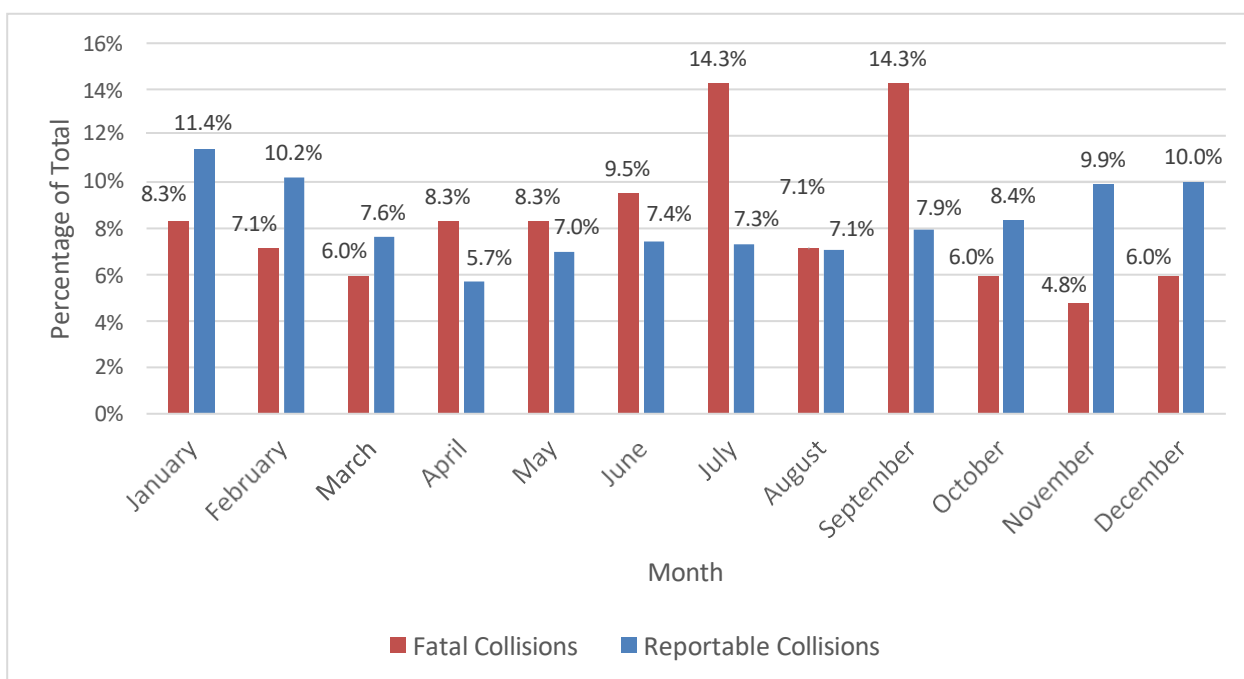
Table 3: Fatal Collisions by Month of Year, 2017 – 2020

Month of Year	Number of Fatal Collisions				
	2017	2018	2019	2020	Total
January	1	1	3	2	7 (8%)
February	1	4	1	0	6 (7%)
March	3	1	1	0	5 (6%)
April	3	3	1	0	7 (8%)
May	2	2	2	1	7 (8%)
June	2	1	1	4	8 (10%)
July	2	1	4	5	12 (14%)
August	0	1	4	1	6 (7%)
September	3	2	3	4	12 (14%)
October	1	3	1	0	5 (6%)
November	2	2	0	0	4 (5%)
December	3	0	2	0	5 (6%)
Total	23	21	23	17	84 (100%)



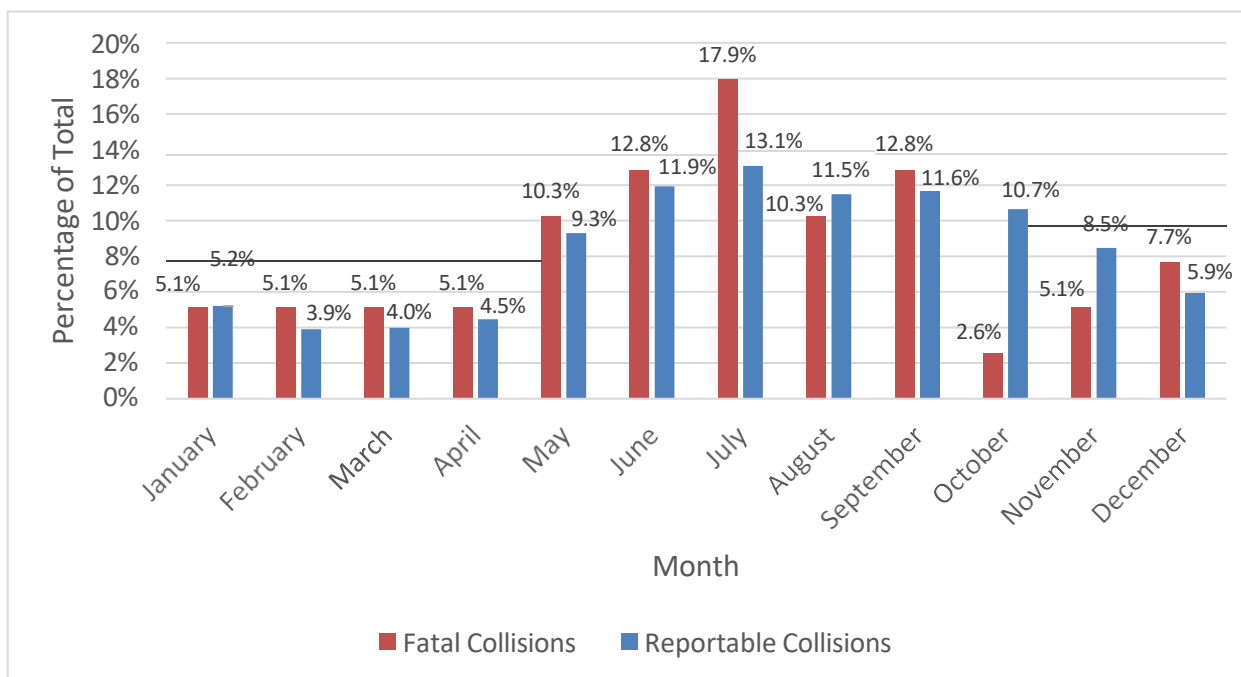
A comparison of the fatal to reportable collisions each month of the year revealed a larger share of fatal collisions (8% to 14%) reported each month from April through September compared to 6% to 8% of reportable collisions during the same months. However, the largest percentage of reportable collisions occurred during the colder months from November to February (10 to 11% monthly). This may be associated with poorer weather conditions and fewer daylight hours contributing to more minor collisions. Figure 5 presents the distribution of fatal and reportable collisions by month as a percentage of total collisions.

Figure 5: Distribution of Fatal and Reportable Collisions by Month, 2017 - 2020



Motor vehicle occupant collisions make up the majority of the reportable collisions and follow similar distributions. However, vulnerable road user collisions are distributed somewhat differently throughout the year due to the seasonal nature of some modes such as cycling and motorcycle riding. Figure 6 shows the distribution of fatal and reportable collisions involving vulnerable road users by month. An examination of vulnerable road user collisions reveals both fatal and reportable collisions involving these road users are higher in the May-October months than at other times during the year. This coincides with the warmer months when active transportation and motorcycle activity are highest.

Figure 6: Distribution of Vulnerable Road User Fatal and Reportable Collisions by Month, 2017 - 2020



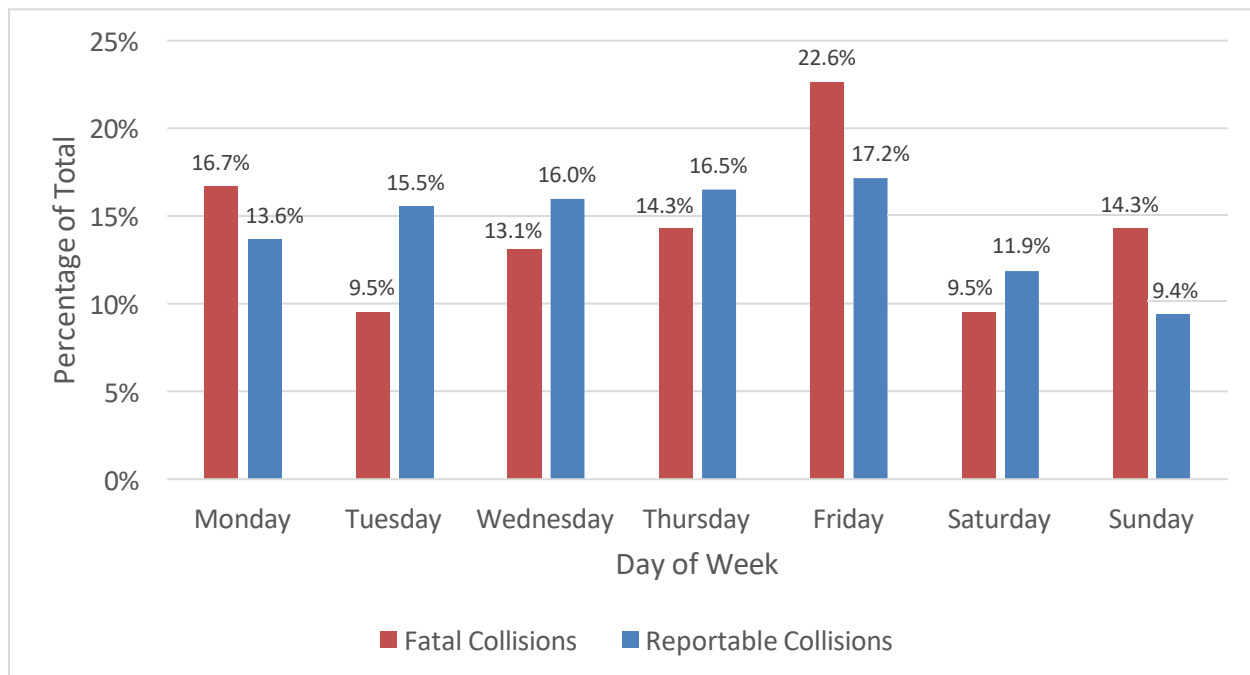
Day of week

Generally speaking, more fatal collisions occur on weekdays than weekends, however, the prevalence by day of week also varies depending on contributing factors. For example, distraction and speed-related fatal collisions more typically occur on weekdays whereas impaired driving fatal collisions are more prevalent on weekend nights and early morning hours (Brown et al., 2021; TIRF National Fatality Database 2022). The fatal collisions reviewed by FCRC are presented according to the day of week in Table 4.

An examination of the percentage of fatal collisions compared to reportable collisions by day of week showed the largest number of fatal collisions occurred on Friday and Monday. Conversely, the largest percentage of reportable collisions were reported on Wednesday, Thursday and Friday. The comparison of the distribution of fatal collisions versus the distribution of reportable collisions is shown in Figure 7.

