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Foreword
When we began the RoadHealth coalition in 2005 we took some time to create a logo and slogan that would capture our strong belief that unacceptably high numbers of crash injuries and deaths were not an inevitable consequence of living in the North, and that we all are in a position to make a difference. We chose a steering wheel and the slogan: “It’s in your hands”.

Our first priority was to work together as a Coalition to improve awareness of crashes as a major safety and public health issue and to engage as many people as possible with this vision of safer northern roads. We have talked about the human side of the statistics and the costs to families and communities when crashes occur. We have talked about the basic issues of Booze, Belts and Speed. We have talked about Education, Engineering, Enforcement and Engagement as the keys to safer roads. We have discussed the idea that people using roads at any point in time form a kind of community where we share the same risks and where the behavior of one citizen in our community has an effect on all of us; whether it is a matter of being courteous and respecting safe space for fellow drivers, demonstrating to our children that we take driving seriously by giving it our full attention, or by ensuring that we are prepared for weather and road conditions every time we head out on the roads.

For this conference and this Report, we have come back to probably the most important single issue: the person behind the wheel and Fitness to Drive.

The negative side of Fitness is Impairment. It can take many forms ranging from chemical impairment due to recreational or prescription drugs to fatigue, to distraction by food, cell phones, electronic gadgets, passengers, and medical issues that affect reaction time, concentration and mood. This report talks about many of them.

The positive side of fitness is a sense of capacity and well being that includes alertness, concentration and energy. We can improve our fitness by attending to our basic health: getting enough exercise and sleep, and eating in a healthy way. It is interesting for me to note that the things we promote in public health to prevent heart disease, cancer, diabetes and other major diseases are the same things that will make us better and safer drivers.
Our statistics show some major improvements over the past few years, especially among male road users, possibly as a result of our focus on the workplace aspect of road safety and the attention that is being paid to the trucking industry. That said, we have much more that we can do, starting with each of us making sure that we are as healthy and fit as we can possibly be every time we get behind the wheel. Driving remains the most dangerous thing that most of us will ever do and we need to be fit to do it.

Thank you for your interest in this Report and our Conference. I look forward to sharing safer roads with you each year as we continue to work together to make it happen.

Dr. David Bowering,
Chief Medical Officer, Northern Health

Acknowledgements
The following people and agencies contributed time, data, and effort to the making of this report, and are gratefully acknowledged for their support:

MaryAnne Arcand Kathleen Meise
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Brian Jonah Ian Pike
Mike Green Eric Brewer

ICBC BC Coroners Service
WorkSafeBC Ministry of Health
BC Injury Prevention Unit Forestry TruckSafe
Trucking Safety Council of BC RCMP
BCAA Traffic Safety Foundation CVSE
Traffic Injury Research Foundation

None of the RoadHealth or CrossRoads activities would be possible without our RoadHealth Coalition Partners:

Northern Health
BC Coroners Service
BC Forest Safety Council
Commercial Vehicle Safety Enforcement (CVSE)
Insurance Corporation of BC (ICBC)
Ministry of Forests and Range
Ministry of Transportation and Infrastructure
Royal Canadian Mounted Police (RCMP)
Wildlife/Vehicle Collision Prevention Program
WorkSafeBC

Road sense is the offspring of courtesy and the parent of safety.
~Australian Traffic Rule, quoted in Quotations for Special Occasions by Maud van Buren
Thank you all for your commitment to road safety and to the health and well being of northern British Columbia.

About This Report

This Report is a collaborative document in which data from a variety of agencies with overlapping mandates and geographical jurisdictions has been brought together to help paint a picture of the “Fitness to Drive” issue in Northern BC, as it relates to motor vehicle crashes. It is in no way intended to be the definitive document in relation to this important topic. Rather, it is intended as a starting point for discussion and action by agencies, governments, industry and citizens who share the goal and responsibility of reducing injuries and deaths on Northern roads.

Each of the data sources we have used has its inherent limitations and is restricted to those events that are reported. As an example, many crashes that occur, either because they are "minor" or because they occur on a bush road, may not be reported at all. Additionally, the reasons for collecting information will have a bearing on the number of events reported; for example, reporting crashes to ICBC for the purposes of insurance claims may capture more events than reporting to the RCMP where people may be motivated to avoid detection. Given the focus of this report, “Fitness to Drive”, it stands to reason that drivers will not necessarily disclose their own physical or mental states at the time of a crash, as there would likely be financial, penal or employment consequences. Therefore, we assume that the human factor plays a larger role in crashes than what this report suggests.

In some cases the numbers in this report will not "add up" reflecting the differing mandates and geographical boundaries within which they were collected.

Nevertheless, we feel there is value in bringing this data together on this important issue. The recommendations at the end represent directions that are based on the contents of the Report and on the expertise of the individuals who have worked together on it. They should not be seen as the end point of comprehensive and detailed work, but rather as reasonable points of departure for the detailed and specific work that still needs to be done.

As always, we dedicate this Report to the memory of friends and families that have been lost to Motor Vehicle Crashes and to the hope that fewer and fewer will die preventable deaths on Northern Roads.
“Fitness to Drive” Overview

“Driving is central to the daily lives of many people, not only as a means of meeting transportation needs, but also as a symbol of autonomy and competency. The prerogative to drive is often perceived to be synonymous with self-respect, social membership and independence”.

Dr. David Butcher, CMAJ Sept 2006

What do British Columbians feel are the most significant road safety issue in BC? According to the Traffic Injury Research Foundation’s Road Safety Monitor 2008, 81.1% of British Columbians see drinking drivers as the most serious problem, followed by drugged drivers at 75%.

The next four highest rated problems involve driver behaviour – running red lights (69.9%), excessive speeding (66.4%), distracted driving (65.8%) and cell phone use (63.2%). Young drivers, which are disproportionately represented in casualty statistics, were at the lowest rating of concern. As you’ll see below, these “opinions” as expressed in the survey do not correspond with statistics, indicating a significant disconnect between people’s perceptions and the reality. This could be examined further and perhaps road safety messaging needs to be changed.

Northern Profile of Crashes and Contributing Factors

According to the BC Coroner’s Service, there were 930 Motor Vehicle Fatalities in the North Region from January 1, 1997 to June 30, 2009. This includes both completed cases and open cases with preliminary classification as incidental MVI’s. Other classifications have been excluded.

A quick profile of the statistics reveal:
- Average age was 38.4 years
- 29.9% were female; 70.1% male
- 84.4% were in a passenger vehicle (car, pickup, SUV)
- 62.0% were drivers and 30.0% were passengers
- 52.7% were single-vehicle incidents; 25.9% resulted from collisions with a passenger vehicle; and 19.9% resulted from collision with a commercial vehicle (logging truck, tractor trailer, tanker)

There were 930 MVI fatalities during this period:
### Decedent Activity by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
<th>Total</th>
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<td>Cyclist</td>
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<td>2009*</td>
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<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>572</td>
</tr>
</tbody>
</table>

* Data for 2009 is preliminary and incomplete.

### Decedent Vehicle by Year*

<table>
<thead>
<tr>
<th>Year</th>
<th>ATV/Dirt-bike etc.</th>
<th>Bicycle</th>
<th>Commercial Vehicle</th>
<th>Motorcycle</th>
<th>Scooter</th>
<th>Passenger Vehicle</th>
<th>Snowmobile</th>
<th>Tractor</th>
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<td>5</td>
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</table>

*For pedestrians, this is the vehicle they were struck by.
### Type of MVI by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Animal</th>
<th>Commercial Vehicle</th>
<th>Dirtbike</th>
<th>Passenger Vehicle</th>
<th>Single Vehicle</th>
<th>Train</th>
<th>Total</th>
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<tbody>
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<tr>
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<td>75</td>
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<tr>
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<td>Total</td>
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<td>241</td>
<td>490</td>
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</table>

Note: These numbers do not reflect “at fault”, but simply the vehicle or object with which there was a collision.

### Gender Breakdown by Year

<table>
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<tr>
<th>Year</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
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<tbody>
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<tr>
<td>1998</td>
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<td>1999</td>
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<td>2008</td>
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<td>33</td>
<td>63</td>
</tr>
<tr>
<td>2009</td>
<td>7</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>278</td>
<td>652</td>
<td>930</td>
</tr>
</tbody>
</table>
Note: more than twice as many males are killed in MVI's as females – in the North this is largely due to driving for work. Likewise, 703 of the 930 total MVI fatalities occur in the “working population” age groups.
Intuitively we would think the winter months would be the highest crash months, when in fact the summer months are worst (with the exception of December – Christmas holiday travelling); road conditions are not as much of a factor in the summer months, which begs the question, why? Several factors have been identified: increased traffic volumes for long weekends and summer vacations, increased drinking & driving, and speed.

