Circumstances surrounding motorcycle fatalities in Canada, 2016 to 2020

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Across Canada, people ride motorcycles for both transportation and recreation. According to Statistics Canada's vehicle registration data, the number of motorcycles registered for on-road use grew 2.7% from 729,687 in 2017 to 749,306 in 2020, with the 2019-to-2020 period observing the lowest annual increase (+0.2%) when compared to each of the two previous years (+1.2%). While these vehicles are an increasingly popular form of transport, there is associated potential for injury and death for riders. According to Transport Canada, 242 motorcycle and moped riders (i.e., drivers and passengers) died in 2020. This is the highest number of deaths recorded in over 20 years and a 24% increase from 195 deaths in 2019. Previously, the number of motorcycle-related deaths fluctuated by less than 17% year to year. The rise from 2019 to 2020 may in part be explained by the increase in number and rate of motorcyclist deaths among riders aged 25 to 39 years and 60 to 79 years. While many steps have been taken to reduce harm to Canadian motorcyclists, such as legislation, safety programs, driving courses, and safety features for both motorcycles and motorcycle gear, riders continue to be considered vulnerable road users. Representing 2% of road users, motorcyclists account for over 10% of all road user deaths.

According to data from the Canadian Coroner and Medical Examiner Database (CCMED), from 2016 to 2020, coroners and medical examiners investigated around 180 deaths per year when the victim was riding a motorcycle (i.e., as a driver or passenger) at the time of the fatal event. Understanding the circumstances surrounding motorcycle fatalities is an important starting point to inform the continued development and implementation of safety measures to protect the lives of Canadians. Although the circumstances or details surrounding these deaths are not always known, findings reported by coroners and medical examiners who investigate these tragic events offer insights.

According to the World Health Organization, risk factors for road traffic injuries include but are not limited to driving at excess speed, driving under the influence of alcohol or drugs, and using unsafe road infrastructure or vehicles. Additionally, according to the Motorcyclists Confederation of Canada (MCC), motorcyclists are advised to wear the right gear (i.e., a helmet, eye protection and body armour), build skills and confidence by taking a motorcycle course, be extra alert at night, and be extra careful in areas with wildlife. The MCC also provides advice for other motorists, such as recommending they check their blind spots and look twice before proceeding through intersections as motorcycles are not always visible to oncoming traffic.

In recognition of Motorcycle Safety Awareness Month, Statistics Canada is releasing information on the circumstances surrounding motorcycle fatalities. The results in this report are based on new insights released today from the CCMED for the period of 2016 to 2020. This report follows an analysis on the circumstances surrounding passenger vehicle fatalities released in November 2022.

Approximately one in nine motorcycle fatalities involved the deceased riding with at least one other person

While the number of riders on the motorcycle was not always specified (58%), approximately one in nine (12%) motorcycle fatalities involved the deceased riding with another person at the time of the collision. Carrying a passenger on a motorcycle increases the weight, which affects the vehicle's handling and balance, and the driver must adapt accordingly.

Coroners and medical examiners reported that riders in the driver's position accounted for 84% of all motorcycle fatalities, while 6% were passengers on the motorcycle (the position of the deceased rider was not specified in 10% of cases).

The rate of motorcycle fatalities was more than seven times higher among males than among females

