




Office of the Chief Coroner for Ontario

Pedestrian Death Review

A Review of All Accidental Pedestrian Deaths in Ontario
From January 1st, 2010 to December 31st 2010



Everyone is a Pedestrian!



This report is dedicated to the 95 Ontarians who lost their lives in preventable pedestrian collisions in 2010, and whose deaths are the subject of this review.

It is the hope of the Office of the Chief Coroner that this report will assist to reduce and prevent pedestrian collisions in the future which ultimately result in needless injuries and preventable deaths.

Lastly, the report acknowledges the impact of these tragic losses on the families of those who died.

Dear Ontarians,

The Office of the Chief Coroner is pleased to submit this report on the pedestrian deaths that occurred in the Province of Ontario between January 1 and December 31, 2010. This review encompasses the tragic deaths of 95 people who died as pedestrians while travelling the roadways of Ontario in 2010.

The motto of the Office of the Chief Coroner is: ***We speak for the dead to protect the living.***

It is our hope that this report and its recommendations will provide a voice to those pedestrians who lost their lives and that from an examination of their deaths, walking and road safety for pedestrians in Ontario will be enhanced.

The report makes 26 recommendations in the areas of road safety and death prevention.

We encourage all Ontarians to take personal responsibility for their own safety and the safety of all road users.

Sincerely,

A handwritten signature in white ink that reads "Bert Lauwers". The signature is written in a cursive, slightly slanted style.

Dr. Bert Lauwers

Deputy Chief Coroner – Inquests
Chair, Pedestrian Death Review

*“We speak
for the dead
to protect
the living.”*

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ACKNOWLEDGEMENTS

The Review Team consisted of Dr. Bert Lauwers as Chair, Dr. Dan Cass, Dr. Nav Persaud, Ms. Dorothy Zwolakowski and Ms. Emily Coleman. The team would like to acknowledge the following for their invaluable contributions to the Pedestrian Death Review:

Families of the deceased for supporting this review.

Members of the Public for providing details of personal experiences of walking, driving, cycling and near collisions as well as their suggested recommendations.

Dr. David Evans of the Office of the Chief Coroner for his timely and dedicated efforts in case analysis and data collection.

Police Services in Ontario for their essential role in providing thorough and prompt collision information to the Review Team.

Service Ontario for graciously providing all Driver's Handbooks to the Review Team so that the team could better understand the knowledge of all road users in Ontario.

Dr. Andrew McCallum, Chief Coroner for his support in establishing the Pedestrian Death Review and his insight and belief that a physician-coroner led death investigation system can, and should properly focus on issues of public safety, patient safety, and health promotion related to injury and death prevention. He fosters this belief to improve the health, safety, and well-being of the citizens of Ontario.

Mr. Albert Koehl and **Mr. Patrick Brown** for approaching the Office of the Chief Coroner as advocates on behalf of a coalition of concerned groups and asking our Office to undertake a review of both pedestrian and cycling deaths to advance safety on behalf of their constituents. The following groups were represented in the review process:

- **United Senior Citizens of Ontario**
- **Hoof and Cycle**
- **8-80 Cities**
- **Cycle Toronto**
- **Advocacy for Respect of Cyclists**

Ms. Doris Hildebrandt for her valuable edits to the report.

INTRODUCTION

PEDESTRIAN DEATHS AND THEIR CONNECTIONS TO ONTARIANS

Who could forget the dreadful cluster of pedestrian deaths of January 2010 in Toronto?

“Pedestrian death toll rises to 14 in the GTA”¹

On January 25th, 2010, The Toronto Star reported that a Toronto woman in her late thirties was the most recent pedestrian victim in a string of deadly collisions that killed 14 people in the Greater Toronto Area that month. It spoke of the accident at the intersection of Davenport Road and Symington Avenue at 6:30 pm when a Dodge Durango struck the woman and carried her on the hood before she was vaulted off and run over. The article then reported an inventory of who had died during this surge, where they died, and under what circumstances. By the end of January 2010, there had been 23 deaths of pedestrians in the Province of Ontario.



Ontarians not only need to walk, they need to walk safely. To do so, they need safe walking spaces. It is believed that with high quality engineered design, universal accessibility and a dedication to safety where pedestrians are of paramount importance, it will be possible to decrease pedestrian deaths.

“Ontarians not only need to walk, they need to walk safely.”

Ontarians need safe walking spaces. According to Dr. David McKeown, Toronto’s Medical Officer of Health, 50% of adults living in Toronto are not physically active enough to maintain their health.² The Toronto Walking Survey of 2008 demonstrated that 9% of Torontonians walk to work, and 25% walk to school. Physically active people are more likely to be walkers.³

Ontarians want to walk and cycle and they want to be safe doing it. A road safety paradigm shift is necessary. High quality engineered design, universal accessibility and a dedication to safety where pedestrians are of paramount importance will together decrease pedestrian deaths.

WALKING AS A MODE OF TRANSPORTATION

Walking is the oldest method of transportation. It confers many benefits to participants including better health with less obesity, reduced costs for transportation, diminished traffic congestion, and improved air quality. In essence, it promotes health in an individual and in a society. With recent rising costs for fuel, it is highly likely that walking will increase in the future. According to a 2006 census, only 6.8% of Canadians having a usual place of work used walking as a mode of transportation to and from their place of work. This varied in Ontario from 4.7% in Toronto, to 10.4 % in Kingston.⁴



THE CANADIAN VISION

Canada has a Road Safety Strategy (RSS 2015). The vision of the Strategy is to make Canada's roads the safest in the world. Currently, Canada is ranked 10th in terms of fatalities per billion vehicle kilometers travelled compared to other member countries of the Organization for Economic Cooperation and Development.

The key elements of RSS 2015 are:

- a downward directional trend in fatality and serious injury rates over the 2011 to 2015 period;
- jurisdictions will adopt a holistic (Safer System) approach addressing the vehicle, the road infrastructure, and road users based on the primary risk groups;
- an evidence-based Best Practice Framework will be adopted in choosing interventions;
- a fluid and flexible approach will allow jurisdictions to adopt best practices appropriate to their situation; and
- jurisdictions will own their road safety plans.⁵

To achieve this, RSS 2015 seeks to address primary target/risk groups including:

- young drivers (16 to 24);
- medically-at-risk drivers (e.g. those with heart disease or cognitive disorders such as Alzheimer's Disease);
- vulnerable road users (i.e. pedestrians, motorcyclists, bicyclists);
- motor carriers (e.g. managers of carrier operations, truck and bus drivers);
- high risk drivers (e.g. those who don't wear seat belts or who speed, drive impaired, or drive without a valid license) and the general population.

This report addresses just road user risk group, that is, **pedestrians**.

DEFINITION OF A PEDESTRIAN

A pedestrian is defined as:

- A person who is not in or upon a vehicle, motorized or otherwise propelled;
- A person in a non-motorized wheelchair;
- A person in a motorized wheel chair that can not travel at over 10 kilometres per hour; or
- A person pushing a bicycle, motorized or non-motorized wheelchair⁶.

The Ontario Road Safety Annual Report 2008 utilizes a simpler definition which is, “Any person not riding in or on a vehicle involved in a motor vehicle collision.”⁷ This was the definition we adopted in our study.

Pedestrians are vulnerable road users as they lack protection if struck by a vehicle. In Canada, from 2004 to 2008, 13% of all road fatalities have been pedestrians; 8 % motorcyclists, and 2% bicyclists. In total, these vulnerable road users account for almost a quarter of traffic fatalities in Canada.⁸

According to this report, characteristics of pedestrian traffic fatalities in Canada are as follows:

- 75% of pedestrian traffic fatalities occurred on urban roads;
- 60% of pedestrians killed in traffic crashes were trying to cross the road;
- 35% of fatally injured pedestrians were aged 65 or older even though they represent only 13% of the population;
- 63% of pedestrians killed at intersections were 65 or older;
- 6% of fatally injured pedestrians were under the age of 16 and of these, 20% ran out into the street;
- 33% of fatally injured pedestrians acted in a manner which caused or contributed to the crash;
- 33% of fatally injured pedestrians were struck by a driver who had committed a traffic infraction prior to the crash;
- 60% of pedestrians were killed at night or during dim light conditions when they were not seen by drivers; and
- 40% of fatally injured pedestrians had been drinking.⁹



HISTORICAL PEDESTRIAN DEATH STATISTICS IN ONTARIO

Ontarians reside in a society where we place a high value on preserving human life. Great effort is made on the part of both governmental and non-governmental organizations to promote health and prevent death. Because of this work, knowledge currently exists related to pedestrian deaths. The Ministry of Transportation publishes the Ontario Road Safety Annual Report, and in 2005, the Ministry published a report called, *Pedestrian Causalities in Ontario: a 15-year review*.

This report contains information with respect to pedestrian deaths over a 15 year period from 1988-2002.

- In the 15 year period, 2,089 pedestrians were fatality injured, which accounted for 14% of motor vehicle fatalities;
- Older pedestrians >75 years accounted for 21.2 % of all fatalities;
- Child and youth fatalities in those less than 19 years of age are declining, likely due to less walking;
- 11/100 pedestrian collisions in rural areas were killed, whereas only 2/100 in pedestrian collisions occurring in urban areas were killed, likely due to higher speeds in rural areas; and
- Locations of fatalities for pedestrians included:
 - 55% occurred away from an intersection or private drive
 - 32.3% occurred at or near an intersection
 - 11.5% occurred due to vehicles turning in/out of an entrance

CITY OF TORONTO PEDESTRIAN COLLISION STUDY 2007

In 2007, The City of Toronto undertook a study of pedestrian/motor vehicle collisions. The study explored these collisions during the period of 2002 and 2003. The results were as follows:

- In the 2-year period, there were 92 fatalities (2002-50; 2003-42)
- Older pedestrians aged 75-84 were involved in 7% of collisions, but represented 28% of fatalities
- The locations for all collisions, both fatal and non-fatal:
 - 47% occurred at intersections
 - 37% occurred at non-intersections
 - 11% occurred in parking lots
 - 5% unknown¹⁰

BASIC CONCEPTS OF PEDESTRIAN DEATHS

The Ontario Trauma Registry reported that in 2009, they received information from 11 participating health care facilities across 14 sites in Ontario. They reported that motor vehicle collisions accounted for 35% of in-hospital deaths resulting from major injury in 2008-2009. Of these injuries and deaths, 29.5% were pedestrians.¹¹



This is not surprising when one considers the results of the World Health Organization's (WHO) and the World Bank's World Report on Road Traffic Injury Prevention. This report identifies that road safety is a public health issue, due to the fact that improved road injury prevention would result in fewer injuries and less severe injuries and death, in addition to preventing hospitalizations. Safer road conditions would mean that more people could and would utilize healthier modes of transportation including walking or cycling, addressing sedentary life style issues.

Equally as significant, this report suggested that pedestrian and road safety is not simply the responsibility of the road users themselves. Other more complex determinants may also be at play to influence behaviour such as road design and layout, traffic laws and their enforcement and the environment in which the incident occurs.

The WHO suggested that a road safety paradigm shift was necessary to improve public health of road users, with the following elements acknowledged:

- ***The vulnerability of the human body should be a limiting design parameter for the traffic system, and speed management is central***
- *Road crash injury is a social equity issue - equal protection to all road users should be aimed for since non-motor vehicle users bear a disproportionate share of road injury and risk (i.e. pedestrians and cyclists)*
- *Local knowledge needs to inform the implementation of local solutions*
- *Road crash injury is largely preventable and predictable; it is a human-made problem amenable to rational analysis and countermeasure*
- *Road safety is a multi-sectoral issue and a public health issue - all sectors, including health, need to be engaged in responsibility, activity and advocacy for road crash injury prevention*
- *Common driving errors and common pedestrian behaviour should not lead to death and serious injury - the traffic system should help users to cope with increasingly demanding conditions¹²*

THE BASIS FOR RECOMMENDATIONS IN THIS REPORT

The Office of the Chief Coroner invited responses from members of the public who provided excellent suggestions for recommendations, but also, spoke eloquently of the need for more and safer walking spaces, as well as their personal experiences regarding near misses of their own or the loss of a loved one. We heard from citizens in Sudbury, Ottawa, Kingston, London, Montreal, Chatham, Sarnia and other cities and towns both in Ontario and abroad. Some of the submissions came from private citizens, and some from public health experts. In total, 71 responses were received. Their stories, thoughts and suggestions were presented to our expert panel for consideration.

As a guiding principle, the Office of the Chief Coroner established that all recommendations made following a review must arise from the evidence obtained from the review. In other words, all recommendations need to be data driven, or stem directly from the deaths reviewed during this study. This principle was adhered to in the generation of the 26 recommendations in this report.



EXECUTIVE SUMMARY

WHO?

- Pedestrian deaths were slightly more prevalent in males (55%) than females (45%).
- Pedestrians over 65 years of age accounted for a strikingly disproportionate share of fatalities based on their representation in the population. They account for about 13.2% of the population, but 36% of the fatalities.
- Children accounted for 3% of the deaths.
- Males were driving the motor vehicle in 67% of the fatalities.
- The peak ages for these male drivers was 25-54 years of age.
- Charges were laid in 30% of the fatalities, both *Criminal Code* and *Highway Traffic Act*.

WHEN?

- Peak hours for pedestrian collisions were between 2 pm and 10 pm daily, largely coinciding with peaks in traffic volume.
- It was dark or twilight for 57% of fatal pedestrian collisions.
- Pedestrian collisions were generally more frequent Monday to Friday, when traffic volumes are highest.
- January was the peak month for pedestrian collisions leading to fatalities for Ontarians.
- Visibility was clear 95% of the time for fatal pedestrian incidents.
- Road conditions were dry for 81% of the incidents, wet for 14% of the incidents, and snowy for 5% of the incidents.

WHERE?

- 76% of fatalities occurred in urban areas and 24% in rural areas.
- 75% of pedestrian fatalities occurred on arterial roads, which are wide, signalized streets that carry high volumes of traffic.

HOW?

Five pedestrian circumstances accounted for 70% of deaths:

1. Pedestrian hit at a mid-block location while crossing (31%).
Causes might include motorists not expecting pedestrians to cross at mid-block, reduced visibility when crossing between parked cars, and motorists unable to stop in time.
2. Pedestrian hit on the sidewalk and/or shoulder of the road (14%).
The commonest cause of this may be loss of control of the vehicle.
3. Vehicle was going straight through the intersection while the pedestrian crossed without the right-of-way (11%).
The cause may be motorists with the right-of-way not expecting pedestrians to be in the roadway.

4. Vehicle turning left while the pedestrian crossed with the right-of-way at the intersection (7%).

The cause may be that motorists may only be paying attention to oncoming traffic and not looking for pedestrians in the crosswalk.

5. Vehicle turning right while the pedestrian crossed with the right-of-way at the intersection (7%).

The cause may be that the driver may forget to look both ways before proceeding.

In addition to the above five mechanisms, a significant number of pedestrians were struck by a heavy truck (12%) or a public transit vehicle (9%). The cause may be decreased visibility of pedestrians by drivers of trucks, and with pedestrians entering or exiting public transit vehicles.



WHY?