### Contributing Factors by Year*

<table>
<thead>
<tr>
<th>Year</th>
<th>Alcohol</th>
<th>Alcohol &amp; Drugs</th>
<th>Drugs</th>
<th>Total</th>
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<tr>
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<td>2008</td>
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<tr>
<td>Total</td>
<td>73</td>
<td>19</td>
<td>21</td>
<td>113</td>
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</tbody>
</table>

*Toxicological testing for MVI fatalities has been mandated by BCCS policy since 2004. Toxicology data for earlier years may be inconsistent or incomplete. Data is not yet available for 2009.

Contributing factors are determined by the investigating coroner, and may include substance use by a third party.

Substances detected included illicit drugs such as marijuana, cocaine, ecstasy, and crystal meth, and a variety of prescription medications including narcotic analgesics and sedatives.
## Township of Injury by Year

<table>
<thead>
<tr>
<th>Injury Township</th>
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<th>99</th>
<th>00</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
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<th>09</th>
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<td>150 Mile House</td>
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CrossRoads Report 2009: “Fitness to Drive”
## Northern Top 10

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Alexis Creek</td>
<td>317</td>
<td>24</td>
<td>75.6</td>
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<tr>
<td>Burns Lake</td>
<td>1895</td>
<td>21</td>
<td>11</td>
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<tr>
<td>Chetwynd</td>
<td>2866</td>
<td>21</td>
<td>3.83</td>
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<tr>
<td>Dawson Creek</td>
<td>10,994</td>
<td>29</td>
<td>2.6</td>
</tr>
<tr>
<td>Fort Nelson</td>
<td>4,871</td>
<td>31</td>
<td>6.46</td>
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<tr>
<td>Ft St John</td>
<td>17,402</td>
<td>57</td>
<td>3.28</td>
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<td>Prince George</td>
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<td>Quesnel</td>
<td>9,915</td>
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<tr>
<td>Terrace</td>
<td>12,660</td>
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<tr>
<td>Valemount</td>
<td>1388</td>
<td>36</td>
<td>27.69</td>
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<tr>
<td>Vanderhoof</td>
<td>4799</td>
<td>28</td>
<td>5.83</td>
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<tr>
<td>Williams Lake</td>
<td>10,744</td>
<td>59</td>
<td>5.51</td>
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Although there appears to be a downward trend in crashes over the past 10 years, possibly indicating that the national Vision 2010 program has been effective, there are still some areas of the region that continue to see higher than average crash numbers. The table above shows the ten highest fatality totals in the region from 1997 to 2009, and rates them on a “per 1,000 people” ratio. It is here that certain issues, characteristics, and commonalities become evident. They should become the focus of targeted efforts in the very near future.

Alexis Creek and Burns Lake: these areas have a high proportion of First Nations population, who are statistically at higher risk to be killed or injured in a crash. RCMP and Coroner investigations from crashes in these areas have identified alcohol and speed as major contributing factors. These are also rural areas, with extreme winter conditions and darkness for much of the year, and both communities, though small, act as a “hub” for huge outlying remote areas.

Fort St John, Fort Nelson, Dawson Creek, and Chetwynd: these areas also have higher than average crash and fatality rates, and indications are that the numbers have a lot to do with oil and gas industry activity, which has a predominantly young male workforce. Excessive speed, alcohol and fatigue have been identified as the key contributing factors. In addition, studies show a direct correlation between the consumption of alcohol, speed, and the lack of seat belt use.

Valemount area is a unique situation, a “choke point”. The intersection of 2 main arteries through BC (Hwy 16 and Hwy 5) sees high rates of heavy truck traffic (projected to increase with the continued development of the Northwest Corridor and inland ports in Prince George and Edmonton) as well as tourist traffic (Jasper National Park, the Rockies). Too often, particularly in the summer months, we hear of crashes between semi-trailer trucks and private vehicles (known as ‘interface’ crashes), often tourists travelling through the area. Unfortunately, this region has traditionally been the scene of multiple fatality crashes, as families tend to travel together. Extreme weather conditions, micro-climates, difficult road maintenance, an abundance of wildlife in the roadway, fatigue and distracted driving as drivers and passengers admire the scenery or the wildlife have been identified as contributing causes of crashes. According to the Heavy Truck Crash Study, released in June 2009, only 18.9 % of interface crashes were caused by the heavy truck. The majority are caused by the private vehicle, even though truck drivers continually are portrayed in the media as reckless and dangerous.

The north’s highways and secondary roads and remote and/or rural areas present hazards that drivers accustomed to travel on
urban and suburban roadways may not be aware of. Two common effects of driving on long open highways are velocitation and highway hypnosis.

Velocitation is a phenomenon caused by driving for long periods at high speeds. Most drivers have probably experienced velocitation coming off of a highway; the change in speed makes the driver think that the car is going much slower than it actually is. Velocitation is dangerous because it can lead the driver to drive much faster than they intend.

When driving on rural highways for a long period of time, drivers should also be aware of a condition known as “highway hypnosis.” This condition results in driving in a dull, drowsy, trance-like state, or even falling asleep at the wheel.

### Table: Crashes caused by human conditions

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th>Year</th>
<th>Casualty Crash</th>
<th>Property Damage Only Crash ($1,000)</th>
<th>Total</th>
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<tr>
<td>Extreme Fatigue</td>
<td>2004</td>
<td>230</td>
<td>210</td>
<td>440</td>
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<td></td>
<td>2005</td>
<td>245</td>
<td>225</td>
<td>470</td>
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<tr>
<td></td>
<td>2006</td>
<td>210</td>
<td>215</td>
<td>425</td>
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<tr>
<td></td>
<td>2007</td>
<td>190</td>
<td>210</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>150</td>
<td>180</td>
<td>330</td>
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<td>Extreme Fatigue Total</td>
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<td>1,040</td>
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<td>Fell Asleep</td>
<td>2004</td>
<td>520</td>
<td>480</td>
<td>900</td>
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<td></td>
<td>2005</td>
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<td>2008</td>
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<td>1,860</td>
<td>4,250</td>
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<td>Illness (<em>Police Comments</em>)</td>
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<td>185</td>
<td>100</td>
<td>285</td>
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<tr>
<td></td>
<td>2005</td>
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<td>2008</td>
<td>155</td>
<td>90</td>
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<td>Illness (<em>Police Comments</em>) Total</td>
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<td>50</td>
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<td></td>
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<td></td>
<td>2008</td>
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<td>65</td>
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<td></td>
<td>2005</td>
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<td>2008</td>
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<tr>
<td>Sudden Loss of Consciousness Total</td>
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<td>980</td>
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**Definitions:**
- Casualty Crash - crash incident where at least one participant was injured or killed.
- Property Damage Only Crash - Crash incident where there were no injuries or fatalities.

* Numbers have been rounded to the nearest five.

Please note that these crash numbers cannot be summed as police can identify up to 4 different contributing factors for each vehicle, motorcycle, cyclist and pedestrian involved in a motor vehicle crash.

Prepared by: Jen Blackman

KBC, British Columbia Competency Centre
ICBC has identified crashes caused by fatigue, falling asleep and illness, as report by police in their investigations over the past 5 years.

When we look at the ICBC data on crashes caused by human factors, falling asleep behind the wheel seems to occur most often. These types of crashes are often single vehicle, or crossing the centre line. Other studies have indicated that long distances, winter driving conditions requiring prolonged periods of concentration, more hours of darkness (again requiring extra concentration), alcohol, and long hours of work contribute to falling asleep behind the wheel in northern BC.

Sudden loss of consciousness, another human condition identified by ICBC, includes medical events such as strokes, heart attacks, diabetic blackouts and epileptic seizures.

Driving as a necessity
For most people, driving represents freedom, control and independence. Driving enables most people to get to the places they want or need to go. For many people, driving is important economically – some drive as part of their job or to get to and from work. Others drive to be able to shop for necessities, to maintain social connections or engage in activities.