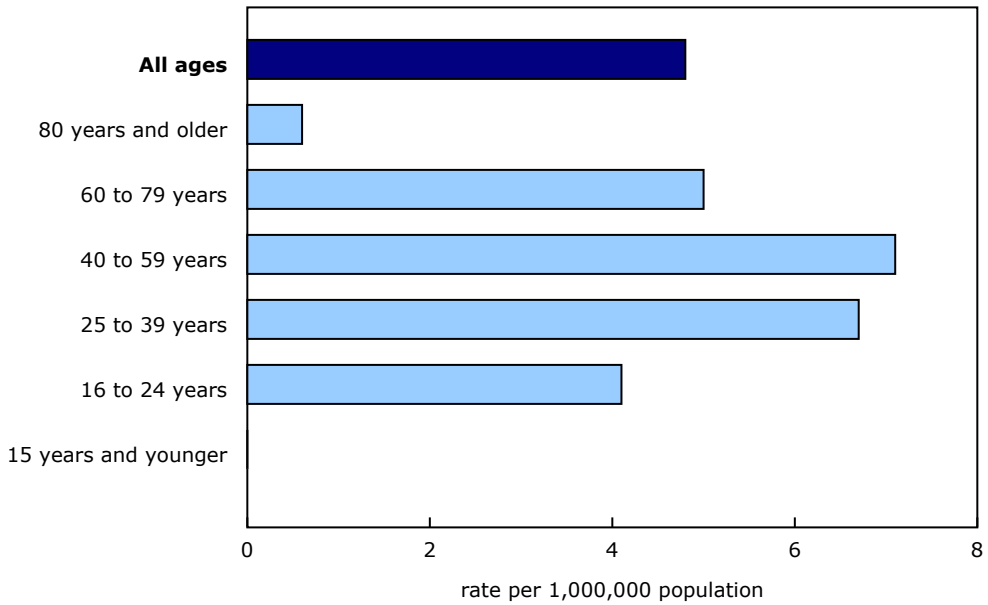
Motorcycle fatalities affect people of both sexes; however, fatalities are more common among males. From 2016 to 2020, the rate of motorcycle fatalities among males (8.5 deaths per 1,000,000 population) was over seven times higher than among females (1.1 deaths per 1,000,000 population), and the difference was even more pronounced (12.5 times higher for males than for females) among drivers. This trend can be explained in part by the greater proportion of males driving motorcycles. According to data from the Canadian Community Health Survey (CCHS) for Ontario, Alberta, New Brunswick and British Columbia, among those who reported having driven a motorcycle in the past 12 months, the proportion of male drivers (84%) was more than five times greater than the proportion of female drivers (16%).

The rate of motorcycle fatalities was highest among those aged 40 to 59 years

Motorcycle fatalities are also more common among certain age groups. The age-specific rate of motorcycle deaths was higher among those aged 40 to 59 years (7.1 deaths per 1,000,000 population), 25 to 39 years (6.7 deaths per 1,000,000 population) and 60 to 79 years (5.0 deaths per 1,000,000 population) than the total rate for all age groups (4.8 deaths per 1,000,000 population). This trend can be explained in part by the greater proportion of motorcycle drivers among these age groups. CCHS data indicate that motorcycle drivers aged 25 to 59 years accounted for the greatest proportion of people who reported driving a motorcycle in the previous 12 months.

The trend in motorcycle fatalities by age group differs from that found in a previous Statistics Canada analysis looking at passenger vehicle fatalities. In 2019, the age-specific rate of passenger vehicle deaths was lower among those aged 15 years and younger and among those aged 40 to 59 years, and higher among those aged 16 to 24 years and among those aged 80 years and older.

Chart 1
Age-specific motorcycle fatality rates, 2016 to 2020



Note(s): Data were not available for all jurisdictions for all years (see Note to readers). Canadian Coroner and Medical Examiner Database counts referenced in this chart were rounded to a neighbouring multiple of five.
Source(s): Canadian Coroner and Medical Examiner Database, 2016-2020 (5125) and table 17-10-0005-01.

More than half of motorcycle fatalities involved a collision between two or more vehicles

Motorcycle fatalities can result from single- or multi-vehicle events. From 2016 to 2020, over half (55%) of motorcycle fatalities resulted from a collision between two or more vehicles, while 38% of fatalities resulted from a single-motorcycle event. Among multi-vehicle fatalities, the most common fatal collision type reported by coroners and medical examiners was intersection-related collisions involving a turn across opposing traffic or a T-bone collision (i.e., the front of one vehicle collides with the side of another). The most common collision type among single-motorcycle fatalities was colliding with a stationary object or leaving the road.

While single-motorcycle collisions may result from loss of vehicle control associated with the motorcycle driver's actions, multi-vehicle collisions may result from either the motorcycle driver's actions or the other driver's actions when interacting.