Table 4: Fatal Collisions by Day of Week, 2017 - 2020

Day of Week	Number of Fatal Collisions				
	2017	2018	2019	2020	Total
Monday	2	4	5	3	14 (17%)
Tuesday	1	3	2	2	8 (10%)
Wednesday	4	1	2	4	11 (13%)
Thursday	5	2	5	0	12 (14%)
Friday	5	7	5	2	19 (23%)
Saturday	3	1	3	1	8 (10%)
Sunday	3	3	1	5	12 (14%)
Total	23	21	23	17	84 (100%)

Figure 7: Distribution of Fatal and Reportable Collisions by Day of Week, 2017 – 2020**Time of day**

The number of fatal collisions was too small to report individual hours, as such, hours were grouped into time periods representing peak morning, mid-day and afternoon timeframes as well as evening and overnight periods. The largest number of fatal collisions were recorded during the afternoon peak period which coincides with rush hour periods and higher traffic

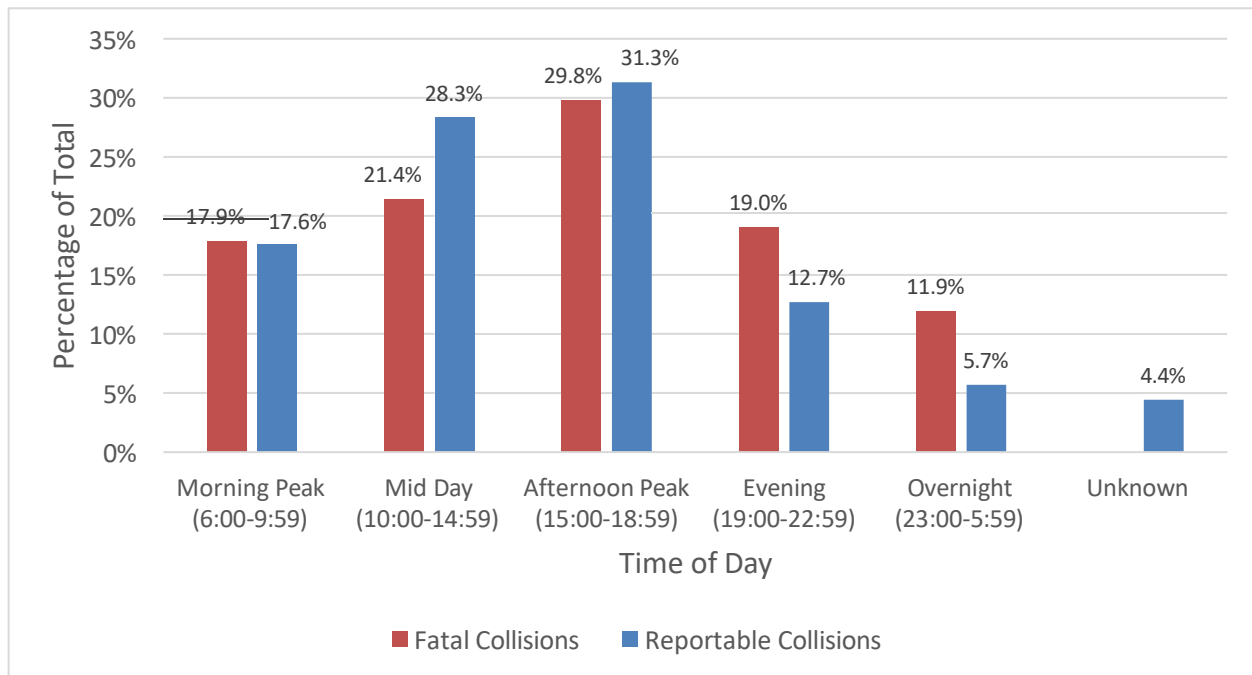
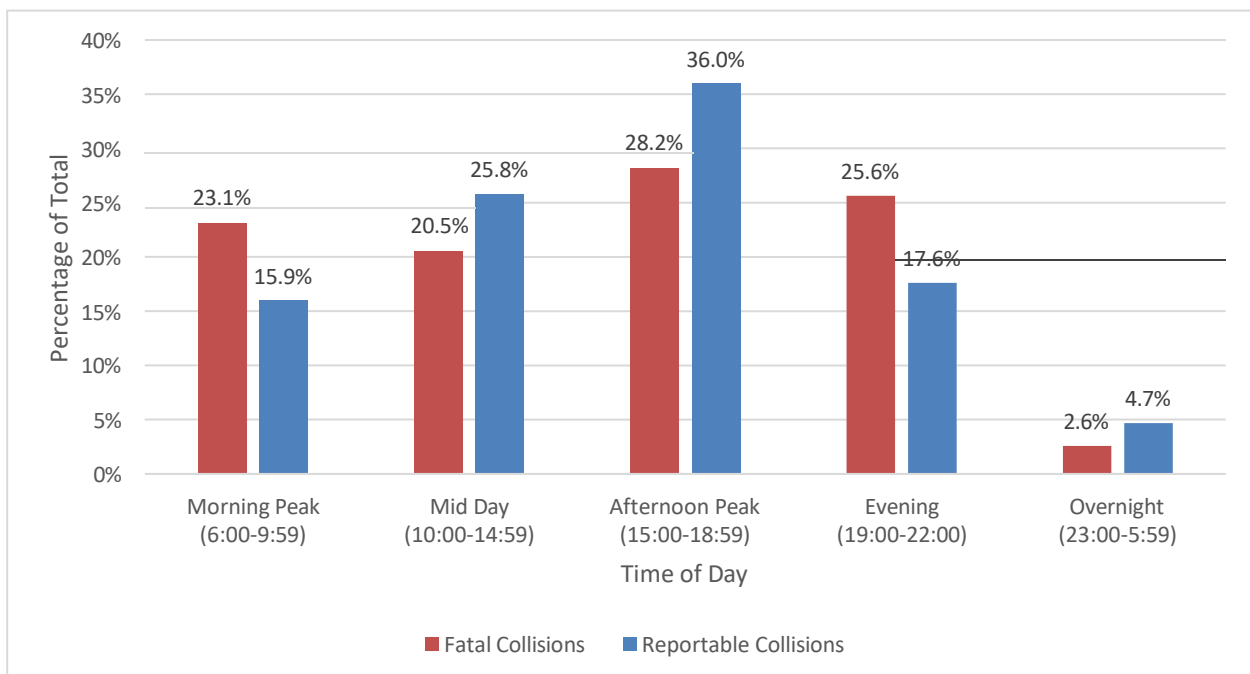
volumes. This is also the time of day when people are naturally fatigued based on the circadian rhythm of the human body. Table 5 shows the annual number of fatal collisions that occurred during each of these periods.

Table 5: Fatal Collisions by Time of Day, 2017 – 2020

Time of Day	Number of Fatal Collisions				
	2017	2018	2019	2020	Total
Morning peak (6:00-9:59)	3	4	6	2	15 (18%)
Midday (10:00-14:59)	6	5	2	5	18 (21%)
Afternoon peak (15:00-18:59)	3	7	11	4	25 (30%)
Evening (19:00-22:59)	8	2	3	3	16 (19%)
Overnight (23:00-5:59)	3	3	1	3	10 (12%)
Total	23	21	23	17	84 (100%)

Overall, the distribution of fatal collisions is similar the distribution of reportable collisions. The only exceptions were more reportable collisions occurring during the midday peak and more fatal collisions occurring in evening and overnight periods. The distributions are compared in Figure 8.

An examination of the distribution of fatal and reportable collisions involving vulnerable road users by time of day presented a somewhat different result. In particular, although a larger percentage of fatal collisions occurred in the evening period, the second largest percentage coincided with the morning peak. Fifteen percent of reportable pedestrian collisions and 27% of the 22 fatal pedestrian collisions occurred during this timeframe. This may be due to a larger number of active transportation users on the road to commute or to avoid daytime heat, and at times the lighting conditions may also be poorer, notably in early Spring and late Fall seasons. Figure 9 shows the distribution of fatal and reportable collisions involving vulnerable road users by time of day.

Figure 8: Distribution of Fatal and Reportable Collisions by Time of Day, 2017 – 2020**Figure 9: Distribution of Vulnerable Road Users in Fatal and Reportable Collisions by Time of Day, 2017 - 2020**

In addition, although vulnerable road user collisions are higher than expected during the evening period, fatal pedestrian collisions are under-represented with 9% compared to 19% of reportable pedestrian collisions during that time period. Fatal pedestrian collisions are over-represented during the overnight period, and national data suggest pedestrians in fatal collisions are often less visible with darker clothing, and impairment by alcohol or drugs is more often a factor (Vanlaar et al., 2016; CCMTA, 2013).

The small numbers of motorcyclist, cyclist and e-bike rider collisions are difficult to distribute across the five time periods and draw meaningful observations. However, it is noted that 43% of the seven fatal collisions involving cyclists and e-bike riders occurred during the afternoon peak with none occurring during the overnight period. Among the 11 fatal motorcyclist collisions, one or two occurred during each of the time periods with the exception of the evening period in which almost half (45%) of the collisions occurred.

ROAD USER DEATHS

All types of road users can be killed or injured in motor vehicle collisions, including motor vehicle occupants (drivers and passengers); motorcyclists, motorcycle passengers, cyclists, e-bike riders, as well as pedestrians. Those involved can suffer varying degrees of injury ranging from a fatality to a minor injury or no injury. Among the 84 fatal collisions reviewed by the FCRC, a total of 92 road users were killed between 2017 and 2020. Table 6 summarizes the number of deaths annually according to road user types.

Table 6: Number of Deaths by Road User Type and Year, 2017-2020

Road User Type	Number of Road Users Killed				
	2017	2018	2019	2020	Total
Motor vehicle driver	17	9	3	9	38 (41%)
Motor vehicle passenger	4	5	4	1	14 (15%)
Pedestrian	4	6	9	3	22 (24%)
Motorcyclist	2	2	5	2	11 (12%)
Cyclist	0	0	3	1	4 (5%)
E-bike rider	0	0	1	2	3 (3%)
Total	27	22	25	18	92 (100%)



More than half of the road users killed were motor vehicle occupants (i.e., drivers or passengers of motor vehicles including cars, buses and trucks). The second largest number of road deaths involved pedestrians, with motorcyclists, cyclists and e-bike riders accounting for fewer fatalities. No motorcycle passengers were killed in collisions reviewed by the FCRC during this timeframe.

A comparison of fatality data to population data provides useful context to determine if certain types of road users or road users with certain characteristics (e.g., age and sex) are over-represented in fatalities. Average population estimates for Ottawa from 2017-2020 were obtained from the Ontario Ministry of Health and Long-Term Care IntelliHEALTH system for comparison purposes. In addition, the age and sex of road users involved in reportable collisions on City roadways between 2017 and 2020 was used to make comparisons. Comparisons are only made with respect to the types of road users involved in fatal collisions. As such, information about motorcyclist passengers was excluded.

