Examination of Driving Practices, Well-being and Community Engagement in Retirement Living Seniors

by

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Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Introduction: Almost all the research on transportation use and travel patterns of older adults has been confined to community-dwelling seniors. This multi-phase project was initiated to gain a better understanding of transportation modalities (including driving) and travel patterns of seniors living in retirement complexes. The current study, Phase IV of the project, focused on residents who were still driving. Previous phases included surveys to determine driving status (Phase I) and general transportation use (Phase II), as well as an in-depth examination of residents 65+ who had recently stopped driving in the past two years (Phase III).

Purposes: The primary objective of this study was to examine the actual driving practices of older drivers living in retirement communities, including associations with driver characteristics, perceptions of driving comfort and abilities, indicators of well-being, and extent of activity and group participation inside and outside the villages. This study also examined travel patterns outside the village, in addition to driving themselves.

Methods: A convenience sample of 38 drivers (mean age 81.9 ± 5.6, range 70 to 91, 42% male) from five urban retirement villages located across Southern Ontario (Kitchener, Waterloo, Guelph, Etobicoke and Whitby), were assessed between February and July, 2013. Participant vehicles were equipped with two electronic data logging devices (one with GPS) for two weeks, during which time they also filled out trip logs (for each driving trip) and daily travel diaries (for non-driving trips). Participants also completed questionnaires (background and driving history, activities inside and outside the village) and scales to assess depression, well-being, perceptions of driving comfort and abilities and balance confidence. Interviews were conducted to examine their experiences over the two week period, as well as gather feedback on transportation at the retirement facilities.

Results: Overall, the sample was highly educated, reported being in good health and not depressed. They were also considerably older and had a greater proportion of females than most community studies. Driving data were obtained for 32 participants. Participants drove an average of three days a week (range 0.5 to 6.5 days/week), and only eight (32%) drove at night. Consistent with findings on older drivers living in the community, driving trips were most often for shopping and errands (65% of total trip segments), followed by social and entertainment purposes (18%). The sample showed more restricted driving patterns when compared to prior studies with community seniors; driving substantially less at night (trips and distance). Most of the sample (73%) did not drive on days with bad weather. Driving perceptions (particularly night comfort) were significantly ($p<0.05$) associated to many driving indicators (days driven, trips, stops, duration and night driving indicators). As expected, the number of non-driving trips outside the village increased as the amount of driving decreased. The sample did not take many non-driving trips over the two weeks (3.7 ± 6.6, range 0 to 29) while some took many trips due to frequent walking trips. Walking (66% of total trips) and being a passenger in a vehicle (29%) were the most common modes of non-driving trips, with public transportation only accounting for less than 1% of all total trips. Non-driving trips were most often for recreational and social reasons, followed by shopping trips. Interviews suggested the sample was starting to think about driving cessation (20/38 or 53%) since moving to the village, where prior to that only one person (2.6%) had thought about it.

Conclusions: Compared to community living seniors, older drivers living in retirement complexes are driving less. Services and amenities within the communities appear to be well utilized, which may reduce the need for travel outside the villages. Although use of public transit, taxis, paratransit and the facility bus (for group outings) was minimal, walking was

popular for physical activity and going to shopping areas nearby. Participants reported driving less often after moving to the village and a significantly larger proportion thought about driving cessation only after moving. It is possible that living in a retirement residence makes driving less essential and therefore residents are leaving the village less often than someone living in the community. Although the study did not have a sufficient sample to conduct comparisons between village locations, the sample represented five different locations, therefore providing a better depiction of retirement living residents. The next phase of the project will help build on current findings by increasing the sample size and allowing for additional comparisons.

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Chapter 1: Introduction

Mobility is critical to the independence and well-being of older adults (Myers, Cyarto & Blanchard, 2005). One definition of mobility is the ability to move through one's environment; whether it is within their residence, community, or beyond (Webber, Porter & Menec, 2010). However, Metz (2000) also discussed mobility and travel in relation to achieving access to desired people/places, as well as the psychological benefits of 'getting out and about', exercise benefits, involvement in the local community, and knowing that a trip could be made even if it not actually undertaken. Furthermore, Suen and Sen (2004) suggest that mobility is "being able to travel where and when a person wants, being informed about travel options, knowing how to use them, being able to use them, and having the means to pay for them". Given these definitions, driving a private vehicle is likely the best option for meeting and maintaining these characteristics of mobility (Whelan, Langford, Oxley, Koppel, & Charlton, 2006).

For older adults in North America, mobility and independence is often equated with having a private vehicle and a valid driver's license (Dickerson, Molnar, Eby, Adler, Bedard, et al., 2007; Turcotte, 2012). Driving serves various purposes (e.g., visiting relatives, purchasing food), and the importance of driving varies depending on the distance required to travel to out-of-home activities and the availability of alternate transportation modes (Whelan et al., 2006). Seniors often remain active in the community by participating in volunteer, social and recreational activities that typically require the use of a vehicle. In Canada the primary mode of transportation for seniors is the personal automobile (Turcotte, 2012). In fact, driving one's own vehicle is the primary form of transportation for older adults (particularly men) well into their late 80's, then followed by being a passenger in a vehicle (Turcotte, 2012). While this report (Turcotte, 2006; 2012) provides a detailed profile of the transportation patterns of community

seniors, Canadians living in collective dwellings (including retirement residences) were not surveyed. Apart from a few studies (Chapter 2), there is a gap in knowledge regarding driving and transportation use of older drivers in retirement residences. Most of what is known comes from surveys of seniors living in the community.

Older adults in the community may use a variety of transportation modes (i.e. drive, take a bus or taxi) but most trips are still made in private cars (Rosenbloom, 2003). Unless services are within walking distance, older adults who no longer drive, or are regulating their driving (i.e., reducing the frequency of their trips) may need to use alternate transportation. Often when there is no spouse that drives (or the individual can no longer drive), older adults start relying on family and friends (Choi, Adams & Kahana, 2012). In such situations, seniors often report a concern with becoming a burden to those around them (Kostyniuk & Shope, 2003). As a result, seniors ask for rides only for essential purposes, which may in-turn reduce their out-of-home activities (e.g., for social and leisure purposes) (e.g., Marotolli, Mendes de Leon, Glass, Williams, Cooney, Berkman, 2000). For older adults, transportation is vital to continued participation in community, social and civic life; participation that is necessary for quality of life. When driving presents considerable safety concerns for the older driver and those around them, or is no longer possible due to environmental, health, or social changes, accessible and practical alternative transportation modes must be made available (Dickerson et al., 2007).

To set the stage for this study, concerns for the growing number of older drivers and the associated safety concerns will first be discussed. This will be followed by a discussion about the consequences of an older driver losing their license and how alternative transportation plays a critical role in maintaining mobility. This chapter will conclude with a brief overview of this thesis document.

1.1 Statement of the Problem

1.1.1 The Aging Driver Population

In Canada, drivers over the age of 65 are the fastest growing segment of the driving population (Dobbs, 2008). In 2009, three-quarters of all older adults had a drivers licence; an estimated 3.25 million individuals (Turcotte, 2012). In Ontario alone, it is estimated that the number of older drivers will increase to 2.5 million by 2028 from approximately one-half million in 1986 (Hopkins, Kilik, Day, Rows, & Tseng, 2004). The number is expected to double in the next decade; an additional three million drivers (Transport Canada, 2007). Additionally, future cohorts of seniors are expected to hold their driving licenses longer, make more trips and drive further distances than the current cohort of older drivers (Burkhardt & McGavock, 1999; Dobbs, 2008; Lyman, Ferguson, Braver & Williams, 2002). Women are also expected to drive more in the coming years, with driver proportions expected to reach parity with men (Burkhardt & McGavock, 1999; Turcotte, 2012).

Other factors may also contribute to driving status in the coming years, including education, income, race, occupation, and household composition. For example, in households where both partners drive, senior men are more likely to report being a primary driver (Dickerson et al., 2007; Turcotte, 2012). Senior males are also more likely to have a valid license and drive longer than female drivers; however, the gender divide is currently shifting to equality (Dickerson et al., 2007; Kulikov, 2011). These factors will be presented in more details in Chapter 2. The increasing aging driver population and greater reliance on private transportation raises some considerable safety concerns, as described below.

1.1.2 Safety and Accident Risk

When adjusting for the amount of driving, older drivers are disproportionately involved in MVAs causing serious injury and death (Staplin, Lococo, Gish, & Decina, 2003). Similar to falls, the risk of being involved in an MVA increases with age, usually beginning at age 70 and escalating thereafter (Bédard, Stones, Guyatt & Hirdes, 2001; Dickerson et al., 2007). Drivers over 80 years of age in Ontario have the second highest rate of fatal collisions; second only to that of the youngest group of drivers (Casson & Racette, 2000; Higgins, 2003; Marshall, Wilson, Molnar, Man-Son-Hing, Stiell & Porter, 2007). Although drivers over 65 years old account for 14% of licensed drivers, they represent 17% of the MVA fatalities (Transport Canada, 2011).

It is important to note that the crash risk for older adults is predominately elevated by drivers which drive the fewest miles; these drivers (low annual mileage (<3000 km) have higher accident rates irrespective of age (e.g., Alvarez & Fierro, 2008; Hakamies-Blomqvist, Raitanen & O'Neil, 2002; Janke, 1991; Langford, Methorst & Hakamies-Blomqvist, 2006). Langford et al. (2006) has hypothesized that this group of low mileage drivers may predominately be drivers who are already self-restricting and report impairments. However, the context of the driving situation with low mileage drivers has shown to be very important. For example, these low mileage drivers most often drive in congested, urban areas (where the risk of collisions is potentially higher), versus high mileage drivers who use freeways and multi-lane roads more often (Keall & Frith, 2004; Langford et al., 2006).

It is predicted that by 2025, 40% of fatal MVAs may be due to age-related changes, particularly those changes which lead to cognitive and visual impairments (Staplin et al., 2003). Older drivers are also more commonly involved in multiple (versus single) vehicle collisions (Marshall et al., 2007; Baker, Falb, Voas, & Lacey, 2003), at lower speeds, and in accidents

occurring at intersections (Preusser, Williams, Ferguson, Ulmer & Weinstein, 1998; Zhang, Lindsay, Clark, Robbins & Mao, 2000). There is evidence to suggest that inclement weather, such as snow, heavy rain and fog can increase the risk of MVAs due to limited visibility and difficulty with vehicle handling (Andrey, 2010, Zhang et al., 2000).

Pedestrian accidents may increase when older adults, who no longer drive, must rely on walking and public transport (e.g., Hakamies-Blomquist, Johansson, Lundburg, 1996). Although incidents of pedestrian accidents are low when compared to falls (Ontario Injury Report data for 2007-2009), senior pedestrians are not only more likely to be struck by vehicles, but are more likely to be seriously injured or die as a result (e.g., Ferrini & Ferrini, 2013). Between 1996 and 2001, seniors represented over a third of fatally injured pedestrians in Canada (Transport Canada, 2010). Most of the accidents involving older pedestrians occur in the early evening and at crosswalks. Studies show that many seniors do not walk fast enough to get across timed crosswalks (e.g., Cyarto, Myers, Tudor-Locke, 2004). Seniors have also been found to have problems negotiating curbs and judging the speed and distance of oncoming vehicles. In fact, many of the factors that put seniors at higher risk for MVAs (e.g., poor vision, slower reaction times) also increase the risk of falls and pedestrian accidents.

Some research has suggested that motor vehicle safety concerns can be moderated by self-regulation of driving practices, engaging only in practices that corresponded with one's functional capabilities and skills (Eby & Molnar, 2009; Finn & Sterns, 2004). However, other research suggests that even though some seniors may restrict their driving (self-regulate), this does not necessarily mean they are driving more safely (Crizzle, Myers, Almeida, 2013). Chapter 2 presents a more detailed discussion of the role of self-regulation and its effects on mobility later life. In addition, licensing authorities (like the MTO) are under pressure to identify and find

better ways to regulate medically-at-risk older drivers (Myers, Trang, Crizzle, 2011). While the ultimate goal of these governing bodies is to make driving safer for everyone, the dramatic personal consequences of license forfeiture (i.e., reduced mobility and dependence on others) are now more recognized and better understood.

1.1.3 Consequences of License Forfeiture

Given the mobility and independence that comes with driving, older adults want to maintain their driving status and control over when and why they stop for as long as they can. For older adults, losing one's license abruptly (i.e., taken away by licensing authorities) can be particularly distressing (e.g., Kulikov, 2011). Some older adults who choose to forfeit their license may regret this choice, and as the literature shows, they may report feelings of increased loneliness, isolation, dependence on others for transportation, loss of identity and decreased freedom (e.g., Rudman, Friedland, Chipman, Sciortino, 2006; Johnson, 1999). However, some studies suggest that the initial negative effects of driving cessation may dissipate over time for those who find ways to adjust and compensate for the change (e.g., Harrison & Ragland, 2003).

Driving cessation is often a gradual process that can take several years. It is preceded by the process of self-regulation (further described in Chapter 2), which is defined by reductions in driving frequency and changes in driving patterns (e.g., Dellinger, Sehgal, Sleet, & Barret-Connor, 2001; Dickerson et al., 2007; Donorfio, D'Ambrosio, Coughlin, & Mohyde, 2009). There may be distinct phases people go through when deciding to stop driving (e.g., Liddle, Turpin, Carlson, & McKenna, 2008; Tuokko, McGee, Rhodes, 2006), unfortunately many older drivers do not prepare or plan ahead for this eventuality (Harrison & Ragland, 2003).

For older adults, driving cessation has been prospectively associated with increased depression, social isolation (Fonda, Wallace, Herzog, 2001; Marotolli, de Leon, Glass, Williams,

Cooney, Berkman, & Tinetti, 1997; Windsor, Anstey, Butterworth, Luszcz, & Andrews, 2007), reduction in networks of friends (Mezuk & Rebok, 2008), reduced out-of-home activity (Marotolli et al., 2000), and possibly even early mortality (Edwards, Perkins, Ross, & Reynolds, 2009). Whether voluntarily or involuntarily, many older adults will ultimately stop driving; thus, raising the important issue of appropriate alternative modes of transportation for this population. When considering driving cessation, older adults are faced with examining what alternatives they have to help them maintain their mobility if they should forfeit their license or have it revoked.

1.1.4 Transportation Alternatives

For some older adults, especially those who no longer drive, mobility needs must be met through alternative modes of transportation. Alternative modes of transportation include buses, retirement community shuttles, taxis, railways, and paratransit services. These alternatives can vary greatly with regards to the availability, accessibility, and flexibility for older adults. Suitable alternate transportation is needed in order to keep older adults active, help them maintain their social relations, and participate in society.

Data from the Canadian Community Health Survey – Healthy Aging (2008-2009) revealed that very few older adults use alternate forms of transportation (like taxis or accessible transit) before the age of 85; however, after 85, a greater proportion depend on accessible transit or taxis as their main source of transportation (especially in women) (Turcotte, 2012). A lack of public transportation and paratransit services (especially in rural or remote communities) may lead to older adults driving against medical advice or without a valid license (e.g., Johnson, 2002). However, even in urban centers public transportation is not widely used by older adults (Dahan-Oliel, Mazer, Gélinas, Dobbs, Lefebvre, 2010; Dickerson et al., 2007; Turcotte, 2012) and usage does not increase with age (Turcotte, 2012).

Public transportation services are also not designed to provide support to individuals with physical and motor, sensory, or cognitive impairments (Dickerson et al., 2007; Turcotte, 2012). For many older adults public transportation is viewed as being unreliable, inconvenient, unsafe and even "distasteful"; moreover, taxis are often seen as too expensive (Johnson, 1999). Furthermore, wheelchair/scooter/cane accessible transit (paratransit) or taxis as the main modes of transportation are seldom used before the age of 85 (9% of adults age 85+) and only then by a small proportion (9% of those aged 85+) as a "last resort" (Turcotte, 2012). Even paratransit services, which are available in some but not all communities, cannot replace the freedom and spontaneity of travel by car (Kulikov, 2011).

Turcotte (2012) found that about half of Canadians aged 85 and over relied on informal transport from family and friends. Studies have shown that older adults more often ask friends for rides than family members (Choi et al., 2012; Glasgow & Blakely, 2000); however, if possible, married individuals (or those in a relationship) often rely on a spouse or partner (Kostyniuk & Shope, 2003). Other family members are often asked to provide a ride for more essential trips like medical appointments or grocery shopping (Adler & Rottunda, 2006; Glasgow & Blakely, 2000) than for a recreational trip. However, being reliant on rides from family and friends may produce feelings of guilt and burden. There may also be financial implications, such as compensation (e.g. gas money), or social implications, like reducing activities to only essential trips (Davey, 2007; Kostyniuk & Shope, 2003).

With advancing age, appropriate transportation (i.e., accessible, affordable, and convenient) is important not only for instrumental activities of daily living (e.g., shopping, getting to medical appointments) but also for leisure and recreational activities, volunteer involvement, and the maintenance of social relationships. Community-dwelling older adults with

unmet mobility needs may need to consider relocating to retirement residences to reduce demands (Cress, Orini, & Kinsler, 2011). The challenges experienced with getting around the community when they (and/or their spouse) no longer drive are often at odds with the desire of many seniors to want to 'age in place'. Although the study did not specifically examine driving status, Krout and colleagues (2002) found that the ability to get around and the desire not to become a burden on family were two of the main reasons reported for relocating to a retirement residence. Because the older adults in this study were healthy and active, the authors felt this was likely an "anticipatory move" to avoid problems down the line and to be closer to their adult children (Krout, Moen, Holmes, Oggins, Bowen, 2002).

Even in the absence of functional limitations or medical conditions, many seniors may choose to enter retirement living because of transportation limitations (Freeman, Gange, Munoz & West, 2006). While retirement residences may offer services and amenities on site (e.g., pharmacy, social clubs, doctors), it is unclear how mobility is affected after moving to retirement facilities. A person's living environment may affect their driving practices as well as the extent and frequency of participation in out-of-home activities.

1.2 Overview

The overall aim of this study is to gain a better sense of the driving practices and transportation use of older adults living in retirement residences. It is hoped that the current study will guide the development of programs that address the unmet transportation needs and overall well-being of older drivers. Chapter 2 contains a review of the existing literature on the driving practices of older adults, factors related to self-regulation, out-of-home activity and planning for transitions to non-driving. Chapter 3 sets the stage for the current study, which is one phase of a multi-phase project conducted with five retirement villages.. Chapter 3 begins with a description

of the study locations, including amenities and on-site services, as well as access to transportation and distances to outside shops and services. Preceding phases, including two surveys of resident driving status and transportation patterns, as well as an in-depth study on former drivers are then described. Chapter 4 describes the study rationale and objectives, ethics approval and consent, sample recruitment, as well as data collection procedures and analyses. The results of this study are presented in Chapter 5 and discussed in Chapter 6.

Chapter 2: Literature Review

2.1 Introduction

Maintaining mobility for older adults is important for a variety of reasons, including remaining connected to friends and family, accessing shopping and services, and getting to appointments out in the community. Yet as described in Chapter 1, travel moves beyond serving just a utilitarian function; it provides a way of maintaining feelings of independence, control over one's life, and engaging with life beyond the home. As the predominant transportation mode for older adults, driving a private vehicle allows the needs of older adults to be met with convenience, and minimal disruption to their daily activities. Even in areas where other transportation options are available, these options are not necessarily accessible, safe, and convenient for older adults with mobility impairments. As introduced in Chapter 1, it is important to learn more about the driving practices of older adults residing in retirement residences as little evidence exists, and in order to help inform the development of policies and programs that will help fulfill their mobility needs.