The type of fatal collision varied by the motorcycle driver's age group and sex. Multi-vehicle fatalities (54%) were more common than single-vehicle fatalities (41%) among male drivers, but the difference was much more pronounced among female drivers, where multi-vehicle fatalities (73%) occurred more than twice as often as single-vehicle fatalities (27%). Multi-vehicle collision fatalities were also more common than single-vehicle collision fatalities among motorcycle drivers of all age groups—except for drivers aged 16 to 24 years and those aged 80 years and older, who experienced an equal proportion of or more single vehicle fatalities than multi-vehicle fatalities. Previous research found that overall crash risk is highest during the first months after getting a driver's licence and that young drivers (20 to 34 years) accounted for a significant portion of drivers accused of alcohol and/or drug impairment (44%). For older adults, changes in vision, physical functioning, and the ability to reason and remember, as well as some diseases and medications might affect their ability to maintain control of the motorcycle.

Table 1
Distribution of motorcycle fatalities by collision type, 2016 to 2020

	% of fatalities
Multi-vehicle collisions	**55**
Intersection-related collision involving a vehicle turning across opposing traffic or T-bone collision	25
Head-on collision	10
Other multi-vehicle collision: vehicles travelling in the same direction	7
Other multi-vehicle collision: vehicles travelling in opposite direction	3
Other multi-vehicle collision: vehicles travelling in an unknown direction	10
Single-motorcycle collisions	**38**
Single-motorcycle collision with a stationary object or leaving the road	27
Other single-motorcycle collision (collision with a moving object; ejection)	11
Not specified	**7**

Note(s): Counts referenced in this table were rounded to a neighbouring multiple of five.
Source(s): Canadian Coroner and Medical Examiner Database, 2016-2020 (**5125**).

Intersections and highways were the leading locations of motorcycle fatalities

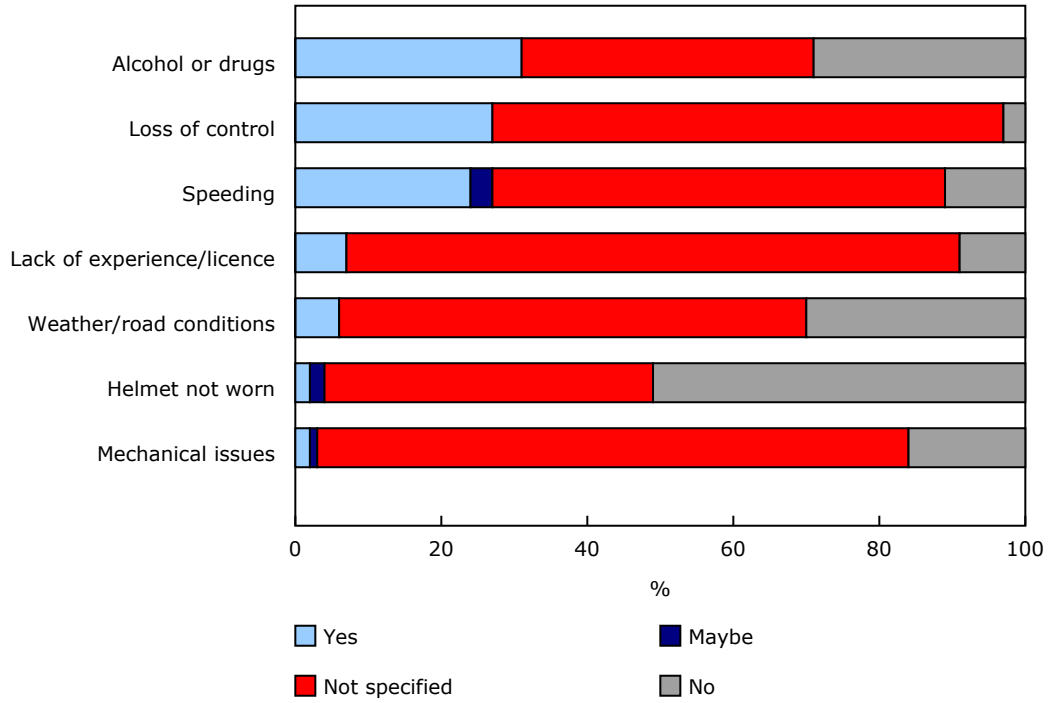
Intersections (31%) and highways (30%) were the leading locations of fatal motorcycle collisions. A previous analysis on passenger vehicle fatalities found that highways (40%) were also the leading location for fatalities involving the deceased riding in a passenger vehicle. However, the proportion of motorcycle fatalities occurring at intersections (31%) was more than twice as high as the proportion of intersection-related passenger vehicle fatalities (13%). According to the MCC, motorcycles are not easily visible to oncoming traffic because of their smaller size—they are therefore more likely to not be seen by other drivers on the road. Other locations where motorcycle fatalities were reported include public roadways (23%) and other specified roadways, such as bridges, railroad crossings or private parking lots (4%). The collision location was not specified in 12% of motorcycle fatalities.

