

Office of the Chief Coroner for Ontario



Cycling Death Review

A Review of All Accidental Cycling Deaths in Ontario
from January 1st, 2006 to December 31st, 2010

Road Safety is Everyone's Responsibility



This report is dedicated to Ontarians who lost their lives while cycling, and in particular, to the 129 people whose deaths were reviewed.



June 2012

Dear Ontarians,

We are pleased to submit this report on the review of all accidental cycling deaths which occurred in the Province of Ontario between January 1st, 2006 and December 31st, 2010. This review arises from the tragic deaths of 129 people who died while cycling in Ontario during the review period.

The motto of the Office of the Chief Coroner for Ontario is,

"We Speak for the Dead to Protect the Living."

It is our hope that this report and its recommendations will give voice to those cyclists who have lost their lives, and that from an examination of the tragedy of their deaths may come hope for a safer Ontario in which all road users can share our roads more safely. The Review Team makes 14 recommendations in the areas of public safety and death prevention.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Dan Cass".

Dan Cass BSc, MD, FRCPC
Deputy Chief Coroner - Investigations
Office of the Chief Coroner for Ontario
Chair, Cycling Death Review

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Families of the deceased for providing information to inform our report and their own insights into the circumstances of their loved ones' deaths.

Members of the Public for sharing their personal experiences, as well as their suggested recommendations.

Mr. Albert Koehl and Mr. Patrick Brown who, as representatives of a coalition of cycling groups, approached the Office of the Chief Coroner to propose this review and who ably represented the perspectives of these groups throughout the review process.

The following groups represented by Patrick Brown and Albert Koehl provided significant input throughout the review process:

Advocacy for Respect for Cyclists

Hoof and Cycle

Cycle Toronto (formerly the Toronto Cyclists Union)

8-80 Cities

United Senior Citizens of Ontario

Members of the Expert Panel of the Cycling Death Review for their dedication, commitment and candour in the discussion of the findings from the Review and the generation of recommendations. The members brought a wide variety of diverse perspectives to the table and through them, this review has benefited from their opinions and expertise.

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

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Dr. William Lucas, Chair of the 1998 Office of the Chief Coroner study, "A Report on Cycling Fatalities in Toronto 1986 – 1996", for his assistance in reviewing the responses to the previous Review's recommendations, and for his insights into the design of the current Review.

Dr. Andrew McCallum, Chief Coroner for Ontario, for his support in establishing the Cycling Death Review and his insight and belief that a physician-coroner led death investigation can and should properly focus on issues of public safety to improve the health, safety, and well-being of the citizens of Ontario.

INTRODUCTION



Definition of Cycling

For the purposes of this Review, cycling was defined as the operation by a person (or persons) of a non-motorized bicycle. Only deaths that were deemed to be accidental were included in the Review. The use of the term “accidental” in this context is discussed below.

Basic Concepts of Cycling Deaths

Road safety is a global public health issue. In the 2004 *World Report on Road Traffic Injury Prevention*¹ co-authored by the World Health Organization and the World Bank, it is estimated that by the year 2020, road traffic injuries will become the third greatest contributor to the global burden of disease and injury. In terms of mortality, cyclists are among the most vulnerable road users worldwide. One European study found that cyclists are eight times more likely to suffer a fatal injury per kilometre of road travelled as compared to occupants of a motor vehicle².

One of the hypotheses of the Cycling Death Review was that all cycling fatalities are preventable. This hypothesis held true in each and every death we reviewed. As a Chief Coroner’s Review, we by definition confined our analysis to fatalities. However, we recognize that cycling deaths are just the tip of the iceberg. In 2009, over 26,000 people in Ontario visited an Emergency Department for treatment of an injury sustained while cycling³. Undoubtedly, countless more were injured but did not require medical treatment. Each of these injuries represents a potential fatality – an incident where, had the situation unfolded slightly differently, a death might have occurred.

As identified in the Ontario Medical Association’s policy paper, *Enhancing Cycling Safety in Ontario*, “When people perceive a safety issue, they are less likely to cycle themselves, and will discourage their children from doing so⁴.” Yet cycling is an excellent way to achieve the physical activity goals of a healthy society. Two-thirds of Canadians are inactive, and 24% are obese⁵. As a society, it is critical that physical activity and active transportation – including cycling - be promoted and supported.

One way to promote cycling is to take steps to enhance safety for cyclists. Not only is such an approach logical, it has been proven to be effective in a number of jurisdictions around the world⁶. A few examples:

Studies in Denmark have shown that providing segregated bicycle tracks or lanes alongside urban roads reduced deaths among cyclists by 35%⁷. In the state of Victoria, Australia, a new law requiring helmets in 1990 increased the use of helmets from 31% to 75% within one year and was associated with a 51% reduction in head injuries to cyclists⁸. In the United Kingdom, fatalities and injuries among cyclists colliding with heavy trucks decreased by 5.7% and 13.2%, respectively, after the introduction of truck side-guards. Fatalities among cyclists who collided with the sides of these trucks were reduced by 61%⁹.



Cycling Deaths and their Connection to Ontarians

We as Ontarians are blessed with access to tens of thousands of kilometres of routes that are suitable for cycling, ranging from provincial highways to urban streets to pathways. Whether for recreation, sport, or as a means of commuting, for many Ontarians cycling is a part of their everyday lives.

When the Cycling Death Review was announced, we invited the public to provide input. The response

was overwhelming. The Office of the Chief Coroner received over 200 submissions from individuals. Many wrote to propose recommendations; others to offer their perspectives about the root causes of cycling collisions and deaths. A number of people shared personal stories – their own experiences with injuries or near misses, or incidents where they had lost a loved one in a cycling collision.

All of the responses were read by the Review Team, summarized, and presented to the Expert Panel. Many of the recommendations contained in this Review mirror the opinions and suggestions of those people who wrote to us. The number and nature of these public submissions underscores the importance of the issue of cycling safety to the people of Ontario. The Review Team is indebted to everyone who took the time to provide their input.

Use Of The Term “Accidental”

In Ontario, all deaths are classified as having taken place in one of five manners: Natural, Accident, Suicide, Homicide or Undetermined. For the purposes of the Cycling Death Review, we included only cycling deaths that were deemed by the investigating coroner to have a manner of death of “Accident”. Thus, we excluded deaths purely due to natural causes (such as a heart attack or stroke) which happened to occur while the person was riding a bicycle, but did not result in significant injuries. The cycling collision itself, therefore, had to play a role in causing the death. By definition, these deaths are classified as being Accidental.

Notwithstanding the above, it is important to note that deaths resulting from cycling collisions, just like motor vehicle collision deaths and pedestrian deaths, are not “accidents” in the sense that all of these deaths were **predictable**, and therefore **preventable**.

The Basis for Recommendations

The issue of cycling safety is one which generates strong opinions and positions. For virtually any strategy or action that one can suggest, there are arguments that can be made pro and con. Many issues have become politicized and polarized to a degree that it is challenging to achieve broad agreement.

For this Review, we established at the outset that the recommendations must arise from the data pertaining to the deaths that we review. In other words, there must be a connection between the circumstances of the deaths and the recommendations made to prevent similar deaths. We have avoided making any recommendations,

however positive and well-intentioned, if they are not supported by our data. Similarly, while we recognize that strategies such as mandatory helmet legislation, the introduction of a one-meter passing rule and side guards for heavy trucks are highly controversial areas, we have made recommendations that reflect the realities of the data from the deaths that we reviewed.

The origin of every one of the 14 recommendations in the Cycling Death Review can be traced back to the death of one or more cyclists in Ontario between 2006 and 2010. We feel that these recommendations speak for the 129 cyclists who lost their lives during the Review period, and, if implemented together, they will help to protect cyclists in Ontario for generations to come.



EXECUTIVE SUMMARY

The Office of the Chief Coroner conducted a detailed review of accidental cycling deaths in Ontario for the period beginning January 1st, 2006 and ending December 31st, 2010.

