OLDER DRIVERS IN BRITISH COLUMBIA: PREDICTING FUTURE PATTERNS AND ASSESSING STRATEGIES FOR PREVENTION OF ACCIDENTS

A Report for the Insurance Corporation of British Columbia’s SMART Program

Submitted by

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Executive Summary

This report provides a comprehensive review of literature pertaining to patterns, behaviours, and policies related to older drivers in BC. It begins with a summary of demographic trends associated with population aging in this province. For example, the proportion of persons aged 65 and over in BC will increase from 12.9% in 2000 to about 20% by 2025, however, the distribution of these individuals will not be uniform because certain areas of BC attract (and retain) more seniors. Projections of older persons with driver’s licenses are calculated and discussed. Indeed, there will be at least a doubling of the sheer number of BC older persons holding a driver’s license between 2000 and 2025. Furthermore, the oldest-old drivers will also increase in numbers – we estimate that persons aged 85+ with a driver’s license will rise from about 14,000 in the year 2000 to almost 30,000 by 2025. Most persons with a driver’s license drive and about three out of four persons drive at least once per week. The health status of current and future older drivers is also addressed, especially the increase in dementia and its impact on driving risk. Although persons with dementia reduce their driving, they still tend to have about twice as many accidents per hour driving than older persons without dementia. The attitudes and driving patterns of the older driver are also examined in an effort to identify key issues for policy. Most older people are dependent on their automobile for service and social need; the majority of older drivers tend to desire to maintain driving into their advanced years; and most are not aware that they pose an increased risk. It has been estimated that drivers aged 65-69 are about twice as likely to be involved in multiple-vehicle accidents at intersections than drivers aged 40-49, and those aged 85+ exhibit rates that are more than ten times higher. The regulatory practices in BC, as well as other countries and jurisdictions, are reviewed and a
number of key issues and recommendations are presented for strategic planning efforts dealing with current and future older drivers in BC. These cover environmental design; regulatory policy; the role of family, friends, and the health professions; policy changes and educational campaigns; and transportation options. A full set of highlights and policy considerations are presented in the final section of the report.

The views expressed in this report are those of the authors. This report can not be cited in part or whole without the consent of the principal author.
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1.0 Introduction

The beginning of the new millennium is an opportune time to address issues pertaining to older drivers within the province of British Columbia (BC). In 1996, there were 850,000 Canadians aged 65 years and over who drove a car, minivan, or truck. Thus, approximately two out of five persons aged 65 and over living in private households are drivers. The proportion of older Canadians, and older British Columbians, will increase significantly in the next 25 years. Debate over these older drivers has been fuelled by statistics that demonstrate that older drivers are more likely to be seriously injured or to die in an automobile accident than drivers of all ages. Indeed, the overall accident rate among the 65-and-over age group is second to the 16- to 19-year old age group (Waters et al., 1994). The province of BC has recently introduced a graduated licensing program for new – primarily younger – drivers in response to high accident rates among this particular group. Consequently, it is possible that further policy reform, in regards to older drivers, may also be contemplated.

While this report will address policy recommendations, such examination must be viewed within a shifting demographic and social context. In particular, in order to understand future patterns and characteristics of older drivers, it is necessary to consider the ‘baby boom’ generation, given its size and placement within the age structure. For this report, the definition of the baby boom generation will be that which is most often used by researchers – those individuals born within the 20-year period between 1946 and 1966. The significance of the baby boom generation is that, as it ages, it will continue to account for a significant proportion of the Canadian population and will have a marked impact on many key social, economic, and health trends (Foot, 1996). It is widely recognized that the first age-cohort of the baby boom generation (i.e., persons born in 1946) will become 65 years of age in 2011. By 2031, the entire baby boom
generation will be 65 years of age or older, and the first age-cohort will be 85 years old.

Examination of the attitudes, health, and lifestyle behaviours of successive cohorts of Canadians is imperative in order to forecast trends associated with older drivers.

The purpose of this report, then, is to examine changing trends in the numbers and characteristics of older drivers, based on past, current, and future population and health patterns and related literature. Aside from the baby boom generation, other major demographic factors such as age, gender, living arrangements, and region will be addressed, in combination with changes in health status. This report will make comparisons among age groups across the life span. However, the primary focus will be on older drivers, who are defined in this report as individuals who are 65 years of age or older with a valid driver’s license issued by the province of BC. Research that pertains to the behaviour, attitudes and preferences of older drivers, as well as consideration of transportation options and driver regulations, will also be examined in order to better understand the key patterns as well as the social and policy contexts surrounding the older driver of today and tomorrow.

1.1 Objectives

The following objectives and guiding research questions are intended to facilitate an evaluation of issues among older drivers:

1) To integrate major population aging and population health trends for the purpose of developing projections and profiles of future older drivers.

Guiding Research Questions:

➢ How will changing trends in population aging and population health affect trends in driving among the elderly?

➢ What is the likely profile of the future older driver?
2) To review and synthesize literature on older drivers’ attitudes and preferences.

*Guiding Research Questions:*

➤ What do older drivers feel about driving?

➤ How important is driving in the lives of the elderly?

3) To evaluate research on older driver behaviour and risk.

*Guiding Research Questions:*

➤ What are the likely trends involving older drivers?

➤ How do the 75+ drivers perform compared to younger drivers?

➤ What are the major problem areas influencing accident rates?

4) To identify “best practices” of addressing problematic areas through intervention.

*Guiding Research Questions:*

➤ Does self-graduation and driving cessation work?

➤ What are the best approaches for evaluating and predicting driving performance and decline?

➤ What are the most effective regulatory interventions for reducing driving risk among older persons?

5) To develop a set of primary issues for consideration in future strategic planning exercises by ICBC and other government agencies.

*Guiding Research Questions:*

➤ What are the major issues facing policy makers in this field now and in the near future?

➤ What are the most promising methods for alternative transportation?

➤ What are the regulatory issues to be addressed by government strategic planning?
2.0 Demographic Factors and the Number of Older Drivers

2.1 Population Aging

2.1.1 National and Provincial Trends

In reviewing demographic data, it is important to consider both absolute and relative statistics. Absolute statistics reveal the actual number of individuals that comprise a certain group – in this case, older drivers. While this figure is meaningful in determining overall demand for specific services and programs, it becomes difficult to interpret when it is removed from the broader context. For this reason, it is useful to also consider relative statistics. These statistics pertain to the proportion of people, which can indicate changing trends over time, such as the proportion of older drivers within the population. The interpretation of an increase in the absolute number of older drivers is perhaps best understood when combined with a review of the relative number of older (versus younger) people who drive.

There are several reasons why it is anticipated that both the relative and absolute numbers of older drivers will increase substantially over the next 25 years. One of the primary reasons is that due to a decline in fertility rates and an increase in life expectancy, the proportion of elderly in our population has risen steadily over the past several decades. Based on standard population projections, the median age of the population will continue to increase, reaching age 44 by 2031. Consequently, the population aged 65 and over will be approximately 2.5 times as large as it is now – 9.2 million compared to 3.7 million persons (Denton and Spencer, 1997). Within the province of BC, 10.9% of the population (representing 298,200 people) was aged 65 and over in 1981. This compares to the national figure of 9.7%. The BC figures increased to 12.7% in 1991 and then dipped slightly, to 12.5% in 1996. Current estimates regarding the proportion of seniors
living in BC indicate that there are approximately 528,500 individuals aged 65 years or older, or about 12.9% of the population (BC Statistics, 1999). While this proportion is slightly higher than the rest of Canada, it is still less than Great Britain, France, West Germany, Sweden, and Italy (McRae, 1997). Canada may look to these countries to determine what, if any, policies exist regarding older drivers. In the meantime, as the baby boom generation begins to enter its senior years (in 2011), BC can expect population figures for the 65-and-over age group to rise to 13.9% by 2010 and 19.8% by 2025 (BC Statistics, 1999) (See Table 1a and Table 1b.). This will result in a doubling of the current number of seniors by the time we reach 2025. It is also noteworthy that the relative increase in the oldest age groups will be sizable. For example, persons aged 75-79, who currently comprise 2.6% of the BC population or 111,100 individuals, will increase to 3.9% of the BC population by 2025 or 228,500 individuals. The percentage of those aged 80-84 will increase from 1.7 (71,200) to 2.3% (136,000) by 2025. And persons aged 85+ will increase from the current proportion of 1.5% (60,700) to 2.2% of the BC population (127,700) by 2025.

Table 1a. BC Population Proportions by Age Group, 1991-2025

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<tr>
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<tbody>
<tr>
<td>15-24</td>
<td>13.5</td>
<td>13.1</td>
<td>13.0</td>
<td>21.4</td>
<td>11.5</td>
<td>10.8</td>
<td>10.7</td>
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<tr>
<td>25-64</td>
<td>53.8</td>
<td>55.7</td>
<td>56.8</td>
<td>57.6</td>
<td>57.0</td>
<td>55.8</td>
<td>54.1</td>
</tr>
<tr>
<td>65+</td>
<td>12.7</td>
<td>12.9</td>
<td>13.2</td>
<td>13.9</td>
<td>15.7</td>
<td>17.7</td>
<td>19.8</td>
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*Gender projections 65+*

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</thead>
<tbody>
<tr>
<td>Females</td>
<td>14.3</td>
<td>14.3</td>
<td>14.5</td>
<td>15.0</td>
<td>16.9</td>
<td>18.9</td>
<td>21.3</td>
</tr>
<tr>
<td>Males</td>
<td>11.0</td>
<td>11.5</td>
<td>11.9</td>
<td>12.7</td>
<td>14.5</td>
<td>16.3</td>
<td>18.4</td>
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*Age Group projections 65+*

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</thead>
<tbody>
<tr>
<td>65-69</td>
<td>4.2</td>
<td>3.7</td>
<td>3.7</td>
<td>4.3</td>
<td>5.4</td>
<td>5.9</td>
<td>6.3</td>
</tr>
<tr>
<td>70-74</td>
<td>3.4</td>
<td>3.3</td>
<td>3.2</td>
<td>3.2</td>
<td>3.7</td>
<td>4.7</td>
<td>5.2</td>
</tr>
<tr>
<td>75-79</td>
<td>2.6</td>
<td>2.7</td>
<td>2.6</td>
<td>2.6</td>
<td>2.6</td>
<td>3.1</td>
<td>3.9</td>
</tr>
<tr>
<td>80-84</td>
<td>1.5</td>
<td>1.7</td>
<td>2.0</td>
<td>1.9</td>
<td>1.9</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>85+</td>
<td>1.1</td>
<td>1.5</td>
<td>1.7</td>
<td>1.9</td>
<td>2.0</td>
<td>2.1</td>
<td>2.2</td>
</tr>
</tbody>
</table>
These significant increases in the older population have significant implications for policy concerning older driver issues in BC, since trends and problems will be magnified.