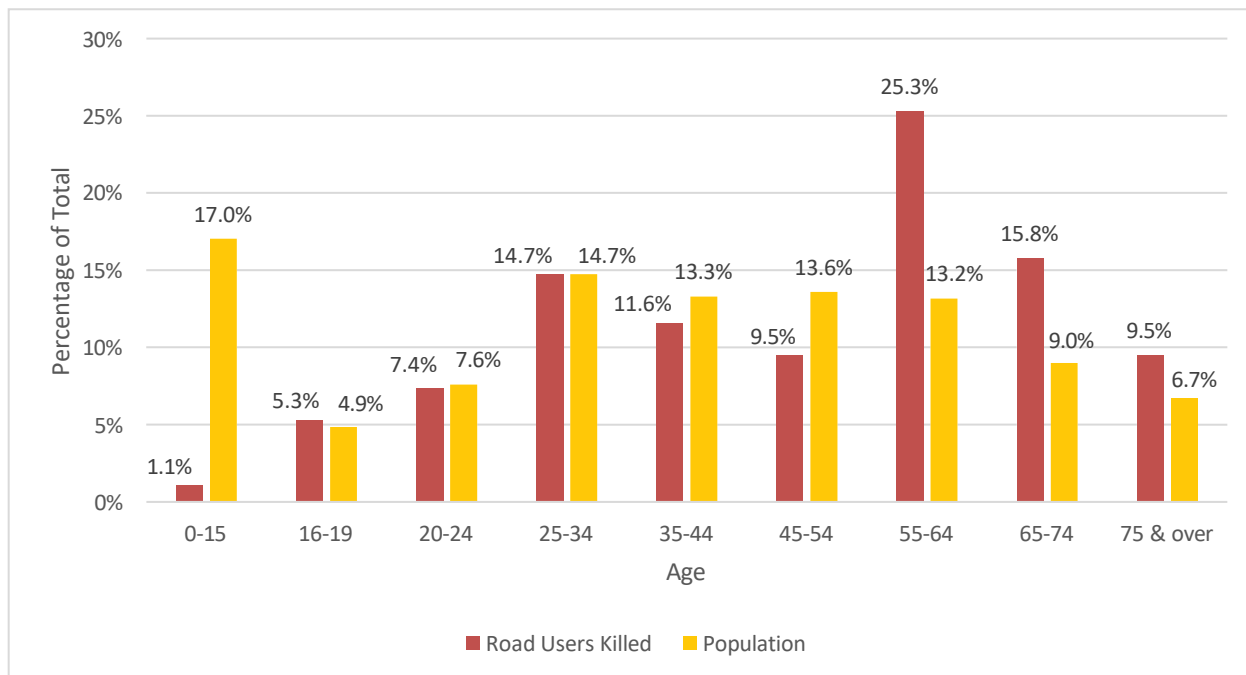
Age

Persons killed in road crashes ranged considerably in age. Due to small numbers, age groups were created for ease of analysis and interpretation of the data. As such, the 92 persons killed in 84 collisions are reported according to age categories and compared to the age distribution of Ottawa's population in Figure 10.

In several age categories, the percentage of road users killed was comparable to, or lower than, the general population. However, in all groups aged 55 years and older, the percentage of road users killed was higher as compared to the general population. The 55-64 age group represented 25% of road users killed which is almost twice as high as the percentage of the population represented by that age group. This may be due, in part, to the fact older road users are more fragile and may have medical conditions that are complicated by injuries when crash-involved. In addition, drivers over the age of 80 are also more prone to driver errors which contribute to crash-involvement (Mayhew et al., 2015; Li et al., 2003; Vanlaar et al., 2008; TIRF, 2016).



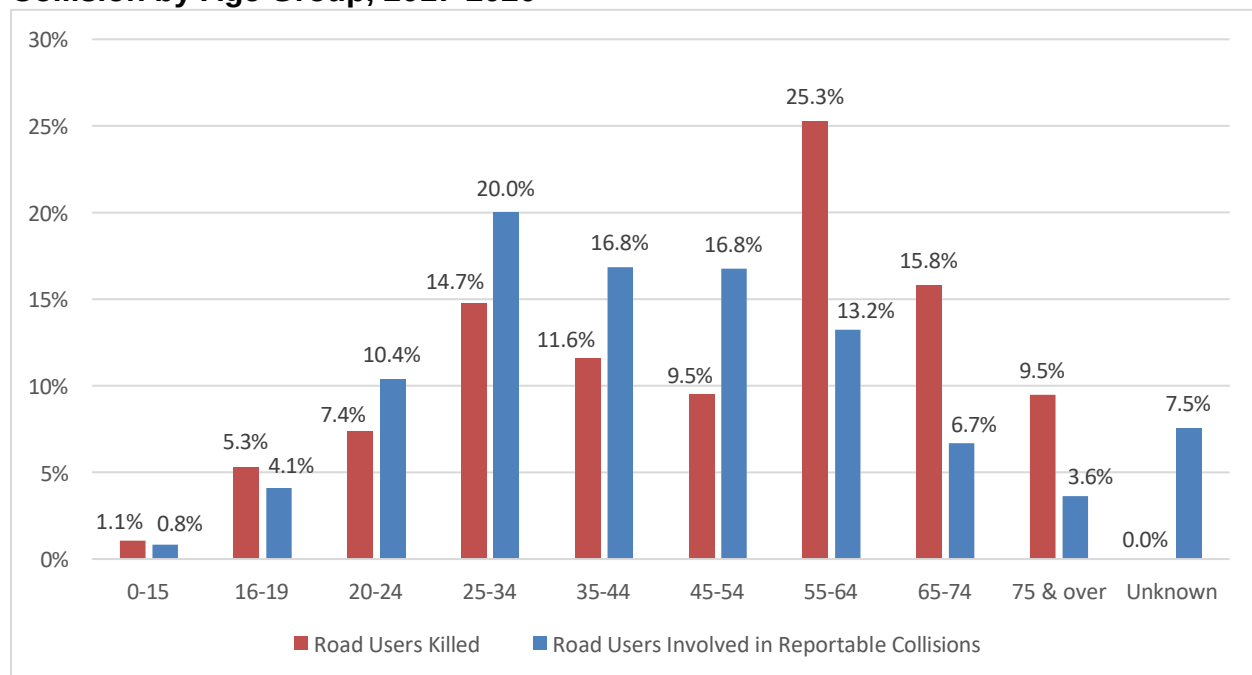
Figure 10: Distribution of Road Users Killed and Average Ottawa Population¹ by Age Group, 2017-2020



¹ Ottawa Population Estimates, 2017-2020. Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Extracted May 27, 2022

However, road users in the 20-54 age categories were over-represented in reportable collisions compared to fatalities, while those aged 55-64 were in a slightly smaller percentage of reportable collisions than other age cohorts. A smaller percentage of road users aged 65 and older were involved in reportable collisions but represented much larger percentages of fatalities. Young road users aged 16-19 years represented slightly more fatalities than those involved in reportable collisions, and this may be associated with their greater propensity for risk-taking and inexperienced driving (GDL Safety Center, 2022). Figure 11 compares the road users killed and the road users involved in reportable collisions.

Figure 11: Distribution of Road Users Killed and Road Users Involved in Reportable Collision by Age Group, 2017-2020

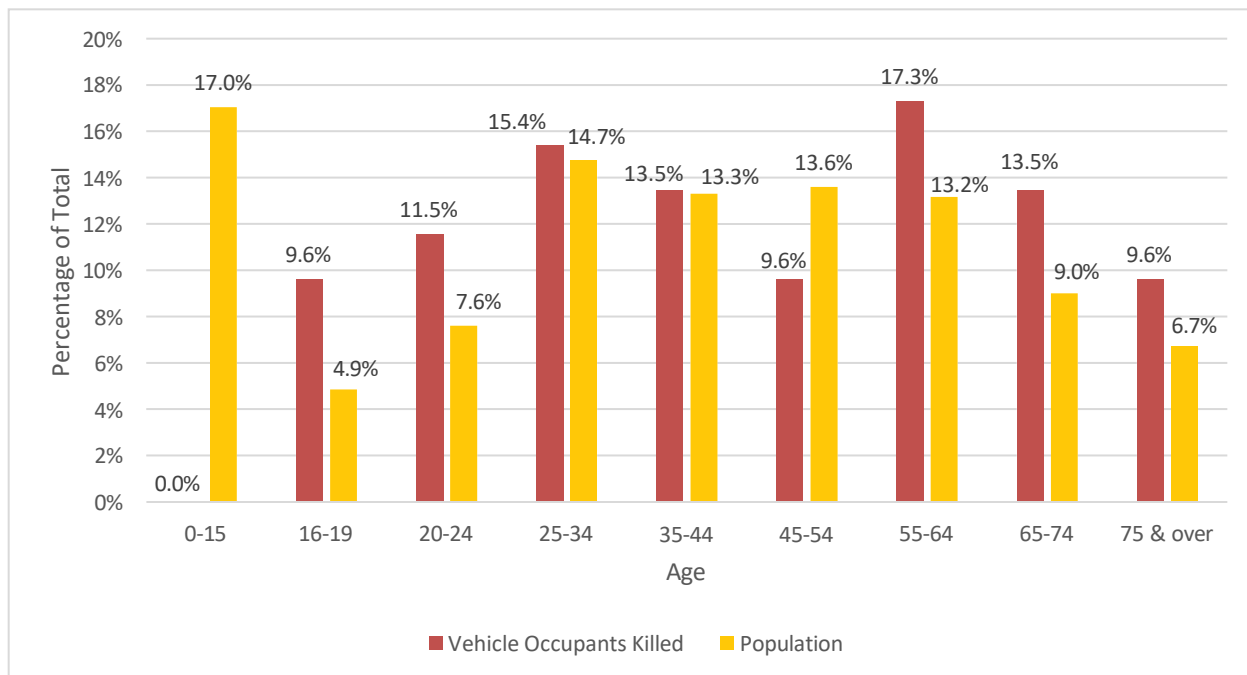


Motor vehicle occupants

Motor vehicle occupants (i.e., drivers or passengers) accounted for more than half (52) of the 92 road users killed in the 84 collisions reviewed by the FCRC. The largest age cohorts represented in fatalities included persons aged 55-64 years (17%) followed by those aged 25-34 years (15%). Figure 12 presents the age distribution of the motor vehicle occupant fatalities and average Ottawa population.

Vehicle occupants aged 16-24 years killed in collisions were over-represented compared to the Ottawa population. Similarly, older age groups (55+ years) were also still over-represented, but to a lesser extent whereas middle-aged adults (45-54) were under-represented. These findings reflect that teens and young adults as well as aging drivers/occupants are more at risk for collision involvement, albeit for different reasons, and this is consistent with national data (TIRF, 2016).

