Vancouver Island Health Authority

Motor Vehicle Collision Report 2012

Health Impacts of Traffic Mishaps and Opportunities for Road Safety

VANCOUVER ISLAND health authority

Vancouver Island Health Authority Office of the Chief Medical Health Officer

Copies of this report are available from the
Office of the Chief Medical Health Officer
Fort Royal Medical Centre
430-1900 Richmond Street
Victoria, BC.,V8R 4R2
Telephone: (250) 519-3406

And electronically at this address: http://www.viha.ca/mho/publications/
Date Created: December 2012

Cover Photo Credit: Adrian Lam, Times Colonist. December 23, 2012

Acknowledgments
The Chief Medical Health Officer wishes to thank the following individuals and organizations for their contributions in the development of this report:

Dr. Perry Kendall, Provincial Health Officer
Office of the Provincial Health Officer, BC

Dr. Eric Young, Deputy Provincial Health Officer
Office of the Provincial Health Officer, BC

Alan Perry and Chris Foord, Co-Chairs
Capital Regional District (CRD) Traffic Safety Commission

Barb McLintock
Media & Coroner's Liaison
BC Coroners Service

Colleen Woodger
Road Safety Coordinator, Vancouver Island
Insurance Corporation of British Columbia (ICBC)

Mike Barkley, Ryan Austin and Andrew Harward
Traffic Safety Unit
Saanich Police Department

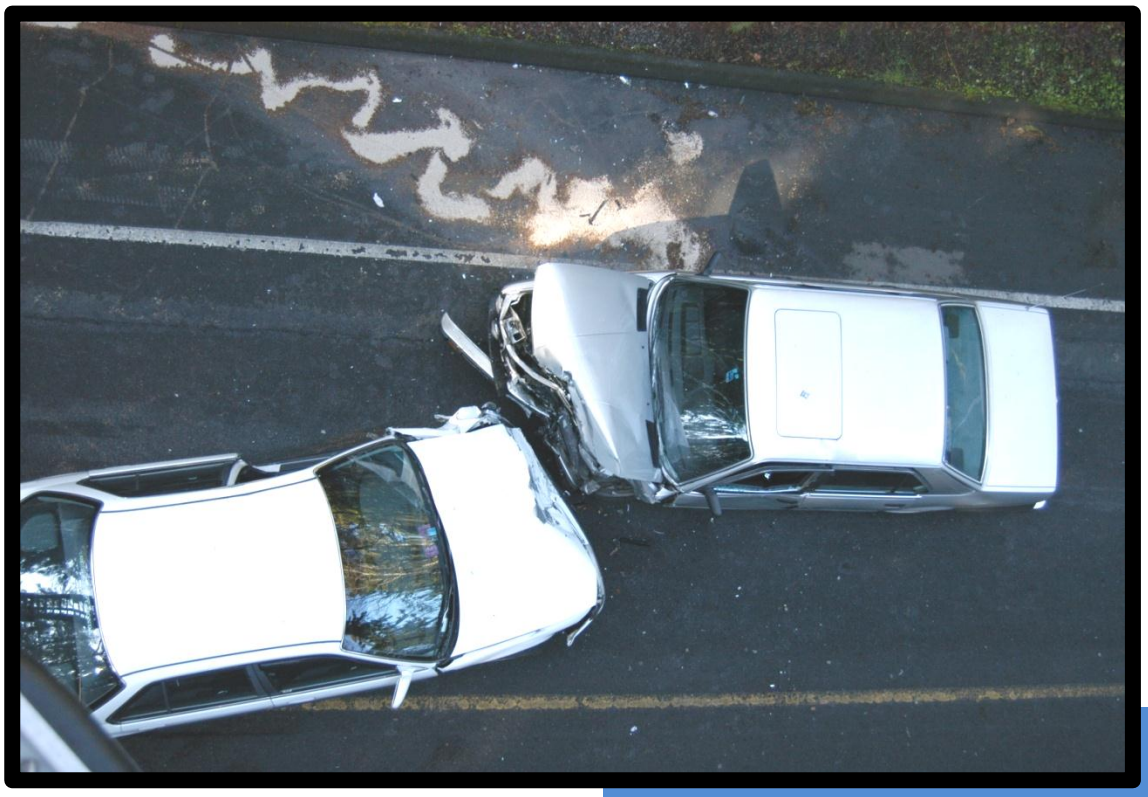
Robin A. Yates, M.Sc.
Injury Prevention Analyst
Ministry of Health, Government of British Columbia

Staff and Researchers at the BC Injury Research and Prevention Unit (BCIRPU)

Dr. Murray Fyfe, Medical Health Officer
Vancouver Island Health Authority

Janice Urquhart, Planning Analyst
Vancouver Island Health Authority

EXECUTIVE SUMMARY



Highlights

Motor vehicle transportation is critical in connecting people and communities on Vancouver Island, and its importance is reflected in more than 500,000 residents being 'active drivers' according to government records. However, the varied geography, weather, road characteristics and driving conditions pose challenges to drivers and in the effective promotion of road safety.

Motor Vehicle Collisions on Vancouver Island

Between 2003 and 2007, there were 17,181 police-attended motor vehicle collisions reported in the Health Authority, of which 264 (1.5 percent) involved one or more fatalities. The majority of collisions occurred in the South Island, where a greater proportion of the population resides; however, almost 50 percent of all fatal collisions occurred in Central Vancouver Island. Central Vancouver Island also saw the highest collision rate per 1,000 active drivers, with peak rates in Cowichan and Alberni Local Health Areas (LHAs).

When calculating the collision rates using length of roadway and number of road junctions/intersections, a higher rate of motor vehicle collisions with severe outcomes occurred on rural roads in less populated areas, despite these locales having fewer junctions/intersections (which tend to be associated with greater risk of crashes). Collisions with severe outcomes are also more likely to take place on roads associated with higher speed limits such as highways/freeways, particularly when motorist speeding is a contributory factor.

The greatest number of collisions occurs during the summer and fall seasons, likely due to an increased number of individuals using the roadways in the summertime and decreasing hours of daylight in the fall. In contrast, the frequency of fatal collisions was more evenly distributed throughout the year, with peaks occurring within each of the seasons.

Source: ICBC

Contributing Factors

Motor vehicle crashes should not be thought of as "accidents" but rather, crashes should be considered to be predictable and preventable events influenced by a variety of factors which are subject to mitigation. These factors determine not only whether a crash is likely to occur, but also if does happen, whether the crash results in injuries, hospitalizations, or fatalities.

Police have been tasked amongst other responsibilities, when called out to a crash, with ascribing 'blame' for mishaps that might end up before the courts and have an emphasis on the 'human factor' in their collision reports. Not surprisingly, "Driver Inattention" was the leading primary contributing factor in motor vehicle collisions in all three of Vancouver Island Health Authority (VIHA) Health Service Delivery Areas (HSDAs) between 2003 and 2007. This phenomenon was observed most often amongst the older and younger age groupings of drivers. As driver's age increases after 65, so does the number of events captured in the category of contributing factor "Driver Error/Confusion". Health issues at any age can result in a slower response time as well as a loss of coordination but these performance compromising conditions are more prevalent in the 'maturing driver'.

Alcohol impairment was cited as the second highest contributing factor to motor vehicle collisions on the island and was especially prevalent in male drivers and younger drivers. While Central Vancouver Island had the greatest total number of alcohol related collisions, alcohol related crashes accounted for a higher percentage of all collisions in the North Vancouver Island HSDA. Alcohol-related crashes often claimed more than just the life of driver who was *under the influence*; thirty-nine percent of the casualties in alcohol-related collisions were not the operator of the vehicle.

Speeding also plays a substantial role in contributing to crashes, particularly for younger drivers. While more pronounced as a contributing factor in North and Central Island, the consequences of excess speed are seen throughout Vancouver Island.

The use of proper safety devices as well as a person's seating position in the vehicle at the time of a collision can significantly influence survivability. Local police reports for the years 2003 through 2007 show that individuals in motor vehicle collisions who were using a safety restraint or device experienced fewer injuries and were less likely to die compared to those individuals who were misusing or not at all using vehicular restraints. In collisions, drivers and front seat right passengers were at a higher risk of injury or death than those seated in the rear of the vehicle, with the center rear seat associated with the lowest fatality risk.

Health Consequences of Collisions

Between 2001 and 2008, more than 5,600 VIHA residents were hospitalized and 443 died a result of transport-related motor vehicle events. More people die at a young age from transport-related collisions involving motor vehicles than any other injury-related cause of death.

Males are much more likely to be killed or injured as the result of a transport collision than females. Between 2000 and 2008, there were 2.5 males dying for every reported female fatality. Transport-related mortality rates from motor vehicle mishaps follow a "U-shaped" distribution, with higher rates of death for youth aged 15-24 years and then again for seniors above the age of 75 years.

While transport related mortality rates in VIHA have remained stable, transport related hospitalizations declined 11% between 2001 and 2008. During this period the rate of both transport related hospitalizations and deaths tended to be highest in the more rural local health areas of North and Central Vancouver Island.

If cyclists and pedestrians are involved in a collision on a roadway, they are at an elevated risk of both serious injury and death when compared to outcomes for occupants of motor vehicles. The injuries and fatalities associated with pedestrian and bicycle mishaps when motor vehicles are not involved, including bicycle-pedestrian encounters, are not captured in this report.

Economic Costs of Collisions

On average, transport-related hospitalizations from motor vehicle mishaps were associated with annual costs of $7.8 million for the island. The health-related costs would be much higher if non-hospital care expenditures, such as physician services and longer term rehabilitation, were included. Indirect costs, for example from lost wages, would further escalate the actual economic burden associated with crash related injuries.

What is being done?

VIHA has a strong interest in road safety not only because traffic-related injuries have a profound influence on the health and wellbeing of our population but also because these mishaps have the potential to be prevented or mitigated in the community with the appropriate investments of time and finances. Reflecting

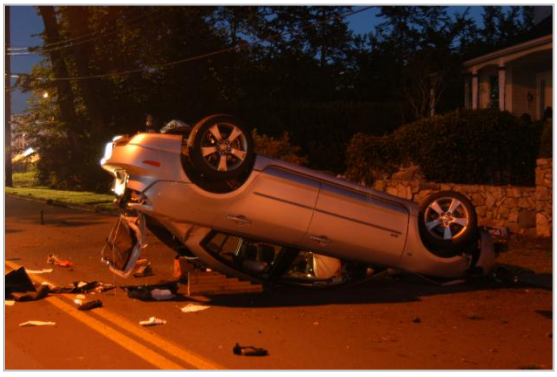
this latter philosophy, the Health Authority has been involved in a number of initiatives aimed at reducing these injuries, frequently in partnership with other like-minded stakeholders.

Since 1985, the Chief Medical Health Officer and the Department of Child Youth and Family services have participated in the Capital Regional District (CRD) Traffic Safety Committee (TSC) (www.traffic-safety.ca). Other members of the CRD TSC from the medical community have included medical officers of health, public health nurses, emergency room physicians, paediatricians and ambulance services personnel. The committee has developed a number of strategies to reduce traffic crashes and related injuries and deaths including:

- "The Older & Wiser Driver: A Self-Assessment Program" developed in conjunction with University of Victoria's Centre on Aging and Silver Threads
- A Visibility Campaign titled "Be Seen and Not Hurt" aimed at vulnerable road users
- The "Stupid Distractions" campaign aimed at reducing distracted drivers.
- The "Summer Malahat Safety Project" aimed at reducing incidents over a high-crash stretch of highway.
- A bicycle helmet promotion campaign with Safe Kids Canada and VIHA Licensing Officers graphically demonstrating the forces involved in a fall using the Triax head form (a device that test the safety of playground surfaces to absorb energy from falls).
- Promoted the 'walking school bus' as a means to get children active and be safety conscious pedestrians.
- Staged the Procession of the Dead in down-town Victoria to highlight the 28 deaths in the CRD that year – an approach that has since been copied by organizations such as ICBC to emphasize the cost of motor vehicle mishaps.
- Large and colourful vinyl appliqués promoting booster seats, seat belts and car seats – covering the sides of Transit buses as well as municipal, university and health authority vehicles across the island.
- Develop and co-fund drinking and driving counter ads at peak times of the year – Christmas, Super Bowl and summer vacation – based on the demographic and law enforcement trending data.
- Presented various initiatives at local, provincial, national and international injury control meetings.

VIHA's Chief Medical Health Officer has partnered with the academic community teaming up with the University of Victoria's Centre for Youth and Society on their "Alternatives to Roadside Memorials Project". The project focused on producing effective messaging for teens to prevent drinking and driving tragedies.

In 2006, VIHA awarded the CRD Traffic Safety Commission (TSC) a $65,000 grant for a project to encourage teens and young adults to celebrate the end of school and the beginning of summer without drinking and driving including advertisements targeting 'bush parties' across the island. No fatalities were recorded in June and July for that year from these celebrations.



Source: Saanich Police TSU

VIHA public health nurses work with parents of new babies to ensure they are aware of how to access and use proper safety restraints for their infants, toddlers and children. Public health, along with other partners, has striven to educate children, families and groups about proper bicycle helmet selection, fitting and use. Helmet promotion takes place at a variety of venues including bike rodeos, bike-to-

work week, and Safe Kids Week.

Stakeholders other than VIHA have an interest in improving road safety. Local police forces are involved in traffic enforcement programs in communities throughout the island, and many run educational programs aimed at improving driving, pedestrian and bicycle safety. In the Capital Regional District, the Integrated Road Safety Unit is made up of resources from five partner police forces and uses data-driven enforcement strategies to target the most serious traffic issues in the area.

The provincial government is attentive to these issues and has introduced new regulations under the Motor Vehicle Act in recent years aimed at improving road safety. More severe impaired driving penalties were introduced in 2010 including the Immediate Roadside Suspension Program. These changes have led to a substantial decrease in impaired-driving related fatalities. The Graduated Licensing Program, a program aimed at reducing crash involvement rates of new drivers, which was introduced in 1998, was enhanced in 2003. In 2009, the Use of Electronic Devices While Driving regulation was introduced. The intent of the legislation is to reduce driver distractions by cell phones or other devices. And, in 2008, regulations requiring use of booster seats for children less than 9 years of age were enacted.

Recommendations

Much work has been done, but many opportunities to reduce the traffic related injury burden still exist. As an initial step, ongoing exchange of relevant data among government agencies and health authorities is needed to improve our understanding and analysis of motor vehicle crashes and injuries at a regional level. Interventions and prevention programs must be evidence-based and their effectiveness evaluated. Success is not a function of popularity or evidence of exceptional program execution as reflected in public attitude and self-reported behaviors but impacts on outcomes – reductions in injuries and death.

Participation in local, multi-disciplinary traffic safety committees provides an opportunity to collaborate with partners around the common goal of reducing motor vehicle related injuries and fatalities. The CRD TSC can serve as a successful example as evidenced by the wealth and breadth of its rigorously evaluated programs since its inception over 25 years ago. Opportunities to develop similar initiatives in other areas on Vancouver Island should be entertained.

Promotional and educational campaigns must be tailored not only to community priorities, but also matched to significant causes of injury and death, preferably using local motor vehicle crash data to refine efforts. Priority areas likely will vary from one area to another of the island. Campaign experience and resources may have been developed and generated by others, so whenever possible and if appropriate should be shared, deployed and evaluated in the new setting. Some examples of collective cooperation include campaigns targeting speeding, combating impaired driving, promoting senior driver safety, improving visibility, reducing distractions, and fostering novice driver safety.

Some of the most significant reductions in crashes and related injuries can be attributed to evidence informed provincial regulation. Timely advocacy for additional legislative enhancements to existing laws, though potentially controversial (such as speed cameras for high crash areas) have the proven potential for further reducing the burden of injuries and death for the population from motor vehicle crashes.

Public health should be expected to collaborate with municipal engineers and planners to identify areas where road design and traffic calming may improve traffic-related health outcomes. Beyond safety and injury prevention, the additional benefits of more walk-able communities and enhancements to mass transit serve to improve overall well being and health of residents.

Injuries, like other health outcomes, disproportionately affect the poor. We recognize the importance of recording measures that capture the contribution of economic and social well-being to motor vehicle mishaps. The importance of identifying and implementing mitigating actions to address these inequities in the social determinants of health cannot be understated. Opportunities range from reducing urban speed limits to helmet give-a-ways in poor neighbourhoods to locating social housing away from the edge of busy thoroughfares.

Three pedestrians struck by vehicles in two days have police issuing a reminder. A 13-year-old boy is fighting for his life tonight after being hit by a pickup truck while trying to cross Sooke Road at Glenshire last night. It was dark and rainy and he was wearing a black hoodie; all conditions perfect for disaster. Just an hour later a 29-year-old woman was hit by a bus while crossing Lansdowne at Foul Bay. And Monday evening a 17-year-old Saanich boy was hit while crossing W. Saanich Road at a marked crosswalk. Police say it's imperative that you keep your wits about you when walking at night. Wear bright or reflective clothing if possible. Look both ways before you cross – sometimes it's easier for you to see cars that it is for them to see you. Keep your head up and your headphones down so you can see and hear what's going on around you. **CTV Vancouver Island News**

Nanaimo RCMP has identified man who died Tuesday after his mobility scooter collided with a car. The 78-year-old male was driving his mobility scooter northbound on Old Victoria Road at about 2:15 p.m. when he unexpectedly crossed the road and was struck by a southbound car. There was no crosswalk or intersection where he tried to cross. **Chris Bush - Nanaimo News Bulletin**

Fire chief Steve Sorensen said one of the motorcyclists crossed the centre line, hit the front of the Nissan pickup truck, and flew over top, where the motorcycle then "exploded" into a hundred pieces. The motorist suffered from a broken arm and cuts. The second motorcyclist then ran into the back of the first motorcycle, sustaining severe road rash. "They were going too fast," Sorensen said. "They were both wearing helmets, luckily." Both men, in their late 20s, had Alberta license plates. **Victoria Times Colonist**

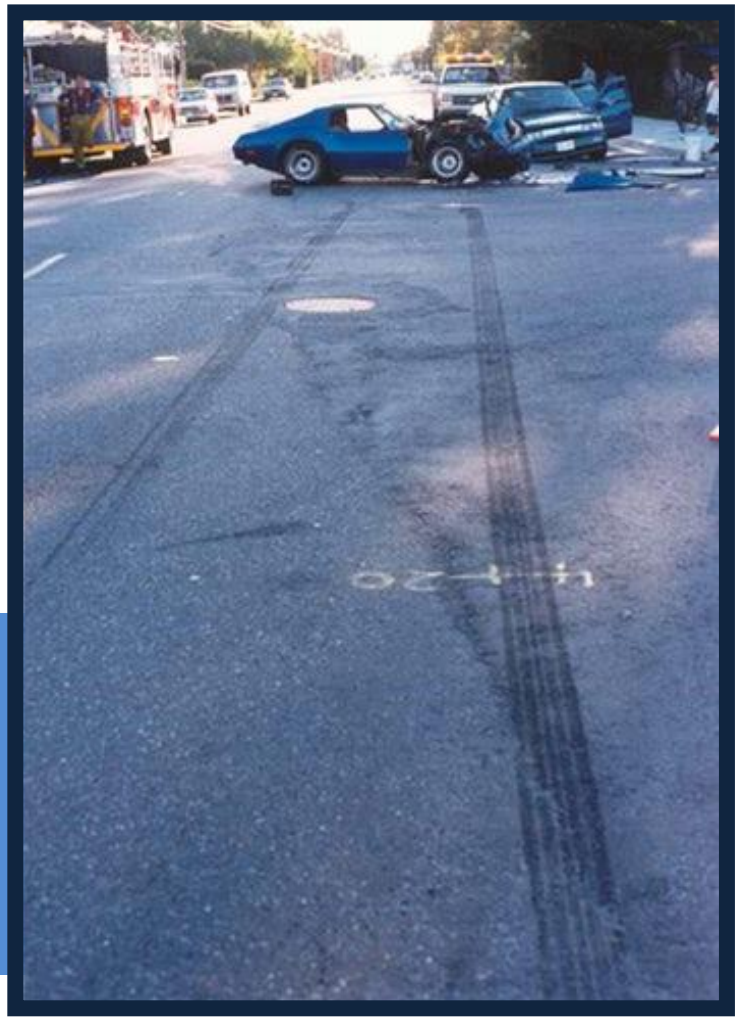
A Nanaimo man has died following a crash Wednesday. The driver, 79, of Nanaimo, was rushed to Nanaimo Regional General Hospital, but died shortly after arriving. He appeared to have suffered a heart attack, which caused him to lose control of his car, police said. Alcohol and speed are not considered factors in the crash. The lone occupant was not wearing a seatbelt. **Chris Bush - Nanaimo News Bulletin**

"At the Coroners Service, we classify almost all motor vehicle deaths as Accidental because that is the worldwide term for unintentional injury, but we surely realize that very few of them are true 'accidents.' Nearly every one that we see was a preventable incident."

– BC Coroners Service

TABLE OF CONTENTS

INTRODUCTION



1 Purpose of Report

Motor vehicle collisions are the leading cause of preventable injury and death in BC, and this is equally true for the Vancouver Island Health Authority (VIHA). On average, each year in VIHA, 3,400 people are injured, 700 hospitalized, and 55 die as a result of motor vehicle crashes. In addition to the human and social impacts associated with these collisions, the economic burden is substantial with the average cost of hospitalization services provided by VIHA being $7.8 million a year.

Road safety is an ongoing public health priority for the health authority. Over the last decades, scientific evidence has consistently shown that the vast majority of motor vehicle incidents can be prevented through a combination of strategies involving effective education, enforcement and engineering. These strategies more often than not require multi-sectoral co-operation and collaboration.

This report not only catalogues the motor vehicle collisions that have occurred in our region between 2003 and 2007 but also provides insights into the contributory factors involved. The report also focuses on key issues in road safety, highlights some current initiatives and suggests what else might be done to reduce the numbers of serious injuries and deaths that occur each year on our roadways. This report is intended to be a companion document to a traffic safety report produced by the Office of the Provincial Health Officer (*in preparation*).

A variety of sources provided collision, hospitalization and mortality data for the report and included the British Columbia Injury Research and Prevention Unit (BCIRPU) and the Insurance Corporation of British Columbia (ICBC). The data was used to capture not only the health care impacts of motor vehicle collision over time, but also where, when and why these collisions were occurring, and to whom.

See *Appendix B* for a listing of data sources and definitions used in this report.

> *Two people went to St. Joseph's General Hospital after a head-on crash Monday near one of the highest-collision intersections in the Comox Valley. The roadway was reportedly slick at the time of the crash. Rain mingled with oil might have been a factor in the mishap, deputy chief Dennis Henderson of the Courtenay Fire Department said at the scene. Excessive speed could also have contributed, he added.*
>
> **Staff Writer - Comox Valley Record**

Section I - Overview of Driving and Motor Vehicle Crashes on Vancouver Island

2 Driving on Vancouver Island

2.1 Overview of Conditions

The Vancouver Island Health Authority covers a wide and varied geographic region comprised of an assortment of urban, suburban, rural and remote areas covering approximately 56,000 square kilometres. Several larger urban communities are situated along the eastern coast of Vancouver Island linked by one major north-south highway system. Between these urban centres lie numerous rural communities. Other smaller communities are connected by major east-west feeder routes across the island. The island is also serviced by secondary collector and arterial routes, and numerous active and decommissioned logging and forest service roads that provide access into the back country.

2.2 Road Conditions

2.2.1 Road Characteristics

The island's varied geography generates a variety of road characteristics and driving conditions than can pose a challenge to the most skilled of drivers. The urban areas are associated with a higher density of local, collector and arterial roadways, whereas rural areas are more likely to consist of local rural roads connected to a larger rural connector joining to a highway system. The higher density of roadways in urban areas is associated with more roadway junctions when compared to the more 'open' rural areas.

Rural and Urban Roads on Vancouver Island

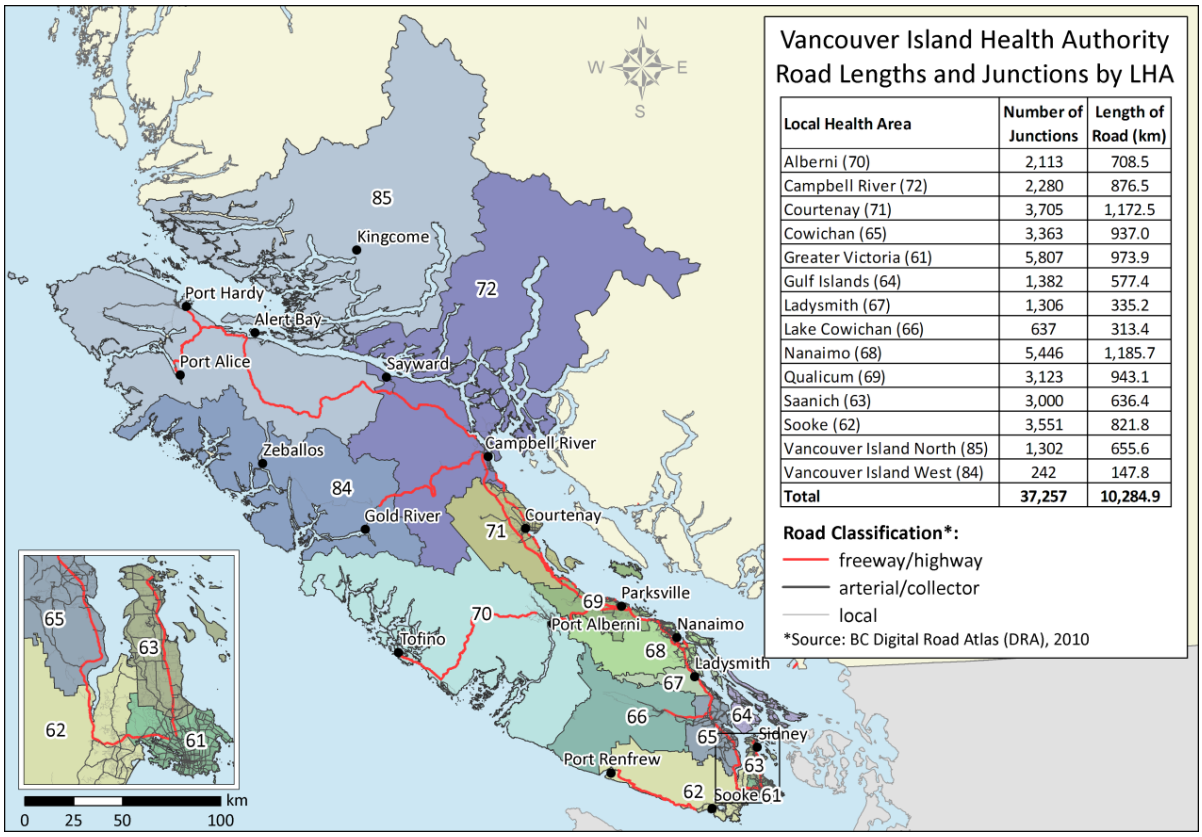
2.3 Road Classification

The Digital Road Atlas (DRA) classifies roads into one of the following categories: arterial, collector, freeway/ highway, local and 'other' (see *Appendix D*). There are more than 10,000 kilometres of roadway on Vancouver Island and each local health area (LHA) has a mixture of road types (Figure 1). Rural areas tend to have a greater proportion of their roads made up of freeways/highways or 'other' road types (service or resource recovery roads for activities like logging). The majority of roads, whether they are located in urban or rural areas, are *local roads* (57 percent). The DRA was also used to derive the total number of junctions[1] for each LHA in VIHA. A 'junction' includes both intersections and road endpoints. Urban areas had more crossing intersections while end point junctions were more prevalent in rural areas. (See map 1 for roadways on Vancouver Island, including the road lengths and number of junctions for each LHA.)

Inland Island Highway on Vancouver Island

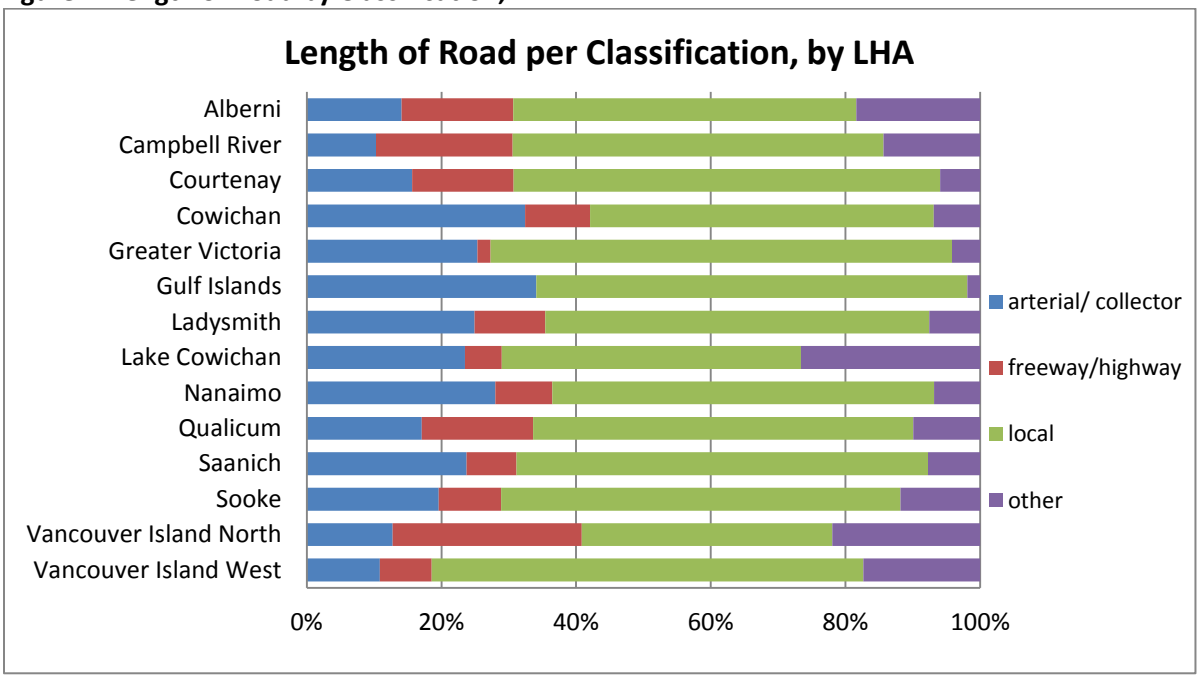
[1] The number of intersections and end points per LHA calculated from the Digital Road Atlas (2010).

Map 1: Road Classifications on Vancouver Island



Local Health Area	Number of Junctions	Length of Road (km)
Alberni (70)	2,113	708.5
Campbell River (72)	2,280	876.5
Courtenay (71)	3,705	1,172.5
Cowichan (65)	3,363	937.0
Greater Victoria (61)	5,807	973.9
Gulf Islands (64)	1,382	577.4
Ladysmith (67)	1,306	335.2
Lake Cowichan (66)	637	313.4
Nanaimo (68)	5,446	1,185.7
Qualicum (69)	3,123	943.1
Saanich (63)	3,000	636.4
Sooke (62)	3,551	821.8
Vancouver Island North (85)	1,302	655.6
Vancouver Island West (84)	242	147.8
Total	**37,257**	**10,284.9**

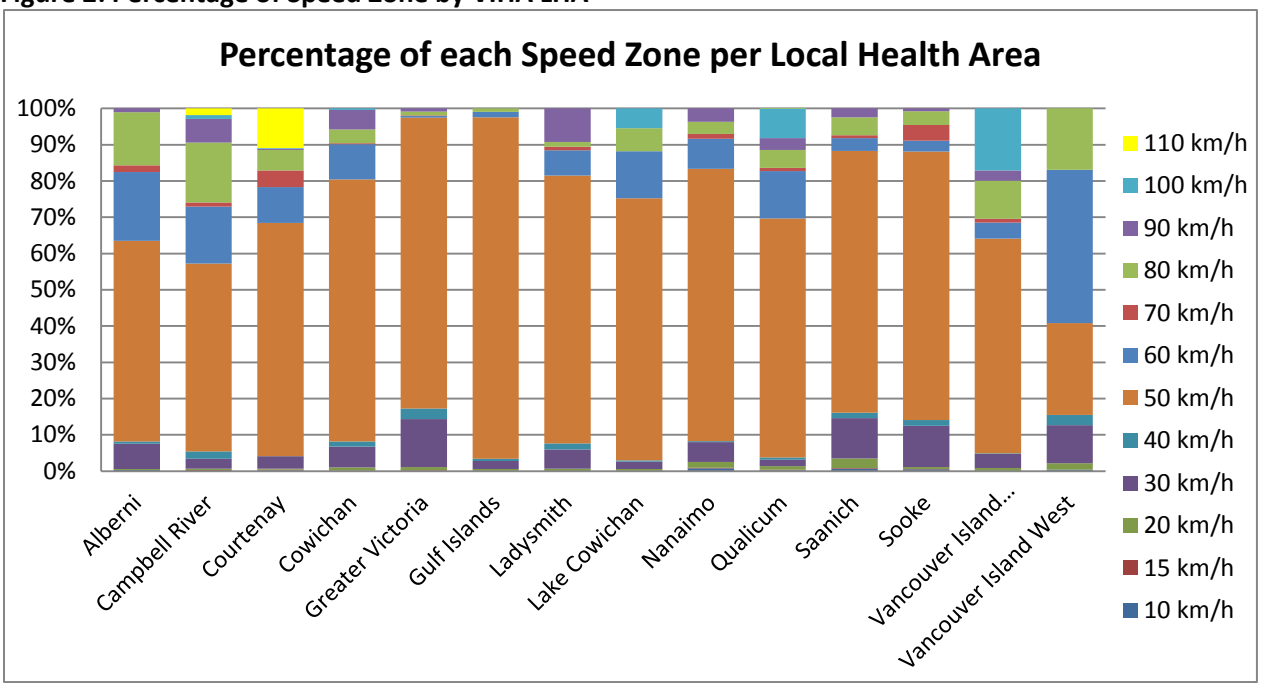
Figure 1: Length of Road by Classification, VIHA LHA



2.4 Speed Zones

Figure 2 illustrates how roadway speed zones vary in the different local health areas. By having more highways and freeways, Courtenay, Campbell River and Vancouver Island North have a higher percentage of roadways with posted speeds exceeding 90km/hr.

Figure 2: Percentage of Speed Zone by VIHA LHA



Note: The BC Digital Road Atlas (DRA) database provides current and historical information for roads in British Columbia. The roads are represented in the atlas by a series of small line segments with end points depicting intersections. There are approximately 10,285 kms of roadway in VIHA, and 37,257 junctions. Using GIS, a dominant speed (km/h) limit was assigned to each line segment. (For example, if the first 80 percent of a segment is 50 km/h, and the last 20 percent of a segment is 30 km/h, the segment is recorded as 50.

2.5 Weather and Driving Conditions

Source: RCMP North Island Division

Vancouver Island generally experiences mild, wet winters and warm, dry summers. Precipitation varies considerably across Vancouver Island with the west coast and northern parts experiencing a much higher average annual rainfall than the southern part of the island.[2]

The areas of Cowichan, Port Alberni and Campbell River have the highest snowfall totals while Greater Victoria and the southern Gulf Islands have the lowest. However, snowfall totals are generally low throughout the entire island when compared to winter in most parts of the rest of Canada.

[2] Environment Canada Weather Office, http://www.climate.weatheroffice.gc.ca

2.6 The Drivers

2.6.1 Active Driver by Local Health Area

In 2007, according the Insurance Corporation of British Columbia (ICBC), there were 524,118 residents of Vancouver Island who were legally licensed as 'active drivers' (85 percent of the population 16 years of age and older) (Table 1). The percent of the population of legal driving age who are registered as active drivers is lower for the South Island compared to North and Central Island (Figure 3).

A limitation of this database is that it includes individuals who may possess a license but choose not to drive. See *Appendix C* for detailed active driver data for VIHA.

