

What? Detailed Profile of Facts and Statistics About PEDESTRIANS

Detailed Profile
Of Facts and Statistics About
PEDESTRIANS

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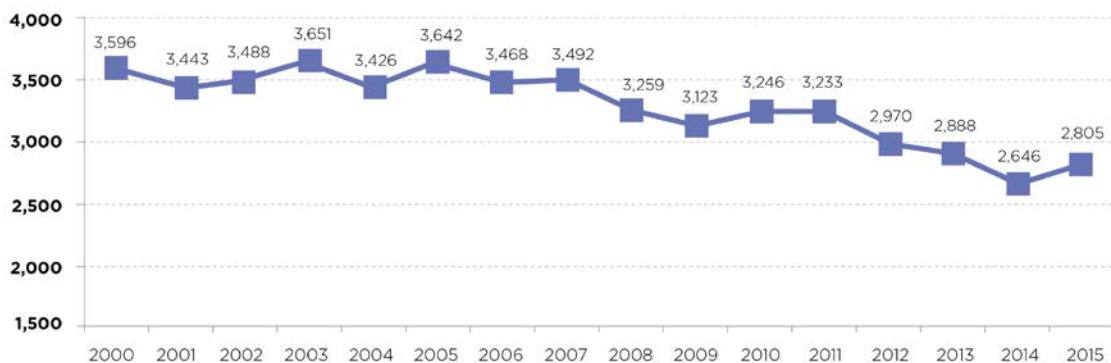
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What

There has been a downward trend in the number of pedestrian victims of accidents causing bodily injury.

Number of pedestrian victims of an accident causing bodily injury, 2000 to 2015



In 2015, 44 pedestrians were killed in Québec, 273 were seriously injured and 2,488 sustained minor injuries in an accident causing bodily injury, for a total of 2,805 pedestrians. This represents a 22% decrease since 2,000, as the number of victims dropped from 3,596 to 2,805. During this period, the total number of victims involved in an accident causing bodily injury dropped from 47,577 in 2000 to 37,351 in 2015, which represents a 21% decrease.

Source: Accident reports, 2000 to 2015.

Pedestrians are vulnerable road users and are the primary beneficiaries when we learn to better share the road.

In order to promote a more active and healthy lifestyle, and out of concern for the environment, the public is increasingly encouraged to get around on foot or bicycle, or to use public transit. On the other hand, there are more and more vehicles on the road. As pedestrians are vulnerable in the event of an impact with a vehicle, more attention must be paid to them. Sharing the road is therefore essential in ensuring the safety of all road users, including pedestrians in particular.

Source: Folder titled *Pedestrians and Drivers—Care and Vigilance Saves Lives!*

There are very few existing strategies to reduce the vulnerability of pedestrians who are under the influence of drugs or alcohol.

In 2013, among the pedestrians killed in Canada as a result of a traffic accident for whom the blood alcohol concentration level was measured during the autopsy, 36% had been drinking and 24% had a blood alcohol concentration above 160 mg/100 ml. In Québec, from 2010 to 2014, 281 pedestrians were killed and the blood alcohol concentration was measured for 119 (42%) of these victims. From this number, 34% had been drinking and 19% had a blood alcohol concentration above 150 mg/100 ml.

Percentage of pedestrians fatally injured and tested based on blood alcohol concentration in Québec, from 2010 to 2014



0 mg/100 ml	66%
1 to 80 mg/100 ml	9%
81 to 150 mg/100 ml	6%
150 mg/100 ml and over	19%

Since no provisions of either the *Highway Safety Code* or the *Criminal Code* concerning impaired faculties apply to pedestrians, municipal by-laws (e.g. drunkenness on a public road, public disorder) are enforced to deal with this problem. In addition to seriously threatening their own safety, pedestrians who are impaired by alcohol or drugs represent a neglected road safety problem that is difficult to solve. Legislation adopted to improve pedestrian safety appears to have little preventative value in this regard. Some studies report that collisions involving drunk pedestrians are concentrated in well-defined urban areas. These results suggest the need for implementing preventive measures in these limited areas that could involve road engineering, education or public health.

Sources:

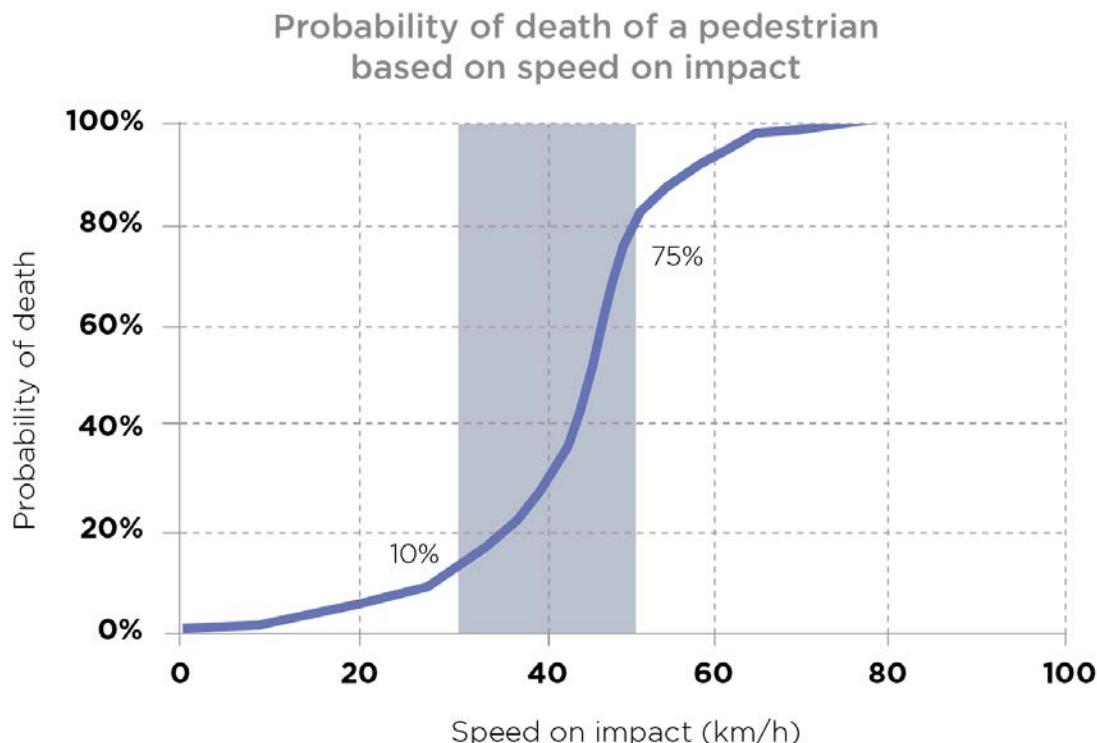
- Countermeasures to Improve Pedestrian Safety in Canada, CCMTA, 2013.
- The Alcohol and Drug-Crash Problems in Canada: 2013 Report. TIRF, 2016.
- Données jumelées de la Société et du Bureau du coroner sur les décès d'accidents de la route, de 2010 à 2014.

In a collision between a vehicle and a pedestrian, the greater the speed of the vehicle on impact, the higher the probability the pedestrian will be killed.

A study by Ashton (1981) has shown that the probability of a pedestrian being killed varies according to the vehicle's speed on impact.

The probability of death increases suddenly in the 30 km/h to 50 km/h range. The likelihood of a pedestrian being killed is 10% when the vehicle travels at 30 km/h and jumps to 75% at 50 km/h.

At an impact speed of 70 km/h and over, the probability of death is nearly 100%.



Source: ASTHON, S.J. Pedestrian Injuries: The Influence of Vehicle Design, 1981.

Wearing reflective clothing is one of the best ways for pedestrians to reduce their risk of being involved in a nighttime collision with a vehicle.

Many accidents that cause pedestrian injury or death occur at night or in low light conditions. Pedestrians often wear dark-coloured clothing, especially in cold weather. This factor, combined with fewer daylight hours, makes them considerably more vulnerable in the fall and winter, especially when there is snow on the ground. Some accessories can make pedestrians more visible, making it easier for drivers to see them sooner.

Wearing reflective clothing, patches of material or tags is one of the most effective ways for pedestrians to reduce their risk of being involved in a nighttime collision with a vehicle. These accessories reflect light, which makes pedestrians very visible. Two laboratory experiments (Owens et al., 1994) compared the visibility of a runner wearing reflective clothing, namely a sweater or jacket, bands or straps attached to the limbs in motion (hips, arms, legs, shoulders), and a runner without any such accessories (control conditions). Detection distances were greater with all the reflective accessories than under the control conditions without any accessories. Moreover, accessories attached to the limbs were more effective than those affixed to the torso, and accessories that drew attention to the body's movements were more effective than a sweater/jacket or bands.