- There were 129 deaths examined in this Cycling Death Review.
- 86% (111 of 129) of those killed while cycling were male.
- The peak age for cycling deaths was 45-54 years; over half of cycling fatalities (66 of 129; 51%) occurred in persons aged 45 and older.
- Children represented a smaller, but significant, portion of cycling deaths. A total of 19 deaths (15%) occurred in those aged 19 and under; 8 of those (6%) were in children aged 14 or under.
- Numbers of cycling fatalities in Ontario declined each year from 2006 (41) to 2009 (14), but rose again (to 25) in 2010.
- The peak months for cycling fatalities were July, August and September (46%).
- A total of 96 of the 129 deaths (74%) occurred in the Spring and Summer months.
- The vast majority of cycling deaths occurred during clear weather, on dry roads, with good visibility.
- More than half (69 of 129; 53%), of the fatal cycling collisions occurred in daylight conditions.
- The peak time for fatal collisions (25 of 129; 19%) occurred between 8:00 pm and 10:00 pm.
- Only 27% (35 of 129) of those who died as the result of a cycling collision were wearing a helmet. Despite mandatory legislation, only 6.25% (1 of 16) of cyclists under the age of 18 who died were wearing a helmet. Those cyclists whose cause of death included a head injury were three times less likely to be wearing a helmet than those who died of other types of injuries.
- In cases where the type of cycling activity was known, 63% of fatal collisions occurred during recreational activities, and 31% during commuting. The balance represented sport cycling activities, either solo or in a group setting.
- In 44 cases, contributing factors on the part of the cyclist alone were identified. In 33 cases, contributing factors on the part of the driver of a vehicle alone were identified. In 48 cases, contributing factors were identified on the part of both the cyclist and the driver. In three cases, the circumstances of the collision were unclear.

Our recommendations include:

- Adoption of a “complete streets” approach – focused on the safety of all road users - to guide the redevelopment of existing communities and the design of new communities throughout Ontario.
- Development of an Ontario Cycling Plan to guide the development of policy, legislation and regulations and the commitment of infrastructure funding to support cycling in Ontario.
- A comprehensive cycling safety public awareness and education strategy, starting in public schools, and continuing through the purchase of every new and used bicycle and through driver’s license testing.
- Legislative change (*Highway Traffic Act (HTA)*; *Municipal Act*; relevant Municipal By-Laws) aimed at ensuring clarity and consistency regarding interactions between cyclists and other road users.
- Strategies to promote and support helmet use for cyclists of all ages.
- Implementation of mandatory helmet legislation for cyclists of all ages, within the context of an evaluation of the impact of this legislation on cycling activity.
- Establishment of a “one-meter” rule for vehicles when passing cyclists.
- Prioritizing the development of paved shoulders on provincial highways.
- Mandatory side-guards for heavy trucks.
- Enforcement, education and public safety activities targeted to the specific issues of cycling safety identified in a given community.

OVERVIEW

I. Background Leading Up to the Review

Following the release of the Drowning Review in June, 2011, the Office of the Chief Coroner for Ontario (OCCO) began to identify areas of focus for subsequent special reviews. The purpose of such reviews, like much of the work of the OCCO, is to learn from tragic deaths in order to generate recommendations aimed at preventing deaths in the future. Section 18 of the *Coroners Act* sets out the statutory basis on which such reviews are conducted:

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*.

In the summer of 2011, the Office was approached by Mr. Albert Koehl and Mr. Patrick Brown, two lawyers who represent a coalition of cycling and pedestrian

groups. The possibility of addressing public safety issues affecting cyclists and pedestrians via a special review was discussed. The timing of these discussions was opportune, and the leadership of the OCCO was compelled by the importance of this issue. The result is this Cycling Death Review, as well as the OCCO Pedestrian Death Review (to be released at a later date).

II. The Review Team

The Review Team consisted of two 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. Dan Cass is the Deputy Chief Coroner - Investigations, was the Project Manager and chaired the Review Team and the Expert Panel. 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, and is currently the Chair of the Pedestrian Death Review. Ms. Dorothy Zwolakowski is the Executive Officer of the Paediatric Death Review Committee and Deaths Under Five Committee, and was the Project Leader for the Cycling Death Review. Ms. Emily Coleman has undergraduate training in forensic sciences, has been a pathologist's assistant with the Ontario Forensic Pathology Service, and is currently the Project and Research Analyst with the Office of the Chief Coroner. She was the Project Assistant 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 extraction, and the

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

III. Project Charter

A project charter was developed which included a mission, scope and hypotheses. The Review period was selected in order to generate sufficient data to test these hypotheses and to develop a more complete understanding of cycling deaths in Ontario.

Mission	To review the cycling deaths that occurred in the period from January 1, 2006 to December 31, 2010.
Scope	<ol style="list-style-type: none"> 1. All cycling fatalities that occurred in the period under review will be considered. 2. The review will only include accidental deaths. 3. Cyclist refers to a person traveling on a non-motorized bicycle.
Hypotheses	<ol style="list-style-type: none"> 1. Cycling deaths are more likely to occur during the spring and summer months. 2. Cycling deaths are more likely to occur in those not wearing helmets. 3. Cycling deaths are more likely to occur when the cyclist and/or driver involved in a collision with a cyclist is using a mobile entertainment/communication device (e.g. cell phone, iPod, etc.). 4. Cycling deaths are more likely to occur when one or more persons involved in the collision are under the influence of alcohol and/or drugs. 5. The vast majority of cycling deaths are preventable.

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 Cycling 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 cycling fatalities that occurred in Ontario during the study period. Cycling 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: On October 24, 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 cycling deaths, were reviewed. Additionally, the Review Team examined the previous OCCO Cycling Death Review (“A Report on Cycling Fatalities in Toronto 1986 – 1996”), released in 1998, and assessed the response to recommendations from that review.

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 77 separate data elements from each case file.

Data Collection and Analysis: Each of the 129 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 cycling 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:

- Canadian Automobile Association
- City of Toronto
- Giffin Koerth Smart Forensics
- McLeish Orlando LLP (representing a coalition of cycling groups)
- Ministry of Municipal Affairs and Housing
- Ministry of Transportation
- Ontario Medical Association
- Ontario Provincial Police
- Share the Road
- SMARTRISK
- St. Michaels Hospital and the University of Toronto
- Toronto Police Service (Traffic Services)
- Toronto Transit Commission

On January 26th, 2012, the Office of the Chief Coroner hosted a meeting of the Cycling Death Review Expert Panel. The 23 Panel members examined individual cases, governing legislation and recommendations and submissions made by the public. The compiled 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.

Cycling Death Review Report: The Office of the Chief Coroner Cycling 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.

FINDINGS - CASE STUDIES

All deaths that were part of the Review were equally important, and all contributed to an understanding of the root causes of cycling fatalities and their potential prevention. The following five cases were chosen as examples of some of the more common themes and issues identified through this Review.

Case Study #1: Cyclist Running Through a Stop Sign

Background

This 11 year old female was riding her bicycle eastbound on a rural road. The conditions were clear and dry and it was daylight. She failed to stop at the posted stop sign and rode directly into the path of an oncoming van travelling southbound at highway speed. The young cyclist was struck and projected a great distance, sustaining significant head injuries. She was stabilized at the local hospital and transferred to a paediatric hospital, but died the next day.

Cause of death

Cranio-cerebral Trauma

Issues

1. The child was not wearing a helmet.
2. The cyclist failed to yield the right of way to a driver when she did not stop at the stop sign.
3. Young driver (17 years old). There may have been some potential contribution of inexperience of the driver in taking sudden evasive action.
4. A fence enclosing a cornfield on the corner of the intersection impaired the ability of the cyclist and the driver to see each other until they both entered the intersection.

Case Study #2: Cyclist Struck by Right Turning Vehicle

Background

This 31 year old female was riding her bicycle southbound on a city road in clear and dry conditions with daylight and ample visibility. A heavy truck was also travelling southbound on the same road. As both the truck and the cyclist approached the intersection, the truck turned right. The rear wheels of the truck ran over the cyclist, crushing her pelvis. She was transported from the scene by air ambulance to a trauma centre, but died a short time later.

Cause of death:

Generalized blunt force trauma with crushing injuries to the pelvis

Issues

1. The truck driver reported he was unable to see the cyclist.
2. The uncovered side of truck between the front and rear wheels created an opportunity for the cyclist to be caught under the rear wheels.

Case Study #3: Cyclist – Loss of Control

Background

This 46 year old experienced cyclist was riding his bicycle downhill at a high rate of speed (estimated to be 69 km/hr). The cyclist was travelling eastbound. The conditions were clear and dry, it was daylight and there was good visibility. As he was travelling down the hill, a southbound vehicle entered the path of the cyclist. As the cyclist swerved to avoid the vehicle, he lost control and slid into a limestone boulder.

Cause of death

Massive brain injury

Issues

1. The cyclist was travelling at a high rate of speed (greater than the posted limit).
2. The driver of the vehicle did not see the cyclist due to distance and traffic congestion.