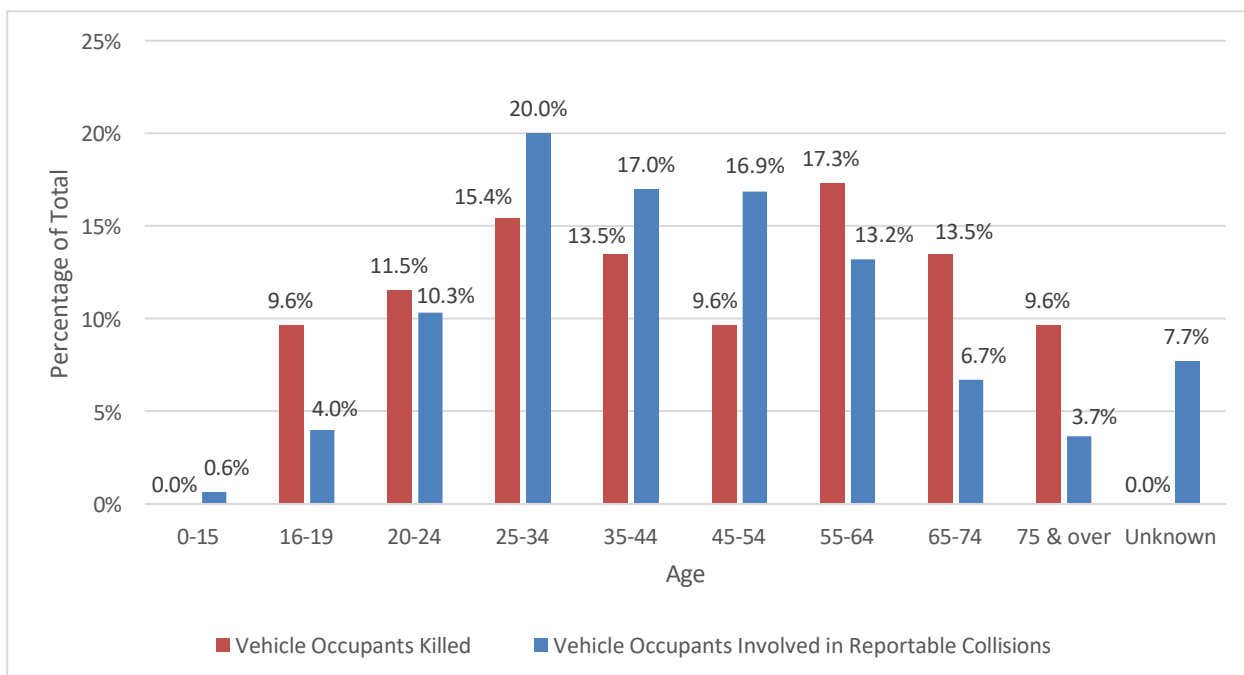
Figure 12: Age Distribution of Motor Vehicle Occupants Killed and Ottawa Population¹, 2017-2020



¹ Ottawa Population Estimates, 2017-2020. Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Extracted May 27, 2022

As shown in Figure 13 comparing the distributions of vehicle occupants killed to that of vehicle occupants involved in reportable collisions revealed an over-representation in the 16-24 year age range and the 55+ year age. This is similar with respect to the older age category to the findings when comparing motor vehicle occupants killed to the City of Ottawa population age group.

Figure 13: Age Distribution of Motor Vehicle Occupants Killed and Motor Vehicle Occupants Involved in Reportable Collisions, 2017-2020

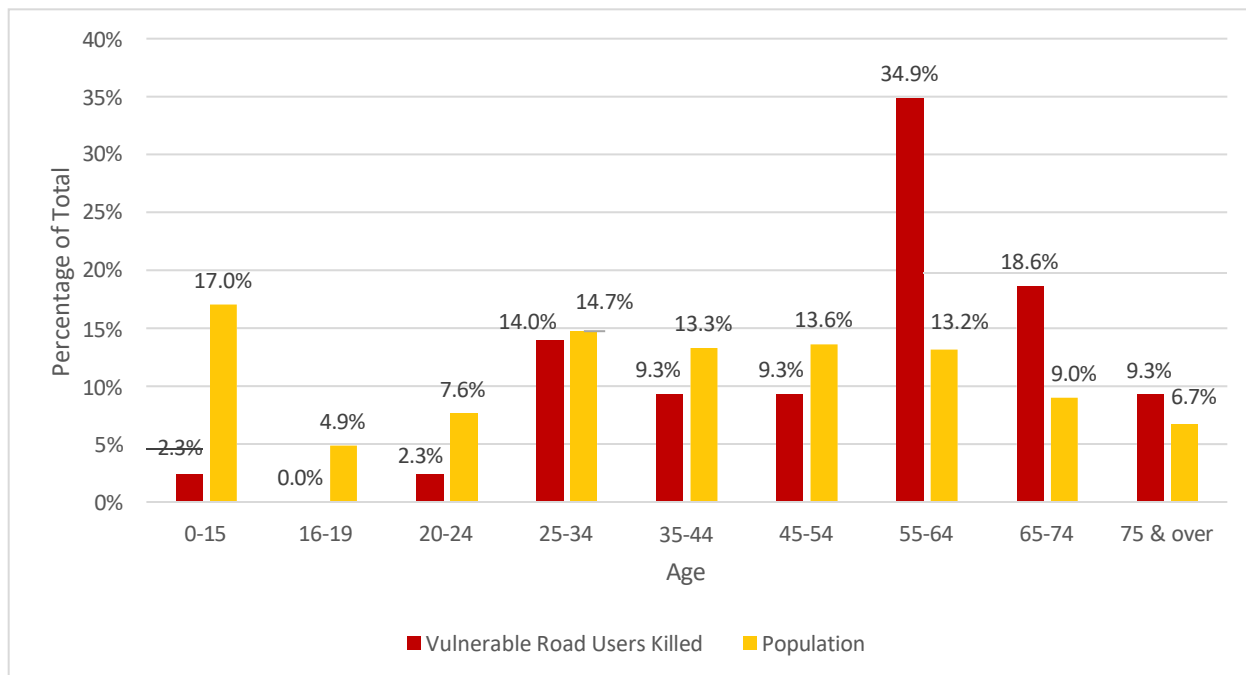


Vulnerable road users

Motorcycle riders and persons using active transportation modes such as walking, cycling, or riding an e-bike are more vulnerable than other road users because they lack the protective exterior of a vehicle and important in-vehicle safety features to mitigate injuries. Among the 92 road users killed, 40 were considered vulnerable road users. There were insufficient data points to assess each of these road user types separately due to small numbers; however, Figure 14 shows the distribution of vulnerable road users killed compared to the average Ottawa population by age group.

For every age group under 55, the percentage of vulnerable road users killed is lower than the corresponding percentage of population in each of the age groups. Like the data for all road users killed, more than expected vulnerable road users were killed in the age groups over 55. The 55-64 age group represents 35% of the vulnerable road users killed, which is almost three times as high as the percentage of the population in that age group.

Figure 14: Distribution of Vulnerable Road Users Killed and Average Ottawa Population¹ by Age Group, 2017-2020

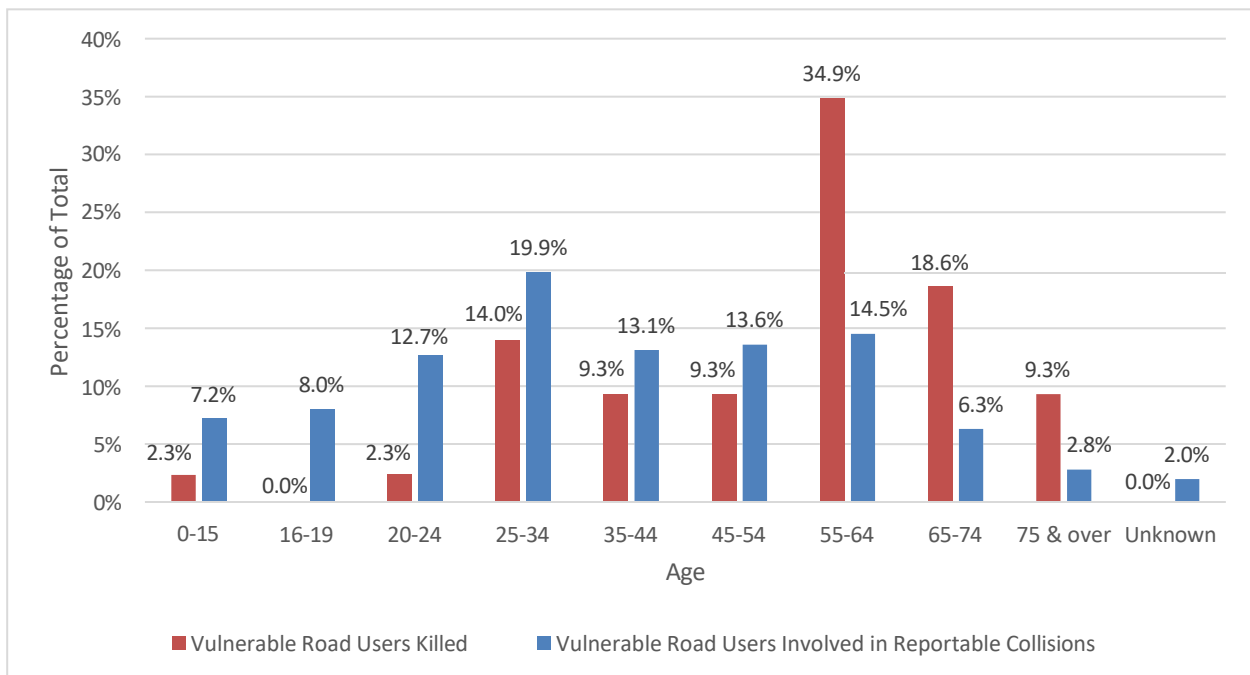


¹ Ottawa Population Estimates, 2017-2020. Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Extracted May 27, 2022

Younger age vulnerable road users were less likely to be killed in road crashes compared to the general population whereas the opposite was true for older age road users. Of the 22 pedestrians killed, 82% were aged 55 and older, which far exceeds the 29% of the population of the same age. Half of the 55 and older pedestrians killed fell within the 55-64 age range. Though numbers are lower for cyclists and e-bike riders, 43% of the seven killed, fell within the 55-64 age group. The 11 motorcyclists were more evenly distributed between the 25-64 age ranges.

Comparing the distributions of vulnerable road users killed and those involved in reportable collisions showed an over-representation of 55 years and older involved in fatal collisions as shown in Figure 15. This is similar to the findings when comparing vulnerable road users killed to the City of Ottawa population age group.

Figure 15: Distribution of Vulnerable Road Users Killed and Involved in Reportable Collisions by Age Group, 2017-2020



Sex

According to City of Ottawa statistics, males represented 49% of the Ottawa population and accounted for 57% of those involved in reportable collisions. Males are typically more often involved in collisions than their female counterparts, but this gap has been slowly closing in the past decade, particularly in relation to young drivers, and with respect to distracted driving and impaired driving (Robertson et al., 2014; Robertson et al., 2011; Schwartz & Rookey, 2008; Lyon et al., 2020).

In terms of road users killed in fatal collisions reviewed by the FCRC, males are also over-represented compared to the Ottawa population, most notably among drivers, cyclists and motorcyclists, as summarized in Table 7.