At least one risk factor was reported in just over half of motorcycle fatalities

Besides providing information on demographics and cause of death, coroners and medical examiners investigating motorcycle fatalities also reported on the consumption of alcohol or drugs, excessive speed, loss of control, lack of experience driving a motorcycle, challenging environmental and road conditions, not wearing a helmet, and mechanical issues. From 2016 to 2020, at least one of these reported risk factors was present in 56% of investigated motorcycle fatalities. At least two of these risk factors were reported in nearly one-third (30%) of motorcycle fatalities.

The presence of a risk factor is considered "not specified" when the information for a given risk factor is missing from the coroner or medical examiner report. However, the absence of a risk factor can only be considered when the coroner or medical examiner has indicated that a given factor was not present.

Chart 2
Select factors more commonly reported by the coroner or medical examiner investigating motorcycle fatalities, 2016 to 2020



Note(s): "Alcohol or drugs" was indicated when the coroner or medical examiner (C/ME) reported that a driver involved in the fatality had consumed alcohol or drugs prior to the event. "Loss of control" was indicated when the C/ME reported that the person driving the motorcycle had lost control. "Speeding" was indicated when the C/ME reported that the person driving the motorcycle, or another driver involved in the collision was speeding. "Lack of experience/licence" was indicated when the C/ME reported that the person driving the motorcycle was either a new motorcycle driver or lacked a motorcycle licence. "Weather/road conditions" was indicated when the C/ME reported challenging weather or road conditions. "Helmet not worn" was indicated when the C/ME reported that the decedent was not wearing a helmet while riding a motorcycle. "Mechanical issues" was indicated when the C/ME reported that the motorcycle was experiencing mechanical issues. Data were not available for all jurisdictions for all years (see Note to readers). Counts referenced in this chart were rounded to a neighbouring multiple of five.
Source(s): Canadian Coroner and Medical Examiner Database, 2016-2020 (5125).

Alcohol, cannabis or other drug consumption was reported in just under one-third of motorcycle fatalities

Despite a decrease in the rate of impaired driving over the past decade, driving under the influence of alcohol or impairing drugs continues to be an issue. From 2016 to 2020, coroners and medical examiners reported that just under one-third (31%) of riders involved in fatal motorcycle collisions consumed alcohol, cannabis or other drugs while they were driving; were passengers riding with a motorcycle driver who had consumed one of these substances before the fatal event; or were involved in a multi-vehicle collision with another vehicle whose driver was under the influence. While alcohol (67%) accounted for the majority of these substances, the presence of cannabis (40%) and other drugs (25%) was also reported by coroners and medical examiners.

The proportion of motorcycle fatalities involving alcohol, cannabis or other drug consumption was two times higher among male driver fatalities (36%) than among female driver fatalities (18%) and 1.75 times higher among drivers aged 25 to 39 years (49%) than among drivers of other age groups (28%). These data align with a Statistics Canada analysis on impaired driving in Canada that found that impaired drivers were most often men and young adults.

While the time of day of the collision was not always well reported, alcohol, cannabis and other drug consumption was more often reported among motorcycle fatalities occurring at night, from 6:00 p.m. to 5:59 a.m. (56%), compared with those occurring during the day, from 6:00 a.m. to 5:59 p.m. (24%), or when the time of day was not specified (26%). Substance consumption was also more often reported among single-vehicle fatalities (42%) than among multi-vehicle fatalities (25%).

Excessive speed was reported in nearly one in four motorcycle fatalities

Speeding is a risk factor for road traffic injury. The coroner or medical examiner reported that speed was flagged in almost one in four (24%) motorcycle fatalities. In 27% of all motorcycle fatalities, the coroner or medical examiner reported that the driver had lost control of the motorcycle.