In northern BC we face climate, geographic and infrastructure conditions that make driving a necessity for most of the population. Long distances from remote or rural areas, lack of public transit, harsh winter conditions, long hours of darkness, lack of safe walking paths because of snow, lack of wide shoulders on roads, and so on, lead to a dependence on vehicles – and for many northern residents, they are large SUV’s or pickup trucks with 4 wheel drive.
Driving as a task

At every moment of the “Driving Task” we are constantly being challenged and “assaulted” by distractions attacking our ability to drive safely. While juggling a cell phone in one hand, adjusting the radio or CD in another, catching up on a quick lunch, and trying to keep kids in the back seat quiet, it all just becomes too much to handle. Making driving even more difficult is changing road and weather conditions. Many of us are also driving under less than ideal conditions while tired, or just not feeling our best. Many people also cope with physical challenges or age that may slow driving reaction times. All this adds up to making driving an extremely complex task even under the best of conditions. Sometimes it is a wonder that we are able to arrive anywhere safely. Truly, we are bordering right on the edge of our ability to handle all these stimuli, and when we go over that edge, we are in very real danger of having an incident.

Most people don’t look at driving as a complex task, and their driving habits reflect that thinking. We look at vehicles like digital cameras, just “point and shoot”…. and then proceed to do all kinds of other things in the vehicle, rather than keep both hands on the wheel, eyes on the road, and mind on task.

Complicating the driving task, and introducing a whole new set of risks and issues is the rapid development of vehicle technology. New technology may have not always have positive effects, as people can become over-reliant on the technology, complacent about risks, or adjust their driving to increase risk because they think the technology will mitigate their actions. The EU has looked at emerging technologies and identified positive and negative impacts on road safety:

- direct effects of an in-car system on the user (*directly altering the driving task*)
• direct effect of a road-side system on users (influencing directly the driving task)
• modifying behaviour of the user (altering driving behaviour in a more general and longer term by delegation of responsibility, etc.)
• modifying behaviour of non-users (influencing the general driving culture by new systems, inducing imitation effects, etc.)
• modifying interactions between users and other road users
• modifying accident consequences (e.g. by improving rescue activities)
• modifying exposure (e.g. by inducing new journeys)
• modifying modal choice (e.g. promoting public transport use by better information, or vice versa)
• modifying route choice (e.g. by leading car traffic to residential areas by route guidance systems)
• modifying speed choice (new technology that promises higher safety for its users may have a negative safety effect by generating higher speeds).

If human impacts are looked upon by looking at the task of driving itself, a checklist developed by the HINT project presents the main areas of expected human impacts (Carsten 1998). Systems that inform, advice or assist the driver, or intervene in the control of the vehicle, all modify the driving task in some way, and influence the work load of the driver. Work load may change in any direction, being too low or too high, or even more, too low for a long time period when driving is assisted by some advanced system, and then suddenly too high in an emergency situation when the driver has to take over control.

Informing and warning systems, especially in-car systems, will bring the problem of the increasing amount of information the driver has to cope with. It is especially problematic if information/warning systems function independently, without any selection, prioritising and timing of the messages. The increasing number of in-car messages to the driver may bring a shift of attention from the area in front of the car to in-car, that may be dangerous.

Driver assistance systems aim at decreasing driver work load, and one of the problems connected to that is that driver work load may become too low in simple driving situations, e.g. during highway driving. These situations are monotonous even when driving present cars, and it is difficult to maintain an optimal level of alertness for the driver. Driver assistance systems which take over part of the driving task, but still leave the responsibility on the driver to intervene in emergency situations, can worsen the situation.

Vehicle control systems may cause similar problems, i.e. that it will not be clear for the driver in every situation where control of the vehicle lies at the moment, what can be expected from the
system and when and how does the driver have to take over control

- Apart from these system-type specific problems, special problems may occur in the changeover period, i.e. in periods when systems are already installed in some new cars, but smaller or bigger part of the car population functions without them. It is likely that behaviour of drivers driving those most prestigious cars will be different from that of the general driving population, and imitating them without having sophisticated technology may be dangerous.

- Training for the use of new systems, and maintaining skills that are not needed while driving with the systems, but may be necessary in some situations, are other problems to be solved.

- Long term behavioural adaptation of drivers to the existence of new systems, even more to a combination of several ones, is a territory not yet sufficiently covered by empirical studies.

Some of the new technology increases the probability of delegation of responsibility of the driver to the system, and also on the possibility that drivers may be involved in other activities while driving (information collection from internet, receiving and sending messages via in-car computer, etc.) in monotonous situations while assisted by the new systems.

New technology, especially information technology, has the promise that a wide variety of new technologies will be introduced in road transport, that will profoundly modify the task of the driver. Some of the systems under development aim at improving directly traffic safety, but most of them concentrate more on features such as driver comfort and efficiency that sell better to the individual driver.

One of the basic needs behind implementation of new technology in road transport is to reduce human errors that lead to accidents, and assist drivers in driving functions where machines can function more accurately than human beings. However, driving is a dynamic process in which drivers may use the assistance they get for attaining further advantages by e.g. driving faster, taking more risk, and this may produce new sources of error. Moreover, the system intervention itself may be a new source of error when e.g. different information sources interfere with each other and with the driving task, or systems that are designed to reduce driver work load decrease vigilance in a degree that is already dangerous. It is necessary that human errors created by new systems are carefully analysed in an early phase of system development, and their sources eliminated before introducing the system into the market.

Safety and behavioural impacts of new systems going to be implemented in vehicles or in road traffic in general are hardly
known. Even more, we do not know anything about the expected safety and behavioural impact of the combination of those systems. Standards, guidelines and regulations are badly missing in this area.

Systems introduced in cars and in road traffic in general may have strong influence on traffic safety, therefore, their production and implementation cannot be steered only by market forces. Safety and behavioural impacts of each new system (and their probable combinations) have to be studied, and their production and use needs to be regulated, so that they may really contribute to the improvement of traffic safety.

**Driving for Work**
(excerpt from WorkSafeBC Annual Report 2008)
Every day, thousands of workers face deadly risks while driving on B.C.’s roads and highways. While WorkSafeBC has limited jurisdiction over the safe operation of motor vehicles — primarily a function of the RCMP — motor vehicle incidents (MVIs) remain a major cause of workrelated injury and death.

This section highlights the persistent incidence of work-related MVIs in the context of ongoing efforts — by WorkSafeBC and others — to improve driving safety in B.C. Unlike other types of claims, the number of claims associated with motor vehicle incidents has not declined over the past 20 years. In fact, with the exception of diseases caused by asbestos exposure, occupational MVIs are responsible for the largest number of work related deaths in B.C.

MVIs accepted for short-term disability, long-term disability, or fatal benefits by industry grouping and age group, 1972–2008

Although workers aged 25–44 years continue to account for the highest number of occupational MVI injuries, this group reported a steady decline in MVI-related injuries in recent years. By contrast, the 45–64 age group experienced a steep increase in these injuries, a trend attributed to an aging workforce. (The relatively small numbers of occupational MVI injuries for workers over age 65 are not shown.)

Some industry groupings, such as general trucking, taxi services, and courier services, require workers to drive as part of their core business activity. Other industry groupings, such as retail/wholesale, hotels/restaurants, and municipal government, require workers to drive from one work location to another in order to perform their core business activities. Age remains a factor in the rate of MVI injuries among these industries; for example, the public transit industry employs a relatively high number of 45–64
year olds, while the retail/wholesale segment has more workers under age 25.

According to the June 2009 Traffic Injury Research Foundation’s Report on Best Practices on Trucking Safety, the following are key characteristics and contributing factors of heavy truck collisions (the define “heavy trucks” as 4,700 kgs and up, essentially from the heavy-duty pickup trucks commonly used in the north right up to the semi trailers):

- driver speeding;
- driver inattention;
- driver impaired by alcohol or drugs;
- driver fatigue;

Fatigue has become a common subject recently for companies examining the health and safety hazards facing their operations. The impacts of fatigue extend to both home and the workplace. Studies have suggested fatigue can have an impact similar to alcohol impairment. Employers therefore have safety and business reasons to deal with fatigue as part of an overall health and safety program.

Recognizing the factors that impact fatigue is important, and this extends beyond traditional factors such as scheduling, and work types. Workplace culture also plays an important role in managing fatigue by allowing fatigue factors to be identified and managed.

“Fitness to Drive” Responsibilities and Obligations

The Law in British Columbia

If the person continues to drive despite recommendations to discontinue, health professionals have a legal obligation to report individuals who are unfit to drive to the Superintendent of Motor Vehicles. Here is the details of the current legislation under the Motor Vehicle Act:

230 (1) This section applies to every legally qualified and registered psychologist, optometrist and medical practitioner who has a patient 16 years of age or older who

(a) in the opinion of the psychologist, optometrist or medical practitioner has a medical condition that makes it dangerous to the patient or to the public for the patient to drive a motor vehicle, and

(b) continues to drive a motor vehicle after being warned of the danger by the psychologist, optometrist or medical practitioner.