Several areas which stood out as causal in these deaths:

- **Vehicle Speed:** 67% of the deaths occurred on roads with posted speeds beyond 50 km/hr, and only 5% on roads below 50 km/hr. For the remainder, the posted speed was unknown.
- **Distractions:** Approximately 20% of pedestrians may have had some form of distraction, such as using a cell phone; MP3 player; a mobile device; pushing a shopping cart; walking a dog; or riding a skateboard.
- **Failure to Yield by the Driver:** This was identified as a factor in approximately 21% of all deaths. This occurred when vehicles were turning right (7%), left (7%), going straight through intersections (4%) and at pedestrian crosswalks (3%).
- **Crossing Against the Signal:** Fatalities occurred involving a pedestrian crossing against the signal in 12% of the deaths.
- **Mid-block Crossing:** 31% of pedestrians who were struck were crossing at mid-block locations at uncontrolled crossings where pedestrians must wait for safe gaps in traffic to cross the roadway.
- **Pedestrian Disabilities:** 10% of those involved in pedestrian fatalities were utilizing assistive devices employed by the elderly and the disabled, such as canes, walkers, crutches and wheelchairs.
- **Driver Inattention:** 14% of pedestrians were hit on a sidewalk or shoulder of the road, which may be due to loss of control of the vehicle. Inattention may occur when drivers utilize personal communication devices, computers and music in their vehicles which can lead to loss of control. The use of such communication devices by drivers could not be quantified in our study.
- **Alcohol and/or Drugs in Drivers:** Limited available data suggest that there was evidence of alcohol and/or drug use observed in 7% of drivers.
- **Alcohol and/or Drugs in Pedestrians:** In 28% of the pedestrians, toxicology was positive for drugs, alcohol or both. While 2% of pedestrians struck by a motor vehicle will die, this rises to 48% for intoxicated pedestrians.¹³

SUMMARY OF RECOMMENDATIONS

A “**complete streets**” approach should be adopted to guide the development of new communities and the re-development of existing communities in Ontario. Complete streets should be designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age.

The Province of Ontario should develop a **Walking Strategy for Ontarians** which encourages municipalities to develop policies, practices, and plans for safe and convenient pedestrian conditions for transportation including road safety, recreation and health.

Infrastructure Canada and Infrastructure Ontario should identify funding specific to pedestrian facilities within municipal infrastructure and stimulus funding programs.

The **Walking Strategy for Ontarians** should be led by the Ministry of Municipal Affairs and Housing, and should:

- include representatives with diverse interests in pedestrian safety;
- seek to eliminate all preventable pedestrian fatalities in the Province of Ontario in the long term, and reduce fatalities by 50% by 2022; and
- consider and recognize vulnerable road-using pedestrians such as children, the elderly, and those with disabilities.



“The Province of Ontario should develop a Walking Strategy for Ontarians.”

The **Walking Strategy for Ontarians** should become a component of the current revisions to the Provincial Policy Statement 2005 (PPS) which was issued under the authority of the Section 3 of the *Planning Act*, in the section, “transportation planning”.

The Ministry of Transportation (MTO), as a stakeholder in developing the **Walking Strategy for Ontarians**, should solicit feedback from stakeholders on potential opportunities and barriers in policy and legislation such as the *Highway Traffic Act*.

The MTO should amend the *Highway Traffic Act* to allow local municipalities to lower the unsigned default speed limit to 40 kilometres an hour on residential streets from the current limit of 50 kilometres an hour.

The MTO should amend the *Highway Traffic Act* to allow municipalities to erect non-signalized pedestrian crossings in mid-block areas.

Transport Canada should make side-guards mandatory on heavy trucks in Canada.

All municipalities in the Province of Ontario should annually undertake a forensic review of all pedestrian deaths that have occurred within their jurisdictions.

All municipalities in the Province of Ontario should review the collision history of the road before initiating road reconstruction or resurfacing to proactively seek to improve pedestrian safety.

Municipalities, in developing their complete streets approach, should consider;

- the introduction of speed reduction strategies where speed has been implicated in the death(s) of pedestrians;
- reducing speed limits to 30 km/hr on residential streets;
- adopting speed limits of 40 km/hr on other streets, unless otherwise posted;
- installing leading pedestrian signal intervals (LPI) in intersections where there have been excess collisions between vehicles and pedestrians;
- strategies to benefit all pedestrians and prevent harm to senior citizens and those with disabilities;
- strategies to prevent collisions occurring at mid-block uncontrolled crossings by incorporating pedestrian crossing islands for roads with four or more lanes; and
- strategies to prevent collisions occurring where pedestrians are walking along the road.

“Introduction of speed reduction strategies.”

The Ministry of Transportation should create an educational body with representatives from both governmental and non-governmental organizations to:

- create an educational program for **senior citizens and other adult pedestrians**; and
- create an educational program for **drivers**.

The Ministry of Transportation, Safety Policy and Education Branch should update the *Official MTO Driver’s Handbook* to include a chapter which clarifies those traffic scenarios in which motorists are most likely to be involved in a collision with a pedestrian.

The Ministry of Education and the Ministry of Transportation should make road safety and pedestrian safety education mandatory for junior kindergarten through grade eight curriculums for children 5 - 14 years of age.

Public education and safety campaigns for both pedestrians and drivers should promote awareness of pedestrian safety during darkness when most fatalities occur, and encourage all pedestrians to wear bright or retro-reflective clothing when walking in the evening or at night.

Police Services in Ontario should develop strong traffic law enforcement programs.

OVERVIEW

In the summer of 2011, the Office was approached by Mr. Albert Koehl and Mr. Patrick Brown, two lawyers who represent a coalition of pedestrian and cycling groups. The possibility of addressing public safety issues affecting pedestrians and cyclists via a special review was discussed. The timing of these discussions was opportune, and the leadership of the OCC was compelled by the importance of this issue. The result is this Pedestrian Death Review, as well as the OCC's Cycling Death Review which was released in June, 2012.

The foundation for the review was laid by establishing a mission, a scope and the hypotheses for the review. They are as follows:



MISSION

To review the pedestrian deaths that occurred from January 1 to December 31, 2010.

SCOPE

1. All pedestrian fatalities that occurred during the period under review will be considered.
2. The review will only consider accidental deaths.*
3. Pedestrian refers to a person travelling on foot (includes rollerblades and skateboards).

HYPOTHESES

1. Pedestrian deaths are more likely to occur during the months when daylight is shorter. (e.g. November to March).
2. Pedestrian deaths are more likely to occur when a pedestrian and/or driver is using a mobile entertainment/communication device. (e.g. cell phone, ipod, etc.).
3. Pedestrian deaths are more likely to occur when one or more persons involved in the collision are under the influence of alcohol and/or drugs.
4. The vast majority of pedestrian deaths are preventable.

“The vast majority of pedestrian deaths are preventable.”

* For the Office of the Chief Coroner, manners of deaths are classified as accident, suicide, homicide, natural or undetermined. An “accidental” death is a manner of death, and deaths are classified as such when the death is “due to an occurrence, incident or event that happens without foresight or expectation.”

FINDINGS, INTERPRETATIONS AND CONCLUSIONS

WHO DIED?

Gender

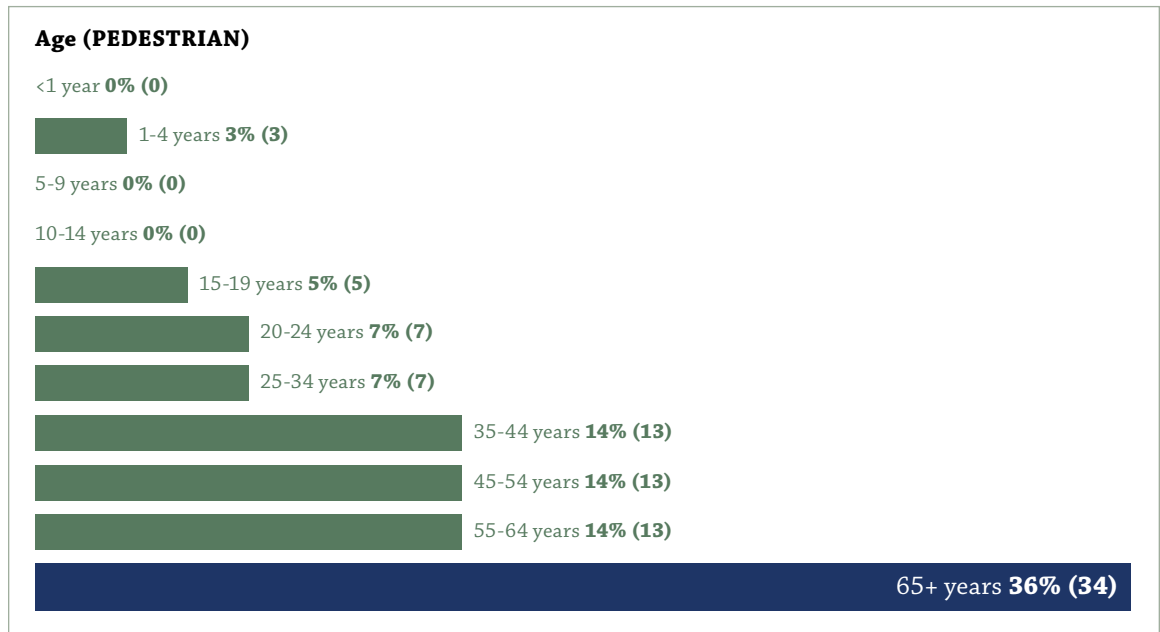
Of the 95 pedestrian fatalities reviewed in this study, 52 (55%) were male and 43 (45%) were female. This is the same proportion of male and female fatalities described in the City of Vancouver Pedestrian Safety Study.¹⁴ Furthermore, in information received from the Ministry of Transportation’s Safety Policy and Education Branch, in data from 2000-2009, 61% of pedestrian fatalities were in males, and 39% in females.¹⁵



Age

In our death review, there was a far greater propensity for those over 65 years of age to be involved in a fatality as pedestrian’s accounting for a surprising 36% of the deaths. This is especially important as those over 65 accounted for just 13.2% of the population of Ontario in 2007. It is evident that over the coming years, the proportion of people over 65 will climb, with a projected percentage of this age group reaching 22% by 2030.¹⁶

Notably, those aged 35-64 accounted for an additional 42% of the deaths.



Similar to the findings of this review, in New York City, pedestrians over 65 years of age accounted for 38% of all pedestrian fatalities, but constitute only 12% of New York City's population.¹⁷ In Ontario, between the years 1988 and 2002, 35% of fatalities occurred in pedestrians greater than 65 years of age.¹⁸ The City of Toronto's Pedestrian Collision Study found that those over 65 years of age accounted for 50% of pedestrian fatalities in the years 2002-2003. In recent studies by Ontario's Ministry of Transportation, pedestrian fatalities in the province are beginning to show a tri-modal distribution. These peaks represent those from 15-20 years of age, from 48-52 years of age; and greater than 65 years of age.¹⁹

In this review, there were three fatalities of children under 14 years of age. This accounted for 3% of all deaths reviewed. While it is always the view of the Office of the Chief Coroner that any death is one too many, this percentage was less than the results of Pedestrian Casualties in Ontario: a 15-year review which found that children and youth 15 years of age and under accounted for 13% of pedestrian deaths. The City of Toronto study found that 3% of pedestrian fatalities occurred in those less than 15 years of age.

The three fatalities of children in this review were all two years of age. Two were struck by vehicles backing out of driveways of homes where the children were being cared for, and one was struck while wandering on the road.



*“Children
accounted for 3%
of the deaths”*

In one of these cases, a two-year old child followed a relative out the door unbeknownst to the adult. The child suffered fatal head injuries when she was backed over by a reversing vehicle in the driveway.

In a second case, a two-year old was playing on the front lawn when a parent began to back out of the driveway. The child ran toward the vehicle, and was run over when trapped underneath. The child died of multiple traumatic injuries.

In the third case, a two-year old child wandered away from a caregiver onto a street and was struck by a car, ultimately dying of a head injury.

These deaths were preventable with careful, vigilant child supervision and utilizing safe driving tactics such as doing circle checks around vehicles before driving.

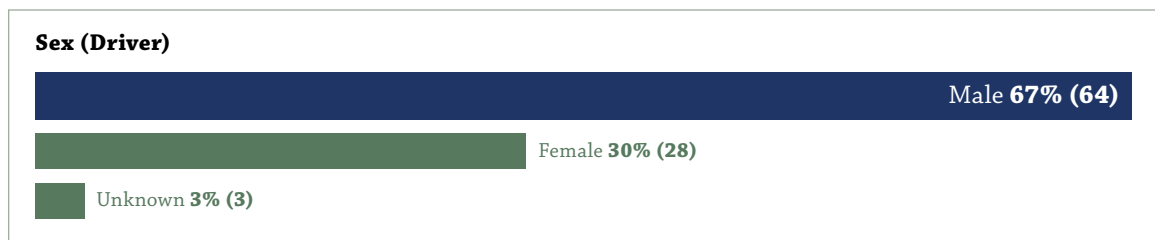
Conclusions

- **Pedestrian deaths were slightly more prevalent in males (55%) than females (45%)**
- **Pedestrians over 65 years of age accounted for a striking disproportion of fatalities based on their representation in the population. They account for about 13.2% of the population, but 36% of the fatalities**
- **Children accounted for 3% of the deaths**

WHO WAS DRIVING?

Gender

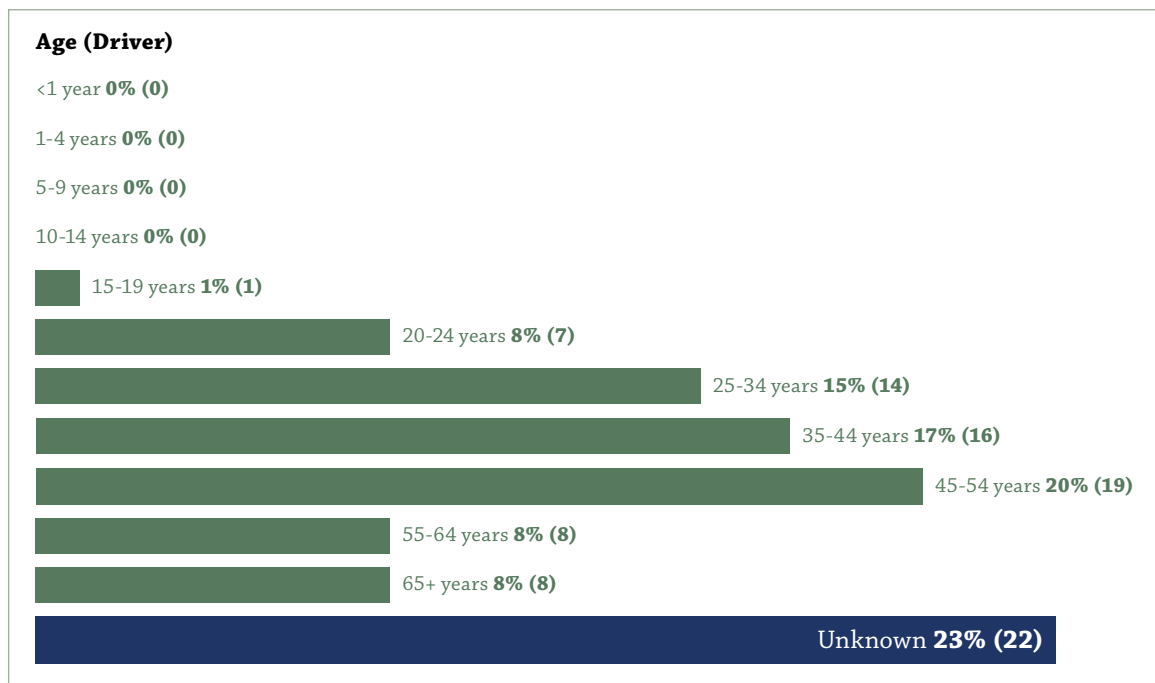
Male drivers were more commonly involved in motor vehicle/pedestrian fatalities in Ontario. A total of 67% of the fatalities in our review involved male drivers. In recent data from Ontario’s Ministry of Transportation, Safety Policy and Education Branch, April 4, 2012 reporting on data from 2000-2009, shows that 67.6% of drivers involved in MVC’s which injured pedestrians were male. In the City of Toronto Pedestrian Collision Study, 72% of drivers involved in pedestrian motor vehicle collisions in Ontario were male, and 28% were female. This is distinct from the demographics of the licensed driving population in Ontario, which is 53% male and 47% female.²⁰ From 1988 to 2002, 78.7% of pedestrian fatalities involved male drivers.²¹



Age

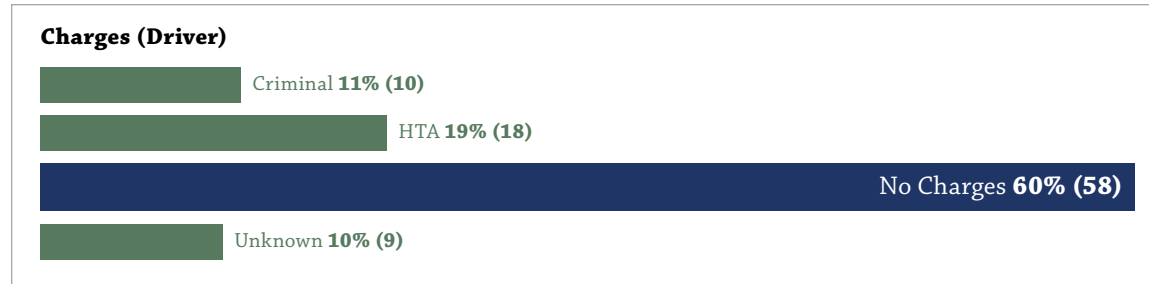
In our review, male drivers aged 25-54 were the typical drivers involved in motor vehicle/pedestrian fatalities. This has traditionally been the case in Ontario. In the review of Pedestrian Causalities in Ontario: a 15-year review, male motor vehicle drivers aged 25-54 were the most likely to be involved in fatal collisions.