The use of hand-held flashlights or body lamps also increase nighttime visibility. Blomberg et al. (1986) have examined various ways (reflective material, battery-powered flashlight, etc.) of increasing visibility. Pedestrians with a flashlight were detected six times farther than an identically-dressed pedestrian without a flashlight.

Sources:

- Countermeasures to Improve Pedestrian Safety in Canada, CCMTA, 2013.
- Blomberg, R. D., A. Hale and D. F. Preusser. "Experimental Evaluation of Alternative Conspicuity Enhancement Techniques for Pedestrians and Bicyclists", *Journal of Safety Research*, 1986.
- Owens, D. A., R. J. Antonoff and E. L. Francis. "Biological motion and nighttime pedestrian conspicuity", *Human Factors*, 1994.

An estimated one in five pedestrians who use a cell phone look at their phone while crossing an intersection.

A study was conducted in Australia in 2007 on distraction among pedestrians who use a cell phone while crossing the street. This study was based on observations of pedestrians who were using a cell phone compared to those who were not as they crossed an intersection, with or without traffic lights.

More than 20% of cell phone users looked at their device as they crossed the intersection (most of the time to send text messages). Using a cell phone also affected the pedestrians' walking speed and their analysis of traffic before crossing.

A study conducted in 2008 (Nasar et al.) focused on the behaviour of pedestrians using either a cell phone, an iPod-type device or no device at all at crosswalks. Pedestrians using a cell phone crossed unsafely more often than the two other groups. Cell phone users represented nearly half (48%) of the pedestrians observed who crossed unsafely, compared to 16% of pedestrians using an iPod-type device and 25% of pedestrians using no device at all. Thus, using a cell phone while crossing the street appears to inhibit cautious behaviour and could represent a danger for pedestrians.

Sources:

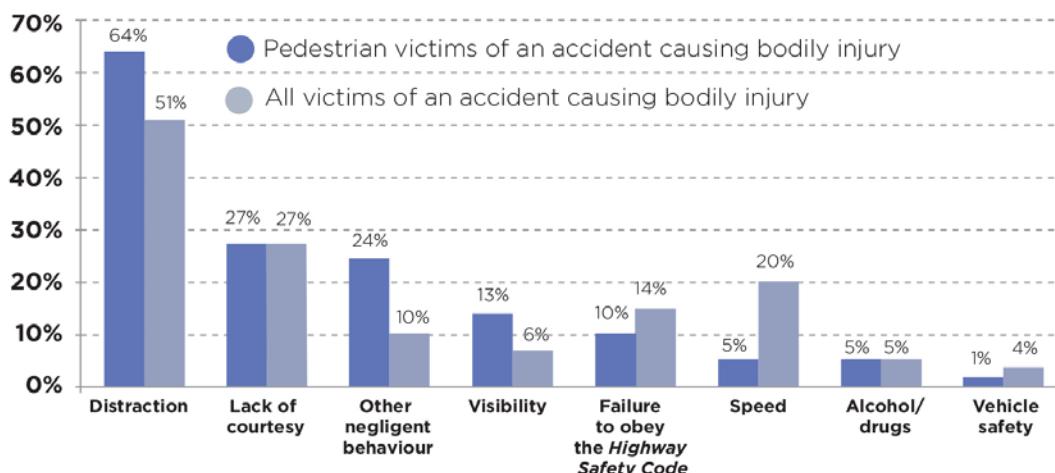
- Hatfield, J., and S. Murphy. "The effects of mobile phone use on pedestrian crossing behaviour at signalised and unsignalised intersections", *Accident Analysis and Prevention*, 2007.
- Nasar, J., P. Hecht and R. Wener. "Mobile telephones, distracted attention, and pedestrian safety", *Accident Analysis and Prevention*, 2008.

Pedestrians are overrepresented in accidents causing bodily injury that involve the following causes:

- **Distraction;**
- **Other negligent behaviour;**
- **Visibility.**

Police officers can indicate the various probable causes of an accident in an accident report. Based on the probable causes of an accident entered in accident reports from 2011 to 2015, the percentages of victims based on victim type¹ can be compared (See the figure below).

Distribution of the percentage of accident victims based on probable cause of accident and type of victim, 2011 to 2015



With regard to pedestrian victims of accidents causing bodily injury, causes of accident involving the largest percentages of victims are distraction (64%), lack of courtesy (27%), other negligent behaviour (24%) and visibility (13%). These causes can be attributed to the pedestrians or the drivers involved in the accident. In the case of distraction, drivers are mostly responsible for the accidents.

¹ Victim percentage comparisons were made for certain causes. The types of victims that compared were pedestrian accident victims with bodily injury and all accident victims with bodily injury. Since an accident can have more than one cause, the sum of all percentages is higher than 100%.

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Percentage of pedestrian victims based on the party responsible for distraction in accidents causing bodily injury and involving at least one pedestrian victim



A comparison of the percentages of pedestrian victims with those of all accidents causing bodily injury reveals that the percentages of victims as a result of distraction (64% vs. 51%), other negligent behaviour (24% vs. 10%) and visibility (13% vs. 6%) are overrepresented.

Conversely, failure to obey the *Highway Safety Code* (10% vs. 14%), speed (5% vs. 20%) and vehicle safety (1% vs. 4%) are underrepresented.

Source: Accident reports, 2011 to 2015.

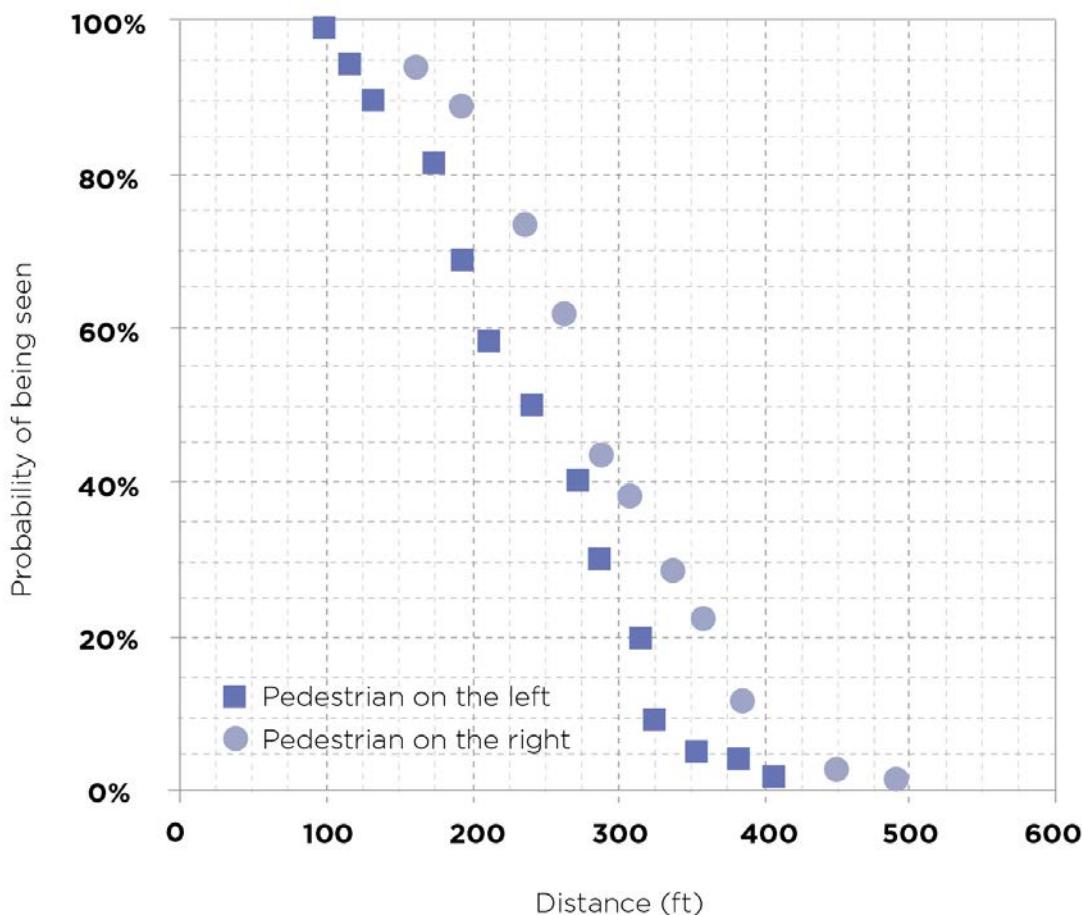
Pedestrians about to enter the path of a vehicle from the left are less likely to be seen by drivers than pedestrians coming in from the right, when distances are equal.