(2) Every psychologist, optometrist and medical practitioner referred to in subsection (1) must report to the superintendent the
name, address and medical condition of a patient referred to in subsection (1).

(3) No action for damages lies or may be brought against a psychologist, an optometrist or a medical practitioner for making a report under this section, unless the psychologist, optometrist or medical practitioner made the report falsely and maliciously.

**Physicians**

Most provinces have legislation requiring physicians to report patients who may have medical conditions that affect their ability to drive. In some instances physicians who have not complied with this legislation have been found liable in the motor vehicle collisions of their patients. This legislation frequently puts physicians in a difficult situation, as reporting patients frequently strains the physician–patient relationship and physicians do not have any validated screening tools to assist them in fairly and validly determining fitness to drive. Even though physicians indicate that they often do not have sufficient education and training in evaluating driving fitness, they acknowledge that they are in the best position to assess medical fitness to drive.ii

In a 2006 Canadian Medical Association Journal article, Northern Health’s Dr David Butcher discusses fitness to drive and the physician’s guide for determination and diagnosis. Dr Butcher also noted that, “In 1999, a landmark legal ruling (BC Superintendent of Motor Vehicles v. BC Council of Human Rights, [1999] 3 SCR 868;) identified the right of Canadian drivers to have their licence eligibility determined individually based on a functional assessment rather than exclusively on a diagnosis. Licensing authorities have a corresponding responsibility to accommodate drivers wherever possible, within safe limits.”iii

**Self-Monitoring**

The law requires that you report any medical condition, change in health, or physical disability that may affect your driving. This is your responsibility and legal obligation, not that of your doctor.

Under the Motor Vehicle Act, the Superintendent of Motor Vehicles has the responsibility for determining the fitness to drive of people who hold or are applying for a British Columbia driver’s licence. Drivers who have a medical condition that has the potential to affect their fitness to drive may be required to have their doctor complete a Driver’s Medical Examination report. A Driver’s Medical Examination is one tool that provides the Superintendent with the information needed to decide whether someone is fit and able to drive safely.1

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Taking away the keys

Mobility and independence are highly valued in our society today. The capacity to drive is crucial to people’s ability to maintain their independence. For many people, particularly males, the ability to drive is also directly tied to their self-esteem.

Losing the ability or the legal license to drive creates a number of hardships for the person affected and their families, including getting to and from work, medical appointments, school, and social activities. In Northern BC, not being able to drive is a particular challenge for a number of extra reasons:

- Lack of public transit in most areas of the region
- Distances travelled to appointments
- Risk of loss of access to social and educational activities
- Harsh winter conditions for walking or mobility assistance devices
- The amount of time needed to get to and from a destination places barriers on who can provide the transportation (availability, willingness)

In the case of cognitive or medical issues, it may be very difficult for families to inform their loved ones that they are not permitted to drive, and they may want to leave the discussion up to a medical team. With time and further discussion, the individual often gains greater insight into his or her abilities and limitations, and may come to agree that driving is not a safe option.

The Office of the Superintendent of Motor Vehicles offers another solution through its confidential “Unsolicited Driver Fitness Reports”. Medical professionals, vision specialists, family members, allied health care providers, or concerned citizens can send a report to the OSMV regarding concerns they have about a driver’s fitness to drive safely. Unsolicited reports expressing concerns regarding a driver’s safety on the road are given high priority by OSMV. The report is reviewed and, if a decision is made that medical information or another exam is required, the driver will be contacted directly. Superintendent may require a driver to take a vision test, a functional driving assessment, or get a medical or other examination in order to help determine whether a driver is able to drive safely. The driver will never know who sent in the report, thereby giving family and friends a safe way to address their concerns.

The car has become... an article of dress without which we feel uncertain, unclad, and incomplete.

~Marshall McLuhan, Understanding Media, 1964
**“Fitness to Drive” Risk Factors**

*Medical*

<table>
<thead>
<tr>
<th>Some of the medical conditions that can affect driving are:</th>
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<tr>
<td>Diabetes</td>
<td>Injuries and disabilities, including limb amputation or paralysis</td>
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<tr>
<td>Epilepsy</td>
<td>Alcohol/drug dependency</td>
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<td>Heart disease</td>
<td>Fainting</td>
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<td>Stroke</td>
<td>Parkinson’s Disease and other neurological disorders</td>
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<td>Arthritis and other joint problems</td>
<td>Dementia and Alzheimer’s Disease</td>
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<td>Eyesight problems such as glaucoma, cataracts, macular degeneration</td>
<td>Giddiness or dizziness</td>
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<td>Sleep disorders, like sleep apnoea</td>
<td>High or low blood pressure</td>
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<tr>
<td>Attention deficit disorder (ADD) or Attention deficit hyperactivity disorder (ADHD)</td>
<td>Depression or other mental health problems like schizophrenia, bipolar disorder, psychosis.</td>
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<td>Lung disease</td>
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It is critical that all drivers are medically fit to drive. Medical attention or lack of control of a motor vehicle can have disastrous effects on you, your family, your friends or other road users. There are a wide range of medical conditions, or combinations of medical conditions, that can affect your “Fitness to Drive”. If you have a medical condition that may affect your “Fitness to Drive”, or are taking medication that can affect driving, you should discuss this with your health professional.
Diabetes
Diabetes is a progressive condition that can affect a person’s fitness to drive. Insulin and oral medications used to treat diabetes can cause low blood sugar, which may result in a sudden loss of consciousness or alteration of consciousness. As well, the long term complications of diabetes may result in vision changes, heart disease, nervous system disease, and others, all of which can affect driving fitness.

In consultation with your doctor, a decision will be made as to whether you are medically fit to drive. In assessing the suitability of people with diabetes to drive, medical evaluations document any complications and assess blood glucose (BG) control, including the frequency and severity of any hypoglycemic incidents.

Diabetes and its complications can affect driving performance due to:
- impaired sensory or motor function
- diabetic eye disease (retinopathy)
- nerve damage (neuropathy)
- kidney disease (nephropathy)
- cardiovascular disease (CVD)
- peripheral vascular disease and stroke
- incidents of hypoglycemia.

Motor vehicle licensing authorities can require licensed drivers to be examined for their medical fitness to drive. You should not have difficulty obtaining and maintaining an operator’s license if you:
- properly manage your diabetes,
- are able to recognize and treat the early symptoms of hypoglycemia, and
- do not have complications that may interfere with your ability to drive.

Hypoglycaemia (low blood sugar)
Low blood sugar levels are dangerous for drivers with diabetes. If you’re taking insulin or tablets for diabetes (except metformin), it’s very important that you avoid low blood sugar levels, which can greatly impair your driving and cause crashes.

Hyperglycaemia (high blood sugar)
High blood sugar levels could leave you feeling unwell or tired, and may affect your ability to drive safely. You should avoid driving while you’re hyperglycaemic.

High or low blood pressure
People with high blood pressure (hypertensive) of all ages generally show a consistent pattern of impairments on tests of
learning and memory, attention and mental flexibility, and abstract reasoning.

There is a large body of literature documenting the relationship between hypertension and impaired cognitive performance. Although there are no data available linking the presence of high blood pressure to an increased risk of motor vehicle crashes, it seems prudent, based on the available literature between hypertension and cognitive impairment, for drivers to be alerted to the role that hypertension may play in motor vehicle crashes.

Drivers must also consider the effects of antihypertensive medication on cognitive performance. Results of studies led the authors to conclude that antihypertensive agents are major culprits of cognitive deficits.

Likewise, low blood pressure can be a danger for drivers. Dizziness and fainting are the most common symptoms. Dizziness and fainting occur often with low blood pressure because the brain is not getting accurate blood flow which deprives the brain of oxygen which it requires to function. This in itself is not really that dangerous (unless it persists for a long time). However, if it happens while you’re driving, it can be dangerous or even fatal for yourself and others.

**Sleep Disorders (sleep apnea)**
Being sleepy on the job can be dangerous. People with untreated sleep apnea have a seven times more risk of traffic or work-related accidents because of daytime sleepiness.

Individuals suffering from sleep apnea experience short cessations of breathing. The natural response of brain will be to stir him/her to wake up. After waking up, the person falls asleep once again repeating the cycle. All these cessations happen without the knowledge of the individual.