Figure 3: Percentage of Population 16 years and over who are Active Drivers by VIHA HSDA, 2003-2007

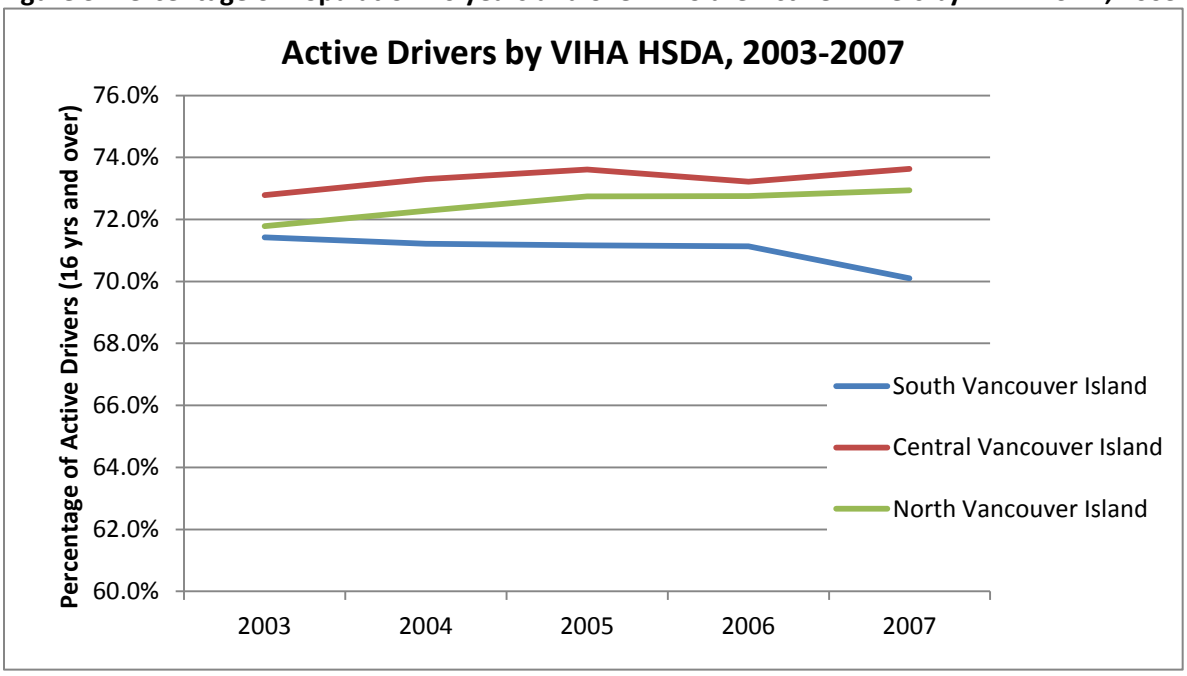


Table 1: Active Drivers by VIHA HSDA, 2003-2007

HSDA	2003	2004	2005	2006	2007
South Vancouver Island	246,592	247,668	250,792	253,144	251,854
Central Vancouver Island	174,327	177,447	181,432	183,903	187,051
North Vancouver Island	80,095	81,289	82,638	83,737	85,213
Total	501,014	506,404	514,862	520,784	524,118

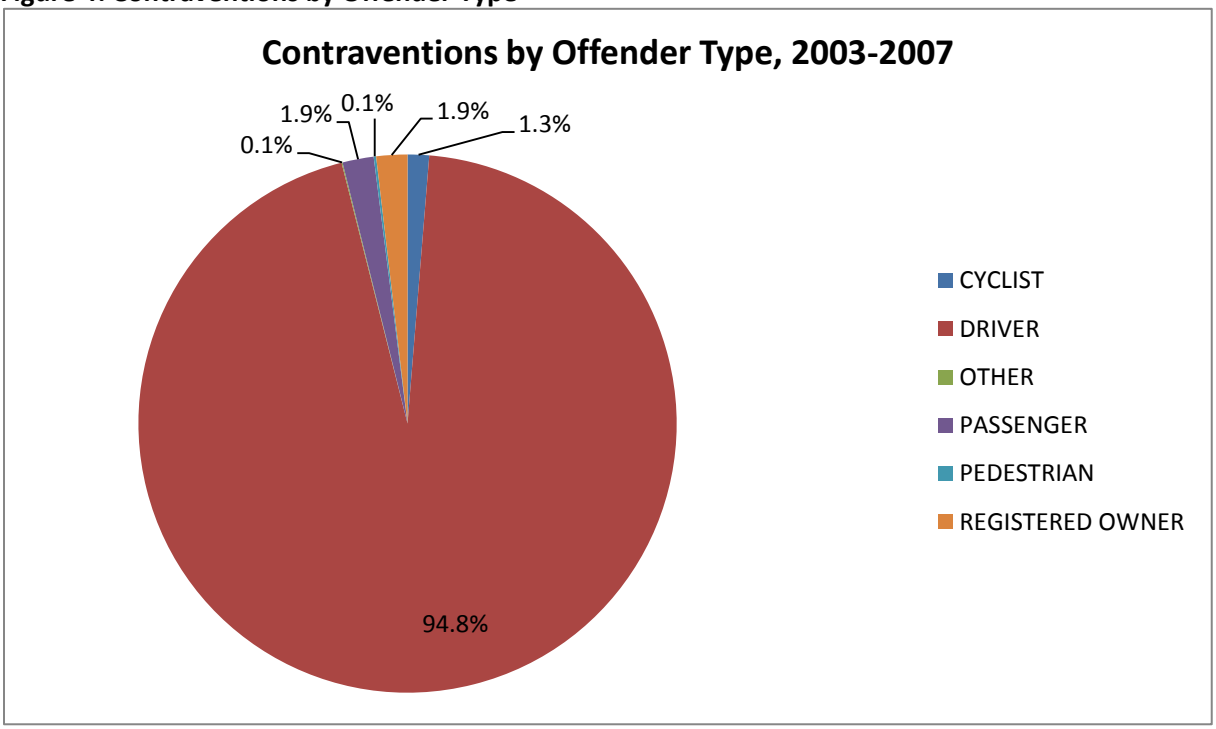
2.6.1.1 Contraventions by Driver, VIHA, 2003-2007

There was an annual average of 81,500 traffic contravention tickets issued (includes offences of the Criminal Code of Canada, Motor Vehicle Act and Motor Vehicle Act's Regulations) for the period 2003-2007. While those driving account for the most contraventions (Figure 4), pedestrians, vehicle passengers and cyclists can also be offenders. Contravention issued to drivers showed an increasing trend over time (Figure 5).

"There was a fatal hit and run – a jeep went through a red light at 94km/hr and hit a motorcycle. The motorist fled the scene. The driver was eventually caught and later charged with dangerous driving causing death and criminal negligence."

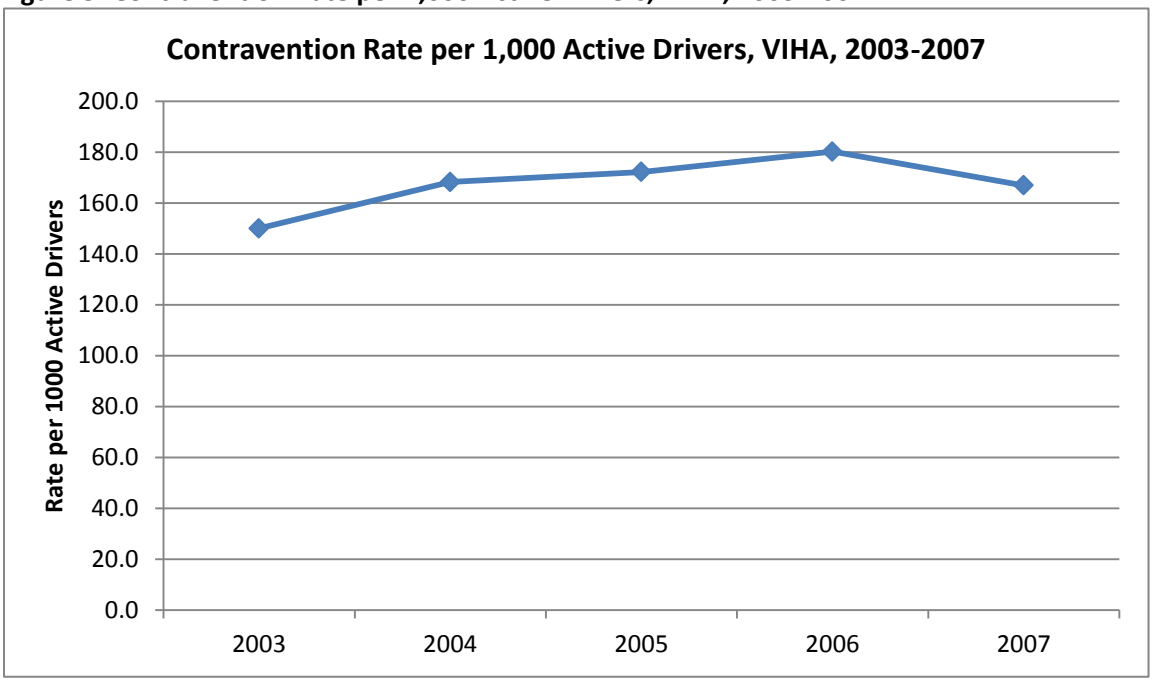
- Saanich PoliceTSU

Figure 4: Contraventions by Offender Type



Note: "Registered owners category" includes vehicles that may have been involved in a collision while there was no one driving the vehicle (e.g. if a vehicle's brake was not engaged and the vehicle rolled down a road and hit another vehicle, the registered owner would be accountable even though there was no actual driver at the time of the incident).

Figure 5: Contravention Rate per 1,000 Active Drivers, VIHA, 2003-2007



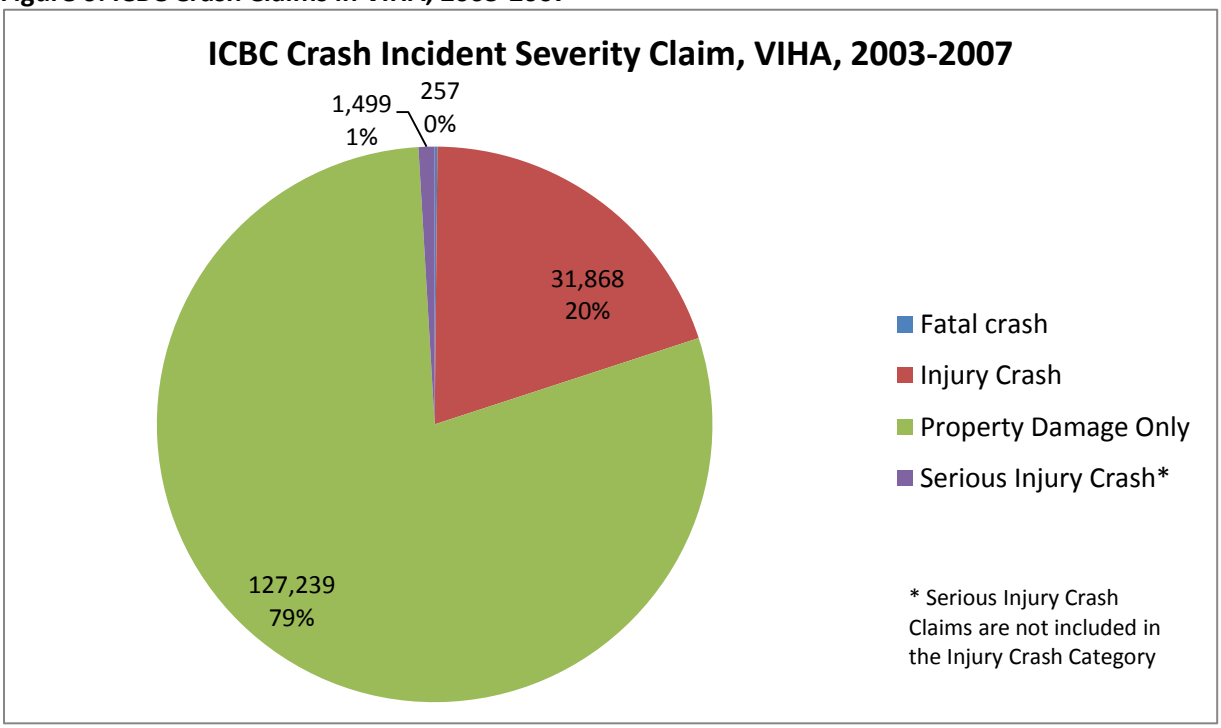
3 Collisions in VIHA – When, Where and Who is Involved?

3.1 ICBC Crash Claims

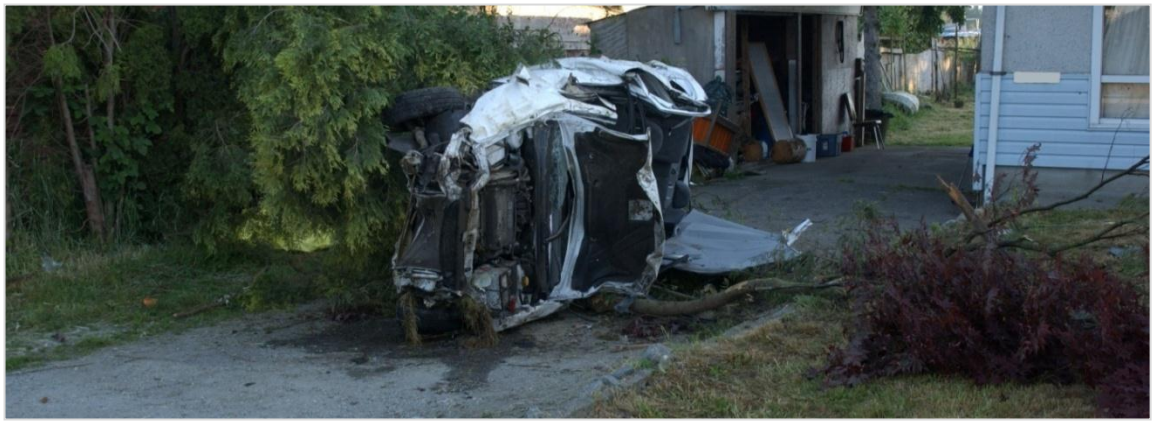
Between 2003 and 2007, there were a total of 160,863 ICBC crash claims on Vancouver Island, of which 21 percent resulted in either injury or death with the remainder resulting in property damage only (Figure 6).

The Traffic Accident Survey (TAS) data set is comprised of reports filed by law enforcement when they attend a collision. Between 2003 and 2007, police-attended 17,181 collisions which were considered serious but which may or may not have involved injuries or fatalities. The primary focus of this report is on the more severe collisions captured in the TAS data and not the more inclusive ICBC data set which captured all mishaps generating an insurance claim.

Figure 6: ICBC Crash Claims in VIHA, 2003-2007



Two people went to St. Joseph's General Hospital after a head-on crash Monday near one of the highest-collision intersections in the Comox Valley. The roadway was reportedly slick at the time of the crash. Rain mingled with oil might have been a factor in the mishap, deputy chief Dennis Henderson of the Courtenay Fire Department said at the scene. Excessive speed could also have contributed, he added.
Staff Writer - Comox Valley Record

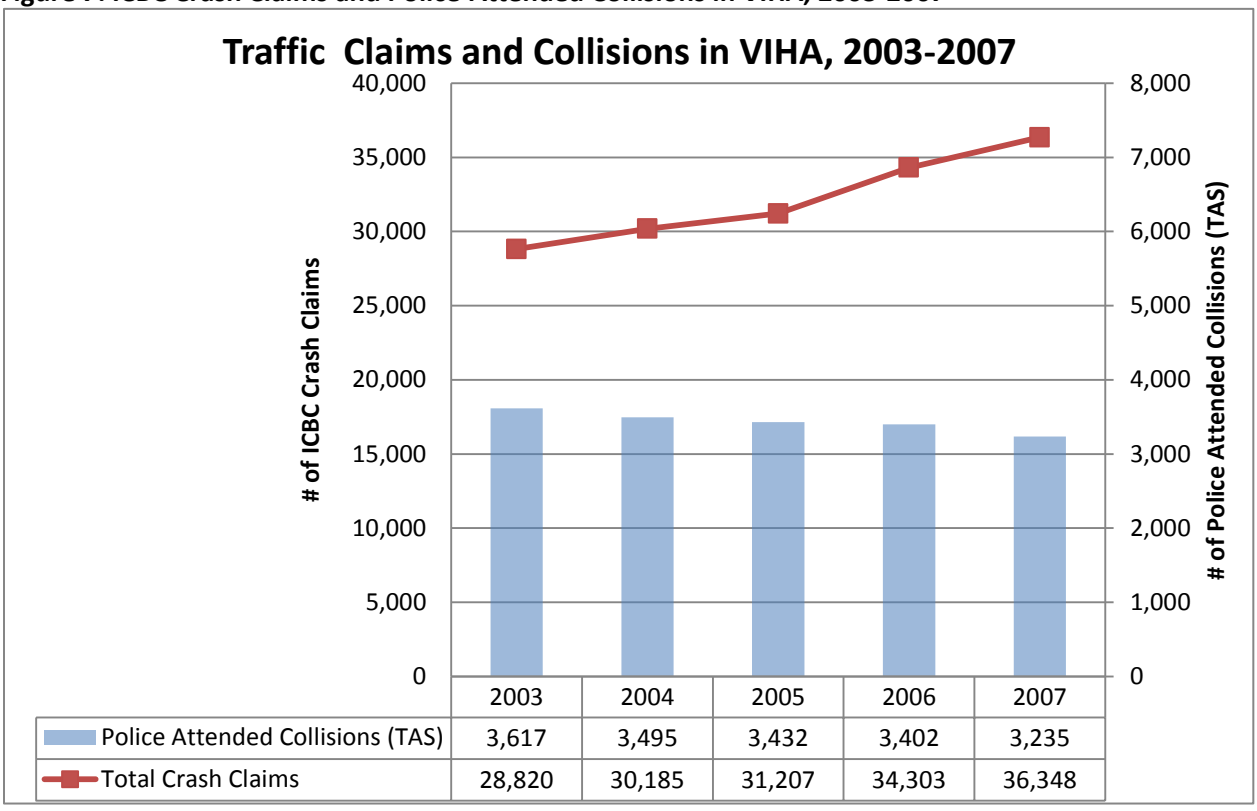


Source: ICBC

3.2 Annual Trends

ICBC crash claims and police-attended collisions trends are compared for a five year period in Figure 7. While ICBC crash claims have increased by 26 percent over the five year time frame, the number of police-attended collisions reported in TAS data decreased by 11 percent between 2003 and 2007. This phenomenon may be a function of the increased repair costs of today's vehicles, fewer injuries and deaths arising from better protection of occupants in modern cars or a more careful screening of calls and deployment of law enforcement which faces workforce issues for a variety of reasons.

Figure 7: ICBC Crash Claims and Police-Attended Collisions in VIHA, 2003-2007



3.3 Seasonal Trends

3.3.1 Collisions by Season

Between 2003 and 2007 the greatest number of motor vehicle collisions occurred in the summer and fall seasons (Figure 8). This is likely due to a higher number of vehicles on the road for periods of greater duration of travel during the summer months, as well as an increased number of bicycles and pedestrians using our roadways for recreation and transportation. (See Chapter 11 for further information on collisions involving bicycles and pedestrians). The response of drivers to changing weather conditions and increasing hours of darkness may contribute to the numbers observed for the fall period.

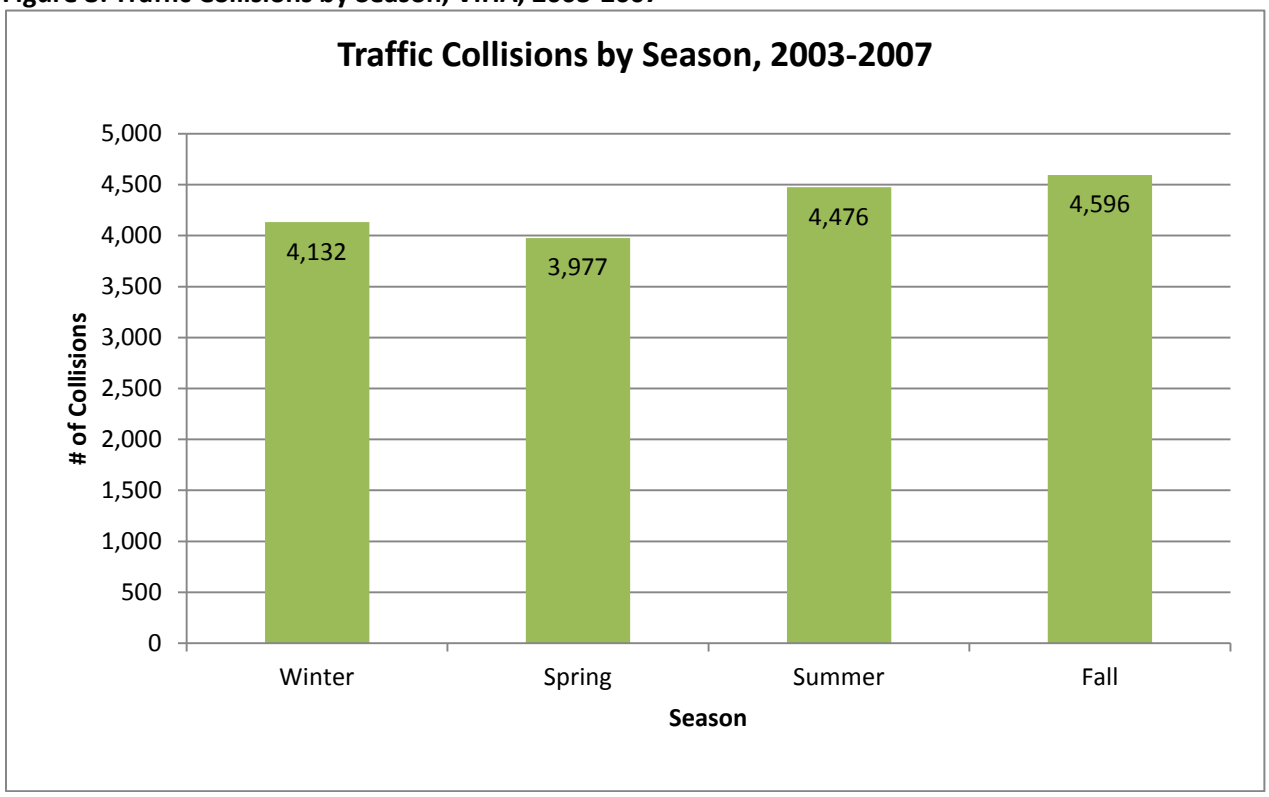
There is less variation between the frequency of **fatal** collisions that occurred during the different seasons (Table 2).

Table 2: Fatal Collisions (2003-07)

Season	Fatal Collision
Winter	66
Spring	56
Summer	74
Fall	68

Winter includes: December, January, February; spring includes: March, April, May; summer includes: June, July, August; fall includes: September, October, and November

Figure 8: Traffic Collisions by Season, VIHA, 2003-2007



Note: Winter includes: December, January, February; spring includes: March, April, May; summer includes: June, July, August; fall includes: September, October, and November

3.3.2 Collision Trends by VIHA LHA and HSDA

As might be expected, the majority of motor vehicle collisions, as recorded in Traffic Accident Survey (TAS), occurred in the South Island, where most of the population resides (Table 3). However the largest number of fatal collisions occurred in Central Vancouver Island, which experienced almost 50 percent of all fatal mishaps on the island between 2003 and 2007.

The neocortex in young drivers, the front part of the brain responsible for 'executive functions' such as weighing risks or considering the consequences of a decision, may not be fully developed until the mid-twenties in some females and late twenties in some males. On maturation, our brains exert better impulse control and decision making. However, as we age we are again challenged, this time with the onset of a gradual and progressive decline in cognitive functioning. The driving statistics in this report may serve to underscore these changes.

- Chief Medical Health Officer, VIHA

One teen was killed and another three were injured after the stolen vehicle they were driving crashed near Park Isle Marine on West Coast Trail. According to a witness report the westbound mid-sized compact vehicle was speeding down the road, lost control and veered into the other lane. "This guy was going like a rocket out of hell," he said.
Sharron Ho - Sooke News Mirror

Table 3: Motor Vehicle Collisions by VIHA LHA, 2003-2007

Total Motor Vehicle Collisions	Fatal Collisions	Personal Injury Collisions	Total Collisions
South Vancouver Island	83	8024	8107
Greater Victoria (61)	21	2940	2961
Sooke (62)	26	1366	1392
Saanich (63)	34	3662	3696
Gulf Islands (64)	*	56	*
Central Vancouver Island	127	6216	6343
Cowichan (65)	27	1588	1615
Lake Cowichan (66)	5	140	145
Ladysmith (67)	5	406	411
Nanaimo (68)	36	2222	2258
Qualicum (69)	30	1080	1110
Alberni (70)	24	780	804
North Vancouver Island	54	2677	2731
Courtenay (71)	19	1305	1324
Campbell River (72)	19	1046	1065
Vancouver Island North (85)	16	326	342

*Denotes value less than 5. **Note**: Personal Injury Accident data set includes all motor vehicle mishaps to which law enforcement attended and completed a report. Despite giving the impression by its title that an injury had occurred in each and every case, the data set includes not only cases in which an injury occurred but also crashes which resulted in no injury. *Source: TAS, ICBC, Collisions Data Set, 2003-2007*

3.3.3 Collisions rates per 'Active Driver'

Source: Saanich Police TSU

The rate of collisions (Figure 9) and fatal collisions (Figure 10) per active driver (see *Appendix C*) varies considerably amongst local health areas. The data do not allow for a calculation of deaths per kilometre travelled. The increased rates may arise from a combination of a greater amount of time behind the wheel, possibly driving more often on roads with higher speed limits (a crash likely to be more severe) and travelling on roadways that are more challenging to navigate (e.g. logging roads). Such factors would need to be studied before concluding that some behavioural dynamic was responsible for drivers residing in some LHAs (e.g. Vancouver Island North, Cowichan and Alberni) inherently being higher risk drivers than their urban counterparts. As well, these elevated rates may be inflated by collisions affecting drivers from other areas when passing through these LHAs (to do so the Traffic Accident Survey (TAS) data would have to be analyzed on location of primary residence and not the scene of crash).

A two vehicle collision near Roberts Lake sent two people to hospital over the weekend. Sayward RCMP and North Island Traffic Services responded to a report of a two vehicle collision on the Island Highway near Robert's Lake at about 11 a.m. on Saturday. "Fresh snow – slippery conditions definitely contributed to it (the accident)," said North Island Traffic Services' Sgt. Mark Whitworth. **Campbell River Mirror**

Figure 9: Collision Rate per 1,000 Active Drivers, VIHA LHA, 2003-2007

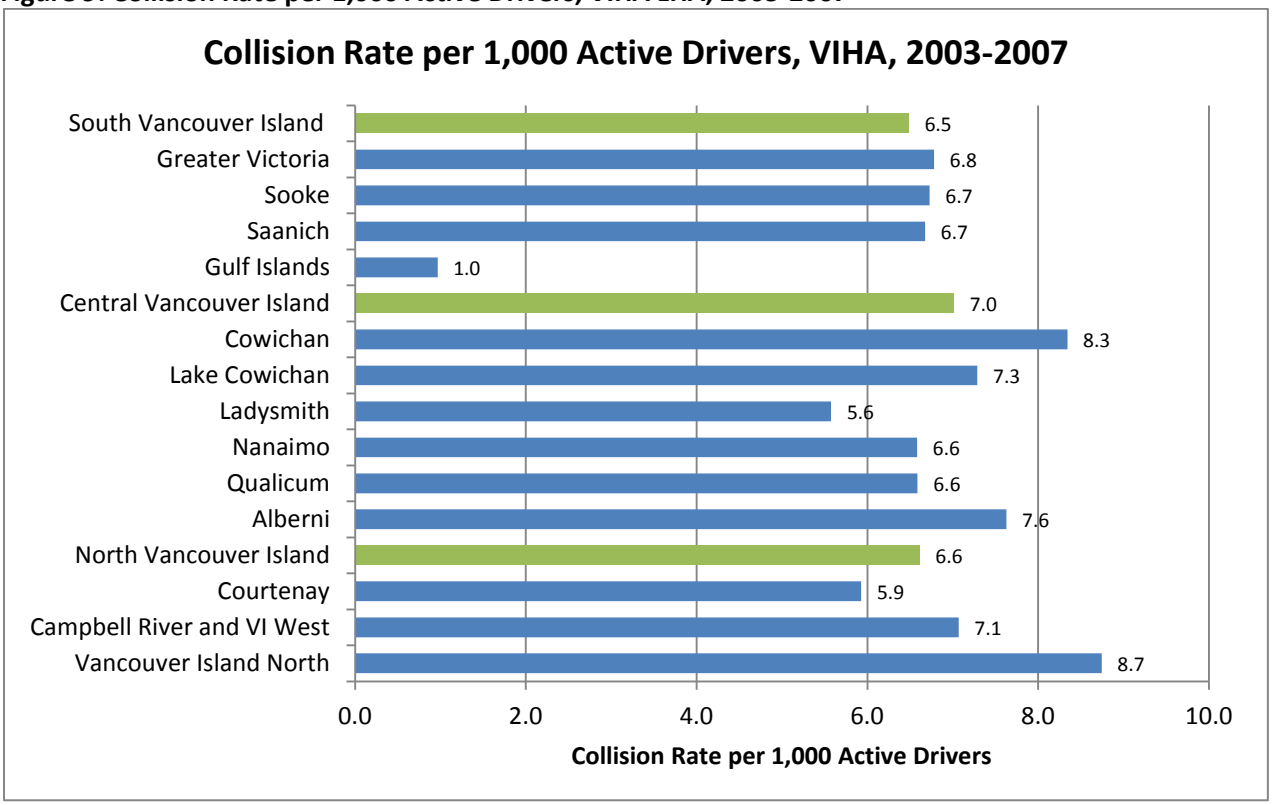
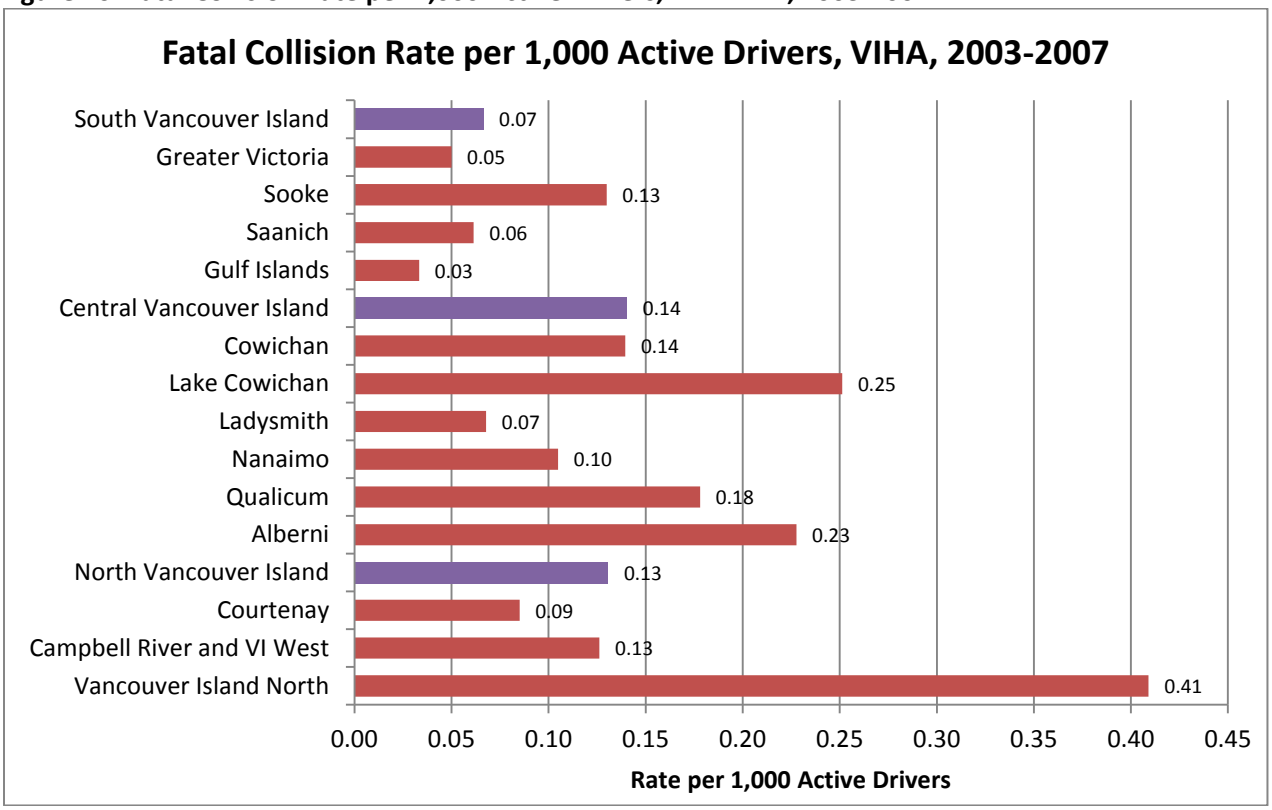


Figure 10: Fatal Collision Rate per 1,000 Active Drivers, VIHA LHA, 2003-2007



3.3.4 CRASH "VICTIMS"

The 17,181 police-attended motor vehicle collisions on the island from 2003 to 2007 involved a total of 31,350 vehicles and 43,458 people. Each collision affected an average of 2.5 individuals.

Table 4 provides a summary of the characteristics of persons involved in motor vehicle collisions reported to the police. All individuals involved in these collisions are considered "victims" in police documentation. However, many of the persons involved in motor vehicle collisions experienced minimal injury, with fully 19,633 (45 percent) of the "*victims"* deemed to be "uninjured" as assessed by police.

Table 4: "Victims" of Motor Vehicle Collisions by Entity Type and Sex, VIHA, 2003-2007

	Vehicle		Cyclist	Pedestrian	Other	Total
	Driver	Not Driver				
Female	10,873	7,217	323	733	13	19,159
Male	16,563	5,463	855	781	25	23,687
Unknown	471	117	9	13	2	612
Total	27,907	12,797	1,187	1,527	40	43,458

Figure 11 shows collision "victims", as defined earlier, classified by age and sex. More males than females were involved in collisions in almost all age categories. The highest rates were seen in 15-24 year old males.

Figure 11: Age and Gender of "Victims" Involved in Motor Vehicle Collisions, VIHA, 2003-2007

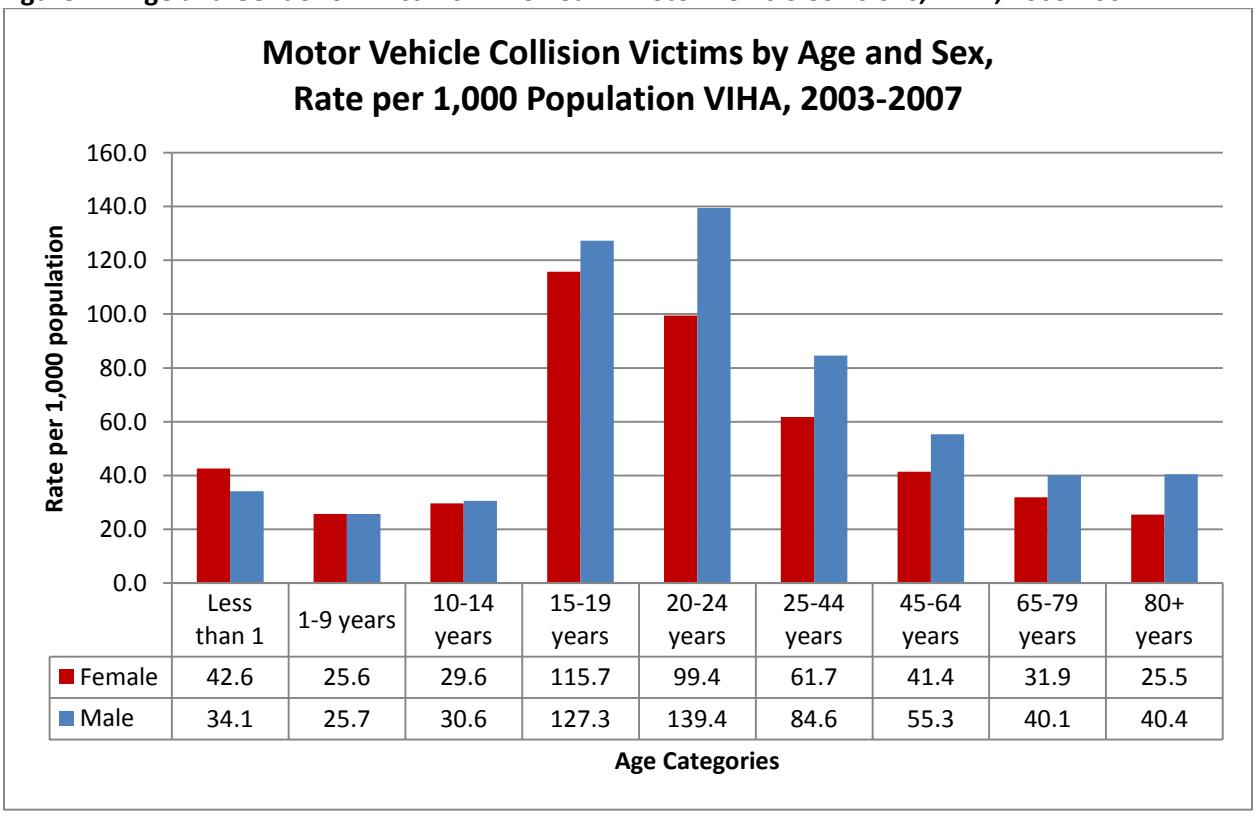
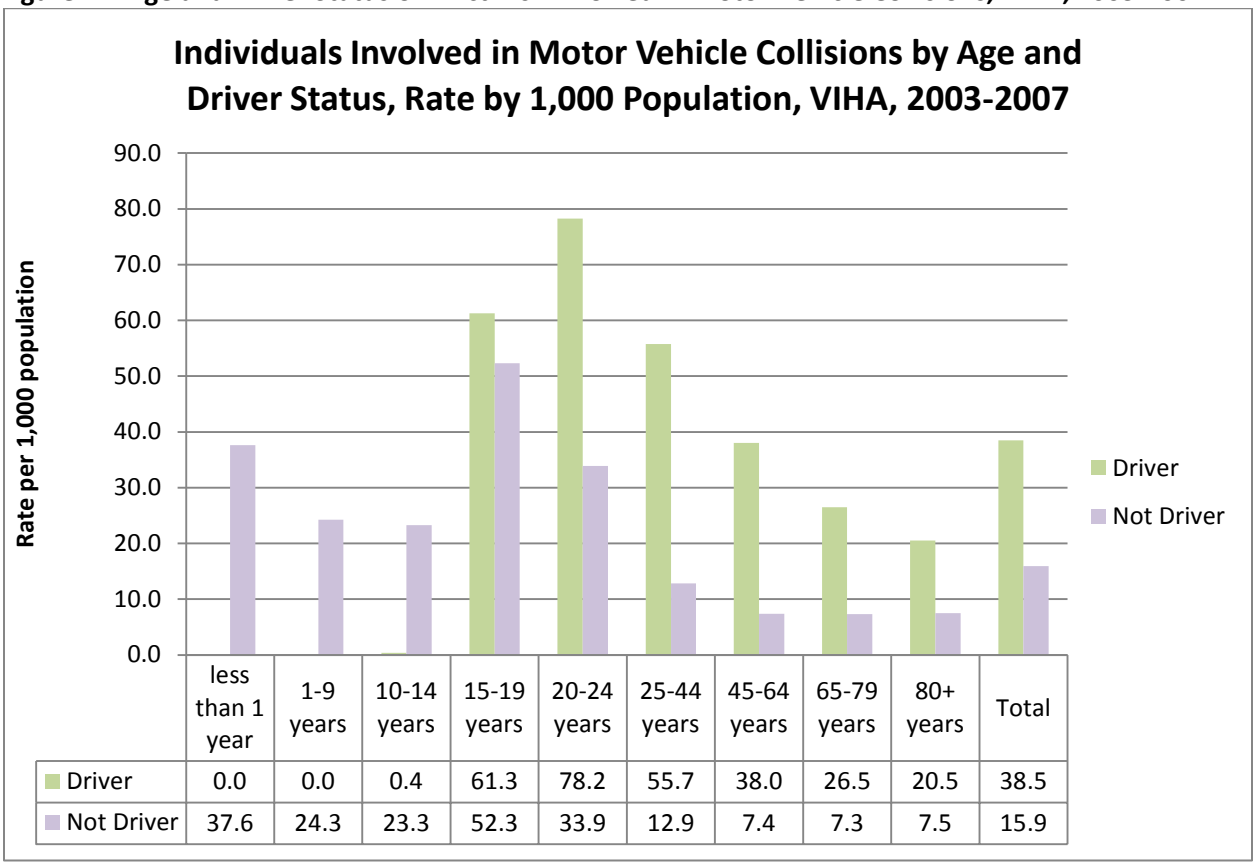


Figure 12 pairs age with driver status as "driver" or "not driver". The highest rate of motor vehicle collision "victims" for *non-drivers* was in the 15-19 year old age category and for *drivers* it was the age group of 20-24 years, followed closely by the 15-19 and 25-44 year old age groups. Of note, the 15-19 year old non-driver

group are the teens whose novice driver contemporaries (see *Appendix F*) are likely to be of the same age and also to have restrictions on the number of similar aged passengers they can transport.