Researchers have determined (2010) that there is a significant probability that a person driving at night with the high beams on will not see a pedestrian. Photometric measurements show that the light from the headlights mostly shines on a pedestrian's feet, and very little light reaches the upper parts of the body until the vehicle is very close. This is why reflective accessories attached to a person's limbs, especially the ankles, are more effective at improving visibility than shirts, sweaters or jackets that only cover the upper body.

Furthermore, given the direction of traffic (cars travel on the right side of the road), pedestrians on the left side of a vehicle receive less light than pedestrians on the right side of a vehicle. As a result, pedestrians who are about to enter the path of a vehicle from the left are less likely to be seen by drivers than pedestrians coming in from the right, all distances remaining equal.

For example, a pedestrian coming in from the left at a distance of 250 ft (76.2 m) from a vehicle has a $\approx 45\%$ chance of being seen by a driver, whereas a pedestrian coming in from the right at same distance from the vehicle has a $\approx 68\%$ probability of being seen.

Probability plot for detection distances
based on pedestrian location



Source: Olson, P.L., R.E. Dewar and E. Farber. Forensic Aspects of Driver Perception and Response, 3rd edition, Tucson, AZ: Lawyers and Judges Publishing Co., 2010.

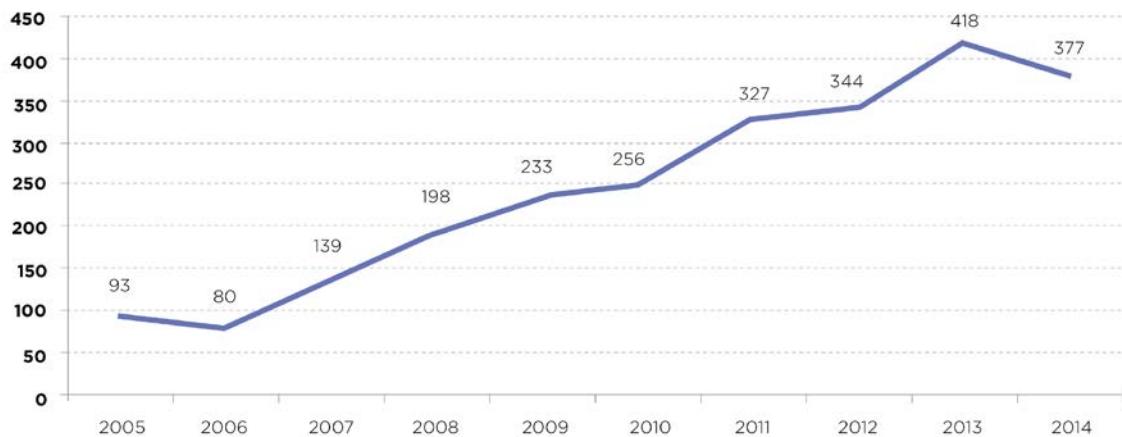
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The number of offences relating to driving a vehicle in connection with pedestrians and cyclists is on the rise.

The number of offences under section 349 of the *Highway Safety Code* (failure to respect the right of way to pedestrians and cyclists at an intersection) is steadily increasing, jumping from 93 in 2005 to 377 in 2014.

Number of offences per year for failure to respect the right of way of pedestrians and cyclists at an intersection, 2005 to 2014



Source: Les infractions et les sanctions reliées à la conduite d'un véhicule routier 2005-2014, SAAQ (in French only).

The following vehicle movements are overrepresented in accidents involving at least one pedestrian victim:

- **turning left;**
- **turning right;**
- **driving in reverse.**

Collisions between motor vehicles and pedestrians can be divided into two main categories: parallel collisions, where a pedestrian is travelling with or against the flow of traffic; and transversal collisions, where a pedestrian travels across a vehicle's trajectory.

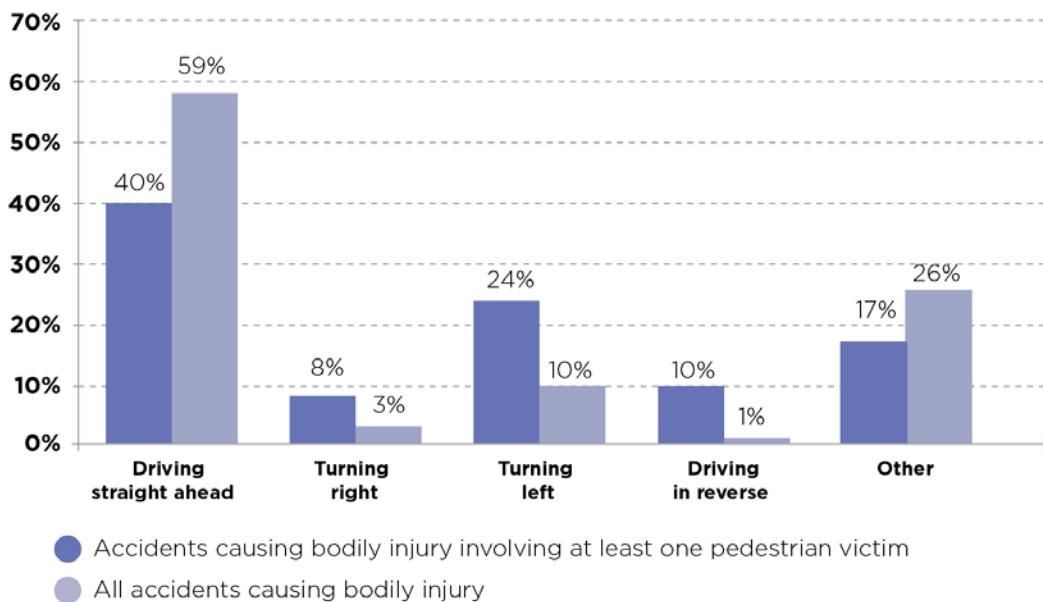
In the case of parallel collisions, the pedestrian is not always aware that a vehicle is approaching (walking with the flow of traffic) or may assume that the driver has seen him or her (walking against the flow of traffic). Moreover, drivers are sometimes unable to determine, especially in the dark, whether the pedestrian is walking towards or away from the vehicle, if they can even see the pedestrian at all. In transversal collisions, the pedestrian is not directly in the driver's field of vision, which gives the driver less time to react to the potential hazard.

Vehicle movement is also important.

A comparison of the distribution of vehicle movements for accidents causing bodily injury involving at least one pedestrian victim with those for all accidents causing bodily injury reveals that the following vehicle movements are overrepresented:

- turning left;
- turning right;
- driving in reverse.

Distribution of the percentage of vehicles based on movement and type of accident, 2011 to 2015



Sources:

- Countermeasures to Improve Pedestrian Safety in Canada, CCMTA, 2013.
- Accident reports, 2011 to 2015.

Few Quebecers (37%) believe that pedestrians obey traffic rules.

In a survey conducted after the 2014 Pedestrian Safety Campaign, the Société de l'assurance automobile du Québec asked respondents about their perception of the relationship between pedestrians and drivers. More than 80% of Quebecers considered pedestrian safety to be an issue of concern (this proportion was 93% in 2002).² In fact, 52% of the respondents believed that drivers were respectful of pedestrians. However, only 37% of the respondents thought that pedestrians were generally respectful of traffic rules. Lastly, a little over a third of pedestrians (35%) believed that they are at a high risk of being involved in an accident with a vehicle.

With regard to strictness on the part of police, a high percentage of respondents (84%) believed that police officers should be strict or very strict towards pedestrians who fail to obey traffic rules. A higher percentage (94%) believed that police officers should be strict or very strict towards drivers who fail to obey traffic rules with regard to pedestrians.

As for pedestrian safety, among those who walk the streets at dusk, 24% stated they often take measures to be seen more easily by drivers, such as wearing light or brightly coloured clothing or visible accessories. Among pedestrians who walk in the vicinity of heavy vehicles, 94% were of the opinion that the blind spots of such vehicles are a significant source of accidents involving heavy vehicles and pedestrians.

Source: Évaluation de la campagne Piétons 2014 "Contre une auto, un piéton n'a aucune chance", rapport d'étude présenté à la SAAQ, SOM, February 2015 (in French only).

² The question was worded slightly differently. Respondents were asked: "In your opinion, is pedestrian safety an issue that is important?" (2002 Pedestrian Safety campaign - Évaluation post-campagne, rapport d'étude présenté à la SAAQ, SOM, November 2002 - in French only).

The diversity of pedestrians is increasing and, given how varied mobility devices can be in size and speed, the number of incidents among pedestrians will likely increase.