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</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>455,300</td>
<td>537,700</td>
<td>581,800</td>
<td>598,400</td>
<td>598,600</td>
<td>600,100</td>
<td>626,700</td>
</tr>
<tr>
<td>25-64</td>
<td>1,813,000</td>
<td>2,283,900</td>
<td>2,535,900</td>
<td>2,778,700</td>
<td>2,956,100</td>
<td>3,089,900</td>
<td>3,172,400</td>
</tr>
<tr>
<td>65+</td>
<td>428,600</td>
<td>528,500</td>
<td>587,600</td>
<td>671,900</td>
<td>813,600</td>
<td>980,600</td>
<td>1,163,700</td>
</tr>
</tbody>
</table>

*Gender projections 65+

| Females   | 243,200 | 294,700 | 325,100 | 369,000 | 443,300 | 533,000 | 633,600 |
| Males     | 185,500 | 233,900 | 262,500 | 302,000 | 370,300 | 447,600 | 530,000 |

*Age Group projections 65+

| 65-69     | 140,700 | 151,500 | 165,800 | 206,600 | 279,700 | 325,000 | 367,800 |
| 70-74     | 113,200 | 134,000 | 142,200 | 156,000 | 194,000 | 261,600 | 303,600 |
| 75-79     | 86,100  | 111,100 | 116,400 | 123,800 | 136,300 | 169,700 | 228,500 |
| 80-84     | 50,800  | 71,200  | 87,500  | 92,100  | 98,300  | 109,000 | 136,000 |
| 85+       | 37,800  | 60,700  | 75,700  | 93,400  | 105,400 | 115,400 | 127,700 |

*Data compiled from BC Population Forecast 99/03, British Columbia Statistics, Ministry of Finance and Corporate Relations, Victoria, B.C.*

In addition to population aging, increases in the proportion of persons aged 65 and over in BC will also be affected by inter-provincial and international migration patterns. Assuming that federal immigration policies remain unchanged, it is anticipated that 75% of the total population growth that will occur in BC over the next decade will result from migration – 25% inter-provincially and 50% internationally (McRae, 1997). Naturally, any change in immigration policies could alter this picture. For example, an increase in international immigrants (who are typically younger or middle-aged individuals) would affect the increasing proportion of elderly in the province. Alternatively, policy changes that reduce the number of immigrants coming into the province could result in a substantial increase in the proportion of elderly British Columbians.
and, therefore, the proportion of older drivers because most immigrants are young or middle-aged. In either case, the absolute number of older people would not have been changed significantly. Instead, it is the proportion of elderly, relative to younger persons, that fluctuates. Finally, it is worth noting that while most international immigrants are younger than age 65, there is a significant number of elderly immigrants who move into BC. At this time, it is unknown how many of these older immigrants will choose to drive in BC, or if they have any specific transportation issues that will need to be addressed.

2.1.2 Regional Differences in Population Aging Within British Columbia

Examination of the population projections of a total province is not necessarily relevant for individual regions within that province. Therefore, it is important to consider regional population projections as well.

 Currently, within BC, the population [all ages] is heavily concentrated in the Lower Mainland (54%), the southeast coast of Vancouver Island (17%), and the Okanagan region (8%). While growth is expected to continue in each of these areas, some areas are experiencing a more rapid growth in the proportion of elderly than other areas (BC Statistics, 1999). The oldest populations (persons aged 65 and over) are currently located in the Kootneys, Okanagan and Similkameen Valleys, White Rock, and southern Vancouver Island. Table 2 illustrates the proportional estimates for the provincial population aged 65 and over, according to regional districts. These projections take into account steady immigration patterns, as described above.
<table>
<thead>
<tr>
<th>Regional District</th>
<th>Total Population</th>
<th>Population Aged 65+</th>
<th>% Distrib. of Pop. 65+ in B.C.</th>
<th>% Aged 65+ in District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Males</td>
<td>Females</td>
<td></td>
</tr>
<tr>
<td>Alberni-Clayoquot</td>
<td>31,652</td>
<td>3,700</td>
<td>1,695</td>
<td>2,005</td>
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<tr>
<td>Bulkley-Nechako</td>
<td>41,642</td>
<td>2,910</td>
<td>1,480</td>
<td>1,430</td>
</tr>
<tr>
<td>Capital</td>
<td>317,989</td>
<td>57,470</td>
<td>23,480</td>
<td>33,990</td>
</tr>
<tr>
<td>Cariboo</td>
<td>66,475</td>
<td>5,650</td>
<td>2,855</td>
<td>2,795</td>
</tr>
<tr>
<td>Central Coast</td>
<td>3,921</td>
<td>245</td>
<td>120</td>
<td>125</td>
</tr>
<tr>
<td>Central Kootenay</td>
<td>58,099</td>
<td>8,570</td>
<td>3,950</td>
<td>4,620</td>
</tr>
<tr>
<td>Central Okanagan</td>
<td>136,541</td>
<td>23,355</td>
<td>10,380</td>
<td>12,975</td>
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<tr>
<td>Columbia-Shuswap</td>
<td>48,116</td>
<td>7,150</td>
<td>3,430</td>
<td>3,720</td>
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<tr>
<td>Comox-Strathcona</td>
<td>97,666</td>
<td>10,760</td>
<td>5,045</td>
<td>5,715</td>
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<td>Cowichan Valley</td>
<td>70,978</td>
<td>10,685</td>
<td>4,995</td>
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<tr>
<td>East Kootenay</td>
<td>56,366</td>
<td>6,315</td>
<td>2,885</td>
<td>3,430</td>
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<tr>
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<td>5,856</td>
<td>140</td>
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<tr>
<td>Fraser Valley</td>
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<td>30,420</td>
<td>13,575</td>
<td>16,845</td>
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<td>Fraser-Fort George</td>
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<td>Greater Vancouver</td>
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<td>91,165</td>
<td>125,250</td>
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<td>Kitimat-Stikine</td>
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<td>Kootenay Boundary</td>
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<td>5,560</td>
<td>2,495</td>
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<td>Mount Waddington</td>
<td>14,601</td>
<td>590</td>
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<td>280</td>
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<tr>
<td>Nanaimo</td>
<td>121,783</td>
<td>20,925</td>
<td>9,605</td>
<td>11,320</td>
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<tr>
<td>North Okanagan</td>
<td>71,607</td>
<td>11,560</td>
<td>5,260</td>
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<td>Okanagan-Similkameen</td>
<td>75,933</td>
<td>18,040</td>
<td>8,295</td>
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<td>Peace River</td>
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<td>1,940</td>
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<td>2,940</td>
<td>1,355</td>
<td>1,585</td>
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<tr>
<td>Skeena-Queen Charlotte</td>
<td>24,795</td>
<td>1,505</td>
<td>700</td>
<td>805</td>
</tr>
<tr>
<td>Squamish-Lillooet</td>
<td>29,401</td>
<td>1,740</td>
<td>845</td>
<td>895</td>
</tr>
<tr>
<td>Stikine Region</td>
<td>1,391</td>
<td>75</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Sunshine Coast</td>
<td>24,914</td>
<td>4,305</td>
<td>2,020</td>
<td>2,285</td>
</tr>
<tr>
<td>Thompson-Nicola</td>
<td>118,801</td>
<td>12,845</td>
<td>6,020</td>
<td>6,825</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,724,500</strong></td>
<td><strong>475,815</strong></td>
<td><strong>207,895</strong></td>
<td><strong>267,920</strong></td>
</tr>
</tbody>
</table>

It is estimated that within the next ten years, approximately 25% of individuals in the Okanagan-Similkameen region will be over the age of 65, an increase from present rates. Assuming that current driving patterns among the elderly will be maintained, the issues outlined in this report will thus be magnified for the population of that region. Other regions, such as Mount Waddington, are expected to experience a decrease in the proportion of older adults, due to the patterns of in- and out-migration among all age groups. Consequently, based on age structure alone they may face remarkably different transportation issues than other parts of the province.

The implications of population aging on transportation may differ depending on whether or not this demographic phenomena is the result of a substantial in-migration of older adults, or an out-migration of younger individuals. On the one hand, a community that attracts people to retire there, may be better able to support alternative forms of transportation due to an influx of post-retirement dollars. On the other hand, a community whose economic base is centered on a younger, working population may be less able to sustain a variety of transportation options, especially during an economic recession. In addition, because a decline in a region’s economic base may facilitate the out-migration of younger workers, seniors may be compelled to become more self-reliant – including transportation (Horne and Robson, 1983). These communities may have a vested interest in keeping their older, retired citizens mobile. However, these patterns also result in relatively high concentrations of older drivers in retirement communities.

2.2 Gender Patterns

Within the population aging trend described earlier, there are important gender differences that will also influence the increasing number of older divers. When the baby boom generation begins to enter its senior years in 2011, the proportion of BC seniors (both males and
females) will be around 14% of the population. However, due to differences in life expectancy for men and women, approximately 15% of the total female population will be comprised of women over the age of 65, compared to 12.7% for males (See Table 1a.). By 2025, these proportions will reach about 21% and 18% for females and males, respectively (BC Statistics, 1999). Furthermore, two-thirds of all persons over the age of 80 will be women. This reflects the gap in life expectancy between females and males.

Data from the Canadian National Population Health Survey (NPHS) demonstrates that within the baby boom cohort, over 90% of men and almost 90% of women hold a driver’s license (Millar, 1999). This is a departure from past trends in which rates of driving have been significantly higher for males compared to females. A major reason for the reduction in gender differences in driving is the changing role of women over the last several decades, in particular, women’s increased labour force participation. Research that has investigated both pre-retirement and retirement aged persons suggests that women have every intention of maintaining their driving privileges into their later years (Yassuda et al., 1997). Hence, long-term projections regarding driving patterns and transportation issues must recognize the increased likelihood of older women to be primary drivers.