In our study, 8% of drivers were under 25 years of age. In the aforementioned 15-year review, drivers aged 24 years and under were involved in 22% of pedestrian fatalities, but comprised only 13.8% of the total licensed driver population.



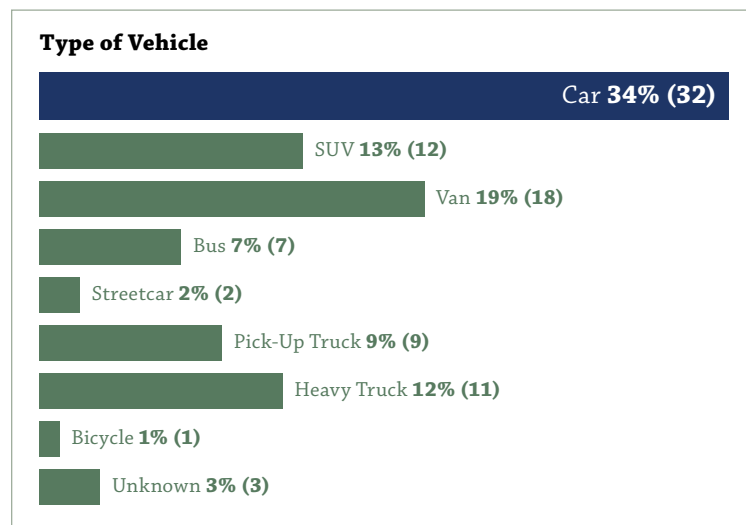
Charges

In our review, 30% of the cases resulted in charges laid under the *Criminal Code* or *Highway Traffic Act*.



Motor Vehicle

A striking finding was that heavy trucks were involved in 12% of the pedestrian fatalities. In nearly half of these, the pedestrian impacted the side of the truck, resulting in the pedestrian being dragged, pinned or run over by the rear wheels.



Case # 1 Elderly Male, Mid-Block Crossing at Night	
Background	<ul style="list-style-type: none"> • 88 year old male • January 2010 – 1810hrs during darkness • The decedent was crossing south to north mid-block with a friend • The decedent was struck by a westbound vehicle • No charges laid, as the driver was not at fault
Cause of Death	<ul style="list-style-type: none"> • Severe Blunt Force Trauma with Head Injury
Issues	<ul style="list-style-type: none"> • Mid-block crossing • Elderly male • It was dark at the time of crossing

Driver Physical Condition and Toxicology

In 78 of 95 cases, the driver was documented to be well. In two cases, the driver was thought to have been suffering from a medical condition. One was a diabetic, and the other had mental health and stability issues. For 12 cases reviewed, the physical status of the driver was unknown.

In 88 of 95 cases reviews, the driver was noted to be sober and did not show any signs of being under the influence of alcohol and/or drugs. In two cases, toxicology testing was done, and in another five, there was other evidence of the driver being under the influence of alcohol and/or drugs. A 15-year review of pedestrian fatalities in Ontario demonstrated that 11% of all pedestrian fatalities were caused by a driver under the influence of alcohol and/or drugs.²² In more recent data from the Ministry of Transportation, Safety Policy and Education Branch, between 2000-2009, of drivers involved in fatal pedestrian motor vehicle collisions, 67.2% were coded as normal; 10.1% were coded as inattentive; and 8% had either been drinking (3.4%), had a blood alcohol concentration of greater than zero, but less than 0.08 mg/100 mL (2.8%), or had their driving ability impaired by alcohol (1.5%) or drugs (0.3%).²³



Conclusions

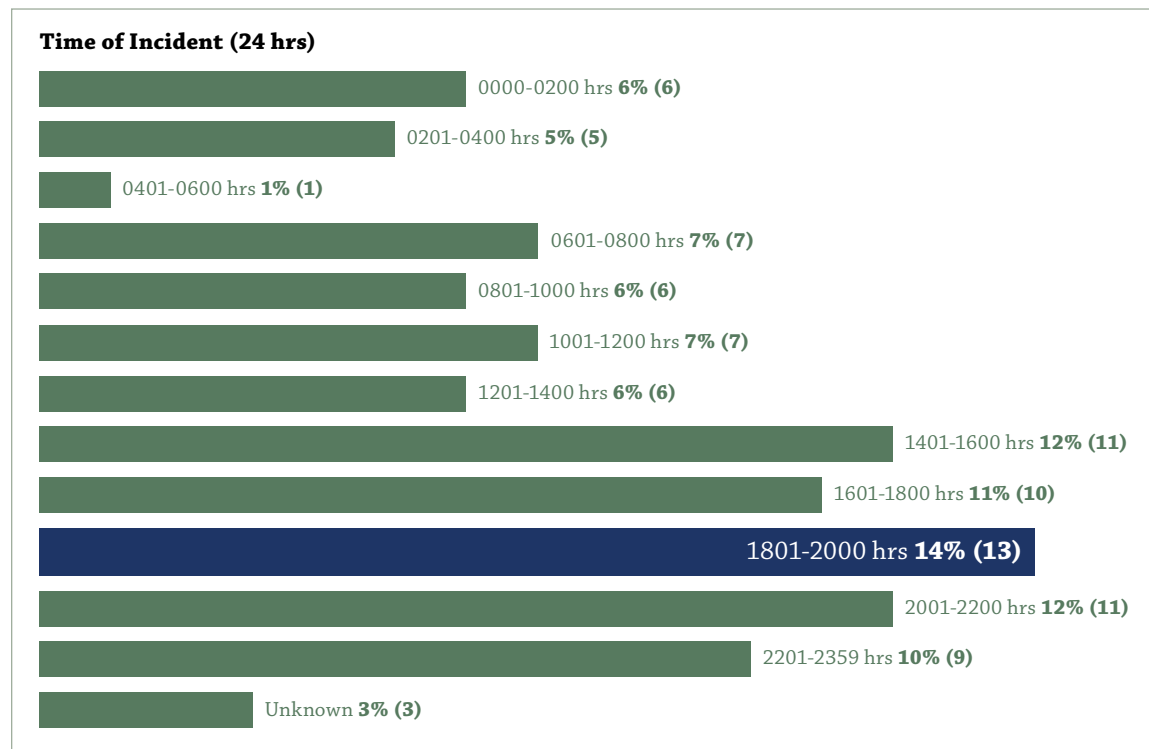
- **Males were driving the motor vehicle in 67% of the fatalities**
- **Peak ages for these males drivers was 25-54 years of age**
- **Charges were laid in 30% of the fatalities, both *Criminal Code and Highway Traffic Act***

Case #2 Young Female, Crossing with Light, Struck by a Left Turning Vehicle at Night	
Background	<ul style="list-style-type: none"> • 24 year old Female • January 2010 – 0632hrs (dark) • Crossing at intersection with green light • Pedestrian was struck and run over by left turning bus
Cause of Death	<ul style="list-style-type: none"> • Traumatic Asphyxia
Issues	<ul style="list-style-type: none"> • Decedent was wearing dark clothing • It was dark outside • The area was well lit with streetlights BUT there were two overhead lights in the area that were not working at the time • The victim was obeying all traffic signals

WHEN DID THE COLLISION OCCUR?

Time of the Day

The largest proportion of pedestrian collision deaths occurred between 2 p.m. in the afternoon and 10 p.m. at night. Approximately 50% of the total deaths occurred between those hours. This is consistent with the *Pedestrian Casualties in Ontario: a 15-year Review* which found that 25% of pedestrian fatalities occurred between 3 p.m. and 7 p.m. The same study provided the potential reasons as highest traffic levels, darkness and alcohol use.²⁴ Further supporting this data is the City of Toronto's Pedestrian Collision Study which found that collisions are more frequent between 3 p.m. and 8 p.m.

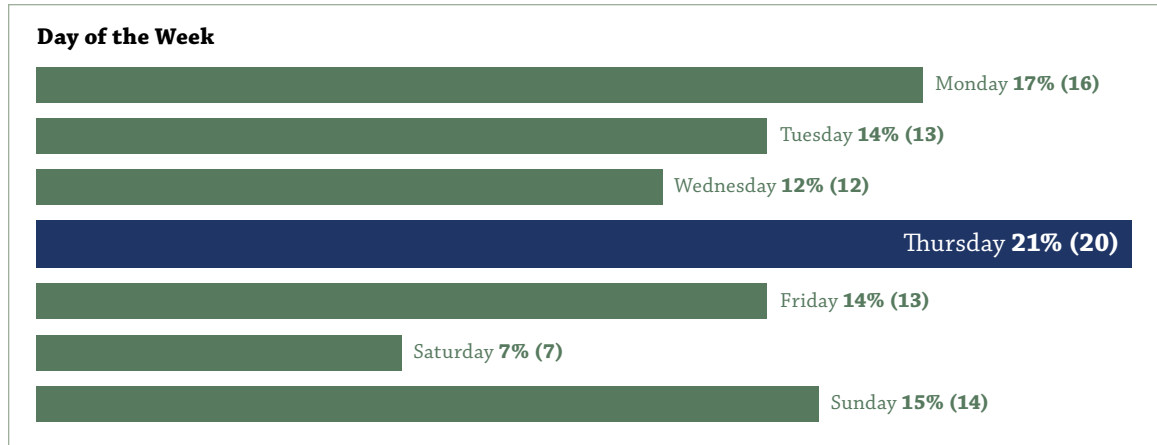


In addition, 57% of the fatal pedestrian accidents occurred during twilight or when there was darkness. Light condition is a factor contributing to pedestrian collisions.



Day of the Week

Fatalities were more frequent Monday to Friday than on the weekend. In our study, deaths occurred more frequently on Thursday. This is likely a statistical anomaly. The *City of Toronto Pedestrian Collision Study* found that collisions were twice as frequent on weekdays than on weekends. They attributed this to increased pedestrian and vehicle volumes on weekdays. In unpublished data from the Ministry of Transportation, for fatalities occurring from 2000-2009, fatal pedestrian collisions were most frequent on Fridays.

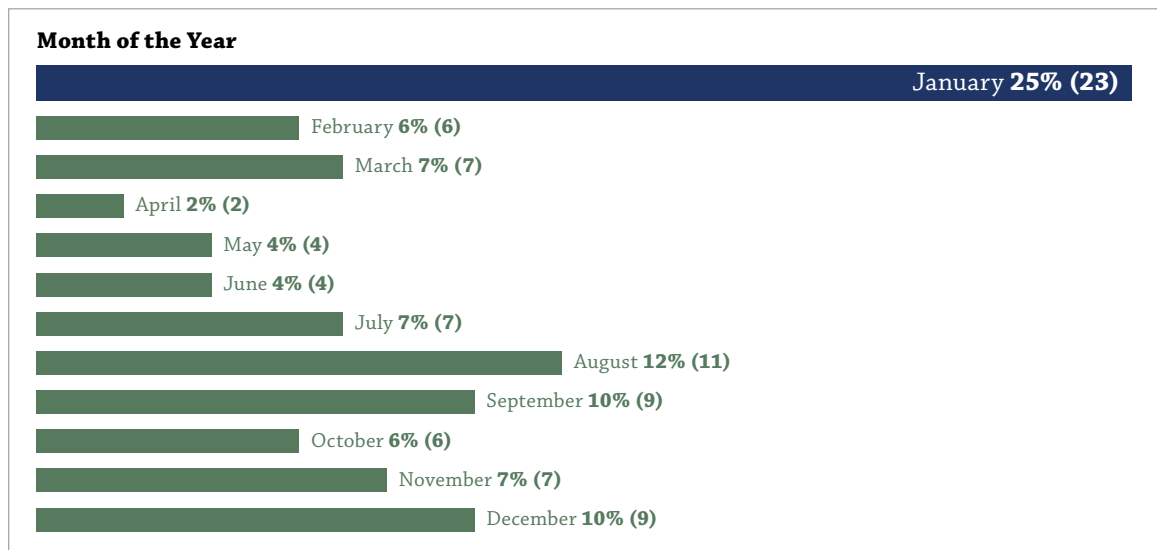


Month of the Year

Our study has demonstrated a clear finding that January was the month in which most pedestrian fatalities occurred. Of the 95 cases reviewed, January had 23 pedestrian fatalities. The only other month with greater than 10 deaths in this review was August.

The *City of Toronto Pedestrian Collision Study* found that there were more pedestrian and motor vehicle collisions in autumn and winter months. November, December and January were peak months. Of interest, while motor vehicle collision distribution was constant, **pedestrian/motor vehicle collision** followed a seasonal distribution. The conclusion was that visibility [related to darkness] was a contributing factor.²⁵

In the *New York City Pedestrian Safety Study*, 20% more pedestrian crashes per month occurred during the winter holiday season (November - January). In the *City of Vancouver Pedestrian Safety Study*, the highest proportion of pedestrian collisions resulting in fatalities occurred in January. It concluded that pedestrians were “particularly vulnerable when it is dark and rainy.”²⁶



Visibility, Road Conditions and Weather

During the fatal pedestrian incidents, visibility was clear 95% of the time. Road conditions were dry for 81% of the incidents, wet for 14% of the incidents, and snowy for 5% of the incidents.