Figure 12: Age and Driver Status of "Victims" Involved in Motor Vehicle Collisions, VIHA, 2003-2007



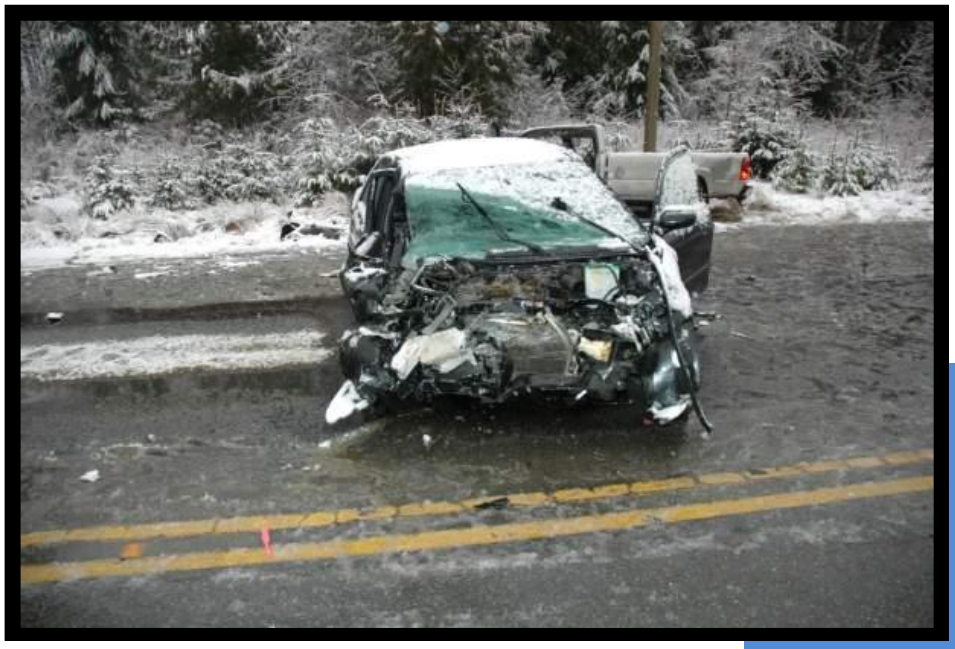
	less than 1 year	1-9 years	10-14 years	15-19 years	20-24 years	25-44 years	45-64 years	65-79 years	80+ years	Total
Driver	0.0	0.0	0.4	61.3	78.2	55.7	38.0	26.5	20.5	38.5
Not Driver	37.6	24.3	23.3	52.3	33.9	12.9	7.4	7.3	7.5	15.9

For some reason if you shoot somebody, people know that is a crime, but if you kill them with your car, that is an "accident". That is not right.

- Saanich Police TSU

Source: ICBC

Section II- Factors Contributing to Crashes on Vancouver Island



4 Contributing Factors in Motor Vehicle Collisions

The term accident implies events that are unexpected, chance or bad luck. The term rarely if ever should be used to describe most motor vehicle crashes. Rather, crashes should be considered to be avoidable events and the likelihood that a crash will happen and its outcome are influenced by a variety of factors that frequently can be mitigated by preventive and curative measures. The interplay between these modifiable factors determines not only whether a crash is likely to occur, but also whether the crash results in injuries, hospitalizations, successful treatment interventions or fatalities. Table 5 lists the most common primary factors in police reports cited as contributing to crashes on Vancouver Island for 2003-2007.

Table 5: Top 10 Primary Contributing Factors for Entities Involved, 2003-2007

Rank	Contributing Factor	# of Entity Collisions	% of all Entity Collisions
1	Driver Inattentive	3,920	12.5%
2	Alcohol Related	1,765	5.6%
3	Failing To Yield Right Of Way	1,729	5.5%
4	Following Too Closely	1,291	4.1%
5	Driving Without Due Care	937	3.0%
6	Driver Error/Confusion	767	2.4%
7	Driving Too Fast for Conditions	668	2.1%
8	Speed Related	665	2.1%
9	Road Condition (ice, snow, slush, water)	623	2.0%
10	Weather (fog, sleet, rain, snow)	449	1.4%

Alcohol Related includes the combined factors of 'Alcohol suspected', 'Alcohol involvement' and 'Ability impaired by alcohol'.
Speed Related includes the combined factors of 'Exceeding speed limit', 'Excessive speed over 40km' and 'Unsafe speed'.

By adopting and implementing preventive strategies to change these largely 'human' factors, crash-related injuries can be reduced. These influencing factors can be further broken down into include environmental (weather, time of day and road conditions) and vehicular factors; the role of each will be explored in greater detail.

Wednesday morning's commute on the Nanaimo Parkway ground to a halt as emergency crews cleared a three-car wreck. The driver of the Honda told police his car hydroplaned when it drove through a pool of water and he lost control of the car when it began to spin. Police chalked up the crash to poor driving conditions and did not charge any of the drivers involved. Nanaimo RCMP are reminding motorists the posted speed limits are the maximum speeds permissible when road conditions are good and it is important to slow down and drive according to road conditions in bad weather. **Chris Bush - Nanaimo News Bulletin**

5 Weather and Temporal Factors Contributing to Crashes on Vancouver Island

5.1 Weather Related Factors

Weather conditions at the time of a collision as reported by law enforcement are shown in Table 6. Collisions occurred most frequently during clear weather. This observation is consistent with section 3.3.1 which revealed that the greatest number of motor vehicle collisions occurred in the summer and fall seasons, when the weather is typically good and our road system is in heaviest use by drivers.

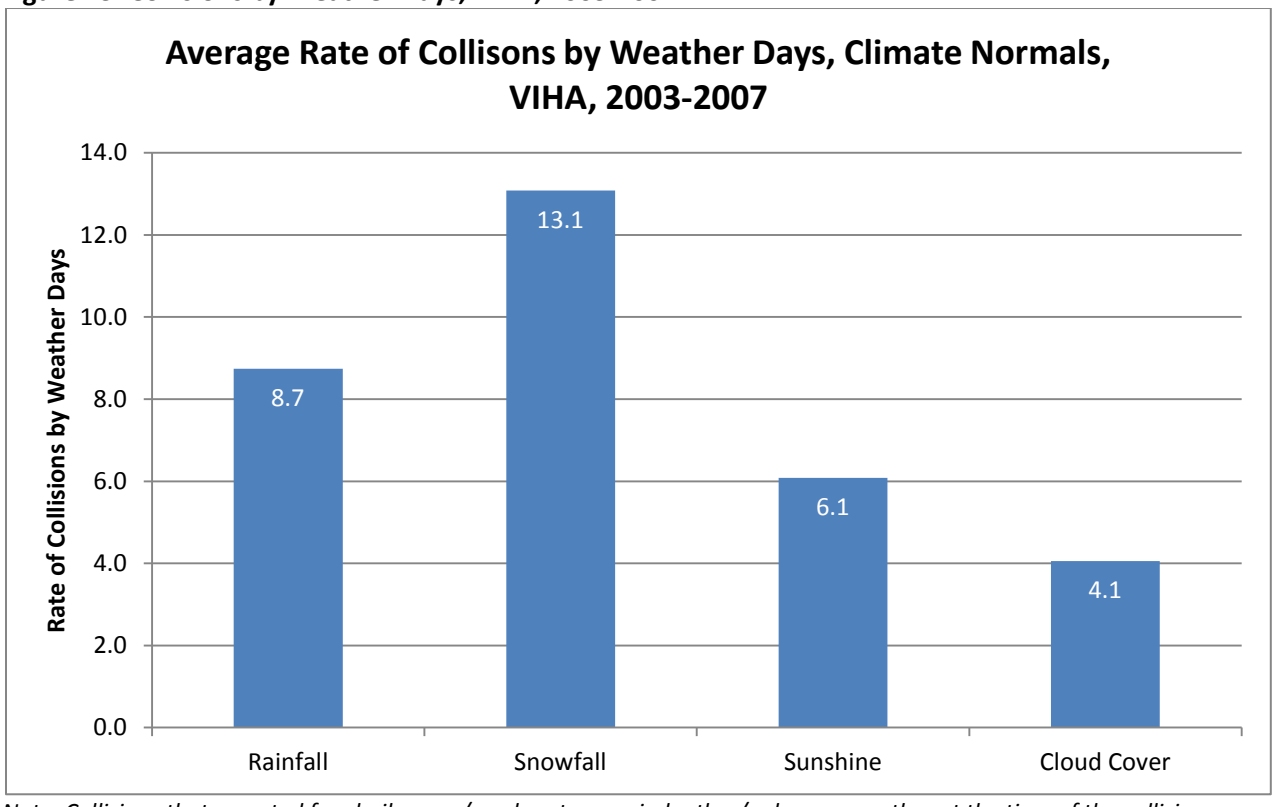
Table 6: Collisions by Weather, 2003-2007

Weather	Frequency	Percent
Clear	8,734	50.8%
Cloudy	4,386	25.5%
Raining	3,337	19.4%
Snowing/Sleet	400	2.3%
Fog	139	0.8%
Hail	25	0.1%
Strong Wind	19	0.1%
Smog/Smoke	9	0.1%
Other	10	0.1%
Unknown	122	0.7%
Total	**17,181**	**100.0%**

Source: Saanich Police TSU

While an overall greater number of collisions are associated with clear or cloudy days, the highest **rate** of collisions occurs at times of snowfall and rainfall (Figure 13).

Figure 13: Collisions by Weather Days, VIHA, 2003-2007



Note: Collisions that reported fog, hail, smog/smoke, strong wind, other/unknown weather at the time of the collision were not included. Method: Rates were calculated using the total collisions by the reported weather type by the average weather days listed in Environment Canada's weather normal's for areas around the island. A rate was calculated for the number of collisions where rain was listed as factor, by the total number of "Days with rainfall greater or equal to 5mm." Similar rates were calculated for "Days of sunshine" (clear), Days of snowfall greater or equal to 5cm" (snow) and "Days with Cloud Cover 8 to 10 tenths opacity" (Cloud). Where available, historical averages were extracted from the different areas of the island including Victoria, Port Alberni, Port Hardy, Cowichan, Campbell River, Nanaimo, and Comox.

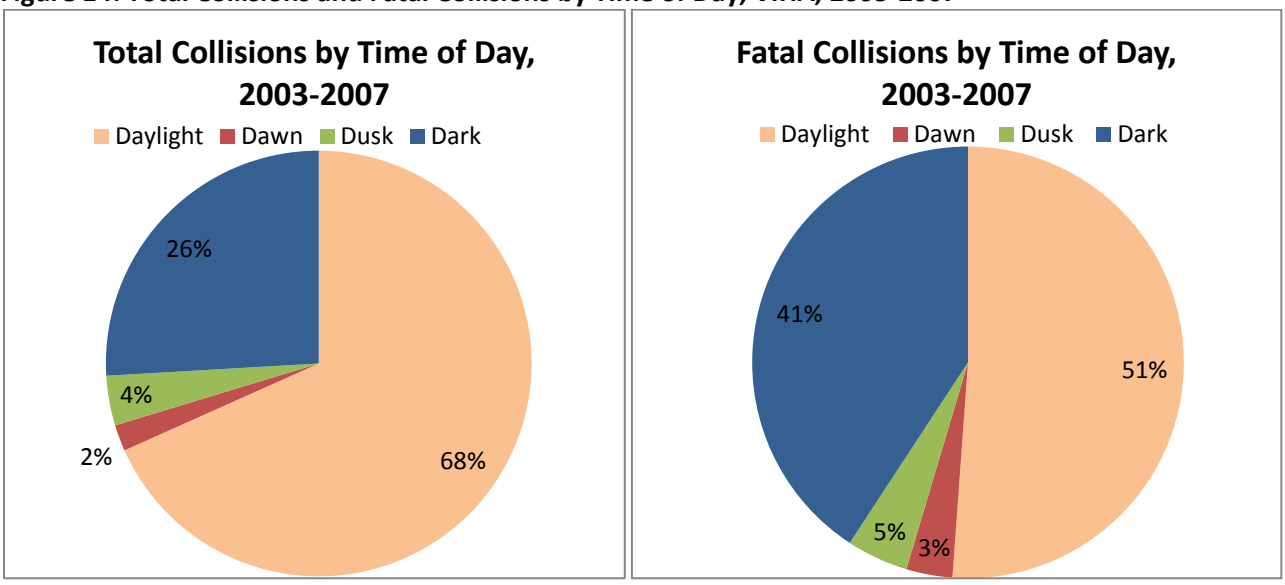
5.2 Daylight and Time of Day

Police record the lighting conditions at the time of a collision, noting whether it is daylight, dawn, dusk or dark. The data revealed that the majority of collisions in VIHA between 2003 and 2007 occurred during daylight hours (Figure 14). The greater volume of traffic on the road during the daylight hours, a peak time of daily travel (see *Appendix C*), likely accounts for this observation. Fatal collisions were more evenly distributed between the daylight hours and hours of darkness, with 41 percent of collisions occurring when visibility was reduced by driving at night.

Source: Victoria Times Colonist Files

Source: Saanich Police TSU

Figure 14: Total Collisions and Fatal Collisions by Time of Day, VIHA, 2003-2007



Fatigue, however it is caused, is a significant risk factor in B.C. collisions. The last report on collision statistics published by ICBC shows 395 injury and 16 fatal crashes attributed to falling asleep at the wheel. I suspect that the true numbers are probably higher than the report shows. (Tim Schewe is a retired RCMP constable with many years of traffic law enforcement experience). **Nanaimo Daily News**

6 Road Factors Contributing to Crashes on Vancouver Island

6.1 Collisions by Road Classification

Most motor vehicle collisions occurred on City/ Municipal streets or *local roads* (Table 7). However, the largest number of fatal collisions occurred on Provincial Highways, possibly because of the greater speeds involved and greater severity of potential crashes.

Table 7: Collision Type by Road Classification, TAS Data, 2003-2007

		City/Municipal Street	Provincial Highway	Rural Road	Total
Fatal Collision	Count	100	128	36	264
	%	37.9%	48.5%	13.6%	100.0%
Personal Injury or no Injury Collision	Count	11,135	4,577	1,205	16,917
	%	65.8%	27.1%	7.1%	100.0%
Total Collisions	Count	11,235	4,705	1,241	17,181
	%	65.4%	27.4%	7.2%	100.0%

6.2 Collisions per Speed Zone

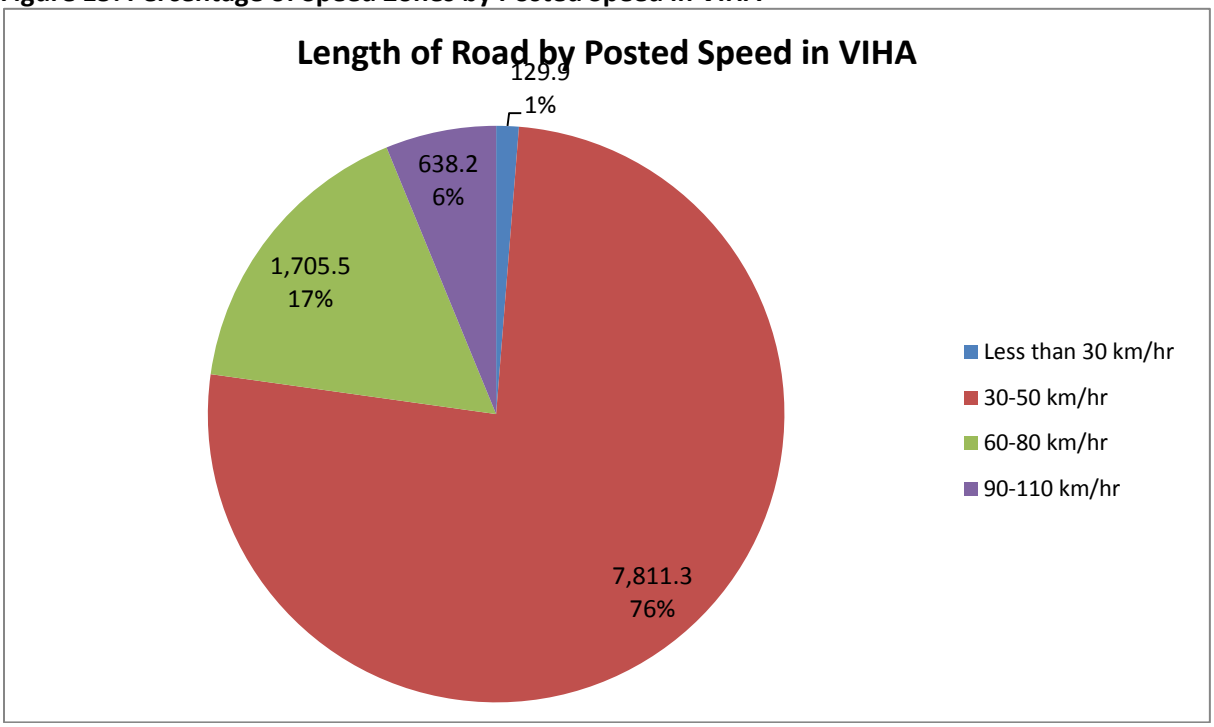
Collisions were tabulated according to the posted speed where they occurred; however, the posted speed zone for the site of the collision does not necessarily reflect the speed at which the vehicle may have been travelling at the time of the collision.

The majority of collisions occurred on roadways that had a posted speed limit of between 30-50km/hr - the most prevalent of road speeds (Figure 15). The influence of speed on severity of outcome is illustrated by the number of serious collisions occurring as a function of ever higher posted speed zones. Three percent of collisions that occurred in the 90-100km/hr speed zone were fatal, compared to only one percent of those in the 30-50km/hr speed zone (Table 8). The table does not chart the number of fatal crashes as a function of total number of kilometres travelled by active drivers in various speed zones. Such an assessment could further refine the association between risk of having a fatal crash and speed of travel.

Table 8: Proportion of Collision Type (Fatal or Personal Injury) by Posted Speed Zones (2003-2007)

	30-50 km/hr	60-80 km/hr	90-100 km/hr	110-120 km/hr	Unknown	Other	Total
Fatal Collision	1.0%	2.7%	3.1%	2.9%	2.1%	1.0%	1.5%
Personal Injury or No Injury Collision	99.0%	97.3%	96.9%	97.1%	97.9%	99.0%	98.5%

Figure 15: Percentage of Speed Zones by Posted Speed in VIHA

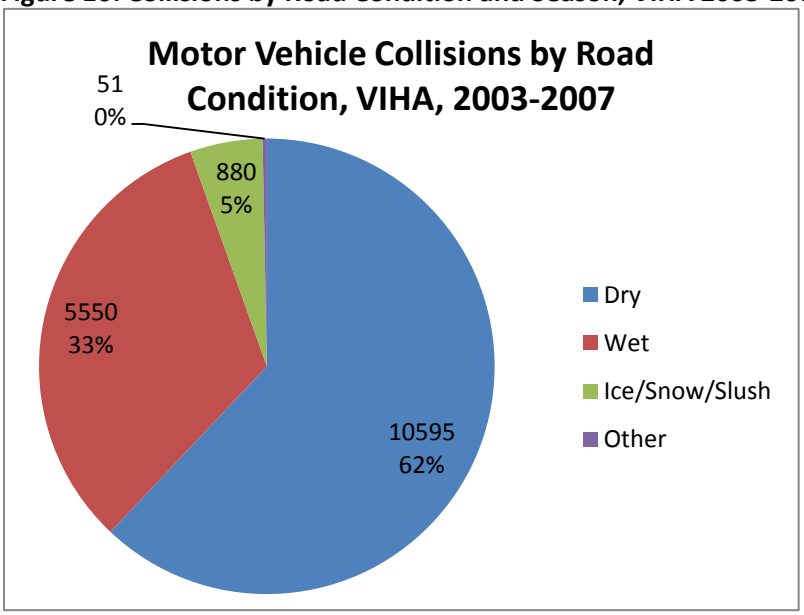


Note: The dominant speed (km/h) limit was assigned to each line segment (In the DRA roads are represented by a series of small line segments with end points depicting intersections. For example, if the first 80% of a segment is 50 km/h, and the last 20% of a segment is 30 km/h, the segment is recorded as 50.

6.3 Weather Related Road Conditions

Weather can be an important contributing factor to motor vehicle collisions by creating poor road conditions and limiting driver visibility. Most collisions occurred on dry roads (Figure 16), reflecting the time of year and weather conditions when most travel occurs.

Figure 16: Collisions by Road Condition and Season, VIHA 2003-2007



Source: RCMP North Island Division

6.4 Collisions by Road Length and Road Junction, 2003-2007

Over the five year period, on average, for every 100 kilometres of road on Vancouver Island there were 170 police-attended collisions and 26 fatal collisions. However, these events were not uniformly distributed across VIHA's transportation network. The highest rate of motor vehicle collisions per length of roadway was in Saanich LHA followed by Greater Victoria LHA. For every 100 road junctions there were, on average, 45 collisions and 0.70 fatal collisions. These numbers varied somewhat amongst the LHAs (Table 9), with Saanich, Vancouver Island North and Alberni having the highest rate of fatal collisions per 100 junctions.

The frequency of collisions and fatalities in an area increased with increased road lengths, with the relationship between road length and collisions being stronger for fatal collisions (Figures 17 and 18). The plotting of this data can serve to highlight areas that are seemingly experiencing rates of collision and death well above those of other island communities with similar lengths of roadways and number of junctions. Such variation is deserving of a more detailed examination as to the reasons why it is so and identification of opportunities for intervention and mitigation. This tabulation may also assist in documenting the obverse and determining why other communities are well below the trend line and build on their successes.

Table 9: Collisions per 100km of Road and per 100 Road Junctions by VIHA LHA, 2003-2007	Collisions per 100km of Road		Collisions per 100 Road Junctions	
	Total Collisions	Fatal Collisions	Total Collisions	Fatal Collisions
South Vancouver Island	269.4	2.8	59.0	0.6
Greater Victoria	304.0	2.2	51.0	0.4
Saanich	580.8	5.3	123.2	1.1
Sooke	169.4	3.2	39.2	0.7
Gulf Islands	10.0	0.3	4.2	0.1
Central Vancouver Island	143.4	2.9	39.7	0.8
Cowichan	172.4	2.9	48.0	0.8
Lake Cowichan	46.3	1.6	22.8	0.8
Ladysmith	122.6	1.5	31.5	0.4
Nanaimo	190.4	3.0	41.5	0.7
Qualicum	117.7	3.2	35.5	1.0
Alberni	113.5	3.4	38.1	1.1
North Vancouver Island	95.7	1.9	36.3	0.7
Courtenay	112.9	1.6	35.7	0.5
Campbell River and VI West	104.0	1.9	42.2	0.8
VI North	52.2	2.4	26.3	1.2

Note: Rates were calculated for each local health area using length of roadway and number of road junctions derived from the DRA for the denominator

Figure 17: Personal Injury Collisions by kms of Road, VIHA, 2003-2007

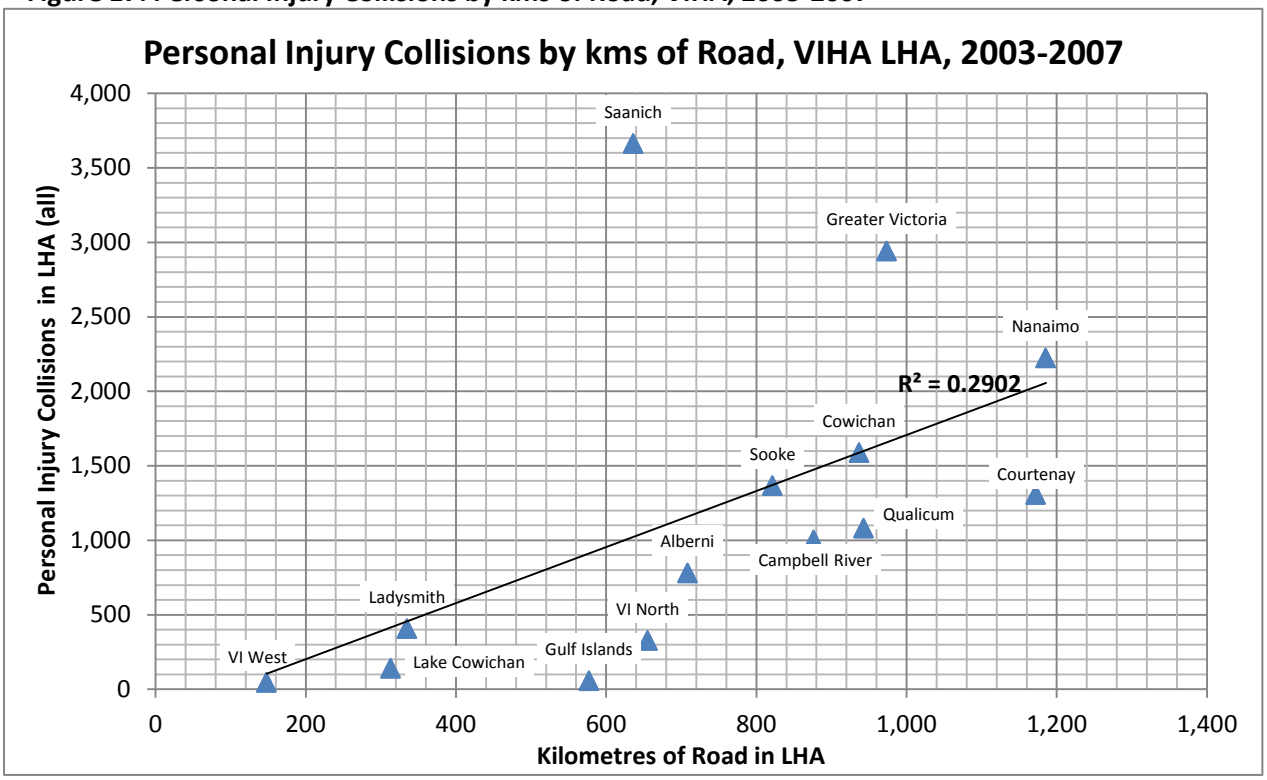
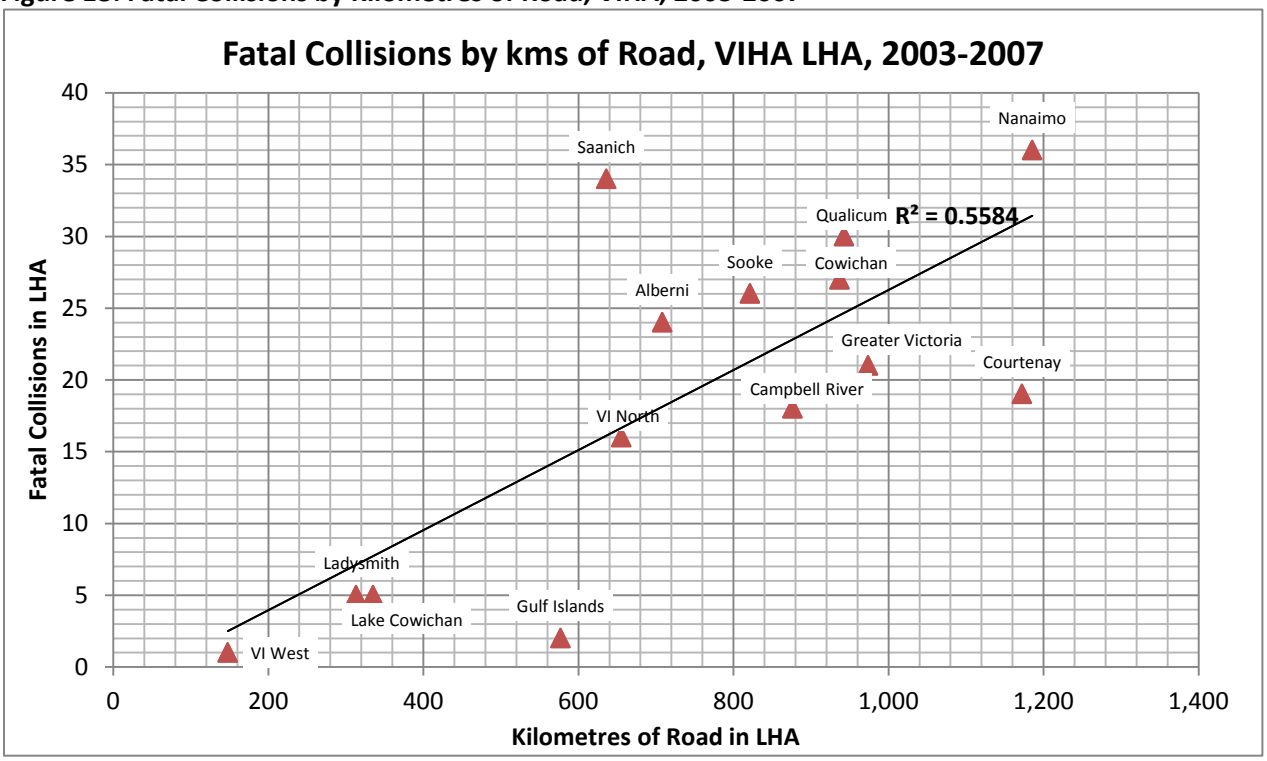


Figure 18: Fatal Collisions by Kilometres of Road, VIHA, 2003-2007



7 Human Factors including Driver distractions, speed and alcohol

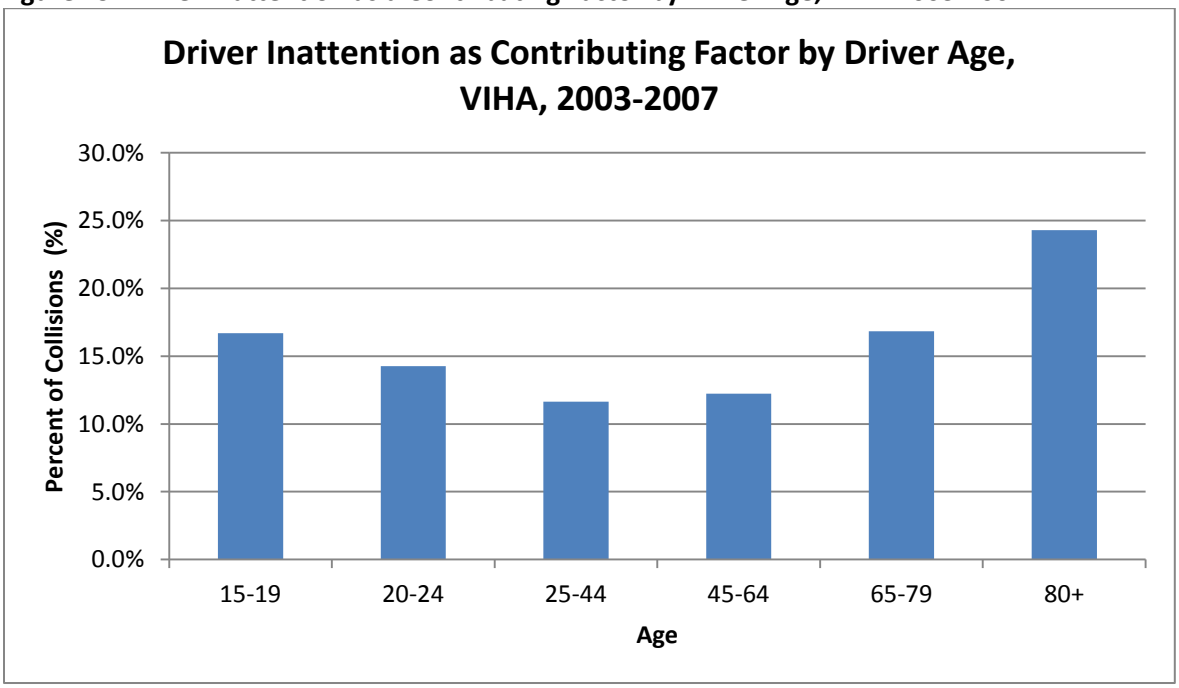
A variety of human factors commonly contribute to collisions, as outlined in Table 5 (in Chapter 4). These factors may work alone or in combination and have a significant bearing on the outcome of an incident. The following section outlines a number of the key human factors that have played a role in collisions on Vancouver Island between 2003 and 2007.

7.1 Driver Inattention as Contributing Factors

Driver inattention or distraction occurs when a driver is delayed in recognizing critical information needed to safely operate a vehicle. The distraction may originate either within or outside the vehicle and draws the driver's attention away from driving.[3]

Driver inattention was cited as the primary contributing factor in 12.5 percent of collision reports and the one that leads all others for motor vehicle incidents on the island between 2003 and 2007. While it is important in all age groups, Inattention as a contributing cause of collisions is highest for younger and older drivers. For the younger driver, the issue may be a function of attempts at multitasking, while delayed cognitive processing associated with normal aging may be a contributing factor for the older driver.

Figure 19: Driver Inattention as a Contributing Factor by Driver Age, VIHA 2003-2007



Driver Inattention was the leading primary contributing factor in motor vehicle collisions in all three of VIHA's HSDAs between 2003 and 2007. Activities such as using a cell phone or electronic device while driving can give rise to a delayed response to a hazard which can ultimately contribute to a motor

"Friday evening, a nice summer night, a young person driving up the Malahat – often there is more than just one person in the vehicle, there are passengers, driver is distracted by talking, music, etc. And it is often one of the passengers who is going to get injured or killed. That is why the Province has put in the graduated license to limit the number of passengers in the car for a new driver. It will reduce the chance that the driver will be distracted."- Saanich Police TSU

[3] Canadian Council of Motor Transport Administrators (CCMTA), http://www.ccmta.ca/english/index.cfm (last updated: June 2010)

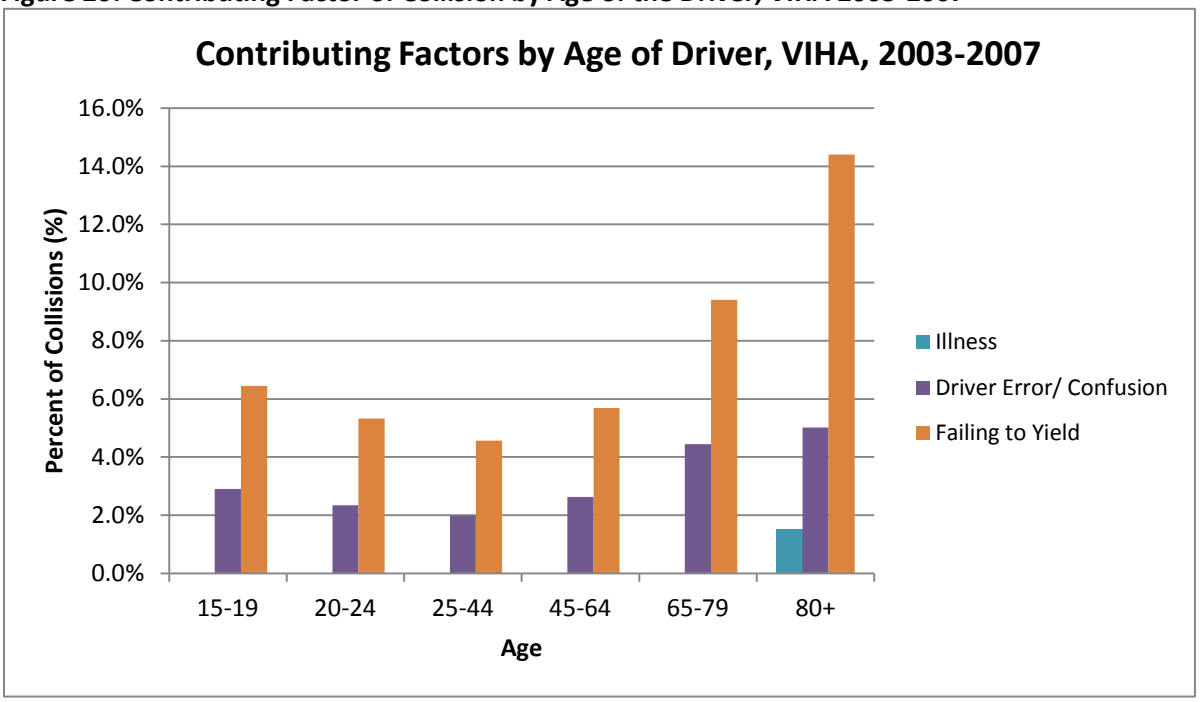
vehicle collision.[4] Moreover, cell phone ownership is on the rise with 74.3% of Canadian households indicating they had a cell phone in 2008, up from 72.4% in 2007.[5] (*Appendix C* provides a summary of findings from a University of Victoria study that observed the prevalence of cell phone use at various locations around the City of Victoria, BC. prior to and following legislation banning the use of hand-held devices in vehicles.)

7.1.1 Driver Error and Failure to Yield as a Contributing Factors

"He went off road right, and typically when they go off road right it means they are distracted." - Saanich Police TSU

Both the physiologic changes associated with normal aging and impairments associated with declining health can pose challenges for senior active drivers. Failing to yield was the most common factor in collisions for all age groups and followed a "U- shaped" distribution with a larger 'arm' for older drivers. Figure 20 illustrates that there are certain contributing factors that increase relative to increasing age of the driver. While driver inattention was the ranking contributing factor for all age groups, some factors were much more common only for those over the age of 65 years. These include: *Ignoring Traffic Control Device, Illness, Backing Unsafely*, *Confusion* and *Sudden Loss of Consciousness*.