The term ‘increased’ is emphasized in acknowledgement of the fact that license holding is much more common among the current cohort of older men than older women. According to data from the NPHS (Millar, 1999), males over the age of 80 are 2.4 times more likely than women in the same age category to hold a driver’s license. Approximately, 60% of the men in this age group are license holders. The gender difference is likely a reflection of the historical differences in the division of labour between housework and labour force participation, which are characteristic of this cohort. Consequently, it is not overly surprising that within each
sequential age cohort of seniors (i.e., 75-to 79-year olds through to 65-to 69-year olds) there is an increase in the proportion of female drivers. Thus, it is to be expected that even within the next 5 to 15 years, the gender gap currently seen among the oldest age group will narrow considerably, as greater numbers and proportions of female drivers move through the life cycle.

2.3 Living Arrangement Patterns

The large proportion of older women living alone is a relatively new phenomenon. Between 1961 and 1996 in B.C., the proportion of women aged 65 and over living alone increased from 21.2% to 35.3%. Furthermore, Table 3 shows the increase in the number of older persons living alone in B.C. with advanced age. Men aged 65 and over exhibit a rate of living alone of 16.2% (34,030/208825), whereas 35.5% (93,935/265,980) of older women aged 65 and over live alone. Among persons aged 75 and over living in BC, the rates are 19.4% for men and 43.6% for women. Regardless of the particular reason(s) why older people live alone and/or apart from family, this situation reduces the availability of other household members who could potentially assist with driving activities. Consequently, older people who live alone may be more likely to continue driving in order to maintain an independent lifestyle.
Table 3: The Elderly Population, by Living Arrangements and Sex: British Columbia, 1996 *

<table>
<thead>
<tr>
<th></th>
<th>65+</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>Persons in Private</td>
<td>200,785</td>
<td>247,425</td>
<td>448,205</td>
</tr>
<tr>
<td>Family Households</td>
<td>161,345</td>
<td>215,195</td>
<td>303,540</td>
</tr>
<tr>
<td>Non-family Households</td>
<td>39,435</td>
<td>105,260</td>
<td>144,695</td>
</tr>
<tr>
<td>with relatives</td>
<td>1,915</td>
<td>7,480</td>
<td>9,395</td>
</tr>
<tr>
<td>non-relatives</td>
<td>3,490</td>
<td>3,845</td>
<td>7,335</td>
</tr>
<tr>
<td>alone</td>
<td>34,030</td>
<td>93,935</td>
<td>127,965</td>
</tr>
<tr>
<td>Persons in Collective</td>
<td>8,040</td>
<td>18,555</td>
<td>26,585</td>
</tr>
<tr>
<td>Dwellings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals and other</td>
<td>795</td>
<td>1,350</td>
<td>2,080</td>
</tr>
<tr>
<td>related institutions</td>
<td>(not</td>
<td></td>
<td></td>
</tr>
<tr>
<td>including special care</td>
<td>including</td>
<td></td>
<td></td>
</tr>
<tr>
<td>homes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special care homes</td>
<td>6,675</td>
<td>16,835</td>
<td>23,510</td>
</tr>
<tr>
<td>(elderly and chronically</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ill)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious institutions</td>
<td>45</td>
<td>95</td>
<td>140</td>
</tr>
<tr>
<td>Service collective</td>
<td>525</td>
<td>275</td>
<td>795</td>
</tr>
<tr>
<td>dwellings §</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other †</td>
<td>55</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>Total Persons</td>
<td>208,825</td>
<td>265,980</td>
<td>474,790</td>
</tr>
</tbody>
</table>

* 20% data. Figures have been rounded, so numbers do not always add up.

§ Includes hotels, motels, tourist homes, lodging houses.

† Includes all other collective households such as penal institutions, work camps, etc.


Living arrangements should be considered in combination with marital status, since widowhood, divorce and remarriage directly affects household configurations. Statistics for British Columbia reveal that in 1996, 28.1% of women aged 64 to 74 years were widowed, compared to only 6.7% of men in the same age category. Not surprisingly, these numbers increased for those persons aged 85 and older, with 79% of women being widowed, compared to...
35.8% of men. Although a small percentage of both men and women in the 85-and-over age group either remarried or moved in with other family after becoming widowed, the majority (60.1% of women and 29.9% of men) continued to live alone (Gutman, Wister, Carrière, & Tredwell, 2000). Gender differences in life expectancy (females live about 6 years longer on average) and in remarriage rates (men remarry at higher rates), contribute to the gender pattern in rates of living alone. Moreover, the propensity for older people, especially women, to live alone may even increase among future cohorts of elderly due to rising divorce rates and falling birthrates, which affect the availability of children with whom one might coreside.

2.4 Summary of Demographic Patterns and Older Drivers

Thus, we observe that both the absolute and relative numbers of elderly will increase substantially in the future, especially once the front end of the baby boom begins to reach 65 in the year 2011, in only 10 years time. This will have direct consequences on the number of older drivers in the province. The regional distribution of these older drivers will not be uniform; high concentrations will be found in the major retirement communities developing around the province, such as in the Okanagan Valley; the Capital District; Parksville/Qualicum/Nanaimo region; White Rock as well as other areas. Yet, the largest sheer numbers of older drivers will still live in the GVRD, given its population base. In addition, migration trends will complicate these patterns in that it is considerably more difficult to predict these trends, especially international in-migration patterns. Due to the imbalance in the sex ratio resulting from differential mortality for men and women, the majority of the older population will be female; there will be approximately two females for every male aged 80 and over. Furthermore rates of driving among older women will increase in the future because of the changing role of women – in particular their increasing labour force participation, which increases driving activity. Finally,
the propensity for older persons (especially women) to live alone, partly due to higher
widowhood rates and lower remarriage rates among women likely increases reliance on an
automobile for many individuals who desire to maintain an independent lifestyle. Before
addressing health-related factors affecting driving, we will examine trends in driving among
older adults.

3.0 Trends in Driving

3.1 Driver’s License Rates

Among today’s cohort of older adults, there is a distinct yet relatively gradual decline in the
proportion of licensed older drivers, with increasing age. Data from the NPHS – as shown in
Table 4 – indicates that 71% of Canadians aged 65-to 69-years hold a current driver’s license.
This rate falls to about 23% among those aged 85 years and older, although it remains above
50% until around the age of 80 years (Millar, 1999). Furthermore, the majority (about 72%) of
persons with a driver’s license continue to drive. These data lend empirical support to focus
group research suggesting that current older drivers wish to continue driving for as long as
possible (Eisenhandler, 1990; Persson, 1993; Yassuda, Wilson, & von Mering, 1997). Many
elderly perceive driving as not just a right, but also as a necessity – in order to maintain an
independent lifestyle.
Table 4. Percentage of Canadians Aged 65+ Holding a Driver’s License

<table>
<thead>
<tr>
<th>Older Canadians Currently Holding a Driver’s License (1999)</th>
<th>65-69 Years</th>
<th>70-74 Years</th>
<th>75-79 Years</th>
<th>80-84 Years</th>
<th>85+ Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>71%</td>
<td>63%</td>
<td>54%</td>
<td>41%</td>
<td>23%</td>
<td></td>
</tr>
</tbody>
</table>

*Data compiled from Millar, 1999*

3.2 Projections of Driver’s License Rates

We can make projections of the number of older persons who are likely to hold driver’s licenses in BC by applying the above rates to BC population projections between 1991 and 2025 previously shown in Table 1B. These projections of licensed drivers have been computed in Table 5 below.

Table 5. Projection* of BC Population 65+ Holding a Driver’s License, 1991-2025

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69</td>
<td>99,897</td>
<td>107,565</td>
<td>117,718</td>
<td>146,686</td>
<td>198,587</td>
<td>230,750</td>
<td>261,138</td>
</tr>
<tr>
<td>70-74</td>
<td>71,316</td>
<td>84,420</td>
<td>89,586</td>
<td>98,280</td>
<td>122,200</td>
<td>164,808</td>
<td>191,268</td>
</tr>
<tr>
<td>75-79</td>
<td>46,494</td>
<td>59,994</td>
<td>62,856</td>
<td>66,852</td>
<td>73,602</td>
<td>91,638</td>
<td>123,390</td>
</tr>
<tr>
<td>80-84</td>
<td>20,828</td>
<td>29,192</td>
<td>35,875</td>
<td>37,761</td>
<td>40,303</td>
<td>44,690</td>
<td>55,760</td>
</tr>
<tr>
<td>85+</td>
<td>8,694</td>
<td>13,961</td>
<td>17,411</td>
<td>21,482</td>
<td>24,242</td>
<td>26,542</td>
<td>29,371</td>
</tr>
<tr>
<td>Total</td>
<td>247,229</td>
<td>295,132</td>
<td>323,446</td>
<td>371,061</td>
<td>458,934</td>
<td>558,428</td>
<td>660,927</td>
</tr>
</tbody>
</table>

*Projections were made by applying the data from 4 showing driving license rates by age to data on BC Population forecasts 99/03 from Table 1B. Note that these estimates make no assumption about changing driver’s license rates over time.*

As observed in Table 5, there are dramatic increases expected in the absolute numbers of persons aged 65 and over who will hold a BC driver’s license. For all persons aged 65 and over, the numbers will more than double -- increasing from 295,132 in 2000 to 660,927 in 2025, with the greatest increases occurring after 2010 due to the presence of the baby boom in this age group. Turning to the older age categories of elderly, there will also be a doubling of the number.

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of individuals holding BC driver’s licenses between 2000 and 2025. For the 80-84 age group, we estimate an increase from 29,192 to 55,760. For the 85+ age group, the numbers rise from 13,961 in 2000 to 29,371 in 2025.

Note that the above projections have been calculated by applying age-specific rates of having a driver’s license in Canada to BC population forecasts provided by BC Stats. It is likely, however, that these projections may underestimate the number of older people with driver’s licenses in the future because rates of driving in the general population have been on the rise and rates among older people have also been increasing. The increased number of younger and middle-aged drivers of today may result in increases of older drivers tomorrow merely because of cohort differences. Turning to senior drivers, one might also anticipate increases in driving rates simply because of changing needs and preferences concerning driving. The automobile appears to play an ever-increasing role in the lives of the elderly, connecting them to services, maintaining family and social relationships, and reinforcing their sense of independence. Furthermore, social values and preferences for independent lifestyles will likely rise in tandem with rates of living alone, which are expected to continue to increase. In general, independent lifestyles are often facilitated by automobile access and use. Therefore it would appear that the projections provided in Table 5 may underestimate driving propensity among future cohorts of older people. Indeed, US data reveal that in 1990, the number of licensed drivers who were aged 65 or older, was almost equal to the number of licensed drivers aged 15 to 24 years (National Highway Traffic Safety Administration Office of Program Development and Evaluation, 1993). We turn now to consideration of changing health status and longevity of the population as it pertains to older drivers in an effort to anticipate other potential modifications to our predictions of driving rates among this group.
4.0 Health Status and Older Drivers

4.1 Life Expectancy and Health Status

As discussed earlier, life expectancy at birth has risen over the past century, with women currently living approximately five years longer than men (BC Statistics, 1999). Consequently, it is now increasingly likely that many Canadians – including people who live in BC – will live into their 90s. Researchers are seeking to understand whether or not these increases in life expectancy are accompanied by a significant change in health status, such as higher or lower rates of chronic illness, and physical or cognitive disability. Naturally, such findings are important for estimating the health status of future older drivers. Given that driving restrictions of older adults are often based on disability status rather than age per se, it is worthwhile considering what researchers suggest might happen in the future in regards to disability rates.