Conclusions

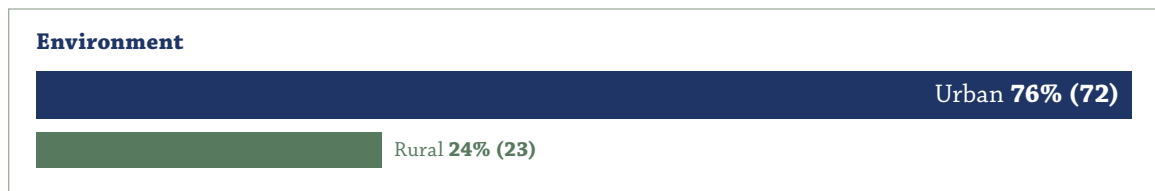
- **Peak hours for pedestrian collisions were between 2 p.m. and 10 p.m. daily, largely coinciding with peaks in traffic volume**
- **It was dark or twilight for 57% of fatal pedestrian collisions**
- **Pedestrian collisions were generally more frequent Monday to Friday, when traffic volumes were highest**
- **January was the peak month for pedestrian collisions leading to fatalities for Ontarians, similar to Vancouver²⁷**
- **Visibility was clear 95% of the time for fatal pedestrian incidents**
- **Road conditions were dry for 81% of the incidents, wet for 14% of the incidents, and snowy for 5% of the incidents**

Case #3	Male Exits Vehicle Following Mechanical Failure and is Struck on a Highway
Background	<ul style="list-style-type: none"> • 43 year old male • January 2010 – 1819hrs • Vehicle 1 sustained a mechanical failure and came to a stop in the right lane of the QEW • Decedent exited Vehicle 1 to call for help • Vehicle 2 struck Vehicle 1 and the decedent while merging onto the highway
Cause of Death	<ul style="list-style-type: none"> • Massive Blunt Force Trauma to the Head
Issues	<ul style="list-style-type: none"> • Dark outside • Mostly dark clothing • Prosthetic right eye • Exited vehicle on the highway placing self at risk

WHERE DID THE COLLISION OCCUR?

Urban versus Rural

Pedestrian collisions leading to fatalities were far more common in urban areas (76%) in our study, and in others. This is consistent with larger traffic volumes and larger populations walking in urban areas. Of interest, in a review of pedestrian fatalities in Ontario, “The vast majority (93%) occurred in urban areas. However, the ratio of fatalities to injuries in rural areas is much higher than in urban areas because of higher speeds on rural roads. When a pedestrian is struck by a vehicle travelling at speeds up to 30 km/hr, 10.3 percent were killed or hospitalized with serious injury; over 30 up to 40 km/hr, 20.7 were killed or seriously injured; and if the vehicle were travelling at speeds over 60 km/hr, 54.2 were killed or seriously injured.”²⁸



When pedestrian injuries in Ontario municipalities were reviewed by the Ministry of Transportation, Safety Policy and Education Branch for the years 2000-2009, the municipalities with the highest number of fatal pedestrian injuries included the following:

Total Pedestrian Fatalities (2000-2009) and Population (2011)

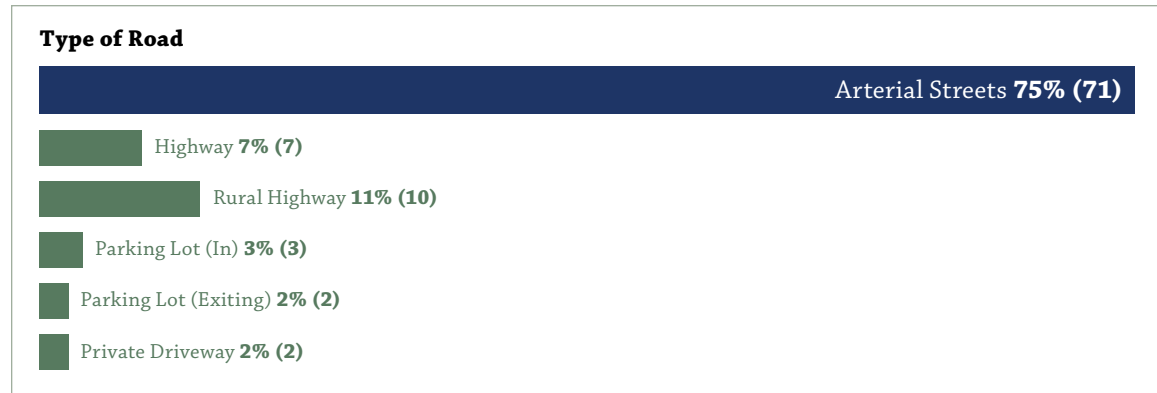
Municipality	Number of Fatalities ²⁹	Population ³⁰
Toronto	308	2,615,060
Mississauga	56	713,443
Ottawa	54	883,391
Hamilton	46	519,949
London	33	366,151
Brampton	24	523,911
Windsor	19	210,891
Sudbury	12	160,274
Barrie	11	135,711
Thunder Bay	10	108,359

Based on a literature review of population distribution by municipalities in Ontario, Ottawa and Brampton appear to have sustained fewer fatalities than might have been anticipated based on their population size over the ten year period. Pedestrian fatalities across different municipalities were not analyzed in our review, but the above fatalities were clustered in urban areas with high pedestrian and vehicular traffic.

Type of Roadway

Arterial streets are wide, signalized streets that carry high volumes of traffic and are characterized by high vehicular capacity and continuity of movement. They are used for through traffic rather than for gaining access to adjacent land.³¹ In New York City, arterial streets accounted for 60% of the fatalities, but only 15% of the road network.³²

In this study, 75% of fatalities occurred on arterial streets. *The New York City Pedestrian Safety Study and Action Plan* found that wide roads, with four or more lanes experienced higher rates of pedestrian crashes, whereas narrow roads with one moving lane in each direction decreased the chance of a pedestrian crash.³³



Conclusions

- **76% of fatalities occurred in urban areas and 24% in rural areas**
- **75% of pedestrian fatalities occurred on arterial roads which are wide, signalized streets that carry high volumes of traffic**

HOW DID THE COLLISION OCCUR?

Roadway Definitions

Some definitions of roadways will aid in understanding these issues. These definitions are taken from the *Highway Traffic Act* except where noted.

Crosswalk

Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by signs or by lines or other markings on the surface.

Highway

Includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle, any part of which is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

Intersection

Means the area embraced within the prolongation or connection of the lateral curb lines or, if none, then the lateral boundary lines of two or more highways that join one another at an angle, whether or not one highway crosses the other.

Mid-block³⁴

Segment of the roadway between two intersections.

Pedestrian Crossover

Means any portion of a roadway, designated by by-law of a municipality, at an intersection or elsewhere, distinctly indicated for pedestrian crossing by signs on the highway and lines or other markings on the surface of the roadway as prescribed by the regulations.

Roadway

Means the part of the highway that is improved, designed or ordinarily used for vehicular traffic, but does not include the shoulder, and where a highway includes two or more separate roadways, the term “roadway” refers to any one roadway separately and not to all of the roadways collectively.

Collision Details

In our review, there were five types of pedestrian-vehicle interactions which resulted in the majority of fatalities. Ranked in order from greatest to least, these included;

Pedestrian hit at mid-block location while crossing	31%
Pedestrian hit on the sidewalk and/or shoulder	14%
Vehicle going straight through the intersection while the pedestrian crossed without the right-of-way	11%
Vehicle turned left while the pedestrian crossed with the right-of-way at the intersection	7%
Vehicle turned right while the pedestrian crossed with the right-of-way at the intersection	7%

These five circumstances accounted for 70% of the deaths.

Collision Details	#	%
Vehicle turns left while pedestrian crosses with right-of-way at intersection	7	7
Vehicle turns left while pedestrian crosses without right-of-way at intersection	0	0
Vehicle turns right while pedestrian crosses with right-of-way at intersection	7	7
Vehicle turns right while pedestrian crosses without right-of-way at intersection	1	1
Vehicle is going straight through intersection while pedestrian crosses with right-of-way	4	4
Vehicle is going straight through intersection while pedestrian crosses without right-of-way	11	11
Pedestrian hit at mid-block location	29	31
Pedestrian hit at private driveway	5	5
Pedestrian hit at pedestrian crossover PXO	3	3
Pedestrian hit on sidewalk or shoulder	13	14
Pedestrian hit in parking lot	3	3
Other (e.g. on busy highway, not on shoulder)	13	14
TOTAL	96*	100

* 1 case has more than one detail

In our review, there were more fatalities which occurred at mid-block locations (31%) than elsewhere. The *City of Toronto Pedestrian Collision Study* reported that this accounted for 22% of all collisions. The reasons suggested in their study included motorists not expecting pedestrians to cross at mid-block reduced visibility when pedestrians cross in between parked cars and motorists unable to stop in time.³⁵

In our review, pedestrians hit on the sidewalk or shoulder accounted for 14% of fatalities. The *City of Toronto Pedestrian Collision Study* reported that this accounted for 3% of all their collisions. This may in part reflect the rural component of our study which encompassed the whole province. It was suggested in the City of Toronto study that the commonest cause of this may be “loss of control of the vehicle.”³⁶

In our review, a vehicle going straight through an intersection while the pedestrian crossed without the right-of-way accounted for 11% of the fatalities. The *City of Toronto Pedestrian Collision Study* reported that this accounted for 14% of all collisions. The reason provided was that motorists, enjoying the right-of-way may not be expecting pedestrians in the roadway.

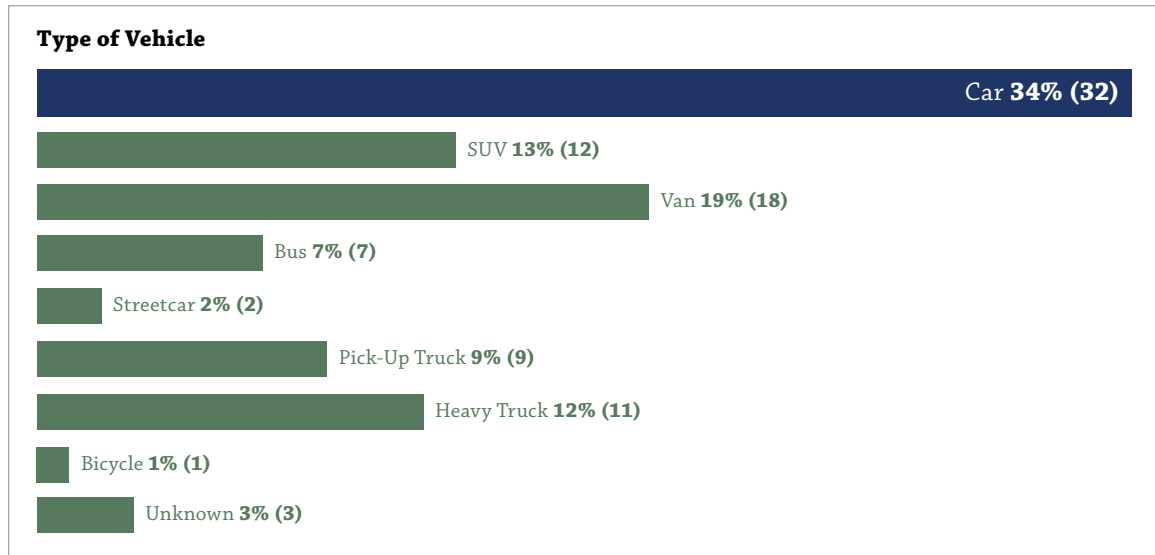
In our review, a vehicle turning left while the pedestrian crossed with the right-of-way at an intersection accounted for 7% of fatalities. The *City of Toronto Pedestrian Collision Study* reported that this accounted for 13% of all collisions. A reason provided was that motorists may be “...more acutely paying attention to oncoming traffic” and not looking for pedestrians in the crosswalk.

Finally, in our review, a vehicle turning right while the pedestrian crossed with the right-of-way at an intersection accounted for 7% of fatalities. The *City of Toronto Pedestrian Collision Study* reported that this accounted for 9% of all collisions. In this circumstance, they reported that the driver “may forget to look both ways before proceeding.”³⁷

Type of Vehicle

As with speed, the type of vehicle is relevant to the severity of the collision. The most significant findings of this sub-analysis involved heavy trucks and public transit vehicles.

Eleven of 95 fatal collisions with vehicles involved a heavy truck. In nearly half of these, the pedestrian impacted the side of the truck, resulting in the pedestrian being dragged, pinned or run over by the rear wheels. In addition, there were nine deaths involving public transit vehicles. Two involved streetcars and seven involved buses.



Conclusions

Five circumstances accounted for 70% of deaths:

- 1. Pedestrian hit at a mid-block location while crossing (31%)**
Causes might include motorists not expecting pedestrians to cross at mid-block, reduced visibility when crossing in between parked cars, and motorists unable to stop in time.
- 2. Pedestrian hit on the sidewalk and/or shoulder (14%)**
The commonest cause of this may be loss of control of the vehicle.
- 3. Vehicle was going straight through the intersection while the pedestrian crossed without the right-of-way (11%)**
The cause may be motorists with the right-of-way not expecting pedestrians in the roadway.
- 4. Vehicle turning left while the pedestrian crossed with the right-of-way at the intersection (7%)**
The cause may be that motorists may be more acutely paying attention to oncoming traffic and not looking for pedestrians in the crosswalk.
- 5. Vehicle turning right while the pedestrian crossed with the right-of-way at the intersection (7%)**
The cause may be that the driver forgot to look both ways before proceeding.

In addition to the above five mechanisms, a significant number of pedestrians were struck by a heavy truck (12%) or a public transit vehicle (9%)

The cause may be decreased visibility of pedestrians to drivers of trucks, and with pedestrians entering and exiting public transit vehicles.

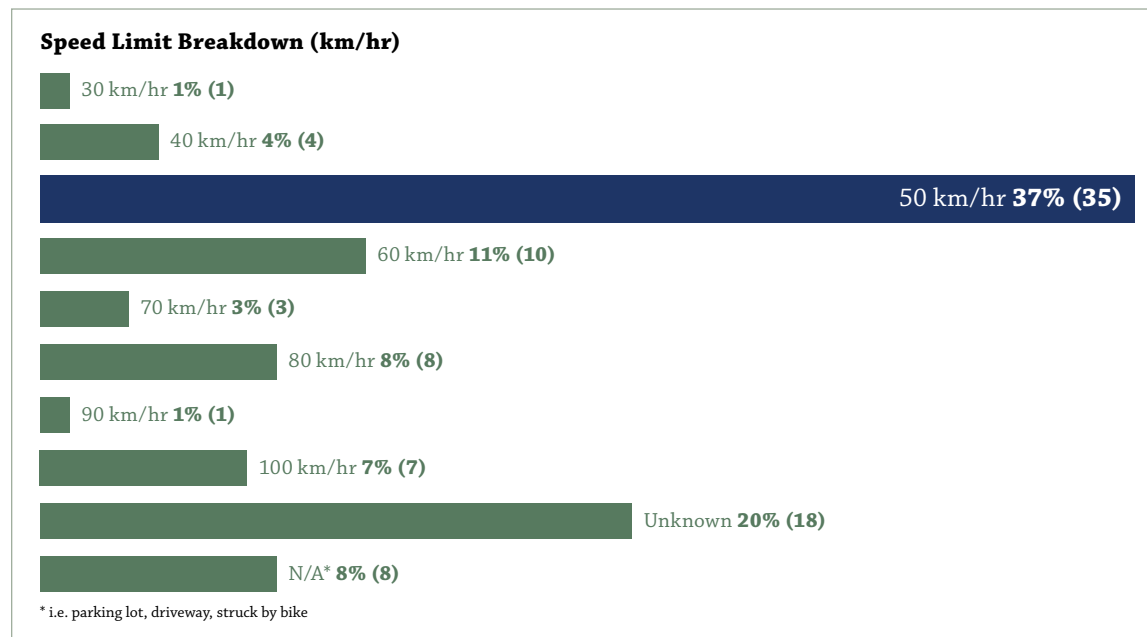
WHY DID A COLLISION RESULTING IN PEDESTRIAN DEATH OCCUR?

Speed

Pedestrians struck by a vehicle travelling in zones where the posted speed was **less than 50 kilometres per hour** accounted for 5% of the total of pedestrian deaths. The evidence from this study demonstrated that when struck in zones where posted limits were **50 kilometres per hour or greater**, death became a far more common outcome, with **67% of the deaths occurring on roads where posted vehicle speeds were beyond 50 km/hr**. For the remaining 28% of the deaths, the speed limit was unknown or was not relevant to the circumstances of the collision.