Figure 20: Contributing Factor of Collision by Age of the Driver, VIHA 2003-2007



7.2 Alcohol as a Contributing Factor

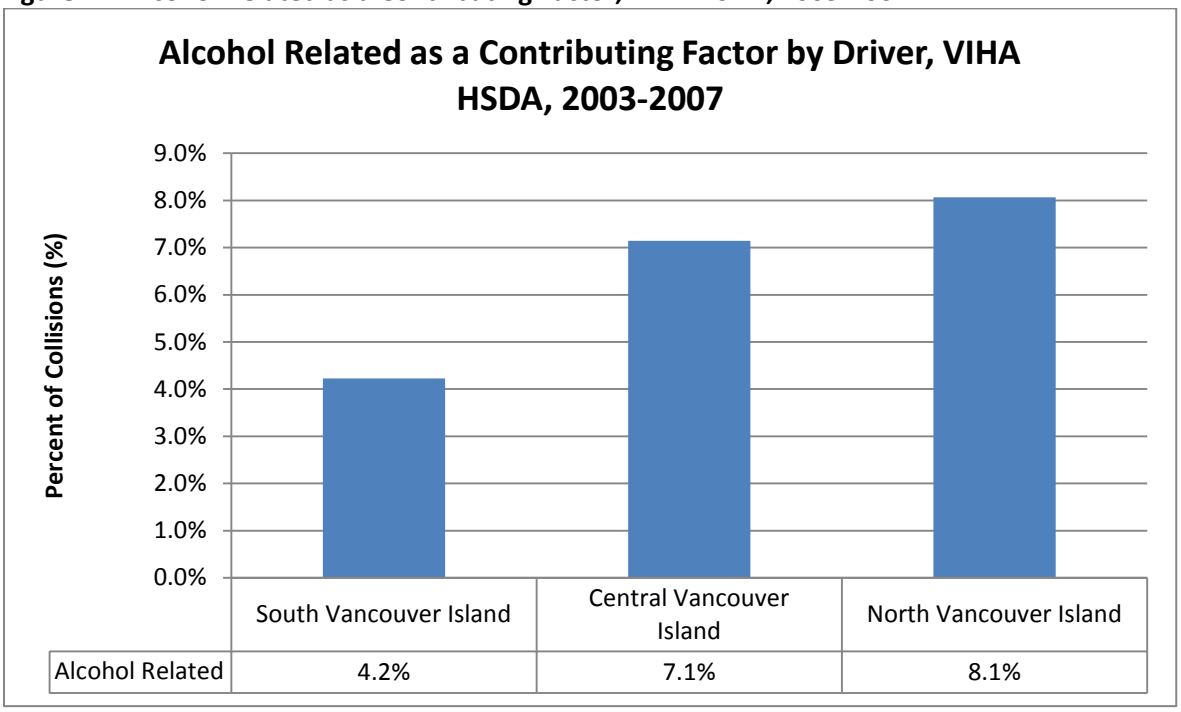
Alcohol was cited as the second highest contributing factor for motor vehicle collisions for Vancouver Island between 2003 and 2007. It was cited in 5.6 percent of cases as being the primary contributing factor for a collision. This varied by HSDA, with the frequency of alcohol related collisions being highest in Central Vancouver Island; however, the proportion of alcohol related collisions were highest in North Vancouver

[4] Caird, J., Willness, Steel, Scialfa (2008). A meta-analysis of the effects of cell phones on driver performance. Accident Analysis and Prevention 40:1282–1293.

[5] Statistics Canada, Proportion of households by type of phone service, December 2008.

Island HSDA (Figure 21). Furthermore, it also was disproportionately represented in collisions involving males and younger drivers of both genders.

Figure 21: Alcohol Related as a Contributing Factor, VIHA HSDA, 2003-2007



While drinking driving awareness and prevention has increased over the last two decades, it is still a major public health challenge, both locally and nationally. A Transport Canada report estimated that in 2007 approximately 1.84 million Canadians had driven when they felt they were over the legal limit in the previous year and one-third of all Canadian drivers killed in car crashes had been drinking.[6] In VIHA between 2003 and 2007, there were 2,752 "victims" of alcohol related collisions, of which 69 were fatal (Table 10). In 39 percent of the cases, the "victim" was not listed as the "driver" suggesting that vehicle passengers, pedestrians, and/or cyclists were also impacted by someone else's drinking and driving.

> *"Scene analysis determined that the vehicle was travelling 135km/hr coming into the corner in a 60km/hr zone. The car went into an embankment and actually rolled up on the embankment and landed on its roof. They were messing around, coming back from a day at the lakes and had been drinking all day. The driver was killed. The other people survived."*
>
> - Saanich Police TSU

Table 10: Alcohol Related Collisions, VIHA, 2003-2007

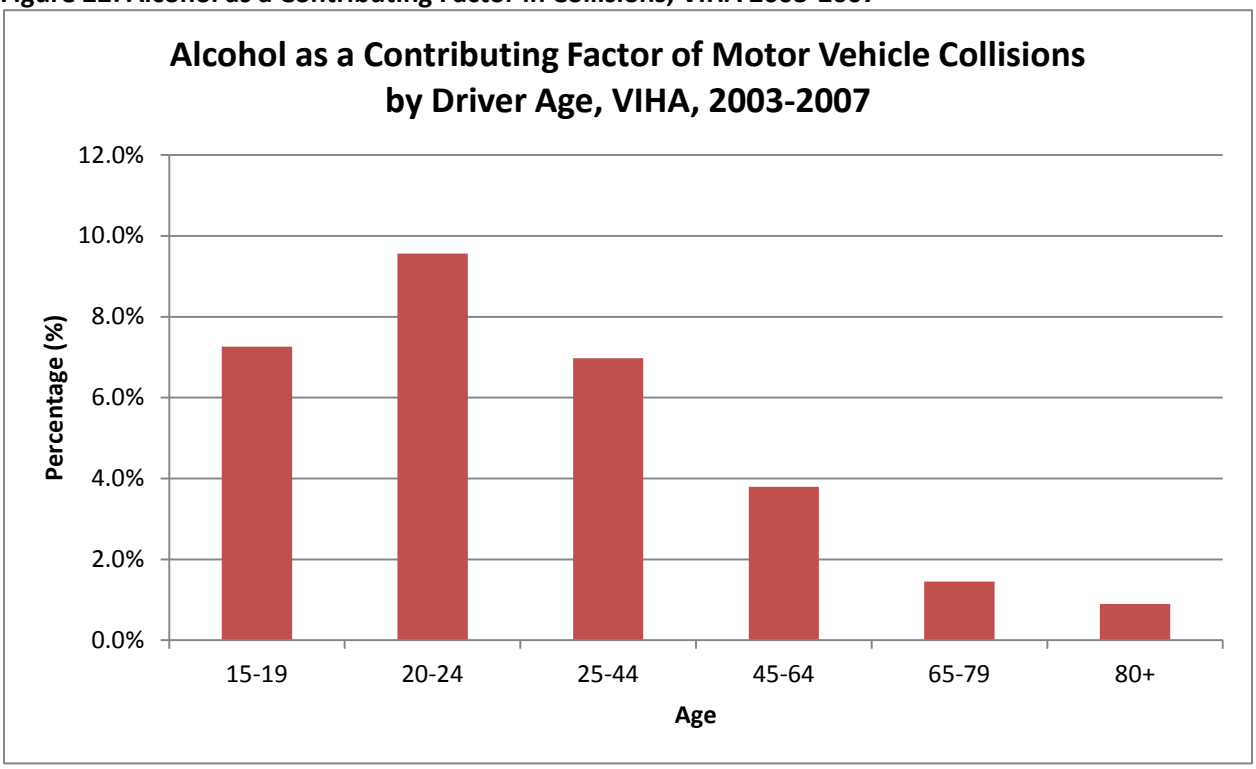
	Uninjured	Injured	Fatal	Unknown	Total
Driver	509	1125	33	24	1691
Pedestrian	0	51	9	5	65
Not Driver	297	632	26	23	978
Unknown	1	14	1	2	18
Total	**807**	**1822**	**69**	**54**	**2752**

Source: Saanich Police TSU

[6] *Smashed*, Transport Canada, www.tc.gc.ca/roadsafety

Figure 22 illustrates that as the age of the driver increases, alcohol as a contributing factor decreases. Alcohol was not one of the top ten contributing factors to crashes for drivers in the 80+ age category.

Figure 22: Alcohol as a Contributing Factor in Collisions, VIHA 2003-2007



7.2.1 Other Substance Use as a Contributing Factor

Drug-related factors as recorded in the Traffic Accident Survey (TAS) data include: Ability Impaired by Drugs, Ability Impaired by Medication, Drugs (Illegal), Drugs Suspected, and Prescribed Medication. There were 261 "victims" of drug-related collisions on the island between 2003 and 2007, of which nine were fatal. There were 79 "victims" of drug-related collisions in VIHA who were not operating the vehicle at the time of the crash, suggesting that, as is the case with driving under the influence of alcohol, drug-related collisions impact more than just the drug-impaired driver (Table 11).

Table 11: Motor Vehicle Collisions Resulting from Drug-Related Factors by Driver Status, 2003-2007

	Driver	Not Driver	Total
Total Drug-Related	**182**	**79**	**261**

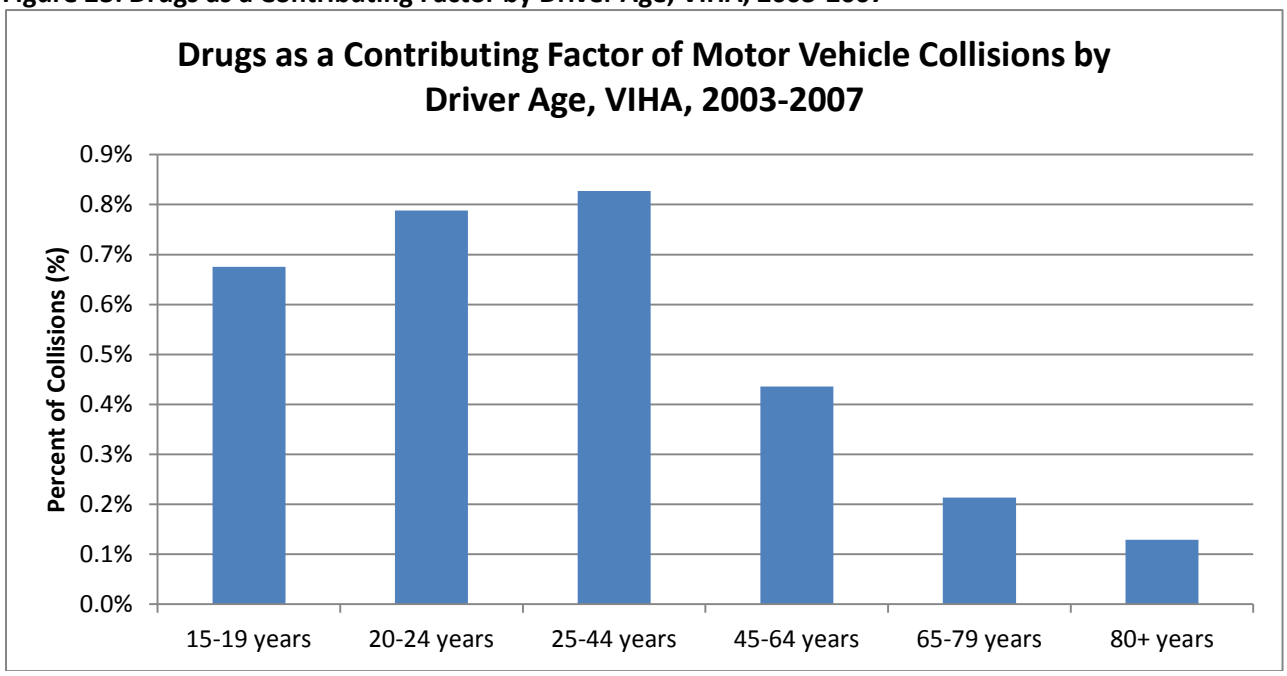
As is the case with alcohol related collisions, the percentage of drug-related collisions decreases with driver age with drug-related contributing factors playing a larger role in motor vehicle collisions involving drivers in the 20-44 year old age group (Figure 23). Elsewhere, marijuana (or cannabis) has been reported to be the most commonly found illegal drug in impaired drivers.[7] Studies have determined that marijuana does impair driving performance in a dose-related manner, an effect that is compounded when combined with alcohol.[8]

[7] Kelly, E., Darke, S., Ross, Joanne., A review of drug use and driving: epidemiology, impairment, risk factors and risk perceptions, Vol.23, Sept.2004. http://onlinelibrary.wiley.com/doi/10.1080/09595230412331289482/abstract

[8] Ramaekers J.G., Berghaus G., van Laar M., Drummerd O.H., *Dose related risk of motor vehicle crashes after cannabis use*. October 2003. http://www.ukcia.org/research/DoseRelatedRiskOfCrashes.pdf

(A recent study in BC on the prevalence of driving under the influence of drugs found that 9% of drivers injured in collisions in which bloodwork was drawn had positive THC (the substance in cannabis that causes impairment) levels.[9])

Figure 23: Drugs as a Contributing Factor by Driver Age, VIHA, 2003-2007



Note: The following primary contributing factors are included as a drug- related collision: "drugs suspected, ability impaired by drugs, prescribed medication, ability impaired by medication and drugs (illegal)"

The ICBC Contravention Data shows that on average, there are 8,326 substance-related violations handed out each year in VIHA, including suspensions and driving prohibitions, and over the 5-year period from 2003 to 2007 there were a total of 41,632 substance-related charges (Table 12).

Table 12: Substance-Related Contraventions by HSDA, 2003-2007

	South Vancouver Island	Central Vancouver Island	North Vancouver Island
Substance-Related Contraventions (#)	19,628	13,656	8,348

Note: *Substance-Related Contraventions* include: '12 hour suspension alcohol related', '24 hour prohibition', '24 hour prohibition-alcohol', 'driving with more than 80 milligrams of alcohol in blood', 'operate a motor vehicle while impaired alcohol/drugs', '24 hour prohibition-drugs', 'Failure or refusal to provide a sample of breath or blood.'

7.2.2 Speed as a Contributing Factor

Source: Saanich Police TSU

Driving too fast for conditions and travelling above the posted limit, both ticketable speed-related offences, were among the top ten factors contributing to collisions on Vancouver Island as identified in police reports (Table 5 in Section 4). Speeding contributes to collisions more for younger drivers, particularly in the 15-19 year old age group (Figure 24). Speeding was also cited by law enforcement as one of the top 10 contributing factors for individuals between the ages of 20-

[9] Brubacher, Dr. JR., *Driving under the influence of drugs: a pilot study,* CAEP Abstract, 2009.

44; however, not so for those over 45 years of age. Travelling above the posted limit or too fast for conditions also contributes more to collisions for drivers in North and Central Island compared to South VIHA (Figure 25). There were a total of 183,482 speeding related contraventions in the Health Authority between 2003 and 2007 for an average of 36,696 contraventions per year.

Figure 24: Speeding as a Contributing Factor in Collisions by Driver Age, VIHA 2003-2007

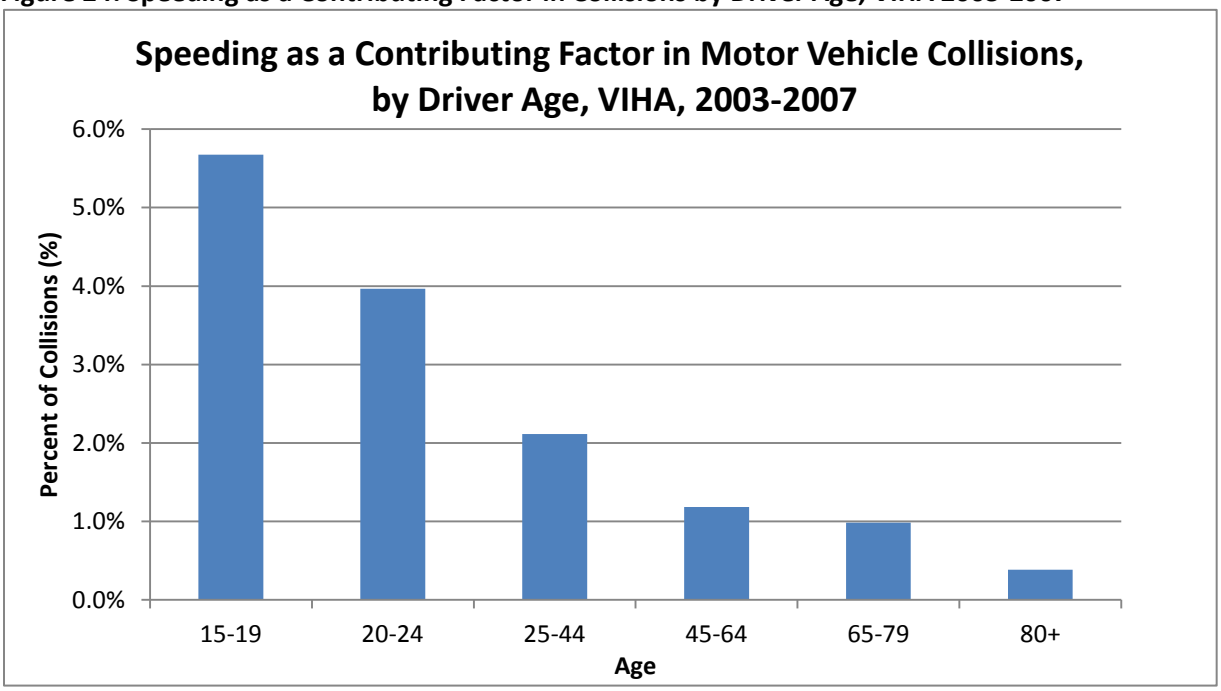
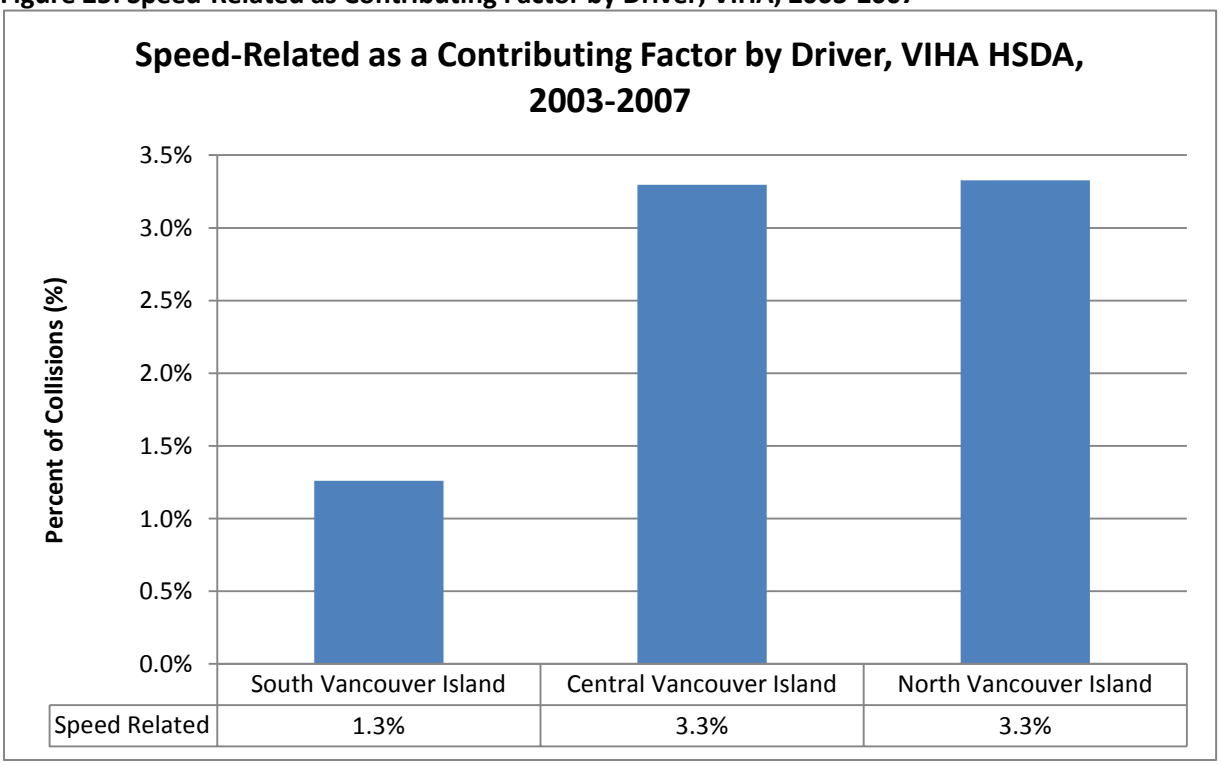


Figure 25: Speed-Related as Contributing Factor by Driver, VIHA, 2003-2007



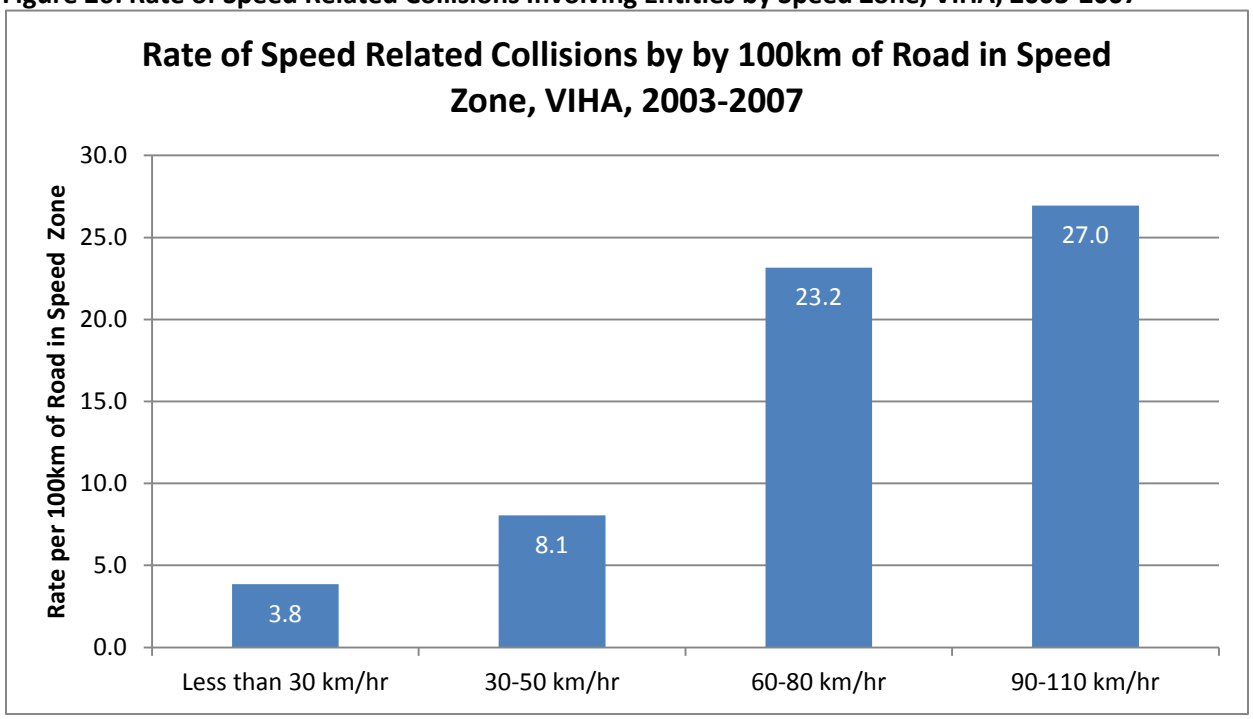
The majority of collisions where speeding was the primary contributing factor occurred in the 30-50 km/hr zones (Table 13), which is not unexpected given that this is the posted speed range for the majority of roadways on Vancouver Island. However, when consideration is given to the differing speed zones on the island, the frequency of speeding related collisions per kilometre of roadway on Vancouver Island is higher for roads with greater posted speed limits (Figure 26).

Table 13: Entity Collisions by Speed Related Contributing Factors and Speed Zone, 2003-2007**

	Less than 30km/hr	30-50km/hr	60-80km/hr	90-100km/hr	110-120km/hr	Unknown or Other
Fatal Collisions	0	15	13	5	*	*
Personal Injury Collisions	5	614	382	167	68	60
Total Speed-Related Collisions	**5**	**629**	**395**	**172**	*****	*****

* Denotes value less than 5. **Note: Speed related includes the combined factors of "Exceeding speed limit", "Driving too fast for Conditions", "Excessive Speed over 40km/hr" and "Unsafe speed."

Figure 26: Rate of Speed Related Collisions Involving Entities by Speed Zone, VIHA, 2003-2007



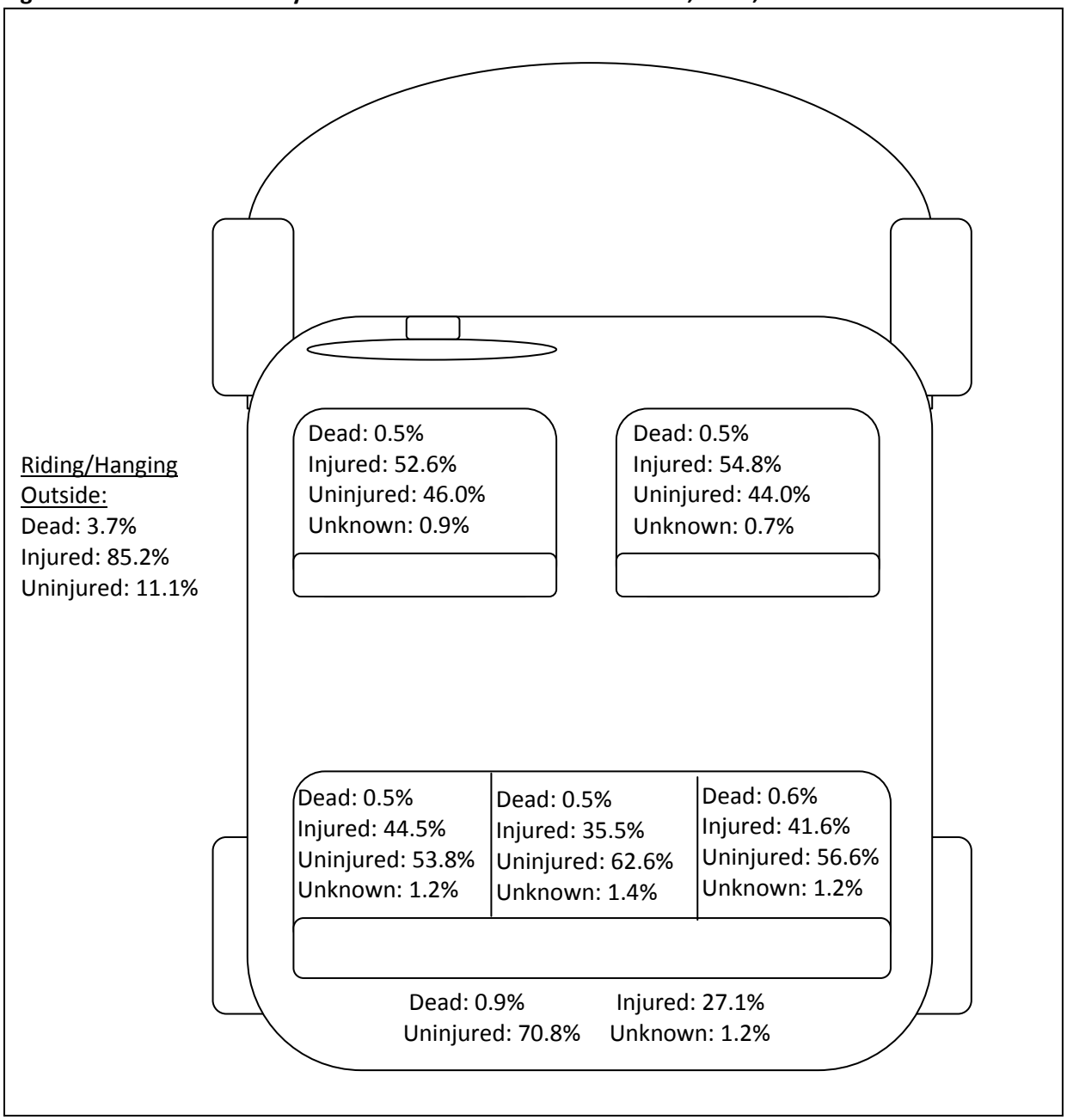
8 Vehicle Factors Contributing to Crashes on Vancouver Island

8.1 "Victim" Status by Seating Position in Vehicle

The seating position of the "victim" in the vehicle at the time of the collision had a bearing on their outcome. While drivers (front seat left) and front seat passengers account for the highest number of individuals killed or injured in a motor vehicle collision, these are the common seating positions for most individuals in a motor vehicle. Figure 27 contrasts the injury status of "victims" involved in motor vehicle collisions with the location in which they were seated in the vehicle. Of "victims" who were *riding/ hanging outside the vehicle*, and therefore unlikely to be restrained, 3.7 percent died, 85.2 percent were injured and only 11 percent escaped injury.

When compared with front seat passengers, injuries were less common among persons in rear seating, especially for the centre rear seat position. A significant difference in deaths based on seating position was not documented for VIHA collisions; other data have demonstrated a higher fatality risk for those in the front seats.[10] Injuries were fewer in rear seat passengers in our data, especially for the rear centre position.

Figure 27: "Victim" Status by Position Inside or Outside of Vehicle, VIHA, 2003-2007



Note: Only passenger vehicles, trucks, SUVs, recreational vehicles, construction vehicles and vans were included.

[10] L Evans and M C Frick, American Journal of Public Health, Vol. 78, Issue 11 1456-1458, 1988

8.2 Safety Equipment Use

Of the 43,458 "victims" involved in police-attended motor vehicle collisions in VIHA between 2003 and 2007, 1,954 were either misusing or not using the appropriate safety restraint or device at the time of the collision (this does not include helmet use or misuse by bicyclists or motorcyclists).

Table 14 below illustrates the importance of proper safety equipment use by motor vehicle occupants involved in a motor vehicle collision. Between 2003 and 2007 in VIHA, properly used safety restraints or devices were associated with fewer injuries and deaths when collisions occurred. Of the "victims" using safety equipment, 0.28 percent of "victims" were killed compared to 3.33 percent who were misusing or not using a proper device. Similarly, 47 percent of "victims" using safety equipment were injured compared to 72 percent of "victims" who were not using an appropriate safety restraint or device.

Table 14: "Victim" Status by Safety Equipment Use, VIHA, 2003-2007

	Dead	Injured	No Injury	Unknown	Total
Safety Equipment Use	96	16,778	16,845	192	33,911
	0.3%	49.5%	49.7%	0.6%	100.0%
Misuse or No Safety Equipment Use	65	1,404	469	16	1,954
	3.3%	71.9%	24.0%	0.8%	100.0%

There were a total of 69,797 safety equipment infractions in VIHA between 2003 and 2007, with the majority being for seatbelt violation citations. This is not unexpected given the number of motor vehicles on the road when compared to other modes of transportation. The number of cyclists who received violation tickets between 2003 and 2007 did increase from 652 in 2003 to 1129 in 2007, a 73 percent increase and may be a consequence of an increased number of cyclists (a fraction of the new cyclists likely are not wearing helmets for the same reasons more established non-helmeted riders have offered to law enforcement and on rider surveys – personal freedom, messes hairs, too warm/cold, etc.) or enhanced enforcement of existing laws. Violations were highest in Central Vancouver Island HSDA (Figure 28).

Source: Saanich Police TSU

RCMP say speed is considered to be a factor in a terrifying crash that's had fatal consequences. The 35-year-old victim was thrown from the car. "The Southbound vehicle then entered the South-bound shoulder, contacted a power pole, became airborne and then rotated several times in the air." recounted Campbell River RCMP Sergeant Troy Beauregard. "The remaining occupant of the South-bound vehicle survived uninjured due the use of proper occupant restraints." "In light of this tragedy, Police are urging drivers to adhere to posted speed limits, drive accordingly when weather results in deteriorating road conditions, and use your seatbelts," urged Beauregard. - **Jennifer Faerber** **Campbell River Mirror**

Figure 28: Safety Equipment Contraventions by VIHA HSDA, 2003-2007

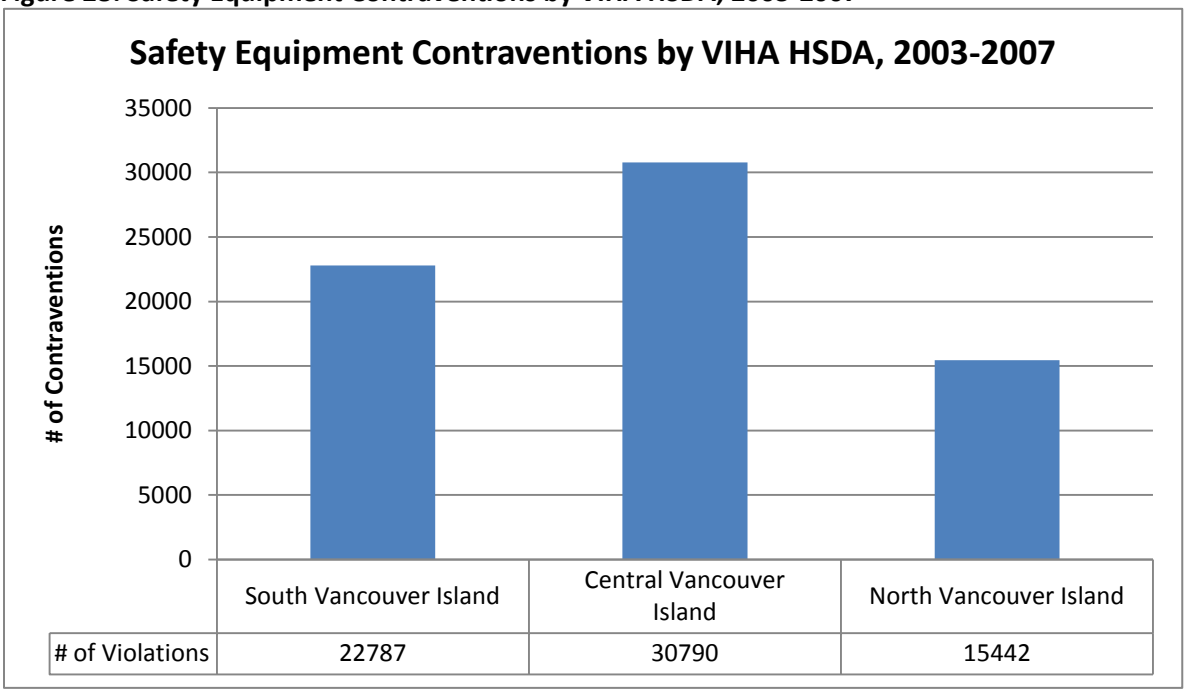


Table 15 illustrates the percentage of collision "victims" who were killed, injured, or uninjured and the type of vehicle safety equipment deployed at the time of the collision. The data re-affirms the value using safety equipment at the time of a collision. For example, in the circumstance where no restraint was used, 3.7 percent of "victims" died, 75 percent were injured and 20 percent experienced no injury. Similarly, in the cases where the restraint was inoperative or broken, 80 percent of "victims" sustained injuries and 20 percent avoided injury. Of interest is the percentage of "victims" that were injured while using a lap and harness belt and the airbag deployed (72 percent) compared to those that had a lap and harness belt and no airbag deployment (47 percent). Critical in interpreting these figures is the circumstances under which airbags are designed to deploy. They are triggered by higher velocity collisions and by the type of collision (head on impacts and in newer vehicles and most luxury cars side impacts as well). To assess the value of airbags, collisions of similar severity with and without air bag deployment would need to be compared. Air bags have been designed for protecting adult-sized individuals and the front passenger air bag should be disabled if a child is being transported in the front passenger seat.

Table 15: Vehicle Safety Equipment Use by "Victim" Status, VIHA, 2003-2007

	Dead	Injured	Uninjured	Unknown
Air Bag Deployed (No Restraint)	1.7%	76.5%	20.9%	0.9%
Child Restraint Used	0.1%	18.3%	79.5%	2.1%
Harness Only	0.0%	50.0%	50.0%	0.0%
Lap & Harness	0.2%	50.8%	48.9%	0.2%
Lap Belt Only	0.1%	47.3%	52.2%	0.4%
Lap & Harness& Airbag Deployed	0.9%	71.5%	26.6%	1.0%
Lap &Harness, No Airbag Deployed	0.2%	47.0%	52.1%	0.6%
Misuse Of Child Restraint	0.0%	58.3%	41.7%	0.0%
Misuse Of Restraint	0.0%	62.5%	37.5%	0.0%

No Restraint Used	3.7%	75.4%	20.2%	0.8%
Position Not Equipped	1.4%	44.0%	53.6%	1.0%
Restraint Inoperative/Broken	0.0%	80.0%	20.0%	0.0%

Children aged 0-14 who were protected by some form of safety equipment/device (child restraint, lap and harness, lap belt etc.) were less likely to be injured during a collision. Of the children secured with proper safety equipment, be it seat belt or infant/ child car seat, 67 percent escaped injury compared to only 41 percent of those where the safety equipment was not used or misused.

Source: ICBC

"Double fatal– two young males were killed. Passenger had case of beer still between his legs. High speed, coming around a corner, over corrected and went sideways going the other way. Just as they got to the end, the car flipped and went on its roof over a tree and crushed the car."