Case Study #4: Cyclist Inattention

Background

This 66 year old male was cycling on a busy city street. The conditions were clear and dry, it was daylight and there was good visibility. The cyclist made a left turn into the path of the streetcar despite a warning bell and was struck by the right side of the streetcar's bumper.

Cause of death

Severe closed head injury

Issues

1. The cyclist was not wearing a helmet.
2. The cyclist disregarded the traffic signals and failed to yield the right of way to the streetcar.

Case Study #5: Driver Inattention

Background

This 76 year old male was cycling westbound in clear, dry conditions with good visibility in daylight. At the same time a vehicle was also travelling westbound on the city street. The vehicle came up behind the bicycle and struck its rear wheel. The cyclist fell off the bicycle onto the hood of the vehicle then on its windshield and then was projected into a pillar before coming to rest 26.7m past the point of impact.

Cause of death

Blunt head and chest trauma

Issues

1. Driver inattention and failure to yield.
2. The cyclist was not wearing a helmet.
3. The driver admitted to looking away from the road after seeing the cyclist and then not making room for him.

FINDINGS – DATA AND INTERPRETATION



Cyclist Demographics

a. Sex

Males represented the vast majority of cycling fatalities. A total of 111 of 129 cycling fatalities (86%) during the Review period occurred in males.

b. Age

The peak age for cycling deaths was 45-54 years; over half of cycling fatalities (66 of 129) occurred in persons aged 45 and older. Children represented a smaller, but significant, portion of cycling deaths. A total of 19 deaths (15%) occurred in those aged 19 and under; 8 of those (6% of the 129 total deaths) were children aged 14 or under.

Conclusions:

- The vast majority of cycling deaths occurred in males.
- More than half of cycling fatalities occurred in persons aged 45 and older.

Timing of Collision

c. Yearly Numbers

The number of cycling fatalities in Ontario declined each year from 2006 (41) to 2009 (14), but rose again to 25 in 2010.

Table 1

Year	# of cases	%
2006	41	32%
2007	29	22%
2008	20	16%
2009	14	11%
2010	25	19%
TOTAL	129	100%

d. Time of Year

The peak months for cycling fatalities were July, August and September, which represented a combined total of 46% of the fatalities in this Review. A total of 96 of the 129 deaths (74%) occurred in the spring and summer months (April to September, inclusive).

Table 2

Month	# of cases	%
January	4	3%
February	2	2%
March	5	4%
April	10	8%
May	13	10%
June	14	11%
July	17	13%
August	17	13%
September	25	19%
October	12	9%
November	8	6%
December	2	2%
TOTAL	129	100%

e. Day of Week

The smallest proportion of deaths occurred on Sundays (8%). While it was not possible to determine the reason for this finding, it was surmised that the lower numbers of fatalities occurring on Sundays may reflect a lighter volume of motor vehicle traffic on those days. The greatest proportion of deaths occurred on Wednesdays (21.6%), although this was not statistically significant.

f. Time of Day

Most fatal cycling collisions took place in the afternoon and evening hours. Three-quarters (94 of 126) of cases in which the time of the collision is known took place between noon and midnight. The peak time was between 8:00 pm and 10:00 pm, when 19% (25 of 129) of all collisions took place.

Table 3

Time of Incident	# of deaths	%
0000 - 0200 hrs	2	2%
0201 - 0400 hrs	5	4%
0401 - 0600 hrs	1	1%
0601 - 0800 hrs	8	6%
0801 - 1000 hrs	9	7%
1001 - 1200 hrs	7	5%
1201 - 1400 hrs	13	10%
1401 - 1600 hrs	16	12%
1601 - 1800 hrs	13	10%
1801 - 2000 hrs	14	11%
2001 - 2200 hrs	25	19%
2201 - 2359 hrs	13	10%
Unknown	3	2%
Total	129	100%

Conclusions:

- Cycling fatalities declined steadily between 2006 and 2009, but rose again in 2010.
- Approximately three-quarters of cycling deaths occurred in the spring and summer months, with just under half occurring in July, August and September.
- Fatal cycling collisions most commonly occurred on afternoons and evenings.
- Fewer fatal collisions took place on Sundays than on any other day.

Environmental Conditions

g. Light Conditions

The light conditions at the time of the collision were known in 124 of the 129 cases. Of those, 69 (53%) occurred in daylight. The remainder of fatal collisions occurred during twilight (5 cases; 4%); dark (50 cases; 39%); or unknown (5 cases; 4%) conditions.

h. Weather and Visibility

In 83% of fatal collisions (107 of 129), weather conditions were clear. Only 7 cases (5%) occurred in conditions of rain, snow or fog. Only 5 (4%) fatal collisions occurred in conditions of poor visibility. In 112 (87%) cases, the visibility was good, and in 12 (9%) the visibility conditions were unknown.

i. Road Conditions

In over 88% of the cases (113 of 129), the road conditions were dry at the time of the collision. In 9 (7%) of the cases the road was described as being wet; in 3 (2%) there was snow or slush; and in 4 (3%) the road conditions were not known.

j. Urban vs Rural

65% (84 of 129) of fatal collisions took place in urban centres; the remainder, 45 cases (35%), occurred outside of a city or town, in a rural environment.

Conclusions:

- More than half of fatal collisions took place in full daylight.
- Most fatal cycling collisions took place in clear, dry conditions with good visibility. Weather and road conditions were not a factor in the vast majority of cases reviewed.
- Two-thirds of fatal cycling collisions occurred in urban centres.

Collision Circumstances

In this Review, the term “motor vehicle” includes passenger automobiles (cars, vans, SUVs, etc.), trucks and buses. It does not include streetcars or trains. There were 100 cases in which a cyclist collided with a motor vehicle, two with a streetcar, and two with a train. Thus, there were 100 cases of bicycle-motor vehicle collisions; but 104 cases in which there was an involved driver (including operators of streetcars and trains). The total numbers in the sections that follow therefore vary slightly to reflect these differences.

k. Collision Details

In 100 of 129 cases (78%), the cyclist collided with a motor vehicle. In two cases the cyclist collided with another cyclist, and in one with a pedestrian. In 25 cases, the injury occurred either through the cyclist colliding with another object or vehicle, or with the cyclist falling from the bicycle without colliding with an object.

Table 4

Cyclist Collided With:	# of cases	% **
Motor Vehicle	100	78%
No Collision	15	12%
Other Object	6	5%
Bike	2	2%
Train	2	2%
Streetcar	2	2%
Pedestrian	1	1%
Unknown	3	2%
Total	131*	

*In two cases, cyclist collided with two different objects

**Percentage calculated out of 129 cases

l. Point of Impact

In most of the cases where the cyclist collided with a vehicle, it was possible to determine the point or points of impact. The most common points of impact were the bumper 53% (55 of 104), hood 41% (43 of 104) or windshield 34% (35 of 104); often more than one point of impact was noted. This pattern suggested that the majority of collisions took place when the driver was attempting to pass the cyclist.

Table 5

Point of Impact	# of cases	% **
Bumper	55	53%
Hood	43	41%
Windshield	35	34%
Car Door	1	1%
Other part of vehicle	40	38%
Unknown	12	12%
Total	186*	

*Cases often had more than 1 point of impact

**Percentage calculated out of 104 cases

m. Mechanism of Injury

In 67 of 104 (64%) cases, the mechanism of injury was known. In 40 of 104 (38%) cases, the cyclist was struck by a vehicle and projected a distance. In 15 of 104 (14%), the cyclist was run over by the vehicle. The complete breakdown by mechanism of injury is shown below.

Table 6

Mechanism of Injury	# of cases	% **
Struck and projected	40	38%
Run over	15	14%
Pinned	6	6%
Dragged	5	5%
Multiple vehicles	1	1%
Unknown	45	43%
Total	112*	

*Some cases had more than one mechanism of injury; hence, total is greater than 104

**Percentage calculated out of 104 cases

n. Heavy Trucks

Eighteen of 100 fatal collisions with a motor vehicle involved a heavy truck. In half of these, the cyclist impacted the side of the truck, resulting in the cyclist being dragged, pinned or run over by the

rear wheels.

Conclusions:

- More than three-quarters of cycling fatalities involved a collision with a motor vehicle.
- The most common point of impact with the vehicle was some combination of the bumper, hood and windshield; thus, occurring when the driver attempted to pass the cyclist.
- The most common mechanism of injury observed was being struck and projected by the vehicle.
- In half of collisions involving heavy trucks, the cyclist impacted the side of the truck, before contacting the rear wheels.