Though the person doesn’t know whether he/she has woken up, the rhythm of sleep is affected and most importantly disturbed. We all need to go through all the five stages of sleep (that is, Stage 1 through 4 and REM sleep) to give complete rest to the brain. When someone is suffering from Sleep Apnea the brain gets exhausted without the knowledge of the affected person. The brain will find ways to make up for the loss of rest and by forcing the person to go to sleep irrespective of the situation that he or she might find themselves in.

To protect yourself and others, get treatment for your sleep apnea. It’s safe for you to drive again after one to three weeks of treatment. At that point, your risk of having a crash becomes the same as other drivers.
Heart disease
Most people who have had a heart attack or heart surgery should wait for at least four to six weeks after they leave the hospital before driving. The reason: weakness, fatigue or medications may slow your reaction time. Consider your own safety and the safety of others. If you have other heart conditions, speak to your doctor about the length of time that is right for you. If you are a commercial driver, you will likely not be permitted to drive for at least three months after having had a heart attack or heart surgery.

Epilepsy
Epilepsy is a general term referring to disorders which can cause seizures. Seizures may come without warning. Having a seizure while driving will clearly impact a person’s ability to drive safely. In some circumstances, medication can control seizures, and a driver who has had seizures may then be able to drive safely. If a driver’s condition has been diagnosed by a doctor, medication has been prescribed, and the medication is diligently taken by the driver, driving privileges may be granted or restored after a required seizure-free time period. In some circumstances, drivers who had seizures, but who have been seizure-free without medication for a required period of time, may also be granted driving privileges.

The Office of the Superintendent of Motor Vehicles (OSMV) in BC requires a Driver’s Medical Examination Report, the usual method for the OSMV to collect the required medical information to make a decision regarding driver fitness. There are several different criteria, depending on classification of driver’s licence and severity of disorder and treatment.

Sensory
Vision
Adequate vision for driving doesn’t just mean clarity that can provided by eyeglasses or corrective lenses. Drivers must be able to concentrate attention in their central vision, but they must also possess good peripheral vision—the ability to see things "out of the corner of your eye." Drivers also need to perceive the spatial relationships between the vehicle and its surroundings, such as its position in lanes of traffic. Picturing the vehicle in space allows the driver to judge distances for the purposes of changing lanes, turning, stopping, and preparing to enter or exit major highways.

Hearing
The effect of impaired hearing on driving safely is still controversial. The best available information suggests that totally deaf private vehicle drivers (class 5) do have an increased
accident risk but unfortunately there is no reliable data available to show how great the hearing loss must be before an increase in the accident rate of hearing impaired drivers is detectable.

There are so few drivers with impaired hearing employed as operators of cargo transport or passenger-carrying vehicles, that there is no reliable data either to support or refute the ability of persons with reduced hearing to drive commercial vehicles safely. Passenger bus and taxi drivers must be able to hear well enough to talk to their passengers. For the passengers safety it would also seem reasonable to expect that bus and taxi drivers should be able to hear well enough to detect external warning sounds such as sirens, horns, or bells.

Truck drivers on the other hand, even with normal hearing, often have great difficulty detecting any warning sounds coming from outside of their cab because of the noise of the engine and the sound proofing that is found with increasing frequency in modern truck cabs. This has led some people to conclude that total deafness would present no safety hazard. Experienced drivers, however, have expressed the opinion that the ability to hear does help them with the driving task and have been reluctant to support the position that a totally deaf driver can drive just as safely as a driver who has at least some hearing.

Cognitive

Attention Deficit Disorder

Attention Deficit Hyperactivity Disorder commonly becomes evident in early childhood and probably will be chronic in nature. The disorder consists of developmental deficiencies that can range from inhibiting behaviors to initiating and sustaining behaviors. The individual may improve with age. Any level of ADD or ADHD may increase the risk of unsafe driving issues. These issues stem from under developed visual perception skills, impaired ability to self-regulate behavior, moods and responses. Lack of organization and the inability to concentrate are also underlining issues. Their ability to learn information for the licensing knowledge test works well when one on one instruction is provided. Learning from their driving mistakes takes extra time. All of the above can result in unsafe driving encounters, unpredictable driving actions or an increased number of “minor” incidents. Medical clearance to drive is encouraged.

If someone you know has ADD or ADHD, look for the following warning signs that may interfere with safe driving:

- Doesn’t observe signs/signals
- Slow to respond to traffic lights
- Failure to yield right of way
Multiple minor incidents
Drifting while driving
Impaired eye/hand/foot coordination
Speed fluctuation/ Inappropriate speeds
Unable to focus with distractions and driving
Does not observe all areas of the vehicle before driving in reverse
Difficulty with interpreting traffic environments/ does not anticipate dangerous situations

If you or those that drive with you notice any of the above warning signs, you may need a driving evaluation. A driver rehabilitation specialist, with knowledge about medical conditions, can provide a comprehensive evaluation and determine your ability to drive.

This assessment should include:
- Visual Perception
- Functional Ability
- Reaction Time
- Behind-the-wheel evaluation

For a teen with ADD / ADHD, these risks may be even greater. Driving requires maturity, concentration, focus, good decision making and judgment, and the ability to stop and think without impulsive responses. It is important for parents to talk with their teens about how ADHD can impact their driving ability and create increased risks on the road. Together they can develop strategies to help limit distractions, focus attention, and make driving a safe experience.

The problem is worst among 16-year-olds, who have the most limited driving experience and an immaturity that often results in risk-taking behind the wheel. Teens often have a “no fear” attitude. They have a sense of invincibility that can be very dangerous, especially behind the wheel of a car.

**Alzheimers / dementia**

Driving a motor vehicle is a complex activity that requires quick reactions; the ability to divide and maintain attention (for example, watching traffic light and pedestrians while keeping one’s foot on the gas pedal or brake); good judgment; an understanding and ability to recall the rules of the road; the ability to find a destination; and adequate eyesight and hearing. Driving also represents freedom, independence and mobility.

Alzheimer’s disease and related dementias cause changes that affect a person’s ability to drive a motor vehicle safely. However, a diagnosis of Alzheimer’s disease does not automatically mean that
a person is incapable of driving. Some people may be capable of driving safely for some time after the diagnosis, depending on the timing of the diagnosis and the rate the disease progresses. However, eventually a person with Alzheimer's disease must stop driving, as it will no longer be safe. There is currently no nationwide standardized testing to determine when someone with Alzheimer's disease is unable to drive a motor vehicle safely.

Driving must be stopped immediately if safety is at risk. Signs that a person's driving abilities are declining include: slow response times, traffic violations, collisions, taking too much time to reach a destination or not reaching the destination at all. Look into the availability of testing to assess the person's driving abilities. This could be a driving simulation test and/or a road test conducted by someone with experience in assessing drivers with cognitive problems.

If this type of driving assessment is not available, enlist the help of a doctor to determine if and when the person is no longer able to drive. The doctor may ask the person and family members questions about:

- driving patterns (when and where the person drives);
- any differences noticed in driving skills;
- any unsafe or abnormal driving behaviour;
- traffic tickets (for going too slow, too fast, improper turns, failing to stop);
- crashes, fender benders or near-misses;
- instances where the driver has been lost;
- how comfortable the person or family members feel about the person's driving abilities.

Brain Injury
Because we take our driving skills for granted, it is easy to forget that driving is the most dangerous thing we do in our everyday lives. We might even think of it as the ultimate multitasking experience. Brain injury can affect the many physical, cognitive, and behavioral skills needed to drive well, depending on the individual and the type of injury. For example, the driver's physical ability to steer the vehicle and control speed, including braking, may be altered by brain injury.

Research findings vary widely on the relationship between driving skills and brain injury, and there is limited information available on the driving records of people who have sustained a brain injury. We do know that between 30 and 60 percent of people with severe brain injury return to driving after they are injured. Evidence also suggests that people with brain injury may place limitations on their driving habits. They may drive less frequently than they did before the injury or drive only at certain
times (such as during daylight), on familiar routes, or when traffic is light. Studies indicate that a failure to recognize even mild cognitive difficulties on the part of the person with brain injury may lead to increased risk while driving.

Brain injury can disrupt and slow down skills that are essential to good driving, such as:
- Ability to maintain a constant position in a lane
- Accuracy of visual perception and memory
- Visual problem solving
- Hand-eye coordination
- Reaction time

Recent research also shows that people with brain injury can experience difficulties in understanding visual stimuli presented rapidly on the periphery of their vision, a problem that is related to driving performance. But there is reason to hope that driving skills affected by brain injury can be improved through training that focuses on visual scanning, spatial perception, attention skills, and problem solving.