Conventional pedestrians (walkers and runners) now share sidewalks with an increasing number of non-motorized personal mobility devices (e.g. inline skates, skateboards) and motorized personal mobility devices (MPMDs) (three- and four-wheeled mobility scooters, electric scooters and Segways). MPMDs for persons with reduced mobility (e.g. three- and four-wheeled mobility scooters and motorized wheelchairs) are classified as pedestrian modes of transportation. All of these MPMDs are grouped together as "pedestrians on wheels."

The diversity of pedestrians is therefore increasing and, given the differences in speed and weight of the various personal mobility devices (some devices can weigh up to 90 kg and reach speeds of up to 40 km/h), conflicts and incidents among pedestrians are likely to occur more frequently.

In most jurisdictions, no distinction is drawn between conventional pedestrians and pedestrians on wheels. Furthermore, no licences, permits, registration or insurance are required to use most MPMDs. Neither is there any systematic recording of incidents among pedestrians, in most cases.

Little research has been done on the hazards posed by these devices. Most of the injuries that result from their use are the result of the person falling from the device. Nevertheless, there is no doubt that collisions between pedestrians on wheels and motor vehicles can cause serious injuries, especially given the fact that some of these pedestrians can travel on the roadway at relatively high speeds.

Sources:

- Countermeasures to Improve Pedestrian Safety in Canada, CCMTA, 2013.
- Discussion Paper and Recommendation Regarding Issues of Managing Motorized Personal Mobility Devices (MPMDs), CCMTA, 2010.

Throughout the pilot project (until 2018), motorized mobility aids can be used on sidewalks and in bike lanes. In certain circumstances, they can also be used on the street and the side of the road.

In Québec, the *Highway Safety Code* does not govern the use of motorized mobility aids (MMAs). MMAs include three- and four-wheeled mobility scooters and motorized wheelchairs. Furthermore, a Ministerial Order currently in effect provides for a pilot project (in effect since June 1, 2015) to be carried out over a three-year period.

Under this pilot project, MMAs are allowed to travel on sidewalks and in bike lanes, as well as on the roadway and the side of the road in certain circumstances. Nevertheless, several MMA users choose to travel on sidewalks. Under the pilot project, MMA users who travel on sidewalks and in bike lanes must ensure that the safety of the other users is not compromised. As well, when they travel on the roadway, they must yield the right of way to pedestrians and other MMA users who are about to cross the road at pedestrian crossings.

Source: Order number 2015-04 of the Minister of Transport relative to the pilot project concerning motorized mobility aids.³

³ The text of the Ministerial Order can be found at the following address:
<http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=1&file=3186.pdf>

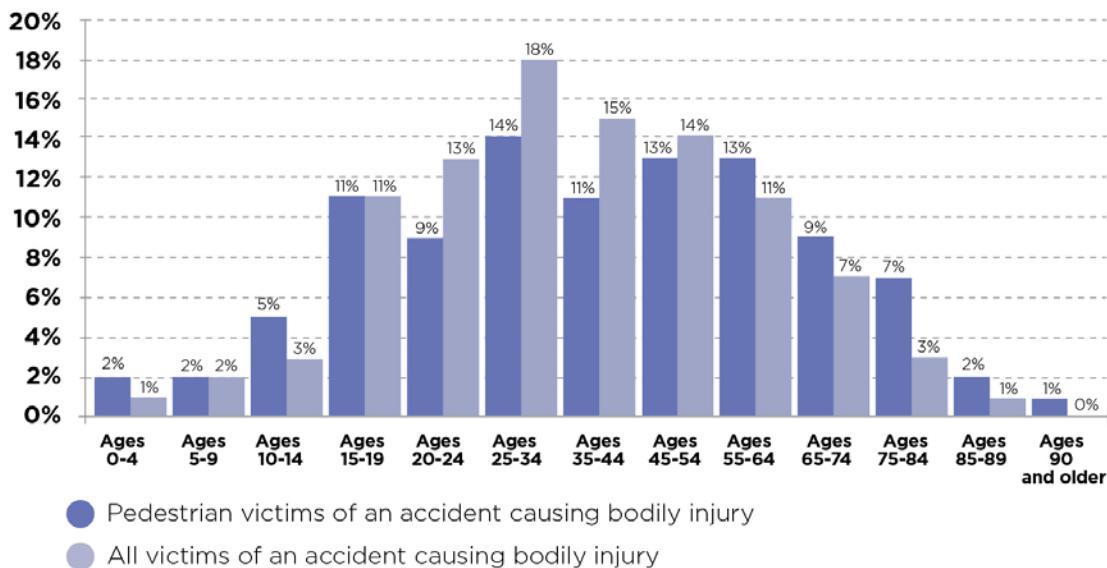
WHO?

The young and the elderly are more at risk of being involved in an accident as pedestrians.

For 2015, the percentage of pedestrian accident victims among the young (aged 0 to 14) and the elderly (aged 55 and older) are overrepresented compared to the percentage figures for all accident victims, as illustrated in the figure below.

A look at the number of pedestrian accident victims based on age bracket reveals that the active adult age brackets (ages 15 to 64) are among those with the highest accident frequency ($n > 250$).

Distribution of the percentage of victims based on age and type of victim, 2015



Placing these numbers in perspective, however, by calculating the percentage of pedestrian accident victims over all victims per age category, the highest percentages ($\pi \geq 10\%$) are in the same age brackets as those presented in the figure above, except for the 5 to 9 (8.8%) and the 55 to 64 (8.9%) age brackets.

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Age bracket	Number of pedestrian victims of an accident causing bodily injury (n)	Percentage of pedestrian victims of an accident causing bodily injury over all victims (π)
0 to 4	61	11.0%
5 to 9	67	8.8%
10 to 14	127	13.0%
15 to 19	303	7.2%
20 to 24	257	5.2%
25 to 34	386	5.8%
35 to 44	299	5.5%
45 to 54	344	6.6%
55 to 64	367	8.9%
65 to 74	249	10.0%
75 to 84	204	15.7%
85 to 89	59	20.5%
90 and older	14	18.7%
Total ⁴	2,737	7.4%

Source: Accident reports, 2015.

⁴ Excluding victims for whom the age was not specified.

Given that aging generally leads to a loss of physical and cognitive capacities, the elderly are more vulnerable pedestrians.

A study conducted in 2001 established a connection between the severity of injuries sustained by pedestrian victims of collisions and the speed of the vehicle involved. The findings revealed that pedestrians aged 60 and older sustained more serious injuries than victims in other age brackets at lower impact speeds.

Another study, from 2007, provided a detailed description of the capacities and processes that deteriorate with age and become a factor in road safety. These include:

- many types of visual functions;
- hearing loss;
- physical movement;
- reduced walking speed;
- loss of balance;
- the ability to react to slipping and tripping.

A 1988 study grouped the cognitive problems linked to collisions involving elderly pedestrians into five principal factors:

- **misjudging gaps:** improperly evaluating the distance of oncoming vehicles as well as the distance between them;
- **distraction:** absent-mindedly following other pedestrians (who are likely to be more alert) and crossing the street after the traffic light has changed;
- **visual attention:** paying more attention to a traffic signal or light than traffic;
- **expectations:** assuming a driver will yield the right of way;
- **impatience:** crossing the street after a long wait or crossing between parked cars before reaching the intersection.

Sources:

- Davis, G. A. "Relating severity of pedestrian injury to impact speed in vehicle-pedestrian crashes: simple threshold model", *Transportation Research*, 2001.
- Dewar, R. E. "Age differences - drivers old and young", in Dewar, R. E. and P. L. Olson. *Human Factors in Traffic Safety*, Second Edition, Tucson, AZ: Lawyers and Judges Publishing Co., 2007.
- McKnight, A. J. "Driver and Pedestrian Training", in *Transportation in an Aging Society*, Transportation Research Board, 1988.

Pedestrians aged 65 and older represent 50% of all injured pedestrians in OECD countries. Compared to other pedestrians, the injuries they sustain are more serious and their hospital stays are longer.

Among all pedestrians, the elderly are more vulnerable, as the scientific literature has confirmed time and again. The statistics paint a clear picture: elderly pedestrians aged 65 and older represent up to 50% of all injured pedestrians in OECD countries. They sustain more serious injuries and remain hospitalized for longer periods.

Another issue is that aging gradually reduces certain capacities required to make decisions about crossing the road: vision (lower sensitivity to contrast, reduced visual field, fading colour perception), hearing, muscle strength, memory (especially spatial memory, by which individuals can encode and use elements in the environment to acknowledge their location), responsiveness (stimulus reaction time) or general motor skills (e.g. osteoarthritis, rheumatism). This puts the elderly at greater risk than other population subgroups.

Generally speaking, the findings of the PARI project confirm that the vulnerability factors of elderly pedestrians are both multiple and varied. They include disabilities related to aging, perception of risk, behaviour while crossing the road, as well as urban development and layout.