Cyclist Features

o. Type of Activity

In 82% (106 of 129) of the deaths included in this review, the type of cycling activity was known. Recreational cycling comprised 63% (67 of 106). A further 31% (33 of 106) occurred during commuting, which speaks to the growing choice of active transportation methods for this activity. The remaining six deaths occurred during sport activities, either solo or in a cycling group.

p. Helmet Use

In Ontario, helmet use is optional for cyclists age 18 and older. Helmets are mandated under the Highway Traffic Act below the age of 18, and parents are responsible for ensuring that helmets are used by their children below the age of 16.

In this Review, only 34 of 129 cyclists (26%) sustaining a fatal injury were wearing a helmet. Of particular concern was that observation that, despite existing legislation, only 1 of 16 cyclists (6.25%) under the age of 18 who died were wearing a helmet.

In 71 of the 129 cases (55%), the cyclist sustained a head injury which caused or contributed to their death. In 43 of those 71 (60%), a head injury alone (with no other significant injuries) caused the death. Those whose cause of death included a head injury were three times less likely to be wearing a helmet as those who died of other types of injuries.

q. Contributory Actions – Cyclist

In 71% of deaths (91 of 129), some modifiable action on the part of the cyclist was identified which contributed to the fatal collision. The three most common contributory cyclist actions identified were inattention (30 cases; 23%), failure to yield right of way (24 cases; 19%) and disregarding traffic signals (10 cases; 8%). The category “Other” included actions such as loss of control of the bicycle at a high rate of speed, and entering the curb lane abruptly after riding on the sidewalk. In 38 cases (29%), no contributory actions on the part of the cyclist were identified. Some cases involved more than one contributory action on the part of the cyclist; hence the total number is greater than 129. The full breakdown is shown in the table below.

Table 7

Contributory Cyclist Action	# of cases*	%**
Cyclist inattention	30	23%
Failure to yield	24	19%
Disregarding traffic signals	10	8%
Passing/Improper lane usage	6	5%
Traveling against traffic	4	3%
Unsafe lane changes	3	2%
Emerging from behind parked vehicles	1	1%
Other	58	45%
Total Actions Identified	136	

* No contributory actions were identified in 38 (29 %) cases

** Percentage calculated out of 129 cases

Other includes: loss of control at a high rate of speed (downhill), swerving to avoid fallen cyclist, jumping from sidewalk to curb lane.

r. **Distractions – Cyclist**

In many cases, it was not possible to determine from the available data whether a cyclist may have been engaged in behaviour which was distracting, or prevented him or her from hearing approaching traffic at the time of the collision. However, in 19 cases (15%), such potential distractions were identified. Half of these were due to the use of a personal music player with headphones while cycling.

Table 8

Distractions: Cyclist	# of cases	%
MP3/iPod	10	8%
Other *	8	6%
Cell Phone	1	1%
Unknown	110	85%
Total	129	100%

* **Other:** Examples include eating while cycling, holding dog on leash, etc.

s. **Encumbrances**

In 21 of 129 cases (16%), the cyclist was identified as carrying or transporting objects which may have encumbered his or her safe operation of the bicycle. The most common of these were bags (such as shopping bags) hanging from handle bars, and large backpacks which may have affected the cyclist's balance or ability to visualize approaching traffic.

t. **Influence of Alcohol and/or Drugs– Cyclist**

In thirty of the cycling fatalities (23%) there was evidence of the cyclist being under the influence of alcohol and/or drugs at the time of the collision. This was documented through toxicology testing done either on arrival at hospital or at autopsy (25 cases), or through information gathered in the course of the police or coroner's investigation (5 cases). Toxicology testing was negative in 60 cases. Toxicology testing was not performed in 39 cases.

Table 9

Cyclist - Alcohol/Drugs	# of cases	%
Alcohol Only	14	11%
Drugs* Only	6	5%
Alcohol and Drugs*	5	4%
Other Evidence of Intoxication	5	4%
Toxicology Negative	60	47%
Toxicology Testing Not Done	39	30%
Total	129	

* Drugs found included cannabis (THC), methadone, cocaine and its metabolite benzoylecgonine, and morphine

Conclusions:

- While the majority of deaths occurred in recreational cyclists, almost one-third of cyclists killed were engaged in commuting activities.
- The rate of helmet use was very low; only 6.25% of children under the age of 18 and 26% of cyclists overall who were killed in a cycling collision were wearing a helmet.
- In more than two thirds of cases, a contributory factor on the part of the cyclist was identified.
- Nineteen cases involved use of a music player, cell phone or other potential distraction.
- Twenty-one cases involved cyclists who were carrying objects or loads which may have affected their balance or ability to avoid a collision.
- Twenty-three percent of cyclists involved in fatal collisions had some evidence of being under the influence of alcohol and/or drugs.

Driver Features

u. **Age of Driver**

In 92 of the cases involving a collision with a motor vehicle, the age of the driver was known. While it was not possible to determine the degree of experience of each driver, in 18 percent of cases, the driver was between the ages of 16 and 20, and therefore by definition a relatively inexperienced driver.

Table 10

Age of Driver (years)	# of cases	% *
≤ 20	18	18%
21-40	29	29%
41-60	31	31%
61+	14	14%
Unknown	8	8%
Total	100	

* Percentage calculated out of 100 cases involving motor vehicle collisions

v. **Contributory Actions – Driver**

In 62% of cases (64 of 104) in which the cyclist collided with a vehicle (defined as a motor vehicle, streetcar or train), one or more modifiable actions on the part of the driver were identified which were felt to have contributed to the death. In the four cases involving a streetcar or train, no contributing factors on the part of the vehicle's operator were identified.

The three most common contributory driver actions were speeding (31; 30%), driver inattention (29; 28%) and failure to yield (20; 19%). In 40 cases (38%), no contributory actions on the part of the driver were identified. Some cases involved more than one contributory action on the part of the driver; hence the total number is greater than 104. The full breakdown is shown in the table below.

It was noted by the Expert Panel that the identification of contributory driver actions in cases involving a collision with a vehicle is subject to bias.

In most cases, the cyclist was unable to provide his or her own observations. While in some cases collision reconstruction data and/or eyewitness interviews afforded a more objective view of the circumstances, this was not always possible. In those cases where the circumstances of the collision were reported solely by the driver, it is recognized that an inherent bias existed which may have led to the under-representation of driver factors.

Table 11

Contributory Driver Action	# of cases*	%**
Speeding	31	30%
Driver inattention	29	28%
Failure to yield	20	19%
Unspecified human error	6	6%
Medical condition	2	2%
Car door opening	1	1%
Other	32	31%
Total Actions Identified	121	

* No contributory actions were identified in 40 (38%) cases

**Percentages calculated out of 104 cases in which there was a driver

w. **Distractions – Driver**

Similar to the comments related to identifying contributing factors, above, it was often not possible to determine from the available data whether a driver was engaged in distracting behaviour at the time of the collision. There is a significant bias against self-reporting of distracted driving in such cases. However, two cases were identified in which distracted driving due to cell phone use on the part of the vehicle driver contributed to the collision.

x. **Influence of Alcohol and/or Drugs – Driver**

The investigative powers granted under the Coroners Act are limited to the deceased person and do not extend to other, living persons who may have been involved in a death. As such, it was not possible for the OCCO to seek out information about the results of testing of drivers for impairment by alcohol or drugs.

However, in ten cases (10%), specific mention was made in the reports provided by police services of evidence of alcohol and/or drug use of the driver of the motor vehicle involved in the collision. This number likely under-represents the number of cases in this Review in which alcohol and/or drug use by the driver was a factor in the collision.

y. Criminal Code/Highway Traffic Act Charges

Based on information available to the reviewers, charges were filed against drivers in 30 of the fatal collisions. There were 13 charges under the *Criminal Code*, and 21 under the *Highway Traffic Act*. (In some cases, there were charges filed under both the *Criminal Code* and the *HTA*; hence, the number of charges is greater than 30.)