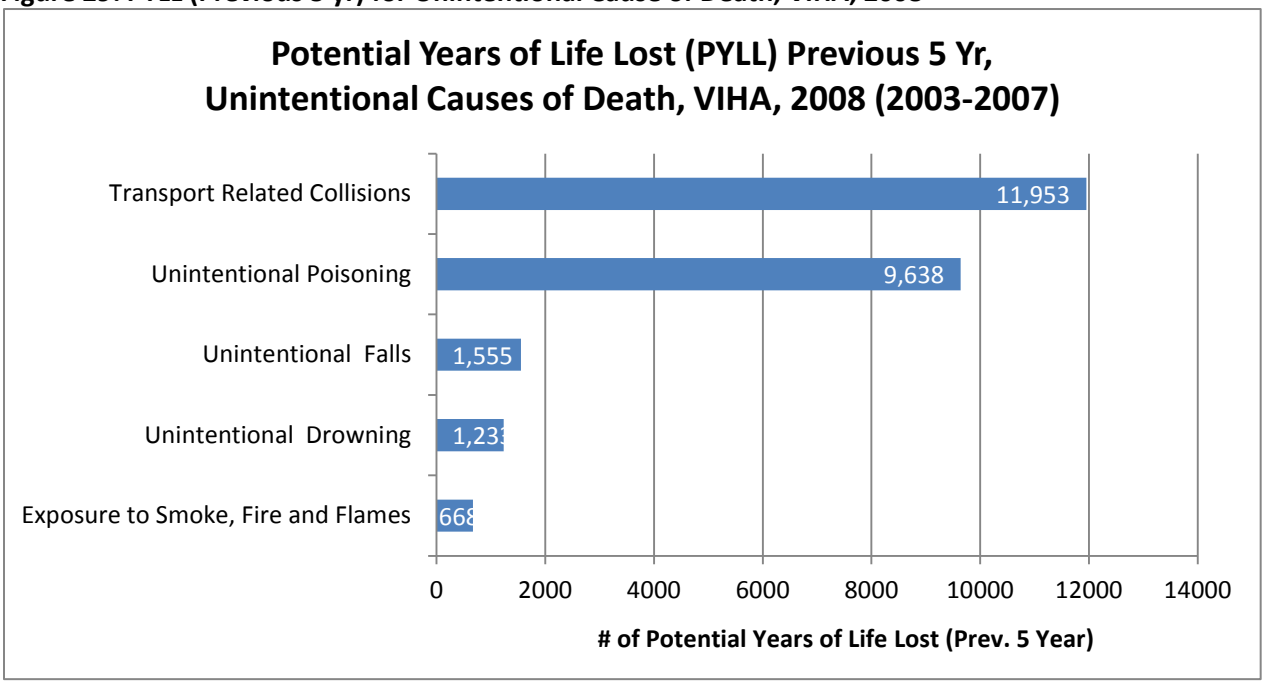
- Saanich Police TSU

SECTION III- IMPACT OF CRASHES ON VANCOUVER ISLAND

9 Health Impacts of Crashes

For VIHA, motor vehicle collisions are one of the leading causes of premature death in the population.[11] The following section summarizes the health impacts of motor vehicle collisions, including hospitalizations and deaths for the Health Authority. Figure 29 illustrates that the potential years of life lost (PYLL Prev. 5yr) for transport-related mishaps involving motor vehicles on Vancouver Island are higher than unintentional poisoning, unintentional falls, unintentional drowning and exposure to smoke, fire and flames. Between 2001 and 2008, more than 5,600 VIHA residents were hospitalized and 443 died a result of transport-related incidents associated with motor vehicles.

Figure 29: PYLL (Previous 5 yr) for Unintentional Cause of Death, VIHA, 2008



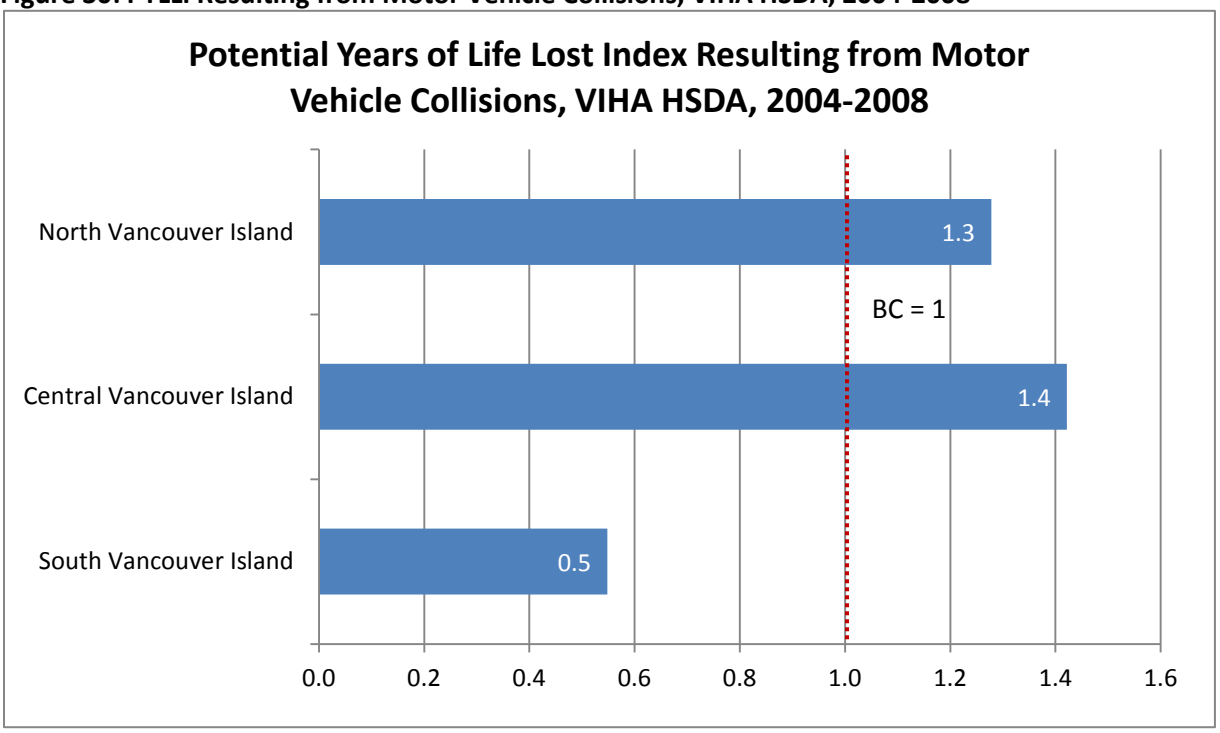
*The **potential years of life lost (PYLL)** is the number of years of life that is lost when a person dies prematurely, generally defined as dying before the age of 75 years. The PYLL Previous 5 yr. is* identical to PYLL except that this number is based on the previous five year aggregate time period. The PYLL Previous 5yr for 2008 is based on 2003-2007. *The **Potential Years of Life Lost Index (PYLLI)** is a measure of premature mortality and is expressed as the ratio of an area's observed PYLL to that which would be expected if it followed a pattern consistent with that of the province overall, where the Potential Years of Life Lost is equal to one.*

Figure 30 shows that between 2004 to 2008, the PYLLI resulting from Motor Vehicle Collisions is the highest in Central Vancouver Island at 1.42, while North Vancouver was next at 1.28 and may be a function of the higher speeds for roads in these areas, more challenging roadways to navigate and greater distances travelled (*BC Vital Statistics Annual Report, 2008*).

Source: Saanich Police TSU

[11] BC Vital Statistics Annual Report, 2008

Figure 30: PYLLI Resulting from Motor Vehicle Collisions, VIHA HSDA, 2004-2008



9.1 Mortality Resulting from Motor Vehicle Collisions

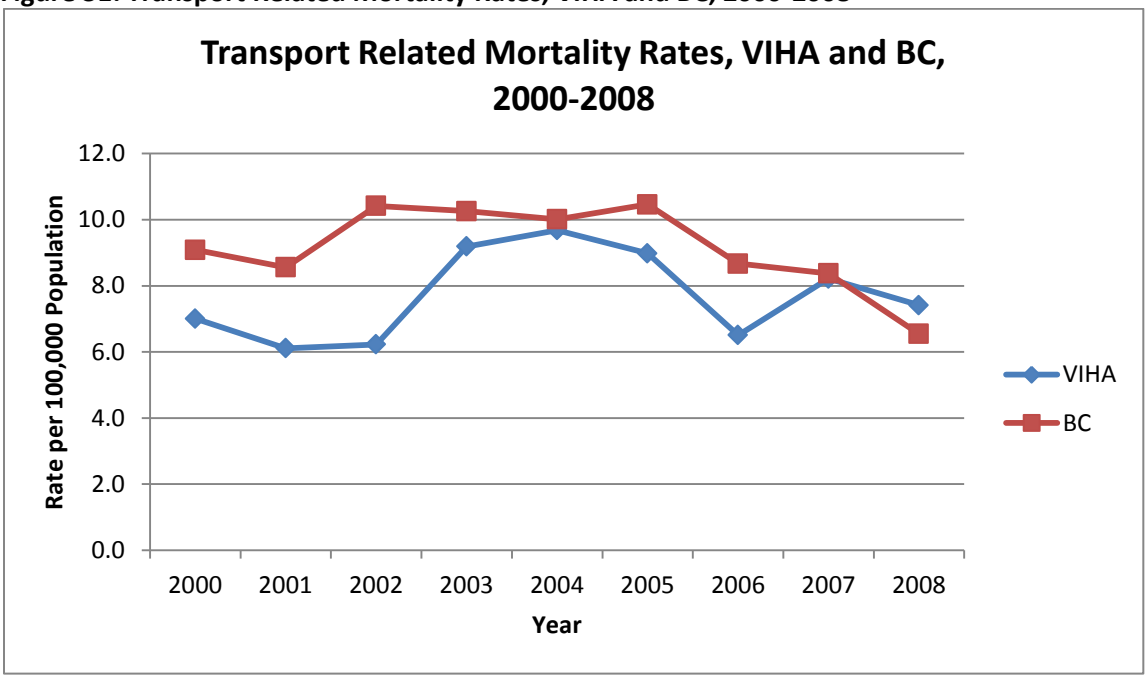
Between 2000 and 2008, the transport-related mortality rate for motor vehicles has remained fairly constant, fluctuating minimally over the course of the nine years with a peak rate in 2004 of 9.7 deaths per 100,000 population (Figure 31). The average for VIHA (7.4 per 100,000 population) was lower than the provincial rate (8.9 deaths per 100,000) and was also lower than other health authorities in BC with the exception of Vancouver Coastal.

"We get to the crashes after they have already occurred. We have little interactions with families. We leave as much of that out as possible – the less I know about the driver, the easier it is to deal with and the easier it is to do our jobs."

- Collision Analyst, Saanich Police TSU

Source: Saanich Police TSU

Figure 31: Transport Related Mortality Rates, VIHA and BC, 2000-2008



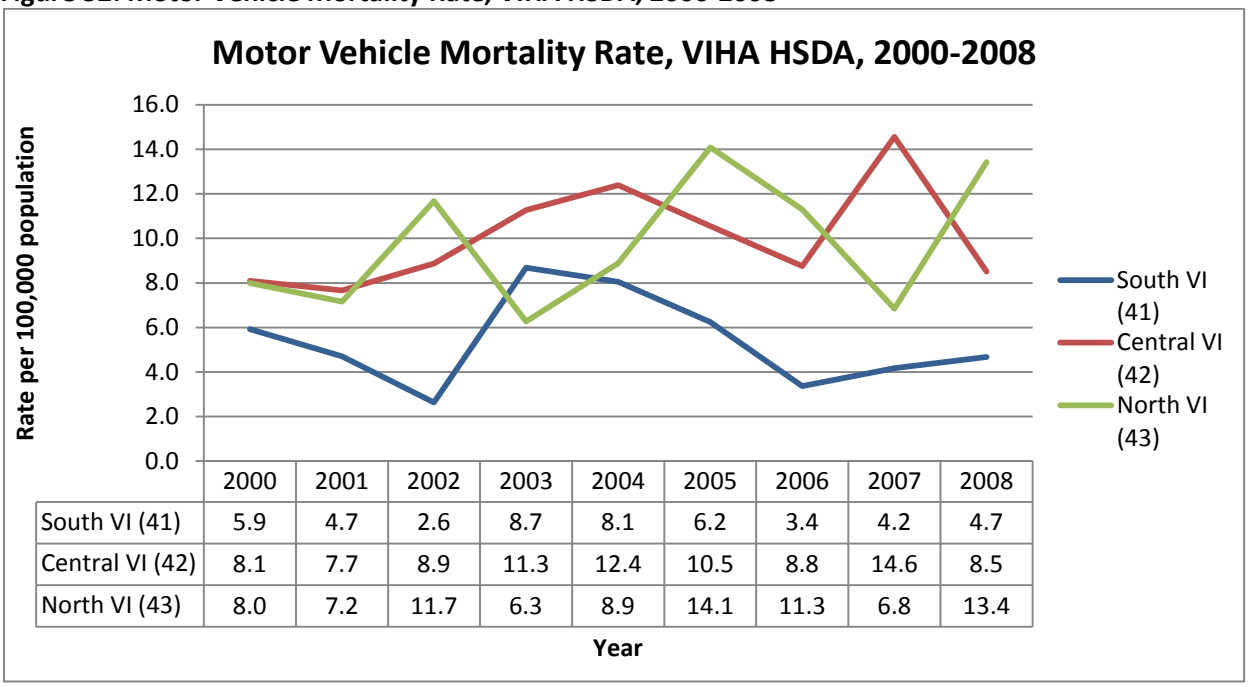
9.1.1 Mortality by HSDA and LHA

At the Health Service Delivery Area (HSDA) level for VIHA, there was significant variation in the number of motor vehicle-related deaths over the nine year time period (Table 16). The overall number of deaths in Central Island was higher than in South Island despite South Island having a larger population. Transport-related mortality rates per 100,000 from motor vehicle collisions were higher not only in Central but also North Island compared to South (Figure 32).

Table 16: Transport-Related Deaths from Motor Vehicle Mishaps by HSDA, VIHA 2000-2008

Health Service Delivery Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	Grand Total
South Vancouver Island (41)	20	16	9	30	28	22	12	15	17	169
Central Vancouver Island (42)	19	18	21	27	30	26	22	37	22	222
North Vancouver Island (43)	9	8	13	7	10	16	13	8	16	100
Grand Total	**48**	**42**	**43**	**64**	**68**	**64**	**47**	**60**	**55**	**491**

Figure 32: Motor Vehicle Mortality Rate, VIHA HSDA, 2000-2008



	2000	2001	2002	2003	2004	2005	2006	2007	2008
South VI (41)	5.9	4.7	2.6	8.7	8.1	6.2	3.4	4.2	4.7
Central VI (42)	8.1	7.7	8.9	11.3	12.4	10.5	8.8	14.6	8.5
North VI (43)	8.0	7.2	11.7	6.3	8.9	14.1	11.3	6.8	13.4

Source: Saanich Police TSU

The driver involved in a fatal rollover early was herself seriously injured in the crash when she swerved and rolled into the median while avoiding a deer that jumped onto the road. **Staff Writer - Comox Valley Record**

Figure 33 shows the number of deaths by LHA between 2000 and 2008, whereas Figure 34 shows the mortality rate per 10,000 population for each LHA. As might be expected, LHAs with larger populations had the largest death count; however it was the rural LHAs that had the highest mortality rates per capita.

Figure 33 – Transport Related Mortality by VIHA HSDA and LHA,

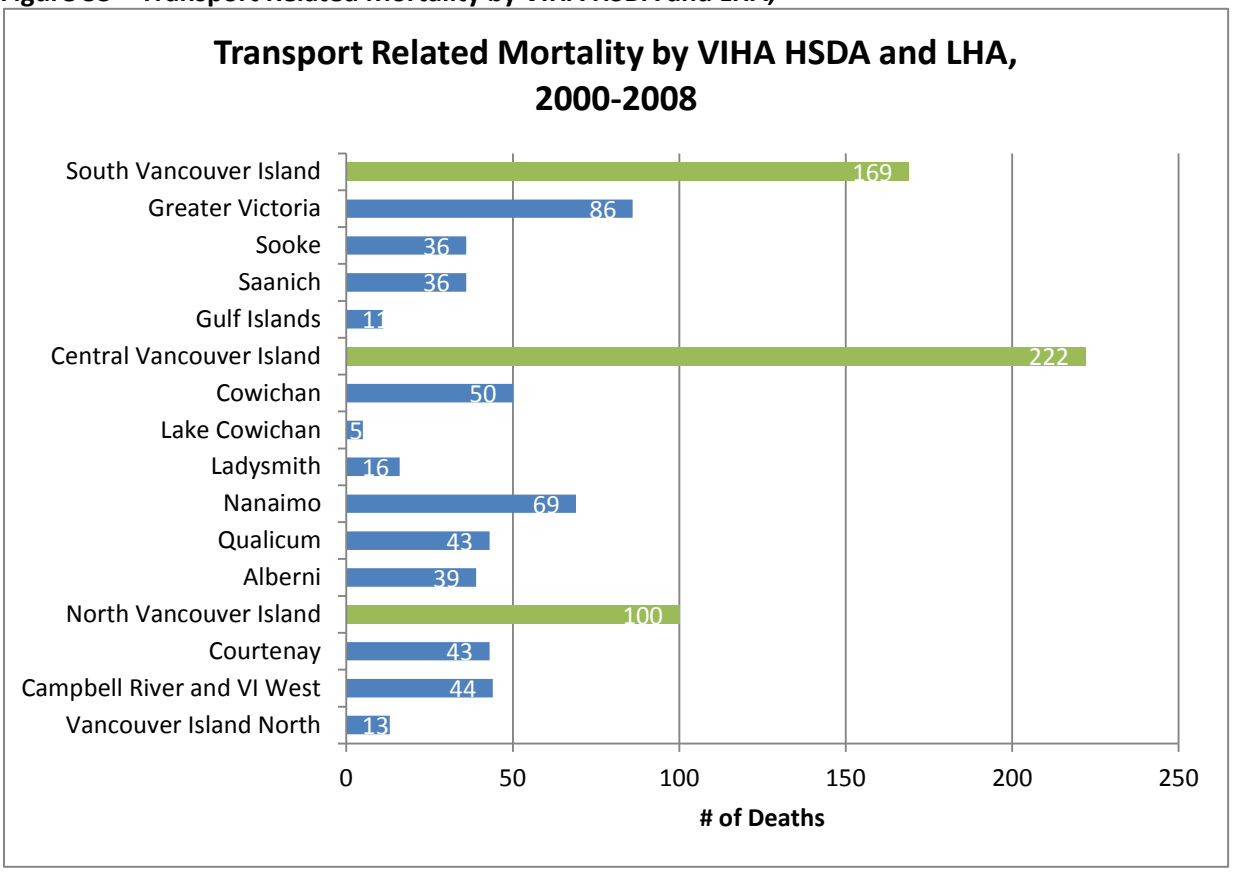
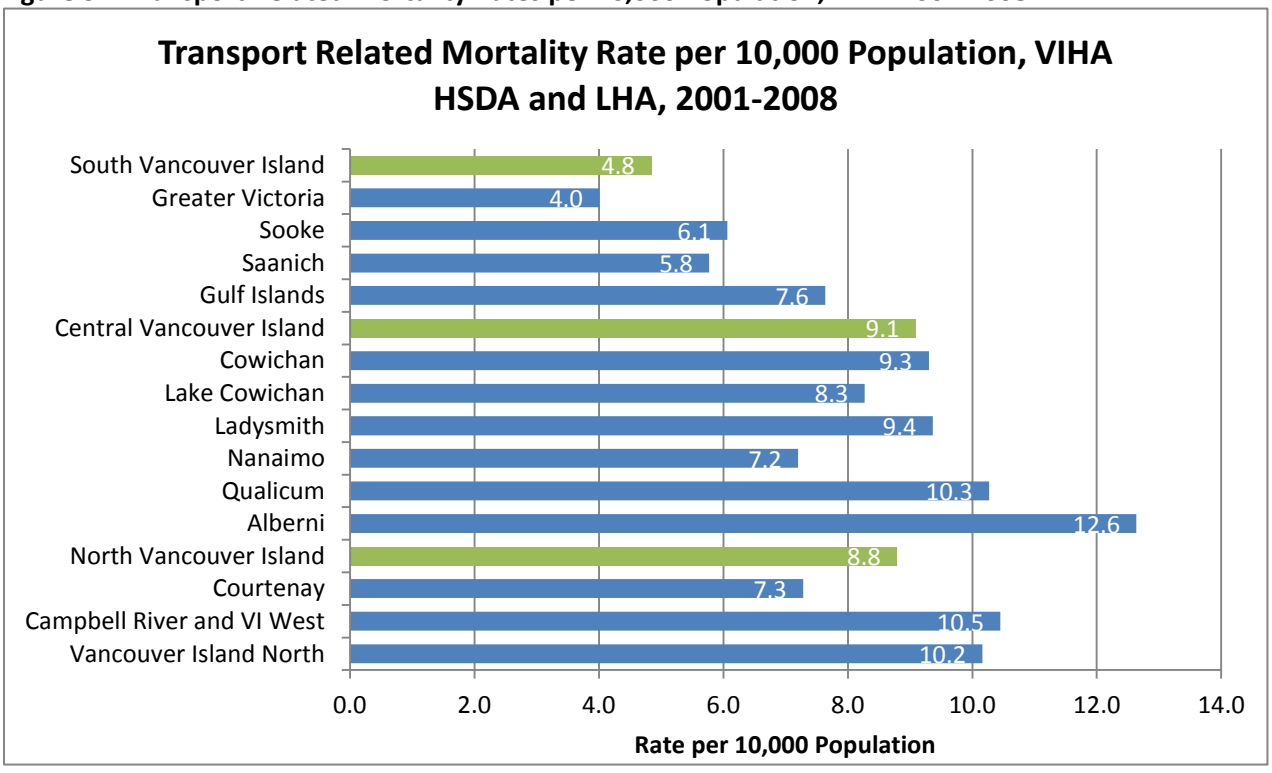


Figure 34: Transport Related Mortality Rates per 10,000 Population, VIHA 2001-2008



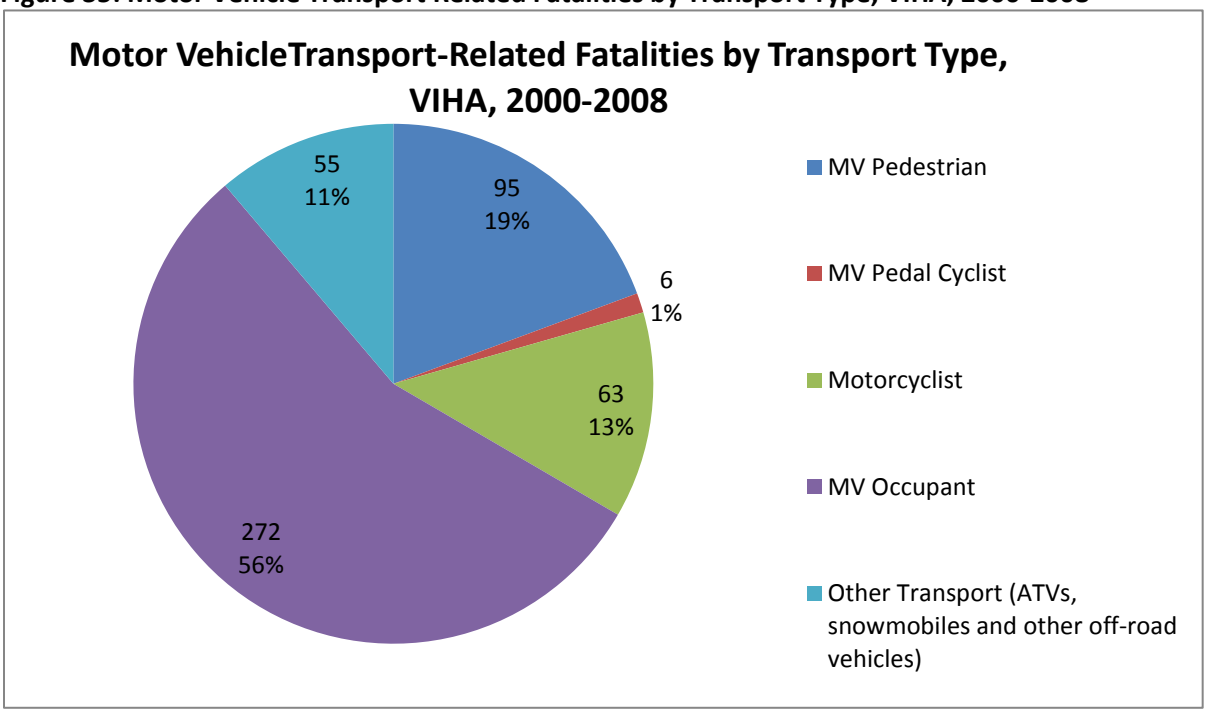
9.1.2 Fatalities by Type of road Transportation

Source: ICBC

Between 2001 and 2008, the majority of transport-related fatalities from motor vehicles in VIHA occurred to Motor Vehicle Occupants, a category which includes both drivers and passengers (Figure 35). Passenger vehicles are the most common type of registered motor vehicles on the roadway, accounting for 66 percent of registrations in BC between 2000 and 2008 (ICBC). Collisions can involve multiple passenger vehicles, which in turn often are each transporting more than one occupant, so it is not unexpected that this group was associated with higher numbers of deaths when compared to users of the other vehicle types.

Pedestrians accounted for 19 percent of fatalities and 13 percent of hospitalizations arising from motor vehicle mishaps. Pedestrian safety and survival is very much driver dependent - not only on human factors such driving distracted/confused/under the influence but also on road-related factors such as exceeding the posted speed, especially in school and playground zones.

Figure 35: Motor Vehicle Transport Related Fatalities by Transport Type, VIHA, 2000-2008

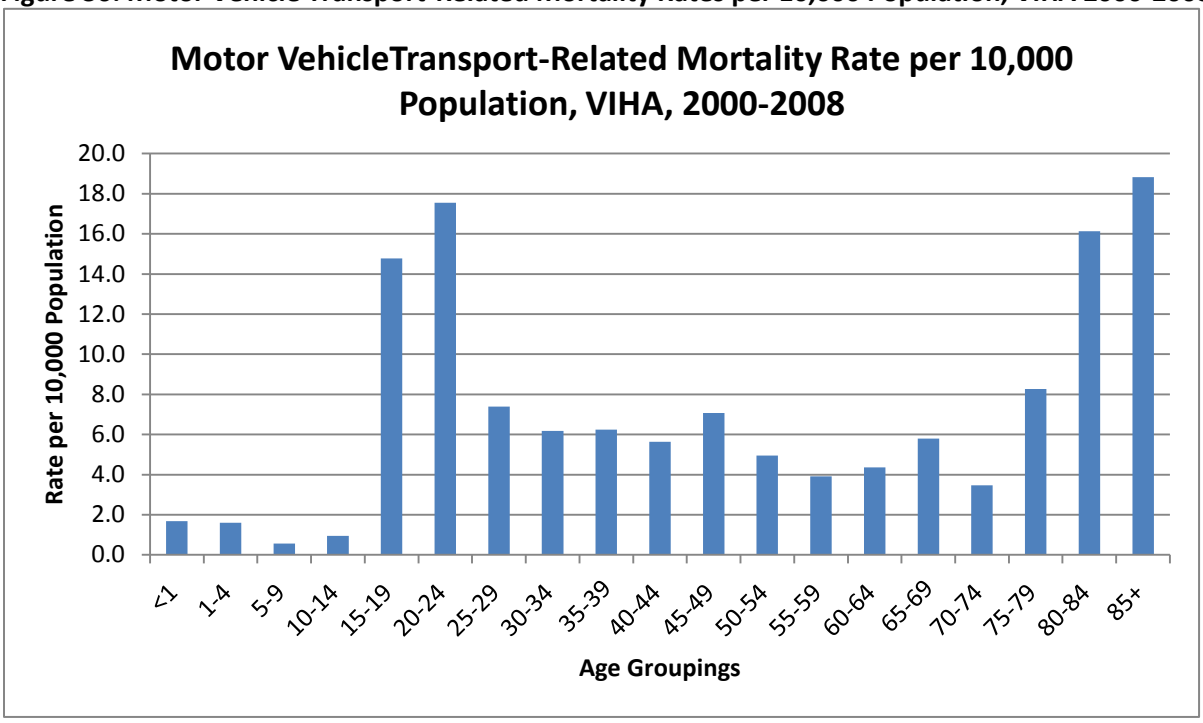


9.1.3 Fatalities by Age and Gender

Males are much more likely to be killed or injured as the result of a transport incident involving a motor vehicle than females. Between 2000 and 2008, the ratio was 2.5 male deaths for every female fatality for all four wheeled vehicles, with even higher ratios for motorcycles, off-road vehicles, and bicycles.

Youth and seniors are at a higher risk of being injured or killed in a motor vehicle mishap (Figure 36). Transport-related mortality rates for motor vehicles follow a “U-shaped” distribution with higher rates for youth aged 15-24 years and seniors above the age of 75 years.

Figure 36: Motor Vehicle Transport-Related Mortality Rates per 10,000 Population, VIHA 2000-2008

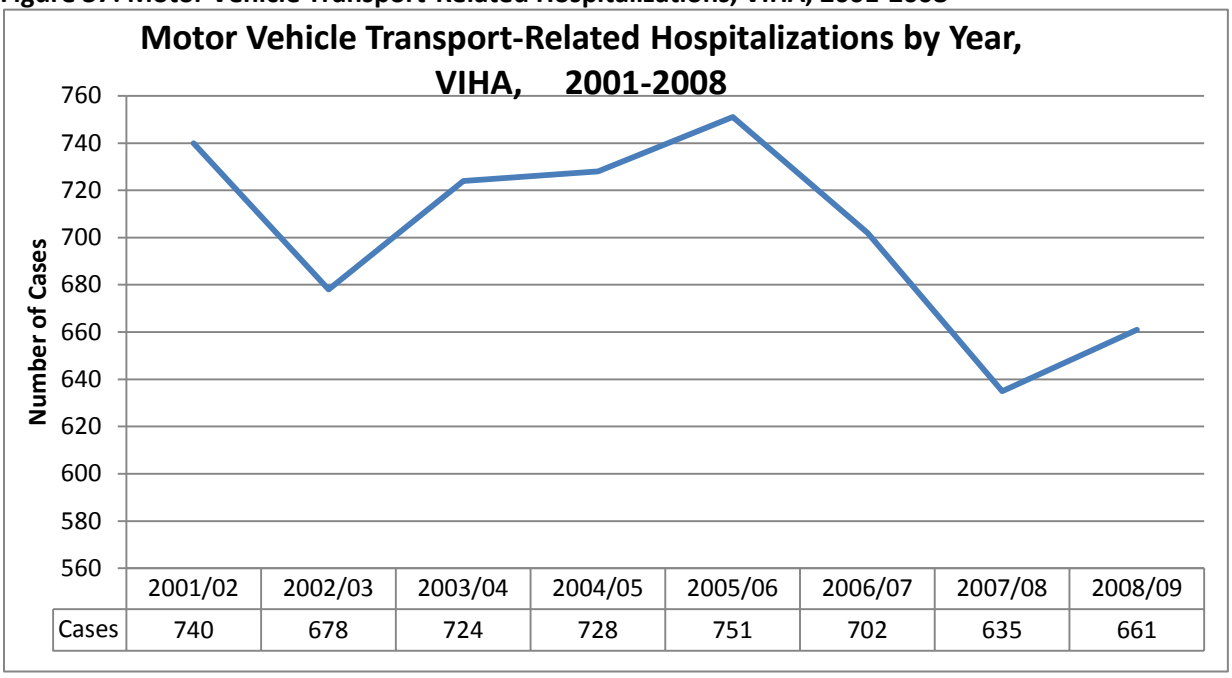


10 Motor Vehicle Transport-Related Hospitalizations

10.1 Motor Vehicle Transport Related Hospitalizations in VIHA by Year

Motor vehicle transport-related hospitalizations displayed a recent downward trend, diminishing by 11 percent between 2001 and 2008 (Figure 37).

Figure 37: Motor Vehicle Transport-Related Hospitalizations, VIHA, 2001-2008



	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Cases	740	678	724	728	751	702	635	661

10.1.1 Hospitalizations by HSDA and LHA

Between 2001 and 2008, the number of motor vehicle transport-related hospitalizations tended to be highest in the more populous South Vancouver Island (Figure 38). However, the hospitalization rates per 10,000 population were greater in North and Central Island.

Figure 38: Motor Vehicle Transport-Related Hospitalizations, VIHA HSDA

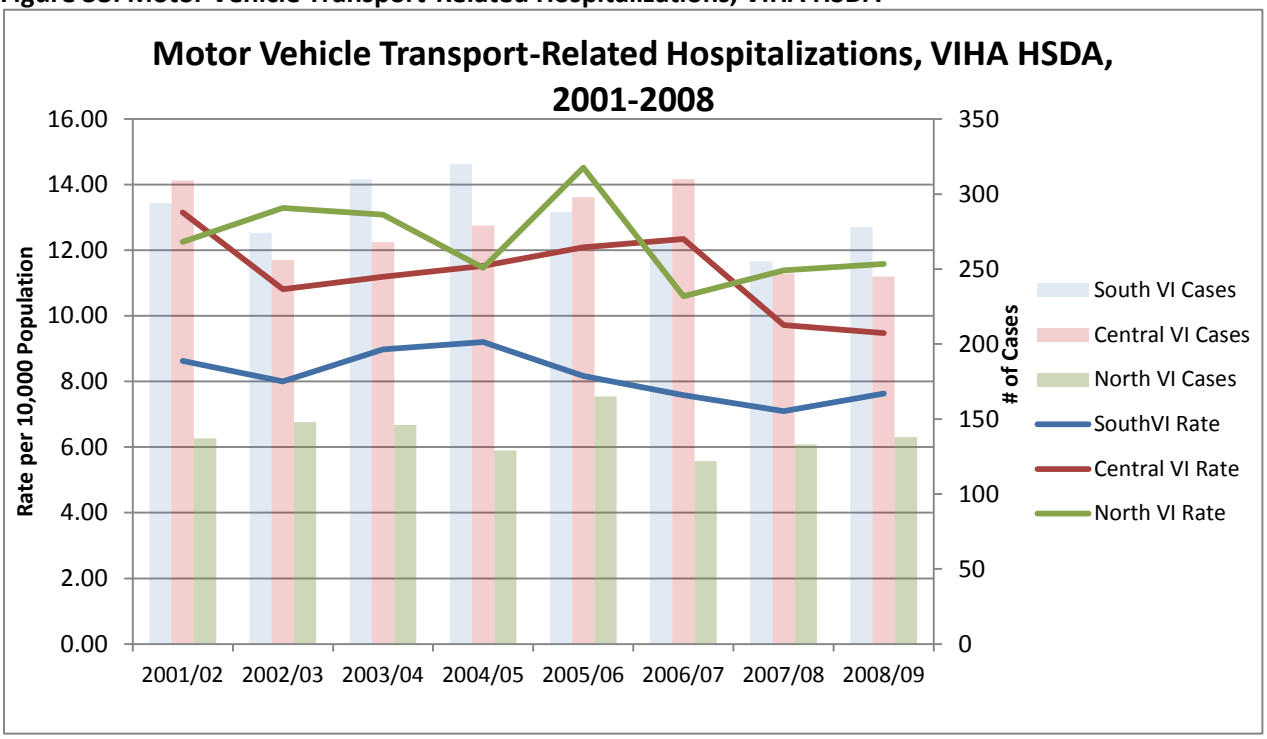


Figure 39 illustrates motor vehicle transport-related hospitalizations by local health area (LHA) in VIHA between 2000 and 2008 and Figure 40 shows the hospitalization rates by LHA. As seen at the HSDA level, the largest number of hospitalizations tended to occur in the largest LHAs. The highest hospitalization rates, however, were in more rural LHA's (e.g. Vancouver Island North, Alberni, Lake Cowichan and Gulf Islands).

Source: Saanich Police TSU

"Collisions can be very resource intensive, especially if the entire road has to be shut down for a collision. It can be frustrating as the general public sometimes forget and think it is "just a crash" and forget that is a crime scene. They don't think that it could be someone's son or daughter that has been killed. If this was someone you knew, you would want us to do a thorough investigation. You would be horrified if we hadn't reviewed the entire scene and taken the time to do a good job."