Sources:

- Abou-Raya, Suzan, and Leila A. Elmeguid (2009). "Road traffic accidents and the elderly", *Geriatrics and Gerontology International*, 9 (3).
- Cloutier et al. (2013). *Projet PARI: Piétons âgés, risque et insécurité routière chez une population grandissante*, Institut National de la Recherche Scientifique, Centre Urbanisation Culture Société (INRS-UCS).
- Dommes, Aurélie, Viola Cavallo, Jean-Baptiste Dubuisson, Isabelle Tournier and Fabrice Vienne (2014). "Crossing a two-way street: comparison of young and old pedestrians", *Journal of Safety Research*, 50 (0).
- Forum International des Transports (2012). *Piétons: Sécurité, espace urbain et santé*. Éditions OCDE, [online] [<http://dx.doi.org/10.1787/9789282103678-fr>].
- Lobjois, R., and V. Cavallo (2009). "The effects of aging on street-crossing behavior: From estimation to actual crossing", *Accident Analysis and Prevention*, 41 (2).
- Loo, B. P., and K. L. Tsui (2009). "Pedestrian injuries in an ageing society: insights from hospital trauma registry", *The Journal of trauma*, 66 (4).
- Oxley, Jennifer A., Elfriede Ihnsen, Brian N. Fildes, Judith L. Charlton and Ross H. Day (2005). "Crossing roads safely: An experimental study of age differences in gap selection by pedestrians", *Accident Analysis & Prevention*, 37 (5).

Children are vulnerable pedestrians because their physical and cognitive capacities are still developing.

The physical, cognitive, visual and auditory development of children puts them at a disadvantage, particularly as pedestrians. Young pedestrians are at a higher risk of accident because crossing the street requires complex processes and behaviours that children have not yet developed, including:

- planning their route;
- detecting vehicles;
- evaluating the speed and distance of oncoming vehicles;
- deciding when the time is right to cross the street.

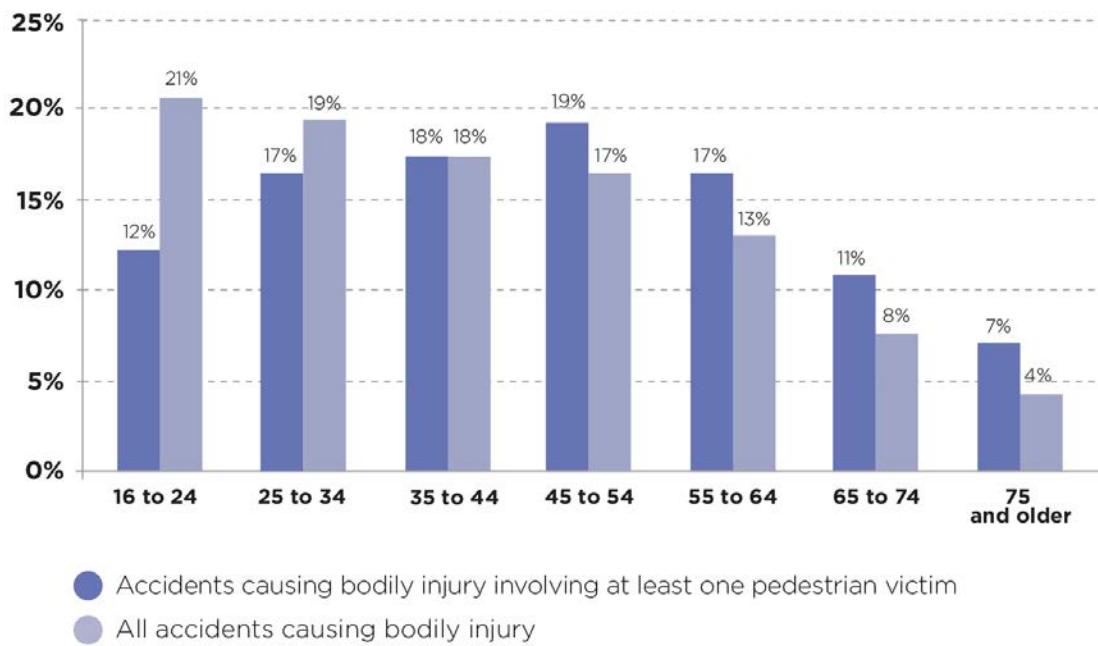
These processes require advanced motor skills, as well as the capacity for continuous analysis and feedback regarding decision making. The risk of injury among children is exacerbated by their small size and lower eye level compared to adults. This forces them to have to look up to see over the tops of vehicles. Furthermore, their field of vision is often obstructed by objects that limit their perception and their ability to face traffic. Their small size also makes them difficult for drivers to see, and they become totally invisible when they are near a vehicle that is taller than they are.

Source: Schieber, R. A., and N. J. Thompson. "Developmental risk factors for childhood pedestrian injuries", *Injury Prevention*, 1996.

Drivers aged 45 and older are overrepresented in accidents involving pedestrians.

For 2015, an analysis of drivers involved in accidents causing bodily injury involving at least one pedestrian victim based on age shows that drivers in the higher age brackets (45 or older) have a higher accident rate than drivers involved in all accidents causing bodily injury. More than half (53.6%) of drivers involved in accidents causing bodily injury involving at least one pedestrian victim are aged 45 or older, whereas they represent 41.8% of drivers involved in all accidents causing bodily injury. Drivers aged 75 or older are even more significantly overrepresented.

Distribution of the percentage of drivers based on age and type of accident, 2015



Heavy vehicles are overrepresented in accidents causing bodily injury involving at least one pedestrian victim and fatal accidents involving at least one pedestrian victim.

Type of vehicle ⁵	Percentage of vehicles involved based on the type of accident		Percentage ratio
	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury	
Automobile and light truck	90.0%	88.2%	1.02
Heavy vehicle ⁶	↑6.3%	5.2%	1.21
Taxi	↑2.6%	1.0%	2.60
Motorcycle	0.4%	3.7%	0.11
Moped and scooter	0.1%	1.0%	0.10
Other ⁷	0.7%	0.8%	0.88

↑This symbol is used to illustrate the fact that the type of vehicle in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

Automobiles, light trucks, heavy vehicles and taxis are more often involved in accidents causing bodily injury involving at least one pedestrian compared to all accidents causing bodily injury. Heavy vehicles, and particularly taxis, were overrepresented in accidents involving pedestrians in 2015.

A look at the percentages of the types of vehicles involved in fatal accidents involving at least one pedestrian victim reveals that, for the period from 2011 to 2015, percentages for heavy vehicles (excluding buses) (17% vs. 14%) and buses (5% vs. 1%) were overrepresented compared to the corresponding percentages for all fatal accidents.

According to a detailed analysis of 47 fatal accidents that occurred between 2007 and 2009 involving at least one heavy vehicle and at least one pedestrian, these accidents:

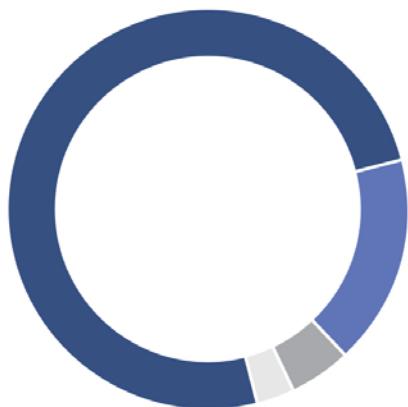
- were often caused by tool vehicles (34%);
- occurred while the heavy vehicle was being driven in reverse (30%);
- occurred while the heavy vehicle was turning left (15%);
- were caused by the pedestrian (the pedestrian was responsible) (32%);
- were caused by the heavy vehicle driver's work methods (15%).

⁵ Excluding bicycles.

⁶ Heavy vehicles include buses, minibuses, heavy trucks, road tractors, tool vehicles and equipment vehicles.

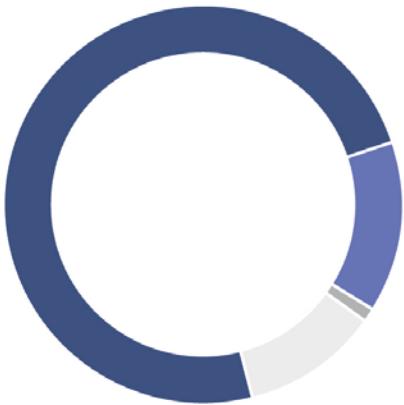
⁷ "Other" includes the other types of vehicles, namely emergency vehicles, snowmobiles, off-road vehicles, etc.