Table 7: Road User Killed by Type and Sex, 2017-2020

Road User Type	Number of Road Users Killed			
	Female	Male	Total	% Male
Motor vehicle driver	13	25	38	66%
Motor vehicle passenger	7	7	14	50%
Pedestrian	8	14	22	64%
Motorcyclist	1	10	11	91%
Cyclist	1	3	4	75%
E-bike rider	0	3	3	100%
Total	30	62	92	68%

More than two-thirds (68%) of the 92 road users killed in fatal crashes were male which is larger in comparison to the Ottawa population and persons involved in reportable collisions. Although there were fewer passengers who were killed in crashes than drivers, it is interesting to note that this passenger category was the only one to match the percentage of males in the population.

DRIVERS IN FATAL COLLISIONS

This section summarizes findings related to vehicle drivers involved in fatal collisions. Drivers of vehicles not requiring a licence to operate it (i.e., bicycles, e-bikes, construction equipment) who were involved in collisions are excluded from this analysis. Many collisions involve more than one motor vehicle and therefore more than one driver.

Comparisons of drivers involved in fatal collisions to the licensed driver population (an estimated 650,000 in Ottawa) can reveal whether the number of drivers involved in the fatal collisions varies from the population based on several characteristics such as age, sex or type of licence held. The information about licenced drivers contained in this report was obtained from the [Ontario Road Safety Annual Report 2018](#) and was the most recent data available at the time this report was drafted.

Between 2017 and 2020, a total of 128 drivers were involved in the 84 fatal collisions reviewed by the FCRC. More than one-third (38%) of the 128 drivers involved in these collisions, or 49,



were killed as a result of the collision.

Age

Table 8 summarizes drivers involved in fatal collision by age group and year. Drivers aged 25-34 years represented the largest segment of those involved in fatal collisions, followed closely by those aged 35-64. To this end, younger and older age groups of drivers are estimated to have lower exposure on the road (i.e., they are estimated to drive fewer kilometres annually) which may be a factor in fewer fatalities in these cohorts.

Table 8: Drivers Involved in Fatal Collisions by Age Group and Year (2017-2020)

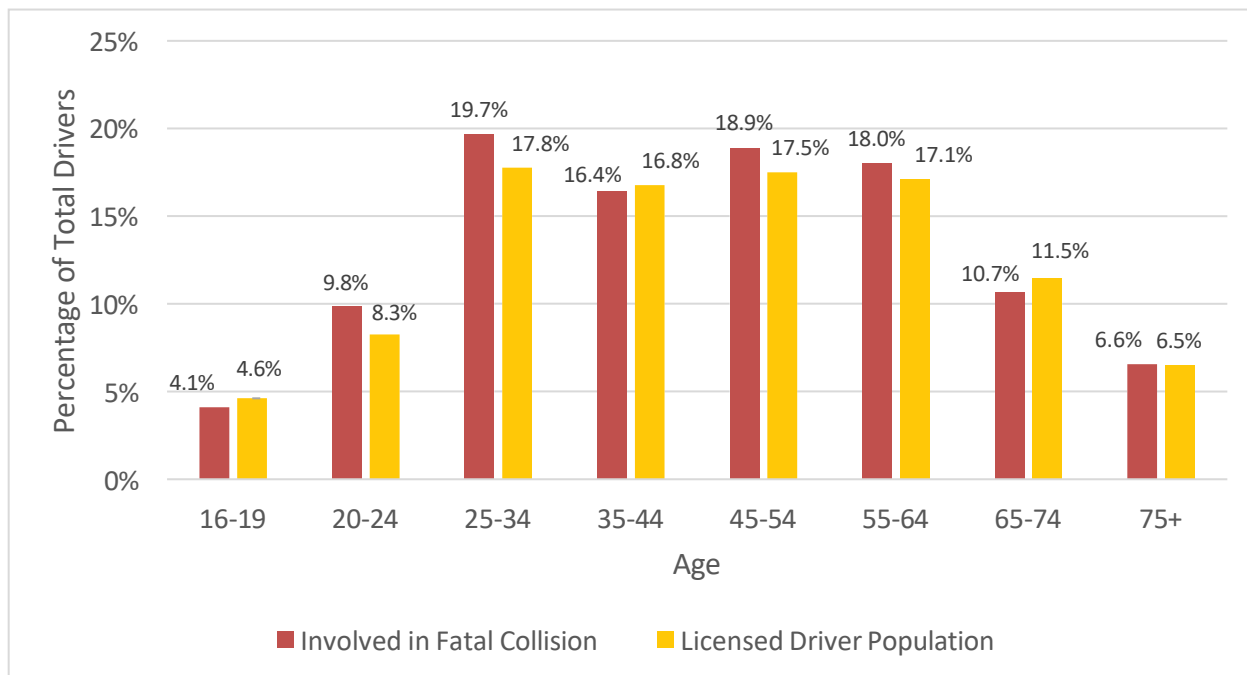
Age Group	Number of Drivers				
	2017	2018	2019	2020	Total
16-19	4	1	0	0	5 (4%)
20-24	3	5	2	2	12 (9%)
25-34	12	5	5	2	24 (19%)
35-44	3	4	5	8	20 (16%)
45-54	6	5	6	6	23 (18%)
55-64	5	6	8	3	22 (17%)
65-74	4	4	2	3	13 (10%)
75+	2	3	2	1	8 (6%)
Unknown	0	0	1	0	1 (1%)
Total	39	33	31	25	128 (100%)

The age cohort with the lowest number of drivers involved in fatal collisions is 65-74 years of age. Often older age drivers tend to drive fewer kilometres or in lower risk conditions because they recognize some natural aging processes can negatively impact motor coordination or hazard detection or eyesight (Feng et al., 2020).

Figure 16 compares the percentage of the 128 drivers involved in fatal collisions by age group to licenced drivers in each age group. In general, the distribution of all drivers involved in the fatal collisions is comparable with the distribution of licenced drivers in terms of age. However, the percentage of drivers involved in fatal collisions aged 20-34 years and 45-64 years is larger when compared to licenced driver populations in these age groups. Motorcyclists

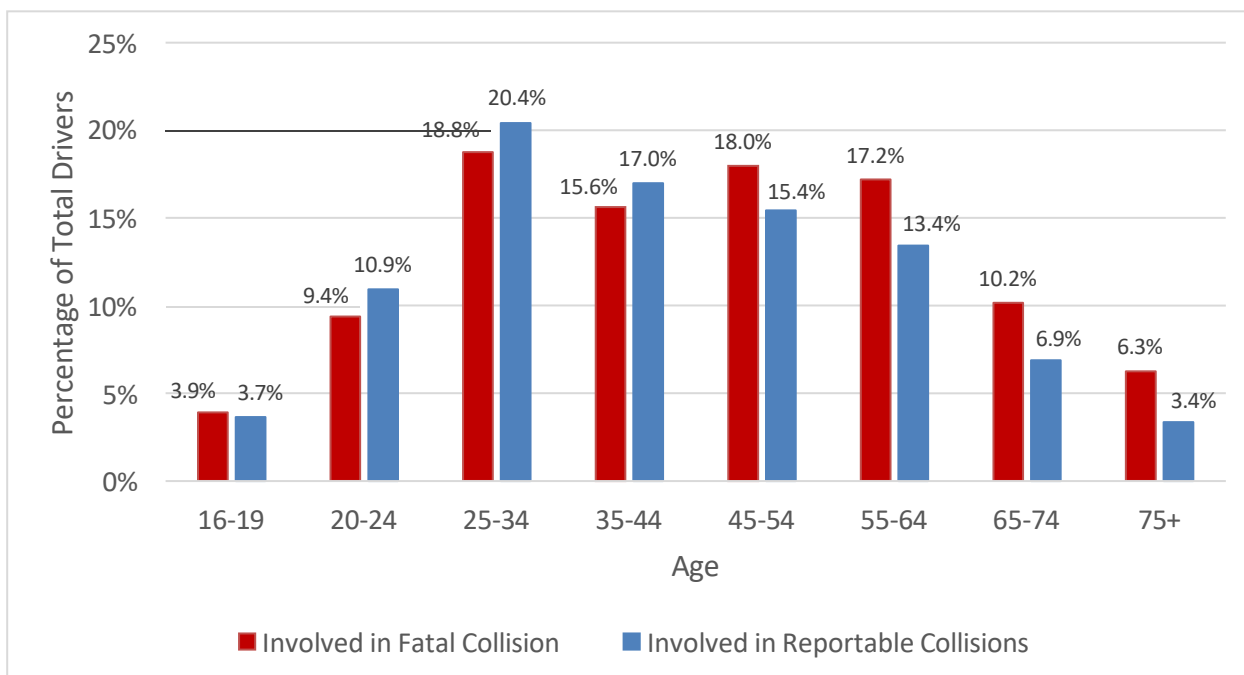
involved in fatal collisions were also equally distributed across the 25-64 age categories.

Figure 16: Distribution of Drivers Involved in Fatal Collisions and Licenced Driver Population¹ by Age Group



A comparison of the age of drivers involved in fatal collisions with those involved in reportable collisions is presented in Figure 17. It revealed that somewhat fewer younger aged drivers were involved in fatal as compared to reportable collisions. Conversely, older age cohorts were slightly over-represented in fatal collisions.

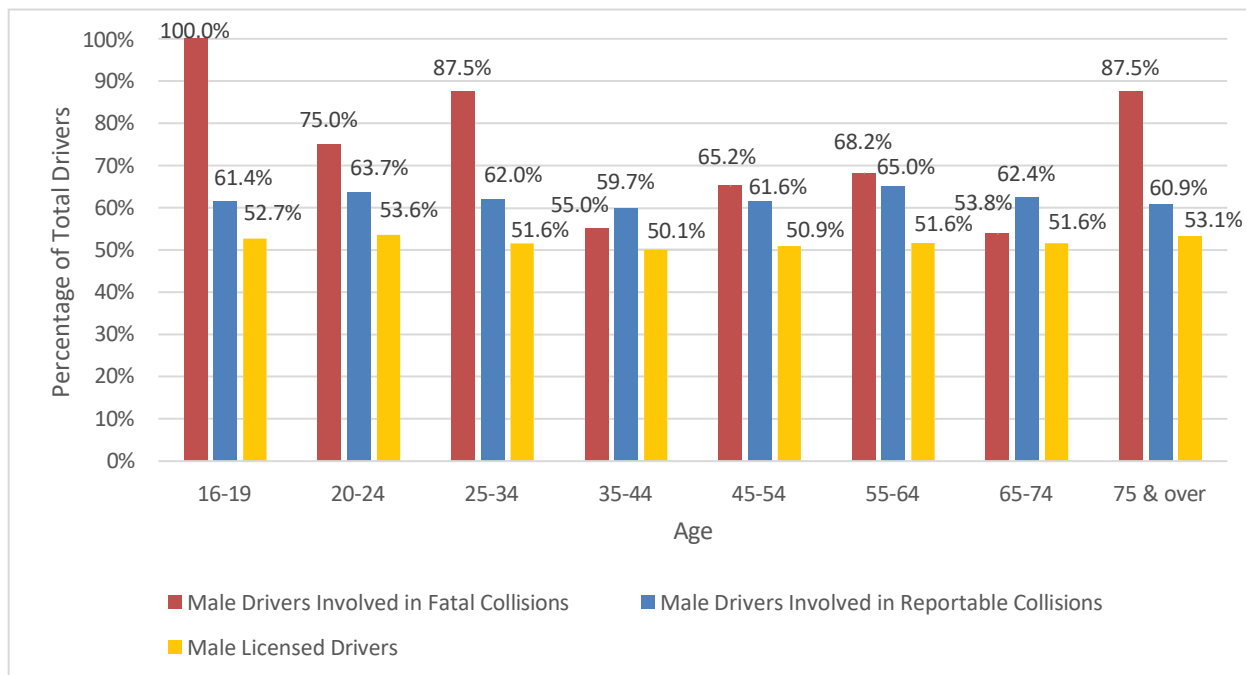
Figure 17: Distribution of Drivers Involved in Fatal Collisions and Reportable Collisions by Age Group



Sex

Almost three-quarters (70%) of the 128 drivers involved in the 84 fatal collisions were male. This percentage was higher in comparison to the 52% of males in the licenced driver population. The percentage of males was also slightly higher than the 57% of males involved in reportable collisions (or 62% of known drivers in collisions) in Ottawa from 2017-2020: Females accounted for 35% of drivers in fatal collisions.