This chapter begins by defining retirement residences and reviewing what is currently known about the driving practices and transportation use of older adults in retirement residences. The next section discusses the various components of driving practices (i.e., driving exposure and patterns), and then follows with a discussion of the concept of self-regulation. Two conceptual frameworks for understanding self-regulation will be introduced, followed by a discussion of the factors that influence self-regulation among older drivers. Next the effects of driving status on out-of-home activity levels will be presented. A brief discussion regarding what is currently known about planning for driving transitions will follow. The final section presents a summary of the literature reviewed with implications for the present study.

2.1.1 Defining Retirement Residences

Prior to presenting the literature it should be noted that here is no standard definition of retirement residences or retirement living facilities. Retirement residences often vary in terms of the living-costs, services provided, and housing types (basic to luxurious) (Choi et al., 2012a; Biggs, Bernard, Kingston & Nettleton, 2000; Gardner, Browning & Kendig, 2005; Gibler, Moschis & Lee, 1998). Retirement residences are considered to be different from nursing homes and long-term care facilities, since retirement residences normally do not provide 24 hour support, medical care, and skilled nursing help (Gibler et al., 1998). Nursing home and long-term care facilities are generally regarded as a care options for those who need more supportive care, and more regular monitoring. Residents in retirement communities generally have access to amenities and services that ease their daily needs (Choi, 2010). The care given in retirement residences range from independent living (little to no services provided) to assisted living in which people received support for activities of daily living like personal hygiene or eating.

Another retirement living option is a Continuing Care Retirement Community (CCRC); a facility that provides residents the opportunity to move between levels of care (i.e., independent living, assisted living, nursing care, etc.) as their needs change (Shippee, 2009). The idea is that the resident can 'age in place' and simply transition to different locations in the facility that are more supportive of their changing needs. Chapter 3 provides a more detailed description of the CCRCs that the sample was recruited from.

2.1.2 Studies Examining Driving in Retirement Residences

To the present author's knowledge, there are only two studies that have examined driving and transportation use among older adults in retirement communities. Both studies have been conducted in the United States and the data are 15-20 years old. An additional study by Jenkins,

Pienta, and Horgas (2002) examined activity outside of a CCRC and driving, however driving data was not reported in the article. Persson (1993) used a convenience sample of older adults living in CCRCs in Oklahoma; although originally, the investigator sought to recruit a community sample. Persson conducted ten focus groups with 56 participants who had stopped driving within the past five years (mean age 81; 63% female, 68% widowed and 98% Caucasian). The focus group findings revealed that the reasons for driving cessation are similar to those presented in the literature: medical conditions, advice from doctors, family and friends, minor accidents, trouble seeing, nervousness, and having their license revoked. In addition, several participants cited that they stopped driving and moved to a CCRC because of the transportation that would be provided by their facility. About one fifth of the sample mentioned they used the facility's van, while 30% relied on friends and 26% on relatives for transportation.

Another study, known as the Florida Retirement Study, collected longitudinal data from a large sample of older adults in three retirement residences (living in independent, non-institutional housing). Choi et al. (2012a), Choi, Adams, & Mezuk (2012); Kelley-Moore, Schumacher, Kahana & Kahana (2006); Lovegreen, Kahana & Kahana (2010) have all published the findings from this study. In addition to the data being collected many years ago (over 20), the driving questions were administered in later waves of the study when the sample had already lived in the facility for several years (an average of 11 years). Consequently, the investigators were not able to assess older adults who recently moved to the CCRC locations. Nor could they examine associations between transitions in housing and driving status. Nonetheless, the study revealed that 'non-kin transportation support' influenced the decision to stop driving and ridesharing also played an important role in meeting transportation needs (Choi et al. 2012a).

2.2 Components of Driving Practices

As described by Blanchard (2008), driving behaviours comprise three components: (1) exposure (e.g., amount of driving); (2) patterns (when and where); and (3) habits (driving errors). Exposure refers to the amount of driving; and is expressed as distance driven (km) per week, distance travelled per trip, or frequency of trips (Blanchard, Myers, Porter, 2010). Driving patterns refer to the context, namely the when and where people drive (Blanchard, 2008). Patterns include route characteristics, trip destinations, weather and road conditions, time of day and traffic conditions (Blanchard, 2008). Driving habits refer to how people drive with respect to vehicle control and handling that may lead to accidents (Blanchard, 2008; Crizzle, 2011). In the present study, the driving exposure and patterns were examined, while driving habits (errors assessed by on-road or driving simulator performance) were not examined. The following sections review published evidence regarding the driving exposure and patterns in older drivers.

2.2.1 Exposure

Older drivers when compared to younger drivers, report driving less often, shorter distances, and closer to home (Collia, Sharp & Giesbrecht, 2003; Davey & Nimmo, 2003; Keall & Frith, 2006; Rosenbloom, 1999). Research has shown that low rates of full-time employment and being female is associated with driving fewer kilometres among older adults (Bauer, Adler, Kuskowski & Rottunda, 2003; Keall & Frith, 2006). The reduction in trip frequency among older adults has also been attributed to the reduction or complete lack of driving for work purposes and the increase in awareness of their declining driving abilities (Bauer et al., 2003; Mollenkopf, Marcelli, Ruoppila, Szeman, Tacken & Wahl, 2004).

There is some evidence that older adults prefer to break longer trips into multiple shorter trips (e.g., Lerner-Frankiel, Vargas, Brown, Krusell & Schoneberger, 1990). Others have

suggested that older drivers may in fact reduce their trip frequency by combining multiple activities into single trips (termed trip chaining) (Burkhardt & McGavock, 1999; Benekohal, Michaels, Shim & Resende, 1994; Mollenkopft, Marcelli, Ruoppila, Flaschentrager, Gagliardi & Spazzafummo, 1997; Rosenbloom, 1999). Overall, when considering driving exposure, caution must be used when interpreting the findings as many of the studies used self-reported measures of driving distance or frequency. Studies conducted by researchers at the University of Waterloo which have compared self-reported and objectively measured driving exposure of older adults will be discussed later in this section.

2.2.2 Patterns

Older drivers in the community prefer to drive on weekdays versus weekends (Keall & Frith, 2004), and during the day rather than at night (Burns, 1999; Hakamies-Blomqvist & Wahlstrom, 1998). Using national survey data, Collia et al., (2003) reported that 60% of trips by older adults occurred between 9:00 a.m. and 4:00 p.m., with peak activity occurring in the late morning. Mollenkopft et al., 2004 found similar findings, but further noted that few trips began at night (after 8:00 p.m.). As noted by several researchers, people who no longer work have more flexibility to not drive at peak times and heavy traffic times of the day (e.g., Keall & Firth, 2004). In addition to reduced night driving (e.g., Kostyniuk & Molnar, 2008; MacDonald, Myers & Blanchard, 2008; Myers, Paradis, Blanchard, 2008), older drivers (particularly females) try to avoid unfamiliar areas, heavy traffic times, highways, and poor weather (e.g., Baldock, Mathias, McLean, Berndt, 2006; Benekohal et al., 1994; Burns, 1999).

2.2.3 Measurement Considerations

Driving practices have been most often been quantified using self-report; however, the accuracy of self-report driving data has been questioned (e.g., Huebner, Porter & Marshall, 2006; Blanchard et al., 2010; Crizzle, Myers & Almeida, 2013). Driving behaviour questionnaires present issues of recall and estimation (i.e., approximation of travel distance) (Blanchard, 2008). Blanchard et al. (2010) found that older drivers' self-report estimates of driving distance (km over one week) were inaccurate when compared to the distances reported by the data logging devices; supporting previous research by Huebner at al. (2006).

The study by Blanchard (2008), published in Blanchard & Myers (2010) and Blanchard et al. (2010), was the first to objectively examine and report both driving exposure and patterns in older adults using in-vehicle devices (one in the on-board diagnostic system and one with GPS capabilities). Subsequent studies by Trang (2010) and Crizzle (2011) at the University of Waterloo also used electronic recording devices.

In-vehicle data logging devices allowed for objective measures of driving practices while placing minimal (if any) burden on study participants (Blanchard et al., 2010; Wolf, Guensler, Washington & Frank, 2001). Although details will be provided in Chapter 4, these devices make use of satellite information (Otto device) and information from the vehicle's computer (CarChip) to determine driving trip lengths and distances. Route characteristics, route origin and destination can be obtained when the GPS device is combined with Geographical Information Systems (e.g., Google Maps) (Blanchard et al., 2010).

Previous studies have shown (through feedback from participants) that these devices do not interfere with driving practices (Blanchard et al., 2010; Crizzle, 2011; Huebner et al., 2006; Marshall et al., 2007; Myers et al., 2011). However, without the use of key fobs and antennas it

is impossible to determine whether the participants themselves (as opposed to someone else) drove the vehicle over the study period. Thus some self-report is needed to identify the driver of the vehicle. For this purpose, logs have been used in these prior studies to specify the driver for each trip, particularly in the case of shared vehicles.

2.2.4 Selected Naturalistic Driving Studies of Community Drivers

To date, three studies at the University of Waterloo have examined the naturalistic driving practices (exposure and patterns) of older drivers living in the community using data logging devices. Detailed results reported in their respective theses (Blanchard, 2008; Crizzle, 2011; Trang, 2010) as well as multiple publications (e.g., Blanchard et al., 2010; Blanchard & Myers, 2010; Myers, Trang & Crizzle, 2011; Crizzle & Myers, 2012; Crizzle, Myers & Almeida, 2012; Crizzle, Myers, Roy & Almeida, 2013), are described briefly below.

The Blanchard (2008) study examined the driving practices of 61 community drivers. The Trang (2010) study focused on the winter driving practices among a sample of 47 community drivers. The Crizzle (2011) study involved 27 participants with Parkinson's disease and 20 age and gender matched healthy controls. All these studies used the electronic devices (CarChip and Otto), as well as trip logs (to verify the identity of who drove the vehicle), weather archives and similar scales/questionnaires (e.g., perceptions, self-regulation, driving history). Findings from these studies are presented throughout the thesis.

Another study that has objectively assessed driving in seniors is the Candrive II cohort study. A large sample (n=928) of Canadian seniors (aged 70+), who drove at least four times a week at entry, have been followed for four years (Marshall et al., 2013). The study features a customized data logging device that collects time stamped information from the vehicle (e.g.,

distance travelled, speed, time of trip) and includes a GPS antenna to ascertain information on vehicle location, as well as a key fob to identify if the participant was driving the vehicle.

At baseline the sample was a large, healthy sample of community living older adults over 70 years old (mean age 76.2 ± 4.9) and 62% were male (Tuokko et al., 2013; Marshall et al., 2013). Although the driving data has not yet been published, baseline information on sample cognitive scores, driver perceptions and self-reported restrictions provide another basis of comparison (Rapoport et al., 2013; Tuokko et al., 2013).

2.3 Definition of Self-Regulation and Models

Broadly, self-regulation refers to the process of restricting or adapting one's driving behaviours (Donorfio et al., 2009). Self-regulation may be a possible compensatory (coping) strategy for older drivers to reduce the demands of driving while still continuing to drive (e.g., Baldock et al., 2006; Charlton, Oxley, Fildes, Oxley, Newstead, Koppel & O'Hare, 2006; Hakamies-Blomqvist & Wahlström, 1998; Gwyther & Holland, 2012). It is thought that self-regulation operates on a continuum (Lyman et al., 2002); spanning from driving independence, to voluntary reduction of driving exposure (Blanchard & Myers, 2010; Charlton et al., 2006; Dellinger et al., 2001; Marottoli & Richardson, 1998) and avoidance of challenging situations (e.g., Baldock et al., 2006; Ball, Owsley, Stalvey, Roenker, Sloane & Graves, 1998; Charlton et al., 2006), all the way through to driving cessation (Gwyther & Holland, 2012). The most common self-regulatory strategies among older adults are to reduce driving at night and in poor weather (Baldock et al., 2006; Ball et al., 1998; Charlton et al., 2006; Molnar & Eby, 2008; Naumann, Dellinger & Kresnow, 2011; Ragland, Satariano & Macleod, 2005). As self-regulation may entail purposeful strategic decisions (e.g., trip and route planning) there is great potential to manage driving risk among the older population (Molnar, Eby, Roberts, St. Louis & Langford,

2009). Some studies suggest that older drivers are able to self-regulate adequately (e.g.,Eberhard, 1996), while others suggest some drivers do not self-regulate appropriately, thus may be at a higher safety risk (Charlton, Oxley, Fildes, Oxley, Newstead, O'Hare & Koppel, 2003).

2.3.1 Models of Self-Regulation

Conceptual frameworks have been developed concerning self-regulation, two of which are described here. Using feedback obtained from interviews with current and former older drivers, Rudman and colleagues (2006) developed a model to conceptualize the process of driving self-regulation. Presented in **Figure 2.1**, this model illustrates the complexity of factors that influence the ability of older adults to monitor and adjust their driving. The model shows how intrapersonal, interpersonal and environmental factors may affect self-regulation and monitoring practices, stressing the role of comfort level (operationalized as driving confidence) in the decision-making process.

Another way to conceptualize driving behaviour is depicted in Michon's hierarchical model (1985). In Michon's model there are three major levels of driving behaviour: strategic, tactical, and operational. At the strategic level, the driver anticipates and makes decisions prior to driving in regards to aspects such as the route and time of travel. The tactical level describes the problem solving and awareness by a driver (through action) with respect to a potential driving hazard (i.e., obstacle avoidance, reducing speed). The focus of the operational level is the execution of the actions that were chosen at the tactical level; that is, the driver demonstrates specific actions/skills in reaction to a sudden obstacle (i.e., braking, steering). Complications at any of these levels (especially tactical and operational) may potentially increase the risk of vehicle accidents and other driving errors (Chee, Lee & Flakmer, 2010).

Michon's model was extended by Eby and Molnar (2009) to include a fourth level, termed "life-goals", in order to capture the drivers' "motives and attitudes in life and how they affect driving" (Molnar, Eby, Roberts, Louis & Langford, 2009, pg 8). This level incorporates factors related to an individual's character (e.g., age, gender, personality, lifestyle, social background) and the nature of their daily lives and looks at how these factors affect driving practices, including what vehicle to buy and where to live (Eby & Molnar, 2009).Eby and Molnar (2009) have suggested that the greatest opportunity for effective self-regulation occurs at this level of decision making (strategic level). Although an older driver may be making changes to the circumstances that they drive in, like the weather conditions or time of day, these changes may be a result of their awareness of declining abilities, like vision loss, or from changes in social roles (i.e., at the life-goals level).

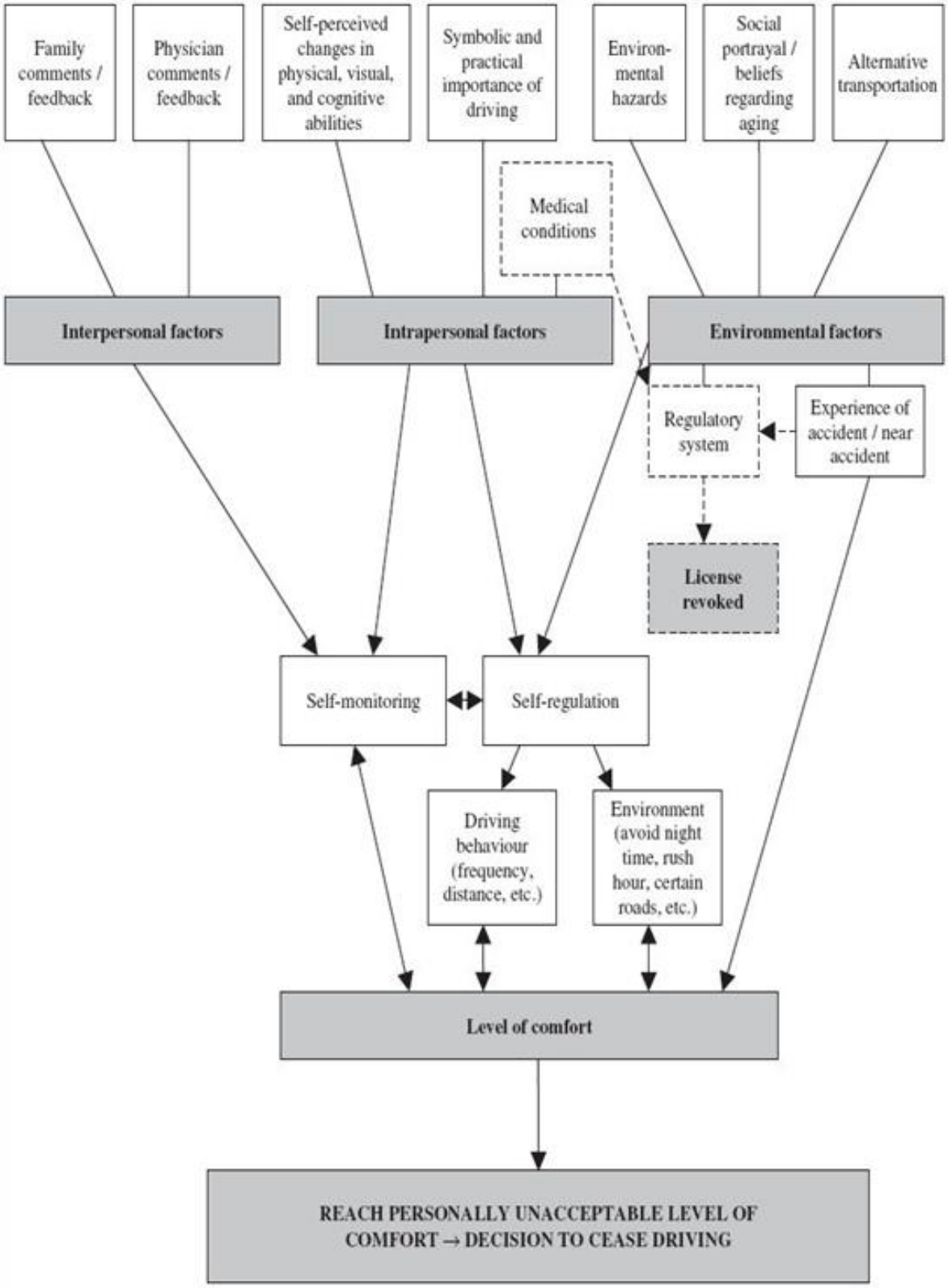


Figure 2.1: Model of the Process of Driving Self-regulation with Aging. Rudman et al., (2006). Canadian Journal on Aging, 25(1), 65-76. Reprinted with permission.

2.4 Factors Related to Self-Regulation

As can be seen from Rudman et al.'s model, many factors can affect self-regulation. Factors in older drivers include being female, comparatively older age, low income, low mileage, poorer health, household composition and cognitive functioning (Ball et al., 1998; Charlton et al., 2006; Kostyniuk, Trombley, & Shope, 1998; Naumann et al., 2011; Ragland, Satariano & MacLeod, 2004); Kulikov, 2011). The next sections provide a brief review of the research evidence on some of the key factors that have been associated with self-regulation.