In terms of predicting future life expectancy and disability rates among the elderly, researchers have tended to examine two opposing hypotheses. One scenario, presented in the literature as Fries’ hypothesis of compression of morbidity, offers a relatively rosy picture of aging and illness (Fries, 1980). This hypothesis assumes that, as a result of continuing advances in the medical arena, life expectancy will ultimately become fixed at a certain threshold such as 115 years of age, but with concurrent reductions in the negative impact of chronic and disabbling diseases. The second hypothesis assumes that an increasing life expectancy will lead to a growth in the prevalence of disabilities across those years. That is, as people age, they become more susceptible to chronic illnesses, which can (sometimes) be disabling. Within this scenario, an aging population will mean greater proportions of frail, chronically ill elderly.

At present, it is possible to find evidence in the literature that, in part, supports both theories. On the one hand, researchers can point to the large proportion of the population who
live with increased disability in their later years (Robine, Bucquet, & Ritchie, 1991). Indeed, much has been made of the fact that medical science has yet to be successful in establishing a cure for chronic, non-fatal conditions such as arthritis or dementia. As a result, incidence rates for these conditions have been increasing among the growing elderly population within the developed world (Guralnik, 1991). As shown in Table 6, additional evidence includes data from the 1991 Health and Activity Limitations Survey which indicates that approximately 44% (181,930) of all persons aged 65 and over who live in BC report some degree of disability – over one-third of which was ranked as ‘severe’ (Gutman, Wister, Campbell, & Duguid, 1995).

Table 6: Disability Rates of the Population Aged 65+: Canada and British Columbia, 1986 and 1991

<table>
<thead>
<tr>
<th></th>
<th>65+ Disability Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1986</td>
</tr>
<tr>
<td>Canada</td>
<td>45.5</td>
</tr>
<tr>
<td>B.C.</td>
<td>43.4</td>
</tr>
</tbody>
</table>

Sources:

Data from the 1994-95 NPHS show that one-third of Canadian men and women aged 65 to 74 years reported being restricted in their ability to perform activities of daily living (e.g., bathing, dressing, meal preparation, shopping). For persons over the age of 75, this figure increases to over 40%, with almost 50% of women in this age group reporting an activity restriction (Rosenberg and Moore, 1997). Thus, there is ample evidence to suggest that almost half of all elderly persons living in the community have some level of functional impairment or disability. However, before considering how disability rates are associated with driving ability,
let us consider the evidence that supports the notion that the incidence rates of chronic illness and
disability might be expected to decline in the future, at least for certain subgroups in society.

While we have witnessed only moderate decreases in mortality rates due to
cardiovascular disease, more significant improvements have been observed with respect to
corresponding morbidity rates, as a result of controlling associated risk factors such as
hypertension. Furthermore, there are subgroups in society who are experiencing better health in
old age than previous cohorts. For example, individuals with higher socio-economic status are
experiencing an increase in disability-free life expectancy – that is, the number of years of life
remaining free of disability (Robine et al., 1991). Thus, from a population health perspective, the
possibility exists for certain segments of the population to experience fewer chronic health
problems and fewer disabling conditions as they age. However, it is important to examine
disability more closely, given that certain types and combinations of conditions have greater
impact on driving ability and driving rates than others.

4.2 Disability and Driving

The clarification of meanings for disability, impairment, and handicap becomes important
when integrating population health data for the purpose of developing projections and profiles of
older drivers. A ‘disability’ is defined by the World Health Organization (WHO) as a
physiological abnormality in the function of limbs or other body parts due to illness or anatomic
deformity (World Health Organization, 1980). According to the WHO terminology, a disability
is distinct from either an ‘impairment’ or ‘handicap’ inasmuch as an individual with a prosthetic
limb is considered to have a disability, but not necessarily a functional impairment or handicap.
For example, the individual may experience few functional limitations when interacting with his
or her environment – e.g., vehicle – as a result of the prosthesis. Or, they may overcome a
potential handicap by having their vehicle adapted to meet their needs. On the other hand, it is important to acknowledge that some conditions cannot be readily overcome with skills training or environmental adaptations. Thus, some people with disabilities experience a significant impairment or handicap with regards to driving whereas others do not. As well, the degree of impairment associated with a particular disability can be highly variable – both within and between individuals (Millar, 1999).

An additional problem that surfaces when attempting to understand the complex relationship between health status and driving stems from the use of subjective versus objective measures of health. There is an apparent paradox, in that self-reported health status seems incongruent with reported levels of diagnosed (objective) chronic conditions. This means that individuals may report objectively ‘severe’ chronic health problems yet subjectively rate their health status as ‘good’ or even ‘excellent’ (Rosenberg et al., 1997). On the one hand, this picture could depict individuals who have strong coping strategies, who are ‘survivors’. On the other hand, this pattern may imply that individuals tend to underestimate their disability or impairment, and overestimate their ability to perform demanding tasks in the face of such limitations. This is an important distinction that will be discussed in relation to driving habits and management decisions.

This report has already spoken to the issue of disability rates among older adults, generally. We turn now to the key question: to what extent do older adults who drive experience health limitations of significance?

Chronic conditions that are likely to impact driving ability include arthritis, cataracts, diabetes, stroke, and dementia (Canadian Medical Association, 1999). Using data from the 1996-97 NPHS, Millar (1999) noted that more than 50% of individuals aged 65 and over whom
had arthritis, cataracts, or diabetes continued to hold a driver’s license. In addition, 49% of people with ‘severe’ chronic pain, 54% of people with glaucoma, and 54% of people with heart disease held a valid driver’s license. In contrast, only 36% of individuals who had experienced a stroke were licensed drivers.

Unfortunately, averages from large data sets such as the NPHS do not reflect the heterogeneity in the elderly population (Bass, Torres-Gil, & Kutza, 1990). Nor do these percentages indicate the quality of driving among the 50% of older drivers who reported two or more chronic health problems (Millar, 1999). To restrict a driver’s license based solely on the presence of a particular chronic condition (or several, in combination) is unrealistic in that the impact of these conditions on overall functioning is variable. It is vital to identify potential impairments that specific chronic conditions may produce, (such as vision or agility loss) and then determine how closely related these impairments are to actual driving ability. For example, it is evident that disabilities such as arthritis can yield very different levels of functioning in individuals (Waller, 1992). The same may be argued for other physical or cognitive disabilities, although this is not meant to downplay the fact that some conditions can severely impair an individual’s ability to drive. Obviously, the safety implications for individuals and other members of society must be weighed carefully (Klavora, Young, & Heslegrave, 2000).

Given that a chronic condition does not necessarily result in impairment, Millar (1999) considered the link between functional limitations and holding a driver’s license. He reported that 47% of seniors with an uncorrected hearing problem were licensed to drive – not necessarily an alarming statistic if one concedes that driving requires more cognitive, visual, and manual dexterity skills than hearing. But, it is perhaps disconcerting to note that 26% of seniors with a serious cognitive impairment, 34% of seniors with an uncorrected visual problem, and 37% of
seniors with decreased manual dexterity held a valid driver’s license. Moreover, there was evidence to suggest that the majority of license holders actually drive their vehicles – 72% of license holders 65 years and over drove three or more times per week (Millar, 1999). Table 7 shows the nature of disability among older persons living in BC who reported any type of disability. Among persons aged 65 and over reporting a disability and living in private households, the high rates for mobility problems (64.1%), agility (60.6%), and sight (19.4%) further suggest that reduced functional status associated with driving is common among older adults. Although these rates include mild, moderate and severe levels of disability, the more serious disabling conditions are more common among older persons aged 80 and over.

Table 7: Population Aged 65+ with Disabilities Residing in Households and Health-Related Institutions, by Nature of Disability: British Columbia, 1991

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Seniors with Disabilities Residing in:</th>
<th></th>
<th></th>
<th>Seniors with Disabilities Residing in:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td>122,850</td>
<td>67.5</td>
<td>100,900</td>
<td>64.1</td>
<td>21,950</td>
<td>89.6</td>
<td></td>
</tr>
<tr>
<td>Agility</td>
<td>117,970</td>
<td>64.8</td>
<td>95,485</td>
<td>60.6</td>
<td>22,485</td>
<td>91.8</td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td>91,085</td>
<td>50.1</td>
<td>80,940</td>
<td>51.4</td>
<td>10,145</td>
<td>41.4</td>
<td></td>
</tr>
<tr>
<td>Seeing</td>
<td>39,785</td>
<td>21.9</td>
<td>30,500</td>
<td>19.4</td>
<td>9,285</td>
<td>37.9</td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td>19,025</td>
<td>10.5</td>
<td>12,270</td>
<td>7.8</td>
<td>6,755</td>
<td>27.6</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>53,195</td>
<td>29.2</td>
<td>37,590</td>
<td>23.9</td>
<td>15,605</td>
<td>63.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>181,930</td>
<td>100.0</td>
<td>157,425</td>
<td>100.0</td>
<td>24,505</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

* Individuals may report more than one type of disability. Therefore, columns do not add to the totals.

Source:

It is also important to note that there may be an interaction effect among disabilities in an individual, as the number of reported disabilities increases with age (Waller, 1992; Rosenberg et
al., 1997). McKnight and McKnight (1999) have noted that a strong correlation exists among deficits that is stronger than the correlation between disability and potentially dangerous driving habits in their examination of specific cognitive and physical abilities. This finding is important to keep in mind when conducting multivariate analyses between disabilities and accidents because co-morbidity and interactions among conditions may be more detrimental to driving ability than individual risk factors. It may also be more difficult to factor out individual disability variables than other high-risk indicators such as past accident history (McKnight and McKnight, 1999). The individual as a whole, with a number of interacting disabilities, will likely need to be assessed in terms of that individual’s potential risk and driving treatment possibilities.