A driving evaluation is a crucial step in determining a person's ability to drive following recovery from brain injury. A typical driving evaluation is in two parts:
1. A review of cognitive abilities, including reaction time, judgment, reasoning, and visual spatial skills.
2. A test of the mechanical operation of a vehicle, either using a simulator or on a live roadway in the presence of the evaluator.

Some individuals with minimal cognitive deficits are able to become licensed to resume driving after they have had training in areas such as visual scanning, attention, and concentration.

Driving is an important part of a person's independent lifestyle. The person with brain injury may assume that he can return to driving once he recovers physically—and well-meaning families may support this assumption—but it may not necessarily be the case. Since it may be very difficult for families to inform their loved ones that they are not permitted to drive, they may want to leave the discussion up to the medical team. With time and further recovery, the individual often gains greater insight into his abilities and limitations, and may come to agree that driving is not a safe option.
Mental

Stress
Stress is well known to have a detrimental effect on physical, mental, and emotional health. Whether it is due to issues at work or at home, stress can lead to problems such as the following, which can increase a person’s vulnerability to fatigue:

- Chest pain
- Decreased sex drive
- Headaches
- Indigestion
- Muscle aches
- Stomach/bowel problems
- Substance abuse
- Weight changes
- Anxiety
- Depression
- Forgetfulness
- Irritability
- Resentment
- Insomnia
- Fatigue

Depression
People who are dealing with depression sometimes have major memory and concentration problems and may also be dealing with suicidal thoughts. This can affect driving reaction time and can also leave a driver confused and struggling to focus. Some of the changes are ones you may notice yourself while other changes may be subtle or may even be pointed out by another person in the car with you. Of particular concern is that an individual who is thinking about suicide makes an immediate decision to harm himself or herself by intentionally causing an accident.

The number of people on antidepressant therapy has been steadily increasing over the past decade. Although considered effective antidepressants do have an enormous range of side effects, and these can impact cognition and driving ability. A person who is depressed may also already have impaired driving due to symptoms of the depression itself.

In the first few weeks of antidepressant therapy, before the therapeutic effects of the drugs are evident, the side effects are often stronger as the body adjusts to the medication. When this is coupled with the already present symptoms of depression, the concern regarding safe driving is particularly important. To ignore the potential impact that depression and antidepressant therapy have on road safety could be dangerous or fatal.

Leave sooner, drive slower, live longer.
~Author Unknown
Fatigue
Driver fatigue is an important causal factor in many highway crashes—and is of particular concern in the trucking industry where many operators undertake long haul drives with limited amounts of sleep. Previous studies suggest that fatigue can affect steering performance and speed control. In real world driving studies and in driving simulator studies, steering performance has been found to gradually worsen with time. With regard to speed the picture has been less clear—in a simulation study, drivers were found to increase their speed the longer they drove, although a survey of military truck drivers suggests that when the drivers are fatigued, some drive slower, and others have difficulty estimating their speed correctly.

Fatigue is a feeling of tiredness or exhaustion that comes from physical or mental exertion; it is a message to the body to rest. It can be aggravated by acute lack of sleep or an accumulated sleep debt. It causes slower reaction time and can result in poor decisions, more mistakes, decreased performance, and dangerous lapses from microsleeps and automatic behaviour. No one is immune to fatigue and its effects have an impact on the fatigued person's workplace, family, and community.

Fatigue has a significant influence on health and safety both at work and at home. When it comes to work and fatigue, research demonstrates that the probability of a workplace incident rises and falls with alertness. The highest rate of industrial incidents is usually found among shift workers and catastrophic incidents are more likely at times when workers are most prone to sleep: between midnight and 6 am and between 1 pm and 3 pm. On the roads, more vehicle collisions occur in the early morning hours than at other times, a time when the fewest vehicles are on the road but when people experience the greatest degree of sleepiness. An analysis of incidents involving commercial trucks found that drivers in fatigue-related incidents had slept an average of five and a half hours during their last sleep period, compared with eight hours for drivers in non-fatigue-related incidents. Also, evidence shows that the one hour lost in the switch to daylight savings time increases collision rates by seven percent. In the week following the change to daylight savings, fatal incidents (on and off the job) increase by six and a half percent.

An Australian study measured the effects of fatigue and rated them against those of alcohol impairment. Findings suggest that after only 20 hours of sustained wakefulness, a person may be as impaired as someone with a blood alcohol concentration of 0.10 percent. The results of this study support the suggestion that even moderate levels of sustained wakefulness reduce performance to an extent greater than is currently acceptable for alcohol intoxication. Since about half of shift workers typically spend at
least 24 hours awake on the first night shift of their work period, these findings have important implications. The results are also important for anyone working extended hours over multiple days or weeks without adequate periods of rest. As sleep debt is cumulative, similar performance impairments should be expected in workers fatigued by that.

Most people need about eight hours of sleep a day—some a bit more and some a little bit less. However, those who do not get enough sleep each day can develop a sleep debt that adds up for them over time. A single night’s shortened or disrupted sleep may not affect worker performance, but an accumulated sleep debt can. The resultant fatigue can lead to the following hazardous conditions, effects, or behaviours:

- inability to see properly
- slower reflexes and reactions
- microsleeps (up to 60 seconds where the brain goes to sleep and worker blacks out no matter what they are doing)
- automatic behaviour (where worker does routine tasks but is not having any conscious thoughts)
- inability to make good decisions or plans
- inability to solve problems
- inability to concentrate, including wandering thoughts
- decreased alertness and watchfulness
- inability to remember things just done, seen, or heard
- inability to notice things the worker usually would notice
- more mistakes than usual
- failure to respond to changes in surroundings or situation
- poor logic and judgement, including taking risks the worker usually would not take
- inability to respond quickly or correctly to changes
- inability to communicate well
- inability to handle stress
- moodiness (e.g., giddy, depressed, irritable, impatient boredom, restlessness, depression, giddiness, grouchiness, and impatience).

Studies also show fatigued workers more often are absent, sick, quit, and cause more incidents than other workers. They also work slower, check their work more, rely more on co-workers, and avoid complex tasks. Aside from sleep debt, fatigue can occur and affect workplace health and safety for a variety of reasons, including the following:

- work scheduling
- work task type and length
- work and workplace conditions
- worker health and stress, and
- workplace safety culture.
Workers' health and stress levels can also contribute to how they are affected by fatigue. If they have conditions such as diabetes or hypertension or short-term illnesses like colds or allergies, they can be more easily fatigued. What's more, the over-the-counter (OTC) or prescription medication they take for an illness or disease could affect their sleep or make them drowsy. For example, some cold medicine, back pain medicine, nausea medicine and muscle relaxants can cause drowsiness. In addition, sleep disorders are also conditions that make fatigue worse. These are physical or neurological sleep problems such as insomnia, sleep apnea, REM behavior disorder, sleepwalking, restless legs syndrome, or periodic limb movement syndrome.

**Attitude**

A recent study in Alberta details the complex network of circumstances and meanings that influence rural people’s driving behavior, and describes the manner in which some rural drivers’ relevant social patterns support the everyday reality of driving and risk taking on rural roads. To fulfill the purpose of the study, 20 focus group interviews were conducted with 212 rural citizens in Alberta, Canada. The findings indicate that rural drivers routinely break traffic laws because:

- they do not perceive the harm in breaking laws,
- they believe that breaking laws is a natural thing to do,
- they negotiate the efficacy of laws according to their personal situations,
- and they believe in the maxim that “ends justify the means.”

It is common for rural drivers to break or “negotiate” traffic laws if it helps them in their work lives or in fulfillment of their immediate needs.

**Risk Taking**

A 2009 study by a group of Israeli researchers investigated whether there is an association between drivers' self-concept, gender, and proclivity for dangerous driving. Participants' self-concept was measured using the brief Hebrew version of the Tennessee Self-Concept Scale (TSCS; Fitts, 1965). Tendency to commit traffic violations and to engage in dangerous driving was assessed using the Dangerous Driving Questionnaire (DDQ; Berger, 1995). The analysis showed that out of all TSCS scales only moral self-concept correlated significantly with general dangerous driving. In addition, the study revealed that male drivers and drivers with low self-concept report more dangerous driving than do females and drivers with high self-concept, correspondingly. Results give evidence in favor of a hypothesis that low self-concept is connected to dangerous driving.
Speed
In every region of the province of BC last year, unsafe speed was the top contributing factor in fatal collisions. There were approximately 8,200 unsafe speed-related crashes on B.C. roads in 2005, resulting in almost 5,600 injuries and 167 fatalities.