The proportion of motorcycle fatalities where excessive speed was reported was higher among male motorcycle driver fatalities (28%) than among female motorcycle driver fatalities (8%) and among fatalities involving drivers aged 16 to 39 years (39%) than among those involving drivers aged 40 years and older (20%). The proportion of motorcycle fatalities where excessive speed was reported was also higher among collisions involving alcohol, cannabis or other drugs (42%) than among those that did not involve these substances (24%), and among single-vehicle collisions (33%) than among multi-vehicle collisions (20%).

Note to readers

The Canadian Coroner and Medical Examiner Database (CCMED) was developed by Statistics Canada in collaboration with the 13 provincial and territorial Chief Coroners and Chief Medical Examiners and the Public Health Agency of Canada. Currently, it combines data from all provincial and territorial databases, except for Manitoba. For the provinces and territories included in the report, data are not available for all years. Data for Nova Scotia, New Brunswick, Quebec, Ontario, Saskatchewan, Alberta, British Columbia, Yukon, and the Northwest Territories are available from 2016 to 2020. Data for Prince Edward Island are available from 2016 to 2019, data for Nunavut are available for 2016 to 2018 and data for Newfoundland and Labrador are available for 2020.

All data are considered preliminary and include only closed cases. Closed cases refer to those whose investigation or inquest is complete and whose cause and manner of death are final. Data for this report were extracted in January 2023.

The number of deaths reported is lower than expected as only closed cases are published. Moreover, as the source of completeness of the available information varies between jurisdictions, users should exercise caution when comparing data between years and across provinces and territories.

Coroners and medical examiners may include additional circumstance information in the reports submitted to the CCMED, but the level of detail provided in the report varies by death investigator and by jurisdiction.

A motorcycle is defined as a self-propelled vehicle with a seat for the driver and is designed so that no more than three wheels are in contact with the ground when in motion. A traditional motorcycle, however, is usually two-wheeled. Full-speed motorcycles must be registered, require a valid motorcycle licence plate to be driven on public roads and require the driver to hold a valid motorcycle licence in all provinces and territories to be operated. There are other types of self-propelled two-wheeled vehicles, such as limited-speed motorcycles, motor-assisted bicycles, mopeds, or scooters, which are not included in this report.

Motorcycle fatalities in this report include deaths resulting from transport-related events (i.e., moving vehicles) and exclude deaths from idle-related events (i.e., where the deceased person was sitting on a parked motorcycle or working around a motorcycle). In addition, these fatalities exclude collisions where the deceased person was riding a moped, an electric bicycle or an off-road vehicle (e.g., a dirt bike). When this report was written, 885 motorcycle fatalities were analyzed for which the investigation was complete (closed case). These cases were used for reporting on the circumstances surrounding motorcycle fatalities. CCMED data coverage varies from one variable to another.

The number of motorcycle registrations comes from the following Statistics Canada table: Vehicle registrations, by type of vehicle. Mopeds are included in the death registration statistics but excluded from the analysis on motorcycle fatalities.

Information on Transport Canada's motorcycle and moped fatalities comes from the National Collision Database Online.

Information on risk factors for road traffic injuries comes from the World Health Organization fact sheet.

Information on motorcycle-specific risk factors comes from the Motorcycle Confederation of Canada.

Information on young drivers accused of alcohol and drug impairment was taken from the following Statistics Canada article: Impaired driving in Canada, 2019.

Information on teenage crash risks comes from the following articles: "Changes in collision rates among novice drivers during the first months of driving," in Accident Analysis and Prevention, 2003; "Driving experience, crashes and traffic citations of teenage beginning drivers," in Accident Analysis and Prevention, 2003; "Crash risk and risky driving behaviours among adolescents during learner and independent driving periods," in the Journal of Adolescent Health, 2018.

Information on factors affecting the driving ability of older adults comes from the "Clinician's guide to Assessing and Counseling Older Drivers" from the American Geriatrics Society, 2019.

Counts referenced in this report were rounded to a neighbouring multiple of five.

Definitions, data sources and methods: survey number 5125.

The infographic "Motorcycle Fatalities in Canada, 2016 to 2020" is also now available as part of the series *Statistics Canada — Infographics* (**11-627-M**).

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; **infostats@statcan.gc.ca**) or Media Relations (**statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca**).