The percentage of male drivers involved in fatal collisions by age is presented in comparison with the percentage of male drivers in the provincial licenced driver population in Figure 18. Males in fatal collisions are over-represented in every age cohort when compared to the licenced driver population. However, only males aged 35-44 and 65-74 are over-represented in reportable collisions. This may be due, in part, to higher levels of exposure.

Figure 18: Males in Fatal Collisions, Reportable Collisions & Licenced Drivers

It is apparent that in both younger and older age categories, the difference between sexes is more significant. For those under the age of 35, 85% of drivers involved in fatal collisions were male, compared to the 62% of the drivers involved in reportable collisions and 52% of licenced drivers in that age group. Though male drivers still account for most drivers in the middle age categories, the average is closer to the percentage of licenced male drivers in those age categories.

Males also represented 91% of motorcyclists involved in fatal crashes which, while higher than other types of licenced drivers, more closely aligns with the percentage of male licenced motorcycle riders in the province at 86%. The percentage of male motorcyclists involved in all reportable collisions in Ottawa between 2017 and 2020 was also consistent with the percentage of the provincially licenced male motorcycle population.

Licence status & class

The type of licence held by each driver was reviewed by the FCRC. Almost all (95%) of drivers involved in fatal collisions held a valid licence for the type of vehicle they were driving at the time of the collision except:

- two drivers were unlicensed
- one driver had an unknown status
- three drivers held licences in other jurisdictions and information was not available

There are a number of classes of driver licences in the provincial licencing system which, when combined, can produce a total of 55 types of licences. Drivers in fatal collisions between 2017 and 2020 represented a small number of types of licences. The types of licences held by drivers in fatal collisions and drivers in the 2018 provincial driver population are presented in Table 9.

Table 9: Licence Class of Drivers Involved in Fatal Collisions 2017-2020, and Licenced Drivers in 2018

Licence Class	Percentage of Total Drivers Involved in Fatal Collisions	Percentage of Total Licenced Drivers¹
G	70%	82%
G1 or G2 only	9%	14%
A, B, C, D, E, F	16%	4%
None	2%	-
Unknown	4%	-
Total	100%	100%

¹ Based on data obtained from the [Ontario Road Safety Annual Report 2018](#)

The class G licence is standard among drivers of cars and light trucks and is the most common licence type held in Ontario. In 2018, more than two-thirds (70%) of drivers involved in fatal collisions held this class compared to more than three-quarters (82%) of licenced drivers in the province.

The G licence is one of two licence classes within Ontario which are part of a graduated licencing system. It requires mandatory testing and practice prior to allowing the holder to advance to the next stage in the process. Both the G1 and G2 licences place certain restrictions and drivers must comply with them. Nine percent of drivers involved in the fatal collisions held G1 or G2 licences compared to 14% of the licenced driver population. In other



words, younger age drivers who typically hold these licences are less likely to be involved in fatal crashes because of the proven safety benefits of graduated driver licencing systems (Vanlaar et al., 2009; Masten et al., 2015; McCartt & Teoh, 2014).

The A through F class licences allow holders to drive various types of larger vehicles ranging from medium size trucks to tractor trailers and buses. Each of these licences permit holders to drive vehicles covered under certain lower licence classes as well as vehicles covered under a class G licence. In 2018, approximately 16% of drivers involved in fatal collisions held A-F licences, however, just 4% of licenced drivers in Ontario held an A-F class licence.

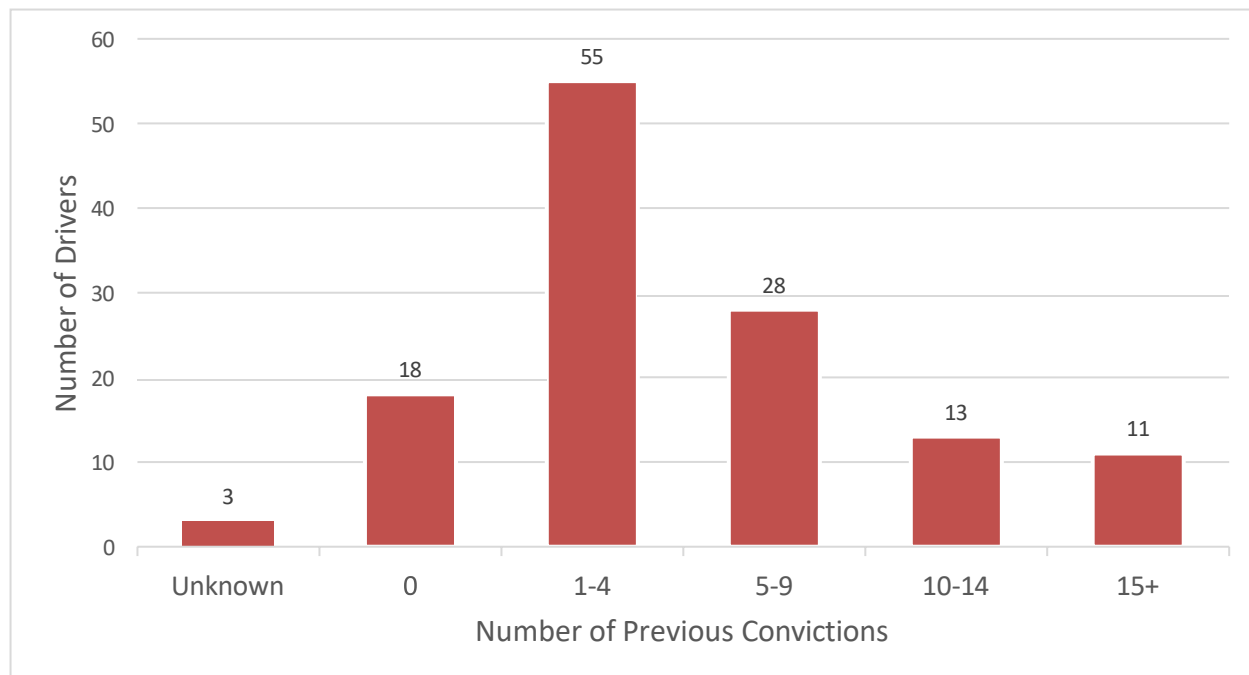
The class M licence allows holders to drive a motorcycle. Like the G licence, there is a graduated licensing process which includes specific testing and practice time to move from M1 to M2 to full M licence with applicable restrictions at each of the stages. The M series of licences can be the only licence a driver holds but often drivers hold another type of licence as well. Less than 0.02% of licenced drivers in Ontario held an M licence without another type of licence in 2018.

Slightly more than one in ten (12%) of drivers involved in the fatal collisions held an M or M2 licence combined with one or more of the G or A through F licences. However, not all of them were driving a motorcycle at the time of the fatal collision. In the provincial licenced driver population, 6% of licenced drivers held an M, M1 or M2 licence. More than one-third (36%) of motorcyclists involved in fatal collisions held an M2 licence with the remaining motorcyclists holding a full M licence.

Previous convictions

The number of previous convictions for traffic-related offences among drivers in fatal collisions reviewed by the FCRC was considered. Offences under the Highway Traffic Act (e.g., speeding, red light running, distraction) or Criminal Code of Canada (e.g., drinking and driving, dangerous driving, fleeing the scene) were included and are summarized in Figure 19.



Figure 19: Previous Convictions for Drivers Involved in Fatal Collisions 2017-2020

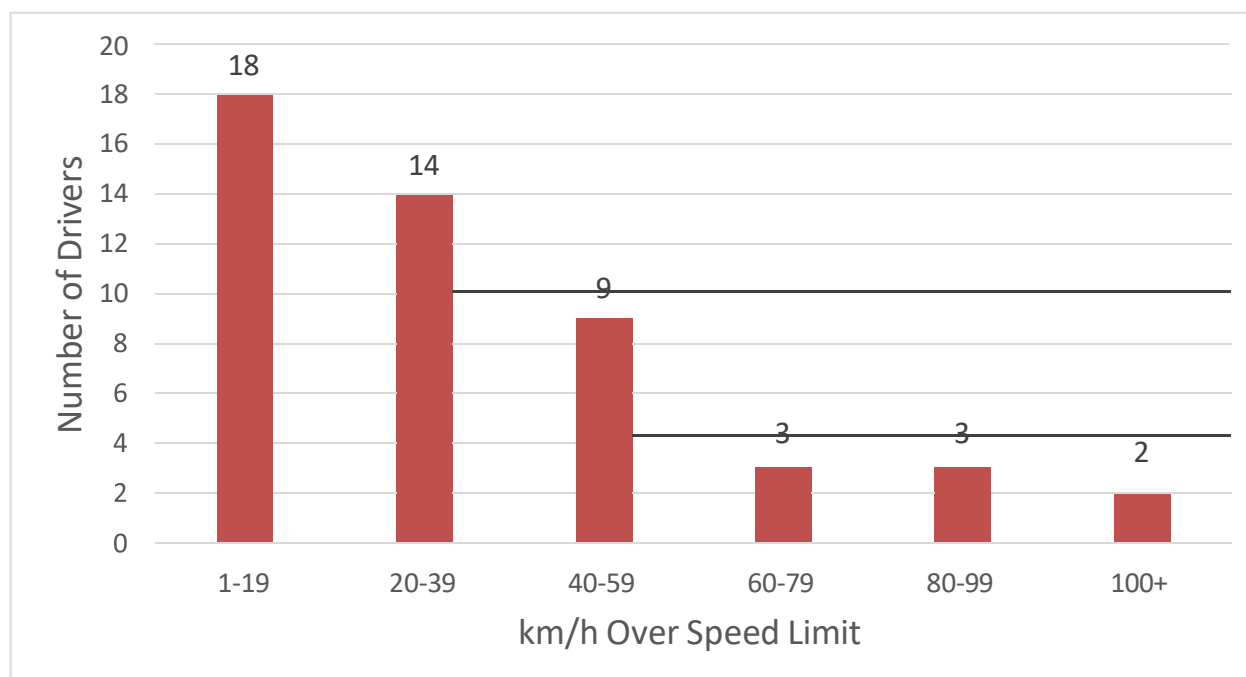
Among drivers involved in fatal collisions for whom records were available, the average number of previous convictions was 5.3, with a range of 0 to 29 previous convictions. Almost one in five (19%) drivers had more than 10 previous convictions. Data with respect to the prevalence of convictions for prior traffic offences is not readily available for the entire licenced driver population in Ontario, nor is it available for drivers involved in non-fatal reportable collisions. As such, it was not possible to draw comparisons with respect to this driver characteristic.