Since the case files reviewed focussed on the decedent, in some cases information was not available with respect to charges filed against the involved driver. Thus, these numbers may under-represent the number of charges filed.

z. Interaction of Cyclist and Driver Factors

Contributing factors to a collision were defined as one or more of: contributory actions on the part of the driver or cyclist; impairment or distraction of the driver or cyclist; and encumbrances (cyclist). In 48 cases (37%), contributing factors on the part of both the cyclist and the driver were identified. The results are shown in Table 12, below:

Table 12

Contributing factor identified for:	# of cases	% of total cases	% of cases involving a motor vehicle (N=100)
Cyclist Only	44	34 %	-
Driver Only	33	26 %	33%
Both Cyclist and Driver	48	37 %	48%
Circumstances Not Known	3	2 %	-
Total	129	100%	-

Conclusions:

- In almost one fifth of cycling deaths involving a motor vehicle, the driver was age 20 or under and by definition relatively inexperienced.
- In 62% of cases involving a vehicle, a contributory action on the part of the driver was identified; this may be an under-representation.
- The data available to the reviewers with respect to drivers was limited, by virtue of the scope of the *Coroners Act*. The following observations were made (although it should be noted that actual numbers are likely higher):
 - In two cases the driver was engaged in distracted driving due to cell phone use.
 - In ten cases, the driver was identified as being under the influence of alcohol and or drugs.
 - A total of 34 charges were filed against 30 drivers; 13 were charges under the *Criminal Code* and 21 were under the *Highway Traffic Act*.
- In 48% of cases involving a motor vehicle, contributing factors on the part of both the cyclist and the driver were identified.

DISCUSSION AND IDENTIFICATION OF THEMES



A wealth of information was gathered from the case files of the 129 cyclists who died between January 1, 2006, and December 31, 2010.

Over 200 members of the public provided input to the Cycling Death Review. The vast majority of public recommendations fell into one of three broad categories: Infrastructure, Education and Enforcement.

During the Expert Panel discussions, a fourth category of recommendations was identified: Legislation. While not all topics and subsequent recommendations fit perfectly within these four categories, this was felt to be a suitable framework within which to organize the main themes arising from the Review.

Infrastructure

In a number of cases, the physical characteristics of the roadway on which the collision took place contributed to the death. This ranged from busy urban areas where no formal bicycle lanes or paths existed, to provincial highways without paved shoulders.

At the Expert Panel meeting, the concept of ensuring that cyclists could share the road safely with motor vehicles and other road users was a prevalent theme.

Literature was reviewed that emphasized urban design principles that were inclusive of all road users, not just motorists. In the United States, the term “complete streets” has been coined to describe such principles. In such a model, a variety of strategies are used to ensure the safety of all road users. Such strategies include cycling networks (segregated or non-segregated bike lanes; bike paths), and other means to permit safe access for all road users, including vulnerable road users such as cyclists and pedestrians. Other strategies include low-speed “community safety zones” in residential areas with increased fines for speeding.

It was felt that the first step in this direction should be the development of a cohesive vision for cycling infrastructure in Ontario: an Ontario Cycling Plan. Such a Plan would be used to guide policy, legislation and regulation regarding cycling, and would also form the basis on which cohesive decisions about cycling infrastructure – including funding - could be made going forward. It was felt to be important that the Plan be accessible to all Ontarians, through such resources as the Ministry of Transportation website.

Coupled with this Plan would be a requirement that a “complete streets” approach be considered for the development of all new communities, and the redevelopment of existing communities

throughout the province. In addition to this, it was felt that the plan to create a network of provincial highways with paved shoulders to support cycling should be expedited.

Recommendations - Infrastructure

1. To the Ministry of Transportation and the Ministry of Municipal Affairs and Housing

A “complete streets” approach should be adopted to guide the redevelopment of existing communities and the creation of new communities throughout Ontario. Such an approach would require that any (re-) development give consideration to enhancing safety for all road users, and should include:

- *Creation of cycling networks (incorporating strategies such as connected cycling lanes, separated bike lanes, bike paths and other models appropriate to the community.)*
- *Designation of community safety zones in residential areas, with reduced posted maximum speeds and increased fines for speeding.*

2. To the Ministry of Transportation and the Ministry of Municipal Affairs and Housing

An Ontario Cycling Plan should be developed, building upon the 1992 Provincial Bicycle Policy. This Plan would establish a vision for cycling in Ontario, and would guide the development of policy, legislation and regulations and commitment of necessary infrastructure funding pertaining to cycling in Ontario. This plan should be publicly available.

3. To the Ministry of Transportation

The Ministry of Transportation should identify the development of paved shoulders on provincial highways as a high priority initiative.

Education

Opportunities exist to enhance the knowledge and understanding of cycling safety for all road users. Education around cycling safety should begin with the purchase of one’s first bike, and continue through the public school years, new driver education and driver’s license testing. Constant reminders are necessary for everyone if safe road use habits are to be achieved and maintained.

Unlike motor vehicle drivers, cyclists do not undergo any formal evaluation of their knowledge of the necessary rules and safe practices before they begin to use the road. As such, there are few formal opportunities to provide such information to new cyclists.

One such opportunity exists at the time of purchase of a bicycle. It was felt that it should be mandatory that critical information for cyclists (such as the rules of the road, and information on helmet use) be provided whenever a new or used bicycle is purchased through a retail establishment. One suggested method was the requirement of a “hang tag”; an information card or pamphlet that would be attached to the handlebar of every bicycle at the time of sale. The “hang tag” would include key facts, and links to other resources (such as the Ministry of Transportation website, and Service Ontario) through which the new cyclist could obtain additional information and publications.

Public school students are a key target group for cycling safety education. A total of 19 children lost

their lives while cycling in Ontario during the period of our Review; one such loss is too many. A number of these 19 fatal collisions occurred because the child either did not know, or did not obey, the rules of the road designed to protect them. Only 6.25% of children who were killed as a result of cycling collisions were wearing helmets, despite legislation that mandates helmet use by every cyclist below the age of 18. Clearly, there is a need for cycling safety education in our schools.

A number of initiatives have resulted in the development of education materials and programs aimed at school-age children. Incorporation of such programs into the school curriculum in Ontario was felt to be a critical success factor in educating our children on how to share the road and cycle safely. Almost one in five drivers who were involved in a fatal collision with a cyclist in this Review was age 20 or under. By definition, these drivers had less than three years of experience as independent drivers. In some of the cases reviewed, the inexperience of the driver was identified as a potential contributing factor in the collision. Indeed, there may have been a larger number of relatively inexperienced drivers; however, we did not have access to data regarding number of years of experience of all drivers involved in fatal cycling collisions.

This finding emphasizes the need to ensure that strategies for sharing the road safely with all road users, especially cyclists, are a major part of the education of new drivers. This may be accomplished

by building upon the existing content in the Ministry of Transportation driver’s handbooks (including those for trucks, buses and motorcycles), and by ensuring that this information is incorporated into Beginning Drivers’ Education (BDE) curricula, on-road driving instruction, and driver’s license testing scenarios.

The need for education and reminders about sharing the road safely does not end with graduation from public school or the acquisition of a driver’s license. People continue to be road users throughout their lives, whether as drivers, cyclists or pedestrians.

In order to sustain this knowledge and awareness, public education campaigns are required on a periodic basis. The Ministry of Transportation has successfully partnered with a number of organizations to develop and deliver such information, and these efforts should be continued and expanded upon. Based on our data, targeting such interventions in the spring and summer months, and in urban centres would likely have the greatest impact.

In addition to the general public, targeted education should be considered for key groups such as truck drivers, driving instructors and operators of BDE courses. Based on our data, cyclists need to be educated about the dangers of cycling distracted, cycling under the influence of alcohol and/or drugs and of carrying loads and packages unsafely.

Recommendations - Education

4. To the Ministry of Transportation

A comprehensive public education program should be developed to promote safer sharing of the road by all users. This initiative should be facilitated by the Ministry of Transportation, in collaboration with key stakeholder groups, including but not limited to, the Canadian Automobile Association, Share the Road Cycling Coalition, local cycling organizations and the Ontario Association of Chiefs of Police. Such a program should include:

- *a targeted public awareness campaign, in the spring/summer months, with key messages around cycling safety. This could include changes arising from other recommendations from this Review (such as changes to the Highway Traffic Act).*

- education targeted at professional truck drivers regarding awareness and avoidance of cycling dangers.
- education / regulation directed towards Beginning Driver Education (BDE) courses and driving instructors to include sharing the road and bicycle safety. This should be introduced in both classroom curricula and on-road training.
- public safety campaigns around the dangers of cycling distracted or under the influence (headphone use; carrying unsafe loads; cycling while under the influence of drugs or alcohol).

5. To the Ministry of Transportation and the Ministry of Consumer Services

It should be a requirement that important bicycle safety information (such as rules of the road and helmet information) be provided to purchasers of any new or used bicycle. Such information could be included in a “hang tag” information card attached to the handlebar of every bicycle at the time of purchase which would include critical information and a reference to the Ministry of Transportation website and Service Ontario for additional bicycle safety information and publications.