This speaks to the World Health Organization's (WHO) *World Report on Road Traffic Injury Prevention*, which suggests that a road safety paradigm shift is necessary and included the following statement:

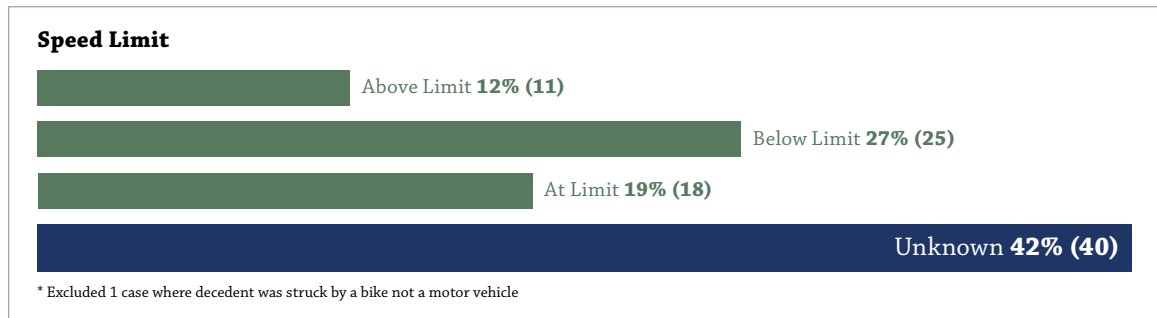
- ***The vulnerability of the human body should be a limiting design parameter for the traffic system, and speed management is central***



There is a well established impact of vehicle speed on death, where “*the fatality risk at 50km/hr being more than twice as high as the risk at 40 km/hr and more than five times higher than the risk at 30 km/hr.*”³⁸

In April 2012, the Medical Officer of Health for the City of Toronto, Dr. David McKeown released a report called *Road to Health: Improving Walking and Cycling in Toronto*. The report stated that in the interests of improving active transportation and health, “the City of Toronto should make targeted efforts to increase safety for pedestrian and cyclists across the City.”³⁹ The same report goes on to say “*Small increases in traffic speeds result in a disproportionately large increase in pedestrian fatalities. For example, pedestrians have an estimated 85% chance of dying when hit by a car travelling at 50 km/hr, but fatality rates decrease to less than 5% when the car travels at 30 km/hr.*”⁴⁰ The same report makes a recommendation to reduce the speeds on residential streets to 30 km/hr, and to 40 km/hr on all other streets, with the notable exception of emergency response vehicles as per the *Highway Traffic Act*.

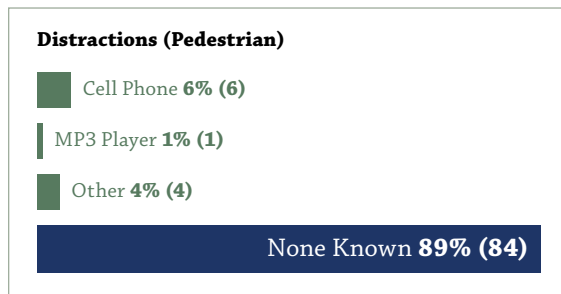
In the *Collision Data Review from 2000-2009* from the MTO Safety Policy and Education Branch, based on their review of police reports, about 12.7% of drivers involved in pedestrian collisions were speeding at the time of the incident which led to the fatality.



Distractions

A fundamental principle is that all road users will be competing, at some time, for the same road space. Because of the wide range of users, including pedestrians, cyclists, cars, trucks, buses, taxis and others, **everyone** needs to maintain complete attention.

Near the Office of the Chief Coroner in Toronto, at the intersection of Grosvenor St. and Yonge St., it is common to see people crossing Grosvenor St. while walking south along Yonge St., without the right-of-way, against the light, at dusk, with their heads down and with a cell phone to their right ear. As with most unsafe situations, these multiple contributory factors become additive in increasing the likelihood of a collision occurring.



Encumbrances, such as walking a dog can be distracting to pedestrians. When distractions are combined with encumbrances such as carrying bags, **approximately 20%** of pedestrians may have some form of distraction.

These estimates may actually be low, due to difficulty of attaining and documenting this information. For example, six pedestrians were running and one was skateboarding at the time they were struck. It is not possible to conclusively state that these activities were distractions, however, they may have played some role.



Failure to Yield

Failure to yield is defined as the failure “...of a driver to yield to a pedestrian that is crossing the street with the light, at a legal crosswalk, or at a marked stop sign-controlled or uncontrolled crosswalk.”⁴¹

Our data suggest that failure to yield was a factor in **approximately 21% of all deaths reviewed**. This occurred when vehicles were turning right (7%), left (7%), going straight through intersections (4%) and at pedestrian crosswalks (3%).

Crossing against the Signal

Pedestrian crossing **against the signal accounted for 12% of the deaths**. This was far more prevalent for pedestrians crossing when the vehicle was going straight through an intersection and the pedestrian crossed without the right-of-way. There was a single incident of a pedestrian being killed when crossing against the light and being struck by a car turning right.

Mid-block Crossing

A surprising **31% of pedestrians** who were struck were crossing at mid-block locations. The *Highway Traffic Act* defines two categories of pedestrian crossings:

1. Controlled Crossings, where vehicles are required to stop or yield to pedestrians legally in the intersection.
2. Uncontrolled Crossings, where pedestrians must wait for safe gaps in traffic to cross the roadway.⁴²

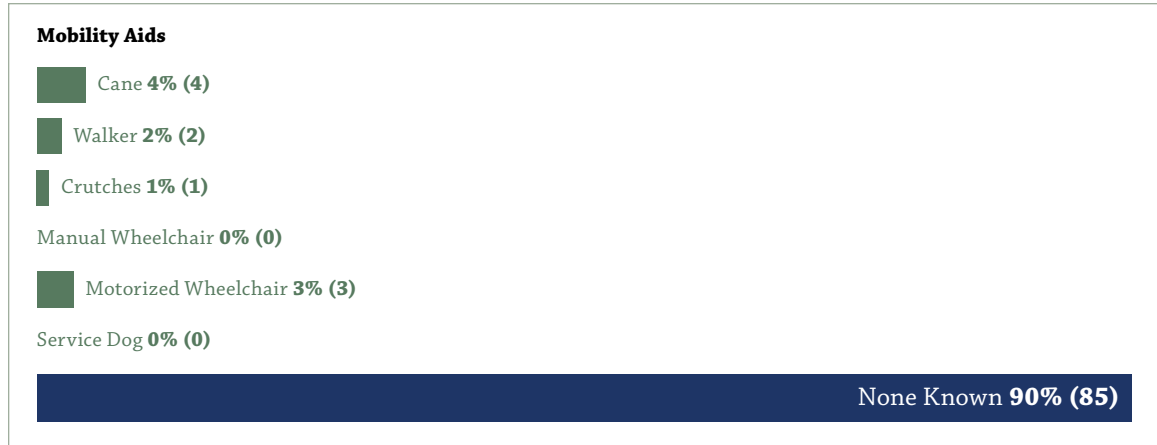
The 31% of pedestrians referenced above entered the roadway and did not have a traffic control measure to provide for their safety.

Case # 4	Youth Crossing With the Light was Struck and Run over by a Truck Making a Right Turn
Background	<ul style="list-style-type: none"> • 17 year-old male • January 2010 at 0852hrs • Clear visibility • The decedent was travelling eastbound on a marked pedestrian crosswalk through a green cross light • A tractor trailer travelling eastbound turned right and struck and ran over the pedestrian
Cause of Death	<ul style="list-style-type: none"> • Severe Crush Injuries to Head
Issues	<ul style="list-style-type: none"> • Clear day • The driver did not see the pedestrian who had the right-of-way • The driver did not know he had struck the pedestrian until he was flagged down

Pedestrian with disabilities

Persons with disabilities may utilize mobility aids to assist with their walking or transportation. Clearly, these types of pedestrians may require more time in a crossing situation, and may face challenges with navigating traffic when in the roadway.

In our review, **10% of those who died were utilizing mobility aids.**



Driver Inattention

There has been expanding interest in this area based on the prevalence of personal communication devices, navigation computers and the use of music in vehicles.

This area is difficult to assess, largely because inattention must be self-reported, or have been observed by a witness. A compelling piece of evidence was that 14% of pedestrians were hit on a sidewalk or shoulder of the road. It was suggested in the City of Toronto study that the commonest cause of this may be “loss of control of the vehicle.” Driver inattention would be expected to contribute to this.

In the New York City study, driver inattention was considered to be the commonest factor in pedestrian crashes.⁴³



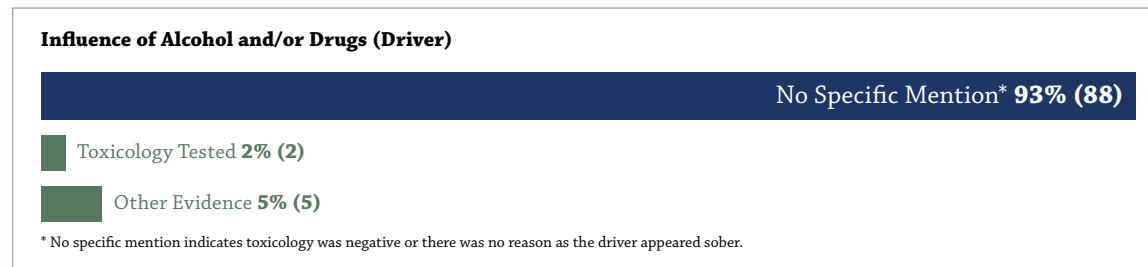
In the Collision Data Review, Pedestrian Safety 2000-2009, the Safety Policy and Education Branch of Ontario’s Ministry of Transportation noted 10.1% of drivers of motor vehicles involved in pedestrian fatalities were coded as “inattentive” by police. This is an area which clearly requires more attention for study in the future in Ontario.

Alcohol and/or Drugs in Drivers and Pedestrians

Drivers

Information about the specific alcohol and/or drug levels in drivers are part of the consideration of the criminal prosecution and are generally not made available for the Coroner's Death Review.

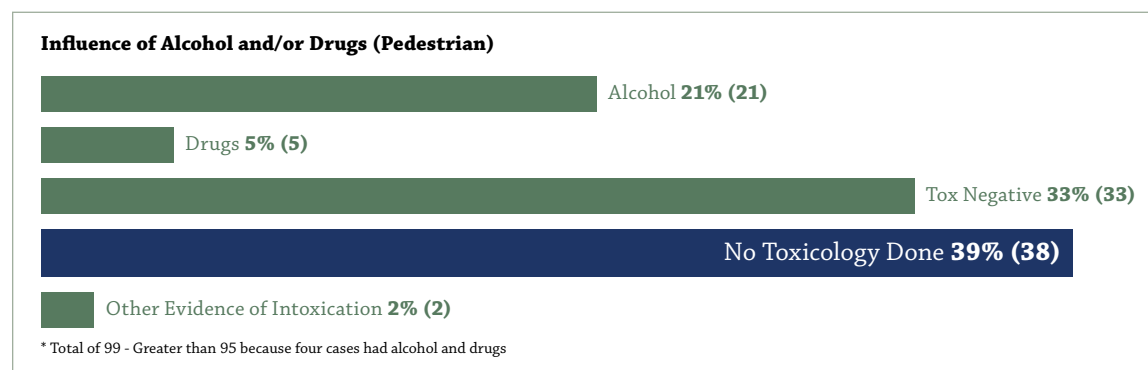
Less specific information obtained for this review revealed that alcohol and/or drugs likely played a small role. Our limited data might suggest that there was some level of influence of alcohol and/or drugs observed in 7% of drivers.



In the United States, 13% of fatal pedestrian crashes involve a driver who has been drinking. The *New York City Pedestrian Safety Study* suggested that 8% of their pedestrian fatalities involved drivers who had been drinking.⁴⁴ In the Collision Data Review, Pedestrian Safety 2000-2009, 8% of drivers were felt to have been either drinking, were legally impaired, or had their ability impaired by alcohol or drugs.⁴⁵

Pedestrians

Regarding pedestrians, in 39 % of cases in our review, testing for alcohol and drugs was not done. Testing can occur when a pedestrian suffers multiple traumatic injuries and has a period of hospitalization before succumbing to the injuries. Blood samples taken at the time of admission to hospital may not be available at the time of death for toxicology testing. In 33% of the cases, toxicology was negative. In 28% of the cases, toxicology was positive for alcohol and/or drugs.



This finding is comparable to the *Collision Data Review, Pedestrian Safety 2000-2009*, where approximately 25% of pedestrians had consumed alcohol before they were killed. Between 1988 and 2002, 20% of pedestrians fatally injured had been drinking prior to the event. The Ministry of Transportation also reported that while 2% of pedestrian struck by a motor vehicle will die, this rises to 48% for intoxicated pedestrians.⁴⁶

Conclusions

Pedestrian fatalities occur for many complex and interrelated reasons. In our Review, there were several areas which stood out as causal in these tragic events:

- **Vehicle speed:** 67% of the deaths occurred on roads with posted speeds beyond 50 km/hr, and only 5% on roads below 50 km/hr, demonstrating the vulnerability of the human body
- **Distractions:** Approximately 20% of pedestrians may have had some form of distraction such as: using a cell phone; an MP3 player; a mobile device; pushing a shopping cart; walking a dog; or riding a skateboard
- **Failure to yield:** This was a factor in approximately 21% of all deaths. This occurred when vehicles were turning right (7%), left (7%), going straight through intersections (4%) and at pedestrian crosswalks (3%)
- **Crossing against the signal:** Fatalities involving a pedestrian crossing against the signal occurred in 12% of the deaths
- **Mid-block Crossing:** 31% of pedestrians who were struck were crossing at mid-block locations at uncontrolled crossings where pedestrians must wait for safe gaps in traffic to allow them to cross the roadway
- **Pedestrian disabilities:** 10% of those involved in pedestrian fatalities were utilizing mobility aids, such as canes, walkers, crutches and wheelchairs
- **Driver Inattention:** 14% of pedestrians were hit on a sidewalk or shoulder of the road, which may be due to loss of control of the vehicle. Inattention may occur when drivers utilize personal communication devices, computers and music in their vehicles and can lead to loss of control
- **Alcohol and Drugs in Drivers:** Limited data suggest that there was evidence of some level of influence of alcohol and/or drugs observed in 7% of drivers
- **Alcohol and Drugs in Pedestrians:** In 28% of the pedestrians, toxicology was positive for drugs, alcohol or both. While 2% of pedestrian struck by a motor vehicle will die, this rises to 48% for pedestrians under the influence of alcohol and/or drugs

Case # 5	Mobility Aid
Background	<ul style="list-style-type: none"> • 51 Year old female • January – 2030hrs (dark) • Wheelchair bound (spina bifida) • Attempting to cross a five lane roadway with NO traffic signals • Struck by a car who did not see the wheelchair • VSA at scene
Cause of Death	<ul style="list-style-type: none"> • Multiple Traumatic Injuries
Issues	<ul style="list-style-type: none"> • Paraplegic in motorized wheelchair • Conditions were dark • Artificial lighting was present • Only reflective material on wheelchair was on the rear portion of the seat and was only visible from behind • Driver reportedly did not see and struck wheelchair without braking

DISCUSSION AND RECOMMENDATIONS

A. LEADERSHIP

The term “complete streets” was first developed in 2003. The complete streets approach is best captured by the following:

“Viewing the road network holistically enables communities to reduce infrastructure costs by designing a transportation network that suits all users at the outset, rather than retrofitting to include pedestrian, cycling or transit amenities later. There are also safety and social benefits to be had by lowering traffic speeds, expanding mobility options, improving air quality, increasing opportunities for physical fitness, and designing more attractive communities.”⁴⁷

With a “complete streets” approach, walking for transportation, recreation or health can be done in a safe environment. Municipal planners utilizing the complete streets philosophy ensure that planning, engineering and transportation considers all road users, including pedestrians, cyclists, and drivers of motor vehicles as well as users of public transit. Older approaches to transportation planning may not have always considered all constituents using the system, such as pedestrians, cyclists and persons with disabilities.