BC drivers’ top excuses for speeding (according to police):

1. I’m late for class/work/court.
2. I didn’t know I was going that fast.
3. I didn’t know the speed limit.
4. I was passing a dangerous/bad/slow driver.
5. My car doesn’t go that fast.
6. I was just keeping up with traffic.
7. I was only going 10 km/h over the speed limit and that’s OK.
8. I have to go to the bathroom.
9. I was having an argument with my spouse and wasn’t paying attention.
10. I’m sick and am going to the hospital/I’m about to give birth.

Road Rage
More and more drivers have started acting out their anger when they get behind the wheel. After they’ve been cut off, tailgated, or slowed down by a vehicle in front of them, these angry drivers can commit incredible acts of violence— including assault and murder!
The AAA Foundation for Traffic Safety studied more than 10,000 incidents of violent aggressive driving committed between 1990 and 1996, and found that at least 218 people were killed and another 12,610 injured in the US, just because the driver got angry.

Although many drivers involved in these incidents are men between the ages of 18 and 26, anyone can become aggressive if they let their anger take precedence over safe driving. The AAA foundation study found that men, women and people of all ages drive aggressively if they are in the wrong mood or circumstances. When drivers explained why they became violent, the reasons are often incredibly trivial: “She wouldn’t let me pass”, “They kept tailgating me”, or “He cut me off!”. One driver, accused of murder, explained, “He practically ran me off the road – what was I supposed to do?”
Distractions

Rubbernecking – despite what most people might think, rubbernecking is the foremost cause of traffic incidents and related injuries. People who live in urban areas are more prone, of course. In fact, many incidents can occur near or around incident scenes.

Changing CD/Radio – we may take changing the radio or inserting a CD for granted, but these activities have shown to contribute to higher incidences of car incidents.

Eating in the car – applying make-up, reading and eating often lead to disaster when driving. If drivers must eat, they should do so while stopped to fill with gas, or for a rest stop break. Far too many incidents have been caused by people trying to avoid getting crumbs or mustard on their pants. Many more incidents yet have been caused because a lid popped off or a drink was spilled on a driver's lap.

The National Highway Traffic Safety Administration (NHTSA) found eating and driving is more dangerous than using a hand held cell phone while driving. Hagerty Classic Insurance even publishes a list of driving and eating dangers.

So what is the most hazardous food drivers can consume?

Coffee – Uncovered drinks generally are the greatest offenders for unexpected splashes and spills. Nobody wants to look soiled or messy, especially on the way to work, and coffee spills are the worst because drivers invariably try to make instant clean-ups while still driving. In addition, hot coffee is often served at temperatures near scalding, and can cause serious burns that also divert a driver’s focus. Hagerty also learned:

- More food-related accidents happen in the morning hours than in the evening because people are concerned about their appearance on the way to work.
- The odds of having a food-related accident can double if the vehicle has a stick shift since eating, shifting and steering requires increased dexterity and adds one more variable to the equation.
- The most hazardous situation combines eating and cellular phone use. When the phone rings, the "driving distraction" increases significantly and in a rush to answer, drivers forget they're driving.

Driver Distraction – kids, animals and construction sites often distract individuals as much as any cell phone or car incidents we see.
Technology – GPS, Entertainment Systems, etc
Technology around vehicle navigation and comfort was discussed earlier, but more and more studies are showing that technology in vehicles is creating more distraction than help in many ways. Any activity that takes the driver’s hands off the wheel and eyes of the road increases the risk of an incident.

Cell phones, hand-held devices
Even a hands free cell phone or the use of blue tooth technology does not guarantee that an incident won’t occur when chatting on a cell phone and driving. Harvard University conducted a study that indicated that individuals using cell phones caused 200 deaths and millions of incident related injuries. These drivers are four times more likely to cause a crash.

While we anticipate hands-free cell phone legislation in the coming year, the fact remains that the conversation, not just the device, contributes to increased crash rates.
Lifestyle

While the road and environmental conditions, along with the vehicle, are contributing factors to a crash, it is primarily the driver that increases the risk of crashing, especially when impaired.

Substance Use

In 2006, 143 Canadians were killed in drinking driver related crashes in BC, 18 lower than in 2005. What is disturbing is that though, there were significant declines from 1995 to 1999 (down to 130 from 241), have not decreased below the 1999 number in the last 10 years. We seem to have reached a plateau when it comes to drinking and driving.

According to last year’s Road Safety Monitor, an annual survey conducted by the Traffic Injury Foundation, an unacceptable 19.7% of British Columbians admitted to driving after consuming alcohol in 2008. And 8.8% admitted driving when they thought they were over the legal limit – much higher than the national result of 5.2%.

Another concern is the high percentage of people who ride along as passengers with someone they know has been drinking. 11.4% of survey respondents indicated they had been a passenger with a drinking driver on at least two occasions, despite knowing the risks. 19.6% of British Columbians know a family member or friend who was drinking and driving, and caused a crash.
The survey also concluded that only 9.5% of drunk drivers are drinking by themselves at home, which means 90.5% of drinking drivers are in the midst of friends or family who could prevent them from driving. 60.9% of drivers who admitted driving after drinking were at a friend or relative’s place, or at a party, compared to 17.2% who were drinking in a bar. As a society, we still seem to tolerate the risk of a friend or relative drinking and driving, rather than having the confrontation of stopping that driver.

Alcohol and other drugs alter the normal function of the brain and body, and interfere with even the most skilled and experienced driver’s ability to drive safely. While different drugs can have different effects on driving, any drug that slows you down, speeds you up or changes the way you see things can affect your driving — too often with tragic consequences.

Alcohol and other depressant drugs
Alcohol blunts alertness and reduces motor coordination. People who drive after using alcohol can’t react as quickly when they need to. Their vision is affected, and may be blurred or doubled. Alcohol alters depth perception, making it hard to tell whether other vehicles, pedestrians or objects are close or far away. And because alcohol affects judgment, people who drive after drinking may feel overconfident and not recognize that their driving skills are reduced. Their driving is more likely to be careless or reckless — weaving, speeding, driving off the road and, too often, crashing.

Alcohol is a depressant drug, which means it slows down your brain and body. Other depressant drugs, including some prescription drugs such as sedatives and painkillers, affect a person’s ability to drive safely in a way similar to alcohol. Any drug that causes drowsiness, including some cough, cold or allergy medications, can also affect a person’s ability to drive safely. When alcohol and another depressant drug are combined, the effect is more intense and dangerous than the effect of either drug on its own. When taking prescription or over-the-counter medications, it is wise to consult with your doctor or pharmacist before driving.

Stimulants
Stimulant drugs, such as caffeine, amphetamines and cocaine, may increase alertness, but this does not mean they improve driving skills. The tired driver who drinks coffee to stay awake on the road should be aware that the stimulant effect can wear off suddenly, and that the only remedy for fatigue is to pull off the road, and sleep. Amphetamines do not seem to affect driving skills when taken at medical doses, but they do make some people over-confident, which can lead to risky driving. Higher doses of amphetamines often make people hostile and aggressive.
People who use cocaine are also likely to feel confident about their driving ability. But cocaine use affects vision, causing blurring, glare and hallucinations. “Snow lights” — weak flashes or movements of light in the peripheral field of vision — tend to make drivers swerve toward or away from the lights. People who use cocaine may also hear sounds that aren’t there, such as bells ringing, or smell scents that aren’t there, such as smoke or gas, which distract them from their driving.

_Cannabis and other hallucinogens_
Cannabis impairs depth perception, attention span and concentration, slows reaction time, and decreases muscle strength and hand steadiness — all of which can affect a person’s ability to drive safely.

The effects of hallucinogenic drugs, such as LSD, ecstasy, mescaline and psilocybin, distort perception and mood. Driving while under the influence of any of these drugs is extremely dangerous.

**Healthy Eating**
A lot of snacks taken on car journeys contain lots of sugar or starch. The "sugar-rush" can boost your mood in the short term (which is why chocolate bars are such a favourite in gas stations), but over a longer period can actually make you feel sleepy.

In fact, it could be a good idea to avoid stocking up with food from the service station altogether if you’re interested in healthy eating on the road. This does not necessarily mean restricting yourself to restaurants, as there may be small grocery stores along the way – they will offer you considerably more choice.

When it comes to snacks to be eaten during a rest break, try to avoid highly processed items, sugars, saturated fats and carbonated drinks. Instead, concentrate on freshly-cut vegetables and fruit, fibre-rich whole-grain crackers or cereal bars, and plenty of bottled water. If you have a cooler bag or box, most items can be kept in it, together with chunks of cheese, which is rich in calcium and protein.