4.3 Cognitive Disability

In addition to the possibility of increasing rates of chronic disease and physical disabilities among elderly individuals, there is growing concern regarding cognitive changes among the aged. Impairments in memory, judgment, information processing, and decision-making may be evidence of cognitive problems that signify dementia, which in turn, is believed to contribute to increased risk of motor vehicle crashes among older adults (Carr, 1997). Although the literature is careful to avoid stereotyping all older adults as having cognitive impairments, there is support for the idea that incidence rates of dementia will increase as the population ages.

The Canadian Study of Health and Aging (Canadian Study of Health and Aging Working Group, 1994) documents the following prevalence rates for dementia in Canada; 2.4% among persons aged 65 to 74, 11.1% among those aged 75 to 84, and 34.5% among the 85+ group. The number of dementia cases is estimated to triple by the year 2031, if current prevalence rates
remain constant. This figure is significantly higher than the estimated increase in dementias in
the total population of only 1.4%.

As noted previously, 26% of Canadians over the age of 65 with a serious cognitive
problem (defined as very forgetful or unable to remember/think) had a driver’s license in 1996-
97; 57% of elderly people with some cognitive problems (defined as somewhat forgetful or
having difficulty thinking) continued to drive (Millar, 1999). Thus, it appears that people with
more severe cognitive impairments are less likely to drive. Whether this decision is initiated by
the individual, themselves, or by family members or physicians, is an issue requiring further
attention by researchers.

In an effort to determine the risks posed by drivers with cognitive disabilities, several
research studies have been conducted in developed countries with a large elderly population
(e.g., Sweden). Many of these studies, which use crash data, have shown that older drivers
continue to drive after onset or diagnosis of dementia (e.g., (Logsdon, Teri, & Larson, 1992;
Dubinsky, Williamson, Gray, & Glatt, 1992; Cooper, Tallman, Tuokko, & Beattie, 1993;
Tuokko, Tallman, Beattie, Cooper, & Weir, 1995)). Although 50% of drivers with dementia stop
driving within three years of onset, this means that half continue to do so (Friedland et al., 1988;
Drachman and Swearer, 1993). Some studies report that drivers with a dementia (specifically,
Alzheimer’s Disease) are up to two times more likely to be involved in a motor vehicle accident
than other older drivers (Cooper, Tallman, Tuokko, & Beattie, 1993). Research also shows that
the actual crash rate for drivers with dementia is no different from that of drivers who are under
26 years of age (Carr, 1997). However, there is support for the idea that reduced duration of
driving after diagnosis of dementia was associated with decreased crash risk (Friedland et al.,
1988; Tuokko et al., 1995). Hence, although the majority of drivers with dementia do not
experience a vehicle crash, they are at greater risk relative to age-equivalent control groups without dementia (Carr, 1997), especially when taking into account number of hours driving (Cooper, Tallman, Tuokko, & Beattie, 1993).

Despite the number of research studies that have been conducted on driving and dementia, the exact stage of disease at which the risk becomes unacceptable and driving becomes hazardous has yet to be determined (Lundberg et al., 1997). Data suggest that individuals with early stages of AD (within the first three years of onset) may not necessarily have higher crash risks than matched controls without AD (Drachman et al., 1993). Some researchers (i.e., (Stutts, 1998; Cotrell and Wild, 1999) have argued that driving exposure could be a mitigating variable—that is, drivers with dementia may reduce their vehicle use. Others, however, contend that drivers in the early stages of dementia may not be aware of their cognitive impairment and may be less likely to restrict their driving and, in turn, increase their accident risk (Carr, 1997; Millar, 1999). Given that neither diagnosis alone, nor duration of time since onset, appears sufficiently predictive of driving ability, further studies are needed to identify the best predictors of driving risk (Carr, 1997).

The need to develop accurate and reliable screening tools, and to determine the most appropriate method of administration, remains a recommendation of many researchers. Carr (1997) argues that an important starting point is to identify those clinical and/or psychometric variables that would predict drivers who are at risk for a crash. The Canadian physician consensus guidelines for the management of dementing disorders suggest looking for significant deficits in visuospatial abilities, attention and judgment, including asking the patient and caregiver about driving problems, accidents or infractions (Patterson et al., 1999). The tests utilized by most specialized driver assessment and rehabilitation centres provide information on
overall perceptive-cognitive skills. These include visual scanning ability, reaction time to visual stimuli, figure-ground discrimination, spatial relations, visual memory, visual processing time, and direction sense (Korner-Bitensky, Sofer, Kaizer, Gelines, & Talbot, 1994). Most, if not all of these tests are standardized assessments and produce an objective measure of an individual’s ability to drive (Klavora et al., 2000). However, it would be a massive and costly undertaking to identify and test all elderly license holders who experience chronic physical illnesses or cognitive disabilities. Thus, researchers such as Millar (1999) have suggested that policy and program administrators should invest time and financial resources in providing alternative forms of transportation that would meet the needs of elderly people who can no longer drive. The reasoning behind this suggestion is that if older adults are offered an alternative to driving, some may decide to surrender their driving license voluntarily.

4.4 The Future Health of the Elderly

While there is little doubt that life expectancy will continue to increase, there is considerable uncertainty as to whether people living longer will do so with greater physical and cognitive illness. Evidence suggests that some forms of chronic conditions are decreasing among the baby boomers (i.e., cardiovascular disease), while others are on the increase (i.e., diabetes). But even if future cohorts of elderly exhibit better physical functioning and fewer chronic illnesses, rates of cognitive dementia appear to be on the rise. The literature on dementia is still in its infancy and we need more research before our understanding of its impact on driving ability is adequate enough to make better predictions. In particular, we need to ascertain how various stages of the illness affects driving ability and the extensiveness of self-graduation (either voluntarily or with the assistance of family and health professionals) among individuals suffering from this disease.
Albeit, anticipated increases in rates of dementia will ultimately result in increases in accidents caused by older drivers with more progressive forms of this disease.

5.0 Driving Attitudes and Preferences Among Older Drivers

5.1 Theoretical Perspectives

There are a number of classical psychological theories of aging that may be used to address the issue of older drivers. The following section will apply a review (Schroots, 1996) of these theories to the topic of driving.

In his Developmental Tasks Theory, Havinghurst reasoned that throughout the life-span, humans face tasks which, if achieved successfully, can lead to happiness and success with later developmental tasks. Conversely, failure to achieve key developmental tasks can result in unhappiness and difficulty with later tasks, not to mention the disapproval of society. Driving may be considered one of the developmental tasks that an individual encounters at a relatively early stage in his or her life. A driver’s license obtained at 16 to 18 years of age is often associated with a first job. Subsequent financial earnings and continuing maturation in the work force facilitates the purchase of an automobile. Expensive automobiles are symbols of financial success. For every adult, the daily activity of their lives centers on the convenience of the automobile, such that not having a vehicle can increase the stress of daily life.

Without a driver’s license, the elderly individual can experience difficulty in completing tasks that depend on mobility, independence and convenience. There may also be an unconscious disapproval from society for those without a license, as it not only acts as permission to drive, but is often called upon as means of identification. Although identification cards can be obtained
in lieu of a driver’s license, the expectation is that everyone over a certain age has a driver’s license and is able to readily produce it.

Supporters of the Disengagement Theory perceive that a natural and normal withdrawal from social roles and activities occurs as individuals enter into old age. Thus, driving becomes one of many activities from which the elder withdraws as they age, given that driving becomes less of a necessity for people who are withdrawing from social roles. The elderly driver is expected to voluntarily give up driving, based on the premise that they are no longer in need of a car. Such an assumption can lead to an understanding that the state may impose restrictions and bans on older drivers without fear of a major backlash from a population of disengaging elderly. The results from elderly focus groups, however, tend to provide little support for the applicability of Disengagement Theory to elderly drivers (Eisenhandler, 1990).

For those elderly drivers who involuntarily surrender their license, Gillins (1990) proposes an adaptation of Kübler-Ross’s theory on loss and grieving. An elderly person may experience denial when it comes time to acknowledge declines in physical and cognitive ability, anger and bargaining when driving restrictions or license suspension are invoked, and depression over the loss of their driver’s license. For example, it has been found that driving cessation was associated with increased depressive symptomology even when socio-demographic and health-related factors were taken into account (Marottoli et al., 1997). These researchers caution against imposing arbitrary decisions to cease driving based on age, and argue the need to develop appropriate transportation alternatives, to facilitate the transition from driver to non-driver among the elderly.

Activity theory proposes that the elderly maintain a positive sense of self by substituting new roles for those roles that are lost as a result of increasing age. Driving is an important factor
that may influence how likely it is that new roles will be adopted and how easily transitions to 
new roles can be made. The retired elderly individual who takes up volunteer work, or an active 
grandparenting role, or manages a daily golf game or other social activity, may rely on their 
continuing ability to drive to get them to and from these new activities. Elderly drivers who 
perceive themselves as competent and independent members of society are more likely to be 
content and well-adjusted members of society. Negative aspects of aging can therefore be 
balanced by positive feelings associated with holding a driver’s license which, in turn, can mean 
less depression and greater adaptability to old age.

Baltes (1987) has proposed a theoretical framework that fits well with how elderly 
drivers gradually change their driving habits to compensate for perceived losses in driving 
ability. Within the ‘selective optimization with compensation’ model, older adults select 
functional domains in which restriction becomes necessary due to losses associated with age; 
they add or maintain behaviours that enrich and augment their life choices, and they compensate 
in other domains when functioning falls below certain standards. This framework accommodates 
elderly drivers who make gradual changes to their driving patterns in order to accommodate age-
related physiological and psychological changes while maintaining the positive aspects of life 
that driving affords them.

5.2 The Perspective of Older Adults Who Drive

Within North American society, the driver’s license is symbolic of one’s competency, as 
well as proof that one belongs to a larger mainstream world. The driver’s license confers positive 
status on its holder regardless of age, and is firmly grounded in the autonomy, independence, 
choice and convenience that an automobile and a driver’s license allow. The loss of one’s 
driver’s license is akin to losing one’s identity as a competent, independent individual and,
therefore, is not something that is surrendered willingly by many older adults (Eisenhandler, 1990).