Distribution of vehicle type in fatal accidents involving at least one pedestrian victim, 2011 to 2015



Automobile or light truck	75%
Heavy vehicle	17%
Bus	5%
Other	3%

Distribution of vehicle type for all fatal accidents, 2011 to 2015



Automobile or light truck	74%
Heavy vehicle	14%
Bus	1%
Other	11%

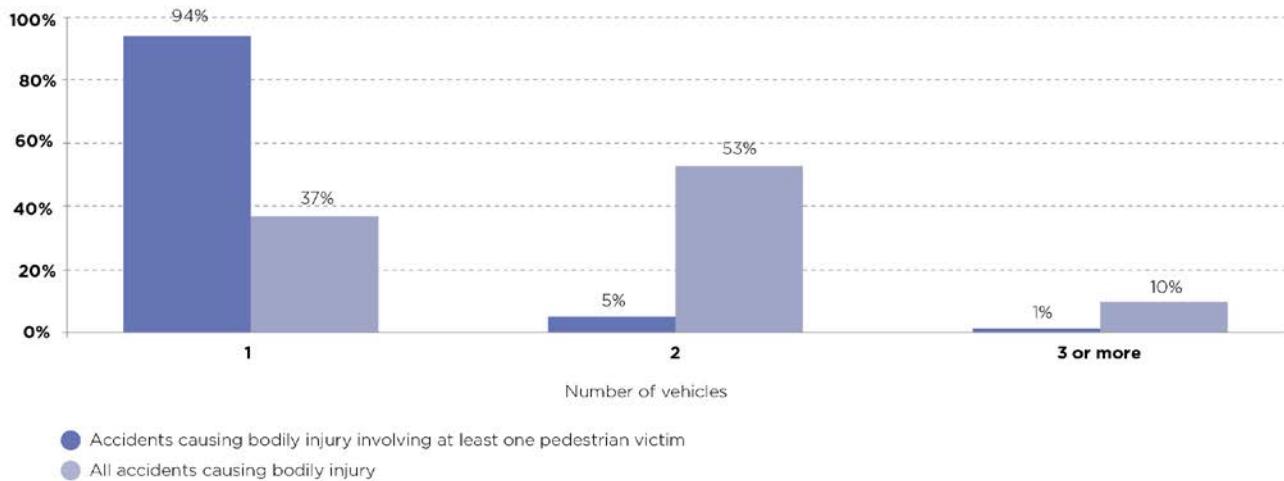
Sources:

- Accident reports, 2011 to 2015.
- *Analyse des accidents mortels impliquant au moins un véhicule lourd de 2007 à 2009 – Principaux constats*, Groupe de travail multisectoriel lié à la Table de concertation gouvernement industrie sur la sécurité des véhicules lourds (in French only).

Accidents involving a single vehicle occur more frequently and are overrepresented in accidents causing bodily injury involving at least one pedestrian victim.

For accidents causing bodily injury involving at least one pedestrian victim, 94% involved a single vehicle, compared to 37% for all accidents causing bodily injury.

Distribution of the percentage of accidents based on the number of vehicles involved and type of accident, 2015

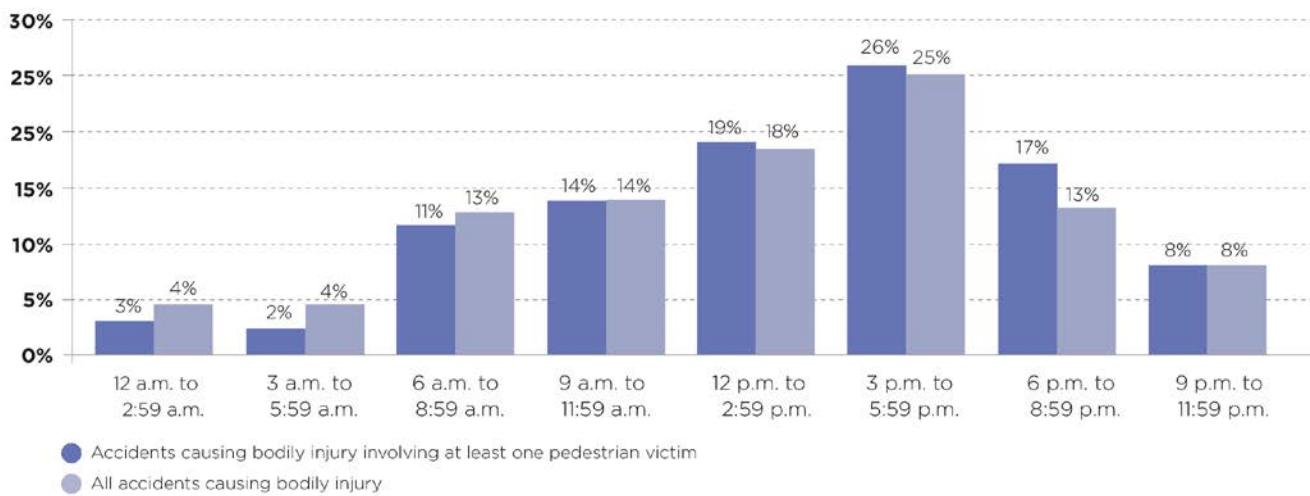


Source: Accident reports, 2015.

When

More than four out of ten accidents causing bodily injury involving at least one pedestrian (43%) occur between 3:00 p.m. and 9:00 p.m.

Distribution of the percentage of accidents based on time of day and type of accident, 2011 to 2015



For the period from 2011 to 2015, an analysis of the data for accidents based on time of day shows that accidents causing bodily injury involving at least one pedestrian victim are overrepresented from 3 p.m. to 9 p.m. compared to all accidents causing bodily injury.

The findings show that 26% of the these accidents occur between 3 p.m. and 6 p.m., compared to 25% for all accidents causing bodily injury, and 17% occur between 6 p.m. and 9 p.m., compared to 13% for all accidents causing bodily injury.

Source: Accident reports, 2011 to 2015.

Accidents causing bodily injury involving at least one pedestrian victim occur more frequently and are overrepresented from October to December.

Month	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury
January	8.6%	8.4%
February	7.2%	7.4%
March	↑7.2%	6.7%
April	6.3%	6.2%
May	7.4%	8.1%
June	7.4%	9.0%
July	7.0%	9.5%
August	6.9%	9.5%
September	9.0%	9.1%
October	↑10.4%	8.5%
November	↑11.6%	8.7%
December	↑10.8%	8.9%

↑ This symbol is used to illustrate the fact that the month in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

From 2011 to 2015, accidents causing bodily injury involving at least one pedestrian victim were more frequent and were overrepresented from October to December.

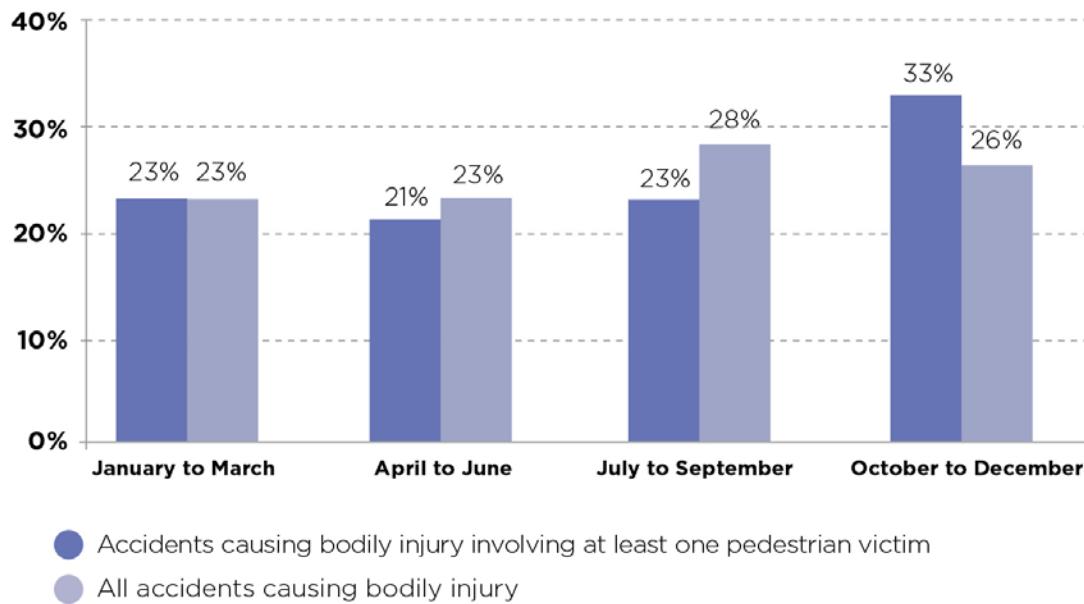
On average, 10.4% of accidents involving at least one pedestrian victim occurred in October; 11.6% occurred in November; and 10.8% occurred in December, whereas these percentages were all below 9.0% for all accidents causing bodily injury.