6. To the Ministry of Education

Cycling and road safety education should be incorporated into the public school curriculum. This could be done in partnership with organizations and agencies (such as the Canadian Automobile Association (CAA) and the Ontario Physical and Health Education Association (OPHEA)) which have a mandate that relates to promotion of physical activity in youth and the enhancement of road safety.

7. To the Ministry of Transportation

The Official Driver’s Handbooks (Driver’s Handbook; Truck Handbook; Bus Handbook; Motorcycle Handbook) should be updated to provide expanded information around sharing the road with cyclists, and include cycling-related scenarios in driver examinations.

Legislation

Two Acts deal with the majority of matters pertaining to Ontario’s roads and their use: the *Highway Traffic Act* (administered by the Minister of Transportation) and the *Municipal Act* (administered by the Minister of Municipal Affairs and Housing). In addition, each Municipality may issue By-Laws regarding the use of the roadways within their jurisdiction. While these Acts and By-Laws contain a number of sections which address the use of the roads by cyclists, the Expert Panel felt that these pieces of legislation should be reviewed to ensure that they are as consistent and clear as possible.

By way of example, the *Highway Traffic Act* stipulates that no person may drive on paved shoulders except in areas where this is permitted by Regulation. In strictest terms, this means that a cyclist is not legally permitted to use the paved shoulder of a highway, even where such a paved shoulder exists, unless the

highway is specifically designated for such use. This could be rectified by amending this section of the *Highway Traffic Act* to limit the prohibition of driving on paved shoulders to drivers of motor vehicles.

Our data indicate that the use of helmets among cyclists involved in fatal collisions was low. Only 26 percent of cyclists killed in our study were wearing a helmet. Even among those under the age of 18, for whom helmet use is legally required under the *Highway Traffic Act*, only 6.25 percent wore a helmet.

Because our Review did not look at all cycling injuries (both fatal and non-fatal), we cannot state with certainty the degree to which wearing a helmet decreases the likelihood of a head injury. However, based on our review of cycling fatalities, we do know that those cyclists whose cause of death included a head injury were more than three times as likely to not be wearing a helmet as those who died of other

types of injuries.

Most people, including most members of our Expert Panel, agree that these data support the use of helmets by cyclists of all ages. There was broad agreement that measures are required which promote and support helmet use. These strategies could include financial incentives (such as a tax exemption for helmets and helmet rebate programs) and public awareness campaigns, especially aimed at parents around existing helmet legislation for children.

The issue of mandatory helmet legislation for all ages is much more controversial, and was the subject of much debate among the members of the Expert Panel. While Expert Panel members were in agreement about promoting helmet use by all cyclists in Ontario, there was disagreement as to whether mandatory legislation was the best way to achieve this goal. There were three general arguments advanced against mandatory helmet legislation.

The first related to the potential for mandatory helmet legislation to decrease the overall number of cyclists. Proponents of this view cited the experience in Australia, where the introduction of mandatory helmet legislation was associated with a drop in cycling activity. Some research exists which suggest that the health benefits of helmets may be outweighed by the detrimental effects on overall health in the population through the decrease in cycling activity in jurisdictions where helmets have been made mandatory.

The second argument against mandatory helmet legislation relates to the view that government may see mandatory helmet legislation as “the answer” to cycling safety, with the result that other measures recommended in this Review (improved infrastructure, legislative review, education and enforcement activities) are de-emphasized or not acted upon.

The third point raised by members of the Expert Panel is that helmets are, indeed, the last line

of defence and of value only after a collision has occurred. Instead of mandating the use of helmets, it was argued that efforts should be focussed on preventing the collision (through strategies such as improved infrastructure and expanded public awareness and education programs) – in other words, if one prevents the collision, helmets become unnecessary. In addition, some stakeholders felt that mandatory helmet legislation sent the message that the responsibility for safety rests with the cyclist alone, rather than being a shared responsibility of all road users.

While there may be differences of opinion with respect to the value of mandatory helmet legislation, the key message to all Ontarians is simple:

Helmet use by all cyclists in Ontario should be encouraged and supported.

Notwithstanding the varied perspectives on helmet legislation, the Office of the Chief Coroner for Ontario takes the position that helmet use by all cyclists can and will decrease fatal head injuries. We feel that this is supported by the findings from this Review, and as such are recommending to the Ministry of Transportation that the *Highway Traffic Act* be amended to make helmets mandatory for all cyclists in Ontario. In recognition of the controversy that surrounds the issue of mandatory helmet legislation, both within the Review’s Expert Panel, and in the cycling community as a whole, this recommendation indicates that the implementation of such legislation should occur within the context of an evaluation of the impact of mandatory helmet legislation on cycling activity in Ontario. Such an evaluation strategy should be developed and carried out in collaboration with the Ministry of Health and Long-Term Care and Public Health Ontario.

The OCCO envisions that such an evaluation would begin with a critical appraisal of the existing literature from jurisdictions in which mandatory helmet legislation has been implemented, and the collection of high-quality baseline data on cycling activity in Ontario. Following this, if the Ministry of

Transportation proceeds with the implementation of mandatory helmet legislation, the impact of this legislation would be evaluated relative to the baseline data.

Another area of discussion concerned the implementation of a one-meter/three-foot rule when drivers are passing a cyclist. Such legislation has been implemented in a number of jurisdictions, including 20 U.S. states and the District of Columbia. Concerns were expressed by some members of the Expert Panel that enforcement of such a provision would be difficult, as it would require proof that the driver had contravened the one-meter distance.

Notwithstanding the potential challenges of such legislation, the fact remains that a significant number – the majority, in fact – of cycling deaths in our Review that involved a motor vehicle occurred when the driver was attempting to pass the cyclist from behind. Often, the driver attempted to pass the cyclist without waiting for a gap in traffic in the adjacent or oncoming lane such that it would allow the driver to move to the left in order to afford the cyclist a safe distance when passing. In order to support and emphasize the need for drivers to allow of a safe distance when passing a cyclist, the OCCO recommends the introduction of a one-meter/three-foot passing rule.

Eighteen of 100 (18%) of fatal collisions with a motor vehicle in this Review involved a heavy truck. In half of these, the cyclist impacted the side of the truck, resulting in the cyclist being dragged, pinned or run over by the rear wheels.

The issue of mandatory side guards for heavy trucks is highly controversial, with strong positions for and against their use. These devices attach to the sides of heavy trucks, and act as a physical barrier designed to decrease the likelihood that a cyclist or pedestrian will come into contact with the rear wheels of the truck. They are currently required on certain vehicles in the European Union (EU), Japan and in a number of jurisdictions in the United States, such as the District of Columbia. Other countries,

including Australia, have studied this issue but have decided not to implement side-guard requirements. The most conclusive data pertaining to the potential safety benefits of side guards come from the United Kingdom. Fatalities and injuries among cyclists who collided with heavy trucks decreased by 5.7% and 13.2%, respectively, after the introduction of truck side-guards. Fatalities among those cyclists who collided with the sides of these trucks were reduced by 61%¹.

In 1998, the Office of the Chief Coroner for Ontario released its only other review of cycling deaths: “A Report on Cycling Fatalities in Toronto 1986-1996”. Among its recommendations was the following:

“That Transport Canada investigate the feasibility of requiring “side guards” for large trucks, trailers and buses operated in urban areas to prevent pedestrians and cyclists being run over by the rear wheels in collisions with these large vehicles.”

Transport Canada commissioned a study of the issue by the National Research Council (NRC), which was released in March, 2010. This study explored the relevant issues, including the evidence for improved safety, and the impact on costs, operations and the environment. While the NRC report does not make a specific recommendation as to whether mandatory side guards should be implemented in Canada, it does set out the key factors to be considered by government in making such a decision.

In discussion by the Expert Panel, it was strongly felt that the matter has been studied extensively, and that enough is now known to make informed decisions as to how side guard legislation could best be implemented. The findings from our study indicated that half of those cyclists killed in collisions with heavy trucks impacted the side of the truck, where side guards could have potentially prevented or decreased the severity of their injuries. Because of this, the Panel supported the recommendation

for the introduction of mandatory side guards on appropriate heavy trucks.

As with all cycling collisions, the most effective strategies are aimed at the prevention of the collision, rather than just the reduction in severity of injuries once a collision has occurred. As such, in

addition to the recommendation for side guards on heavy trucks, it is recommended that consideration be given to requiring additional safety equipment (such as blind spot mirrors and blind spot warning signs) to make cyclists more visible to trucks and decrease the chance of a collision, especially during right-hand turns.

Recommendations - Legislation

8. To the Ministry of Transportation

A comprehensive review and revision of the Highway Traffic Act should be conducted to ensure that it is consistent and understandable with respect to cycling and cyclists and therefore easier to promote and enforce.