Speeding

When a fatal collision occurs, oftentimes the speed of vehicles involved in the collision can be determined by Fatal Investigators as part of collision reconstruction. In some collisions more than one driver was found to be speeding. Our data captures this due to the extensive review and analysis conducted. Speed was determined for 109 of the 128 drivers involved in collisions reviewed by the FCRC. Speeding was defined as a driver travelling in excess of the speed limit. Almost half (45%) of the 109 drivers for whom speed was determined in the investigation were engaged in speeding at the time of the collision. In other words, speed is

prevalent in fatal collisions in Ottawa. Figure 20 summarizes the number of drivers travelling over the speed limit at the time of the fatal collision from 2017 to 2020, and it is important to note that fatal collisions on 400-series highways are excluded from this report.

Figure 20: Number of Drivers Travelling by km/h Over the Speed Limit



Among the 49 speeding drivers in fatal collisions, almost two-thirds (31) were travelling at least 20 km/h or more over the speed limit and were deemed to be engaged in excessive speeding. More concerning, five drivers were travelling at 80 km/h or more over the speed limit, and the highest speed by drivers in fatal collisions was 135 km/h over the speed limit.

Though not a direct comparison, national data indicates speed is generally a factor in 25% of fatal collisions across Canada and approximately 300 people are killed annually as a result of speeding (TIRF National Fatality Database, 2022). Reviewing MVCR data for fatal collisions in the City just over 20% note speeding as a factor, which aligns with the national data. To help place this data in context, speed is directly related to crash risk and small increases in speed translate into large increases in crash risk. For example, travelling just 10 km/h over the speed limit is estimated to double crash risk while a speed of 20 km/h increases crash risk sixfold (Kloeden et al., 2001).

The frequency of speeding among all Ottawa drivers is not available for comparison, and there are also limitations on speeding information collected through collision reports. MVCRs include a code related to driver speed at the time of collision, but this is typically under-reported in less severe collisions because collision investigations are less detailed compared to fatal collisions. Usually, speed is self-reported by drivers or witnesses if available. For this reason, there is limited opportunity to compare these numbers to the population of non-fatal reportable collisions to provide context.

Drug and/or alcohol use

Fatally injured road users are subject to the testing of post-mortem blood samples for alcohol and drug levels. This is not limited to drivers but would be considered for all fatally injured road users (pedestrians, cyclists, e-bike riders, motorcyclists) involved in collisions reviewed by the FCRC. Surviving drivers in impaired driving collisions are also assessed by police to determine whether drivers are impaired. This assessment may involve direct observations, results of behavioural tests, and breath and blood tests. Consideration is also given to driving behaviour as determined by the police investigation.

The FCRC reviewed police charges for impaired driving among surviving drivers, as well as post-mortem drug and alcohol toxicology in deceased road users combined with the traffic collision investigation results to determine if drugs or alcohol were possible factors in collisions. The review looked at both impairment and presence of drugs and alcohol. Table 10 summarizes the number of fatal collisions each year in which impairment by alcohol or drugs was a factor.

Table 10: Impairment in Fatal Collisions, 2017 – 2020

Impairment in Collision	2017	2018	2019	2020	Total
Yes	9	5	5	9	28 (33%)
No	14	16	18	8	56 (67%)
Total	23	21	23	17	84 (100%)



One-third (33%) of fatal collisions reviewed by the FCRC involved one or more road users determined to have alcohol and/or drugs over the legal limit in their system at the time of the collision. Impairment by alcohol or drugs was not a factor in the remaining two-thirds (67%) of collisions. Due to the inclusion of vulnerable road users, in our analysis this is slightly higher than 2019 national data which showed approximately 26.2% of fatalities involved alcohol used by either a dying or a surviving driver (TIRF National Fatality Database 2022).

More than half (54%) of fatal collisions reviewed by the FCRC involved one or more road users determined to have the presence of alcohol or drugs in their system (though may have been below the legal limit) at the time of the collision. Table 11 summarizes the number of fatal collisions each year in which alcohol or drug use was present.

Table 11: Presence of Alcohol/Drugs in Fatal Collisions, 2017 – 2020

Presence of Alcohol/Drugs in Collision	2017	2018	2019	2020	Total
Yes	15	8	9	13	45 (54%)
No	8	13	14	4	39 (46%)
Total	23	21	23	17	84 (100%)

In terms of the most prevalent substances in these fatal collisions, the active ingredient in cannabis ($\Delta 9$ tetrahydrocannabinol; THC) was a factor in almost one in five (19%) fatal collisions. Similarly, cocaine (and its breakdown products) was also a factor in 20% or 17 fatal collisions, and alcohol (ethanol) was a factor in 19% or 16 fatal collisions. Road users often had more than one of these substances present in their system at the time of collision and this is very consistent with national data. While national data about all road users drug and alcohol consumption is not known, in Canada in 2019, approximately half (53%) of drivers in fatal crashes tested positive for the presence of any type of drug. Among this group, almost half (49%) tested positive for cannabis, 42% tested positive for central nervous system depressants, and 35% tested positive for central nervous system stimulants (Robertson, 2022).

RECOMMENDATIONS

The mandate of the FCRC is to facilitate the prompt sharing of information between its members immediately following fatal collisions to improve understanding about contributing factors in those collisions. Their role also includes identifying recommendations, if any, to strengthen enforcement campaigns, public education initiatives and roadway infrastructure to prevent future deaths. The scope of authority in each of these areas is described below.

Enforcement recommendations focus on strengthening the enforcement of rules of the road through traditional or automated methods. The objective is to increase driver compliance to reduce crash risk by discouraging risky behaviours such as speeding, impaired driving and distraction. OPS is responsible for delivering traditional enforcement initiatives recommended by the FCRC while the City of Ottawa is responsible for implementing automated enforcement measures.

Education recommendations are designed to encourage road users to make safe choices when using roadway infrastructure. The objective of educational initiatives is to increase understanding of how driver choices on the road can increase safety or create risk and negatively impact the outcome of interactions with other road users. Education campaigns can be targeted to address specific risky behaviours or specific locations or areas of the road network. Campaigns can also be more broad-based to reach a larger population of road users to increase knowledge and awareness. OPS, OPH and the City of Ottawa all contribute to implementing recommendations of this nature.

Engineering recommendations include those related to changing the physical infrastructure of the roadway. They can be site-specific or can include policy changes to influence how the roadway infrastructure is designed and built by the jurisdiction responsible for providing the infrastructure. Based on the scope of the FCRC, the City of Ottawa is responsible for implementing engineering recommendations arising from this committee.

Individual recommendations

Between 2017 and 2020, the FCRC made 13 engineering recommendations and three



education recommendations based on the review of individual collisions. The education recommendations included one site-specific outreach activity related to pedestrian safety as well as two broader initiatives for impaired driving and pedestrian safety. The 13 engineering recommendations were site-specific and consisted of review and/or implementation of signage, signal timing changes, or temporary traffic calming measures. In three cases, geometric modifications through the City's existing road safety programs were adopted. Enforcement was undertaken as needed to address contributing factors associated with the collisions.

The level of detail provided in this current summary of recommendations is intended to be very high-level. This is done to protect the privacy of individuals involved in specific collisions, and to ensure individuals cannot be identified in collisions included in this review.

Recommendations based on cumulative data

Based on a cumulative review of FCRC findings and a review of findings from this analysis of 84 fatal collisions in Ottawa, the following recommendations are put forward for discussion and consideration.

To the City of Ottawa:

- **Develop a comprehensive strategy to reduce speeds on Ottawa roads.** Speed is a significant factor in fatal collisions with just under half (45%) of the drivers for whom speed was determined, were travelling above the speed limit. Of concern, two-thirds of drivers who were speeding, were driving more than 20 km/h over the speed limit; slightly more than one-third had exceeded the limit by at least 40 km/h.

The City has traditionally set speed limits based on operating speeds rather than on speeds that will minimize the potential for fatal or serious injury based on the mix of vehicles, road users and protective infrastructure present. Updating the City's Speed Zoning Policy to better align with the principles of a Safe Systems Approach will help set expectations related to speed.

Some design measures have been and are being implemented on some roads to reduce



speeds in urban and residential areas. These measures include the use of various traffic calming measures. The increased use of automated speed enforcement should be further promoted and implemented on roads where speeding is pervasive. This technology is a more effective and cost-efficient tool to support traditional enforcement strategies.

Finally, initiatives to educate Ottawa road users about the risks associated with speed can help drivers make safer choices and shift the road safety culture. Key facts to share include: small increases in speed equal large increases in risk, higher speeds increase stopping distance and reduce reaction time, active transportation users are less likely to survive impacts by vehicles travelling speeds over 40km/h.

- **Conduct an in-depth review of collisions involving road users aged 55 years and older.** This age cohort, whether they are motor vehicle drivers or active transportation users, are over-represented in fatal crashes and reportable collisions. A more detailed analysis of collisions involving this group of road users is needed to better understand contributing factors in these fatalities. Working with key partners with knowledge of national data sources, key risks and preventive measures with respect to older road users, can help guide the selection of proven countermeasures to reduce risk among drivers and active transportation users as they age.

To the Ottawa Police Service:

- **OPS should continue Targeted enforcement for peak crash periods to help curb risk-taking associated with fatal collisions.** Fatal collisions were more prevalent in Spring, Summer, and September. These periods of year are generally associated with clear, dry roads, long weekends, holiday travellers and higher travel speeds. These are also periods when students graduate and return to school. Warmer weather and more daylight hours are also more conducive to active transportation modes such as walking and cycling. With respect to speed collisions in lower density and rural areas, increased enforcement resources and targeted efforts during months with more speed fatalities are needed.



Crashes were also more common on weekdays and during peak periods in the morning, mid-afternoon and evening which typically produce higher levels of traffic congestion. Generally, the characteristics of these collisions indicate distracted and fatigued driving as well as speeding are more often contributing factors, and active transportation users are at greater risk of injury. As such, focused enforcement on these risky behaviours combined with educational initiatives can help reduce the prevalence of these collisions.