When more is called for than just a snack, it may be time to pull over and find a restaurant in which to eat. If it’s a fast-food option you want, there will still be way to avoid the usual "junk food" options loaded with bad fats, tons of calories and little in the way of healthy nutrition. Eaten regularly, this type of food can leave you feeling more tired and irritable than ever and perhaps give you a stomach ache to boot. Foods high in fibre, vegetables and salads will be far healthier, of course, and will probably make you feel fitter, more alert and better-nourished.
Starches produce the same effect as sugars – it just takes longer. If you’re intending to drive after you eat, it’s clearly sensible to avoid heavy, starch laden meals (bread, potatoes, pasta) which could leave you feeling bloated, uncomfortable and sleepy once back behind the wheel.

**Physical Fitness**

Driving a vehicle is a physical activity, and a driver who gets no physical exercise may not have the required strength, flexibility, or coordination to control and operate a vehicle safely. A driver must:

- see and hear clearly
- synthesize different types of information right away
- act quickly and decisively
- be able to react and respond immediately

Drivers who monitor and keep track of changes in their eyesight, physical fitness and reflexes may be able to adjust their driving habits so they stay safe on the road.

Physical fitness is the functioning of the heart, blood vessels, lungs, and muscles at optimum efficiency. Physical fitness is now defined as the body’s ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypokinetic diseases, and to meet emergency situations. Fitness can also be divided into five categories: aerobic fitness, muscular strength, muscular endurance, flexibility, and body composition.

When you optimize your fitness, you improve your concentration skills, stamina and fatigue resistance and thereby enhance your safety on the road.

It has been found that drivers have to make about 15 major decisions for each kilometre driven, each requiring almost immediate action. Experience and mature judgment are important, but older drivers often process information more slowly. Older drivers are generally safe and conscientious drivers - for some seniors the physical changes of aging can however interfere with driving responsibly and safely.

As the number of older drivers’ increases, concerns about the safety implications have been raised as well. These concerns relate to flexibility, coordination and speed of movement when controlling a vehicle on the road.

It is important to note that driving skills of senior citizens can be improved by regular exercise. Older people who performed a physical conditioning program developed by researchers at Yale School of Medicine were able to maintain or enhance their driving
performance, potentially leading to a safer and more independent quality of life.

All drivers should exercise regularly. Physical fitness is essential to safe driving, especially for seniors. Exercise can be as simple as walking for at least 20 minutes five times a week. Gardening, golf, tennis, and other activities also are great ways to keep your body in top physical condition.

**Age and Experience**

**Older Drivers**
Canada's population is aging and the number of older drivers is increasing rapidly. Our culture is quickly facing the social and personal challenges of how to accommodate large numbers of older drivers who desire to maintain their independence.

Drivers need to pay attention to several things at once. They need to scan the road, make judgments, and be able to react appropriately to changing conditions. These abilities may be slowed or impaired with the development of impaired brain function whether from the effects of medication, medical disorders, drug /alcohol or dementia. Reduced vision (particularly at night), a decrease in depth perception, and movement limiting disabilities such as arthritis and rheumatism (which slow down response time in dealing with sudden traffic changes), can all affect your ability to drive safely. Age and medical conditions affect driving ability in many ways. You may recognize the changes immediately, slowly over a period of time or sometimes not at all.

Auto collisions have become the most common cause of incidental death among people between the ages of 65 and 74 years. Alarmingly, the highest crash rate per kilometre of any age group, excluding teenagers, is among older drivers. Given all this, how can seniors and their caregivers know when it is time to give up driving? There is no clear-cut answer and simply because someone has a medical condition, it does not mean he/she should stop driving. Each person is different. For instance it may be possible for a person with Alzheimer's Disease to drive safely in the early stages of the illness. Yet, caregivers must carefully evaluate and look for the warning signs of unsafe driving in the patient. There is a growing consensus that elders with a moderate impairment of dementia should not drive.

Auto-related incidents are the most common cause of incidental death among the 65 to 74 age group, and the second most common cause among older persons in general. Today, drivers 65 and older have higher crash rates per kilometer than all other
groups except teenagers. Ability to drive may be impaired by such age-related changes as:

- hearing changes
- difficulty with night vision
- effects of medication
- diminished cognitive abilities
- reaction time changes
- failure to personally accept the consequences of ageing upon functional abilities

Maturity often brings with it a change in physical mobility. For example, can you still easily turn your head from side to side when changing lanes, or to the rear when backing up or making turns? Is there weakness in your arms or legs that interferes with accelerating, braking and steering?

Age and/or medical related changes in cartilage, ligaments, bones and muscles, decreases ability to perform the physical motions needed for safe driving. Adults with arthritis or osteoporosis can also have limited movement and painful or restricted movements that can cause serious driving problems. Maintaining a healthy active lifestyle will help to eliminate some of these problems.

**Young Drivers**

The new, young driver is learning many new skills and concepts, all at once, and often in a very stressful environment:

- How to use and control a vehicle’s immense power and force.
- How to move this powerful vehicle in relation to other vehicles.
- The rules of the road.
- How to react and manoeuver based on the behaviour of other drivers.

Teens admit to driving habits they know are risky, yet seem unfazed by the dangers. According to a 2005 survey of 1,000 people ages 15 and 17 conducted by the Allstate Foundation:

- More than half (56 percent) of young drivers use cell phones while driving
- 69% said that they speed to keep up with traffic
- 64% said they speed to go through a yellow light
- 47% said that passengers sometimes distract them
- Nearly half said they believed that most crashes involving teens result from drunk driving
- **Risk taking**- Research has found that young drivers, particularly males, are more likely to drink drive and to drive too fast for the road conditions.
- **Perception of hazards**- The skills to anticipate and accurately assess hazards develop over time. Young drivers often put
themselves in potentially hazardous situations e.g. driving too close to the vehicle in front or running red lights rather than stopping.

- **Passengers** - Young driver crash risk increases when they carry similar age passengers. This is likely to be due to distractions caused by the passengers, as well as peer pressure on the driver to take risks.

- **Night driving** - Many crashes which lead to the death of young drivers occur at night, particularly on weekend nights and when carrying several passengers. This is likely to be due to inexperience in night driving as well as risk taking.

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**“Fitness to Drive” - Recommendations**

1. We need a significant ongoing public awareness campaign along the lines of Think! (The UK road safety campaign) The messages would be that driving requires one’s full attention and should never be a “background” activity.

2. RoadHealth should coordinate a “safety corridor” similar to the initiative in the Fraser Canyon between McBride, Valemount and the Alberta Border.

3. Every effort should be made to bring driver training and road safety awareness to First Nations in the region.

4. RoadHealth should work more closely with the resource industries on joint strategies to reduce the risks for workers driving for, or to and from, work.
“Fitness to Drive” Toolkit

Fitness to Drive Quiz

Driving & Your Health (Australia)
A series of “Tool Box Talks” complete with speaking notes and power point presentations on everything from smoking to cancer to drug and alcohol use; also a great “Operator Guide”, a guide to driver health issues including a range of strategies to help operators address driver health.

DriveSharp
http://drivesharp.positscience.com/?CJAID=10685832&CJPID=3529639
DriveSharp takes a unique approach to driving safety. It is not a driving simulation or education program. Instead, it’s a brain fitness software program that sharpens the most important safety equipment of all: the mind of the drive

AAA Roadwise Review:
http://www.aaaexchnage.com/Main/Default.asp?CategoryId=3&SubCategoryId=38&ContentId=315
A Tool to Help Seniors Drive Safely Longer is a scientifically validated screening tool developed by AAA and noted transportation safety researchers. Available on CD-ROM, this tool allows seniors to measure in the privacy of their own home the eight functional abilities shown to be the strongest predictors of crash risk among older drivers. The abilities assessed in Roadwise Review include:
- Leg Strength and General Mobility
- Head/Neck Flexibility
- High-Contrast Visual Acuity
- Low-Contrast Visual Acuity
- Working Memory
- Visualization of Missing Information
- Visual Search
- Useful Field of View

http://www2.enform.ca/885
The purpose of this document is to help companies design and implement an effective fatigue management program, which can contribute to reducing the s and injuries among their workers.
Brain Fitness Plan
http://www.alzheimerbc.org/Alzheimer-s-Disease-and-Dementia/Brain-Fitness-Plan.aspx
Actively keeping your brain in good shape will help you stay mentally sharp as you age, and the Alzheimer Society of B.C.’s Healthy Brain program will give you the information you need to get started.
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