2.4.1 Driver Characteristics

The most consistent predictive factor of self-regulation among older adults is gender (Gwyther & Holland, 2012). When compared to older females, older males make less drastic changes to their driving behaviours as they age (Eberhard, 1996), and are more hesitant to give up driving (Dickerson et al., 2007; Kostyniuk et al., 1998). Older men, who are also married, are more likely to be licensed to drive (Turcotte, 2006), drive when travelling with a spouse (Burkhardt & McGavock, 1999), and drive more kilometers than women (Benekohal et al., 2004). In contrast, women more often avoid challenging situations and stop driving earlier than men (Benekohal et al., 2008; Burkhardt & McGavock, 1999). Females who voluntarily stop driving are usually younger and in better health than males (Adler & Rottunda, 2006; Dickerson et al., 2007; Gallo, Rebok, & Lesikar, 1999; Hakamies-Blomqvist & Wahlstrom, 1998).

When looking at driving confidence and perceived abilities, there are mixed results regarding the effect of gender. Some studies have not found significant gender differences (e.g., MacDonald et al., 2008; Marottoli & Richardson, 1998), while others report males have higher levels of driving confidence and/or perceived abilities (e.g., Blanchard & Myers, 2010; Myers et al., 2008; Windsor et al., 2007). With regards to females having more restrictive driving

behaviours than males, Gwyther and Holland (2012) have suggested this may be due to a cohort effect, given that traditionally the older female generation have not been the main household driver, and therefore have less experience and less confidence when driving (Kostyniuk et al., 1998). Additionally, Whelan and colleagues (2006) reported that although both genders preferred the private vehicle as their main mode of transport, females are more likely to use alternative modes of transportation.

Kulikov (2011) found that older adults with lower education levels, when compared to college educated older adults, were more likely to restrict their driving to short distances and stop driving. The study also found that those who were employed and had higher incomes were statistically associated with increased driving.

Older drivers drive less and avoid more challenging situations more as they age (Persson, 1993). Naumann et al. (2011) found that the proportion of adults restricting their driving behaviours began to increase at 55-64 years, and sharply increased after age 64. This is not surprising as there are age-related changes including vision, range of motion, hearing, and reaction time (Coughlin, 2001). The medications used to treat medical conditions (which increase with age) may also affect their driving abilities (Adler & Rottunda, 2006). Therefore, in response to the changes and declining health status, many older drivers may self-regulate their driving behaviours (i.e., drive less at night) (e.g., Adler & Rottunda, 2006; Ball et al., 1998). Braitman & Williams (2011) found that impairments in memory and physical mobility were associated with increased driving avoidance. This supports the notion that older drivers may be taking proactive steps towards regulating their driving to compensate for some impairments. Changes in marital status (i.e., becoming widowed or divorced) are also associated with changes in the trip distance (by car) for older adults. Braitman & Williams (2011) found these older

drivers were more likely to drive a greater distance on average (per week) if they became widowed or divorced.

2.4.2 Environmental Characteristics

Research has suggested that household composition plays an important role in influencing driving practices. Donorfio et al. (2009) found that older adults who lived alone or reported being the primary household driver were less likely to self-regulate their driving. Crizzle and Myers (2012) found that older drivers who lived with another driver drove more at night and further from home compared to those who lived alone. Not surprisingly, those who were the only driver in the household drove more overall (trips, km, duration, and days). Furthermore, Donorfio et al. (2009) found that in two-person households, older adults were more willing to allow their partner to drive or share the driving. Blanchard and Myers (2010) found that sole drivers were much older, drove more often, further distances (and further from home), and had lower comfort scores than couple drivers.

Older adults living in rural areas are less likely to have access to public transport than those urban areas (Turcotte, 2006). Seniors in urban areas also make fewer trips than their rural counterparts (Mollenkopf et al., 2004; Pucher & Renne, 2005), although Hildebrand, Gordon & Hanson (2004) found the opposite. Drivers in rural areas also tend to drive more kilometres (e.g., Blanchard & Myers, 2010; Burkhardt & McGavock, 1999; Glascow & Blakely, 2000) and have higher night comfort scores (DCS-N) (Blanchard & Myers, 2010).

Another factor to consider is effect of licensing regulations and the variations in the regulations across provinces (licensing regulations are under provincial or territorial jurisdiction) (Trang, 2010). For example, in Ontario all drivers over 80 years of age and every two years after that are required to renew their licence through the Senior Drivers Renewal Program (SDRP).

The SDRP includes a vision test, a test on the road rules and signs, a group education session, and possibly (if required) a road test (Ministry of Transportation, 2012). However, this is not the case in other provinces like Manitoba where there are no age-based renewal requirements.

Environmental conditions may also affect driving practices (e.g., weather conditions, road maintenance and terrain). Winter driving conditions in northern climates can be especially challenging for older adults, as snow reduces visibility (especially when combined with darkness) and makes vehicle handling more difficult (Andrey, 2010; Zhang et al., 2000). Overall, older drivers are more likely to avoid bad weather conditions (e.g., Baldock et al., 2006; Hakamies-Blomqvist & Wahlström, 1998; Ragland et al., 2004). In poor weather conditions, they also tend to avoid unfamiliar routes, city centres, highways, and turning across traffic (Benekohal et al., 1994; Burns, 1999). Sabback and Mann (2005) compared a sample of older drivers from Florida to a sample in western New York, and reported that the drivers reported less winter driving, with over half of the sample reporting avoidance of snow, sleet, or ice conditions.

In contrast to previous research which used interview data (e.g., Kilpelainen & Summala, 2007; Sabback & Mann, 2005), Myers et al. (2011) examined the influence of winter conditions on naturalistic driving in older adults. This sample was more likely to drive (than not drive) in poor weather conditions. Although poor weather was also the number one reason given by study participants for postponement or cancellation of driving trips, they were more likely to drive than not drive (Myers et al., 2011). On days with good weather (no weather advisories, no precipitation) the drivers were more likely to make trips for social or entertainment purposes than on days with poor weather. This provided further support to previous research which has suggested that older drivers may postpone/cancel trips in bad winter weather (Kilpelainen & Summala, 2007). Additionally, Myers and colleagues found that females were also significantly

less likely to drive in bad weather, poor road conditions and had significantly lower driving comfort scores when compared to males. The amount of daylight and night driving also varied on a monthly basis; reinforcing the importance of examining seasonal climate factors on driving exposure and patterns.

In terms of the type of housing, Freeman et al. (2006) found that older adults that lived in retirement residences (including assisted living) were older, more likely female, and did not have another driver in their household, compared to those in the community. In a longitudinal study by Braitman & Williams (2011), the authors found an association between moving housing locations and driving exposure; that is, drivers who moved from a retirement home to a private home or assisted living drove less distance overall. The authors speculated that this could be due to transportation support provided by friends or family in the former case.

2.4.3 Driver Perceptions

Driving perceptions and in particular driving confidence/comfort has also been implicated as an important influence on self-regulatory and driving practices among older adults and may account for gender differences (Baldock et al., 2006; Charlton et al., 2006; MacDonald et al., 2008; Marottoli & Richardson, 1998; Molnar & Eby, 2008; Myers et al., 2008; Rudman et al., 2006). When considering driver safety, the relationship between perceived driving abilities and actual driving abilities is paramount as research has shown that perceptions influence driving behaviours (e.g., Baldock et al., 2006; Marottoli & Richardson, 1998; Myers et al., 2008; Ragland et al., 2004). Older drivers who are not aware of their inabilities and functional declines (or deny them) may put themselves and others at considerable risk by exceeding their limitations (Myers et al., 2008). There is some preliminary evidence suggesting that drivers who

overestimated their abilities and have high confidence are less likely to regulate their driving practices (MacDonald et al., 2008; Marottoli & Richardson, 1998).

As previously shown in Rudman et al.'s (2006) model (**Figure 2.1**) and in previous studies (e.g., Baldock et al., 2006; Blanchard & Myers, 2010; Charlton et al., 2006; Donorfio et al., 2009; Molnar & Eby, 2008; Myers et al., 2011), confidence or comfort level has been shown to be a key factor in the self-regulation process of older drivers. Driving confidence, operationalized as self-efficacy, is based on Bandura's Social Cognitive Theory (Bandura, 1977; Bandura, 1986) which describes the "belief in one's capabilities to execute a specific action or set of actions in a given situation" (Blanchard, 2008). Bandura (1977) postulates that self-efficacy is a stronger determinant of one's behaviour than the person's actual abilities.

In Rudman et al.'s study (2006), older drivers reported restrictions in their driving when their driving comfort declined, and including many of whom stopped driving when they reported a "personally unacceptable level of discomfort". In a sample of drivers over 77 years of age, Marottoli and Richardson (1998) found that reduced driving frequency and mileage (self-reported) was associated with low driving confidence. In a sample of community drivers (aged 60 to 92), self-reported driving confidence was low and there were high levels of avoidance of challenging situations like driving at night and in the rain (Baldock et al., 2006). Studies (e.g., Blanchard, 2008, Trang, 2010) have reported significant associations between driver perceptions (comfort scores and perceived driving abilities) and objectively measured driving practices.

2.5 Out-of-home Activity (Community Engagement)

Driving reduction and eventual driving cessation have been shown to adversely affect community activity and contribute to social isolation for many older adults (e.g., Burkhardt, Berger, Creedon & Gavock, 1998; Marotolli et al., 2000; Mollenkopf et al., 1997). Participation

in out-of-home activities not only impacts the overall well-being of an older adult, but has important implications for physical health as well (Marotolli et al., 2000). Out-of-home activities often include religious service attendance, visiting friends and family, recreational activities (i.e., bowling), shopping, and appointments. With increasing age, recreational activities tend to decrease in favour of more activities of daily living (Blanchard, 2008; Siren, Hakamies-Blomqvist & Lindeman, 2004).

Turcotte (2006) found that the risk of social isolation for those who live alone, is even greater for older adults when they have limited access to transportation (e.g., unable to visit family). For older drivers, the most commonly cited trip purposes include (in descending order): social and recreational, shopping related, personal medical or business appointments, and lastly accompanying someone else (Blanchard, 2008; Davey & Nimmo, 2003; Mollenkopf et al., 1997). Using data from the healthy aging component of the 2009 Canadian Community Health Survey (16 369 respondents aged 65 and over, in private households) Turcotte (2012) found that seniors who drove their own car as their main source of transportation, were the most likely to have engaged in a social activity in the week prior to the survey (73%). In comparison, only 53% of passengers and seniors that did not have a licence, and 46% of seniors who used accessible transit or taxi had participated in a social activity in the week prior to the study (Turcotte, 2012).

Turcotte (2006) also found that older adults with a car and a driver's license are more likely to be involved in their community through volunteer work. Given that transportation is an essential element of getting to where the volunteering activities are held, it is likely that access to convenient transportation promotes volunteerism (Turcotte, 2006). In fact, Turcotte (2006) found that older adults with a vehicle and license had a predictive probability of volunteer work of

32%, compared to 17% for those without a vehicle or public transit, and 15% for those who only have access to a vehicle by being a passenger.

The ability to maintain out-of-home activities is impacted by where people reside reside and their social networks (Harrison & Ragland, 2003). In Marotolli et al.'s (2000) study, residents of 'private housing complexes' (age restricted) had significantly lower activity levels compared with older adults in the general community. Burkhardt et al. (1998) found that older adults, who live alone (when compared to a multi-person household), did not have ready access to alternative transportation modes. Jenkins et al. (2002) found that when compared to assisted living (AL) residents, those in the independent living (IL) areas of the CCRC facility reported higher activity engagement (inside and outside the facility) as well as quality of life. The authors noted that IL residents were more likely to drive but they did not report any further data.

Although research has shown that out-of-home activity levels decrease dramatically following driving cessation (e.g., Marotolli et al., 2000), it is not known how current drivers who may be self-regulating and approaching driving cessation compare on these levels, with those who have stopped driving. This study hoped to fill this knowledge gap by providing insight into out-of-home activity (also referred to as community engagement) levels of older drivers in retirement communities.

2.6 Planning for Driving Transitions

Given the large number of older drivers, it is important to understand how they prepare or plan for transitions to non-driving, in order to develop ways to help improve this process and minimize aspects that do not allow them to transition well (Dickerson et al., 2009). With suitable planning, such transitions can be made less stressful and harmful to their well-being. Unfortunately, older drivers often do not plan for driving cessation; many fear the social and

psychological implications that may arise from driving cessation and are often reluctant to confront these prematurely (Oxley & Fildes, 2004). Oxley and Fildes (2004) have suggested that older drivers should begin to plan for driving transitions as part of their career retirement so that there are adequate options in place to help maintain mobility. This may include moving to new locations that meet their mobility needs, and where driving is less essential.

The continuum from driving to non-driving may also be less distressing and overwhelming if older drivers begin to substitute some car trips with alternative modes prior to cessation (Oxley & Fildes, 2004). This may include simply becoming more familiar with public bus routes in their local area or transit services available at their facility (non-community dwelling drivers). Especially among the retirement living population where little research exists, planning for driving transitions may be of particular importance as these drivers are also dealing with another major life transition, namely housing relocation.

2.7 Summary and Implications

In order to support on-going mobility, independence and quality of life among older drivers, it is important to learn more about the driving practices and transportation needs of seniors living in retirement communities. The literature suggests there are multiple factors that influence driving practice as well as the use of other modes like public transportation. Research also suggests that there is a connection between driving and community engagement and quality of life in older adults (Harrison & Ragland, 2003; Turcotte, 2006; Jenkins et al., 2002). Also, a growing number of older adults are relocating to retirement communities (Gibler et al., 1998) for many reasons including greater access to service and programs (Krout et al., 2002) and even for the village transport (shuttle bus) (Persson, 1993). As demand grows, factors unique to the retirement residences (e.g., level of care, service availability) should also be explored.

There are few studies in the literature that examine the driving practices and transportation use of older adults living in retirement residences. In addition, with the exception of a small number of studies that have used in-vehicle devices, most studies examining the driving practices of older adults have relied on self-report. As shown previously, self-reported estimates of driving exposure and patterns are not always accurate (e.g., Blanchard et al., 2010; Huebner et al., 2006); therefore, objective measures (such as in-vehicle electronic logging devices) should be used. Although there are studies of community living seniors using in-vehicle devices (e.g., Blanchard & Myers, 2010; Myers et al., 2011; Crizzle & Myers, 2012), this study is the first study to examine naturalistic driving practices in older adults living in retirement.

Chapter 3: Project Background

As described in Chapter 1, access to safe, affordable and accessible transportation is fundamental for older adults to remain independent and engaged in the community. Not surprisingly, driving is the preferred mode of transportation for Canadian seniors (particularly men) well into their 80's, and when driving oneself is no longer an option, seniors begin to rely on family and friends for rides. As presented in Chapter 2, most of the research on driving and transportation use in general has been based on community-dwelling seniors. Only a few studies have examined these important issues concerning seniors living in retirement complexes. For example, the studies in Florida (Choi et al., 2012a) suggest that residents who continue to drive may find they use their vehicles less than when they lived in the community and find it easier to give up driving completely, if they have access to other means of transport. However, there is no research to date on the proportion of seniors in retirement communities who continue to drive, much less their driving habits.

The broad aim of the project being conducted by a team of researchers from the University of Waterloo is to gain a better understanding of the mobility patterns and needs of older adults living in retirement homes to expand our knowledge base and ultimately guide the development of services to address unmet transportation needs and enhance quality of life. This project, which began in 2011, was initiated by Drs. Myers and Crizzle, in collaboration with the Schlegel-University of Waterloo Research Institute for Aging (RIA). The RIA reviews and oversees all research projects conducted in the Schlegel Villages (SVs). The SVs are a consortium of continuing care retirement communities in Southern Ontario, which offer options ranging from independent living condos and apartments to supportive/assistive care to long-term

or nursing home care as illustrated in **Appendix A**. For this project we worked with the four villages that offer retirement living options (condos, apartments or rooms), shown in **Figure 3.1.**

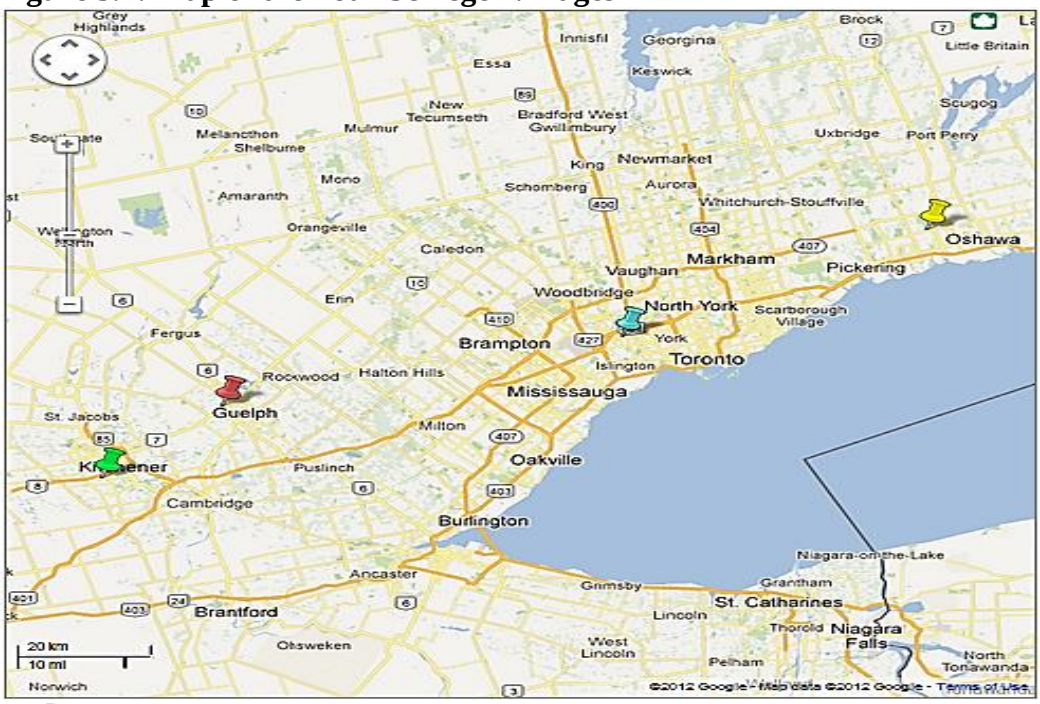
This project consists of five sequential phases: Phase I (an initial survey of driving status; Phase II (a longer survey of resident transportation use); Phase III (an in-depth study on former drivers; Phase IV (an in-depth study on current drivers) and Phase V (an in-depth examination of functional abilities, falls and travel patterns in relation to driving status). Phases I to III were all conducted with the four Schlegel Villages, while Phases IV and V included another retirement community (Luther Village on the Park in Waterloo) to increase the sample of current drivers.

To set the stage for the present study (Phase IV of the project), this chapter begins with a description of the Schlegel and Luther Villages, respectively, including parking, proximity of shops, and access to public transport at the various locations. This is followed by a brief description of the previous phases of the project, as well as the next phase which is ongoing.

3.1 Description of the Schlegel Villages

The four Schlegel Villages that participated in this project are shown in **Figure 3.1.** Depending on the layout chosen, residents living in the condominiums and apartments have full kitchens or kitchenettes, washing machines, clothing dyers, and dishwashers. Those in apartments receive linen and housekeeping services weekly, and one meal a day (although they can purchase other services). Meanwhile, those living in the rooms on the main floor receive additional services (three meals a day, medication administration and daily monitoring by the nurses). Those living in intermediate assisted care areas receive the same services as residents in the main floor rooms as well as help with transfers, bathing and dressing.