The figure below illustrates the overrepresentation and the striking difference for the last three months of the year, during which nearly one out of three accidents involving at least one pedestrian victim occur (33%).

When?

Detailed Profile of Facts and Statistics About PEDESTRIANS

Distribution of the percentage of accidents based on yearly quarter and the type of accident, 2011 to 2015



Source: Accident reports, 2011 to 2015.

On average, accidents causing bodily injury involving at least one pedestrian victim occur more frequently on weekdays than on weekends.

An analysis of accident data from 2011 to 2015 shows that accidents causing bodily injury involving at least one pedestrian victim occur more often on weekdays. They are overrepresented from Monday to Friday compared to all accidents causing bodily injury.

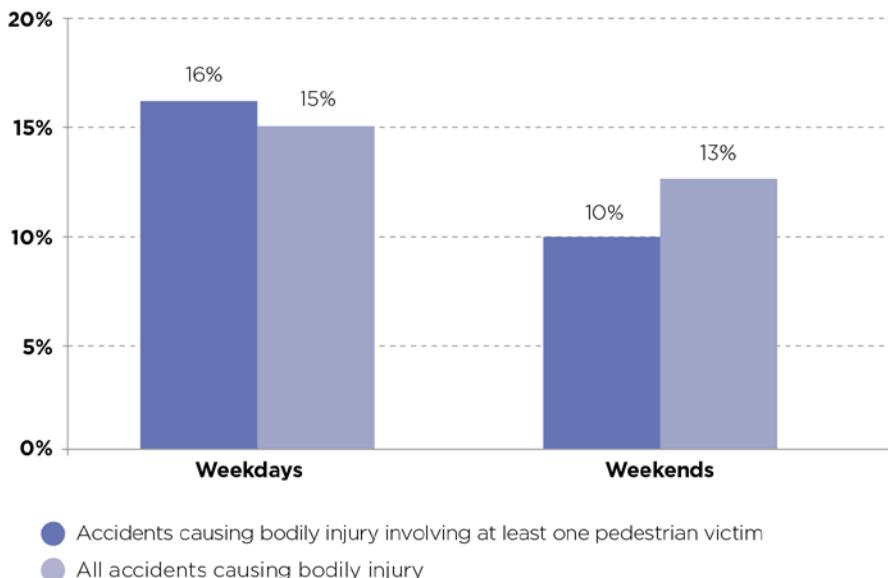
The daily percentage of accidents involving at least one pedestrian is 10% on weekends (Saturday and Sunday), compared to 13% for all accidents causing bodily injury.

On weekdays (Monday to Friday), the average daily percentage of accidents causing bodily injury involving at least one pedestrian victim is 16%. This figure is slightly lower for all accidents causing bodily injury (15%).

Day of the week	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury
Sunday	8.7%	11.6%
Monday	↑14.0%	13.6%
Tuesday	↑15.8%	14.1%
Wednesday	↑15.7%	14.4%
Thursday	↑17.9%	15.7%
Friday	↑17.4%	17.0%
Saturday	10.5%	13.5%

↑ This symbol is used to illustrate the fact that the day of the week in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

Average daily percentages of accidents based on period during the week and type of accident, 2011 to 2015



Source: Accident reports, 2011 to 2015.

Accidents causing bodily injury involving at least one pedestrian victim occur more frequently and are overrepresented in clear weather.

Weather conditions	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury
Clear	↑63.8%	61.0%
Cloudy or dark	18.6%	19.9%
Rain (heavy, showers, drizzle)	↑12.1%	9.1%
Snow (storm, blowing snow, hail)	4.6%	8.6%
Other	0.9%	1.4%

↑ This symbol is used to illustrate the fact that the weather condition in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

A study of weather conditions⁸ from 2011 to 2015 when accidents causing bodily injury involving at least one pedestrian victim occurred shows that accidents occurred more frequently and were overrepresented in clear weather.

Accidents involving at least one pedestrian victim are also overrepresented in rainy weather. Such is the case for 12.1% of accidents involving at least one pedestrian, compared to 9.1% for all accidents causing bodily injury. This underscores the importance of pedestrians making sure they are visible at all times, especially in the rain.

Source: Accident reports, 2011 to 2015.

⁸ Weather conditions describe atmospheric conditions, such as clouds, precipitation or wind, that prevailed when the accident occurred. "Clear" weather conditions means there were few or no clouds, which can also occur at night. This variable is different from the "daylight" variable.

Accidents causing bodily injury involving at least one pedestrian victim occur more frequently when visibility is reduced than all accidents causing bodily injury.

Visibility for the driver involved in the accident	Drivers involved in	
	accidents causing bodily injury involving at least one pedestrian victim	all accidents causing bodily injury
Good	76.0%	87.8%
Reduced by a vehicle	↑ 4.1%	2.8%
Reduced by sun glare	↑ 5.9%	2.2%
Reduced by weather conditions	↑ 9.1%	5.3%
Reduced by other factors ⁹	↑ 5.0%	1.8%

↑ This symbol is used to illustrate the fact that the visibility factor in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

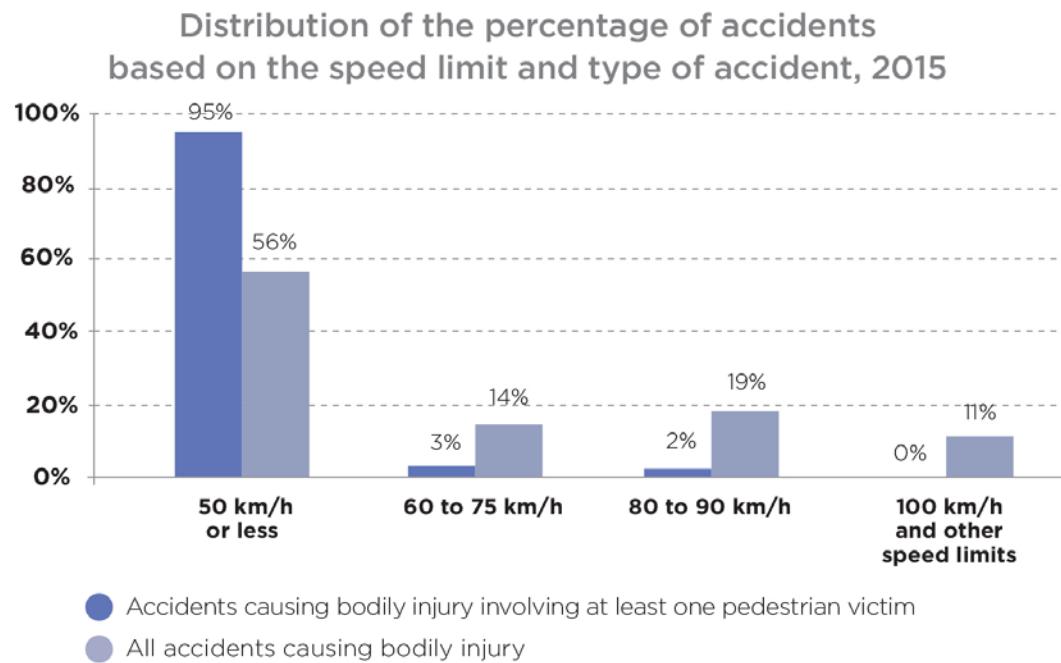
Driver visibility is a key factor in accidents causing bodily injury involving at least one pedestrian victim. A comparison of the distribution of drivers involved in such accidents with the distribution of drivers involved in all accidents causing bodily injury in 2015 clearly shows that all reduced visibility categories are overrepresented. Driver visibility was reduced for 24.0% of drivers involved in an accident causing bodily injury involving at least one pedestrian victim, whereas driver visibility was reduced for only 12.2% of drivers involved in all accidents causing bodily injury.

Source: Accident reports, 2015.

⁹ "Reduced by other factors" refers to dust, smoke, splashes, embankments, headlights of other vehicles, trees, etc.

Where

Accidents causing bodily injury involving at least one pedestrian victim are more frequent and overrepresented in zones where the speed limit is 50 km/h or less.



In 2015, 95% of accidents causing bodily injury involving at least one pedestrian victim occurred in zones where the speed limit is 50 km/h or less, compared to 56% for all accidents causing bodily injury.

Accidents causing bodily injury involving at least one pedestrian victim are more frequent and overrepresented in zones of 50 km/h or less.

Accidents involving pedestrians are more frequent and overrepresented on main roads and residential streets.