9. To the Ministry of Municipal Affairs and Housing, the Association of Municipalities of Ontario and the City of Toronto

A comprehensive review and revision of the Municipal Act, the City of Toronto Act and relevant Municipal By-Laws should be conducted to ensure that they are consistent and understandable with respect to cycling and cyclists and therefore easier to promote and enforce.

10. To the Ministry of Health and Long-Term Care, Ministry of Finance, Ministry of Consumer Services, the Ontario Association of Chiefs of Police and the Ontario Provincial Police

The use of helmets by cyclists of all ages should be promoted and supported. Such a strategy should include:

- financial incentives, such as removal of tax on bicycle helmets and helmet rebate programs.*
- promotion of helmet use through public awareness campaigns (including campaigns aimed at parents to support current legislation for cyclists under the age of 18).*
- enforcement of existing legislation regarding helmet use in cyclists under the age of 18.*

11. To the Ministry of Transportation

The Highway Traffic Act should be amended to make helmets mandatory for cyclists of all ages in Ontario. This should occur in conjunction with an evaluation of the impact of mandatory helmet legislation on cycling activity in Ontario. Such an evaluation strategy should be developed and carried out in collaboration with the Ministry of Health and Long-Term Care and Public Health Ontario.

12. To the Ministry of Transportation

*The Highway Traffic Act should be amended to include a one (1) meter / three (3) foot passing rule for vehicles when passing cyclists. This change in legislation should be reflected in the **Ontario Driver's Handbook**, Beginning Driver Education curricula and the driver's licence examination process.*

13. To Transport Canada

Side-guards should be made mandatory for heavy trucks in Canada. In addition, consideration should also be given to requiring additional safety equipment (such as blind spot mirrors and blind spot warning signs) to make cyclists more visible to trucks and decrease the chance of a collision, especially during right-hand turns.

Enforcement

While it was recognized that proactive enhancements to cycling safety, through a combination of improved infrastructure, targeted public education and legislative change, was the cornerstone of the recommendations arising from this review, it was agreed that enforcement of relevant laws (both existing and proposed) was a critical part of this strategy.

One approach that was discussed by the Expert Panel was that of diversion programs as an alternative to fines for drivers convicted of relevant offences under the *Highway Traffic Act*. However, upon further study, it was identified that such programs have been tried previously in Ontario, but did not prove successful and have subsequently been withdrawn. Such programs are therefore not recommended by this Review.

A key concept identified through the Expert Panel discussion was that of linking education,

enhancement of public safety and enforcement efforts to the circumstances of each community. That is, these activities should not be seen as a “one size fits all” approach, but instead should be focussed on the situations and locations that present the greatest opportunities for improvement in safety in a given area. The issues and high-risk activities pertaining to cycling are not the same in a large urban area as they are in a smaller community or a rural setting.

Developing a community-specific approach to targeted education, public safety interventions and enforcement would require collaboration between the local police service or Ontario Provincial Police detachment and the relevant Municipality, including a review of local data around cycling injuries and fatalities. In that way, enforcement activities and “blitzes” would be better focussed on the highest yield issues and locations for that community.

Recommendation - Enforcement

14. To the Ontario Association of Chiefs of Police, the Ontario Provincial Police, and the Ministry of Municipal Affairs and Housing

Municipalities and police services (municipal/regional/provincial) should review local data related to cycling injuries and fatalities in order to identify and address opportunities for targeted education, public safety interventions and enforcement activities.

Our Project charter began with five hypotheses; let us conclude this section by reflecting on whether our Review has supported or refuted each of these.

Cycling deaths are more likely to occur during the spring and summer months.

This hypothesis was confirmed; three-quarters of fatal cycling collisions occurred from April to September.

Cycling deaths are more likely to occur in those not wearing helmets.

Our data showed the rate of helmet use to be very low – only 26 percent of those cyclists killed during the Review period were wearing a helmet. Those cyclists whose cause of death included a head injury were three times more likely to not be wearing a helmet compared to those who died of other injuries.

Cycling deaths are more likely to occur when the cyclist and/or driver involved in a collision with a cyclist is using a mobile entertainment/communication device.

Our data were not conclusive enough to confirm this hypothesis, as this information was not captured reliably in all cases. However, we did identify 21 cases in which either the cyclist or the driver were engaged in distracting activities that were felt to have contributed to the collision. In ten of these, the cyclist was wearing headphones attached to a mobile entertainment device.

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

Again, the nature of our data was such that we were not able to make a definitive statement about the rate of alcohol and/or drug use among drivers involved in fatal cycling collisions. Despite this limitation, we identified 30 cyclists and 10 drivers who were under the influence of alcohol and/or drugs at the time of the collision; the number of the number of individuals under the influence of alcohol and/or drugs is likely significantly under-represented in our data. The prevalence of alcohol and/or drug use while cycling in our Review is significant, and supports the need for targeted public education as noted above.

The vast majority of cycling deaths are preventable. This hypothesis was strongly supported by our data. In virtually every case, some modifiable action(s) on the part of the cyclist, driver, or both, contributed to the death. Uncontrollable factors, such as weather and road conditions, rarely contributed to the death. In three cases the exact circumstances were not known, so it was not possible to determine with certainty whether the factors which contributed to the collision were related to the cyclist, the driver or both. However, our data support the conclusion that **all of the 129 deaths in this Review could have been prevented.**

CONSOLIDATED LIST OF RECOMMENDATIONS



Recommendations - Infrastructure

1. To the Ministry of Transportation and the Ministry of Municipal Affairs and Housing

A “complete streets” approach should be adopted to guide the redevelopment of existing communities and the creation of new communities throughout Ontario. Such an approach would require that any (re-)development give consideration to enhancing safety for all road users, and should include:

- Creation of cycling networks (incorporating strategies such as connected cycling lanes, separated bike lanes, bike paths and other models appropriate to the community.)
- Designation of community safety zones in residential areas, with reduced posted maximum speeds and increased fines for speeding.

2. To the Ministry of Transportation and the Ministry of Municipal Affairs and Housing

An Ontario Cycling Plan should be developed, building upon the 1992 Provincial Bicycle Policy. This Plan would establish a vision for cycling in Ontario, and would guide the development of policy, legislation and regulations and commitment of necessary infrastructure funding pertaining to cycling in Ontario. This plan should be publicly available.

3. To the Ministry of Transportation

The Ministry of Transportation should identify the development of paved shoulders on provincial highways as a high priority initiative.

Recommendations - Education

4. To the Ministry of Transportation

A comprehensive public education program should be developed to promote safer sharing of the road by all users. This initiative should be facilitated by the Ministry of Transportation, in collaboration with key stakeholder groups, including but not limited to, the Canadian Automobile Association, Share the Road Cycling Coalition, local cycling organizations and the Ontario Association of Chiefs of Police. Such a program should include:

- a targeted public awareness campaign, in the spring/summer months, with key messages around cycling safety. This could include changes arising from other recommendations from this Review (such as changes to the Highway Traffic Act).
- education targeted at professional truck drivers regarding awareness and avoidance of cycling dangers.
- education / regulation directed towards Beginning Driver Education (BDE) courses and driving instructors to include sharing the road and bicycle safety. This should be introduced in both classroom curricula and on-road training.
- public safety campaigns around the dangers of distracted and impaired cycling (headphone use; carrying unsafe loads; cycling while under the influence of drugs or alcohol).

5. To the Ministry of Transportation and the Ministry of Consumer Services

It should be a requirement that important bicycle safety information (such as rules of the road and helmet information) be provided to purchasers of any new or used bicycle. Such information could be included in a “hang tag” information card attached to the handlebar of every bicycle at the time of purchase which would include critical information and a reference to the Ministry of Transportation website and Service Ontario for additional bicycle safety information and publications.

6. To the Ministry of Education

Cycling and road safety education should be incorporated into the public school curriculum. This could be done in partnership with organizations and agencies (such as the Canadian Automobile Association (CAA) and the Ontario Physical and Health Education Association (OPHEA)) which have a mandate that relates to promotion of physical activity in youth and the enhancement of road safety.

7. To the Ministry of Transportation

The Official Driver’s Handbooks (Driver’s Handbook; Truck Handbook; Bus Handbook; Motorcycle Handbook) should be updated to provide expanded information around sharing the road with cyclists, and include cycling-related scenarios in driver examinations.

Recommendations - Legislation

8. To the Ministry of Transportation

A comprehensive review and revision of the Highway Traffic Act should be conducted to ensure that it is consistent and understandable with respect to cycling and cyclists and therefore easier to promote and enforce.