The City of Toronto’s Walking Strategy envisions designing streets for pedestrians following key principles including:

- “Walking is the foundation of mobility and is a part of virtually every trip made in Toronto;
- Streets are destinations as well as travel routes; and
- Street design should create healthy, convenient and attractive environments that accommodate the needs of all pedestrians.”⁴⁸

The City of Ottawa created the *Integrated Road Safety Program* in 2003. The program’s objective was to enhance existing road safety initiatives, including reducing “...the number of traffic collisions, injuries and fatalities, making Ottawa’s roadways safer for pedestrians, cyclists and motor vehicle users.”⁴⁹

Both visions clearly seek to weave safety, health and recreation into a single continuum. Can a *Walking Strategy for Ontarians* be delivered to all its citizens?

The creation of a *Walking Strategy for Ontarians* utilizing the complete streets approach requires leadership at all levels. The province has assisted this in the Provincial Policy Statement (PPS) of 2005, issued under the Planning Act. The PPS “... recognizes the complex inter-relationships among economic, environmental and social factors in planning and embodies good planning principles.”⁵⁰

In terms of transportation planning, the PPS goes on to state:

“1.5.1 Healthy, active communities should be promoted by:

planning public streets, spaces and facilities to be safe, meet the needs of pedestrians, and facilitate pedestrian and non-motorized movement, including but not limited to, walking and cycling;”⁵¹

The PPS is currently under review. If a *Walking Strategy for Ontarians* were developed, it could be codified in legislation by being included in the planned revision to the Provincial Policy Statement.

The Expert Panel was very supportive of the approach where leadership played a central role in advancing the agenda of reducing pedestrian fatalities through a walking strategy incorporating complete streets concepts. They also suggested that funding programs would encourage municipalities in developing their own walking strategies.

RECOMMENDATIONS

To the Ministry of Transportation, Ministry of Municipal Affairs and Housing, Infrastructure Ontario, Association of Municipalities of Ontario and all Municipalities in Ontario

1. A “complete streets” approach should be adopted to guide the development of new communities and the re-development of existing communities in Ontario. Complete streets should be designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age. Complete streets features might include such items as:
 - Improved pedestrian infrastructure, e.g. well-designed and well-placed crosswalks, pedestrian crossing “islands,” raised crosswalks, audible pedestrian signals and sidewalk “bulb outs” (widened sidewalks that effectively narrow the road)
 - Sidewalk amenities for pedestrians and those waiting for public transit, such as benches and recycling bins
 - Improved bicycle infrastructure and amenities, such as bicycle lanes, racks and parking areas
 - Wider shoulders
 - Synchronized traffic signals along major routes and arterial roads
 - Bus pullouts or special bus lanes
 - Safe and convenient pedestrian connections to transit stops
 - Landscaping features such as trees, planters and ground cover
 - Centre medians
 - On-street parking and other speed reduction methods, such as traffic calming measures⁵²

To the Ministry of Municipal Affairs and Housing (MMAH), the Association of Municipalities of Ontario and all Municipalities in Ontario

2. a. The Province of Ontario should develop a *Walking Strategy for Ontarians*. The vision should include the creation of a walking environment for the citizens of Ontario which integrates walking with other modes of transportation including public transit, cycling and driving, and seeks environmental, health, social and safety benefits for Ontarians.
2. b. As a component, municipalities should be encouraged to develop policies, practices, and plans for safe and convenient pedestrian conditions for transportation including road safety, recreation and health; in essence, creating their own individual walking strategies, (e.g. Toronto Pedestrian Charter 2002, Toronto Walking Strategy 2009, Ottawa Integrated Road Safety Program 2003/Safer Roads Ottawa 2012.).

To Infrastructure Canada and Infrastructure Ontario

3. Infrastructure Canada and Infrastructure Ontario should identify funding specific to pedestrian facilities within municipal infrastructure and stimulus funding programs.

To the Ministry of Municipal Affairs and Housing

4. The creation of the *Walking Strategy for Ontarians* should be led by the Ministry of Municipal Affairs and Housing, and include representatives including, but not limited to;
 - the Ministry of Transportation
 - the Ministry of Health and Long-Term Care
 - the Ministry of Tourism, Culture and Sport
 - the Association of Municipalities of Ontario
 - the Ontario Association of Chiefs of Police
 - representatives from individual municipalities in Ontario
 - representatives from the insurance industry
 - representatives from school boards
 - walking, cycling and transit users groups
 - health care organizations such as the Ontario Medical Association
 - representatives from Transit Commissions such as the Toronto Transit Commission
 - seniors' groups
 - organizations that work with the disabled (including the visually and hearing impaired)
 - Parachute-Leaders in injury prevention (created in 2012 by the amalgamation of Safe Kids Canada, Safe Communities, SMARTRISK, and ThinkFirst.
5. The *Walking Strategy for Ontarians* should seek to eliminate all preventable pedestrian deaths in the long term, and in the short term to reduce preventable pedestrian fatalities 50% in the Province of Ontario by 2022, using the benchmark of the 95 fatalities from this report.
6. The *Walking Strategy for Ontarians* should consider and recognize vulnerable road using pedestrians in its development with the rationale that if roadways are safe for vulnerable road users, they will be safe for everyone. Vulnerable pedestrians include:
 - Senior citizens greater than 65 years of age
 - Pedestrians with disabilities
 - Children

To the Ministry of Municipal Affairs and Housing

7. The *Walking Strategy for Ontarians* should become a component of the current review of the Provincial Policy Statement 2005 (PPS) under “transportation planning.” The Provincial Policy Statement 2005 (PPS) recognizes the complex inter-relationships among economic, environmental and social factors in planning and embodies good planning principles. It provides clear policy direction on land use planning to promote strong communities, a clean and healthy environment and a strong economy. The PPS is issued under the authority of the Section 3 of the *Planning Act*, and is currently under review. The *Walking Strategy for Ontarians* should become a component of the current review to the Provincial Policy Statement 2005 (PPS) under “transportation planning”.

B. LEGISLATION

Upon review of the data, members of the Expert Panel felt that opportunities might exist to improve pedestrian safety through a review of the *Highway Traffic Act*.

The Panel was of the opinion that the scientific evidence that pedestrians struck at lower speeds had a far greater chance of survival was irrefutable. Although supportive of changes to lower the speed limit for local municipalities, there was a strong view that in the absence of enforcement, drivers will drive the speed at which they are comfortable, irrespective of the posted speed, unless speed reduction is accompanied by engineering changes to the road to encourage adoption of slower speeds.



RECOMMENDATIONS

To the Ministry of Transportation (MTO), The Ministry of Municipal Affairs and Housing and the Association of Municipalities in Ontario

8. The Ministry of Transportation, as a stakeholder in developing the Walking Strategy for Ontarians, should solicit feedback from municipalities and other stakeholders on the potential opportunities and barriers in its own policies and legislation, such as the *Highway Traffic Act*, to support and improve pedestrian safety in Ontario.
9. The MTO should amend the *Highway Traffic Act*, to allow local municipalities to set the unsigned default speed limit at 40 kilometres an hour on residential streets, a decrease from the current 50 kilometres an hour.

To the Ministry of Transportation

10. The Ministry of Transportation should amend the *Highway Traffic Act*, to allow for municipality by-laws to provide for the erection of non-signalized pedestrian crossings for mid-block crossings in residential areas.

To Transport Canada

11. Transport Canada should make side-guards mandatory on heavy trucks in Canada. In addition, consideration should be given to requiring additional equipment (such as blind spot mirrors and blind spot warning signs) to make pedestrians more visible to trucks and decrease the chance of a collision, especially during right-hand turns.

C. ENGINEERING

The World Health Organization's (WHO) *World Report on Road Traffic Injury Prevention* suggested that a road safety paradigm shift was necessary and included the statement that “the vulnerability of the human body should be a limiting design parameter for the traffic system, and speed management is central.”

Our review would affirm that statement. Only 5% of people struck and killed were struck in areas where the speed was less than 50 kilometres per hour. Currently, drivers are not permitted to drive at a rate of speed greater than 50 kilometres per hour within a local municipality or within a built-up area, under section 128 of the *Highway Traffic Act*. In our Review, 67% of pedestrians were struck and killed in areas with speeds exceeding 50 kilometres per hour.

According to Rosen and Sander, there is a strong relationship between impact speed and death. They quote the risk of death at 50km/h as twice as high than at 40km/h, and five times as high than at 30km/h. They conclude that it is important to keep speeds as low as possible within urban areas where the majority of pedestrian collisions occur.⁵³

However, reduction in posted speeds is only part of the solution. When the City of Ottawa reduced speeds from 50 km/h to 40 km/h, studies which followed indicated that there was no substantial change in speed at which motorists travelled the roads. They concluded that the roadways themselves must also be changed to encourage slower speeds, as motorists will likely travel at speeds at which they are comfortable in the absence of enforcement.⁵⁴

Aside from speed reduction, engineering design features to improve safety for pedestrians using the roadway should be implemented. Measures such as leading pedestrian signal intervals (LPI) in intersections ensure that vehicles intending to turn right or left have improved visibility and yielding response time for pedestrians that have begun to cross. High risk pedestrians include the elderly, those with disabilities and children. Specific measures directed toward mobility, auditory and visual impairments are of benefit.

In our review, mid-block crossings accounted for 31% of the deaths. Engineering strategies to reduce these deaths need to be implemented. Panel members pointed out that current deficiencies in the *Highway Traffic Act* should be amended to allow for the council of a municipality to provide, via a by-law, for the erection of non-signalized pedestrian crossings for mid-block crossings in residential areas, an option not currently available in Ontario, but available in other provinces in Canada.



In our review, 11 deaths occurred when pedestrian were struck and killed by heavy trucks. In almost half of these, the pedestrian came into contact with the side of the truck. Side guards on heavy trucks may prevent pedestrians from falling under these vehicles. Vehicle side guards are intended to provide protection to vulnerable road users such as pedestrians and cyclists against falling under the sides of the truck and being caught under the wheels. In the European Union, “...deaths and serious injuries ...have been reduced since the introduction of side guards.”⁵⁵

RECOMMENDATIONS

To the Association of Municipalities of Ontario and all Municipalities in Ontario and the Ministry of Municipal Affairs and Housing

12. All municipalities in the Province of Ontario should undertake an annual forensic review of all pedestrian deaths that occurred within their jurisdictions to identify collision-prone areas. They should seek to understand the root causes of the deaths with a view to implementing engineering changes that may support enhanced safety for pedestrians and avoid future deaths. Analyzing collision patterns can assist in guiding the development of remedial or preventive measures.
13. All municipalities in the Province of Ontario should review the collision history of a road and proactively seek to improve pedestrian safety as a component of capital planning for road reconstruction and resurfacing projects.
14. Municipalities should consider the introduction of speed reduction strategies where speed has been implicated in the death(s) of pedestrians, and in areas where there are large populations of pedestrians utilizing the roadway including school areas, seniors' homes, community and recreation centres and hospitals. Some of the traffic calming strategies to consider for implementation include:
 - Reducing the number of travel lanes
 - Installing wide parking lanes
 - Reducing the width of travel lanes, in concert with the introduction of cycling lanes
 - Installing centre medians
 - Introducing road diets*
 - Installing speed humps
 - Installing raised intersections
 - Installing bulb outs
 - Installing chicanes
 - Installing cross walks
 - Installing automated traffic enforcement systems which are scientifically validated and strategically located
15. Municipalities, in developing their complete streets approach, should consider reducing speed limits to 30 km/hr on residential streets. In addition, municipalities should adopt speed limits of 40 km/hr on other streets, unless otherwise posted, or as required by the *Highway Traffic Act*.
16. Municipalities, in developing their complete streets approach, should consider installing leading pedestrian signal intervals (LPI) in intersections where there have been collisions or where a high occurrence of potential collisions between vehicles and pedestrians might occur. The WALK sign, turned on 3-5 seconds before the green light ensures that the vehicle intending to turn right or left has improved visibility and time to yield to pedestrians that have begun to cross.



* A Road Diet is a treatment given to an urban roadway in which the number of lanes is reduced, and the freed space converted to parking, bike lanes, landscaping, walkways, or medians. Road Diets are implemented to provide additional pavement and safety for bicyclists and pedestrians, reduce speeding, and to make room for parking. (<http://streetswiki.wikispaces.com/Road+Diet>)

17. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to benefit all pedestrians, particularly senior citizens and those with disabilities by including:

- Pedestrian lights with longer countdowns and walking times (reduce walking speed assumptions from 1.2 m/sec to 0.73 m/sec)
- Auditory signals at pedestrian/traffic lights
- Shorter crossing distances
- Pedestrian countdown signal timers
- Additional lighting at intersections with high night-time pedestrian demand
- Widened sidewalks to accommodate mobility aids
- Removal of snow and ice as a priority
- Pedestrian crossing islands
- Marked crosswalks at all four legs of an intersection

18. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to prevent collisions occurring at mid-block uncontrolled crossings by incorporating pedestrian crossing islands on roads with four or more lanes where pedestrian are commonly crossing at mid-block and/or pedestrian/vehicle collisions have occurred.

19. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to prevent collisions occurring where pedestrians are walking along the road. Some of these strategies might include:

- Developing new communities that provide sidewalks
- Adding sidewalks in existing communities
- Building roads with paved shoulders a minimum of 4 feet (1.8m) wide
- Building communities with continuous and connected sidewalks along both sides of the street
- Ensuring that sidewalks continue through driveways which are prohibited from being blocked
- Providing double-sided lighting along both sides of arterial streets



D. EDUCATION

If we hope to reduce injuries and fatalities from pedestrian collisions, we must begin with education. Education is a vital component of injury prevention and reduction. Target groups need to be identified and programs developed and delivered. Clearly, senior citizens, drivers and children would be targeted high risk groups who might benefit from focussed education strategies.

To address all possible causal areas, educating future drivers of precisely the scenarios under which they may find their vehicles in conflict with a pedestrian might heighten their awareness of this risk as new drivers.



RECOMMENDATIONS

To the Ministry of Transportation

20. The Ministry of Transportation should create an educational body with representatives from both governmental and non-governmental organizations to assist with the creation and delivery of educational programs targeting safety for pedestrians in Ontario. Invited participants might include:

- 8-80 Cities
- Association of Ontario Municipalities
- Canadian Automobile Association
- Insurance Bureau of Canada
- Mothers Against Drunk Drivers
- Ontario Association of Chiefs of Police
- Ontario Provincial Police
- Ontario Public Health Association
- Ontario Public School Board's Association
- Parachute-Leaders in injury prevention (created in 2012 by the amalgamation of Safe Kids Canada, Safe Communities, SMARTRISK, and ThinkFirst)
- United Senior Citizens of Ontario
- Safety Council of Canada
- Ontario Safety League
- Active and Safe Routes to School
- Canada Walks

The mandate of the educational body would be the identification and delivery of public education programs directed at preventing pedestrian deaths.

21. The Ministry of Transportation should create an educational program for senior citizens and other adult pedestrians stressing the need for navigating streets safely, particularly when exposed to arterial streets and high risk corridors.