Road category	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury
Ramp, service road, highway collector lane	0.6%	3.4%
Numbered road	7.7%	36.6%
Main road	↑ 44.0%	33.2%
Residential street	↑ 27.7%	13.8%
Country road	1.6%	8.2%
Parking lot	↑ 13.4%	3.0%
Other ¹⁰	↑ 4.9%	1.9%

↑ This symbol is used to illustrate the fact that the road category in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

In 2015, whereas all accidents causing bodily injury occurred more frequently on numbered and main roads, more than 70% of accidents causing bodily injury involving at least one pedestrian victim occurred on main roads (44.0%) and residential streets (27.7%).

Accidents involving at least one pedestrian victim are overrepresented on both of these types of roads, as well as in parking lots (13.4%) and other categories (e.g. private property).

This overrepresentation is especially pronounced in parking lots, where 13.4% of collisions involving a pedestrian victim occurred, compared to 3.0% for all accidents causing bodily injury.

Source: Accident reports, 2015.

¹⁰ "Other" refers to alleys, other public roads, private property, private roads, etc.

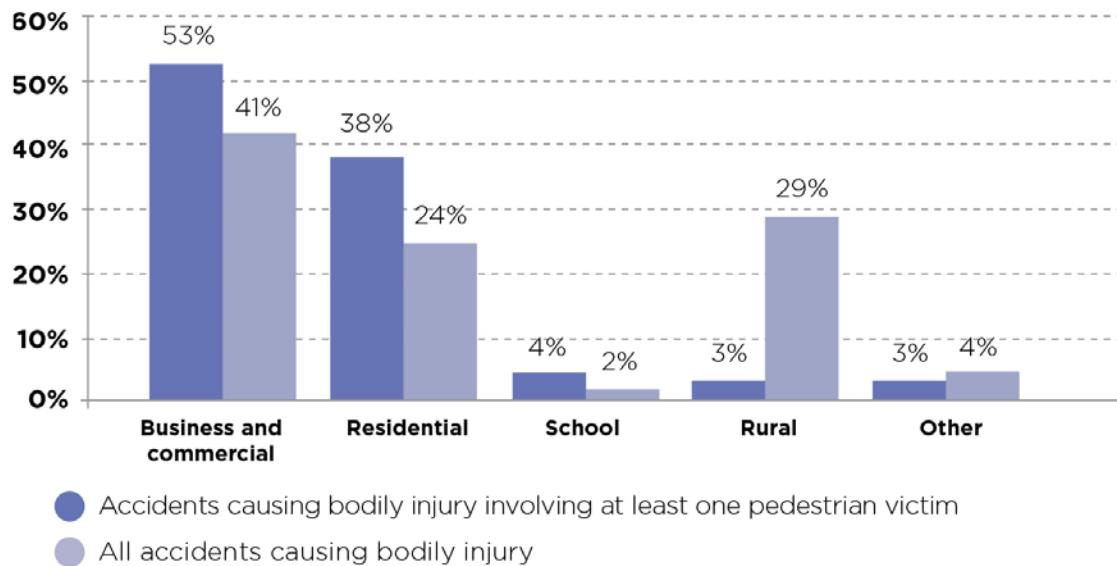
Accidents causing bodily injury involving at least one pedestrian victim are more frequent and overrepresented in business, commercial and residential environments.

An analysis of the environments in which accidents occurred for 2015 shows that accidents causing bodily injury involving at least one pedestrian victim were more frequent and overrepresented in business and commercial (53%) and residential (38%) environments.

Only 3% of accidents involving at least one pedestrian victim occurred in a rural environment, whereas such was the case for 29% of all accidents causing bodily injury. However, the severity of the accidents involving at least one pedestrian were more serious in rural environments.

In rural environments, the percentage of fatal accidents involving at least one pedestrian victim was 12%, whereas it was less than 4% in the other types of environment. In comparison, the percentage of all fatal accidents was 3% in rural environments.

Distribution of the percentage of accidents based on environment and type of accident, 2015



Where?

Detailed Profile of Facts and Statistics About PEDESTRIANS

Distribution of accidents causing bodily injury involving at least one pedestrian victim in a rural environment based on the severity of injury, 2015



● Mild	66%
● Serious	22%
● Fatal	12%

Distribution of accidents causing bodily injury in a rural environment based on the severity of injury, 2015



● Mild	91%
● Serious	7%
● Fatal	3%

Source: Accident reports, 2015.

Montréal is the administrative region where accidents causing bodily injury involving at least one pedestrian victim occur the most frequently and are the most strongly overrepresented.

Administrative region	Accidents causing bodily injury involving at least one pedestrian victim	All accidents causing bodily injury	Average annual pedestrian victim rate per 100,000 residents
Montréal	↑ 42.9%	21.1%	63.5
Montérégie	13.1%	18.5%	25.5
Capitale-Nationale	7.9%	8.1%	31.7
Laurentides	5.5%	7.6%	27.3
Laval	↑ 5.3%	5.1%	37.4
Lanaudière	4.3%	6.7%	26.1
Outaouais	3.8%	4.2%	28.8
Chaudière-Appalaches	2.8%	5.4%	19.1
Mauricie	2.7%	4.3%	29.7
Saguenay—Lac-St-Jean	2.5%	3.6%	26.2
Estrie	2.3%	4.0%	20.5
Centre-du-Québec	2.0%	3.6%	25.2
Abitibi-Témiscamingue	1.8%	2.1%	34.2
Bas-Saint-Laurent	1.5%	2.8%	20.6
Côte-Nord	0.9%	1.2%	29.6
Gaspésie—Îles-de-la-Madeleine	0.6%	1.3%	19.1
Nord-du-Québec	0.2%	0.3%	16.4

↑ This symbol is used to illustrate the fact that the administrative region in question is distinctly overrepresented (only when the percentage ratio is ≥ 1.03).

For the period from 2011 to 2015, accidents causing bodily injury involving at least one pedestrian victim were more frequent and overrepresented in the administrative region of Montréal (42.9%).

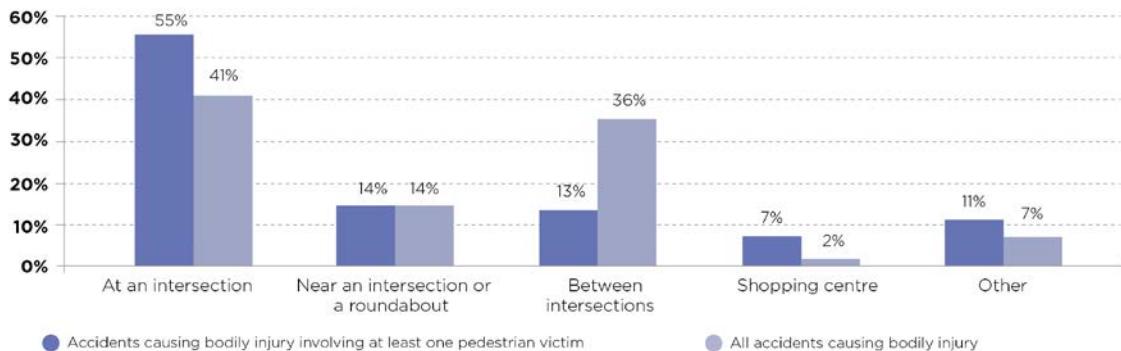
The Montérégie (13.1%) and the Capitale-Nationale (7.9%) are the other administrative regions where this type of accident occurs more frequently, whereas Laval is the only other region where such accidents are overrepresented.

Do these administrative regions have such higher percentages only because they have more residents? One way to put these numbers in perspective is to consider the rate of pedestrian victims (number of pedestrian victims involved in accidents causing bodily injury, divided by the total population number, multiplied by 100,000) for each region. This exercise reveals that Montréal still has the highest rate (63.5). The rates for the other regions range from 16.4 (Nord-du-Québec) to 37.4 (Laval).

Source: Accident reports, 2011 to 2015.

More than half of accidents involving pedestrians occur at intersections.

Distribution of the percentage of accidents based on location and type of accident, 2015



In 2015, accidents causing bodily injury involving at least one pedestrian victim occurred more frequently and were overrepresented at intersections (less than 5 metres from an intersection). The *Highway Safety Code* requirement that pedestrians cross at intersections is not unrelated to this fact, as these areas are where pedestrians and motorists interact most often. It should be pointed out, however, that even though intersections are the most appropriate places to cross a street, doing so requires extra caution. Furthermore, pedestrians are clearly overrepresented in the "Shopping centre" and "Other" categories (e.g. tunnels, level crossings, overpasses).

Only 13% of accidents causing bodily injury involving at least one pedestrian victim occur between intersections (at more than 100 metres from an intersection), compared to 36% for all accidents causing bodily injury.

Source: Accident reports, 2015.