Figure 3.1: Map of the Four Schlegel Villages



The Village of Winston Park (WP) in Kitchener

The Village of Riverside Glen (RG) in Guelph

The Village of Humber Heights (HH) in Etobicoke

The Village of Taunton Mills (TM) in Whitby

All residents regardless of living area, receive monthly blood pressure checks, medication reviews twice a year by a pharmacist, and annual nursing assessments. Residents have access to on-site foot care, basic dental and optometry services, physiotherapists, kinesiologists and massage therapists. All apartments and rooms in the SVs are equipped with safety features such as grab bars, high toilets, bathroom doors which open to the outside, and call belts. Although some services and amenities vary from across SVs, all have a small convenience store, a library, a chapel, a barber and hair salon, a fitness centre and a café.

Parking and bus stops: The Villages of HH, TM, and WP all have indoor (underground) and outdoor parking, while the Village of RG only has outdoor parking. Outdoor, visitor parking

is available at all of the SVs. Each of the SVs have a covered public bus shelter located close to the main entrances.

Distances: The villages of WP and TM are located within walking distance (for more mobile residents) of shops and services. For example, at WP there is a bank, post office, gas station and grocery store within 400-800 metres. However, the village of HH in Etobicoke is not located within walking distance to shops/ plazas. Residents at RG, meanwhile, must walk a fair distance, uphill on a sidewalk along a heavily travelled road to reach the nearest shops. The researcher was only aware of a walking path at RG and does not believe the other locations have dedicated walking paths to nearby shops.

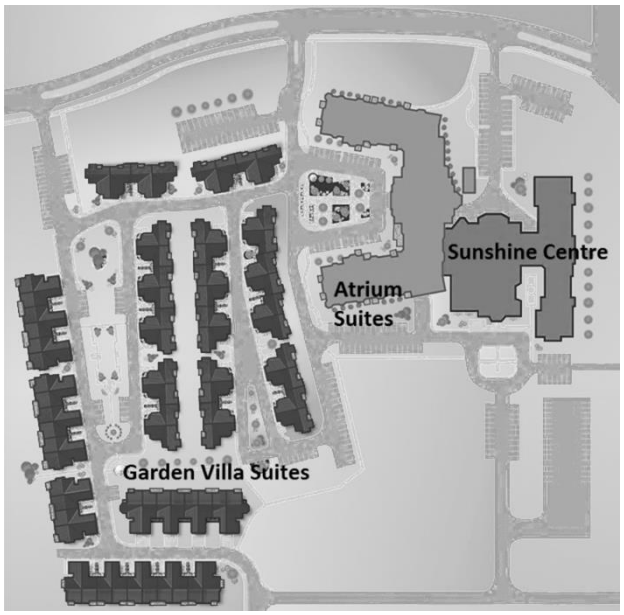
Village bus: All SVs have a permanent bus owned by the village for resident outings. Residents must sign-up in advance, although the process varies from village to village. For example, at TM, the sign-up sheets with a schedule of outings are available at the beginning of the month. The activities and destinations are usually a part of the recreation programming at the village. Residents do not pay to use the village bus; but may need to pay for tickets to some events and associated costs such as meals. The SV buses have a capacity of approximately 16 residents with two spots for wheelchair accessibility.

3.2 Luther Village on the Park

Luther Village on the Park (LV) is a retirement community located in Waterloo's 'uptown' area, which makes it especially close to the shops and activities (e.g., the Westmount Plaza). There are 72 town homes (known as the Garden Villas) and 154 apartments (known as the Atrium Suites). The Sunshine Center (148 rooms), meanwhile, provides assisted living in main floor rooms (similar to the SVs) consisting of meals, laundry and cleaning services. In the Sunshine Centre, larger rooms have a kitchen (full-sized refrigerator and stove) while smaller

rooms have a kitchenette (for making light meals). A small, separate section offers a few rooms for residents with dementia to receive 24 hour supervision.

Figure 3.2: Layout of Luther Village



The locations of the housing options at LV are depicted in **Figure 3.2**, the Atrium Suites are located in the main building along with the village café, store, fitness area, library and wellness centre (services and amenities described in the section below). Access to the Atrium Suites requires visitors to use an intercom (identical to apartment facilities) to contact the resident and unlock the entrance to the elevators. The Sunshine Centre is attached to the main building and can be accessed easily by other residents. Although located on the LV grounds, the Garden Villas (townhomes) are separated from the main building by roadways and sidewalks.

Parking: Each Atrium Suite has a parking spot, either indoors or outdoors, while the Garden Villas feature an attached (single-car) garage, driveway and additional parking spots along the roadways and garden areas. There is also ample visitor parking available.

Distances: LV is located right beside the Westmount Shopping plaza, which features a drugstore, coffee shop, a banking facility and other small shops. On the other side of LV is the

Waterloo Memorial Recreation Complex where residents can engage in various physical activities (e.g., walking and swimming) and other leisure/special events (e.g., hockey games). Unlike the SV locations, LV residents do not need to walk up a main city road to get to shops and services, rather LV is located along Father David Bauer Drive, which is a local road (lower speed and traffic) that is connected to high volume traffic roads on either side. There are also well kept paths to access the small shopping plaza and also the core of 'uptown' Waterloo.

Bus stops: While interviewing two of the residents at LV, the researcher learned that recently residents were approached by Grand River Transit to vote whether they would want/use a bus stop located on Father David Bauer Drive right outside the village. This would have placed a bus stop just a quick walk near the entrance as opposed to walking a few more minutes up to the closest intersection. This bus stop was not installed due to insufficient resident interest.

Village bus: Unlike the SVs, LV does not have a permanent village bus. Instead, organizers wait until there is a program or activity that may be of interest to residents, and at that point they hire an outside bus company to provide transport. For example, residents may purchase tickets for a play through the staff/organizers and based on the number of residents interested, LV may rent a school bus to transport them to the play. Capacity and accessibility features vary by the vehicle and company contracted for the event. Additional information on public transit cost, paratransit, taxis and other services can be found in **Appendix A.**

3.2.1 Services and Activities in Luther Village on the Park

Like the SVs, LV offers many services and amenities on-site to conveniently support the lifestyles of their residents. Residents can also purchase 'a la carte' services like dry cleaning, household repairs, and carpet/room cleaning. Café patrons at the on-site *Village Café* can have access to newspapers and free coffee and tea. Small baked goods and light lunches are available

for purchase. In addition to the Village Café, LV offers Martin's Restaurant and the Sunshine Dining room for dining. Located in the main building, Martin's Restaurant is also open to the public, and offers a popular Sunday brunch and Thursday buffet. The Sunshine Dining room is similar to the dining area in the SV, offering up to three meals a day, served to residents with a choice of meal options. LV also has an on-site store known as *The Shoppe*. In the store residents can purchase cleaning supplies, personal care products, stamps, and a variety of foods (e.g., bread, milk, and candy).

The Wellness Centre provides an environment for residents to access information on community health services, read medical reference books/pamphlets, watch educational health videos and also make use of the on-site health services. For example, a weekly blood pressure clinic, blood work, family physician services, and even mobile massage therapy services that can be conducted by appointment in the residents' rooms. The services at the Wellness Centre are optional as the residents are also encouraged to use their regular physicians and health care providers if they so choose.

There is also a fitness centre, hair salon, on-site banking services, two libraries, lounge areas and other spaces like quilting and billiard rooms. The main building also offers the Great Hall, a hall with the capacity of 225 people that is often used for dinners, special events, and meetings with residents. In addition there are many outdoor activity areas available for social functions, and activities like shuffleboard and horseshoes.

In addition to the on-site services, there are many clubs and activities held on a regular basis, of which many of the clubs are organized by the resident committees. One of the more regular and popular activities occurring is the Monday morning (10:00 a.m. to 11:30 a.m.) coffee hour in the Great Hall. This provides a great opportunity for residents to come together and enjoy

a coffee and socialize. Other activities include bi-monthly Saturday movie nights, slide show presentations from residents about their travels, and guest speakers. In addition to the regular fitness classes offered at LV, there are also walking groups, and yoga and tai chi activities. LV also has an on-site chapel with weekly chapel services.

3.3 Phase I: Initial Survey of Resident Driving Status

When the project began, neither the RIA nor the SVs knew how many of their residents were driving, thus the first step was to survey residents living in the retirement areas of the four SVs. This survey, developed by Drs. Myers and Crizzle and coordinated by the RIA, was distributed and collected by village staff in the fall of 2011. Findings are detailed in a report to the RIA (Janssen-Grieve, Myers & Crizzle, 2012), and summarized below.

Surveys were distributed to 683 residents who were living in the retirement areas of the four Villages, including those receiving intermediate assistive physical care. Those receiving intermediate supportive care due to memory loss were not given the surveys. The primary mode of distribution was staff placing the surveys in resident mailboxes, but at two of the Villages residents were also approached directly (e.g., at dinner time). The overall return rate was 30%.

Respondents (n=206) ranged in age from 55 to 97 years (mean 85.1±6.4) and the sample consisted of 68.4% women (n=141) and 31.5% men (n=65). As shown in **Table 3.1,** 59 or 29% indicated that they were still driving; HH had the highest proportion of current drivers (46%), followed by: TM (36%), WP (23%), and RG (17%). All reported having a valid license (one missing), a car, and most (96.6%) a village parking spot.

Table 3.1: Driving Status by Village from the Initial Survey

	Current	Former	Never	Total
Taunton Mills	11 (35.5%)	18 (58%)	2 (6.5%)	31
Humber Heights	21 (46%)	22 (48%)	3 (6%)	46
Riverside Glen	7 (17%)	30 (71%)	5 (12%)	42

Winston Park	20 (23%)	59 (68%)	8 (9%)	87
Total	**59 (29%)**	129 (62%)	18 (9%)	**206**

Notes: The row percentages were calculated using the total number of residents from each facility (for example, 21 of the 46 respondents or 46% from HH were current drivers).

As shown in **Table 3.2**, a larger proportion of women (61%) than men (39%) were still driving. The female drivers tended to be younger than the males on average, approaching significant (p=.07), less likely to be married and more likely to live alone (although not significant).

Table 3.2: Characteristics of Respondents to the Initial Survey

	Current Drivers n=59 (29%)	**Former Drivers** n=129 (62%)	**Never Drove** n=18 (9%)
Mean Age	84.5 ± 5.2 (n=58)	85.1 ± 6.9 (n=123)	87.3 ± 6.2 (n=18)
Age Range	72 to 97	55 to 96	68 to 96
Gender			
Male	23 (39%)	41 (31.8%)	1 (5.6%)
Female	36 (61%)	88 (68.2%)	17 (94.4%)
Marital Status			
Widowed	31 (53.4%)	93 (72.6%)	15 (83.3%)
Married	24 (41.4%)	24 (18.8%)	2 (11.1%)
Single	3 (5.2%)	9 (7.0%)	1 (5.6%)
Divorced	0	2 (1.6%)	0
Living Arrangements			
Alone	39 (68.4%)	109 (88.6%)	18 (100%)
Spouse/Partner	17 (29.8%)	14 (11.4%)	0
Family member	1 (1.8%)	0	0
Level of Care			
Apartment	40 (70.2%)	42 (33.1%)	5 (29.4%)
Main Floor Retirement	16 (28.1%)	60 (47.2%)	10 (58.8%)
Intermediate Assisted Care	1 (1.7%)	25 (19.7%)	2 (11.8%)

Note: Values presented as valid percent (frequencies), or Mean ± S.D. (range).

Compared to former drivers, current drivers were significantly more likely to be married and live in apartments versus on the main floor ($p < .001$). Only one person who was still driving received intermediate assistive care, compared to almost 20% of the former drivers.

According to the surveys, many of those still driving had moved to the Villages fairly recently: 23% in the last year and 73% within the past two years. As this initial survey was only one page, the information gathered was limited. For instance, residents were asked the year but

not the month they moved to the Villages. Thus, a longer survey (described below) was developed to obtain a more comprehensive profile of resident driving status and transportation use in general, as well as to determine eligibility for participation in the in-depth studies.

3.4 Phase II: Resident Transportation Patterns Survey (RTPS)

Shown in **Appendix A,** the two-page RTPS asked all residents for basic information: age and gender; month and year of their move to the village; where they lived before; use of various types of transport; and driving status. Depending on whether or not they drove, they were asked to complete Section 2 or 3, respectively. The RTPS was distributed in fall, 2012 to the mailboxes of all residents (n=732) living in the retirement sections of the four villages (excluding memory care) at the time of the survey. A total of 407 of surveys were returned for a response rate of 55.6%. Due to missing information on driving status (n=8), only 399 of surveys were analyzed. Two additional surveys that were filled out by current drivers during recruitment for the present study were not included in these analyses.

Of the 399 residents, 272 were female and 127 were males that ranged in age from 65 to 100 years old (mean age 86.8 ± 5.7). Current drivers (n=82) made up 21% of respondents, compared to 68% who had stopped driving (former driver) and 11% who had never driven. Although there were no gender differences for current and former drivers, never drivers were predominately females ($p<0.001$). In the sample as a whole, a substantial proportion (82%) received rides from others (on average five times a month), most often from their children (62%), followed by other relatives (29%) and friends (23%). About half used the shuttle service provided by their village, while 44% used other forms of transportation; most often taxis (73%). Only 19% used public buses. Level of independence (based on service use), receiving rides from others and using other modes of transport were significant predictors ($p<.001$) of driving, while

age, gender and how long they had lived in the village were not (logistic regression {N=365 -2Log Likelihood Ratio = 233.876; Nagelkerke R^2 = .478}).

Compared to former and never drivers, current drivers were significantly more independent ($p<0.001$), younger ($p<0.03$), and less likely to use other modes of transportation ($p<0.001$) and receive rides from others ($p<0.001$). Among the current drivers (mean age 84.8± 4.2; 59% women), the men and those living more independently were significantly more likely to drive more often (three days a week or more). Not surprisingly, current drivers were less likely to use other forms of transportation, including rides from others (p <.001). Only a small proportion used other forms of transport (primarily taxis). Of the current drivers that received rides from others (N=36), 73.5% received rides from someone who does not live in the village, while 26.5% from someone in the village. Current drivers reported receiving rides from others approximately three times a month (mean 3.2 ± 2.4).

3.5 Phase II: In-depth Study with Former Drivers

This phase of the study was conducted by Courtney Janssen-Grieve (CJG) for her Master's thesis. Data was collected from January to March, 2013 and consisted of multiple recruitment strategies (see Janssen-Grieve, 2013). To be eligible, residents had to be 65 and older and quit driving in the past two years. The study included questionnaires (e.g., driving history, current transportation use), scales (e.g., depression and balance confidence), daily travel diaries (for two weeks), and small group discussions. A total of 20 residents (55% female) from the SVs participated; mean age 86.5 ± 4.9 (range 75 to 97).

The study examined events leading to the decision to stop driving, as well as the impact of this decision, including activity outside the village and travel patterns. Over a third had stopped driving before moving to the retirement village, 42% after the move (average 2 years);

while for 20% these transitions occurred within the same month. Except for a few, this sample appeared to have come to terms with their decision and showed few depressive symptoms. Most had relatives in the area and received rides from others. Three quarters made at least one trip out of the village over two weeks, most often as a passenger in a private vehicle and for recreation or social purposes. Since moving to the village, 55% reported that their involvement in community-based activities had decreased, however they took part in many village activities. Further study details can be found in the thesis (Janssen-Grieve, 2013).

3.6 Phases IV and V: In-depth Studies on Current Drivers

As this is the focus of the present thesis, the methods for the in-depth study on current drivers will be described fully in the next chapter. However, it is important to note that another student (Spencer Gooderham [SG]) was also involved in this study and is currently assessing additional residents from LV to increase the sample size. His study (proposal defended on July 17, 2013), considered Phase V of the project, will focus on the functional assessment data and fall incident reports collected from current drivers. Additionally, he will statistically compare data collected from the former drivers (Phase III) and the current drivers with respect to characteristics, falls, depression, ABC scores, travel patterns, activity and social engagement (in and outside the village).

Chapter 4: Methods

This chapter begins with the study rationale and objectives. Ethics approval, consent and confidentiality are described next, followed by eligibility criteria and sample recruitment. The next section outlines the study protocol and data collection procedures, followed by a description of the measures, and finally data handling and analyses. As the study involved five locations (four SVs and LV), differences in recruitment strategies and other study materials are noted at appropriate junctures. The study timeline and milestones are shown in **Appendix B**.

4.1 Study Rationale and Objectives

As described in Chapters 1 and 2, there is considerable research on driving in older adults. However, the majority of studies have relied on self-report data which has been shown to be inaccurate relative to objective measures of driving (Huebner et al., 2006; Blanchard et al., 2010). To date, there have been no naturalistic driving studies on older adults living in retirement communities. Similarly, studies which have examined driving relative to other modes of transportation (e.g., Blanchard, 2008; Dahan-Oliel et al., 2010; Turcotte, 2006; 2012) have all been restricted to community-dwelling samples. Although there is some evidence that retirement residents who continue to drive may have lower levels of disability (e.g., Kelly-Moore et al., 2006), as well as higher levels of activity engagement outside the complex and better quality of life (e.g., Jenkins et al., 2002), amount of driving was not objectively measured. This study builds on prior studies by UW researchers that have used electronic data-logging devices to objectively examine driving practices in community-dwelling older drivers. Similar to Blanchard (2008), this study examined travel patterns (using various modes of transportation) more broadly. Additionally, this study looked at indicators of well-being and extent of

community engagement (i.e., activity and group participation inside and outside the Villages). The **primary study objectives** were as follows:

1. To examine the actual driving practices (exposure and patterns) of retirement living seniors, as well as their travel patterns in general (using various modes of transportation).
2. To examine associations between actual driving practices and:
    a. driver characteristics (e.g., age, gender, cognitive scores);
    b. perceptions of driving comfort and abilities;
    c. indicators of well-being(depression and vitality); and
    d. extent of activity and group participation inside and outside the Village.

A **secondary objective** of this study was to examine self-reported driving restrictions and intentions to quit driving (Kowalski, Love, Tuokko, MacDonald, Hultsch & Strauss, 2012), Although self-reported driving practices are subject to recall and social desirability bias, and drivers may not restrict as much as they report on questionnaires (e.g., Blanchard et al., 2010; Myers et al., 2011; Crizzle et al., 2012), it is still important to profile residents on these measures to see how they compare to previous samples of community dwelling older drivers.

4.2 Ethics Approval, Consent and Confidentiality

Prior to recruitment, approval was obtained (January 14, 2013) from the University of Waterloo's Office of Research Ethics (ORE). Consent for contacting participants by telephone was obtained via the resident interest form or directly from the resident at the time of sign-up. Signed consent for study participation was obtained at the beginning of the first session. Recruitment (letters of study information and interest forms) and consent materials for the SV

sample are shown in **Appendix C**, while those for the LV sample can be found in **Appendix D**. Participants were repeatedly assured that none of the information they provided or that was recorded by the devices installed in their vehicles (e.g., speeding) would be voluntarily reported to licensing authorities. Consent forms for participation and for follow-up contact were photocopied by RIA staff; the originals were secured by the researcher in a locked cabinet.