9. To the Ministry of Municipal Affairs and Housing, the Association of Municipalities of Ontario and the City of Toronto

A comprehensive review and revision of the Municipal Act, the City of Toronto Act and relevant Municipal By-Laws should be conducted to ensure that they are consistent and understandable with respect to cycling and cyclists and therefore easier to promote and enforce.

10. To the Ministry of Health and Long-Term Care, Ministry of Finance, Ministry of Consumer Services, the Ontario Association of Chiefs of Police and the Ontario Provincial Police

The use of helmets by cyclists of all ages should be promoted and supported. Such a strategy should include:

- *financial incentives, such as removal of tax on bicycle helmets and helmet rebate programs.*
- *promotion of helmet use through public awareness campaigns (including campaigns aimed at parents to support current legislation for cyclists under the age of 18).*
- *enforcement of existing legislation regarding helmet use in cyclists under the age of 18.*

11. To the Ministry of Transportation

The Highway Traffic Act should be amended to make helmets mandatory for cyclists of all ages in Ontario. This should occur in conjunction with an evaluation of the impact of mandatory helmet legislation on cycling activity in Ontario. Such an evaluation strategy should be developed and carried out in collaboration with the Ministry of Health and Long-Term Care and Public Health Ontario.

12. To the Ministry of Transportation

The Highway Traffic Act should be amended to include a one (1) meter / three (3) foot passing rule for vehicles when passing cyclists. This change in legislation should be reflected in the Ontario Driver's Handbook, Beginning Driver Education curricula and the driver's licence examination process.

13. To Transport Canada

Side-guards should be made mandatory for heavy trucks in Canada. In addition, consideration should also be given to requiring additional safety equipment (such as blind spot mirrors and blind spot warning signs) to make cyclists more visible to trucks and decrease the chance of a collision, especially during right-hand turns.

Recommendation - Enforcement

14. To the Ontario Association of Chiefs of Police, the Ontario Provincial Police, and the Ministry of Municipal Affairs and Housing

Municipalities and police services (municipal/regional/provincial) should review local data related to cycling injuries and fatalities in order to identify and address opportunities for targeted education, public safety interventions and enforcement activities.

REVIEW PARTICIPANTS

Biographies from Team & Panel Members

Dan Cass, BSc, MD, FRCPC

Deputy Chief Coroner - Investigations
Office of the Chief Coroner

Dr. Cass is the Deputy Chief Coroner - Investigations for Ontario. 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, and has treated countless patients who sustained injuries while cycling. 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.

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 Assistant Clinical Professor in the Faculty of Family Medicine at McMaster University. He is a former president of the Ontario Coroners Association.

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 cycling. 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 - Investigations at the Office of the Chief Coroner for Ontario (OCCO), and has been with the OCCO 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. She is the coordinator of two expert review committees at the OCCO, the Deaths Under Five Committee and the Paediatric Death Review Committee. These are multidisciplinary committees which review all deaths of children under the age of five and medically complex deaths in the province. Dorothy also provides executive support to the Deputy Chief Coroner - Investigations, who oversees 17,000 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 since then. Emily has also held a technical role as a Forensic Pathologist's Assistant at the Provincial Forensic Pathology Unit. Additionally, Emily has worked intimately for a number of years coordinating Project *RESOLVE*. This important project works on helping to identify unidentified remains for the province. This team 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 - Investigations.

Patrick Brown

Partner, McLeish Orlando LLP

Patrick Brown is a cyclist and partner at the law firm McLeish Orlando LLP. Over the years he has represented the families of cyclists killed on Ontario roads. He currently serves as a Director of Cycle Toronto (formerly

the Toronto Cyclists Union) and is the Past President of the Ontario Trial Lawyers Association. Patrick and fellow lawyer Albert Koehl represent a Coalition of interested groups seeking enhanced safety for cyclists, including Cycle Toronto (Toronto Cyclists Union), Advocacy for Respect for Cyclists, Hoof and Cycle, 8-80 Cities, and the United Senior Citizens of Ontario.

Jamie J. Catania, BEng, 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 practise 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.

Chris Cavaciutti, BA, MD, CCFP, MHSc, ASAM

Staff Physician
St. Michael's Hospital

Chris Cavaciutti is a staff physician in the Department of Family and Community Medicine at St. Michael's Hospital and an assistant professor in the Faculty of Medicine at the University of Toronto. He is a graduate of University of Toronto medical school and the University of British Columbia family medicine residency program. Dr. Cavaciutti's clinical and research interests include inner city primary care, and cycling health and safety.

Lise Grenier

Sergeant
Ontario Provincial Police

Sergeant Lise Grenier joined the Ontario Provincial Police (OPP) in 1988. She is currently assigned to the Highway Safety Division, Provincial Traffic Operations. Sgt. Grenier is a Program Coordinator and OPP expert on issues related to off-road vehicles, motorized snow vehicles, motorcycles and bicycles.

Chris Whaley

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 the Manager of Specialized Patrol in the Highway Safety Division.

Anna Halkidis

Manager, Community Relations & Auto Travel
Government & Community Relations & Automotive
Canadian Automobile Association (CAA), South Central Ontario

In her role Anna Halkidis develops annual community relations strategies and traffic safety initiatives; builds operational plans that enhance corporate brand & image; creates value in communities through outreach efforts and builds stakeholder relationships with community partners, police agencies and government; and chairs corporate charity committees.

Pamela Kennedy

Formerly: Manager of Research and Evaluation
SMARTRISK

Pamela Kennedy received her MSc in Kinesiology and Health Science (Epidemiology) from York University after completing a BPHE and BAH degree from Queen's University. Her research interests include prevention of child and youth injuries, as well as seniors falls prevention. During her tenure as the Manager of Research and Evaluation at the SMARTRISK Foundation, she was a member of the Association of Public Health Epidemiologists of Ontario, the Ontario Neurotrauma Foundation Surveillance Stream Committee, and a member of the CIHR Strategic Teams in Applied Research.

Gary McBratney

Traffic Services Reconstruction Squad
Toronto Police Service

Staff Sergeant Gary McBratney joined the Toronto Police Service in September 1980. He is currently in charge of the Collision Reconstruction Program for the Toronto Police Service, Traffic Services Unit.

Hugh G. Smith

Traffic Services, Safety Programs/Communications
Toronto Police Service

Constable Hugh Smith, Toronto Police Service officer since May 1987. 10 years as a front-line officer and one of the founding officers of the Bicycle Patrol Unit in 1990. Became a Can-Bike II Certified Instructor in 1994, and a National Can-Bike Examiner in 1999. Constable Smith continued in training as a Police Vehicle Operations instructor from 1997 to 2009, Toronto Police College, and is presently assigned to the Traffic Services Unit, Traffic Safety Programs, specializing in communications and media relations.

John O'Grady

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.

Eleanor McMahon

Founder and CEO
Share the Road Cycling Coalition

Eleanor McMahon has spent most of her career as a communications, government relations and marketing professional. Her work includes senior roles in the private, public and non-for profit sectors. Following the death of her husband, Ontario Provincial Police Sergeant Greg Stobbart - killed in a cycling collision in June 2006 – Ms. McMahon launched the Coalition, a provincial cycling advocacy and policy organization in 2008. In 2009 Ms. McMahon advocated for "Greg's Law" which created enhanced penalties for suspended drivers. The Bill was passed in the Ontario legislature in 2009, in Sgt. Stobbart's memory.

John Wellner

Director, Health Promotion
Ontario Medical Association

John Wellner is the Director, Health Promotion at the Ontario Medical Association (OMA), where he has been since 2001. John's work is focused on public health policy and education programs, which involve promoting illness prevention and injury avoidance, on behalf of Ontario's doctors. In 2011, the OMA released a position paper on *Enhancing Cycling Safety in Ontario*, which contained a number of recommendations to improve this beneficial form of exercise. John is a fair-weather cycling commuter with a long history of involvement in transportation issues.

Kathryn MacKay

Analyst, Health Promotion
Ontario Medical Association

A health promotion professional who adopted a bicycle as her regular means of transportation while living in Montreal. Since moving to Toronto, she has continued to cycle for work, play, and errands, and is interested in making the city and the entire province more bike-friendly, to help the environment and public health.

Ontario Ministry of Transportation – representatives participated on Expert Panel.

Ministry of Municipal Affairs and Housing – representative participated on Expert Panel.

Daniel Egan

Manager, Cycling Infrastructure and Programs
Transportation Services Division, City of Toronto

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