- Saanich Police TSU

Figure 39: Transport Related Hospitalizations, VIHA LHA and HSDA, 2001-2008

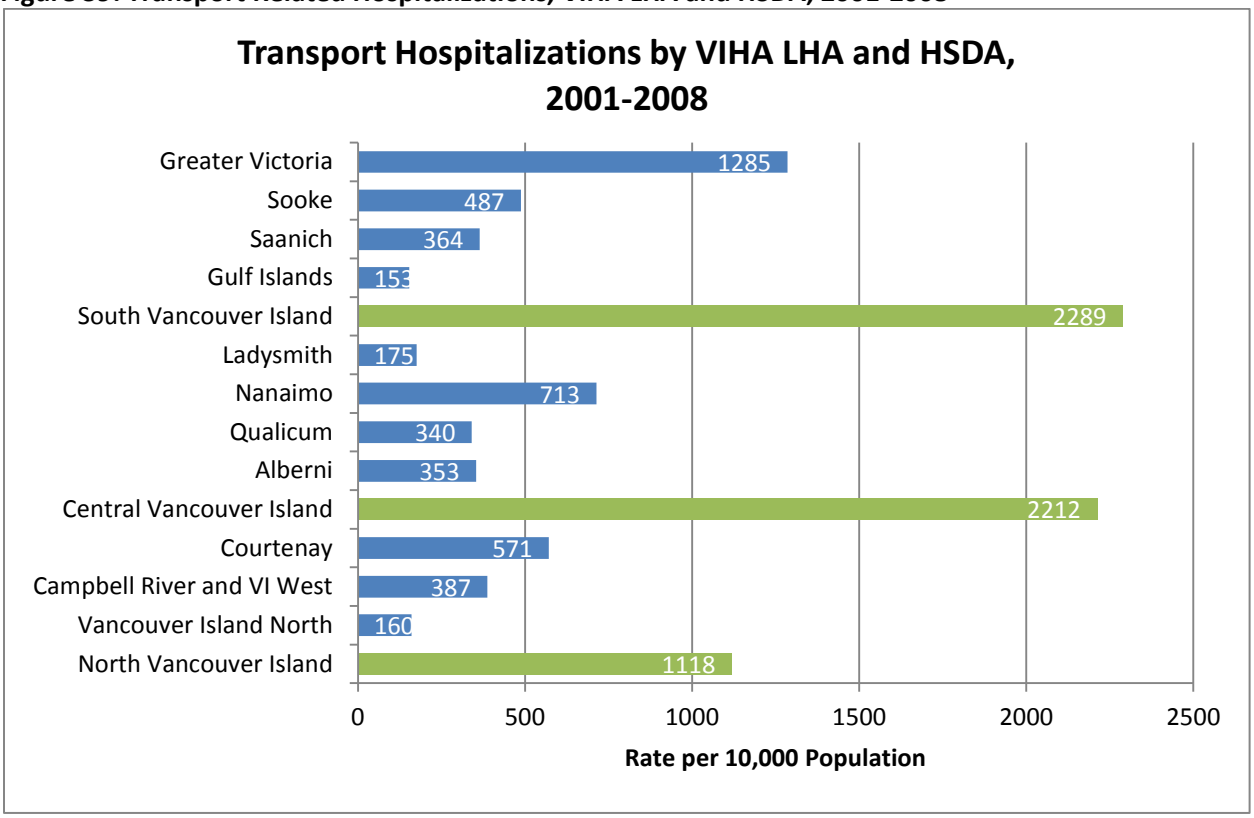
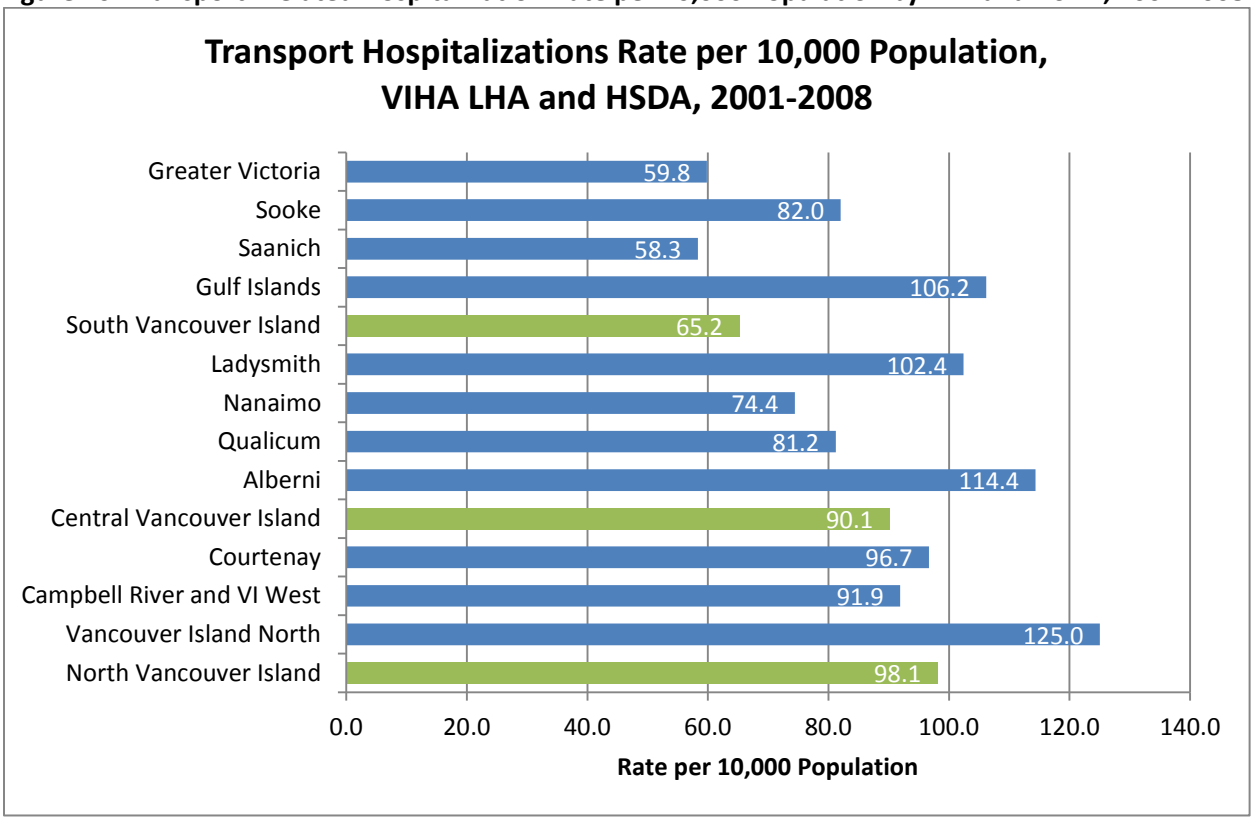
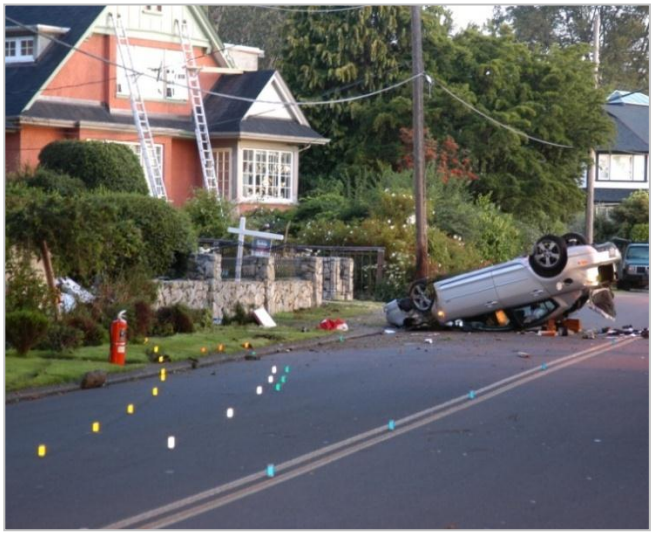


Figure 40: Transport- Related Hospitalization Rate per 10,000 Population by LHA and HSDA, 2001-2008





Source: Saanich Police TSU

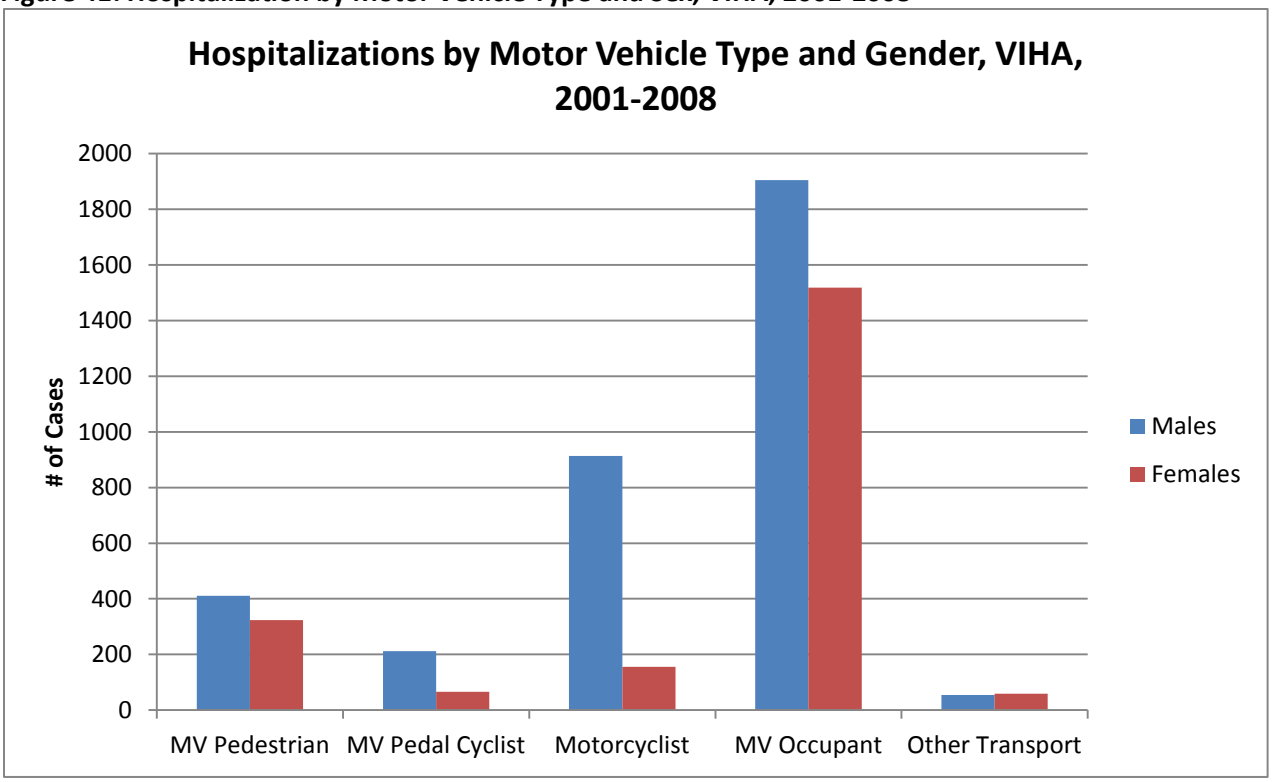
"When a car tracks sideways it leaves marks on the road that are called "Yaw Marks". It is an aeronautical term as the vehicle is basically rotating around a mass. For the nighttime, we have reflectors and we have different colors for different tire marks so we can see the movement of the car."

- Saanich Police TSU

10.1.2 Hospitalizations by Motor Vehicle Type

The majority of motor vehicle transport-related hospitalizations in VIHA between 2001 and 2008 involved Motor Vehicle Occupants. Males were considerably more likely to be hospitalized as a result of a pedal-cycle or motorcycle collision than females. Hospitalizations resulting from collisions involving pedestrians and motor vehicle occupants were more evenly distributed between males and females (Figure 41).

Figure 41: Hospitalization by Motor Vehicle Type and Sex, VIHA, 2001-2008

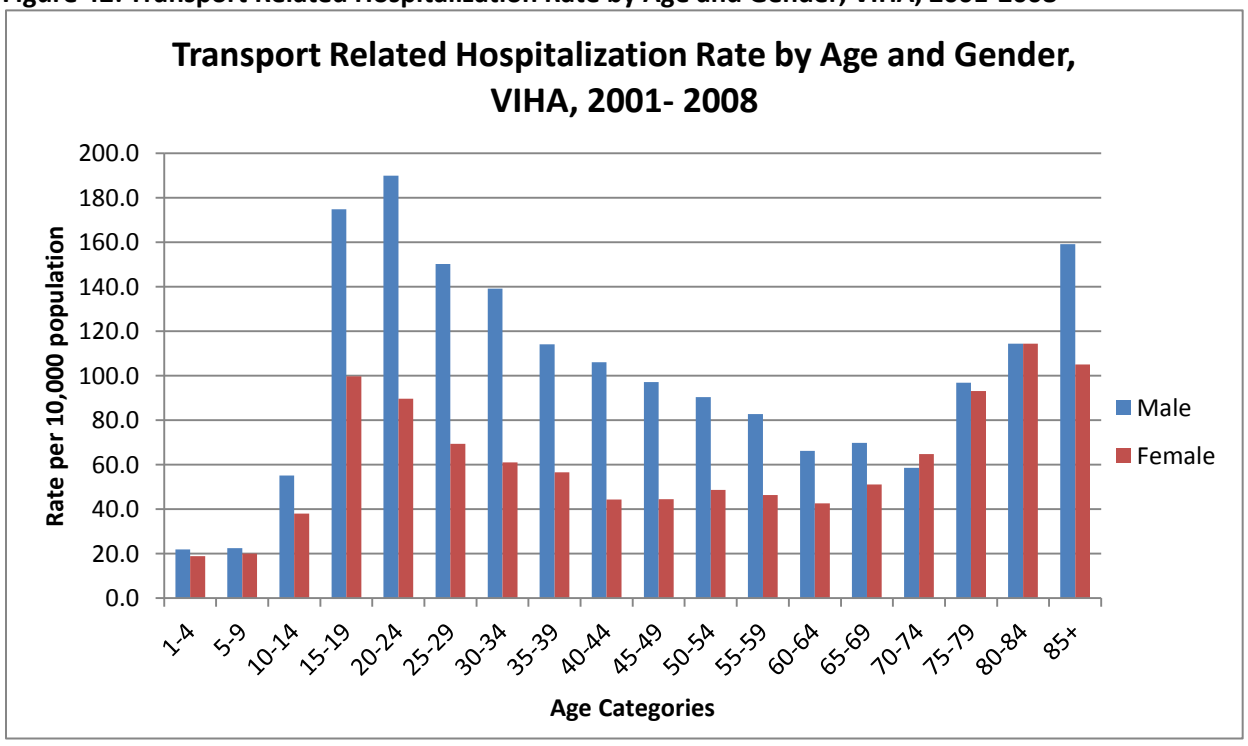


10.1.3 Hospitalizations by Age and Gender

As seen with fatalities, motor vehicle transport-related hospitalization rates follow a "U-shaped" distribution, with higher rates for youth aged 15-24 years and seniors above the age of 75 years (see Figure 42).

The rate of hospitalization for males exceeded those for females in most age groups, especially so for those in their late teens and early twenties. With increasing age, the ratio between males and females decreased.

Figure 42: Transport Related Hospitalization Rate by Age and Gender, VIHA, 2001-2008



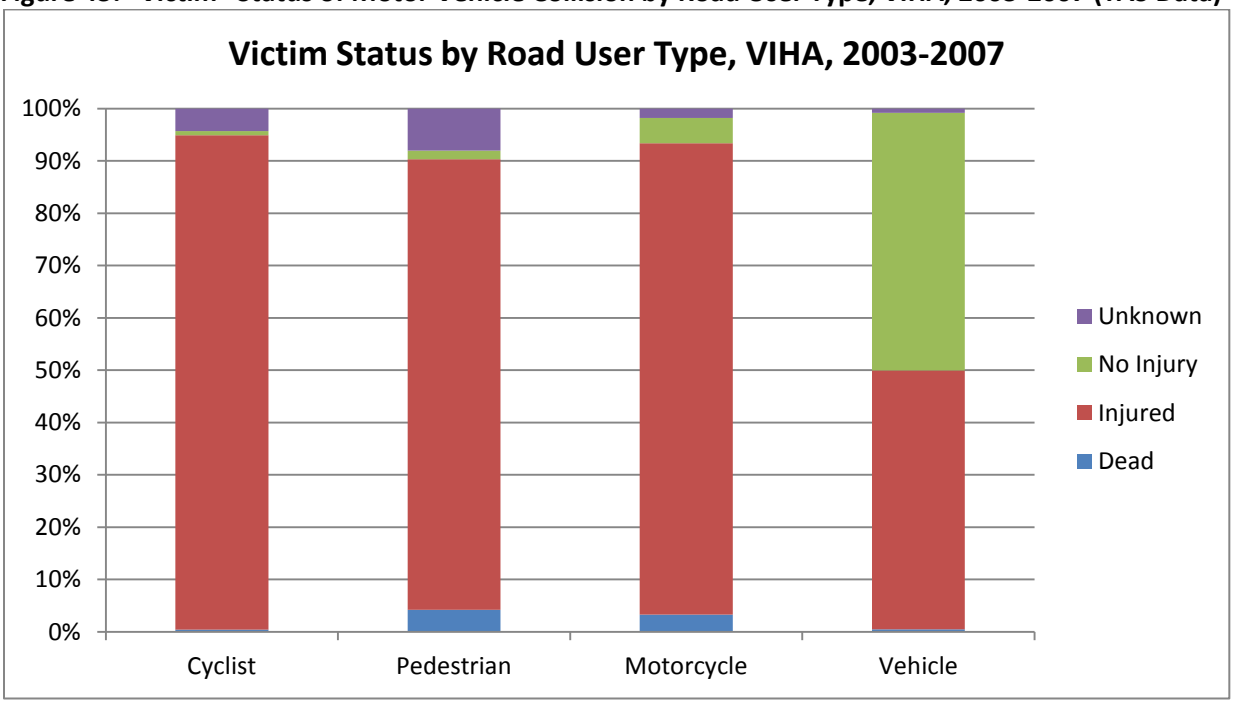
Source: Saanich Police TSU

11 Vulnerable Road Users

Pedestrians, cyclists and motorcyclists are considered *vulnerable road users* and are at higher risk for serious injury or death when compared to individuals travelling in motor vehicles. Unlike cars, they lack a physical barrier or protective "shell" against objects or other motorized vehicles in their roadway environment.[12] Figure 43, a summary of the different modes of transportation employed by "victims" serves to affirm the increased risk. It demonstrates that a higher proportion of collisions involving cyclists (94.5 percent), pedestrians (86 percent) and motorcyclists (90 percent) result in injury as compared to vehicle occupants involved in mishaps (49.5 percent). Similarly, 3.3 percent of motorcyclists and 4.2 percent of pedestrians involved in motor vehicle collisions died compared to 0.5 percent of motor vehicle occupants.

Source: Saanich Police TSU

Figure 43: "Victim" Status of Motor Vehicle Collision by Road User Type, VIHA, 2003-2007 (TAS Data)



[12] Transport Canada, *A Quick Look at Fatally Injured Vulnerable Road Users*, Fact Sheet. June 2010. Road Safety and Motor Vehicle, Regulation Directorate (http://www.tc.gc.ca/eng/roadsafety/menu.htm)

From TAS data (reports from police-attended collisions), the percent of collisions involving vulnerable road users that were fatal varied by health area (Figure 44). This increased rate was most notable in the North Island for motorcyclists and Central Island for pedestrians. While these numbers may be influenced by geographic variations in police response to minor collisions, there may also be underlying factors that increase the risk for vulnerable users in some areas more than others.

Figure 44: "Victim" Fatality by Road User Type and VIHA HSDA, 2003-2007 (TAS Data)

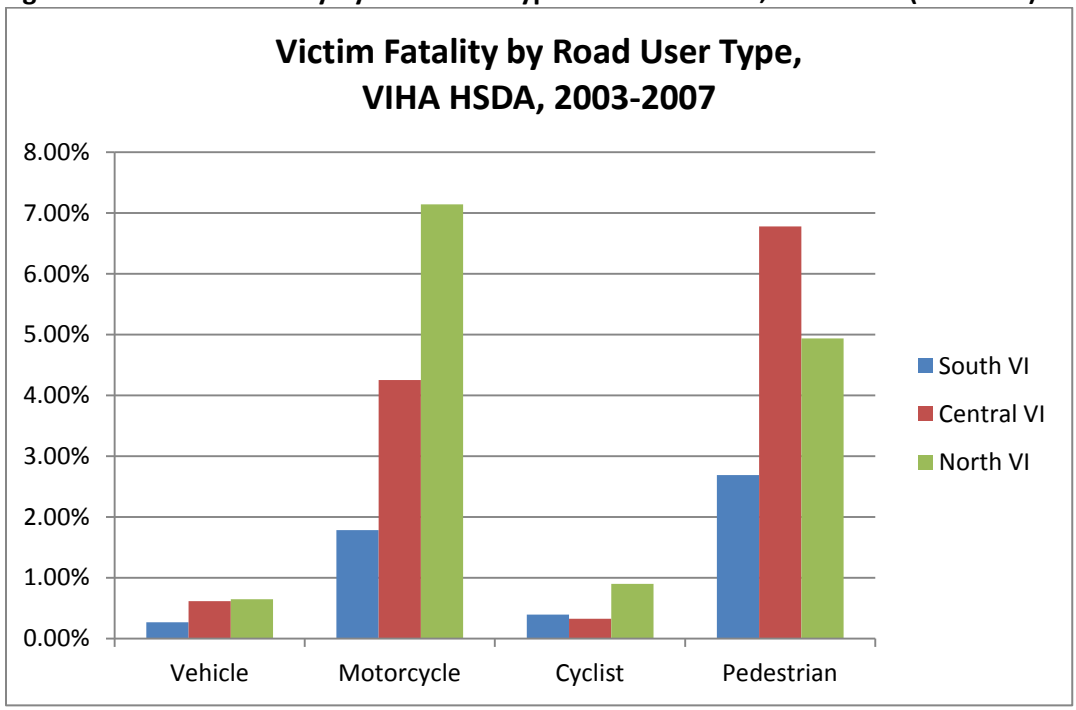
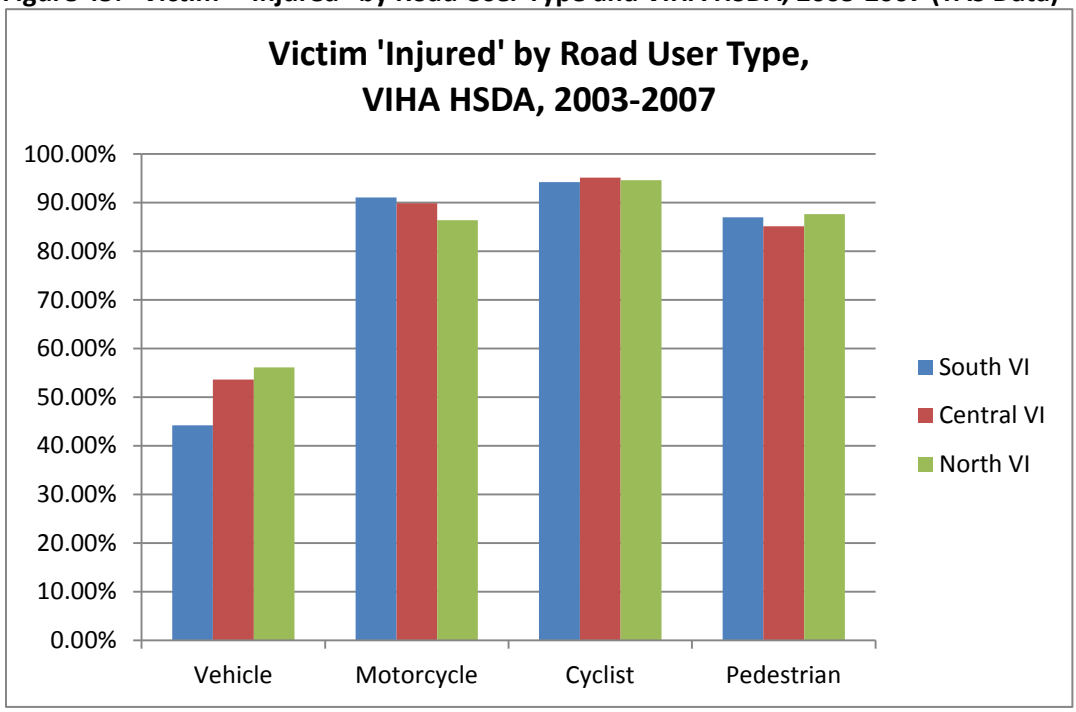


Figure 45: "Victim" "Injured" by Road User Type and VIHA HSDA, 2003-2007 (TAS Data)



11.1 Contributing Factors in Motorcycle Collisions

Table 17 shows speed related factors being the second highest contributor in motorcycle crashes (7.4%) closely followed by Driver Error/ Confusion (6.9%) with alcohol being the fourth highest factor cited (4.8%).

Table 17: Contributing Factor in Motorcycle Collisions by Driver

Primary Contributing Factor	#	%
Driver Inattentive	98	9.8%
Speed Related	74	7.4%
Driver Error/Confusion	69	6.9%
Alcohol Related	48	4.8%
Wild Animal	42	4.2%
Road Condition (ice,snow,slush,water)	32	3.2%
Obstruction/Debris On Road	29	2.9%
Avoiding Veh./Ped./Cycle	25	2.5%
Driving Without Due Care	25	2.5%
Following Too Closely	25	2.5%

"In motorcycle courses I teach people to ride like people are trying to kill them. Having the skills and ability to protect yourself is extremely important. Even if the motorcyclist is following rules of the road, other people may not but it is the motorcyclist who will suffer the consequences."

Saanich Police TSU

11.2 Socio-Economic Status and Pedestrian Injuries

A study of pedestrian injury in Vancouver found that people living in lower socioeconomic status (SES) neighbourhoods were more likely to become "victims" of pedestrian trauma than those living in higher SES neighbourhoods. Furthermore, pedestrian injuries were more likely to occur in lower SES neighbourhoods, regardless of the neighbourhood in which the "victim" resides.[13] This latter finding may be a function of higher speeds and more four and even six lanes of roadway in these neighbourhoods. These streets that often serve as pass-throughs to more affluent areas are challenging to all pedestrians crossing in poorer SES neighbourhoods and can be found in many town and cities across the province.

Source: Saanich Police TSU

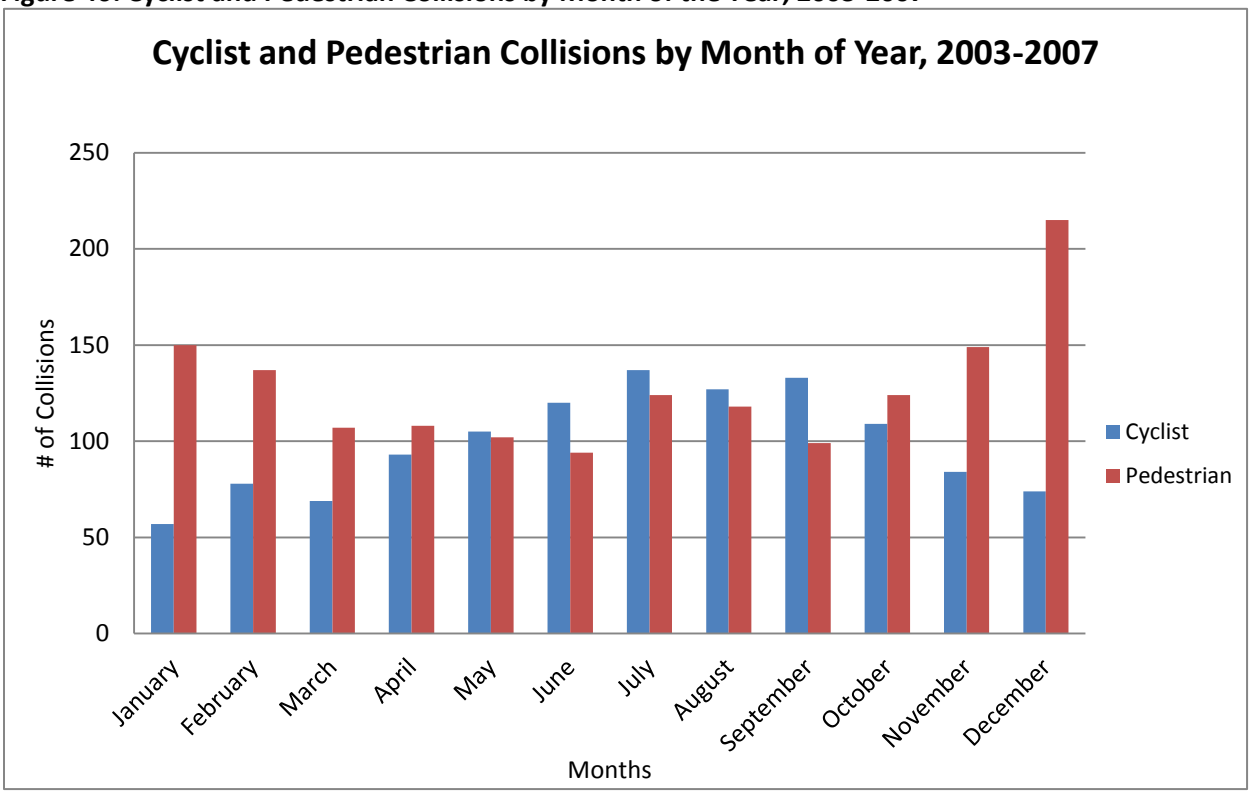
11.3 Cyclist and Pedestrian Collisions by Month, 2003-2007

Figure 46 illustrates the monthly variation in the number of collisions that involved cyclists and pedestrians. The data suggests that pedestrians are at higher risk of being involved in a collision during the winter months when the hours of daylight are less and there is an increase in wet weather. During these times street lighting is more frequently relied upon by motorists, but it is becoming increasingly important that pedestrians/cyclists be clearly visible. Collisions involving cyclists were highest from June until September. This is likely a function of more cyclists taking advantage of the better weather and longer hours of daylight.

"We attended a scene where a pedestrian was struck and was wearing dark clothing, walking at night. We can see from the point of impact where the pedestrian was hit. The person was wearing non-reflective clothing on a wet and raining night." Saanich Police TSU

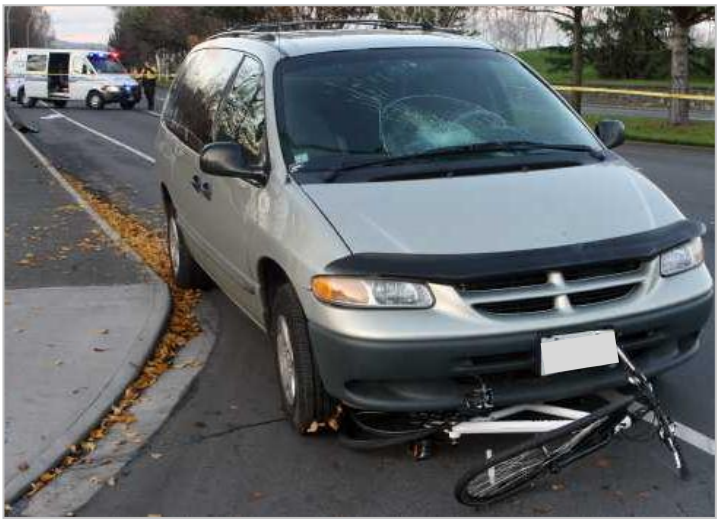
[13] S.E. Lord, MD, et al. Vulnerability to pedestrian trauma: Demographic, temporal, societal, geographic, and environmental factors-Ongoing epidemiological and geospatial surveillance can provide data for formulating injury-prevention policy. BC Medical Journal, Vol.52. No.3., April 2010

Figure 46: Cyclist and Pedestrian Collisions by Month of the Year, 2003-2007



12.4 Helmet Use by Cyclists

Helmets reduce the likelihood of severe head injuries should a cyclist be involved in a collision.



Source: Times Colonist

Helmet use is mandatory in BC for cyclists, but rider compliance with helmet use when cycling is highly variable. There were a total of 327 cyclists representing 27 percent of riders involved in collisions between 2003 and 2007 who were not wearing helmets at the time of the collision (Table 18). Helmet use also appears to be influenced by age and gender of the "victim" involved in the collision (Table 19) with males being less compliant. Bicyclists in their late teens and early twenties also showed a lower rate of helmet use. A comparison between recreational and commuter cyclist helmet use was not available.

Table 18: Helmet Use by Cyclists Involved in Collisions (TAS Data) by HSDA, VIHA, 2003-2007

	South Vancouver Island	Central Vancouver Island	North Vancouver Island	**Total**
Helmet	499 (78%)	129 (48%)	44 (47%)	**672**
No Helmet	140 (22%)	138 (52%)	49 (53%)	**327**
Total	**639**	**267**	**93**	**999**

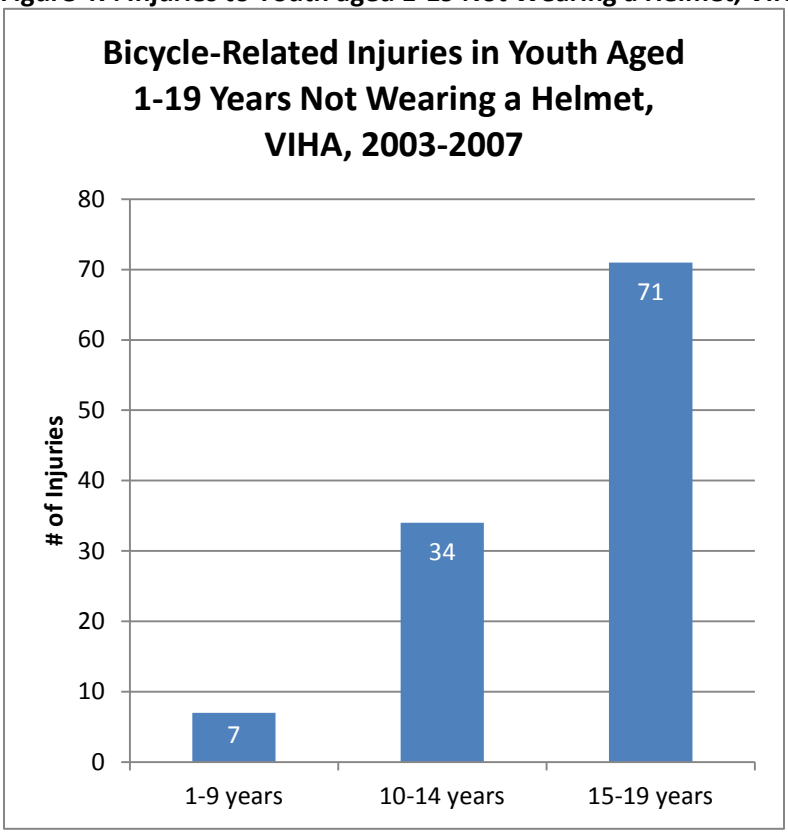
Table 19: Safety Equipment Use by Cyclists involved in Collisions (TAS Data) by Age and Gender, VIHA, 2003-2007

Gender	**Equipment Use**		**1-9 years**	**10-14 years**	**15-19 years**	**20-24 years**	**25-44 years**	**45-64 years**	**65-79 years**	**80+ years**
Female	Helmet	%	44.4%	72.7%	46.2%	55.2%	71.1%	78.6%	71.4%	-
	No Helmet	%	22.2%	18.2%	43.6%	23.9%	15.7%	7.1%	14.3%	-
	Unknown	%	33.3%	9.1%	10.3%	20.9%	13.2%	14.3%	14.3%	
	Total	#	**9**	**22**	**39**	**67**	**121**	**56**	**7**	-
Male	Helmet	%	61.9%	61.6%	32.2%	38.9%	54.3%	65.1%	60.9%	100.0%
	No Helmet	%	23.8%	29.5%	49.6%	44.4%	29.1%	18.2%	17.4%	0.0%
	Unknown	%	14.3%	8.9%	18.3%	16.7%	16.7%	16.7%	21.7%	0.0%
	Total	#	**21**	**112**	**115**	**90**	**282**	**192**	**23**	**6**

Not wearing a helmet is an issue at any age. A middle-aged male was riding his bicycle on a quiet residential street and was not wearing a helmet. He rode over a stone no more than one inch in diameter, lost control of his bicycle and fell to the ground, striking his head on the curb. He sustained a significant head injury which has left him brain damaged. He will require life-long supportive care. It is a tragedy for everyone involved. Police found the small stone involved at the scene of the mishap and will use it as a reminder of why it is important to wear a helmet. - VicPD

Figure 47 below shows that injuries continue to occur among young cyclists within VIHA who are not wearing helmets, particularly for adolescents.

Figure 47: Injuries to Youth aged 1-19 Not Wearing a Helmet, VIHA, 2003-2007



12 Economic Impact of Crashes

On average, annual transport-related hospitalizations from motor vehicles cost $7.8 million for the island, with a grand total of over $63 million incurred during the eight year period from 2001 until 2008. However, the full impact is much more extensive. These figures only capture the cost of hospital stays; they do not include the costs associated with longer term rehabilitation, physician visits in the community, additional treatments, and emergency care. No opportunity costs are associated with untimely deaths. Moreover, the indirect costs associated with lost wages, family or institutional care for permanent disability and the psycho-social impact on the "victim" and their families are significant and are not reflected in these figures. The impact on human potential is amplified for youth who are also the population at the highest risk of being hospitalized from transport-related incidents involving motor vehicles.

Table 20: Transport Related Hospitalization Costs, VIHA, 2001-2008

Year	Cost
2001/02	$7,089,476.51
2002/03	$6,412,886.08
2003/04	$8,762,761.78
2004/05	$8,391,473.32
2005/06	$9,107,764.30
2006/07	$8,049,422.36
2007/08	$6,943,517.54
2008/09	$8,361,449.93

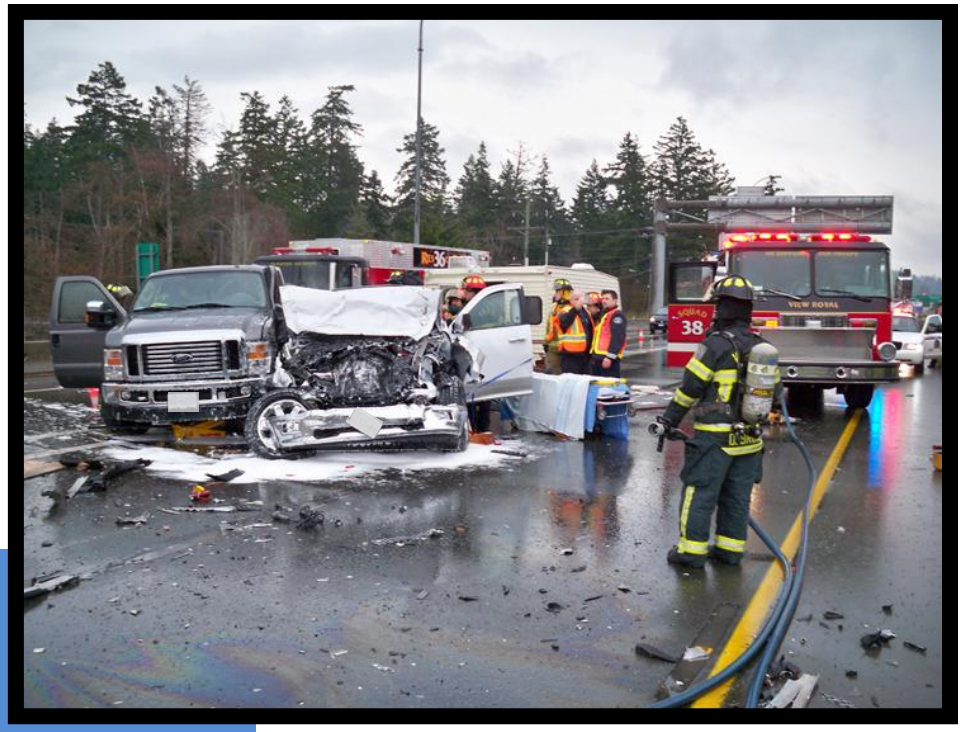
A Transport Canada report released in 2007 estimated the social costs of traffic collisions in British Columbia to be $8.8 billion a year. This figure takes into account both direct health care costs and the indirect costs previously mentioned.[14]

Source: Saanich Police TSU

A woman who dropped some money at a McDonald's drive thru over the weekend suffered serious injuries when she tried to retrieve it. The woman, who was driving a van, opened her door to pick up the money from the ground, said Comox Valley RCMP in a news release on Tuesday. But her foot released from the brake, sending her van forward, pinning the woman between the wall and the vehicle's door. "The Comox Valley RCMP is reminding drivers to be cautious at all times when operating a vehicle. Placing your vehicle in park when taking part in possibly distracting activities is highly recommended," said Const. Nicole Hall. **Staff Writer - Comox Valley Record**

[14] Analysis and Estimation of the Social Cost of Motor Vehicle Collisions in Ontario, Transport Canada, August 2007, Final Report: http://www.tc.gc.ca/media/documents/roadsafety/TP14800E.pdf

SECTION IV - SUMMARY AND RECOMMENDATIONS



13 What is being done?

VIHA Activities

VIHA has a strong interest in road safety because traffic-related injuries have a large influence on the health and wellbeing of our population. The Health Authority works to prevent injuries and promote road safety in the following ways:

- Surveillance: VIHA has a mandate to monitor health and other relevant data in order to identify factors that are contributing to health either in a positive or a negative way. This Motor Vehicle Collision Report provides evidence based insights into the issue. Beyond being of value to VIHA, it is hoped that readers may also gain an understanding of the importance of traffic related injuries on our island and an appreciation of how, why, when and how the events occur. Surveillance data is collected to underscore the role inequity play in both the frequency and severity of these events as well as establish priorities areas for action and mitigation for the entire population.