To maximize confidentiality, resident names were removed from completed materials (e.g., questionnaires, diaries) by the RIA staff member who also retained the master list, and names were replaced with an identification code (e.g., TM.2012.134). The resident's first name and initial was used to enter data from the trip logs, travel diaries and devices to ensure accurate matching of information and later replaced with ID codes. For information obtained from the interviews, code names were assigned and inserted into the transcriptions before analyses. Additional ORE approval (Form 104) was obtained (June 7, 2013) when recruitment expanded to Luther Village (LV). Modifications were made to recruitment processes and materials (e.g., letter of study information and resident interest form) and study materials as needed (e.g., services and amenities checklist). For LV, the researcher developed and retained the master list of the residents' confidential ID codes.

4.3 Study Eligibility

To have been eligible for this study the residents must have:

- been 65 years or older;
- driven a vehicle 1996 or newer and non-hybrid (for compatibility with the CarChip);
- kept their vehicle at the Village;
- driven the vehicle themselves at least once a week; and
- been available for the duration of the study (two appointments ~ two weeks apart).

4.4 Sample Recruitment

Recruitment and data collection was staggered (proceeding from village to village, beginning with WP) given only 15 sets of in-vehicle devices were available as well as to facilitate scheduling and allow enough time between assessments. Given the overlap in project timelines, recruitment was conducted at some of the villages with CJG and the additional support of the RIA research co-ordinator (Kaylen Pfisterer). As noted in Chapter 3, another graduate student (SG) conducted the functional assessments and helped with recruitment at the LVs.

4.4.1 Schlegel Village Presentations

As a means of generating interest in both studies (with former and current drivers, respectively) brief presentations were held at each of the four SVs (timeline shown in **Appendix B**). The two researchers (CJG and SS) discussed mobility/transportation in general before introducing their projects. As detailed in Janssen-Grieve's (2013) thesis, the low turnout at HH, RG and WP, may have been due to popular activities taking place at the same time. To increase attendance at TM, CJG and KP (RIA) served coffee and spoke to residents during lunch and invited residents to an afternoon presentation held with the Resident Council Meeting.

4.4.2 Pamphlets and in-Person Recruitment

Additional recruitment strategies were employed in January, 2013, including a pamphlet (**Appendix C**), which was distributed to retirement resident mailboxes. In addition to short descriptions of the studies, the pamphlet advertised the date (approximately a week in advance) when the researchers would be at the village to discuss the studies, and included an interest form they could hand into the office.

The researchers then set up "booths" (tables with signs) in high traffic areas (e.g., near the dining halls and cafés) at each of the SVs on the dates shown in **Appendix A**. Signs were posted throughout the village for promotion. Interest forms were collected from the office and names cross-checked against the list of eligible residents who had completed the RTPS (extra copies were available for those who spoke to the researchers and had not yet completed this survey). Residents who stopped to talk were given additional study information and shown the vehicle devices and examples of the trip logs and travel diaries. Some people were scheduled at that time (and given the full letter of study information and appointment cards). When walk-by traffic was slow, the researcher went to the rooms of eligible residents (according to the RTPS) with the permission of the RIA to recruit.

4.4.3 Luther Village Presentations and Additional Strategies

As discussed in Chapter 3, when it became evident the researcher would not attain the target sample size from the SVs, another retirement community (Luther Village) was approached. With the assistance of the Coordinator of the Wellness Centre, the researchers (SS and SG) were invited to attend the weekly coffee hour in the main building (on the mornings of June 17 and 24, 2013), to speak to residents about the study and set-up a table. The coffee hour was chosen because it was a regular, popular activity arranged by the residents themselves often attended by 60 to 100 people.

The first date conflicted with the residents' Annual General Meeting (AGM), which was held shortly after the coffee hour. Nonetheless, during the announcements the primary researcher (SS) made a short speech about the study and invited attendees to come to the back of the room to ask questions and get a copy of the information letter and interest form. The following week, the researchers returned during the morning coffee hour. A staff member reminded the residents

about our study and encouraged them to speak to us afterwards. Additional residents were scheduled, one of whom suggested the names of seven others who were not there that day but felt they might be interested. Two people (couple) were not eligible because they drove a hybrid vehicle. Staff put information letters in the other residents' mail boxes, however, none responded.

4.5 Study Protocol

This study protocol was based on naturalistic driving studies with older adults by previous graduate students supervised by Dr. Myers, namely: Robin Blanchard's study conducted between June and October 2007; Aileen Trang's study conducted from November 2008 to March 2009, and most recently, the study by Alexander Crizzle, conducted from October 2009 to August 2010. Similar to the studies by Trang and Crizzle, this study employed a two-week monitoring period (Blanchard only monitored driving for one week). Although driving patterns were found to be fairly consistent from week one to two, the longer monitoring period captured more instances of night driving, as well as greater variability of weather and road conditions (Myers et al., 2011). As shown in **Figure 4.1**, two meetings were scheduled with participants before and after the two week monitoring period.

At the SVs sessions were held in quiet meeting rooms, most often the libraries and the Country Kitchens. At LV, the first session took place at their homes or rooms, except for one participant who was assessed in the Great Hall after the AGM. The second sessions at LV were held in the Little Hall (a private meeting room), except for one who was assessed in the Wellness Centre (semi-private area for functional assessments and fully private for questionnaires).

Figure 4.1: Current Driver Study Protocol

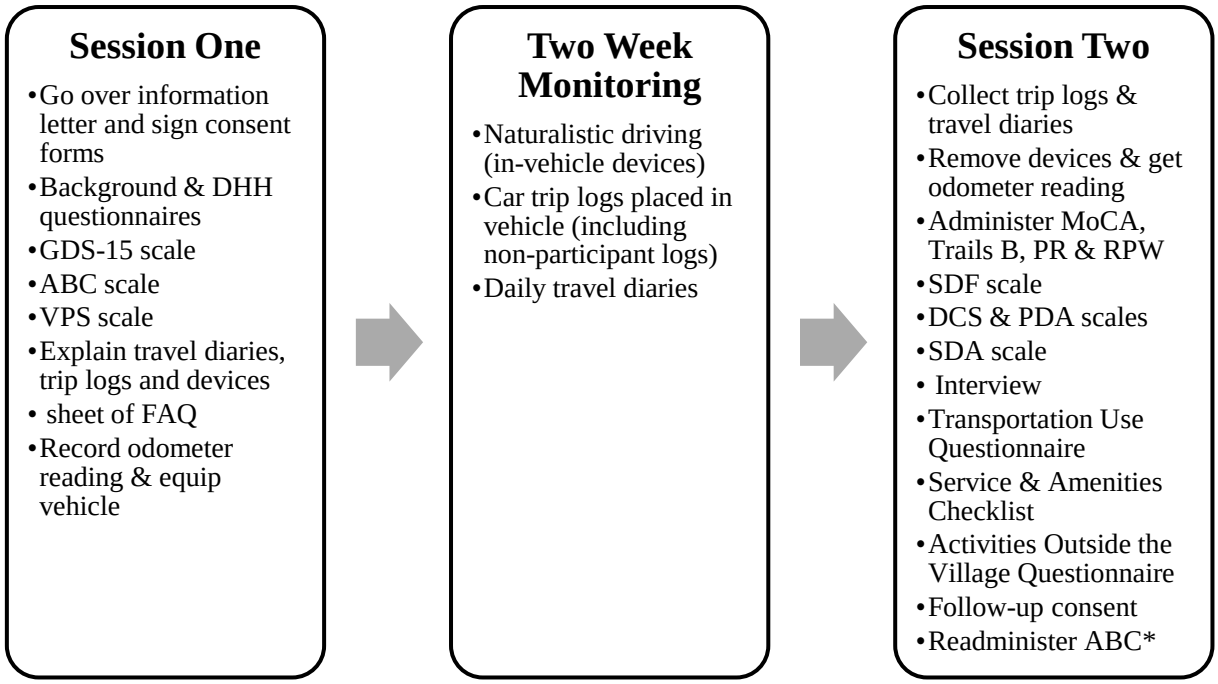


Figure Legend: DHH = Driving History & Habits Questionnaire; **GDS** = Geriatric Depression Scale; **ABC** = Activities-specific Balance Confidence Scale (extended version); **VPS** = Vitality Plus Scale; **FAQ** = Frequently Asked Questions regarding the devices; **MoCA** = Montreal Cognitive Assessment; **PR chart** = Pelli-Robson chart; **RPW =** Rapid Paced Walk; **DCS** = Day and Night Driving Comfort Scales; **PDA** = Perceived Driving Abilities Scale; **SDA** = Situational Driving Avoidance Scale; **SDF** = Situation Driving Frequency Scale. *Administration of the ABC (time two) was optional at the SVs.

First session: The researcher began by reviewing the study information, showing and explaining the vehicle recording devices and answering questions. At that point the researcher asked if they were still interested in participating (all of whom were), went over the consent form and obtained signatures. Participants were then asked to complete the background and driving questionnaires, followed by the GDS, ABC and VPS scales (all of which are described below in **Section 4.6 - Instruments**). Next, the researcher explained the trip logs and travel diaries and provided examples and instructions for both. Potential technical problems with the devices were reviewed and participants were given a sheet of Frequently Asked Questions (FAQ) developed by Dr. Crizzle, as well as the researcher's phone number. The researcher then accompanied the resident

to their vehicle, installed the two electronic devices (if possible) and recorded the odometer reading as well as device numbers on a Vehicle Recording Sheet. A set of trip logs and pen attached to a clipboard were left in the person's vehicle. Participants were instructed to drive as they usually would over the two-weeks. In the event that someone else drove their vehicle without them being present (i.e., they let a friend borrow their car), they were asked to have that individual complete a *non-participant* trip log.

They were advised to try not to take their vehicle in for regular servicing over this period if possible, or if necessary to remind the mechanic to replace the devices following servicing. All materials for the first session are shown in **Appendix E**. Time for completion of the first session generally took between 45 and 65 minutes, not including the time to accompany the participants to their vehicles and equip the vehicles.

Two week monitoring period: Consistent with previous naturalistic driving studies of older adults (Blanchard & Myers, 2010; Crizzle & Myers, 2012; Myers et al. 2011), driving exposure and patterns were examined using two electronic devices: the CarChip® and the Otto Driving Companion®. Both devices collect similar date and time-stamped information (e.g., distance travelled, duration, speed). The GPS feature of the Otto, together with area maps, further permits an examination of the roadways used and radius or distance travelled from home. Odometer readings were recorded at both the beginning and the end of the study to provide backup data on total driving distance (km), similar to the studies by Trang (2010) and Crizzle (2011). Similarly, trip logs were used to identify who drove the vehicle, obtain descriptions of trip purposes and general weather conditions, and cross-check the data. For example, if data were missing from the CarChip or Otto, data from the other device, together with information from the trip logs, could be used to reconstruct routes. Finally, people were asked to complete daily travel diaries to

capture other modes of transport (apart from driving oneself) over the two week period. Materials used in the monitoring period are shown in **Appendix F**.

Second session: Following the driving monitoring period, the researcher (accompanied by SG) met with the participants again as soon as possible (within 15 to 21 days after the first session). Prior to this meeting, they were reminded to bring their travel diaries, as well as glasses, coats and boots if needed. Sessions took place in quiet and private rooms and, as shown in **Figure 4.1**, began by collecting the trip logs, removing the devices from the person's vehicle and recording the odometer reading. If two people were scheduled at the same time, one would begin the functional assessments (MoCA, Trails, vision chart and walk test) with SG, while the other started on the questionnaires with SS (at opposite ends of the room). At all locations, the functional assessments were administered by SG, while all other components were always administered by SS. While residents completed the scales and questionnaires, the researcher reviewed their trip logs and travel diaries for missing or inconsistent information. Session two took approximately 60 minutes to complete, with 15 to 20 minutes for the functional assessments. All materials for session two are shown in **Appendix G** and described below.

4.6 Instruments

This section presents a detailed description of the tools used in this study. Please refer to **Figure 4.1** for the order of administration. All instruments can be found in **Appendices E** (first session), **F** (logs and travel diaries) or **G** (second session). Prior to self-completion of the scales and questionnaires, the researcher went over instructions and answered any questions that arose.

4.6.1 Background and Driving History and Habits Questionnaires

The background questionnaire was used to collect basic personal information such as age, gender, education, marital status, living arrangements (Part A), where they lived before they

moved to the Village (Part B), as well as data on health, mobility, falls and physical activity (Part C). The Driving History & Habits Questionnaire (DHHQ), adapted from prior studies (Blanchard, 2008; Trang 2010; Crizzle, 2011), was used to gather information on: driving history, reasons for driving, driving habits and preferences, and thoughts about future driving restrictions and cessation.

4.6.2 The Geriatric Depression Scale (GDS) – 15 Items

Similar to Crizzle (2011), the GDS-15 was used to assess depression. The GDS-15 is quick and easy to complete, using a YES/NO response format and shows good psychometric properties (Lyness, Noel, Cox, King, Conwell & Caine, 1997). Possible scores can range from 0 to 15 with higher scores indicating more depressive symptoms. Consistent with prior studies at the SVs, participants were given a slip of paper which stated the following:

> *Your health and well-being are important to us. If you are feeling unhappy or troubled, we encourage you to contact your physician or any staff member who can arrange for you to see a nurse on duty or the attending physician 24 hours, 7 days a week. If this is not an emergency, you can also contact the director of retirement care at your village (name and # provided).*

This note was given out in the first session after the consent form was signed and prior to administering the questionnaires and scales. Although the LV participants did not receive this, they were informed that any concerns should be discussed with their Wellness Coordinator.

4.6.3 Vitality Plus Scale (VPS)

The 10-item Vitality Plus Scale (VPS) was used as a general measure of well-being. This simple tool was developed to assess interrelated psychophysical components of well-being such

as sleep, appetite and energy level that are influenced by physical activity/inactivity (Myers et al., 1999). The VPS has demonstrated good psychometric properties, including test-retest reliability (ICC= 0.87), associations with measures of physical functioning (e.g., TUG test [r =-.58] and walking speed [r =.43]) and scores on the Vitality (VIT) subscale of the SF-36 (r =-.65, p <0.001) (Myers et al., 1999). Each item is scored from 1 to 5 and total scores can range from 10 to 50. Higher scores indicate greater well-being.

4.6.4 The Activities-specific Balance Confidence (ABC) Scale

Balance confidence, which has been related to mobility and activity restrictions (e.g., Myers et al., 2005; Webber et al., 2005), was assessed using the ABC Scale. The original 16-item ABC Scale is widely used (Jorstad, Hauer, Becker & Lamb, 2005) and has good test-retest reliability, construct validity and discriminative ability (Powell & Myers., 1995; Myers, Powell, Maki, Holliday, Brawley, & Sherk, 1996; Myers, Fletcher, Myers & Sherk, 1998). Similar to Crizzle (2011), this study employed a modified and extended version of the ABC Scale using a 5-point (collapsed) rating scale (based on Rasch analyses). The wording of some of the items was modified to make them more applicable to seniors living in retirement facilities and items were added to address balance concerns as a pedestrian and when using public transport. Scores were calculated for the original (slightly modified) 16 items and for the full 27 items. In both cases scores can range from 0 to 100% with high scores indicating greater confidence.

4.6.5 The Montreal Cognitive Assessment (MoCA)

Similar to Crizzle's 2011 study, the Montreal Cognitive Assessment (MoCA) was used to assess cognitive functioning. The MoCA covers a broader range of cognitive domains than the Mini Mental State Exam (MMSE) (Nazem, Siderowf, Duda, Have, Colcher, Horn et al., 2009)

and is less prone to ceiling effects (Zadikoff, Fox, Tang-Wai, Thomsen, de Bie, Wadia et al., 2008; Gill, Freshman, Blender, Ravina, 2008). Shown in **Appendix G**, the MoCA comprises 12 tests in multiple domains: executive function/visual spatial, naming, memory, language, attention, abstraction and orientation (Gill et al., 2008; Nazem et al., 2009). The MoCA is usually scored from 0-30, with scores below 26 indicative of mild cognitive impairment (MCI) (Nasreddine, Phillips, Bédirian, Charbonneau, Whitehead, Collin et al., 2005). However, Luis, Keegan & Mullan (2009) found that a cut-off score of 23 provided greater specificity (0.95) and sensitivity (0.96). Dr. Crizzle provided training on the administration and scoring of the MoCA. For the purposes of this thesis, only total MoCA scores (not domain scores) are were examined. The other functional assessments shown in **Figure 4.1** (protocol) are beyond the scope of this thesis and will be analyzed for another student thesis.

4.6.6 Driving Comfort Scales (DCSs)

Driving comfort was assessed using the 13-item Driving Comfort Day (DCS-D) and 16-item Driving Comfort Night (DCS-N) scales. Participants rated their level of comfort in various driving situations on a 5-point scale, with higher scores indicating greater comfort (Myers et al., 2008). Both scales were developed with older drivers, and have shown good person (DCS-D, .89; DCS-N, .96), item (DCS-D, .98; DCS-N, .97) and test-retest reliability over 7 to 16 days (ICC= .91 and .86) respectively (Myers et al., 2008). Good test-retest reliability was replicated with an independent sample of older drivers (Blanchard & Myers, 2010).

4.6.7 The Perceived Driving Abilities (PDA) Scale

On the 15-item Perceived Driving Abilities (PDA) Scale, participants rated their current driving abilities using a four-point scale from *poor* (score = 0) to *very good* (score = 3). Scores

range from 0 to 45, with higher scores indicating greater perceived driving abilities (MacDonald et al., 2008). The PDA scale has good item (.96) and person (.92) reliabilities, good internal consistency (α=.94) (MacDonald et al., 2008), and moderate test-retest reliability (ICC = .65) (Blanchard & Myers, 2010).

4.6.8 The Situational Driving Frequency (SDF) and Avoidance (SDA) Scales

The Situational Driving Frequency (SDF) and Avoidance (SDA) scales were used to assess self-reported driving restrictions. The 14-item SDF scale asks how often the person drives in various challenging driving situations and is scored using a five-point scale (from never to very often, 4-7 days per week); scores can range from 0 to 56. The SDA scale, meanwhile, asks people to check from a list of 20-items, which driving situations they try and avoid if possible. Scores can range from 0 to 20. The 21st item ("No I don't try of avoid any of these situations") is used to verify that people have read through the list. Higher scores on the SDF and lower scores on the SDA, respectively, indicate fewer driving restrictions. Both the SDF and SDA scales have shown high internal consistency (α = .92, .87) and 7-14 day test-retest reliability (ICC= .89, .86), respectively (MacDonald et al., 2008). Further examination with a separate sample of older drivers, by Blanchard & Myers (2010) also found the SDF and SDA scales to have high internal consistency (α= .92, .87) and good test-retest reliability (ICC=.89, .86).

4.6.9 Transportation Use Questionnaire

The transportation use questionnaire was developed for this project (beginning with CJG's study on former drivers) to examine how often residents use various types of transportation (other than driving themselves), whether they receive rides from others and from

whom. The present sample (current drivers) was asked three additional questions on using taxis, public transit and the Village bus (see **Appendix G**).

4.6.10 Activities outside the Village Questionnaire

Using a number of sources (e.g., Jenkins et al., 2002; Maratolli et al., 2000), a questionnaire was developed for this project to assess group and activity participation inside and outside the Village, as well as size of social networks and ways they stay in touch with family and friends who live outside the Village (shown in **Appendix G**). Information gathered from this tool, together with the Transportation Use Questionnaire, car trip logs and travel diaries were intended to provide a more comprehensive profile of resident travel and activity patterns.