Eisenhandler (1990) refers to the driver’s license as an ‘asphalt identikit’ (identity kit), a term which she coined after engaging in focus group discussions. Generally, the elderly participants were strongly opposed to surrendering their driver’s license, whether or not they acknowledged functional impairments that may compromise the safety of themselves or others. This idea speaks to the intensity of emotional and psychological value that a driver’s license holds. Possession of a license protects the elderly against disruption of their identity. Whereas, losing or giving up a license leads to dependency on others, be it family, friends, or public transportation. Such neediness is not seen as a positive condition, since it involves taking on a stigmatizing identity of frailty and/or incompetence. These points are borne out in recent focus group research.

In a series of ten focus groups, Persson (1993) met with 56 seniors from a retirement community to determine their perceptions of driving management and cessation. The seniors involved in these groups had all stopped driving within the previous five years. Under the direction of a moderator, participants discussed feelings and experiences in their later years as a driver. Other topics for discussion included troublesome aspects of driving, medical problems and medical advice related to driving, concerns of family or friends, events leading up to a decision to stop driving, difficult adjustments to not driving, and current attitudes towards friends who were having difficulty driving.

Persson (1993) found that 84% of participants reported feeling that they had stopped driving at “about the right time” (p.89), albeit reluctantly. Most of them (80%) noted that they had followed a pattern of gradual change in driving habits including not driving at night, staying
away from heavy or fast traffic, driving fewer [kilometers], and driving without passengers. Participants reported a variety of events that contributed to driving cessation, with no single reason presented as the primary cause. The most frequently cited reason was advice from their doctor (27%), with 20% noting increased difficulty seeing pedestrians and other cars. Another 20% reported that increasing nervousness behind the wheel was one of the reasons why they had stopped driving. Only 16% stated that advice from family and friends’ was a contributing factor to their driving cessation. Other reasons cited by the participants included increased car costs, lack of enjoyment in driving, getting lost, increased health problems, moving to a retirement centre where transportation was provided, and having a minor accident. Participants emphasized that the decision to stop driving should ultimately be a matter of personal choice and not something to be dictated by physicians or families. In fact, more participants had received advice to stop driving – 32% from physicians and 33% from relatives—than had actually done so. Several participants mentioned that regular, objective testing of older drivers would be a more desirable way of determining driving ability.

Similar to the research by Persson (1993), Yassuda et al. (1997) conducted a focus group using a sample of 59 upper-middle class elderly (aged 62 to 94 years) living in retirement communities. In contrast to Persson’s sample of ex-drivers, 81% of this group were current drivers. As a result, the discussions tended to focus on how to continue driving for as long as possible, that is, driving management issues. Participants spoke of self-managed ways to reduce accident-risk and extend safe driving such as avoiding night driving, heavy traffic, bad weather, and left-hand turns. As with the earlier reports, participants in this study raised themes such as feeling nervous as a driver or passenger, viewing the car as a means of independence, and wanting to see improved visibility of road signs as a way of helping older drivers. Converse to
the previous study, the majority of participants believed that others (e.g., physicians, family) should be the ones responsible for making driving cessation decisions. However, for those in the group who had lost their license due to acute health problems and/or the decision of others, the event was extremely traumatic. As one woman noted, “only losing my husband has been worse than losing my car” (Yassuda et al., 1997, p.534). The lack of a feasible transportation alternative was cited by many of the participants as a reason why driving cessation was not viewed as an option. Indeed, a third of current drivers stated that they would continue driving until obliged to stop by circumstances that were both beyond their control and unforeseeable. These drivers were also asked at what age they thought they should retire from driving. Interestingly, they gave an age that was seven years higher than the average age that ex-drivers in the study had ceased driving.

There are certain limitations to the generalizability of such focus group findings. The small sample in the above studies may not be representative of the general older population. For example, the majority of participants in the reported studies were highly educated whites. It is possible that high levels of education lead an individual to feel better prepared in assessing their own risk and safety in driving, with little dependence on outsiders’ opinions. Those having less education may be more willing to take the advice of others in this regard, especially advice from professionals.

In summary, these focus group studies clearly demonstrate that older adults perceive driving as their right, as well as an important part of their identity. Elderly drivers are primarily concerned with keeping their licenses for as long as possible, have strong emotions connected to having a license, and see themselves as driving for a significant number of years. Thus, self-graduation as a sole means of driving reduction appears to be insufficient for many individuals.
The results from the focus groups suggest that there are mixed feelings about having others become involved in decisions regarding driving reductions or cessation. As in Persson's study (1993), individuals in Eisenhandler's study (1990) tended to believe that they would know when it was time to give up their license, although few could actually pinpoint precipitating factors or events that would prompt them to give up their license. Perhaps because of this uncertainty, participants in the study by Yassuda et al. (1997) seemed more receptive to transferring this control to other people, such as those in a position of authority. Decision-makers may wish to look at incorporating methods that address preparation for both self-graduation and cessation as a means of supporting older drivers who are facing these changes in lifestyle.

6.0 Older Driver Behaviour and Risk

The preceding results of numerous focus groups contradict the assumption that many older drivers will no longer need, or want, to drive once they retire from work. According to Rosenbloom (1993), the connection between settlement patterns and vehicle ownership have reinforced the importance of automobiles within North American society. The concomitant increase in the significance of vehicle and home ownership during the 20th Century meant that working-age persons could afford to purchase a home in the suburbs or rural areas, and commute to/from work. The value of vehicles became cemented when the mobility they offered became necessary not only for employment, but also for shopping, medical appointments, socialization, and leisure activities (Hunt, 1993). Moreover, as workers aged and retired, they tended to remain in the suburban and rural areas (where public transportation is limited or non-existent), thus maintaining their dependence on the automobile (Rosenbloom, 1993).
Urban-dwelling elders are no less dependent on their vehicles for transportation. According to Statistics Canada (1999), seniors most frequently use their vehicles for shopping (95% for urban, 89% for rural), and personal appointments such as physicians’ visits (83% for urban, 72% for rural). Approximately 70% of urban elders and 60% of rural elders use their vehicles to attend social visits with family or friends. Less than 50% of private vehicle travel by the elderly involves long-distance trips or leisure driving. Thus, whether it is for social or practical reasons, for mobility or for independence, the automobile represents an important and regular method of travel for many older adults.

Perry, Wheeler, & Schiflett (1992) compiled a list of elderly driver habits that were distinguished from average driver habits. They found that the elderly driver tends to be more cautious, drive 30% to 50% less often and for shorter distances, stop more often, drive less in bad weather or at night, avoid rush hour traffic, and avoid major highways. In addition, the elderly driver tends to make slower and fewer lane changes, break more and accelerate less, and have problems with changing lanes, left turns, highway on-ramps and with reading signs. In terms of traffic violations, they tend to be fined for failure to signal, following too close, travelling too slowly and turning improperly.

Several of these habits can serve to increase the accident risk among older drivers, although it is important to note that bad driving habits do not necessarily lead to an accident (Cox, Taylor, & Kovatchev, 1999). The fact that older drivers are often aware of their compromised driving ability means that they self-regulate their exposure to that risk. In fact, McGwin and Brown (1999) contend that one advantage to the driving style of older drivers is their aversion to risk. That is, many older drivers consciously modify their driving patterns to maximize their driving competence. Moreover, if the elderly driver has a chance to choose their
position and pace in traffic, researchers have found that these older driver perform much better. Nonetheless, there is serious cause for concern when an older driver may lack insight into their decline in driving competence and, thus, not perceive a need to self-regulate their driving habits (Dobbs, 1997).

In terms of overall crash involvement rates, the elderly have far fewer crashes than other age groups. However, the ratio of elderly crashes to actual distance traveled, indicates the 65 years-and-older age group pose a similarly high risk as those under 25 years of age, with middle-aged drivers posing the lowest risk, thus creating a U-shaped curve. For the 80 years-and-older age group, the risk more than doubles compared to the 65 and over age group (Rosenbloom, 1993; Retchin and Anapolle, 1993; Yassuda et al., 1997; Cox and Cox, 1998).

However, older drivers appear to exhibit different driving behaviours associated with crash risks. A higher percentage of drivers over the age of 70 are involved in right of way and traffic sign violations than younger drivers. A higher percentage of 80 to 89 year-olds are involved in speed infractions, and many more elderly drivers have problems negotiating intersections safely and are more likely to be involved in multiple vehicle accidents (Retchin et al., 1993). In a US study (Preusser et al., 1998), drivers aged 65-69 were 2.26 times more at risk than drivers aged 40-49 for multiple-vehicle involvements at intersections compared with 1.29 times for all other situations. For the 85+ age group, the probabilities were 10.62 for multiple-vehicle accidents at intersections and 3.74 times for all other situations.

Overall, infractions most often cited in the elderly include failure to yield, changing directions unsafely, failure to obey traffic signs and signals, careless intersections crossings, improper and inaccurate turns, careless and improper lane changes, careless merging, careless backing (Perry et al., 1992). Cox et al. (1998), in a recent letter to the Journal of the American
Geriatrics Society, bring forth their findings that in a sample of 70 observed drivers, 11 “elderly drivers” took significantly longer in making their left turns than other drivers. The researchers postulated that this meant the older driver had a higher exposure time to oncoming traffic, which may be contributing to the higher accident rates at left turns. Furthermore, Perry et al. (1992) report that most accidents for the elderly driver are rear end collisions (27.5%), traffic signals (19%), stop/yield signs (14%), loss of control (13.5%), backing out of driveways (9.5%), improper lane changes (9%), and non-intersection turns (7.5%).

Thus, there is persuasive evidence that older drivers have higher accident rates per hour driven and that these accidents tend to involve visual problems, concentration, reaction time, and other sensory-motor tasks necessary to operate a motor vehicle. Negotiation of intersections, especially left turns, stand out as a major area of concern, but it is not the only one. While older drivers tend to compensate for some deficiencies in sensory-motor tasks (e.g., driving more slowly), some of these behaviours can actually increase accident risk. As our population ages, policy and regulatory approaches to this issue become more crucial. We turn now to a discussion of policy and regulatory changes related to older drivers.

7.0 Policy Considerations
Given that it is inevitable that driving ability declines with advanced age, and that crash rates increase, the experiences of many countries indicates that it is not a simple matter to institute regulatory policy and practices. Cobb & Coughlin (1998) contend, as do others, that there is a diversity of imperfect licensing controls dealing with this problem across US states. Yet, since self-graduation does not appear to work in isolation, regulatory practices may be required to
lower risk, graduate driving, and remove dangerous drivers from the roads (Cobb & Coughlin, 1997). Below we address a number of policy areas for consideration.