- Advocacy: Public health personnel promote and provide the evidentiary base for strategies that will improve health. Public health advocates are expected to bring forward recommendations for changes in laws, policies, practices or standards to improve health. Public health advocacy has a long tradition of improving road safety and reducing injuries through the promotion of, at times, controversial health public policy in this arena.

- Community Capacity Building: VIHA has a responsibility to work with communities in order to ensure that members can address factors affecting their health. From time to time, communities may be in the best position to identify solutions to traffic and injury related problems that affect their collective health. The health authority can engage and, at times assist, communities in this process.

- Education: Every day, health authority staff help individuals and groups to learn about ways they can improve their health. Health education is an important ongoing activity that informs people about what they can do to reduce their risk of injuries related to motor vehicle collisions. Moreover, if the perceived benefits are great enough, support making mandatory many of these activities.

The following are examples of initiatives that VIHA has been involved in, using the above listed strategies (singularly but often in combination) to promote road safety and reduce injuries.

13.1 Promoting Dry Grad Events

In 2006, VIHA awarded the CRD Traffic Safety Commission (TSC) a $65,000 grant for a project to encourage teens and young adults to celebrate the end of school and the beginning of summer without drinking and driving. The TSC directed $20,000 of the funding to island secondary schools for dry grad events. Each school received up to $500 toward food, music or other expenses of safe graduation activities. The remaining $45,000 was used to produce a hard-hitting campaign to combat drinking and driving on rural and logging roads on Vancouver Island. Targeting teens and young adults, the campaign included signage on back roads where partiers tended to congregate, posters in drinking establishments and public service announcements on radio stations that have large youth audiences. There were no fatalities recorded with graduation events that year or on back roads or bush parties in June and July.

13.2 Child Safety Restraints

Child safety restraints save children's lives and prevent serious injury when installed and used properly. One measure of effectiveness in reducing harm is reflected in our provincial government making the use of these devices mandatory. An infant seat is required for children under one year of age, a rear facing car seat for children up to 14 kg, a forward facing car seat for children up to 22 kg, and a booster seat until the child turns 9 years.

VIHA public health nurses make new parents of babies aware of the importance of safely transporting their infants and how to do it. A number of partner agencies also help parents with growing families ensure that their children safely restrained at each stage of their maturation.

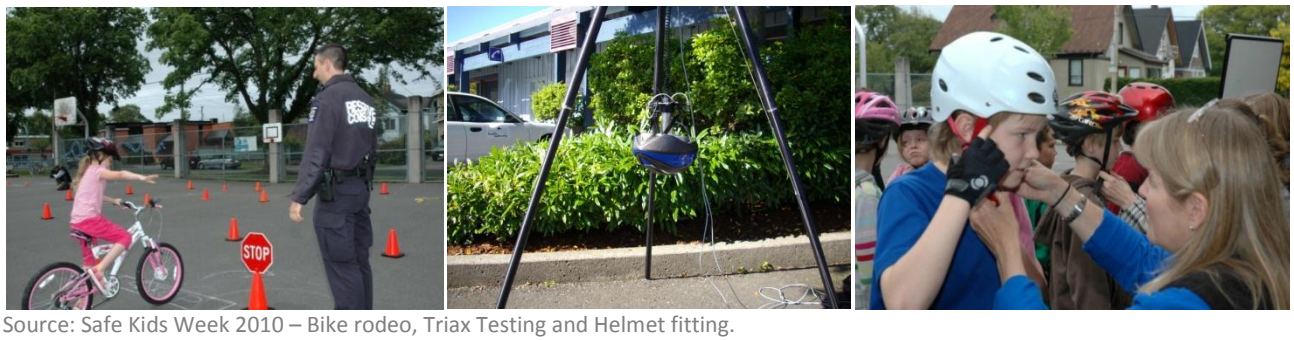
Source: St. John Ambulance www.sja.ca

Purchasing safety equipment can be a financial strain on families, especially those with limited or fixed incomes. However, the cost of a life saving seat is less than the cost of one tank of gasoline and less than a ticket for not safely securing your child. Alternatives, such as buying a car seat at garage sales, may be a false economy. Such seats may have been in a crash and sustained serious damage. This significantly reduces its ability to protect the occupant, yet show no visible signs of such structural failure. Car seats also come with an expiry date and should be destroyed after that date, not re-sold. Programs to assist families in need with purchasing approved seats have been well received by the community in the past but are subject to the foibles of funding for such projects. Private rentals are available but are not cost-effective long term.

13.3 Bicycle safety and helmet use

Bicycle helmets save lives and their use is legislated for all ages in BC. Nevertheless, some children, adolescents and adults continue to ride without a helmet. Public health, along with other partners, has striven to educate children, families and groups about proper bicycle helmet selection, fitting and use. Helmet promotion takes place at a variety of venues including bike rodeos, bike-to-work week, and during Safe Kids Week.

Safe Kids Week was the largest annual national child injury prevention awareness campaign in the country, brought to Canadians by Safe Kids Canada. VIHA Public Health has participated in this event for the last eight years with sole purpose of providing key child injury prevention messages to the public through interactive safety demonstrations that garner extensive media coverage. The events have involved collaboration by the Office of the Chief Medical Health Officer, Public Health Nursing, and Community Care



Source: Safe Kids Week 2010 – Bike rodeo, Triax Testing and Helmet fitting.

Facility Licensing with, among others, children, parents, Parent Advisory Councils, teachers and principals from elementary schools, the Capital Regional District (CRD) Traffic Safety Commission, elected official at

both the municipal and provincial levels of government, local police and RCMP, the media and local bicycle shops. For the year bicycle helmets were featured, the police sponsored a bike rodeo at each of the schools participating in the event and included a helmet fitting station as part of the festivities. VIHA public health staff demonstrated to attendees the effectiveness of helmets at preventing head injuries by actually measuring the traumatic forces involved in falling on a hard surface with and without protection.

The Triax devise used measures surface impacts using a head form and a computer and records the Head Injury Criteria (HIC) associated with surfacing material. The HIC provides an estimate of the relative risk of head injury. During the Safe Kids event, no protection along with different types of head gear ranging from a hoodie, a pink Halloween wig to a proper bicycle helmet were used in the demonstration. A head form relying on these different levels of protection was dropped on to the same hard, unforgiving surface. The school children collectively predicted, as a CSI investigative team, whether a serious injury would occur. The display illustrated conclusively to all in attendance that only an approved bicycle helmet could protect your brain from injury.

13.4 The Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y) Program

The Prevent Alcohol and Risk-Related Trauma in Youth Program (P.A.R.T.Y.) is an injury prevention program that is presented at hospitals across Vancouver Island. The Program P.A.R.T.Y. is funded through sponsorship by the Vancouver Island Autoplan Brokers, the Vancouver Island Health Authority, community businesses and private donations. Program partners also include ICBC, Nanaimo & District Hospital Foundation, police, RCMP, BC Ambulance Service, First Memorial Funeral Services, post secondary institutions and school districts.

Source: Saanich Police TSU

Several days per month during the school year, groups of grade 10 students tour a hospital for 3 ½ hours to learn about real life physical trauma from those who witness it firsthand. The students meet medical professionals, public safety experts and crash survivors as they experience the pathway a seriously injured patient follows, from the crash site through to rehabilitation.

This reality education provides graphic information to young people. The intent is to enable the participants to recognize potential injury producing situations, to make informed prevention choices and to adopt behaviours that could minimize injury risk.

Students learn that crashes are not accidents and crash related injuries can be avoided. The consequences of not wearing a seat belt, operating a motor vehicle under the influence of drugs or alcohol and speeding include permanent brain injury, spinal cord injury, burns, paralysis and death.

B-Other Regional and Provincial Activities

A variety of organizations share VIHA's goal of reducing motor vehicle collisions and their associated consequences. Most of these initiatives are based out of the South Island, or out of larger urban centres, therefore they may not be reaching individuals residing in rural areas. The following section highlights a few of these programs.

13.5 Regional Initiatives- Capital Regional District Traffic Safety Commission

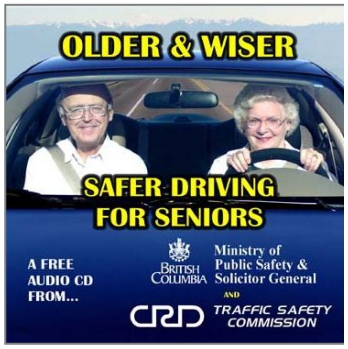
The Capital Regional District (CRD) Traffic Safety Commission (TSC) is a multi-disciplinary team comprised of representatives from a number of organizations and municipalities in the region, including Office of the Chief Medical Health Officer, Registrar of Motor Vehicles, Area Police Chiefs, the School Districts, the media, the University of Victoria, police, RCMP, ICBC, Municipalities, traffic planners, BCAA Traffic Safety Foundation, VIHA Public Health Nursing, members of the Integrated Road Safety Unit, and the Coroner's Office. The CRD TSC was founded in 1985 to create a results-oriented community-wide approach to the broader issues of traffic safety, including engineering and education as well as enforcement. The TSC operates under the auspices of the CRD Board and one elected representative from the CRD Board is appointed to the TSC annually. The goal of the TSC is to "*prevent injuries, save lives and contribute positively to a safer traffic environment*," by:

- Improving traffic safety conditions in the Capital Regional District.
- Undertaking projects aimed at reducing the frequency and severity of traffic collisions and working to positively influence the behaviour of all road users.
- Increasing community awareness of the CRD TSC, allowing it to be recognized as an authoritative body on traffic safety matters.
- Identifying the frequency and severity of traffic collisions within the region.
- Developing comprehensive programs - education, enforcement, engineering, and policy.
- Making public statements to appropriate bodies on matters of concern to the CRD TSC.
- Assessing the results of traffic safety programs.
- Encouraging and supporting community partnerships which further the goals of the TSC.

As VIHA's Chief Medical Health Officer and a VIHA Public Health Nurse are members of the multi-disciplinary team, the health authority is actively involved in the creation, design and implementation of the many programs and initiatives that are conducted by the TSC.

The following are some examples of CRD TSC initiatives:

Older & Wiser Driver: In 2003, the TSC co-developed a program with the University of Victoria's Centre on Aging, titled: "The Older & Wiser Driver: A Self-Assessment Program." Ninety-three older drivers attended one of six driving self-assessment education sessions, which were arranged in collaboration with agencies serving seniors on the Saanich Peninsula. Senior drivers were asked what would make them safer drivers, and were given information packages including a 74 minute audio CD produced by the Commission with input from the RCMP and municipal police forces, ICBC, and the Centre on Aging. Participants reported that the information provided in the sessions could be useful in helping older adults talk about driving concerns with their families. In addition, many participants reported that as a result of attending the education session they planned to make changes to their driving behaviours. ICBC has taken the program province-wide.



Source: CRD Traffic Safety Commission

Be Seen and Not Hurt: The CRD Traffic Safety Commission developed a Visibility Campaign titled "Be Seen and Not

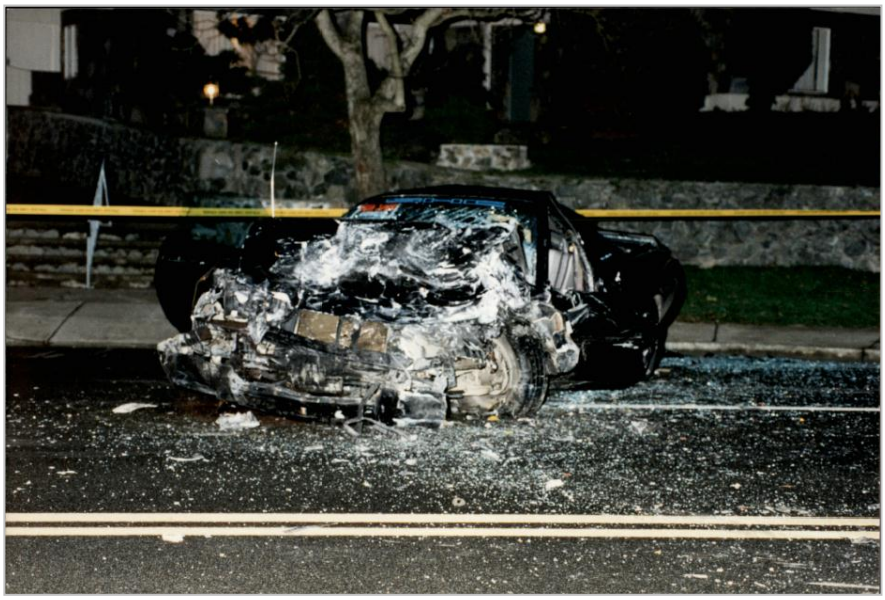
Source: CRD Traffic Safety Commission

Hurt" aimed at vulnerable road users – pedestrians and cyclists - in the Capital Region. The campaign, which was released in the fall of 2010 includes posters and other promotional material featuring messages reminding individuals to wear reflective materials when they are out cycling, walking after dark or out in poor weather. More examples of the promotional materials can be seen in *Appendix G*.

Stupid Distractions Campaign:
The issue of driver distractions has been the subject of a campaign by the Capital Regional District's Traffic Safety Commission for drivers young and old. The messages are carried on the side of a variety of vehicles including those belonging to VIHA, municipalities, University of Victoria and BC Transit.

Summer Malahat Safety Project:
The Malahat Drive is a 25 kilometre section of Highway #1 that runs along the west side of Saanich Inlet and is the only major paved connection between the CRD and the rest of Vancouver Island. The winding, steep route has gained a reputation for an increased risk of crashes, fatalities, and collision-related road closures.

During the summer of 2011, the CRD Integrated Road Safety Unit, a partner in the CRD TSC, undertook a summer safety project on the Malahat which included a notable increase in police presence, notice signs, and increased enforcement of violations, including speeding. During the campaign, no fatal crashes occurred and excessive speeding was reduced by thirty percent.


Source: Saanich Police TSU

(See *Appendix A* for more on our partners.)

14 RECOMMENDATIONS

1. **Need for ongoing data exchange to enable surveillance**

   Data used in this report provided insights into the occurrence of traffic related injuries and deaths on Vancouver Island. Some of the findings, such as time trends for collisions and variations in collision rates amongst local health areas, are a stimulus for further exploration. Other findings, such as those related to child safety restraints, identified opportunities for immediate and ongoing intervention and evaluation. When action does occur, either in the form of legislation or public education, an ongoing dependency on data is created. It is needed to determine if the intervention was successful or not. Moreover, to fulfill the function and role of monitoring the risks and impacts of motor vehicle collisions on health authority residents, accurate, reliable and timely data on an annual basis is a prerequisite. Challenges in meeting this obligation includes many of the data elements related to traffic injuries either not being readily accessible or not on an ongoing basis. As well, administrative databases related to collisions and traffic infractions are collected for purposes other than surveillance and health care consequences. Agreements must be worked out with these parties to enable a stable data transfer.

2. **Ongoing participation and coordination in regional committees (CRD Traffic Safety Commission) and work to create similar committees in other regional districts around emerging Road Safety Issues**

It is evident that the CRD Traffic Safety Commission has had success in the South Island region. Of concern, however, is that a disproportionate number of severe collisions are occurring in the Central and North Island. It is possible that much of the work done in the CRD increasing public education and awareness about road safety issues could be portable to other parts of the island. There is value in stakeholders coming together at a regional or local level to review priority road safety challenges and identify potential solutions. The Health Authority has an opportunity to build on the work of the CRD TSC to create similar geographically-based multidisciplinary teams. Where community safety committees already exist, it would be prudent to ensure that their mandate includes traffic safety and that all relevant stakeholders are included. Such endeavours would focus on engaging in established, evidence-based activities and programs already underway in the South Island that can be tailored to local community needs. These TSC's should not be concerned with administrative functions such as placement of stop signs and organizing School Patrols.

3. **Increase Promotional and Education Campaigns in areas of the Region witnessing high numbers of motor vehicle collisions, especially around the contributing factors of speed, alcohol, failure to wear seatbelts, and driver inattention**

Motor vehicle collisions are not evenly distributed throughout the health authority with some local health areas experiencing a disproportionately high rate of fatal collisions. VIHA should engage partners in these areas to adopt evidence-based, targeted campaigns and programs for higher risk populations such as younger drivers and mature drivers. Speed, alcohol, and driver inattention would be central themes in these prevention efforts given their significance as contributing factors in the collisions in this report. As identified earlier, surveillance findings can guide the selection of preventive programs, and ongoing data monitoring can help evaluate the effectiveness of these programs.

4. **Healthy Public Policy and Legislation Predicated on the Evidence**

Some of the most significant reductions in crashes and related injuries have been associated with enhancements to provincial legislation. As featured in this report, they have included legislation related to impaired driving, child safety restraints, graduated licensing, and distracted driving. Opportunities continue to exist for policy changes that could substantially reduce collisions and related injuries and deaths. Health

officials and other stakeholders have a role to play in identifying meaningful policy options and advocating for their adoption.

Speed, for example, plays a significant role in many severe collisions. Speed camera enforcement programs are in place in many jurisdictions outside of BC. A Cochrane Collaborative review concluded that these programs have demonstrated effectiveness at reducing injuries and fatalities caused by speed-related collisions. While speed camera enforcement had previously been in force in BC, the program ceased to operate in 2001. The potential to protect the health and safety of British Columbians and reduce fatalities could be realized through the re-introduction of a speed camera enforcement program in this province. Initially, it may be located in high crash areas only.

5. Collaboration with Municipal Engineers to Ensure Road Safety for Vulnerable User Groups

Transportation engineers commence their planning of community roadways with a diverse set of requirements and competing agendas. The need to ensure vehicle traffic flows smoothly, quickly and efficiently through an area may, at times, be at odds with safety concerns and liveable, walkable neighbourhoods. Vulnerable road users (pedestrians and cyclists and amongst them in particular the senior and youth segments of the population) are at a disproportionate risk of being seriously injured or killed in a collision with a motor vehicle. There is an opportunity to collaborate with transportation planners and engineers to ensure that road safety with vulnerable groups in mind is paramount in the planning and construction of road infrastructure as well as active transportation infrastructure and design exercises. This is especially true for lower socio-economic areas, where people living in these neighbourhoods are more likely to become victim of pedestrian trauma than those living in more affluent neighbourhoods.

6. Addressing socio-economic and cultural factors that contribute to risk.

Injuries, like other health outcomes, affect the poor more often. While not specifically explored in this report, other reviews have shown that traffic related injuries and deaths are more likely to affect those with lower income, lower education levels, and those from neighbourhoods characterized by lower socioeconomic status. This trend has been reported for both adults and children.

The reasons behind the socioeconomic gradient and injuries are complex and inter-related. Socioeconomic status is known to be correlated with stress associated with work and life circumstances. These stress levels have, in turn, been shown to be linked to driving outcomes. In addition, a higher level of traffic hazards may be found in lower socioeconomic neighbourhoods. Finally, financial challenges for those with limited income may make it difficult to acquire safety equipment (e.g. child car seats, helmets or a newer car with more advanced safety features).

The importance of measures that capture inequities in the social determinants of health can, therefore, not be understated. In a similar vein, interventions for this population flowing from identified needs could include targeted approaches, for example, by providing financial assistance for those with limited income to purchase child safety restraints and bicycle helmets. These injury control activities hopefully would be part of a set of broader public health and societal interventions to address the root causes of poverty and social inequity.

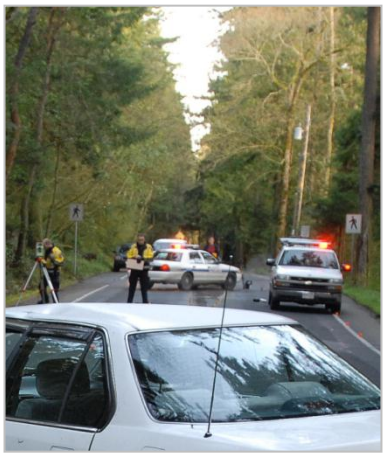
APPENDIX A – PARTNER AGENCIES AND PROGRAMS

14.1 Local police activities

Local police forces are involved in traffic enforcement programs in communities throughout the island, and many run educational programs aimed at improving driving, pedestrian and bicycle safety. In addition, the South Island benefits from an integrated policing approach to road safety under the CRD Integrated Road Safety Unit.

14.1.1 Integrated Road Safety Units (IRSU)

In December 2003, a Memorandum of Understanding (MOU) was signed between ICBC and the Ministry of Public Safety and the Solicitor General (Province of B.C.) to change the process by which ICBC funded enhanced traffic enforcement programs. Integrated Road Safety Units (IRSUs) are comprised of both RCMP members and local independent Police Department officers throughout the Province. Two IRSUs are located on Vancouver Island: one in Courtenay Comox, and one in the Capital Regional District (CRD)



Source: Saanich Police TSU

IRSUs are charged with the responsibility of using data-driven enforcement strategies to address the most serious traffic issues in their areas. By engaging municipalities and media, by working more effectively with road safety partners, and by supporting more targeted, strategic deployments, better outcomes may be achieved for all road users.

The CRD IRSU is an integrated policing unit designed to:

- Provide targeted enhanced traffic enforcement to B.C.'s capital region;
- Use data-driven traffic enforcement strategies; and
- Target high-risk driving behaviours such as speeding, failure to wear a seatbelt, intersection offences, aggressive driving, and impaired driving.

The South Island IRSU is drawn from officers from five different police agencies - Victoria, Saanich, Central Saanich, Oak Bay, and the local Royal Canadian Mounted Police (RCMP).

14.1.2 Special Focus: Saanich Police Department – Traffic Safety Unit

The Saanich Police Department is a member of the BC Integrated Road Safety Unit, but they too have their own Traffic Safety Unit (TSU) which is responsible for investigation and analysis of all serious motor vehicle crashes within the municipality. Some members of the unit are specially trained as Collision Reconstructionists and poses special expertise in this field of forensics. In addition to investigating collisions and driving complaints, the 12-man TSU also enforces the Motor Vehicle Act through regular campaigns and road safety projects, as well as enforcement at high crash areas and daily enforcement around the municipality. A detailed summary of a crash analysis can be found in *Appendix D*.

14.2 Office of the Superintendent of Motor Vehicles

14.2.1 2010 BC Guide in Determining Fitness to Drive

In July 2010, the Officer of the Superintendent of Motor Vehicles (OSMV) released the 2010 BC Guide in Determining Fitness to Drive, replacing the previous 1997 BC Guide for Physicians in Determining Fitness to Drive a Motor Vehicle, 7th edition. The Guide is the result of an ongoing partnership between the OSMV and

the British Columbia Medical Association (BCMA) which uses best-evidence available to create medical condition guidelines and a decision making framework for determining driver fitness.

The Motor Vehicle Act (MVA) provides the statutory authority for the Driver Fitness Program, which gives the Superintendent the authority to determine that applicants for various classes of driver's licences are able and fit to drive safely and to require an individual to be examined as to their fitness and ability to drive. It also authorizes the Superintendent to impose restrictions and conditions, to cancel and issue different classes of driver's license or prohibit a driver if the driver has a medical condition affecting fitness and ability to drive. The Driver Fitness Program assesses approximately 120,000 drivers annually. In an average year, 3,400 drivers have had their driving privileges cancelled or denied for fitness reasons and 2,500 have had their driving privileges restricted or reduced.[15]

See *Appendix E* for the driver fitness screening tool and form used to Report of a Condition Affecting Fitness and Ability to Drive.

14.2.2 Graduated License Program

The Graduated Licensing Program (GLP) for new drivers was introduced in BC on August 1, 1998, with a multi-phase licensing system that allows new drivers to gradually gain driving experience in restricted, lower risk environments. The GLP's staged program is designed to help individuals become safer drivers, while reducing the risk of a collision while in the learning period. For a new driver, it generally takes 36 months to get a driver's license. *Appendix F* details the stages in the GLP.

Enhancements were made to the program in October 2003 which extended the minimum Learner and Novice stages by an additional six months, added a passenger restriction to the Novice stage, and enacted a requirement that Novice stage drivers must stay prohibition free for 24 consecutive months.

Source: ICBC

An interim evaluation of the enhancements to the GLP was conducted in a 2006 report titled: The *Graduated Licensing Program (Enhanced): Estimates of Claims Savings 2004-2006 Report.* The findings from the report estimate that there was a reduction in new driver crashes and associated claim costs during the first three years after the enhancements were made in 2003. The report also looked at the long-term benefits of the GLP and found that between January and December 31, 2006, the crash rate for GLP drivers dropped by 28 percent, or approximately 17,500 crashes.[16]

[15] 2010 BC Guide in Determining Fitness to Drive, Ministry of Public Safety and Solicitor General Office of the Superintendant of Motor Vehicles, pg.7. http://www.drivesafe.com/2010%20BC%20Guide%20in%20Determining%20Fitness%20to%20Drive.pdf

[16] Graduated Licensing Program (Enhanced), Estimate of Claims Savings: 2004-2006, http://icbc.com/csDelPrd/Satellite?c=ICBC_Document_C&cid=1225927658215&pagename=ICBC%2FICBC_Document_C%2Ficbc_DocumentLinkT&proxied=true

A follow-up evaluation*, The Graduated Licensing: Year 6 Evaluation Report*, tracked the crash records of drivers who entered the program between 1999 and 2004 and examined the short- and long-term effects of the program on new driver crash rates. The report found that the GLP has successfully reduced the short- and longer-term crash involvement rates of new drivers. Compared to Pre-GLP New drivers, the GLP 1-year crash rate declined from 17.8 to 13.1 per 100 licensed driver years, a reduction of 26%.[17]

The detailed restrictions to the Learner (L) and Novice (N) stages can be found in *Appendix F*.

14.2.3 ENHANCED IMPAIRED DRIVING LEGISLATION

In the fall of 2010, British Columbia announced the implementation of more severe impaired driving penalties in an effort to reduce drinking driving, especially by repeat offenders. Changes to the Motor Vehicle Act (MVA) now mean that drivers who provide a failing breath sample above 0.08 percent blood alcohol content (BAC) or refuse to provide a breath sample at the roadside now face an immediate, 90-day driving ban and a $500 fine. As well, their vehicle is impounded for 30 days. These drivers may also face criminal charges.

Drivers caught once in the "warn" range (between 0.05 and 0.08 per cent BAC) in a five-year period will face an immediate, three-day driving ban and a $200 fine; a second time, a seven-day ban and a $300 fine; and a third time, a 30-day ban and a $400 fine.

There are three criminal charges that can be laid under the Criminal Code of Canada if you drink and drive:

1. "impaired driving" (caused by alcohol or drugs – both legal prescription drugs and illegal ones)
2. driving with a blood-alcohol level over 80 milligrams (called "over .08")
3. failing or refusing to provide breath or blood samples on demand (called "refusing to blow")
4. As well, all these can be upgraded if the impaired driving causes injury or death.

14.2.4 CHILD SAFETY RESTRAINT LEGISLTATION

Provincial legislation requires that children under nine years of age be placed in appropriate child safety restraints while travelling in a motor vehicle. Children under a year must be secured in an appropriate rear-facing child car seat. Over one year of age and between 9-18 kg, children may be secured in a forward facing child car seat using the harness straps. And in 2008, regulations requiring use of booster seats for children over four and under 9 years were implemented.

14.2.5 USE OF ELECTRONIC DEVISES WHILE DRIVING REGULATION

In 2009, the Use of Electronic Devices While Driving regulation was introduced. The regulation aims to reduce driver distractions by cell phones or other devices.

14.3 INSURANCE CORPORATION OF BC (ICBC)

ICBC is actively involved in the promotion of road safety through a number of campaigns aimed at topics such as impaired driving, speeding, and intersection crashes. Further details on these campaigns can be found on the ICBC website (http://www.icbc.com/road-safety).

[17] Graduated Licensing: Year Six Evaluation Report, Short and Longer-Term Effects on New Driver Crash Rates, Specific Component Effects and Early Effects of October 2003 Enhancements. Dec.2006. http://icbc.com/csDelPrd/Satellite?c=ICBC_Document_C&cid=1225927417407&pagename=ICBC%2FICBC_Document_C%2Ficbc_DocumentLinkT&proxied=true

APPENDIX B - DATA SOURCES AND GLOSSARY OF TERMS

15 Summary of Data Sources

A number of data sources were used in the preparation of this document, many of which were provided by the British Columbian Injury Research and Prevention Unit (BCIRPU) to health authorities, including ICBC collision data, hospitalization data and mortality data. The data provided in this report assists in painting a clearer picture of the health care impacts of motor vehicle collision trends in the health authority and the province, and providing us with a better understanding of where and when these collisions are occurring, and to whom. Much of the data in this report was provided on a one-time basis. In order to properly monitor the risks and impacts of motor vehicle collisions on our population; it is evident that an ongoing exchange of accurate, reliable and timely data between government agencies in the province needs to be formalized.

15.1 Data Sources and Limitations

15.1.1 Hospitalization Data (Discharge Abstract Database)

Transport related hospitalization data was available for the years 2001 to 2008. The Discharge Abstract Database (DAD) is a national database that provides detailed information on all separations from acute care institutions, including discharges, deaths, sign-outs and transfers. CIHI receives data directly from all hospitals in every province and territory, except Quebec. For cost estimates in this report, hospital separation data was extracted for the 2008/09 fiscal year where cases with an injury code (first E-Code) of *motor vehicle-related accidents* were coded. The data platform for this report is driven by a methodology that also supports the information synthesized in of the Provincial Health Officer's (PHO)[18] Report. The PHO's report focus is on vehicle-related road safety issues, and provides a more refined representation of hospitalizations due to motor vehicle-related incidents for the province. The hospitalization data includes the following transport categories:

- Motor vehicle (MV) - Pedestrian
- MV - Pedal Cyclist
- Motorcyclist
- MV Occupant
- Other Transport

Hospitalization data that did not specify involvement of a vehicle or a roadway was excluded. This limits data capture within both the pedestrian and bicycle transport categories to those involving a vehicle. For example, the Non-MV Bicycle transport category is not included in the spectrum of hospital morbidity. In keeping with our exclusion criteria, the Motorcyclist category and the Other Transport category have been modified to leave out non-motor vehicle related incidents. The MV Occupant category is inclusive of all sub-codes. Motorized and non-motorized off-road vehicular data has not been included in the hospitalization data as these vehicles did not intersect with motor vehicles on a roadway in high numbers.

15.1.2 Transport Related Mortality Data, BC Vital Statistics

Mortality data was provided to the health authorities using a similar format as the hospitalization data for the years 2000 to 2008. It should be noted that the BC Vital Statistics Agency lists transport-related deaths of all categories including motor vehicular by area of residence, whereas the actual collision leading to the death of an island resident may have occurred outside of VIHA boundaries. While off-island events preclude solutions specific to our roadways, it nevertheless is valuable information which enables us to assess the

[18] Provincial Health Officer's Report on Road Safety, will be released November 2011

broader impacts of motor vehicle collisions on the population of our health authority such as the contribution to the rate of premature mortality.

15.1.3 ICBC - Traffic Accident Survey (TAS) Data and Claims and Contravention Data

Collision Data

The Insurance Corporation of British Columbia (ICBC) provided the traffic collision data from their provincial database. It includes all police-attended and reported motor vehicle collisions. Motor vehicle collisions are reportable in British Columbia if they result in personal injury or death or aggregate property damage in excess of $1,000 ($600 for a motorcycle). Since 1995, this collision data set (Traffic Accident Survey (TAS)) has captured police-reported collisions involving a personal injury or a fatality. The form from which data is extracted for TAS is the Police Investigation Report (MV6020) and it usually is completed at the scene of the collision.

Of note, TAS data are not suitable for calculating injury rates at a regional level (e.g. number of injuries /100,000 resident populations) as it includes **all** injuries and deaths that take place within the health authority, irrespective of place of residency. The comprehensive traffic collision data provides valuable and inclusive insights on all island collisions (e.g. alcohol, speed, restraint use and nature/types of crash) that are not available from other sources (such as hospitalization or mortality data).

The following is a summary of the data sets provided by ICBC:

- **TAS Accident Data Set** lists all police-attended and reported motor vehicle collisions that occurred in the health authority between 2003 and 2007 and contained 17,181 cases (collisions).
- **Entity Data Set** defines all entities (vehicles) involved in the crash and includes 31,350 for the same time period. As there can be multiple entities involved in one collision, this number will be higher than the number of collisions in the same time period.
- **Victim Data Set** includes all parties involved in a collision on the island between 2003-2007 whether they were injured or not and produced a list of 43,450 individuals.

See the end of this appendix for a list of the variables in the TAS Accident, Entity and Victim Data Sets and their definitions.

Claims and Contravention Data

ICBC provides with a summary of all collision claims for the island than took place between 2003 and 2007. This data contains those collisions that may not have been reported to police, or did not have police attend the scene. The claims data set captures the severity of an incident (resulted in a fatality, serious injury, injury or property damage only). The contravention data lists all violations that were ticketed by police between 2003 and 2007 in the health authority. The data elements provided also document what, if any, legal contravention was associated with the event (Motor Vehicle Act, Criminal Code of Canada or Motor Vehicle Act Regulations), the purported offender(s) (driver, passenger, registered owner, and cyclist) and the nature of the contravention as it appeared on any ticket.

Active Driver Data

ICBC made available a list of *active drivers* by city for the time period under review. *Active drivers* possess a valid driver's license. The authors used the Digital Road Atlas (described below) in geographic information systems (GIS) to determine the total number of active drivers within each Local Health Area (LHA) in VIHA.

15.1.4 BC Digital Road Atlas (DRA)

The BC Digital Road Atlas (DRA) database provides current and historical information for roads in British Columbia. The roads are represented in the atlas by a series of small line segments with end points depicting intersections. There are approximately 10,285 kms of roadway in VIHA, and 37,257 junctions (end points). Road classifications and attributes described in this report are based on the DRA. It should be noted that a dominant speed (km/h) limit was assigned to each line segment. For example, if the posted first 80 percent of a segment is 50 km/h, and the last 20 percent of a segment is 30 km/h, the entire segment is recorded as 50km/h.

(The DRA program exists to provide a single, authoritative source of road data for the Province. The program services clients and users in the DRA partnership through ongoing provision of data and services to meet the partners' specific needs.)

15.1.5 Road Classifications

TAC Road Classification from Geometric Design Guide for Canadian Roads (Transportation Association of Canada)

Road Classification – Rural Roads

	Rural Local Roads	**Rural Collectors**	**Rural Arterials**	**Rural Freeways**
Service Function	Traffic movement secondary consideration	Traffic movement and land access of equal importance	Traffic movement primary consideration	Optimum mobility
Traffic volume vehicles per day (typically)	<1,000 AADT	<5,000 AADT	<12,000 AADT	>8,000 AADT
Average running speed (km/hr) free flow conditions	50-90	50-90	60-100	70-110
Vehicle Type	Predominantly passenger cars, light to medium trucks and occasional heavy trucks	All types, up to 30% trucks in the 3t to 5t range	All types, up to 20% trucks	All types, up to 20% heavy trucks
Normal connections	Locals Collectors	Locals Collectors Arterials	Collectors Arterials Freeways	Arterials Freeways

Road Classification – Urban Roads

	Public Lanes Residential or Commercial	Locals – Residential or Indust./ Commercial	Collectors Residential Indust./Commercial	Arterials Minor or Major	Expressways	Freeways
Traffic service function	Traffic movement not a consideration	Traffic movement secondary consideration	Traffic movement and land access of equal importance	Minor: traffic movement major consideration Major: traffic movement primary consideration	Traffic movement primary consideration	Optimum mobility
Traffic volume (Veh/day) (typical)	Residential: <500 Commercial: <1000	Residential: <1000 Indust./Commercial: <3000	Residential: <8,000 Indust./Commercial: 1000-12,000	Minor: 5,000-20,000 Major: 10,000 – 30,000	>10,000	>20,000
Average Running Speed (km/hr) (off peak)	20-30	20-40	30-70	Minor: 40-60 Major: 50-90	60-90	70-110
Vehicle Type	Residential: Passenger and service vehicles Commercial: all types	Residential: Passenger and service vehicles Indust./Commercial: all types	Residential: Passenger and service vehicles Indust./Commercial: all types	Minor: all types Major: all types, up to 20% trucks	All types up to 20% trucks	All types up to 20% trucks
Desirable connections	Public lanes, locals	Public lanes, locals, collectors	Locals, collectors, arterials	Collectors, arterials, expressways, freeways	Arterials, expressways, freeways	Arterials, expressways, freeways

Additional Road Classification Data

(BC Ministry of Transportation and Highways- Supplement to TAC Geometric Design Guide, June 2007 (http://www.th.gov.bc.ca/publications/eng_publications/geomet/TAC/TAC_2007_Supplement/Ch1400-2007.pdf))

Arterial/Primary

A general term denoting a road primarily for through traffic usually on a continuous route. Direct access to abutting land is not a priority. Arterial roads will not be discussed in these guidelines.

Collector/Secondary

A road that provides for traffic movement between arterials and local streets with some direct access to adjacent property.

Local

A road primarily for access to residences, businesses, or other abutting property. Note: Local streets intended for commercial or industrial development are considered as collector roads.