4.6.11 Service and Amenities Checklist

As people age and mobility becomes more difficult, they may begin substituting in-home for out-of-home activities (Marottoli et al., 2000). Thus, the researchers developed a checklist of village services and amenities used over the past month, as well as services from outside agencies. As services and activities differed, two versions of this checklist were created for the samples from the SVs and LV, respectively (both are shown in **Appendix G**).

4.6.12 Interview

Before beginning the interview, the participants were asked for permission to audio record the interview (none refused). As shown in the script (**Appendix G**), participants were asked if the devices affected their driving, whether they experienced any vehicle or driving problems, and whether the two week monitoring period was typical of their usual driving and travel patterns (from the diaries). In addition, the researcher inquired about sharing rides with other residents and participants had the opportunity to provide suggestions on how the Villages

might provide additional travel support. Based on the CanDrive project, Dr. Myers suggested an additional question for LV participants, namely if they drove any other vehicles over the two weeks. Although SV participants were not asked this question, no one had more than one parking space thus reducing the probability of driving more than one vehicle. In contrast, at LV, the Garden Villas (townhouses) have multiple parking spots (driveway, garage and in some cases an unmarked parking spot located on the LV premise).

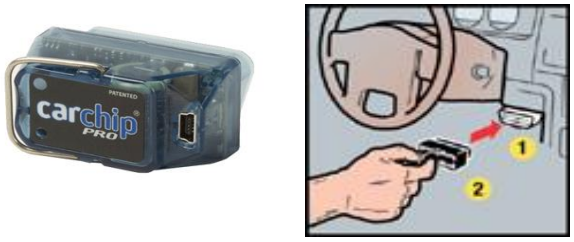
4.7 Driving Exposure and Patterns Measurement Tools

As depicted in the **Figure 4.1**, two electronic data logging devices were installed into participant vehicles for a two-week monitoring period. In addition to the CarChip Pro and the Otto Driving Companion, trip logs were used to gather additional as described below.

4.7.1 CarChip Pro

Shown in **Figure 4.2**, the CarChip Pro ® (Model 8226; Davis Instruments, Hayward, CA) is an electronic data-logging device that is installed in the vehicle's on-board diagnostic (OBDII) system port usually located under the steering wheel. As in previous studies examining objective driving exposure and patterns (e.g., Blanchard, 2008; Crizzle, 2011, Huebner et al., 2006; Trang, 2010) this device was used to provide time and date stamped driving data.

Figure 4.2: CarChip Pro Device and Installation



Recording begins automatically when the engine is turned on and stops when the ignition is turned off (Huebner et al., 2006). This particular model has a logging capacity of 300 hours before the device begins to overwrite data (Davis Instruments, 2008). The 15 devices were programmed to log data at one second intervals. As the CarChip has been found to be more accurate for recording distance, compared to GPS devices which are vulnerable to signal loss (Huebner et al., 2006), data from this device was used for most of the driving indicators (e.g., distance, duration, trips and stops). Version 2.3.1 of the CarChip software was used to upload the data from the CarChip to the researcher's computer.

4.7.2 Otto Driving Companion

Shown in **Figure 4.3**, The Otto Driving Companion ® (Model PM2626; Persen Technologies, Winnipeg, MB) is a small device powered by an AC adapter, which is mounted on the dashboard using a removable sticky pad. When paired with digital maps from Goggle Earth, the GPS data can be used to examine where the vehicle travelled. In this study, the Otto data was used primarily to examine radius or the furthest distance from home for each trip. Similar to Crizzle (2011), the device was set to record at one-second intervals for up to 320 hours.

Figure 4.3: Otto Driving Companion

As the Otto Driving Companion was originally designed to warn drivers of potentially hazardous situations (such as speeding or approaching a crosswalk or school zone), the device is equipped with warning lights and auditory messages. In this study, these alerts were muted prior

to installing the device. However, drivers still heard a voice say ‘logging enabled’ each time the vehicle was started after being off for more than 10 hours (or if the adapter is not properly connected), as well as the alert ‘outside coverage area’ if they went outside their area. They were told that was normal and to ignore these alerts. The Otto data was uploaded and stored on the researcher’s computer using the Otto website (www.myottomate.com). When an internet connection was not available, the researcher used the Otto Configuration software, Version 1.04.

4.7.3 Trip Logs

Trip logs were used to supplement the data collected from the devices. Logs, instructions and example sheets for the residents are shown in **Appendix F**. Adapted from prior studies (Blanchard, 2008; Trang, 2010; Crizzle, 2011), participants were asked to complete a log for each trip, indicating: the date and time of departure; who drove; the number of passengers in the vehicle; general weather conditions; trip purposes; destination (town or city); and the time they returned home. Or ask others who drove their vehicle to complete the *non-participant* logs. Logs were attached to a clipboard with a pen and placed in their vehicle when devices were installed.

4.7.4 Travel Diaries

Over the two week monitoring period, participants were also asked to complete daily travel diaries to capture other modes of travel outside the village (e.g., as a passenger in someone else’s vehicle, walking, using taxis, public transit or the village shuttle), as well as trip purposes. Instructions and examples are shown in **Appendix F**, as are the categories used to classify trip purposes. Participants were given fourteen sheets and asked to complete these when they get home from a trip or at the end of the day. For each day they were asked to indicate how many trips they made, where they went or what they did in general (e.g., shopping), the mode(s) of

travel to and from the destinations, approximate time they left and returned home, and general weather conditions. Participants were also asked if the reason they chose not to drive on various trips was due to weather.

4.8 Data Handling and Analysis

Given the complexity of the driving data, the researcher received training from Dr. Crizzle regarding the installation and use of the devices, the software and procedures for downloading and cleaning the data. All scales were scored according to the developer's instructions. Data was entered into SPSS (Statistical Package for the Social Sciences, Version 20.0). Two databases were constructed, one for the RTPS information and the other for the remainder of the current driver data.

Prior to entering driving data into the SPSS database, the researcher downloaded the electronic data from the CarChips and Otto. The information was "cleaned" using Microsoft Excel and involved removal of non-participant data (identifying using the trip logs) and any trips with 0 km (Blanchard, 2008; Trang, 2010; Crizzle, 2011). Given the close proximity of stores, banking services and gas stations, the researcher used the Otto driving companion and Google map service to determine if the low km trips (e.g., < 1km) were due to error or were legitimate short distant trips. For example, the nearest shopping centre to WP was only 0.8 km and some trip segments could be only 0.2 km if people drove from the bank to the grocery store in the same plaza In addition, participants at LV were instructed to record trips (on car trip logs) where they left the LV premise, as some residents drove for 0.1 – 0.2 km to the main building or the garden. The trip logs were used to screen for trips on the premises which residents may have forgotten to omit from their trip logs.

To measure radius or driving distance from home, the researcher used Google Earth and uploaded the Otto data and calculated the minimum and maximum radius from the village locations. A line was drawn on the mapped data from the Village location to the furthest point of the participant's trip. The researcher made every attempt to reconstruct trip routes for participants with a few missing segments by looking at other similar trips made by the resident.

Descriptive analyses were used for continuous and categorical variables. Continuous variables included calculations of central tendency (mean, standard deviations, and range). Categorical variables are expressed as frequencies and percentages. The appropriate analyses (parametric versus non-parametric) were selected after checking for normality using both visual examination (e.g., normal probability plots) and statistical tests (e.g., the Shapiro-Wilks test). Parametric (e.g., Person r, independent t-tests, chi-square) and non-parametric tests (e.g., Spearman rho, Mann-Whitney U) were used to examine associations and make comparisons (e.g., by gender and cognitive scores). The significance level for all tests was set at $p=0.05$.

Similar to prior studies (Blanchard, 2008; Trang, 2010; Crizzle, 2011), a round trip (which could comprise multiple segments consisting of stops and starts) was defined as leaving and returning to one's home. The final stop (returning to the village) was not counted in the total number of stops (e.g., leaving the village to get gas then returning home would be one stop). Local archives of sunrise, sunset times and amount of daylight (hours/minutes), together with the date and time-stamped CarChip data, were used to classify daytime versus night driving, using the criteria shown in **Table 4.1**.

Table 4.1: Criteria for Daytime versus Night Driving Trips

Daytime Trips	After sunrise but before sunset
Night Trips	After sunset until the next sunrise
Partial Night Trips	Began in daylight (before sunset) and end in darkness (after sunset)

Environment Canada archives (www.weatheroffice.ec.gc.ca) were used to determine time of sunrise and sunset, as well as daily temperatures and precipitation (snow and rain) for each day over the study period in which one or more participants had their vehicles equipped. Data was organized using Microsoft Excel. In cases of discrepancy with the trip logs (participants' descriptions of weather conditions for each trip, where provided), the latter was considered more important as driver observations of weather conditions appear to have a greater influence on driving practices than weather forecasts (e.g., Kilpelainen & Summala, 2007). Moreover, local weather conditions vary and do not always match regional forecasts (Blanchard, 2008).

Previous research by Langford and colleagues (2006) has argued that low mileage drivers may be at great risk for collisions as they tend to do most of their driving in congested urban areas. Conversely, high mileage drivers tend to drive more on highways and freeways. Most studies on the 'low mileage bias' has used self-reported annual mileage to classify people into low (<3,000 km), middle (3,000 to 14,000 km) and high (>14,000 km) mileage drivers. Weekly equivalents using actual driving data from CarChips were established by Blanchard (2008), and subsequently used by Trang (2010) and Crizzle (2011) to determine the proportion of low mileage drivers in their respective samples. We used the same classification system (shown in **Table 4.2**) to compare our sample to prior studies with community living older drivers.

Table 4.2: Classification of Mileage Groups

Low	< 57.7 km per week (< 3000 km annually)
Middle	57.7 to 269.2 km per week (>3,0000 but < 14,000 km annually)
High	>269.2 km per week (> 14,000 km annually)

The matrix shown in **Appendix H** outlines the primary variables and associated data sources that were used to examine each of the study objectives. Open-ended responses to the questionnaires, trip logs (e.g., trip purposes), and travel diaries were subjected to content analysis, categorized and entered into the SPSS database or an Excel Workbook for further

analysis. Abridged transcriptions were produced from the audio recorded interviews. Focused coding methods were used to extract themes or primary issues emerging from the qualitative data. Pseudonyms were used in the transcription and the results, to protect confidentiality.

Chapter 5: Results

This chapter begins with sample recruitment, followed by data completeness, sample characteristics and representativeness of the SV sample. Participants from the SVs and LV are compared with respect to general characteristics, relocation, health, driving experience and preferences. Scores on well-being, functional measures and perceptions of driving comfort and abilities are presented next, followed by self-reported driving habits, objective driving data, associations with driving practices and trip purposes. Alternate modes of transport and patterns of travel outside their villages are then presented, followed by participation in village life and in the broader community. The chapter concludes with participant suggestions on how their villages might improve transportation services. To ensure confidentiality and still enable the reader to follow the story of certain participants, residents' names are presented at pseudonyms (e.g., HINI) throughout the rest of this thesis.

5.1 Recruitment

As shown in **Table 5.1**, data collection began on February 4, 2013 at Winston Park and ended on July 18, 2013 at Luther Village. Recruitment and data collection was staggered, moving from village to village. The final sample (N=38) consisted of 27 residents from the SVs and 11 from LV (total of 16 men and 22 women, average age 81.9 ± 5.6, range 70 to 91).

Table 5.1: Data Collection at each Site

Location	Start and End Dates	First Session	Second Session
WP	February 4 to March 13, 2013	12(5♂, 7♀)	11(4♂, 7♀)
TM	February 26 to May 15, 2013	12(6♂, 6♀)	12(6♂, 6♀)
RG	May 17 to May 31, 2013	1(1♀)	0
HH	May 23 to June 14, 2013	2(1♂, 1♀)	2(1♂, 1♀)
LV	June 17 to July 18, 2013	11(4♂, 7♀)	10(3♂, 7♀)
Totals		**38**	**35**

5.2 Data Completeness

Study withdrawals: As can be seen from **Table 5.1,** three individuals (one each from WP, RG and LV) did not complete the second assessment. The individual from WP (MUGA) said he was not interested in continuing at the time of the second session, at which point the devices were extracted from his vehicle and the trip logs and diaries collected. Concerning the person from RG (MAST), when the researcher arrived to collect the devices and logs, she said she had taken her car to the mechanic shop for four days, thus did not record those trips. As she was also in the midst of selling her home (in Toronto), she felt she could no longer participate at this time. The third person withdrew from the study (MALU from LV) when he was called to remind him of the second session. He said that filling out the trip logs was "just too much"; prior to the phone call he had stopped doing so and pulled out the Otto device. The researcher met with him during his scheduled second session to collect the devices and trip logs. He also declined to stay for any of the questionnaires or the interviews.

Session one data: As shown in **Table 5.2** All 38 participants completed the background and driving history and habits questionnaire (DHHQ), as well as the ABC scale. One person who had to leave before the end of the session (JOSM) did not complete the GDS-15 or the VPS. One other person did not rate the requisite number of items on the VPS to calculate a total score.

Session two data: In addition to the three people who withdrew from the study, JOSM did not stay for the full session, thus did not complete the SDF scale, Activities outside the Village questionnaire or the functional assessments. Interviews were not conducted with two residents (JOSH, JOPE) due to time constraints.

Table 5.2: Missing Components for Sessions One and Two

Session One					
	GDS-15	**VPS**	**ABC-27**	**Background Questionnaire**	**DHHQ**
# missing	1	2	0	0	0

Table 5.2 Continued

Session Two					
	SDA	**SDF**	**PDA**	**DCS-D**	**DCS-N**
# missing	3	4	3	3	3
	Transportation Questionnaire	**Services & Amenities**	**Interview**	**Functional Assessments**	**Out of Village Activities Quest.**
# missing	3	3	5	4	4

Note: n=3 withdrew prior to the second session and the number is reflected in the # missing

Driving data: As shown in **Table 5.3**, eight people in the study lived together or shared vehicles. As shown in **Table 5.4**, CarChips were installed in the vehicles (or shared vehicles) for 36 of the 38 study participants. One woman (JOSM) did not want the devices installed, while one man's car (JOSH) was not compatible with the device. Otto devices, meanwhile, were only installed in 24 vehicles, primarily due to the maps for the Whitby area not being available in time for 9 of the 12 participants from TM.

Table 5.3: Participants who Shared Vehicles or Lived Together

Location	
SV	Two females shared a vehicle, although only one drove during the two-week period due to the illness of the other female.
SV	A married couple (male and female) shared a vehicle and the driving.
LV	A married couple (male and female) shared a vehicle and the driving.
LV	A married couple (male and female) each had their own vehicle and drove only that vehicle for the study period.

Data from the CarChips were only usable in 32/36 cases due to people withdrawing, or failure of the devices to record information. Otto data, meanwhile, was usable for only 19 of the 24 devices installed, primarily due to problems with the power source. It should also be noted that one resident (JOTA in LV) had a monitoring period of only 12 days because she was scheduled to leave on vacation (researcher notified during monitoring period).

Table 5.4: CarChip and Otto Data by Location

Data Collection Location	Car Chip		Otto	
	Installed	Useable	Installed	Useable
Winston Park	11	11	10	9
Taunton Mills	10	10	3	1
Riverside Glen	1	0	1	0

Table 5.4 Continued

Data Collection Location	Car Chip		Otto	
	Installed	Useable	Installed	Useable
Humber Heights	2	2	1	1
Luther Village on the Park	11	9	9	8
Total	**36**	**32**	**24**	**19**

Trip logs: Of the 32 sets of trip logs recovered, there was missing information particularly concerning passengers and odometer readings. Half the SV and 27% of the LV participants did not record any passenger information (i.e., number of passengers and relationship of passenger to the driver). Due to this large amount of missing information, results concerning the number and relation of passengers are not presented.

Travel diaries: Four people (all from the SVs: DOHO, OLRO, JOSM, ROKE) did not bring travel diaries to the second session. All four said that they had not completed these as they did not make any non-driving trips in the last two weeks. These people were assigned a value of 0 and included in the sample calculation regarding mean trips. However, these people were not included in the analyses regarding mode of travel and trip purpose(s).

Other considerations: During the interview, participants were asked if there were any circumstances that may have affected the results of this study. One resident (MACR) was undergoing chemotherapy at the time and mentioned that the treatment likely affected her answers to the health and well-being questions. She had a normal GDS-15 (2), but a low VPS score (19). During this time she did not drive herself but got rides from another female participant (DOWA) with whom she lived with and shared a vehicle.

Another female participant (HINI), who drove only once over the two weeks, said she had been ill (with a cold or the flu). When asked if this affected her driving, she replied that she did not drive very often in bad winter weather in any case, but likely would have driven more had she not been ill. Additionally, due to progressive hearing loss, she was asked to stop driving

temporarily by her physician. According to her trip logs, her son drove her vehicle multiple times over the monitoring period.

5.3 Sample Characteristics

This section begins with an examination of sample representativeness based on a comparison of those who participated in the study and those considered eligible (over age 65, currently drove, parked their car at the village, and drove at least once a week) according to the RTPS, but chose not to participate. It is important to note that this comparison only applies to the SV sample, as the RTPS was not distributed in LV. Following this examination, the demographic and health characteristics of participants are presented and compared for the SV and LV groups.

5.3.1. Representativeness of SV Sample

Study participants were compared to residents who were eligible but chose not to participate, as shown in **Table 5.5**. As mentioned in **Chapter 3**, a total of 82 surveys were initially returned by residents who said they were still driving; two more were collected from study participants who had not already completed the RTPS. When determining eligibility, 10 respondents to the RTPS were not included because nine drove less than once a week and one did not have a vehicle. No significant differences ($p<0.05$) were found on the variables shown in the table below. Unfortunately, questions on marital status and education were not included in the RTPS, precluding comparisons on these variables.

Table 5.5: Comparison of Study Participants and Non-participants (Schlegel Villages)

	Participants (N=27)	**Eligible Non-participants (N=47)**
Age	84.59 ± 3.54 77 to 91	85.85 ± 4.10 75 to 94
Gender Male Female	 12 (44.4) 15 (55.6)	 21 (44.7) 26 (55.3)

Table 5.5 Continued

	Participants (N=27)	Eligible Non-participants (N=47)
Level of Care		
Independent	19 (70.4)	39 (83)
Main Floor	8 (29.6)	8 (17)
Assisted Care	0 (0)	0 (0)
Year of Move	n=24	n=45
Median	2011	2010
Mode	2012	2010
Uses Shuttle	n=25	n=43
No	8 (32.0)	23 (48.9)
Yes	17 (68.0)	20 (42.6)
Frequency of Shuttle Use†	n=16	n=20
Less than once a month	8 (50.0)	10 (50.0)
At least once a month	8 (50.0)	10 (50.0)
Receive Rides from Others	n=24	n=43
Yes	11 (45.8)	18 (41.9)
No	13 (54.2)	25 (58.1)
Ride Frequency	n=9	n=18
	2.89 ± 2.84	3.28 ± 1.98
	1.0 to 10.0	1.0 to 8.0
Ride Provider Lives in Village*	n=11	n=17
No	7 (63.6)	13 (76.5)
Yes	4 (36.4)	4 (23.5)
Uses Other Forms of Transportation*		
Yes	3 (11.1)	10 (21.3)
No	24 (88.9)	37 (78.7)
Days a week usually drive†		
5 days or more	9 (33.3)	12 (25.5)
3 to 4 days	7 (25.9)	15 (31.9)
1 to 2 days	8 (29.6)	20 (42.6)

Note: Missing data is indicated by n's for each variable. Values are presented as frequencies (valid %) or mean ± SD, range.†categories collapsed for chi-square analysis * cells too small for analysis

5.3.2 General Characteristics

The sample comprised 27 participants from four SVs and 11 from LV. In the total or combined sample of 38, there were 16 males and 22 females. Primary characteristics of the SV and LV groups, obtained from the background questionnaire are presented in **Table 5.6**. Additional results can be found in **Appendix I**, **Table I1**.