22. The Ministry of Transportation should create an educational program for drivers stressing the need to:
- Watching for pedestrians at all times
 - No alcohol and/or drugs before driving
 - No distracted driving
 - Yield to pedestrians at cross walks
 - Yield to pedestrians when making turns, both right and left
 - Drive within posted speed limits, and consider the significant risk of fatality to pedestrians when struck at incrementally increasing rates of speed
 - Reduce speeds in inclement weather
 - Be aware that, when driving in roads with more than one lane, one should never pass a car which is stopped for a pedestrian
 - Exercise great caution and awareness of pedestrians entering/exiting or trying to catch public transit vehicles
 - Be vigilant and cautious around young children, including:
 - Performing a circle check by walking around the vehicle to check for any obstacles before leaving a parking spot; and
 - Parking the vehicle by backing in to ensure the driver knows the path is clear when leaving.
23. The Ministry of Transportation, in educating future drivers (who are also pedestrians), should update the *Official MTO Driver's Handbook* to include a chapter which clarifies those traffic scenarios in which motorists are most likely to be involved in a collision with a pedestrian. In this way, young and new drivers taking beginning drivers education courses, might acquire a heightened awareness of situations in which pedestrians and drivers are most at risk for collisions.

To the Ministry of Education and Ministry of Transportation

24. The Ministry of Education and the Ministry of Transportation should make road safety and pedestrian safety information mandatory in the junior kindergarten through grade eight curriculum, targeting children 5-14 years of age on a yearly basis. The focus should be on navigating streets safely, particularly when exposed to arterial streets and high risk corridors.
25. The Ministry of Education and the Ministry of Transportation should ensure that public education and safety campaigns for both pedestrians and drivers should promote awareness of pedestrian safety at night, given that most fatalities occurred at twilight or in the dark. All pedestrians should be encouraged to wear bright or retro-reflective clothing when walking in the evening or at night.

E. ENFORCEMENT

Currently, the penalties for improper crossing of a road by a pedestrian are not sufficiently significant to create an effective deterrent, according to our Expert Panel.

Recommendation number 8, suggests that the MTO should solicit feedback from municipalities on potential opportunities and barriers in its own policies and legislation such as the *Highway Traffic Act* to improving pedestrian safety.

The Panel was of the opinion that enforcement was a vital tool in promoting pedestrian safety.

RECOMMENDATIONS

To the Ontario Association of Chiefs of Police

26. Police Services in Ontario should develop strong traffic law enforcement programs consisting of notification of the community, public awareness and education as well as officer training.

Targeted driving behaviours might include:

- Speeding
- Failing to yield to pedestrians
- Running red lights and stop signs
- Distracted driving
- Failing to yield when making a right or left turn

Targeted pedestrian behaviours might include:

- Crossing the road when distracted
- Crossing at an unfavourable location
- Crossing against the traffic signal

HYPOTHESES: THE ANSWERS

At the outset, we had four hypotheses. Here, listed below, are the answers to these four questions:

1. **Pedestrian deaths are more likely to occur during the months where daylight is shorter, (November to March).**

- 55% of the deaths we examined occurred in the darker months of January to March.

2. **Pedestrian deaths are more likely to occur when a pedestrian and/or driver is using a mobile entertainment/communication device, (e.g. cell phone, ipod, etc.).**

- When distractions are combined with encumbrances, approximately 20% of pedestrians may have some form of distraction.
- Driver distractions could not be accurately assessed.

3. **Pedestrian deaths are more likely to occur when one or more persons involved in the collision are under the influence of alcohol and/or drugs.**

- In 28% of the pedestrian fatalities, the pedestrian's toxicology was positive for drugs, alcohol or both. Our data are limited on drivers, and reveals that there was some level of impairment observed in 7% of drivers.

4. **The vast majority of pedestrian deaths are preventable.**

- The Office of the Chief Coroner believes that 100% of the deaths were preventable.

“55% of the deaths we examined occurred in the darker months of January to March”

REVIEW PARTICIPANTS

Biographies of Team and Panel Members

Bert Lauwers, MD, CCFP, FCFP
Deputy Chief Coroner – Inquests
Office of the Chief Coroner

Dr. Lauwers is currently the Deputy Chief Coroner – Inquests. He is a graduate of the University of Toronto Medical School and has a Fellowship in the College of Family Physicians. He is appointed as an Associate Clinical Professor in the Faculty of Family Medicine at McMaster University. He is a former president of the Ontario Coroners Association. He was formerly the Deputy Chief Coroner – Investigations and Chair of the Paediatric Death Review Committee and Deaths Under Five Committee.

Dan Cass, BSc, MD, FRCPC
Deputy Chief Coroner – Investigations
Office of the Chief Coroner

Dr. Cass is the Deputy Chief Coroner – Investigations. He is a graduate of the University of Toronto Medical School and has a Fellowship in Emergency Medicine from the Royal College of Physicians and Surgeons of Canada. Prior to joining the Office of the Chief Coroner, Dr. Cass was an emergency physician at a major trauma centre for 16 years. He is an Associate Professor in the Department of Medicine, Division of Emergency Medicine at the University of Toronto, and is a core member of the Centre for Patient Safety at the University of Toronto. Dr. Cass was the Chair of the Office of the Chief Coroner's Cycling Death Review, released in June, 2012.

Nav Persaud, BA, BSc, MSc, MD, CCFP
Family Physician – St. Michael's Hospital
Investigating Coroner – Office of the Chief Coroner

Dr. Persaud is an Investigating Coroner in Toronto and an Associate Scientist at the Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's Hospital. He holds degrees from the University of Toronto and the University of Oxford. As a family physician at St. Michael's Hospital, he encourages his patients to regularly and safely engage in physical activities such as walking. He is a Lecturer in the Department of Family and Community Medicine at the University of Toronto.

David Evans, MD, FRCPC
Investigating Coroner and Former Regional Supervising Coroner

Dr. Evans qualified from Guys Hospital Medical School at the University of London in 1965. After practicing for two years in the National Health Service he immigrated to Canada in 1967 taking up a teaching position at the University of Toronto Anatomy Department for a year. Dr. Evans was a family doctor in the west end of Toronto and a member of the Staff of St. Joseph's Hospital from 1967-1970. In 1970, he commenced his specialty training in the Gallie Post Graduate Surgical Training Program completing his Certification and Fellowship in Urology in 1976. Dr. Evans then practiced in Brampton from 1977-2002. In 1991, Dr. Evans was appointed as a Coroner for the Province of Ontario. Upon his retirement from his surgical practice in 2002, he was appointed a Regional Supervising Coroner for the Office of the Chief Coroner, a position from which he retired in 2010. Dr. Evans continues to be an Investigating Coroner and an Inquest Coroner for the province.

Dorothy Zwolakowski
Executive Officer – Investigations
Office of the Chief Coroner

Dorothy Zwolakowski is the Executive Officer of Investigations at the Office of the Chief Coroner for Ontario (OCC), and has been with the OCC since 2002. She is a graduate of the University of Toronto with a degree in Sociology and also holds a Certificate in Quality Management from the University of Manitoba. Dorothy provides executive support to the Deputy Chief Coroner of Investigations, who oversees 16,000 death investigations annually in the province.

Emily Coleman
Project and Research Analyst
Office of the Chief Coroner

Emily Coleman joined the Office of the Chief Coroner in 2004 and has held several different roles within the office including a technical role as a Forensic Pathologist's Assistant at the Provincial Forensic Pathology Unit. Emily has worked intimately for a number of years coordinating Project RESOLVE and was awarded an Accolade Award for Partnership by the Ontario Provincial Police. In her current role, Emily is responsible for providing direct support for ongoing projects and reviews in the Investigations Unit for the Deputy Chief Coroner of Investigations directed towards enhancing public safety in Ontario.

Albert Koehl
Environmental lawyer

Albert Koehl is an environmental lawyer and advocate for efficient, safe, and healthy transport. He has represented community groups before the courts and tribunals on road safety matters. He is a frequent contributor to newspapers and journals on transport issues.

Albert is a founder of Cycle & Sole, The Walk and Roll Caravan, and Bells on Bloor; non-profit groups that advocate for safer roads.

Jamie J. Catania, BEng, MEng, PEng
Principal and Head, Accident Reconstruction Group
Giffin Koerth Forensics

Mr. Catania is a Senior Forensic Engineer who has specialized in reconstructing accidents for nearly 20 years, has been the lead engineer in well over 1,000 investigations, and is qualified to perform all aspects of reconstruction. Mr. Catania regularly speaks at insurance and legal conferences, and takes an active role in guiding the practice of forensic engineering in his professional community. He has been qualified as an expert in his field on numerous occasions at various levels of the court system in Ontario and British Columbia.

Mike Brady - City of Toronto

Mike Brady is a Certified Engineering Technologist and is currently Manager of Traffic Safety for the Transportation Services Division of the City of Toronto. Throughout his 29-year career in traffic, he has held several positions responsible for the planning, design, installation, operation and maintenance of traffic control devices. For more than a decade, Mike's current focus has been understanding traffic safety performance and automated traffic enforcement systems.

Fiona Chapman - City of Toronto

Fiona Chapman is the Manager of Pedestrian Projects with the City of Toronto. She is primarily responsible for the implementation of the City's Walking Strategy; a set of 52 actions designed to create high quality pedestrian environments and foster a culture of walking in all of Toronto's neighbourhoods.

**Kevin Wylie
Manager, Roads and Traffic Operations and Maintenance**

Kevin has worked for municipal government for over 25 years both at the City of Toronto and the City of Ottawa. Recently he led the development of the Safer Roads Ottawa program.

**Philippe Landry, P.Eng
Manager, Traffic Management and Operational Support
City of Ottawa**

Phillippe has worked for municipal governments for over 20 years both at the former Region of Ottawa-Carleton, and now City of Ottawa in traffic operations, traffic safety and traffic management. He has worked on various pedestrian operations/safety initiatives including the development of Ontario Traffic Manual Book 15 - Pedestrian Crossing Devices, the City of Ottawa's Human Centered Pedestrian Safety Evaluation Program and the Pedestrian Countdown Signal Installation Program.

**Pam Fusilli
Vice President, Government & Stakeholder Relations
Parachute - Leaders in Injury Prevention**

Pamela Fuselli is the Vice President, Government & Stakeholder Relations at the newly formed national organization, Parachute - Leaders in injury prevention, amalgamating Safe Communities Canada, Safe Kids Canada, SMARTRISK and ThinkFirst Canada. For the past five years, Pam was the Executive Director at Safe Kids Canada and she was with that organization for 13 years.

**Kristen Gane
Program Manager and Media Spokesperson
Parachute - Leaders in Injury Prevention**

Kristen Gane program manager and media spokesperson at Parachute Canada. Kristen strives toward reducing the number of severe injuries and fatalities among Canadian children through education, meaningful engagement and advocacy.

**Hugh G. Smith
Traffic Services, Safety Programs/Communications
Toronto Police Service**

Constable Hugh Smith has been a Toronto Police Service Officer since May 1987. He spent 10 years as a front-line officer, before being assigned to Police Vehicle Operations, as an instructor from 1997 to 2009. He is presently assigned to the Traffic Services Unit, Traffic Safety Programs, specializing in pedestrian/cycling safety and continues as a Collision Scene Communications Officer.

Gary McBratney
Traffic Services Reconstruction Squad
Toronto Police Service

Staff Sergeant Gary McBratney joined the Toronto Police Service in September 1980. Currently he is the officer in charge of the Collision Reconstruction Squad at Traffic Services and is also a Designated Collision Re-constructionist. He is responsible for the day to day operations within that unit and overseeing the technical training program for the Toronto Police Service in relation to collision investigations. He is the chair of the Collision Reconstruction Subcommittee for the Ontario Association of Chiefs of Police Traffic Committee.

Kathryn MacKay
Analyst, Health Promotion
Ontario Medical Association

Kathryn is the Analyst in Health Promotion at the Ontario Medical Association (OMA), where she has been since 2010. Kathryn's work focuses on public health policy, education programs, and prevention of injury and illness. Kathryn has been involved in a number of active transportation projects, including the Office of the Chief Coroner for Ontario's Review of Cycling Deaths, and the drafting of the City of Toronto's 2012 report, Road to Health: Improving Walking and Cycling in Toronto.

Whaley, Chris S/Sgt
Staff Sergeant
Ontario Provincial Police

Chris Whaley is a Staff Sergeant with the Ontario Provincial Police and has been a police officer since 1993. His current assignment is as the Manager of Specialized Patrol in the Highway Safety Division.

Mark Wright
Provincial Coordinator
Ontario Provincial Police

Mark Wright is the Provincial Coordinator for the Ontario Provincial Police's Technical Collision and Reconstruction Program, a position he has held for the past 11 years. He has 28 years of policing experience and has been a Collision Reconstructionist since 1994 after graduating from the University of Toronto.

Mark serves as the OPP representative on the General Board of Directors for ACTAR – The Accreditation Commission for Traffic Accident Reconstructionists. He currently serves this organization as the Vice-Chairman and has been accredited with ACTAR since 2001.

O'Grady, John TTC
Chief Safety Officer
Toronto Transit Commission

John has been the Chief Safety Officer of the Toronto Transit Commission (TTC) since 1998. He has over 35 years of professional experience in the field of health, safety and environment in the transportation and power generation sectors. Before joining the TTC, John led the health and safety function for Ontario Hydro, Canada's largest electric utility. He graduated from the University of Waterloo with a Bachelor of Environmental Studies degree and later earned his MA from the University of Toronto. He is a Canadian Registered Safety Professional and serves as Past Chair of the American Public Transportation Association's Rail Safety Committee.

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APPENDICES

APPENDIX A CONSOLIDATED RECOMMENDATIONS

A. LEADERSHIP

To the Ministry of Transportation, Ministry of Municipal Affairs and Housing, Infrastructure Ontario, Association of Municipalities of Ontario and all Municipalities in Ontario

1. A “complete streets” approach should be adopted to guide the development of new communities and the re-development of existing communities in Ontario. Complete streets should be designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age. Complete streets features might include such items as:
 - Improved pedestrian infrastructure, e.g. well-designed and well-placed crosswalks, pedestrian crossing “islands,” raised crosswalks, audible pedestrian signals and sidewalk “bulb outs” (widened sidewalks that effectively narrow the road)
 - Sidewalk amenities for pedestrians and those waiting for public transit, such as benches and recycling bins
 - Improved bicycle infrastructure and amenities, such as bicycle lanes, racks and parking areas
 - Wider shoulders
 - Synchronized traffic signals along major routes and arterial roads
 - Bus pullouts or special bus lanes
 - Safe and convenient pedestrian connections to transit stops
 - Landscaping features such as trees, planters and ground cover
 - Centre medians
 - On-street parking and other speed reduction methods, such as traffic calming measures

To the Ministry of Municipal Affairs and Housing (MMAH), the Association of Municipalities of Ontario and all Municipalities in Ontario

2. a. The Province of Ontario should develop a *Walking Strategy for Ontarians*. The vision should include the creation of a walking environment for the citizens of Ontario which integrates walking with other modes of transportation including public transit, cycling and driving, and seeks environmental, health, social and safety benefits for Ontarians.
2. b. As a component, municipalities should be encouraged to develop policies, practices, and plans for safe and convenient pedestrian conditions for transportation including road safety, recreation and health. In essence, creating their own individual walking strategies, (e.g. Toronto Pedestrian Charter 2002, Toronto Walking Strategy 2009, Ottawa Integrated Road Safety Program 2003/Safer Roads Ottawa 2012).

To Infrastructure Canada and Infrastructure Ontario

3. Infrastructure Canada and Infrastructure Ontario should identify funding specific to pedestrian facilities within municipal infrastructure and stimulus funding programs.