7.1 Environmental Design Policy

While there are several steps that seniors can take to reduce their accident risk, it is also important to acknowledge environmental factors that contribute to increased risk. These include highway design and vehicle design (Schieber, 1994). Road signs and signals are an obvious area that deserves consideration. It would be relatively easy to gradually increase the visibility of signage over time, especially around intersections. Reduction in the complexity of highway merges and dangerous intersections is another. Furthermore, vehicle design may be adapted to facilitate driving for older drivers, such as reduction of glare, ergonomics of the driving seat and controls, and in-vehicle intelligent transportation systems (Caird et al., 1998). Adjustable seats and mirrors help to improve vision. In addition, there have been developments in the area of special controls for individuals with physical limitations, such as weak grip strength. Further research that focuses on the interaction of environmental and individual human factors is needed. Some developments have been shown to be successful in retirement communities such as Florida, but further work is required to examine wider dissemination and best practices in environmental design of roads and vehicles. We turn now to a discussion of regulatory practices.

7.2 Regulatory Issues and Practices

7.2.1 Current Regulatory Practices in BC

This section begins with a brief description of the current policy context in BC concerning testing, graduation and cessation of drivers who are in their senior years. First, six months before reaching their 80th birthday, all residents receive a letter from ICBC requesting
that they undergo a medical examination, which must be submitted within 45 days of receipt. They are also required to undergo a medical exam every two years after the age of 80. If there are physical or medical problems associated with the individual (e.g., serious visual impairment), then they must take a vision and road test exam and be evaluated by a driver examiner. Second, if a licensing office receives information from a family member, friend, doctor, or police officer indicating that a licensed driver is a high risk, then they would also be required to be examined. In either situation, an individual may have their license renewed; have their license not renewed; or they may have restrictions placed on their driving (graduated licensing), such as limits on night time driving, distance driving from the home residence, etc. It should also be noted that it is mandatory for a doctor to report high risk drivers because of physical or cognitive problems.

There is some discussion regarding the implementation of a graduated licensing system, under which older drivers would take a second road test in order to better test competence. The additional testing would facilitate more accurate assessment in order to identify restrictions or graduation of driving. This issue will be further discussed in the subsequent sections of the report in which we cover policy issues and options found in a number of different constituencies.

7.2.2 Driving Rights and Age-Based Testing

The Canadian Charter of Rights and Freedoms, section 7 says that “Everyone has the right to life, liberty, and security of the person, and the right not to be deprived thereof except in accordance with the principles of fundamental justice” (Bryden, 1994). Some have tried to interpret the right to liberty equivocal to the right to drive. However, Chief Justice Nemetz of the BC Court of Appeal has noted in Regina vs Robson that “Liberty” under the Charter cannot be taken to create an absolute right to drive. Age, infirmity and other impediments may restrict the granting of driver’s licenses. However, once the license is granted,
there becomes attached to it the general liberty to employ one’s skill and ability -- in this case the ability to drive. Accordingly, such liberty constitutes a right under the Charter and a person cannot be deprived of it except in accordance with the principles of fundamental justice (Bryden, 1994). For the elderly driver, there is some comfort in this statement in that revoking a license must be done in a just manner and not indiscriminately. Thus, there is little legal support for introducing age-based suspensions, though the path lies open to have individuals retested in a fair and just manner, upon reaching a certain age, such as the method used in BC. Policies instituted by some US states using an age-based criterion for more frequent license renewal among the elderly has found support in the literature (Mercier & Falb, 1997). These authors suggest age 75 as a threshold, rather than the 80 year criterion used in BC for a medical exam. Yet, full mandatory retesting at a specific age has not been widely adopted due to its cost and remains a politically sensitive issue (Cobb & Coughlin, 1998). There are several other more common regulatory methods used to regulate older drivers, which we turn to now.

7.2.3 Common Regulatory Methods Cross-Nationally

There are a number of regulatory practices that are currently being used to identify older drivers with safety concerns due to lower physical and cognitive functioning. These tend to apply to all drivers rather than be age-based. The most common approaches used are: restricted or graduated licensing; vision exams; knowledge assessment and road testing (Cobb & Coughlin, 1997).

Restricted or graduated licensing is a common practice in BC and in most of the US states and many other countries. Any driver with a vision problem is typically assessed and restrictions may be imposed limiting driving to time of day, daylight, distance from the home and selected routes (Cobb & Coughlin, 1997). Testing by a driving examiner may involve a
vision test, knowledge tests of traffic rules, and actual road testing. Although vision tests and knowledge tests are useful in identifying high risk drivers of any age, these testing methods are not always adequate (Shinar & Schieber, 1991). Performance-based driving evaluation tests appear to be the best method and have been shown to be valid and reliable (Odenheimer et al., 1994). Their problem is that there needs to be a system in place to flag high risk drivers, since comprehensive age-based testing is problematic because of the costs as well as the legal/political issues raised above. Flagging methods typically include an examiner’s observation of a driver’s fitness, driving record, or medical reporting. But flagging methods are often inaccurate. First, examiners often feel that they are unable to adequately assess marginal cases (Cobb & Coughlin, 1997). Second, driver’s records do not identify a high risk driver until after a problem arises. Third, health professionals do not use standard methods (see section below). While simulation testing has also received attention in the literature in an effort to test more efficiently (Bylsma, 1997), they too tend to be too expensive for many jurisdictions.

There is also a need to develop and evaluate driver retraining programs that target the older driver. These need to be linked to a performance-based driving evaluation testing procedures that can accommodate individuals with both physical and cognitive disabilities.

7.2.4 The Role of Family & Friends

Family or friends may play a key role in influencing high risk older drivers. They may informally pressure the individual to reduce or cease driving, or they may notify the driver’s licensing office in their community. But, family and friends tend not to get involved in directly modifying driving behaviour until there is a very serious deficiency if at all (Cobb & Coughlin, 1997). Given the complexity of personal relationships, it is not reasonable to rely on family and friends to play a major role in driving graduation and cessation behaviour. It is possible,
however, that carefully tailored media driving campaigns (similar to MADD or BC’s COUNTERATTACK programs) could be used to increase involvement of family and friends.

7.2.5 The Role of Health Professionals

Although provincial and territorial licensing authorities are responsible for issuing driver’s licenses, physicians and other health care professionals are increasingly being drawn into the decision-making process regarding older drivers. Within both Canada and the United States, it is generally accepted that physicians have a legal obligation to provide medical information to public authorities (i.e., licensing bodies) where the interests of the individual driver and public safety come into conflict (Miller and Morley, 1993; Canadian Medical Association, 1998). Under Section 221 of the British Columbia Motor Vehicle Act, it is mandatory for physicians to report individuals whose medical condition renders driving dangerous or who continues to drive after having been warned not to (by their physician). In fact, physicians in six Canadian provinces and territories – BC, Manitoba, Ontario, Prince Edward Island, Northwest Territories, and Yukon Territories – have a mandatory obligation to report unfit drivers. The remainder (except for Newfoundland) have a discretionary obligation (Canadian Medical Association, 1998). Mandatory reporting means that physicians are held liable if their patient is involved in a motor vehicle accident. However, several national and international surveys reveal that physicians are uncertain as to how to adequately assess driving ability and recommend driving restrictions to their patients.

In a survey of over 2,000 American physicians, Miller and Morley (1993) found that only 21% of respondents maintained records pertaining to patients’ driving status. There was no consensus in regards to what medical criteria would best serve as an indicator of the need for driving restrictions. While many physicians stated that cognitive status was an important
indicator, most were using a screening tool (the Folstein Mini-Mental Status Examination) which
was not designed for use as a driving assessment tool. The majority (69%) were unaware of the
American Medical Association’s driving guidelines and over 60% had never referred a patient
for an evaluation of driving status.

By contrast, over 71% of 523 physicians in Saskatchewan, Canada had used the
Physician’s Guide to Driver Examination – the Canadian counterpart to the AMA guidelines
(Marshall and Gilbert, 1999). The researchers found that, despite being legally obligated to
report unfit drivers, more than one-quarter of physicians stated that they would hesitate to do so
because of the impact on the physician-patient relationship. Moreover, results highlighted
disparities in the practical and emotional impact of driving cessation between urban versus rural
dwelling seniors. Physicians were more likely to report a patient if restricted licensing (i.e.,
driving under specific conditions – daylight hours, limited distances from home) was available.
As with the earlier study by Miller and Morley (1993), Marshall and Gilbert (1999) noted that
physicians in Saskatchewan generally felt that they had inadequate training and knowledge to
determine medical fitness to drive. Consequently, numerous authors (e.g., (Hunt, 1993; Korner-
Bitensky et al., 1994; Fitten, 1997)) propose the involvement of other health care professionals
who can evaluate and retrain older drivers, or assist them in adjusting to a nondriving lifestyle.

For example, occupational therapists working at specialized rehabilitation and driver
assessment centres are regularly called upon to assess physically and/or cognitively impaired
individuals, and to provide recommendations regarding fitness to drive. Evaluation methods may
vary between programs (which are located throughout Canada), but generally consist of both
cognitive and physical examinations. In-house evaluations are conducted prior to on-road testing,
to identify potential deficits and determine if a retraining program would be effective in
improving a person's driving safety. It is important to note that the majority of referrals to this type of centre are for younger adults who have sustained a brain injury, or for older adults with a diagnosis of stroke or dementia. Limited numbers of assessment centres and the costs associated with assessment, reduce the widespread use of such programs among a broader population of older drivers. Nonetheless, they offer a vital service for a particular portion of the population and may, in the near future, expand to continue assisting older adults, their physicians, and provincial authorities in the decision-making process.

Other health care professionals who may have a similarly increased role in regards to older drivers are psychiatrists, neuropsychiatrists and neuropsychologists, and social workers or other counselors (Fitten, 1997). Older drivers, their families and physicians, as well as other health care providers would all benefit from learning more about how to refer unfit drivers for an objective re-assessment of driving skills.

7.3  Transportation Options for the Elderly

In the US, over two-thirds of the elderly live in the suburbs or rural areas where they moved as younger, viable, working members of society (Rosenbloom, 1993). Similar patterns are observed in Canada. Today's 65 year olds are half as likely to move as 65 year olds in the 1960s. Part of this reluctance to move is dependent on the use of an automobile to maintain mobility. This trend is evident in the trend that over 80% of trips made by an elderly individual are completed as a driver or passenger in a private vehicle. Comparisons of per person trips in 1983 and in 1990, show a 2% to 5% increase in private vehicle use over these seven years (Rosenbloom, 1993). In turn, elderly are depending less on public transit and walking to complete their trips. Per person trips have shown a 3% decline in walked trips (Rosenbloom,
1993). Though the changes are small, they may indicate a trend that may be increasingly evident as the baby-boom generation ages.