Table 5.6: Sample Characteristics by Village and Gender

	SV Sample (N=27)	SV Males (n=12)	SV Females (n=15)	LV Sample (N=11)	LV Males (n=4)	LV Females (n=7)
Gender		-	-		-	-
Male	12 (44.4)			4 (36.4)		
Female	15 (55.6)			7 (63.6)		
Age[a]	84.33 ± 3.94 75 to 91	84.42 ± 5.02 75 to 91	84.27 ± 3.01 77 to 87	76.00 ± 4.54 70 to 83	76.00 ± 4.69 71 to 80	76.00 ± 4.83 70 to 83
Education	n=25	n=12	n=13			
Some high school	6 (24.0)	1 (8.3)	5 (38.5)	0 (0)	0 (0)	0 (0)
Completed high school	3 (12.0)	2 (16.7)	1 (7.7)	0 (0)	0 (0)	0 (0)
Some college or univ.	5 (20.0)	3 (25.0)	2 (15.4)	2 (18.2)	0 (0)	2 (28.6)
Completed college or university	9 (36.0)	4 (33.3)	5 (38.5)	3 (27.3)	1 (25.0)	2 (28.6)
Graduate/prof. degree	2 (8.0)	2 (16.7)	0 (0)	6 (54.5)	3 (75.0)	3 (42.9)
Employment						
Full or part-time	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Retired	26 (96.3)	12 (100)	14 (93.3)	11 (100)	4 (100)	7 (100)
Never worked	1 (3.7)	0 (0)	1 (6.7)	0 (0)	0 (0)	0 (0)
Accommodation SV				N/A	N/A	N/A
Apartment (full kitchen)	15 (55.6)	6 (50.0)	9 (60.0)			
Apartment (kitchenette)	5 (18.5)	3 (25.0)	2 (13.3)			
Main floor room	7 (25.9)	3 (25.0)	4 (26.7)			
Accommodation LV	N/A	N/A	N/A			
Townhome				7 (63.6)	3 (75.0)	4 (57.1)
Condo/ suites				3 (27.3)	1 (25.0)	2 (28.6)
Rented room				1 (9.1)	0 (0)	1 (14.3)
Marital Status[a]						
Married	8 (29.6)	5 (41.7)	3 (20.0)	9 (81.8)	4 (100)	5 (71.4)
Divorced	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Widowed	14 (51.9)	7 (58.3)	7 (46.7)	2 (18.2)	0 (0)	2 (28.6)
Never Married	5 (18.5)	0 (0)	5 (33.3)	0 (0)	0 (0)	0 (0)
Gross Annual Income[b]	n=24	n=10	n=14	n=10	n=4	n=6
Less than $50 000	11 (45.8)	5 (50.0)	6 (42.9)	0 (0)	0 (0)	0 (0)
$50 001 - $74 999	6 (25.0)	2 (20.0)	4 (28.6)	7 (70.0)	2 (50.0)	5 (83.3)
$75 000 or over	7 (29.2)	3 (30.0)	4 (28.6)	3 (30.0)	2 (50.0)	1 (16.7)

Note: Missing data is indicated by the n's for each variable. Values are Mean ± SD and range or frequencies (%). Comparisons are independent t-tests t(p), Mann–Whitney U or Chi-Square analysis.
[a] Significant group (SV vs. LV) difference ($p < .01$). [b] Significant group (SV vs. LV) difference ($p < .05$).

No gender differences emerged between the SV's and LV. However, the SV group was significantly older (t=5.66, p=0.000), less likely to be married (X^2=8.610, p=0.005), and had a

lower self-reported household income (< $50, 000 and ≥$50, 001) than the LV group (X^2=6.775, p=0.014). Most participants lived in independent units at their villages. Residents living in the SV apartments (full or mini kitchenette) were younger than those living in single rooms on the main floor, although not significantly. For the LV group, those in the condos/suites were younger than those in the townhomes. The person in the Sunshine Centre was the oldest (age 83).

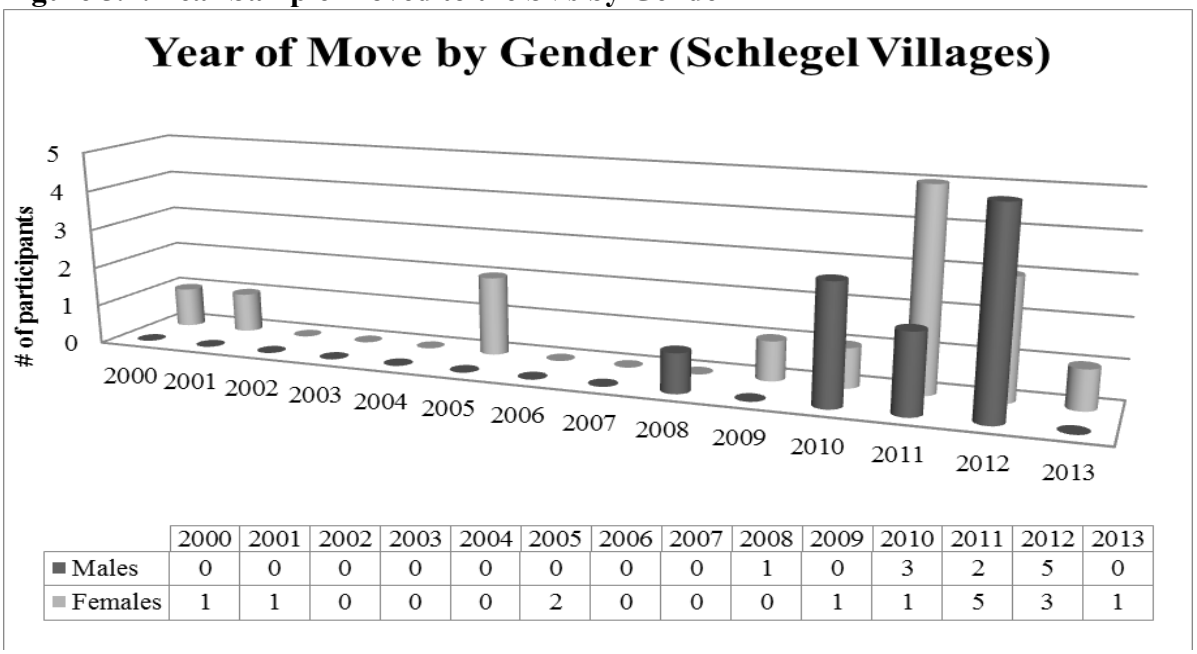
In the total sample, married participants (n=17) were significantly younger (78.35 ± 6.00 versus 84.84 ± 3.04) than the 21 residents who are not married (z=-3.348, p=0.001). For the five SV males who reported they were married, four lived with their spouse in the same apartment; one did not answer the question. Of the three female SV participants, two lived with their spouse in the same room/apartment. One female resident from WP reported her spouse was living in another part in the village (assisted care section due to dementia). Only two people (the couple who participated from TM), said their spouse still drove (25% of the SV group). In the LV group, 9 out of 11 respondents were married and lived with their spouse in the same room/house. Compared to the SV sample, 55.6% (5/9) of the married LV participants had a spouse that still drove. Four participants (two couples) were enrolled together.

Residents from the SV's (n=26) reported having lived in their village on average 3.23 ± 3.36 years (range 0 to 13 years). As shown in **Figure 5.1**, 81.5% (n=22) had lived there for five years or less. Only four had lived there more than five years, including two females (12 and 13 years, respectively). On average, the women had lived in the village longer than the men (average 4.07 ± 4.15 versus 2.09 ± 1.30 years), although this difference was not significant.

The LV participants (n=11) reported living in the village an average of 6.27 ± 4.71 years (range 0 to 13 years). As shown in **Figure 5.2**, 45.5% (n=5) reported moving in the last three years. Residents at LV had lived at their village longer than those at the SV (z=-1.919, p=0.055),

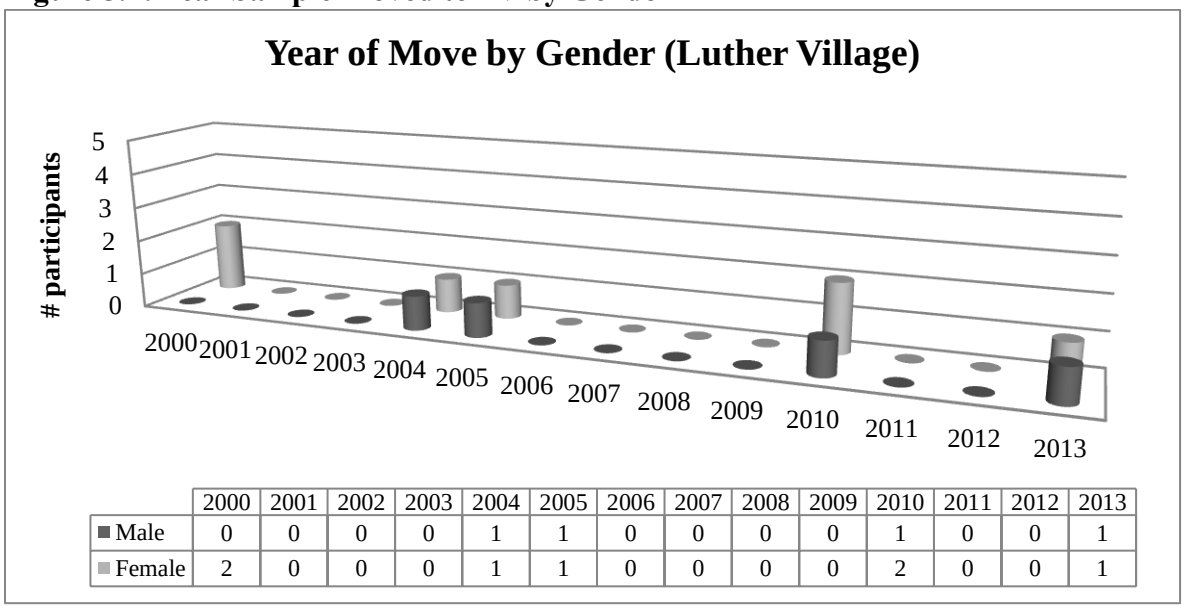
approaching significance. Similar to the SV group, the women at LV had lived in the village longer than the men (average 7.00 ± 5.13 versus 5.00 ± 4.24 years, respectively).

Figure 5.1: Year Sample Moved to the SVs by Gender



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Males	0	0	0	0	0	0	0	0	1	0	3	2	5	0
Females	1	1	0	0	0	2	0	0	0	1	1	5	3	1

Figure 5.2: Year Sample Moved to LV by Gender

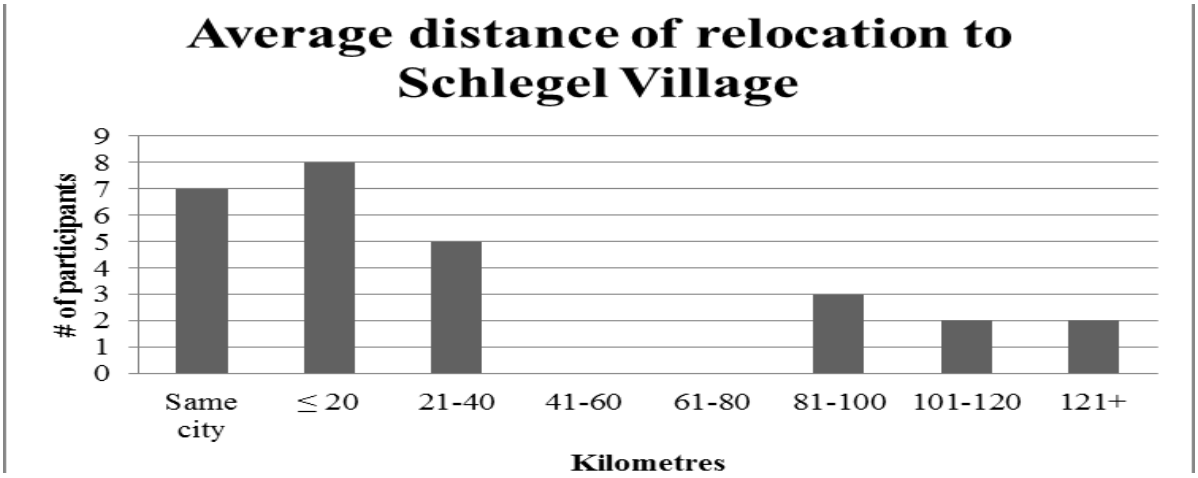


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Male	0	0	0	0	1	1	0	0	0	0	1	0	0	1
Female	2	0	0	0	1	1	0	0	0	0	2	0	0	1

Participants were also asked where they lived prior to moving to their respective villages. Google Maps (Google Inc.) was used to calculate the average distance of the prior city (city centre) to the city of the SV of LV locations (e.g., the distance from Bowmanville to Whitby is

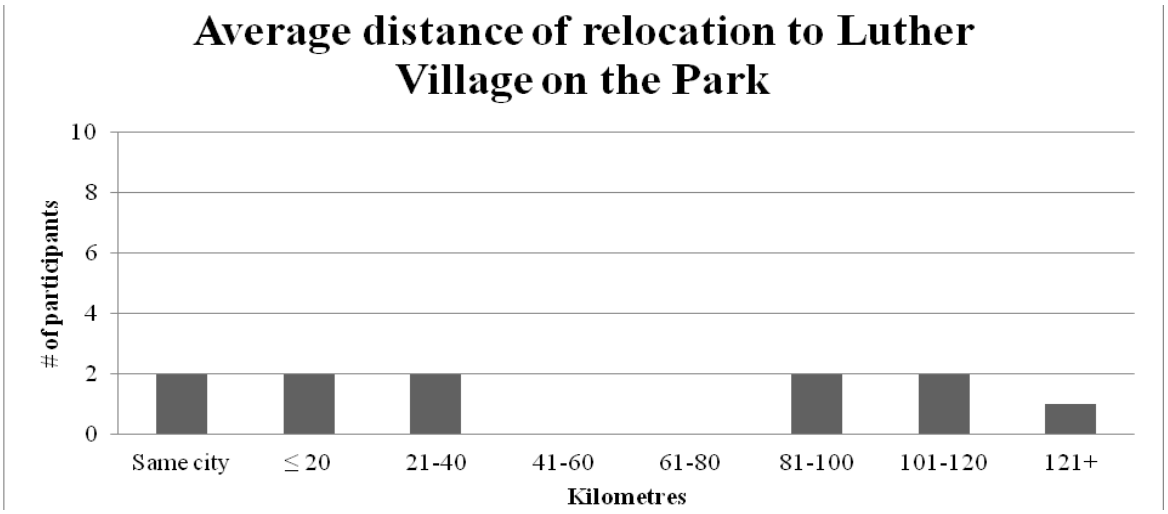
approximately 26 km). As shown in **Figure 5.3**, over half (15 of 26) of the SV participants lived within 20 km of their current village prior to moving (a quarter in the same city); most within 40 km. Only four participants moved to a village that was more than 100km away.

Figure 5.3: Average Distance (km) of Relocation for the SV Sample



As shown in the figure below (**Figure 5.4**), LV participants showed a similar pattern. Many residents (6/11) had previously lived less than 40 km from the village and few (3/11) lived more than 100 km away. For the distance of over 121 km, this participant reported moving from out of province (Alberta, CA) to LV.

Figure 5.4: Average Distance (km) of Relocation from Prior City to LV



On the background questionnaire, participants were asked about their primary reasons for relocating to the village (open ended responses). The results from the content analysis, depicted in the form of a word cloud, are shown below in **Figure 5.5**. The larger and more prominent the words, the more frequently they appeared in the sample's responses.

Figure 5.5: Reasons for Relocation to the Villages

For both groups, the most common reason for moving was to be closer to immediate family members, other relatives and friends, followed by health issues (themselves or their spouses) prior to the move or future concerns. Another theme had to do with reducing the demands of home ownership and maintenance. Some reported "needing a change" or described their reason for moving as their "home was no longer fun". A frequent response from the LV residents was that they wanted to live somewhere where they could "age in place", while only one person from the SVs mentioned this. Another reason for moving was so their spouse could receive a higher level of care while they themselves could still live independently.

5.3.3 Health Characteristics

Selected health characteristics for the SV and LV groups, respectively, are depicted in **Table 5.7** and discussed below. Each variable was statistically compared by group and gender. Additional information can be found in **Appendix I**, **Table I1**.

Table 5.7: Selected Health Characteristics by Group and Gender

	SV Sample (N=27)	SV Males (n=12)	SV Females (n=15)	LV Sample (N=11)	LV Males (n=4)	LV Females (n=7)
Self-reported Health	n=26	n=11	n=15			
Excellent	4 (15.4)	1 (9.1)	3 (20.0)	5 (45.5)	1 (25.0)	4 (57.1)
Good	19 (73.1)	8 (72.7)	11 (73.3)	6 (54.5)	3 (75.0)	3 (42.9)
Fair	3 (11.5)	2 (18.2)	1 (6.7)	0 (0)	0 (0)	0 (0)
Poor	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Use of Cane/Walker (Indoor)	n=25	n=11	n=14			
No	15 (60.0)	9 (81.8)	6 (42.9)	10 (90.9)	4 (100.0)	6 (85.7)
Yes	10 (40.0)	2 (18.2)	8 (57.1)	1 (9.1)	0 (0)	1 (14.3)
Use of Cane/Walker (Outdoor)	n=25	n=11	n=14			
No	15 (60.0)	8 (72.7)	7 (50.0)	10 (90.9)	4 (100.0)	6 (85.7)
Yes	10 (40.0)	3 (27.3)	7 (50.0)	1 (9.1)	0 (0)	1 (14.3)
Able to walk ¼ mile	n=26	n=12	n=14			
No	4 (14.8)	1 (8.3)	3 (20.0)	0 (0)	0 (0)	0 (0)
Yes	20 (74.1)	9 (75.0)	11 (73.3)	11 (100)	4 (100.0)	7 (100.0)
Unsure	2 (11.1)	2 (16.7)	1 (6.7)	0 (0)	0 (0)	0 (0)
Fallen in the past year	n=26	n=12	n=14			
No	19 (73.1)	8 (66.7)	11 (78.6)	9 (81.8)	4 (100.0)	5 (71.4)
Yes	7 (26.9)	4 (33.3)	3 (21.4)	2 (18.2)	0 (0)	2 (28.6)
Fallen more than once	n=26	n=12	n=14		-	
No	4 (57.1)	2 (50.0)	2 (66.7)	1 (50.0)		1 (50.0)
Yes	3 (42.9)	2 (50.0)	1 (33.3)	1 (50.0)		1 (50.0)
Injured from fall	n=26	n=12	n=14		-	
No	5 (71.4)	3 (75.0)	2 (66.7)	2 (100)		2 (100)
Yes	2 (28.6)	1 (25.0)	1 (33.3)	0 (0)		0 (0)
Trouble getting up	n=26	n=12	n=14		-	
No	4 (57.1)	2 (50.0)	2 (66.7)	1 (50.0)		1 (50.0)
Yes	3 (42.9)	2 (50.0)	1 (33.3)	1 (50.0)		1 (50.0)
Diagnosed Conditions	2.74 ± 1.66	2.25 ± 1.60	3.13 ± 1.64	1.91 ± 0.70	2.25 ± 0.50	1.71 ± 0.76
0 to 11 possible	0 to 6	0 to 5	0 to 6	1 to 3	2 to 3	1 to 3

Table 5.7 Continued

	SV Sample (N=27)	SV Males (n=12)	SV Females (n=15)	LV Sample (N=11)	LV Males (n=4)	LV Females (n=7)
Eyesight						
Better than most	10 (37.0)	4 (33.3)	6 (40.0)	5 (45.5)	0 (0)	5 (71.4)
About the same	17 (63.0)	8 (66.7)	9 (60.0)	6 (54.5)	4 (100.0)	2 (28.6)
Worse	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Difficulties Score[a]	0.74 ± 1.20 0 to 5	0.25 ± 0.45 0 to 1	1.13 ± 1.46 0 to 5	0.45 ± 0.52 0 o 1	0.75 ± 0.50 0 to 1	0.29 ± 0.49 0 to 1

Note: Missing data shown by n's. Values are mean ± SD, range or frequencies (valid %). Comparisons are independent t-tests t(p), Mann–Whitney U or Chi-Square. [a] significant gender differences for SV group.