To the Ministry of Municipal Affairs and Housing

4. The creation of the *Walking Strategy for Ontarians* should be led by the Ministry of Municipal Affairs and Housing, and include representatives including, but not limited to:
 - the Ministry of Transportation
 - the Ministry of Health and Long-Term Care
 - the Ministry of Tourism, Culture and Sport
 - the Association of Municipalities of Ontario
 - the Ontario Association of Chiefs of Police
 - representatives from individual municipalities in Ontario
 - representatives from the insurance industry
 - representatives from school boards
 - walking, cycling and transit users groups
 - health care organizations such as the Ontario Medical Association
 - representatives from Transit Commissions such as the Toronto Transit Commission
 - seniors' groups
 - organizations that work with the disabled (including the visually and hearing impaired)
 - Parachute-Leaders in injury prevention (created in 2012 by the amalgamation of Safe Kids Canada, Safe Communities, SMARTRISK, and ThinkFirst)
5. *The Walking Strategy for Ontarians* should seek to eliminate all preventable pedestrian deaths in the long term, and in the short term to reduce preventable pedestrian fatalities 50% in the Province of Ontario by 2022, using the benchmark of the 95 fatalities from this report.
6. *The Walking Strategy for Ontarians* should consider and recognize vulnerable road using pedestrians in its development with the rationale that if roadways are safe for vulnerable road users, they will be safe for everyone. Vulnerable pedestrians include:
 - Senior citizens greater than 65 years of age
 - Pedestrians with disabilities
 - Children

To the Ministry of Municipal Affairs and Housing

7. *The Walking Strategy for Ontarians* should become a component of the current review of the Provincial Policy Statement 2005 (PPS) under “transportation planning.” The Provincial Policy Statement 2005 (PPS) recognizes the complex inter-relationships among economic, environmental and social factors in planning and embodies good planning principles. It provides clear policy direction on land use planning to promote strong communities, a clean and healthy environment and a strong economy. The PPS is issued under the authority of the Section 3 of the Planning Act, and is currently under review. *The Walking Strategy for Ontarians* should become a component of the current review to the Provincial Policy Statement 2005 (PPS) under “transportation planning”.

B. LEGISLATION

To the Ministry of Transportation (MTO), The Ministry of Municipal Affairs and Housing and the Association of Municipalities in Ontario

8. The Ministry of Transportation, as a stakeholder in developing the *Walking Strategy for Ontarians*, should solicit feedback from municipalities and other stakeholders on the potential opportunities and barriers in its own policies and legislation, such as the *Highway Traffic Act*, to support and improve pedestrian safety in Ontario.
9. The MTO should amend the *Highway Traffic Act*, to allow local municipalities to set the unsigned default speed limit at 40 kilometres an hour on residential streets, a decrease from the current 50 kilometres an hour.

To the Ministry of Transportation

10. The Ministry of Transportation should amend the *Highway Traffic Act*, to allow for municipality by-laws to provide for the erection of non-signalized pedestrian crossings for mid-block crossings in residential areas.

To Transport Canada

11. Transport Canada should make side-guards mandatory on heavy trucks in Canada. In addition, consideration should be given to requiring additional equipment (such as blind spot mirrors and blind spot warning signs) to make pedestrians more visible to trucks and decrease the chance of a collision, especially during right-hand turns.

C. ENGINEERING

To the Association of Municipalities of Ontario and all Municipalities in Ontario and the Ministry of Municipal Affairs and Housing

12. All municipalities in the Province of Ontario should undertake an annual forensic review of all pedestrian deaths that occurred within their jurisdictions to identify collision-prone areas. They should seek to understand the root causes of the deaths with a view to implementing engineering changes that may support enhanced safety for pedestrians and avoid future deaths. Analyzing collision patterns can assist in guiding the development of remedial or preventive measures.
13. All municipalities in the Province of Ontario should review the collision history of a road and proactively seek to improve pedestrian safety as a component of capital planning for road reconstruction and resurfacing projects.

14. Municipalities should consider the introduction of speed reduction strategies where speed has been implicated in the death(s) of pedestrians, and in areas where there are large populations of pedestrians utilizing the roadway including school areas, seniors' homes, community and recreation centres and hospitals. Some of the traffic calming strategies to consider for implementation include:
 - Reducing the number of travel lanes
 - Installing wide parking lanes
 - Reducing the width of travel lanes, in concert with the introduction of cycling lanes
 - Installing centre medians
 - Introducing road diets
 - Installing speed humps
 - Installing raised intersections
 - Installing bulb outs
 - Installing chicanes
 - Installing cross walks
 - Installing automated traffic enforcement systems which are scientifically validated and strategically located
15. Municipalities, in developing their complete streets approach, should consider reducing speed limits to 30 km/hr on residential streets. In addition, municipalities should adopt speed limits of 40 km/hr on other streets, unless otherwise posted, or as required by the *Highway Traffic Act*.
16. Municipalities, in developing their complete streets approach, should consider installing leading pedestrian signal intervals (LPI) in intersections where there have been collisions or where a high occurrence of potential collisions between vehicles and pedestrians might occur. The WALK sign, turned on 3-5 seconds before the green light ensures that the vehicle intending to turn right or left has improved visibility and time to yield to pedestrians that have begun to cross.
17. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to benefit all pedestrians, particularly senior citizens and those with disabilities by including:
 - Pedestrian lights with longer countdowns and walking times (reduce walking speed assumptions from 1.2 m/sec to 0.73 m/sec)
 - Auditory signals at pedestrian/traffic lights
 - Shorter crossing distances
 - Pedestrian countdown signal timers
 - Additional lighting at intersections with high night-time pedestrian demand
 - Widened sidewalks to accommodate mobility aids
 - Removal of snow and ice as a priority
 - Pedestrian crossing islands
 - Marked crosswalks at all four legs of an intersection

18. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to prevent collisions occurring at mid-block uncontrolled crossings by incorporating pedestrian crossing islands on roads with four or more lanes where pedestrian are commonly crossing at mid-block and/or pedestrian/vehicle collisions have occurred.
19. Municipalities, in developing their complete streets approach to pedestrians, should consider strategies to prevent collisions occurring where pedestrians are walking along the road. Some of these strategies might include:
 - Developing new communities that provide sidewalks
 - Adding sidewalks in existing communities
 - Building roads with paved shoulders a minimum of 4 feet (1.8m) wide
 - Building communities with continuous and connected sidewalks along both sides of the street
 - Ensuring that sidewalks continue through driveways which are prohibited from being blocked
 - Providing double-sided lighting along both sides of arterial streets

D. EDUCATION

To the Ministry of Transportation

20. The Ministry of Transportation should create an educational body with representatives from both governmental and non-governmental organizations to assist with the creation and delivery of educational programs targeting safety for pedestrians in Ontario. Invited participants might include:
 - 8-80 Cities
 - Association of Ontario Municipalities
 - Canadian Automobile Association
 - Insurance Bureau of Canada
 - Mothers Against Drunk Drivers
 - Ontario Association of Chiefs of Police
 - Ontario Provincial Police
 - Ontario Public Health Association
 - Ontario Public School Board's Association
 - Parachute-Leaders in injury prevention (created in 2012 by the amalgamation of Safe Kids Canada, Safe Communities, SMARTRISK, and ThinkFirst)
 - United Senior Citizens of Ontario
 - Safety Council of Canada
 - Ontario Safety League
 - Active and Safe Routes to School
 - Canada Walks

The mandate of the educational body would be the identification and delivery of public education programs directed at preventing pedestrian deaths.

21. The Ministry of Transportation should create an educational program for **senior citizens and other adult pedestrians** stressing the need for navigating streets safely, particularly when exposed to arterial streets and high risk corridors.
22. The Ministry of Transportation should create an educational program for **drivers** stressing the need to:
 - Watching for pedestrians at all times
 - No alcohol and/or drugs before driving
 - No distracted driving
 - Yield to pedestrians at cross walks
 - Yield to pedestrians when making turns, both right and left
 - Drive within posted speed limits, and consider the significant risk of fatality to pedestrians when struck at incrementally increasing rates of speed
 - Reduce speeds in inclement weather
 - Be aware that, when driving in roads with more than one lane, one should never pass a car which is stopped for a pedestrian
 - Exercise great caution and awareness of pedestrians entering/exiting or trying to catch public transit vehicles
 - Be vigilant and cautious around young children, including:
 - Performing a circle check by walking around the vehicle to check for any obstacles before leaving a parking spot; and
 - Parking the vehicle by backing in to ensure the driver knows the path is clear when leaving.
23. The Ministry of Transportation, in educating future drivers (who are also pedestrians), should update the *Official MTO Driver's Handbook* to include a chapter which clarifies those traffic scenarios in which motorists are most likely to be involved in a collision with a pedestrian. In this way, young and new drivers taking beginning driver education courses, might acquire a heightened awareness of situations in which pedestrians and drivers are most at risk for collisions.

To the Ministry of Education and Ministry of Transportation

24. The Ministry of Education and the Ministry of Transportation should make road safety and pedestrian safety information mandatory in the junior kindergarten through grade eight curriculum, targeting children 5-14 years of age on a yearly basis. The focus should be on navigating streets safely, particularly when exposed to arterial streets and high risk corridors.
25. The Ministry of Education and the Ministry of Transportation should ensure that public education and safety campaigns for both pedestrians and drivers should promote awareness of pedestrian safety at night, given that most fatalities occurred at twilight or in the dark. All pedestrians should be encouraged to wear bright or retro-reflective clothing when walking in the evening or at night.

E. ENFORCEMENT

To the Ontario Association of Chiefs of Police

26. Police Services in Ontario should develop strong traffic law enforcement programs consisting of notification of the community, public awareness and education as well as officer training.

Targeted driving behaviours might include:

- Speeding
- Failing to yield to pedestrians
- Running red lights and stop signs
- Distracted driving
- Failing to yield when making a right or left turn

Targeted pedestrian behaviours might include:

- Crossing the road when distracted
- Crossing at an unfavourable location
- Crossing against the traffic signal

APPENDIX B

PURPOSES OF A CORONERS DEATH INVESTIGATION

Section 18 of the *Coroners Act* sets out the statutory basis on which such reviews are conducted:

Coroner's investigation

15. (1) *Where a coroner is informed that there is in his or her jurisdiction the body of a person and that there is reason to believe that the person died in any of the circumstances mentioned in section 10, the coroner shall issue a warrant to take possession of the body and shall examine the body and make such investigation as, in the opinion of the coroner, is necessary in the public interest to enable the coroner,*
- (a) *to determine the answers to the questions set out in subsection 31 (1);*
 - (b) *to determine whether or not an inquest is necessary; and*
 - (c) **to collect and analyze information about the death in order to prevent further deaths in similar circumstances. 2009, c. 15, s. 7 (1).**

Inquest unnecessary

18. (1) *Where the coroner determines that an inquest is unnecessary, the coroner shall forthwith transmit to the Chief Coroner a signed statement setting forth briefly the results of the investigation, and shall also forthwith transmit to the division registrar a notice of the death in the form prescribed by the Vital Statistics Act. 2009, c. 15, s. 10.*

Recommendations

- (2) ***The coroner may make recommendations to the Chief Coroner with respect to the prevention of deaths in circumstances similar to those of the death that was the subject of the coroner's investigation. 2009, c. 15, s. 10.***

Disclosure to the public

- (3) *The Chief Coroner shall bring the findings and recommendations of a coroner's investigation, which may include personal information as defined in the Freedom of Information and Protection of Privacy Act, to the attention of the public, or any segment of the public, if the Chief Coroner reasonably believes that it is necessary in the interests of public safety to do so. 2009, c. 15, s. 10.*

APPENDIX C

THE REVIEW TEAM

The Review Team consisted of three senior coroners, an investigating coroner and physician/researcher from St. Michael's Hospital, the Executive Officer of Investigations and the Project and Research Analyst for the Office of the Chief Coroner.

Dr. Bert Lauwers is the Deputy Chief Coroner – Inquests. He previously chaired the Drowning Review and the Review of the Youth Suicides at the Pikangikum First Nation. Dr. Lauwers was the Project Manager and chaired both the Review Team and the Expert Panel. Dr. Dan Cass is the Deputy Chief Coroner- Investigations and chaired the Cycling Death Review. Ms. Dorothy Zwolakowski is the Executive Officer of Investigations and Ms. Emily Coleman, who is currently the Project and Research Analyst with the Office of the Chief Coroner, were the Project Leads for this Review. Dr. Nav Persaud is an investigating coroner, as well as a staff family physician and associate scientist at St. Michael's Hospital in Toronto. Dr. Persaud holds a Banting Postdoctoral Fellowship from the Canadian Institutes of Health Research (CIHR) and was the Scientific Advisor on this Review.

All members of the project team contributed to the development of the project charter, the review of case files and data abstraction, the subsequent analysis of data and the generation of recommendations. Dr. David Evans, a senior investigating coroner and former Regional Supervising Coroner, reviewed a large number of the case files and contributed his considerable knowledge and experience to the project team.

APPENDIX D

THE REVIEW-METHODOLOGY

The project consisted of a number of phases, many of which took place in parallel:

Creation of Review Team: The Office of the Chief Coroner Pedestrian Death Review Team was established. The Team generated the project charter and developed the methodology for the review.

Case Identification: The Review Team identified all pedestrian fatalities that occurred in Ontario during the study period. Pedestrian deaths were identified through a search of the Coroners Information System (CIS) database, supplemented by a manual review of files to determine if they met inclusion criteria.

Announcement of Review: In November, 2011, the review was publicly announced. Submissions from the public were invited, and were subsequently compiled and reviewed. Perspectives and recommendations from the public were later presented to the Expert Panel for consideration.

Background Research: Literature, including published research studies and reviews from other jurisdictions related to pedestrian deaths, were reviewed.

Data Extraction Tool: A data extraction tool was developed to facilitate the capture of data during the review of each case file. This tool was created based on literature from previous reviews, both locally and abroad, as well as Collision Reconstruction Reports from the Toronto Police Service. The data extraction tool was piloted on five randomly selected case files and final revisions to the tool were made. The resulting tool captured 70 separate data elements from each case file.

Data Collection and Analysis: Each of the 95 case files was reviewed manually. Materials reviewed included the Coroner's Investigation Statement, police reports (Police Occurrence Report +/- Collision Reconstruction Report), hospital records (where appropriate) and the Report of Post Mortem Examination, including Toxicology analysis (in cases in which a post mortem was performed). The data were reviewed and validated by the Review Team. Themes and trends were identified, and the findings were analyzed and prepared for review by the Expert Panel.

Expert Panel: Stakeholders who shared a unique interest and expertise in pedestrian and road safety were identified in order to assemble an Expert Panel to review the findings and assist in the generation of recommendations. The process used to identify potential Expert Panel members included targeted recruitment of key individuals and agencies, and self-identification by potential participants based on e-mails, letters and oral communication. The Review Team met to review the potential stakeholders and identified invitees to participate in the Expert Panel using pre-defined criteria.

In addition to the Project Team members, the Expert Review Panel members included representation from:

- City of Toronto
- City of Ottawa
- Giffin Koerth Smart Forensics
- Ministry of Municipal Affairs and Housing
- Ministry of Transportation
- Ontario Medical Association
- Ontario Provincial Police
- SMARTRISK
- St. Michael's Hospital and the University of Toronto
- Toronto Police Service (Traffic Services)
- Toronto Transit Commission

On February 9, 2012, the Office of the Chief Coroner hosted a meeting of the Pedestrian Death Review Expert Panel. The 22 Panel members examined individual cases, governing legislation and recommendations and submissions made by the public. The compiled Review data were reviewed, common themes were identified, and recommendations discussed, debated and developed.

Draft recommendations were developed by the Review Team and distributed to the Panel members for their review and consideration. Feedback from the Expert Panel was considered, and the recommendations were finalized and endorsed by the Chief Coroner.

Pedestrian Death Review Report: The Office of the Chief Coroner Pedestrian Death Review Report was developed, translated into French and into a format compliant with the *Accessibility for Ontarians with Disabilities Act* (AODA), and publicly released. All recommendations contained in the report were sent directly to the recipient agencies and ministries by the Chief Coroner for Ontario. The recipients will be canvassed in one year in order to determine what action has been taken on the recommendations made, and the responses received from the recipients will be made public.



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