In Europe, however, private transportation is followed by public transportation as the second most likely means of transport, and then followed in third place by walking. Rates of use of the public transportation system, walking and bike riding are higher in many European countries. However, these communities have been organized to better accommodate mobility using options other than automobile use, partly because of the higher density of the population coupled with the smaller geographical regions. While there are distinct health promotion consequences for individuals who could walk or ride bicycles in lieu of automobiles, considerable effort needs to be invested into the organization of pathways, as well as changing people’s attitudes about these options. Furthermore, many areas in Canada lack a strong public transportation infrastructure, partly because of the vast distances between communities. There are also public transportation problems within communities, especially for the elderly.

Perry, Wheeler, Schiflett (1992) completed a literature review of aging driver needs for mobility in 1992 using a number of reports from US transportation departments. Transportation problems were found to be most evident for females, minorities and older respondents with health problems and disabilities. Those who continue to drive have the least transportation problems (Elder and Holly, 1974/1975, cited in Perry et al., 1992). Thus, if we move elderly from drivers to non-drivers, we increase the potential for transportation problems for a greater proportion of the population. Obviously, the less stigmatized and the more viable transportation options available the easier it will be to move people from drivers to non-drivers as necessary.

Turning specifically to public transit, there are a number of problems for the elderly (Rosenbloom, 1993). These problems are associated with financial, psychological, and physical
restrictions that the elderly may have in using transit. Many elderly dislike public transportation because it takes longer (and scheduling is based on schedules of the working population), because it is uncomfortable or difficult for them to use, and because it can be costly to use regularly. There are few trips that take 15 min by car that can be done in less than half hour by transit. Furthermore, transit coverage that focuses on work commuting lines (suburb to downtown business center) and work hours, do not suit the elderly. Overall, it is believed we need more complete transit coverage to meet the needs of the elderly. However, Rosenbloom (1993) suggests that the real problem is that transit does not and will not ever provide the mobility and freedom that a car does.

The needs of frail elderly are particularly important. There are many urban centers that have implemented special door-to-door services such as Handi-dart in British Columbia. These services however, reach very few people (17%-20% of those who need it) and those people who do use it do so infrequently (only 12 % of their trips are done via special transit). Problems center on the fact that users must register and pass eligibility criteria. Also, the service does not cover situations most elderly need to overcome, such as being unable to ride the bus in the rain, transportation at night or in poor weather rather than driving their cars, and service on weekends. Finally, these special services often require from 24 hours to 3 days advance notice.

The lack of viable transportation alternatives for elderly highlight the dependence on the automobile voiced by the elderly in focus groups. If walking or biking is considered as a viable option, then we need to provide services elderly require within walking/biking distances and with walking/bike paths that are safe and convenient. There is an urgent need to think about the organization of our transportation routes and services, which requires bringing together multiple sectors of government as well as researchers. Simply grouping the transportation needs of the
elderly with those of other age groups is insufficient. In addition, there are target groups within the elderly population, for example those who are frail/disabled, poor, or socially isolated. There are specific needs that will need to be addressed for the elderly if driving becomes less of an option for them in their later years (Stunkel, 1997.)

8.0 Research Highlights and Policy Considerations for Strategic Planning

The review, synthesis and integration of literature presented in this report is suggestive of a number of key areas that should be considered for strategic planning efforts dealing with current and future older drivers in BC.

8.1 Research Highlights

1. There will be a dramatic increase in the number of older drivers and high risk drivers.
   - The proportion of persons aged 65 and over in BC will increase from 12.9% in 2000 to about 20% by 2025.
   - Some regional districts will have extremely high concentrations of seniors, such as in the Central Okanagan, White Rock, and many retirement communities on Vancouver Island.
   - There will be at least a doubling of the sheer number of BC older persons holding a driver’s license between 2000 and 2025.
   - The oldest-old drivers will also increase in numbers – we estimate that persons aged 85+ with a driver’s license will rise from about 14,000 in 2000 to almost 30,000 by 2025.
   - Age-specific driving rates for the elderly will likely increase in the future because driving has become more important for middle-aged persons (about 90% of male and female baby-boomers drive) who will be our future drivers, in addition to the fact that driving
has become more important for elderly persons in order to maintain independent lifestyles.

➢ There will likely be many more older women who will drive in the future and who live alone and depend on an automobile or some other equally efficient form of transportation.

➢ People are living longer, but they can expect to live with some form of physical and/or cognitive disability that may impede their driving ability.

➢ The majority of seniors report at least one chronic illness, and 44% are deemed to be disabled – they have at least one form of activity limitation.

➢ The prevalence of cognitive dementia rises rapidly with age: 2.4% for persons aged 65-74; 11.1% for persons aged 75-84; and 34.5% for persons aged 85+; and is expected to increase over time, especially for the oldest old.

➢ Although persons with dementia reduce their driving, they still tend to have about twice as many accidents per hour driving than older persons without dementia.

➢ Research is needed that examines associations between degrees of dementia and driving risk and ability.

2. Driving ability decreases with the onset of illness and loss of functional ability, yet many elderly continue to drive.

➢ More than 50% of individuals aged 65 and over hold a driver’s license after being diagnoses with arthritis, cataracts, diabetes, severe chronic pain, glaucoma and heart disease.
Also, 26% of older persons with a serious cognitive problem, and 57% with some form of cognitive problem hold driver’s licenses, the majority of whom will operate a motor vehicle.

Comorbidity may pose a more serious risk to driving ability than individual chronic conditions.

3. Attitudes and preferences of current and future older drivers impede self-graduation.

Most older people feel that driving is a right and future cohorts of older drivers may feel even stronger.

Driving is synonymous with not only independent living, but with their own identity.

Most focus groups show that older drivers over-rate their ability and are reluctant to relinquish their driver’s license and their driving “right” even in the face of functional limitations.

Self-graduation occurs among some older adults, but should not be relied on as the only method of driving reduction and cessation due to age-related functional loss.

Focus group research indicates that a majority of elderly who have quit driving feel they did so about the right time, albeit reluctantly.

Self-graduated drivers who decide to quit are influenced by several factors ranked in the following order: 1) doctors’ advice; 2) own recognition of serious visual loss; 3) increasing nervousness behind the wheel of an automobile; and 4) advice from family or friends.

Focus group research suggests that elderly would be accepting of more regular objective driving tests to determine ability.
➢ There may be about 30% of elderly who will continue to drive until circumstances beyond their control force them to stop.

4. Older drivers depend on the automobile.

➢ Seniors most frequently use their automobiles for shopping (95% urban, 89% rural); personal appointments, such as for doctors’ visits (83% urban, 72% rural); and social visits (70% urban, 60% rural).

➢ Less than 50% of private vehicle travel is for long-distance trips or leisure driving.

5. Older drivers exhibit high risk driving and high rates of accidents.

➢ It has been estimated that drivers aged 65-69 are about 2.26 times more at risk for multiple-vehicle involvements at intersections than drivers aged 40-49 compared with 1.29 times for all other situations.

➢ For the 85+ age group, the relative risks are 10.62 times higher than drivers aged 40-49 for multiple-vehicle accidents at intersections and 3.74 times for all other situations.

➢ The ratio of elderly crashes to actual distance traveled indicates the 65 years-and-older age group pose a similarly high risk as those under 25 years of age, with middle-aged drivers posing the lowest risk, thus creating a U-shaped curve.

➢ The only age group with higher crash rates is the 16-19 age group.

➢ For the 80 years-and-older age group, the risk of accident more than doubles, compared to the 65 and over age group.

6. Environmental design of roads and signage needs to be evaluated for safety.

➢ Larger and more visible road signs and signals should be used at intersections, especially complex ones.

➢ Highway design complexity needs to be analyzed in an effort to maximize drivability.
Vehicle design to adapt to the needs of the older driver should be supported.

7. **Regulatory practices need to be carefully reviewed**
   - The age criterion (six months before age 80) for requesting a medical exam should be reevaluated. Lowering the age to 70 or 75 should be assessed.
   - A graduated licensing system linked to more sensitive driving performance testing for all high risk drivers should be examined.
   - Assessment of performance evaluation tests tailored for the older driver
   - Consideration of policies to support more frequent retesting of older drivers
   - Expand development of driver retraining programs.
   - Further refinement of standardized guidelines for driver examiners evaluating older driver ability.
   - Examination of simulation methodology for identifying high risk drivers.

8. **Increase the role of family and friends**
   - Examine a multitude of methods to increase family and friend’s involvement in driving graduation and cessation among high risk drivers.
   - Educate the family about their potential role in driver graduation.
   - Involvement of the family and the physician together may prove to be more efficient.

9. **Involve a broader range of health professionals**
   - Approximately 71% of physicians use the *Physician’s Guide to Driver Examination*.
   - However, most physicians are reluctant to report unfit drivers because of the doctor-patient relationship.
   - More physicians would report unfit drivers if a graduation or restricted licensing system was more widely used and available.
➢ A broad range of health professionals (e.g., community nurses, PTs, OTs) need to be used to identify high risk drivers.

➢ Guidelines need to be developed for various health professions similar to the Physician's Guide to Driver Examination.

10. Develop viable transportation options.

➢ The reliance of the private automobile is on the increase.

➢ Public transportation systems need to be assessed and redesigned to meet the needs of an older population, especially persons with physical and/or cognitive problems.

➢ Expansion and increased accessibility of Handi-dart and other specialized transportation systems for mobility-restricted elderly is required.

➢ Innovative transportation options targeting older adults need to be piloted and evaluated.

➢ Expansion and improvement of walking and biking pathways require attention.

11. Support media campaigns to raise awareness of older driver issues and to change norms concerning involvement in family decisions.

➢ Older drivers should be made aware of driver risk factors among the elderly.

➢ Driver retraining programs should be more widely available and advertised.

➢ Campaigns targeting family and friends in the decision of graduation and cessation of driving, and in initiating medical exams and retesting may be beneficial.

➢ Greater public attention needs to be placed on driver problems with intersections and left-hand turns.

12. Expand programs of research.

➢ Significantly more research should be supported in the areas highlighted.
- A large-scale comparative study assessing different older driver policies and accident rates needs to be undertaken.
References


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