15.2 ICBC TAS DATA VARIABLES

TAS ACCIDENT	
Attribute Name	**Definition**
LHA	The LHA in which a [VEHICLE INCIDENT] occurred.
Accident Type Cd & Desc	The Accident Type based on accident severity.
Accident Year	The year that the Accident occurred.
Accident Month	The month that the Accident occurred.
Location Code	The Location Code is an eleven character field which indicates the location code of the accident spot. Provincial Highway, Municipal Street, Rural Rd
Diagram Code & Desc	The Diagram Code is defined as the code describing the actions of the vehicles at the time of the accident.
Road Class & Desc	Road Class is defined as the number of lanes on the roadway at the scene of an accident and whether or not the roadway is divided
Traffic Flow & Desc	Traffic Flow is a description of the flow of traffic.
Speedrange	The speed zone range for the location of an accident.
Road Surface & Desc	The description of the surface of the road at an accident. The description provides the codes
Traffic Control & Desc	The description of the surface of the traffic controls at an accident site. If the control is not an illuminated signal, then it may be selected from a list of codes numbered 00 through 06.
Road Character & Desc	The description of the character of the road at the accident site.
Road Condition & Desc	Road Condition is a description of the condition of the road at the time of an accident, as a result of the prevailing environmental conditions.
Weather & Desc	The description of the weather at the time of the accident.
Lighting Condition & Desc	The Lighting Conditions at the time of an accident.
Type Coll 2 & Desc	The description of the second type of accident collision event after the primary occurrence. These codes are the same as the third collision event codes.
Location 1 Event & Desc	The description of the first contact during an accident.
Acc Geocode Latitude	The latitude component of a location that is used for the geocoding.
Acc Geocode Longitude	The longitude component of a location that is used for the geocoding.

TAS ENTITY	
Attribute Name	**Definition & Business Rules**
LHA	The LHA in which a [VEHICLE INCIDENT] occurred.
Category & Desc	The Entity Type is found on the MV104A in the Label Beside box (i.e. V, P, C, 99).
Accident Type Cd & Desc	The Accident Type based on accident severity.
Accident Year	The year that the Accident occurred.
Accident Month	The month that the Accident occurred.
Contributing Factor 1 & Desc	The possible first contributing factor of an accident.
Contributing Factor 2 & Desc	The possible second contributing factor of an accident.

Contributing Factor 3 & Desc	The possible third contributing factor of an accident.
Contributing Factor 4 & Desc	The possible fourth contributing factor of an accident.
Vehicle Type & Desc	The type of [VEHICLE] involved in an accident from a list of possibilities included on the MV104A. This description is related to the STYLE field but is not identical. This includes passenger vehicle, motorcycle, SUV, truck, Panel Van, bicycle, bus, ATVs, Construction vehicles
vehiage	The Model Year for a [VEHICLE] involved in an accident.
Location Code	The Location Code is an eleven character field which indicates the location code of the accident spot.Provincial Highway, Municipal Street, Rural Rd
Diagram Code & Desc	The Diagram Code is defined as the code describing the actions of the vehicles at the time of the accident.
Road Class & Desc	Road Class is defined as the number of lanes on the roadway at the scene of an accident and whether or not the roadway is divided
Traffic Flow & Desc	Traffic Flow is a description of the flow of traffic.
speedrange	The speed zone range for the location of an accident.
Road Surface & Desc	The description of the surface of the road at an accident.
Traffic Control & Desc	The description of the surface of the traffic controls at an accident site. If the control is not an illuminated signal, then it may be selected from a list of codes numbered 00 through 06. Otherwise, the signal type and colour are specified in the two digit codes ranging from 21 to 53.
Road Character & Desc	The description of the character of the road at the accident site.
Weather & Desc	The description of the weather at the time of the accident.
Lighting Condition & Desc	The Lighting Conditions at the time of an accident.
Type Coll 2 & Desc	The description of the second type of accident collision event after the primary occurrence. These codes are the same as the third collision event codes.
Location 1 Event & Desc	The description of the first contact during an accident.
Acc Geocode Latitude	The latitude component of a location that is used for the geocoding.
Acc Geocode Longitude	The longitude component of a location that is used for the geocoding.

TAS VICTIM FULL (this includes all those involved in the crash, whether injured or not)	
Attribute Name	**Definition & Business Rules**
LHA	The LHA in which a [VEHICLE INCIDENT] occurred.
Entity Desc	The entity type involved in an accident.
Accident Type Cd & Desc	The Accident Type based on accident severity.
Accident Year	The year that the Accident occurred.
Accident Month	The month that the Accident occurred.
Age Group	5 year age groupings of the “victim” involved in an accident.
Sex	The gender of a “victim” involved in an accident.
Position & Desc	The position of each passenger in a [VEHICLE] involved in an accident, as they are listed in the "all involved" section of the MV104A form.

Vehicle Type & Desc	The type of [VEHICLE] involved in an accident from a list of possibilities included on the MV104A. This description is related to the STYLE field but is not identical. This includes passenger vehicle, motorcycle, SUV, truck, Panel Van, bicycle, bus, ATVs, Construction vehicles
Safety Equipment & Desc	The type of safety equipment that a vehicle occupant was using at the time of an accident.
Ejected From Vehicle & Desc	The indicator as to whether or not the vehicle occupant was ejected from the vehicle during an accident.
Contributing Factor 1 & Desc	The possible first contributing factor of an accident.
Contributing Factor 2 & Desc	The possible second contributing factor of an accident.
Contributing Factor 3 & Desc	The possible third contributing factor of an accident.
Contributing Factor 4 & Desc	The possible fourth contributing factor of an accident.
Location Of Injury & Desc	The location of the “victim's” most severe injury.
Type Of Injury & Desc	The type of injury identified by the injury location.
Injury Class & Desc	The classification given to an injury to ascertain the severity of injuries sustained in a collision. (CDA Rel. 56, 2004)
Victim Status & Desc	The severity of an injury of a “victim” in an accident, in terms of medical treatment required.
Licence Class & Desc	The class of the driver’s licence number for a driver in an accident. (TAS Data Dictionary, Jan., 1997)
Acc Geocode Latitude	The latitude component of a location that is used for the geocoding.
Acc Geocode Longitude	The longitude component of a location that is used for the geocoding.

ICBC Claims and Contravention Data:

Attribute Name	**Definition & Business Rules - A code which indicates the relative severity of a [VEHICLE INCIDENT] with no monetary threshold.**
Incident Severity	**F – Fatality:** One or more claims in the incident is coded with a KOL 31 (Death Benefits), Or one or more claimants in the incident is coded with an injury results code 190 (Fatality)
	S -Serious Injury One or more participants in the incident is coded with one or more of the Following: accident benefits are greater than or equal to $30,000, or bodily injury is greater than or equal to $100,000, or future care is greater than or equal to $25,000, or future wage loss is greater than or equal to $50,000 Or, if the vehicle incident participant has one or more of following injuries: above or below the knee amputation, or arm or other amputation, or non-functioning limb, or hemiparesis, or paraplegia, or quadriplegia, or blindness, or deafness, or loss of smell, or joint fusion or replacement, or mild, moderate, severe or vegetative mental impairment, or epilepsy, or internal organ removal, or non-functioning organ, or sexual dysfunction, or brachial plexus injury, or non-union of fracture, or traumatic deformity, or avascular necrosis, or spinal fusion Or, the severity code of “catastrophic” has been assigned.
	I – Injury (Includes Serious Injury Incidents) One or more participants in the incident is coded with one or more of the following: 17 - Bodily Injury, Uninsured Motorist 21 - Bodily Injury 26 - Underinsured Motorist 27 - Bodily Injury, Hit-and-Run 32 - Accident Benefit, Disability 35 - Accident Benefit, Medical Expenses
	PDO – Property Damage Only

APPENDIX C – ADDITIONAL DATA AND FIGURES

Active Driver Data

ICBC provided each health authority with a list of active drivers by city within the Province for each year between 2003 and 2007. Active drivers are those individuals who possess a valid driver's license. VIHA staff used the Digital Road Atlas (described in *Appendix C*) in geographic information systems (GIS) to determine the total number of active drivers within each Local Health Area (LHA). The following is a summary of the total number of active drivers by LHA and HSDA in VIHA.

Active Drivers per LHA in VIHA					
LHA #	**2003**	**2004**	**2005**	**2006**	**2007**
061	86,004	85,758	86,661	87,198	87,712
062	38,962	39,894	41,287	42,677	40,258
063	109,815	110,161	110,846	111,141	111,625
064	11,811	11,855	11,998	12,128	12,259
065	37,437	37,917	38,649	39,445	40,129
066	3,869	3,933	4,011	4,006	4,078
067	14,201	14,435	14,827	14,980	15,263
068	66,059	67,394	68,876	69,684	71,088
069	31,974	32,919	33,883	34,530	35,175
070	20,787	20,849	21,186	21,258	21,318
071	42,862	43,807	44,731	45,458	46,462
072	27,784	28,237	28,769	29,187	29,575
084	1,426	1,397	1,384	1,372	1,411
085	8,023	7,848	7,754	7,720	7,765
TOTAL	**501,014**	**506,404**	**514,862**	**520,784**	**524,118**

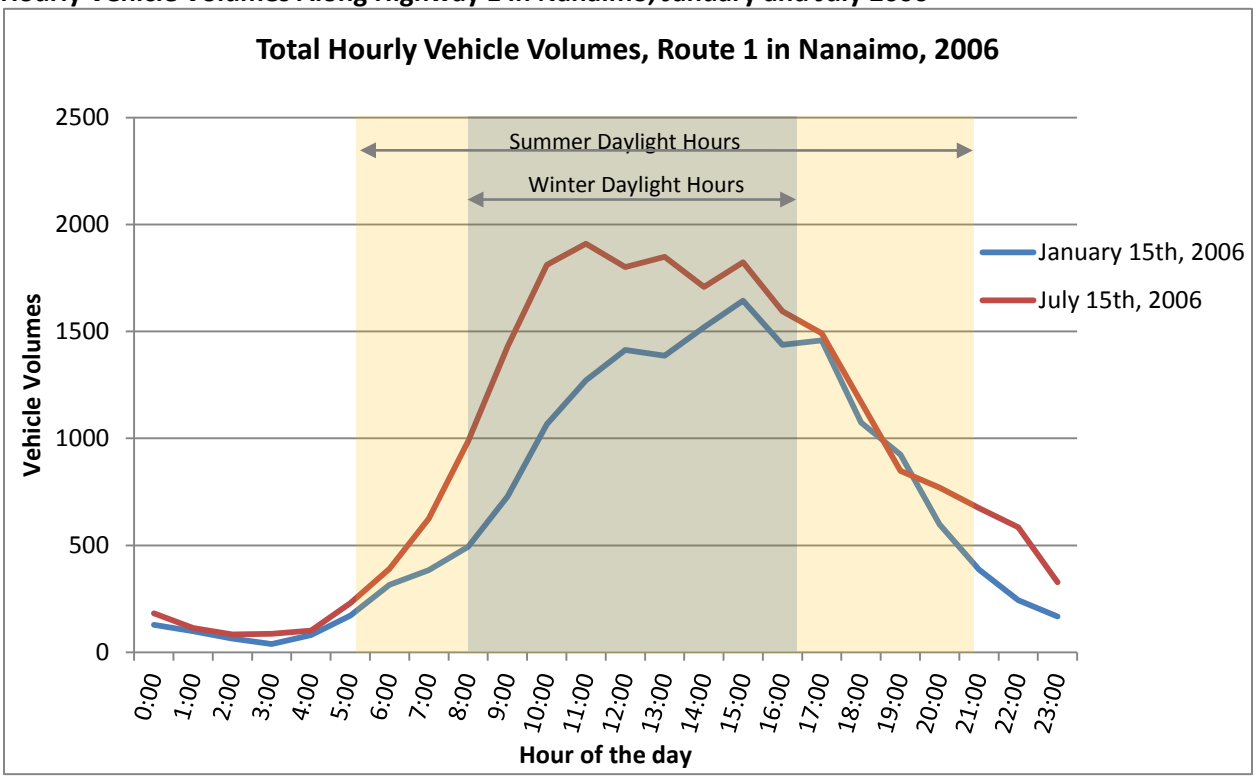
Active Drivers per HSDA in VIHA					
HSDA	**2003**	**2004**	**2005**	**2006**	**2007**
41	246,592	247,668	250,792	253,144	251,854
42	174,327	177,447	181,432	183,903	187,051
43	80,095	81,289	82,638	83,737	85,213
Total	**501,014**	**506,404**	**514,862**	**520,784**	**524,118**

Note: There were active drivers with an unknown location that were not included. Ladysmith active drivers were assigned to LHA 67 and Victoria active drivers were assigned to LHA 61.

Traffic Volumes and Daylight

The Ministry of Transportation and Infrastructure's Traffic Data Program monitors traffic volumes at several locations throughout the province. Hourly traffic volumes were reviewed over the course of a 24-hour period for two days of the year, January 15th and July 15th at Highway 1 in Nanaimo to determine the variation in vehicle volumes at different hours of the day during a winter and summer day. The traffic data confirms that vehicle volumes peak during the day, between 8:00am and 7:00pm during a day in July and between 10:00am and 6:00pm during a day in January. This is consistent with sunrise/sunset at 8:05am /4:46pm in January (8 hours and 40 minutes of daylight) and 5:27am/9:16pm (15 hours and 48 minutes of daylight) in July respectively.

Hourly Vehicle Volumes Along Highway 1 in Nanaimo, January and July 2006



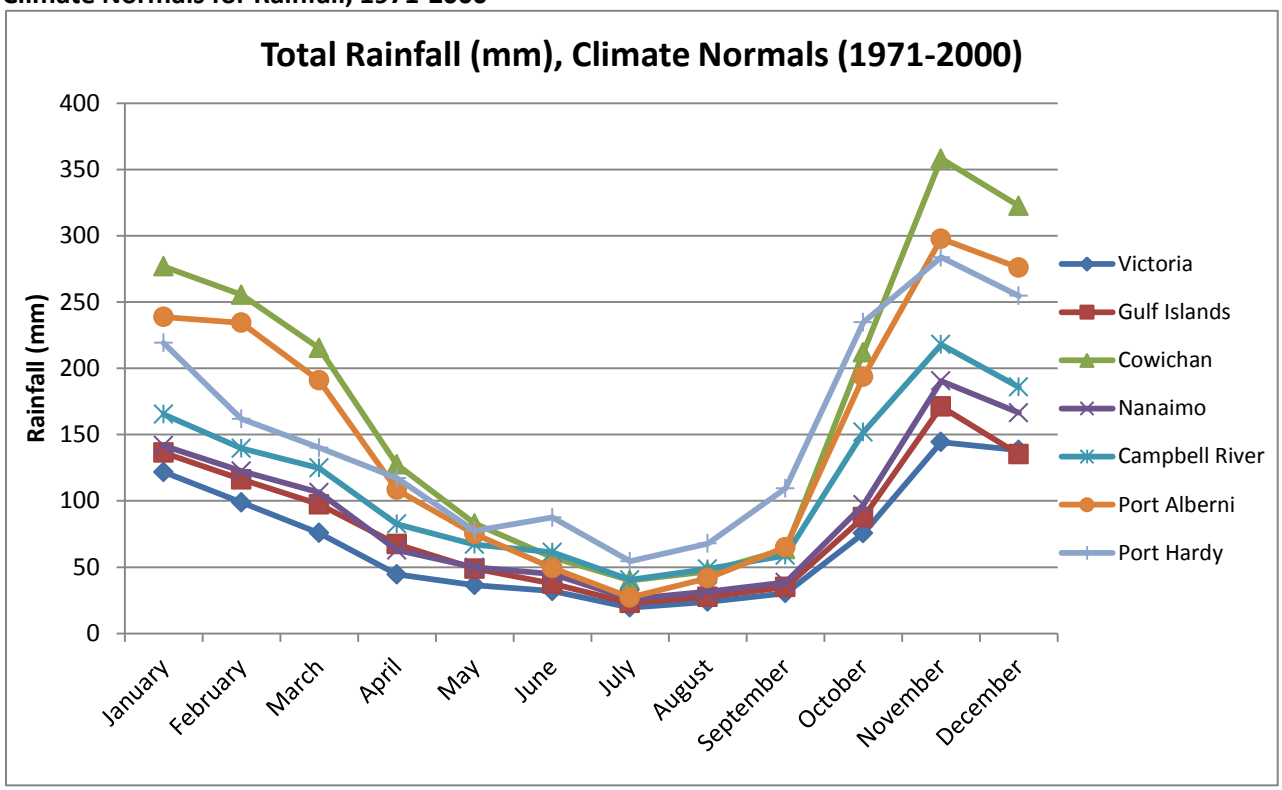
Source: The Ministry of Transportation Traffic Data Program, http://www.th.gov.bc.ca/trafficData/index.asp

Weather on Vancouver Island

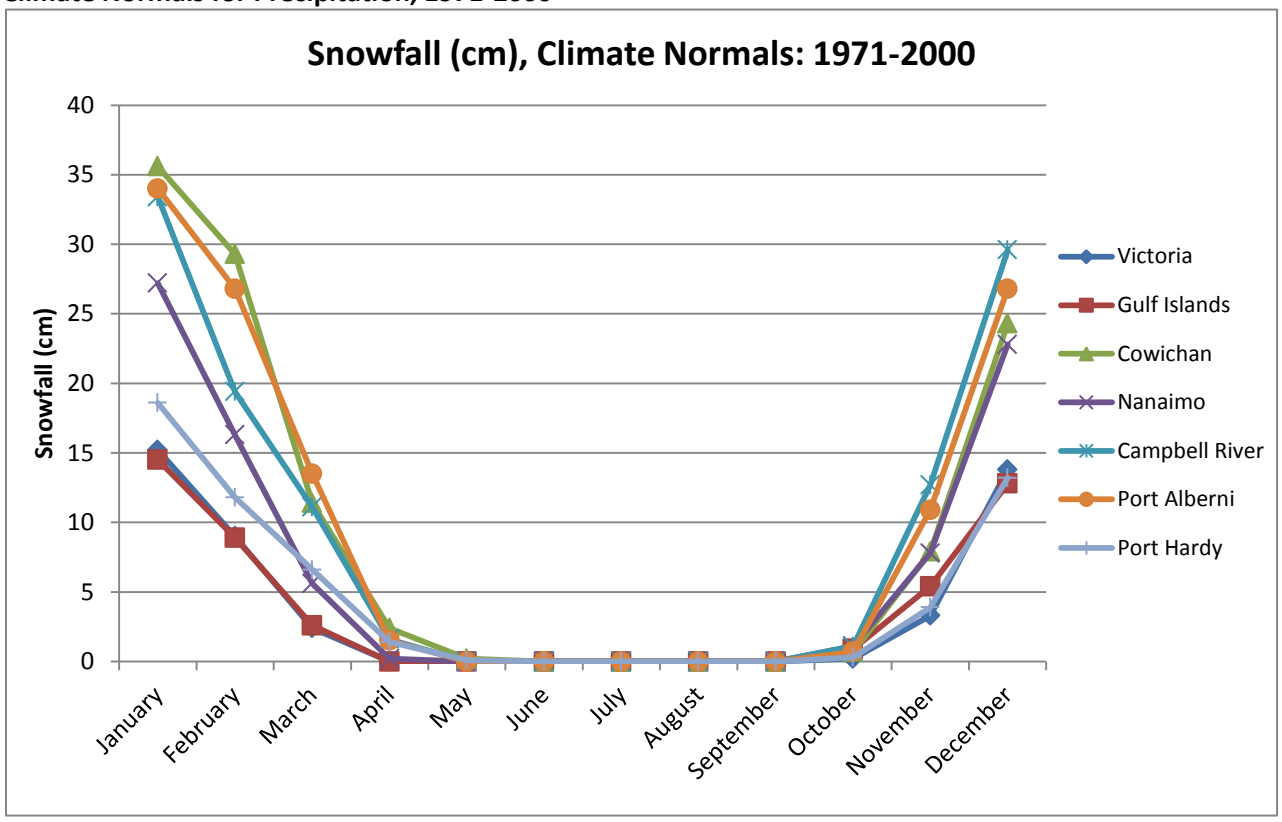
Weather can have a variety of effects on driving conditions ranging from limited traction associated with ice and snow, to reduced visibility with precipitation and fog. In order to describe the climate at select sites throughout Vancouver Island, Environment Canada weather data were reviewed for the years 1971 to 2000. Overall, the climate on Vancouver Island is typified by mild, wet winters and warm, dry summers. While the northern tip of Vancouver Island is cooler due to its higher latitude, regional variation in temperature throughout the health authority is not extreme. Precipitation, however, varies considerably with the west coast and northern Vancouver Island experiencing a much higher average rainfall than that of the southern tip of Vancouver Island and the Gulf Islands.

Trends in snowfall were similar to those of rainfall, with Cowichan, Port Alberni and Campbell River showing the highest snowfall totals over the course of the year in the 30-year period. However, the data reveals that that the total monthly snowfall in VIHA is low and ranges from 15-35cm during the winter months, with minimal to no snowfall between April and November. Warmer temperatures and less precipitation in Victoria and Gulf Islands resulted in a lower snowfall for these areas, especially for the months between January and March.

Climate Normals for Rainfall, 1971-2000



Climate Normals for Precipitation, 1971-2000



Source: Environment Canada Weather Office, http://www.climate.weatheroffice.gc.ca

Top 10 Contributing Factors in Motor Vehicle Collisions by HSDA (Ordered based on South VI)

		South Vancouver Island	Central Vancouver Island	North Vancouver Island
1	Driver Inattentive	13.94%	13.19%	12.18%
2	Failing To Yield Right Of Way	6.07%	5.56%	5.74%
3	Following Too Closely	4.72%	4.15%	4.02%
4	Alcohol Related	4.23%	7.15%	8.06%
5	Driving Without Due Care	3.65%	2.94%	2.35%
6	Driver Error/Confusion	2.60%	2.82%	2.15%
7	Ignoring Traffic Control Device	1.62%	1.31%	1.36%
8	Speed Related	1.26%	3.30%	3.33%
9	Driving Too Fast for Conditions	1.21%	3.17%	3.97%
10	Weather (fog,sleet,rain,snow)	1.20%	1.60%	2.44%

Summary of University of Victoria (UVic) Cell Phone Study

In January 2010, the province implemented new laws banning the use of cell phones while driving, including all hand-held mobile devices.[19] In order to determine if there have been any impacts on the driver habits since the ban was implemented, two individuals from the University of Victoria conducted a study that observed the prevalence of cell phone use at various locations around the City of Victoria, BC. Data was collected at 40 intersections with location selection based on road type. The study was first conducted in February 2009 and repeated again in April 2010 after the ban was in effect. The results from the study shows a significant decline in the number of cell phone use before and after the ban was in effect, with 75 drivers using cell phones in 2010 compared to 350 drivers using cell phones while driving in the 2009 study.[20] A decline in cell phone use while driving will hopefully result in a decrease of collisions resulting from driver inattention in future years.

[19] Drive Smart BC (April, 2010). Cell Phone Amendment to Motor Vehicle Act (http://www.drivesmartbc.ca/equipment/news-cell-phone-amendment-motor-vehicle-act.)

[20] Edghill, Thomas and Fingler, Theresa. Comparison study of the prevalence of cell phone use while driving in the City of Victoria, British Columbia, April 2010.

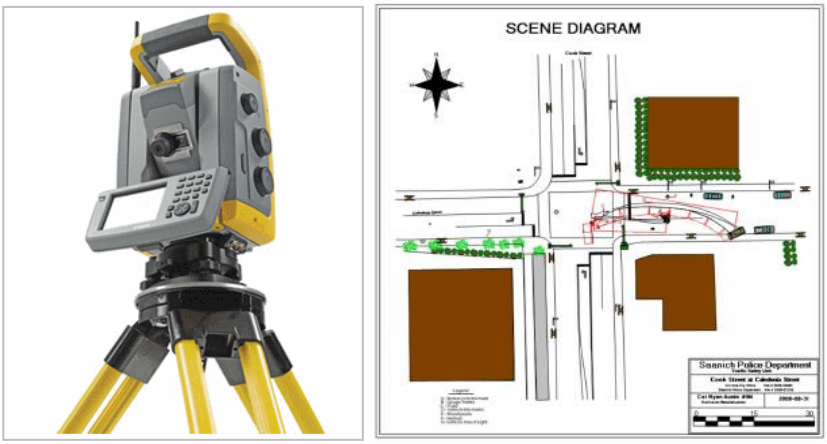
APPENDIX D – CRASH ANALYSIS

15.2.1 Collision AnalysiS (Saanich Police)

Source: Saanich Police TSU

Collisions are very front-end loaded and often require a large team of officers and resources when the collision first occurs to conduct a full scene investigation. Fatal collisions are often considered crime scenes especially as there can be more than one vehicle and driver involved and the entire area will be closed down to protect the scene from becoming contaminated by external factors. There could be a large number of officers required at a scene – from traffic control officers, to police spokesperson for media inquiries, to forensics, to the scene reconstruction experts, who are required to investigate all aspects of the collision. Collision Analyst are officers specially trained to investigate the scene of a collision scene and use total station surveying equipment to document the scenes forensically. Scene diagramming is also done for other criminal investigations, such as homicides, etc. Collision Analysts at the Saanich Traffic Safety Unit have four levels:

Level 1 - Patrol investigating level that all officers get. This focuses on correct completion of required collision report.
Level 2 - On-Scene Investigator. Trained to locate and document different types of collision scene evidence, such as types of skid marks, etc., but has more minimal math and theory training to actually analysis the evidence. A level 2 would pass the information on to a higher level for analysis.
Level 3 - Collision Analyst who is trained in more detailed scene investigation and detailed mathematical and physical analysis of scene evidence. Some areas would require a level 3 to pass information to a level 4 for analysis. Can be deemed an expert for Criminal court testimony.
Level 4 - Collision Reconstructionist. The top level of training for collision investigation. Interpretation and analysis of all scene evidence, development of complex mathematical solutions to scene evidence, such as Momentum Analysis. Can be deemed an expert for Criminal court testimony.
Collisions themselves are also classified at different levels depending on the severity and Police resources required:
Level 1 – Minor collision requiring police attendance but minimal to no scene investigation. Cause is straightforward enough not to require scene investigation. This would include all "routine" collisions where a patrol officer would attend and generate a collision report for ICBC termed a MV6020.
Level 2- Collision requiring police Collision Analyst attendance that may require minimal scene investigation if the cause is unclear or conflict of opinion, or in cases involving Police or government vehicles, or where civil liability may be an issue.



Source: Saanich Police TSU

Level 3- Serious collision requiring police attendance and scene investigation as well as reconstruction. Collision may include serious injury, Police government vehicles, serious civil liability, and criminal charges.
Level 4- Fatal collision (fatal or life altering) that requires full reconstruction and investigation.

In most cases, the level 2, 3 and 4 collisions would result in the collision analyst using the laser robotic total station to conduct the forensic scene diagramming, in addition to other scene measurements and analysis. The scene work is almost always to the same level, but the report generated depends on the level the incident is designated. Therefore if a file is designated as a level 2 initially and then two days later, the circumstances change (like and involved party dies or there is new evidence), the file level designation can be changed and all the necessary data and evidence has already been collected. This allows for a more or less detailed report to be generated at any time in the future.

Level 3 and Level 4 incidents generate a standalone report which is separate from the Police records system. The Saanich Police use a version of Auto CAD software to produce 2D and 3D diagrams and animation as required.

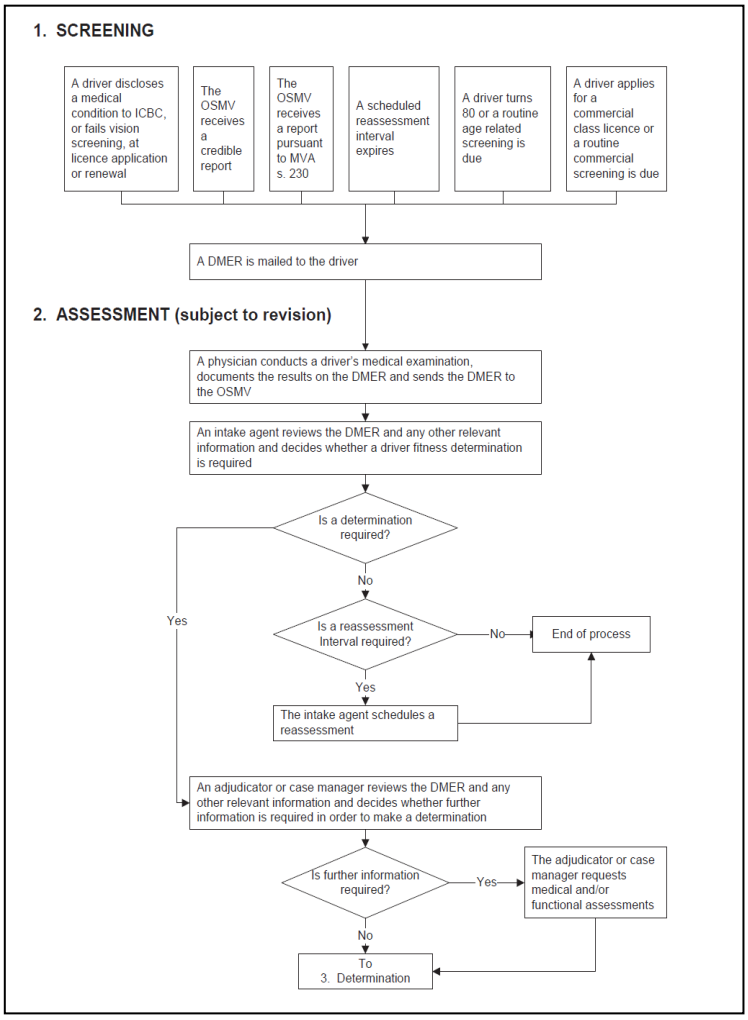
The investigation results in a final report that details the analysis, the conclusions regarding contributing factors as well as recommendations that could be required in court. If it is determined that road engineering could have played a role in the collision, the report will often make a recommendation to improve the safety of the roadway, including increased lighting in a rural area, or reflective markings along a median to increase visibility.

Source: Saanich Police TSU

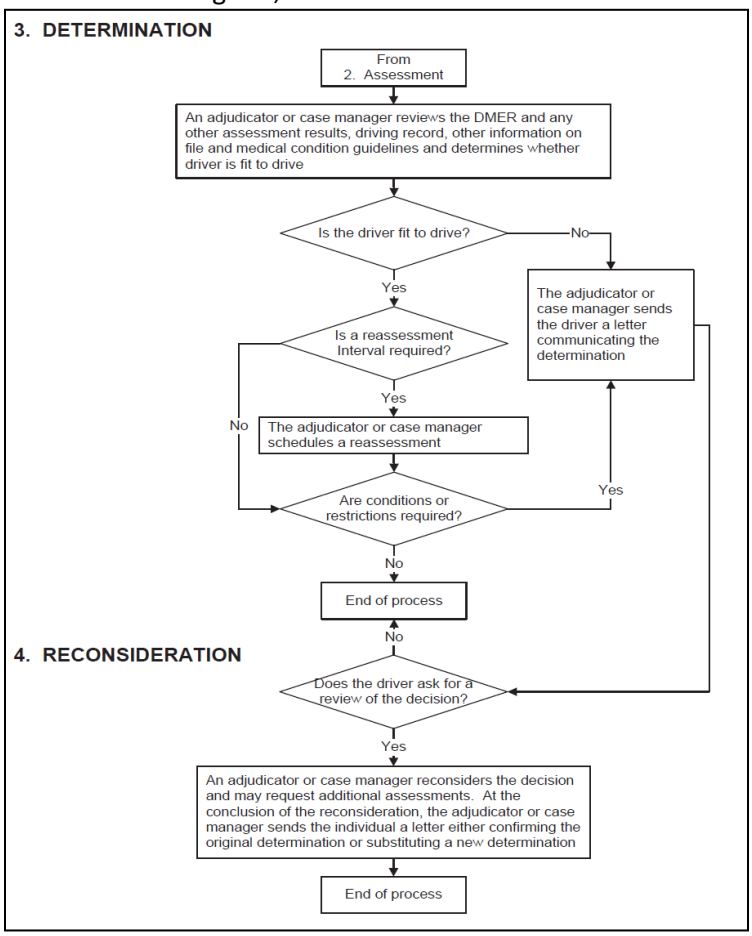
APPENDIX E – DRIVER FITNESS ASSESSMENT

There are four key activities of the Driver Fitness Program: Screening, Assessment, Determination and Reconsideration. Screening identifies individuals who have a known or possible medical condition that may impair their functional ability to drive, commercial drivers, and aging drivers.

An assessment occurs if a driver discloses a medical condition to ICBC or fails at vision screening; a credible report concerning a driver's potential incapability is received, such as from a police officer, doctor or family member; a doctor reports that a driver who has been deemed medically unfit to drive is continuing to do so; a scheduled interval occurs; a driver turns 80 or every 2 years subsequently; a driver applies for a commercial license or a regular commercial license check occurs. The key assessment used for driver fitness determinations is a driver's medical examination completed by a physician– usually a driver's doctor or specialist. Information gathered during the examination is documented on the Driver Medical Examination Report (DMER).



Driver Fitness Program, Determination and Reconsideration Flow Chart



APPENDIX F – GRADUATED LICENSING PROGRAM

Stage	Name	Description
1	Learners (L) Stage	The driver gains experience while practicing with an adult under strict conditions. After 12 months of prohibition-free driving, the driver can qualify to take their first road test—the Class 7 road test. A person can stay in the learner's (L) stage as long as they need to. A learner's (L) licence is valid for 2 years, but can be renewed by re-qualifying on the knowledge test in the learner's (L) stage. A novice (N) licence will be received once the road test is passed.
2	Novice (N) Stage	The driver may now drive without supervision but with limits on the number of passengers and zero tolerance for alcohol. A driver will be eligible to take the second Class 5 road test to exit the GLP after 24 months of prohibition-free driving in the Novice (N) licence stage. Once you pass this test, you will graduate to your full-privilege driver's licence. Most drivers must remain in this stage for 24 months. A driver can reduce the novice (N) licence stage by six months by taking an ICBC-approved driver education course. The approved course must be taken while the driver is still in the learner's (L) stage and they must: • be prohibition free • not get any violation tickets, or • have any at-fault crashes in order to keep the six month reduction.
3	Full- Privilege License	The N stage restrictions are lifted for the driver. A driver must wait longer than 24 months to qualify for a full-privilege licence if they are prohibited from driving, or if their driver's licence is cancelled, surrendered, suspended or expired. When unlicensed, progress through the stages of graduated licensing is stopped. Once a licence is reinstated after a prohibition, the 24-month novice stage will start over from the beginning.

Learner's (L) stage driving restrictions

If a driver violates these restrictions, they must pay graduated licensing penalties.

Passenger Vehicle (Class 7L)

Cell phones and driver distraction
Restricted from using both hand-held and hands-free electronic devices while driving

Qualified supervisor
You must be accompanied by a supervisor who is 25 or older and has a valid driver's licence (Class

Motorcycle (Class 8L)

Cell phones and driver distraction
Restricted from using both hand-held and hands-free cell phones and portable electronic devices while riding.

Qualified Supervisor
Until you pass the motorcycle skills test, you must always ride within sight of a qualified supervisor—

1/2/3/4 or 5). He or she must sit beside you in the front passenger seat.

Minimum 12 months
After 12 months you qualify to take your first road test—the Class 7 road test. You can stay in the learner stage as long as you need to. Your learner's (L) licence is valid for 2 years (but can be renewed by re-qualifying on the knowledge test).

Passenger restriction
You may carry a maximum of 2 passengers: your licensed adult supervisor and 1 other person.

Driving hours
You may drive only between 5 a.m. and midnight.

L sign
When you're driving, you must display a red L (learner) sign. The sign alerts others that you're a new driver so they can give you more space.

Zero blood-alcohol content
There must be no alcohol in your body when you drive.

After 12 months you qualify to take your first road test—the Class 7 road test. You can stay in the learner stage as long as you need to.

Your learner's (L) licence is valid for 2 years (but can be renewed by re-qualifying on the knowledge test).

someone 25 or older who holds a valid Class 6 licence.

Minimum 12 months
Your application was accepted. You passed your knowledge and vision tests. You've been issued a motorcycle learner's (L) (Class 8) licence. The Class 8 learner's licence is valid for 2 years. You can renew by re-qualifying for the knowledge test and redo the motorcycle skills test.

No passengers
You must not carry any passengers.

Restricted riding hours
You are permitted to ride only during daylight hours, that is, between sunrise and sunset.

You must not exceed 60 km/h until you pass the motorcycle skills test.

L sign
You must display a red L (learner) sign on the rear of your motorcycle. You can also display it on your clothing as long as it is clearly visible from behind your motorcycle.

Zero blood-alcohol content
There must be no alcohol in your body when you drive.

After 30 days, you can take the motorcycle skills test and when you pass, you can ride without a supervisor.

Your Class 8 learner's (L) licence is valid for **2 years.**

You can stay in the Class 8 learner stage as long as you want. However, after 2 years, your motorcycle learner's (L) licence will expire.

Novice stage driving restrictions

Once the Class 7 or 8 road test is passed, the driver will receive a Class 7 or 8 novice (N) licence. Some—but not all—licence restrictions are removed.

If a driver violates these restrictions or get any other tickets or prohibitions, they must pay graduated licensing penalties.

Restriction	Description
Cell phone and driver distraction	Restricted from using both hand-held and hands-free cell phones and portable electronic devices while driving or riding. The GLP hands-free restriction is lifted for riding if no valid class 7 or 7L licence is held.
Display N sign	In the novice stage, you are issued a green N (Novice) sign—this replaces the L sign. When driving, you must display the N sign at the back of your vehicle so drivers behind can see it. If you are a motorcyclist with a Class 8 novice licence, you must display the N sign on the back of your motorbike or clothing so that drivers behind can see it. **Lost your N?** If you lose or misplace your N sign for your car or motorcycle, you must replace it immediately. There is no charge for this. This is a mandatory restriction and you can be fined for not replacing your N sign (PDF).
Zero blood-alcohol content	You must not drive with any alcohol in your body.
Passengers	You are limited to 1 passenger—unless you're driving a passenger vehicle and have a supervisor 25 years or older with a valid Class 1, 2, 3, 4, or 5 driver's licence. **What about family members?** This restriction does not apply to immediate family members: mother, father, sister, brother, child, spouse, grandparent, grandchild; including step and foster relationships.

APPENDIX G – EXAMPLES OF PROMOTIONAL MATERIAL

Stupid Distraction Campaign (Source: CRD Traffic Safety Commission)

Be Seen and Not Hurt (Source: CRD Traffic Safety Commission)