To the Ottawa Police Services and the City of Ottawa:

- **Ottawa Police Service and Safer Roads Ottawa should work collaboratively to increase enforcement and education about the risks associated with alcohol and drug-impaired driving.** Impairment was a factor in one-third (33%) of fatal collisions in Ottawa. Polysubstance use (more than one substance) was common in Ottawa as is the case nationally. The most common combination of substances is alcohol and cannabis, and research shows that combining cannabis with even small amounts of alcohol can increase crash risk (Lyon & Robertson, 2020; ICADTS, 2022a; ICADTS 2022b). As such, increased enforcement and education during months with peak impaired driving crashes are important to combat this problem. Providing adequate resources to sustain training of officers in impaired driving enforcement and deliver targeted enforcement initiatives are essential to increase general deterrence which is accomplished by increasing the real likelihood drivers will be detected, as well as the perception that drivers will be detected.

In addition, concerted public education about the risk associated with impairment is needed to highlight the effects of combining alcohol and cannabis on crash risk.

To the Fatal Collision Review Committee and the Ministry of Transportation Ontario:

- **FCRC and MTO should work collaboratively to conduct further comparisons of the prevalence of prior convictions and suspensions for drivers involved in fatal collisions and drivers in the general population.** The average number of prior convictions among drivers in fatal collisions for whom records were available was 5.3. Almost one in five (19%) drivers had more than 10 previous convictions and the highest



number was 29. The MTO should analyze and provide provincial data related to the same. Further analysis of this issue may provide guidance with respect to the need for stronger penalties, driver improvement programs, and other remediation measures to reduce fatal crashes in Ottawa.

To the Ministry of Transportation Ontario:

- **MTO should ensure enhanced data collection and analysis of e-bike fatalities and collisions in Ottawa and Ontario to increase understanding of risks and identify appropriate preventive measures.** At present, e-bike collisions are misclassified as motorcycles or bicycles, and this may be due in part to after-market modifications by riders. A review of e-bike definitions and coding strategies across jurisdictions can help address this data gap and ensure the safety risks associated with this mode of transportation are recognized and managed accordingly. Data improvements can increase knowledge about this issue and it can then be determined whether specific interventions may be required to prevent deaths involving these vehicles.

CONCLUSION

Between 2017 and 2020, the FCRC reviewed a total of 95 fatal collisions of which the circumstances of 84 fatal collisions are summarized in this report. The 84 collisions resulted in a total of 92 deaths.

There are lessons to be learned from each fatality review. Meeting early and reviewing a traffic death extensively provides detailed information which cannot be provided any other way.

Combining information from each review, and examining them cumulatively, provides a unique perspective on trends and may provide opportunities for improvement not seen in an individual case.

This is the first report of the Ottawa FCRC provides an opportunity to identify the committee's role, its work to date and areas which should be studied and considered further. Future reports will integrate lessons learned from regular traffic fatality reviews based on these initial findings and recommendations.



REFERENCES

Brown, S., Robertson, R.D. & Vanlaar, W.G.M. (2021) Impaired & Distracted Driving Data Comparison. Traffic Injury Research Foundation. Ottawa, Canada.

<https://tirf.ca/download/impaired-distracted-driving-data-comparison/>

Canadian Council of Motor Transport Administrators (CCMTA). (2013). Countermeasures to Improve Pedestrian Safety In Canada. Ottawa, ON: CCMTA. Available at:

https://www.ccmta.ca/web/default/files/PDF/CCMTA_Pedestrian_Report_Eng_FINAL.pdf

Feng YR, Meuleners L, Stevenson M, Heyworth J, Murray K, Maher S. Driver Self-Regulation Practices in Older Drivers with and Without Mild Cognitive Impairment. Clinical Interventions in Aging. (2020) Vol.15:217-224. <https://doi.org/10.2147%2FCIA.S236998>.

PMID: 32103924; PMCID: PMC7027824.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7027824/>

Graduated Driver Licensing Safety Center: Magnitude and Characteristic of Young Driver Crashes. Traffic Injury Research Foundation. Ottawa, Canada. <https://gdlframework.tirf.ca/module/the-issue/magnitude-and-characteristics-of-young-driver-crashes/>. Last accessed December 22, 2022

Holmes, E., Vanlaar, W., McAteer, H., Robertson, R.D., McKiernan, A., & Brown, S. (2013). Elderly Driver Road Safety Programs: Literature Review & Best practices. Traffic Injury Research Foundation. Ottawa, Canada.

International Council on Alcohol, Drugs & Traffic Safety (2022a). Cannabis & Driving: Recent Epidemiological Evidence. Available at:

<https://www.icadtsinternational.com/resources/Documents/Fact%20Sheets/ICADTS-Cannabis-Recent%20Epidemiological%20Evidence-19.pdf>

International Council on Alcohol, Drugs & Traffic Safety (2022b). Cannabis & Driving: Recent Experimental Evidence. Available at:

<https://www.icadtsinternational.com/resources/Documents/Fact%20Sheets/ICADTS-Cannabis-Recent%20Epidemiological%20Evidence-19.pdf>

Kloeden, C. N., Ponte, G., & McLean, J. (2001). Travelling speed and risk of crash involvement on rural roads (Report No. CR 204). Road Accident Research Unit, Adelaide University.

Li, G., Braver, E.R. Chen, L.H. (2003). Fragility versus excessive crash involvement as determinants of high death rates per vehicle-mile of travel among older drivers. Accident Analysis and Prevention, 35(2): 227-235.

Lyon, C., Vanlaar, W., Robertson, R. (2020). The Road Safety Monitor 2019: Distracted Driving Attitudes and Practices, 2004-2019. Traffic Injury Research Foundation. Ottawa, Canada



- Lyon, C. and Robertson, R.D., (2020) Alcohol, Marijuana & Driving Risk. Sober Smart Driving Education Program. Traffic Injury Research Foundation. Ottawa, Canada.
- Masten, S. V., Thomas, F. D., Korbela, K. T., Blomberg, R. D., et al. (2015). Meta-analysis of GDL laws. Washington, D.C.: National Highway Traffic Safety Administration
- Mayhew, D., Mainegra Hing, M., & Vanlaar, W. (2016). Progression through Graduated Driver Licensing Programs: Final Report. (September 2016), Traffic Injury Research Foundation. Prepared for the Centers for Disease Control and Prevention. <https://tirf.ca/TIRFCAD16J1>
- Mayhew, D., Vanlaar, W., Carr, D., Meister, S., Mainegra Hing, M., & Robertson, R.D. (April 2015) Cognitive Road Tests & Conditional Licensing: What the Literature Tells Us. Traffic Injury Research Foundation. Prepared for the Ontario Ministry of Transportation.
- McCartt, A.T., and Teoh, E. R. (2014). Tracking progress in teenage crash risk in the United States since the advent of graduated driver licensing programs. Arlington VA: Insurance Institute for Highway Safety.
- Ministry of Transportation Ontario, 2018, [Ontario Road Safety Annual Report \(ORSAR\), Toronto, ON](https://files.ontario.ca/mto-2/mto-orsar-2018-en-2021-11-18.pdf) (<https://files.ontario.ca/mto-2/mto-orsar-2018-en-2021-11-18.pdf>).
- National Highway Traffic Safety Administration (February 2015). Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Study. Traffic Safety Facts: A Brief Statistical Summary. DOT HS 813 115. US Department of Transportation. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>
- Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO system, Extracted May 27, 2022, Ottawa Population Estimates, 2017-2020,
- Ostvik, E., Elvik, R. (1991). The Effects of Speed Enforcement on Individual Road User Behaviour and Accidents. In: Enforcement and Rewarding: Strategies and Effects: Proceedings of the International Road Safety Symposium in Copenhagen, Denmark, September 19-21, 1990. Published by the SWOV Institute for Road Safety Research, Leidschendam, The Netherlands. <https://journals.sagepub.com/doi/10.3141/1595-03>
- Robertson, R.D., Wood, K., M., & Holmes, E. A. (2014). Impaired Driving Risk Assessment: A Primer for Practitioners. Traffic Injury Research Foundation. Ottawa, Canada. <https://tirf.ca/TIRFCAD14B>
- Robertson, A., Liew, H., & Gardner, S. (2011). An evaluation of the narrowing gender gap in DUI arrests. Accident Analysis and Prevention, 43, 1414-1420.
- Robertson, R.D., (2022). Prevalence of Teens & Young Adults in Fatal Crashes. Presentation to the 31st Annual Canadian Association of Road Safety Professionals. June 21st, 2022.
- Robertson, R.D. (August 31st, 2022). Using Cannabis-Impaired Driving Research to Inform



Policy Decisions. Plenary Presentation to the 23rd International Conference on Alcohol, Drugs & Traffic Safety. Rotterdam, The Netherlands.

Schwartz, J., & Rookey, B.D. (2008). The narrowing gender gap in arrests: Assessing competing explanations using self-report, traffic fatality, and official data on drunk driving, 1980-2004. *Criminology*, 46(3), 637-671.

Traffic Injury Research Foundation. National Fatality Database. Queried September 6th, 2022.

Traffic Injury Research Foundation. (2016). The role of driver age in fatally injured drivers in Canada, 2000-2013. Traffic Injury Research Foundation, Ottawa, ON.

<https://tirf.ca/publications/role-driver-age-fatally-injured-drivers-canada-2000-2013/>

Vanlaar, W., Mainegra Hing, M., Brown, S., McAteer, H., Crain, J., & McFaull, S. (2016). Fatal and serious injuries related to vulnerable road users in Canada. *Journal of Safety Research* 58 (2016) 67–77.

Vanlaar W, Mayhew D, Marcoux K, Wets G, Brijs T, Shope J. An evaluation of graduated driver licensing programs in North America using a meta-analytic approach. *Accident Analysis & Prevention*. 2009 Sep;41(5):1104-11. doi: 10.1016/j.aap.2009.06.024. Epub 2009 Jul 15. PMID: 19664453.

<https://www.sciencedirect.com/science/article/abs/pii/S0001457509001572?via%3Dihub>

Vanlaar, W.G.M., Woods-Fry, H., Lyon, C. & Robertson, R.D. (2020). Road Safety Monitor 2020: The Impact of The COVID-19 Pandemic on Travel Behaviour & Road Safety. Traffic Injury Research Foundation. Ottawa, Canada.

Vanlaar, W., Robertson, R. & Marcoux, K. (2008). The Road Safety Monitor 2007: Excessive Speeding. Traffic Injury Research Foundation. Ottawa, Canada.

Vanlaar, W.G.M., Emery, P., Robertson, R.D. (2008). The Road Safety Monitor 2007: Elderly Drivers. Ottawa, Ontario: Traffic Injury Research Foundation. Ottawa, Canada.

Young & New Driver Safety Centre: The Issues. Traffic Injury Research Foundation. Ottawa, Canada. <https://yndrc.tirf.ca/issues/index.php>. Last accessed December 22, 2022



Appendix A - Terms of Reference