All but three people (from the SVs) rated their health as good or excellent. In the SV group, 40% reported using a cane or walker indoors and/or outdoors, compared to only one LV resident (9%). Everyone from LV reported being able to walk a quarter mile with or without assistance, compared to 74% of the SV sample (11% were unsure). Although SV participants reported more falls over the past year (27% versus 18%), group differences were not significant. Significant gender and age differences were not found for fallers versus non-fallers. All but two people (from the SVs) reported taking prescription medications.

The SV sample reported an average of 2.74 ± 1.66 diagnosed health conditions (range 0 to 6). SV males reported fewer diagnosed conditions (2.25 ± 1.60) than females (3.13 ± 1.64), although not significant (t=-1.404, p=0.173). The three most common conditions (see **Table I1, Appendix I** for complete list) for males were: high blood pressure, cholesterol, heart problems (n=8); cataracts (n=7); and arthritis (n=4). The three most common conditions for females were: cataracts (n=12); high blood pressure, cholesterol, heart problems (n=9); and arthritis (n=7).

The LV sample reported an average of 1.91 ± 0.70 diagnosed conditions. Similarly, males reported more diagnosed conditions (2.25 ± 0.50) than females (1.71 ± 0.76). The three most common conditions for males (n=4) were: high blood pressure, cholesterol, heart problems (n=3); hearing problems (n=2) and arthritis (n=2); and cataracts (n=1) and Parkinson's disease

(n=1). For females (n=7), these were: arthritis (n=5); high blood pressure, cholesterol, heart problems (n=4); and hearing problems (n=1) and cataracts (n=1). Again no significant gender difference emerged. No one in either group reported having worse eyesight than others their age.

Respondents were also asked whether they experienced various difficulties (five possible options) that may affect mobility and driving. Overall the SV sample reported more difficulties (0.74 ± 1.20 versus 0.45 ± 0.52), although not significant. Within the SV sample, women reported significantly more difficulties than men (z=-1.974, p=0.048). Details on difficulty items and ratings can be found in **Table I1 - Appendix I**.

5.4 Driving Experience

Apart from a few people who obtained their driver's licence in their 40s, most had obtained their licence between the ages of 16 to 22. Before the move, 59% of the SV and all the LV residents said there was another driver in their household. Additionally, 67% of the SV and 46% of the LV group said someone relied on them to drive. Only one person reportedly had considered giving up their license and all said that they were glad they had not done so.

As shown in **Appendix I** (**Table I2**), the majority of both groups felt that driving was very or extremely important for multiple reasons, especially maintaining their present lifestyle. All of the SV group and 63.6% of the LV group had discussed their driving with someone, most often: a family member (44% of SV versus 27% LV); friend (20% of SV versus none in LV); physician (12% of SV versus 18% LV); or eye care professional (24% of SV versus 18% LV). Only 7% of the SV sample and none of the LV group reported someone had suggested they limit their driving. Over half (59%) of those from the SVs (16/27) and 36% (4/11) from LV reportedly had thought about giving up driving in the next few years.

Overall, the sample reported few driving problems over the past year: accidents (n=3); traffic violations (n=0); near misses (n=5); getting lost (n=2); or backing into things (n=4). Only four people had reportedly taken a driving course in the past few years: three had taken courses from the CAA or AAA; the other a private course.

Based on age (80 years or older), 85% (n=23) of the SV and 36% (n=4) of the LV samples were eligible for the MTO's Mandatory Senior Driver Renewal Program (SDRP). Of the 27 who were eligible, 25 had reportedly gone through this in the last two years (one response missing, one person said they did this three years ago). Ten people commented on the SDRP; all of whom felt everyone should have to do a road test. As one person (JOTA) said, "I have got it memorized, so the questions aren't sufficient, we need a road test. I remember my neighbour saying '*I don't even bother studying for it'*…with age we develop habits, and habits don't show up on a written test." Another (ANBR), who had not yet taken the course, said: "From all I have heard the test is almost a joke. I think a full road driving test should be mandatory for everyone who wishes to drive after her/his 80th birthday, and every two years after that."

5.5 Driver Perceptions

Scores on the Driving Comfort scales (Day and Night) can range from 0 to 100 with higher scores indicating greater comfort. Similarly, higher scores on the Perceived Driving Abilities scale (possible range 0 to 45), indicate more positive perceptions of current driving abilities. As expected, scores on the DCS Day and Night Scales were highly correlated (r=. 92, p <.01). Scores on the PDA scale correlated moderately with the DCS-D and DCS-N scores, respectively (r=.63 and r=.66, p <.01). Sample scores, including ratings on item one of the DCS-N scale (driving at night even in good weather and traffic conditions), are shown in **Table 5.8**.

Table 5.8: Perception Scores by Group and Gender (Total Sample)

	SV Sample (N=27)	LV Sample (N=11)	Total Sample (N=38)	Males (n=16)	Females (n=22)
DCS-D[b,c]	n=25 61.64 ± 23.79 13.46 to 100	n=10 70.58 ± 15.20 42.31 to 88.46	n=35 64.19 ± 21.85 13.46 to 100	n=14 76.28 ± 14.09 48.08 to 92.86	n=21 56.14 ± 22.64 13.46 to 100
DCS-N[b,c]	n=25 49.44 ± 28.11 0 to 96.88	n=10 60.63 ± 17.21 34.38 to 84.38	n=35 52.63 ± 25.74 0 to 96.88	n=14 70.20 ± 16.58 39.06 to 96.88	n=21 40.92 ± 24.23 0 to 92.19
DCS-N item #1[b,c]	n=25 69.00 ± 32.50 0 to 100	n=10 87.50 ± 21.25 50 to 100	n=35 74.29 ± 30.61 0 to 100	n=14 87.50 ± 21.37 50 to 100	n=21 65.48 ± 33.05 0 to 100
PDA[b]	n=25 31.44 ± 7.44 18 to 43	n=10 35.80 ± 5.49 26 to 44	n=35 32.69 ± 7.15 18 to 44	n=14 35.00 ± 5.58 26 to 43	n=21 31.14 ± 7.77 18 to 44

[a] significant group differences; [b] significant gender differences for SV group; [c] significant gender differences in total sample. Note: Mean ± SD and range; group comparisons are independent t-tests $t(p)$ or Mann-Whitney U test $z(p)$. One male (MUGA) and one female (MAST) from SV did not complete the measures, and one male from LV (MALU).

Although mean perception scores were higher in the LV group, differences were not statistically significant. For the total sample, scores differed significantly by gender for the DCS-D (t=2.960, p=0.006), DCS-N (t=3.939, p=0.000), and DCS-N item #1 (z=-2.082, p=0.037). Males also scored higher on the PDA scale, but not significantly. Within the SV sample, significant gender differences emerged for the DCS-D (t=2.648, p=0.014), DCS-N (t=3.806, p=0.001), PDA (t=2.161, p=0.041) and DCS-N item #1 (z=-1.950, p=0.051).

In the total sample, those who were married (versus not married) had significantly higher DCS-D scores (t=-4.313, p=0.000), DCS-N scores (t=-3.821, p=0.001), PDA scores (t=-3.177, p=0.003) and the DCS=N item #1 score (z=-2.369, p=0.018). With respect to education, participants (total sample) with a college or higher education had a significantly higher DCS-D score (t=-2.040, p=0.050), DCS-N score (t=-2.731, p=0.010), and DCS-N item #1 score (z=-3.779, p=0.000). Scores on the PDA scale were not significantly different by education. Although not statistically significant, participants who reported vision conditions (n=16) (e.g., cataracts, glaucoma) had lower DCS-N scores (49.26 ± 28.11, 0 to 92.19 versus 56.64 ± 22.83, 10.94 to

96.88) than participants without vision concerns (n=19). People with vision concerns scored slightly lower on the PDA scale (31.94 ± 7.90, 18 to 42 versus 33.13 ± 6.44, 22 to 44).

5.6 Well-being and Functional Scores

Scores concerning various aspects of functioning and well-being (depression, vitality, cognition and balance confidence) are shown in **Table 5.9**. Individual item scores on the various measures can be found in **Appendix I** (**Tables I3, I4,** and **I5**).

Table 5.9: Well-being and Functional Scores by Location and Gender (combined sample)

	SV Sample (N=27)	LV Sample (N=11)	Total Sample (N=38)	Males (n=16)	Females (n=22)
GDS-15	n=26		n=37	n=16	n=21
Total Score	1.31 ± 1.38	0.73 ± 1.01	1.14 ± 1.29	1.25 ± 1.48	1.05 ± 1.16
	0 to 5	0 to 3	0 to 5	0 to 5	0 to 4
Normal (0-5)	26 (100.0)	11 (100.0)	37 (100.0)	16 (100.0)	21 (100.0)
ABC-27 [a,b,c]	79.92±16.05	91.50± 7.00	83.27 ± 14.92	89.30 ± 12.29	78.89 ± 15.38
	41.67 to 100	76.85 to 99.07	41.67 to 100	52.78 to 100	41.67 to 99.07
ABC-16	n=26		n=37		n=21
	85.06±12.11	91.19 ± 7.14	86.88 ± 11.14	89.71 ± 11.51	84.73 ± 10.62
	54.69 to 100	76.56 to 98.44	54.69 to 100	54.69 to 100	60.94 to 98.44
VPS	n=25		n=36		n=20
	38.96 ± 6.94	40.64 ± 4.13	39.47 ± 6.21	40.25 ± 4.55	38.85 ± 7.33
	19 to 49	35 to 47	19 to 49	30 to 48	19 to 49
MoCA[a]	n=24	n=10	n=34	n=14	n=20
Total Score	22.71 ± 2.66	25.60 ± 3.72	23.56 ± 3.24	23.14 ± 2.77	23.85 ± 3.57
	18 to 28	18 to 29	18 to 29	19 to 28	18 to 29
Below 26	21 (87.50)	2 (20.0)	23 (67.6)	11 (78.6)	12 (60.0)
Below 23	11 (45.83)	1 (10.0)	12 (35.3)	6 (42.9)	6 (30.0)

Note: missing scores explained earlier. [a] significant group differences; [b] significant gender differences for SV group; [c] significant gender difference for total sample.

5.6.1 Depression

As shown in **Table 5.9**, participants showed few depressive symptoms and all scored within the normal range (≤5) on the GDS-15. Although the SV group had higher scores than the LV group, this difference was not statistically significant, nor was there a gender difference.

5.6.2 Balance Confidence

The LV group scored higher on the original (ABC-16) and extended (ABC-27) scales; the latter was significant (z=-1.982, p=0.048). A significant gender difference was found on the ABC-27 (total sample: z=-2.545, p=0.011), and within the SV group (t=2.994, p=0.006). Scores on the ABC-16 did not differ significantly by gender (total sample), but scores approached significance in the SV group (t=2.006, p=0.056). Age (total sample) was significantly associated with the ABC-27 (*rho*=-.334, p=0.040) and ABC-16 (*rho*=-.339, p=0.040).

Participants who had used a cane/walker either in or outdoors (n=11) had a lower mean ABC-27 score (70.43 ± 12.02) than those who did not (n=25, 88.34 ± 13.06), z=-3.576, p=0.000. Significant differences also emerged within groups (SV: t=2.601, p=0.016; LV: t=2.891, p=0.018). ABC-16 scores were also significantly lower for participants who used a cane/walker in both groups (SV: t=4.014, p=0.001; LV: t=2.783, p=0.021).

Those able to walk a quarter of a mile (with or without assistance), also scored significantly higher on the ABC-27; total sample (z=-2.310, p=0.021) and within the SV group (t=-2.594, p=0.017). No significant differences emerged on either the ABC-27 or ABC-16 scores for fallers versus non-fallers.

5.6.3 Vitality

Total scores on the VPS can range from 10 to 50, with higher scores indicating more positive well-being (Myers et al., 1999). Scores were relatively high for both the groups and no significant differences emerged with respect to group, gender, education level, marital status, income level, use of cane/walker, ability to walk a quarter mile, or falls in the past year.

5.6.4 Cognitive Function

As shown above in **Table 5.9**, the LV group scored significantly higher on the MoCA (t=-2.564, p=0.015). A greater proportion of the SV sample also scored below 26 (87.5% versus 20%), indicating possible MCI. Mean scores for men and women were similar. In both groups, residents who had fallen and had less than a college education had lower MoCA scores, although not statistically significant. In the SV group, MoCA scores were significantly higher for residents who reportedly were able to walk a quarter mile (t=-2.853, p=0.010). As shown in **Table 5.10** below, those who scored below 26 on the MoCA were significantly older (total sample).

Table 5.10: Age Comparison for MoCA Cut-offs

	SV Sample (N=24)		**LV Sample (N=10)**		**Combined sample (N=34)**	
	< 26 n=21	**≥ 26** n=3	**< 26** n=2	**≥ 26** n=8	**< 26** n=23	**≥ 26** n=11
Age	83.71 ± 4.11 75 to 89	85.67 ± 1.53 84 to 87	77.00 ± 5.66 73 to 81	75.25 ± 4.65 70 to 83	83.13 ± 4.54 73 to 89	78.09 ± 6.27 70 to 87
Significance	z=-0.575, p=0.565		t=0.462, p=0.656		z=-2.257, p=0.024	

Note: values are mean ± SD and range. Comparisons are independent t-tests t(p) or Mann–Whitney U.

5.7 Self-Reported Driving Behaviours

Self-reported driving behaviours were captured through responses on the Driving History and Habits questionnaire (DHHQ). Restrictions were also assessed using the SDA and SDF scales. As shown in **Table 5.11**, both groups reportedly drove on all types of roadways and at all times of the day. SV participants drove significantly less on rural roads (X^2=4.416, p=0.036), and on highways, approaching significance (X^2=3.623, p=0.057). In the SV group, males drove significantly more than females in the early evening (X^2=3.844, p=0.05), at night (X^2=8.168, p=0.004) and on highways (X^2=5.185, p=0.023).

Table 5.11: Self-reported Driving Patterns and Preferences

	SV Sample (N=27)	LV Sample (N=11)	Total Sample (N=38)	Males (n=16)	Females (n=22)
Roadways					
Residential	21 (77.8)	11 (100.0)	32 (84.2)	14 (87.5)	18 (81.8)
Main city streets	25 (92.6)	11 (100.0)	36 (94.7)	15 (93.8)	21 (95.5)
Rural roads[a]	12 (44.4)	9 (81.8)	21 (55.3)	6 (37.5)	15 (68.2)
Freeways	15 (55.6)	8 (72.7)	23 (60.5)	12 (75.0)	11 (50.0)
Highways[b,c]	16 (59.3)	10 (90.9)	26 (68.4)	14 (87.5)	12 (54.5)
Time of day					
Morning	23 (85.2)	11 (100.0)	34 (89.5)	15 (93.8)	19 (86.4)
Afternoon	27 (100.0)	11 (100.0)	38 (100.0)	16 (100.0)	22 (100.0)
Early evening[b]	17 (63.0)	10 (90.9)	27 (71.1)	14 (87.5)	13 (59.1)
At night[b,c]	12 (44.4)	5 (45.5)	17 (44.7)	12 (75.0)	5 (22.7)
Preference*					
Drive yourself	24 (88.9)	7 (63.6)	31 (81.6)	14 (87.5)	17 (77.3)
Have someone drive you	5 (18.5)	2 (18.2)	7 (18.4)	1 (6.3)	6 (27.3)
Taxis	1 (3.7)	0 (0)	1 (2.6)	0 (0)	1 (4.5)
Bus	0 (0)	1 (9.1)	1 (2.6)	1 (6.3)	0 (0)
Special transit services	2 (7.4)	0 (0)	2 (5.3)	0 (0)	2 (9.1)
Walk	1 (3.7)	1 (9.1)	2 (5.3)	0 (0)	2 (9.1)
Village Shuttle	4 (14.8)	0 (0)	4 (10.5)	0 (0)	4 (18.2)
Others rely on drive (current)					
No	20 (74.1)	5 (45.5)	25 (65.8)	12 (75.0)	13 (59.1)
Yes	7 (25.9)	6 (54.5)	13 (34.2)	4 (25.0)	9 (40.9)
In winter, drive					
Much less often	10 (37.0)	1 (9.1)	11 (28.9)	1 (6.3)	10 (45.5)
A little less	11 (40.7)	6 (54.5)	17 (44.7)	9 (56.3)	8 (36.4)
About the same	6 (22.2)	4 (36.4)	10 (26.3)	6 (37.5)	4 (18.2)
More often	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Note: values are frequencies (%), comparisons are Chi-Square; [a] significant group difference p=<0.05. [b] significant gender difference (SV) p<0.05 [c] significant gender difference in the total sample * percentage greater than 100 due to multiple responses.

Participants were also asked how often they drove (days per week) in the month before moving to their respective villages, as well as how often they currently drove (days per week). These comparisons are presented in **Table 5.12** and **Table 5.13** below for the SV and LV groups, respectively. Although not significant, driving frequency decreased more for the SV group.

While average driving frequency was similar before the move, women in the SV group drove significantly less often than the men after the move (t=2.483, p=0.02).

Table 5.12: Self-reported Driving Frequency Before and After Move (Schlegel Villages)

Month Before Move			After Move		
Total (N=27)	Males (n=12)	Females (n=15)	Total (N=27)	Males (n=12)	Females (n=15)
5.52 ± 1.58 2.0 to 7.0	5.92 ± 1.18 4.0 to 7.0	5.20 ± 1.82 2.0 to 7.0	3.33 ± 1.70 1.0 to 7.0	4.16 ± 1.63 1.0 to 7.0	2.67 ± 1.48 1.0 to 6.5

Note: values are mean ± SD and range. Comparisons are independent t-tests t(p) or Mann–Whitney U.

Table 5.13: Self-reported Driving Frequency Before and After Move (Luther Village)

Month Before Move			After Move		
Total (N=11)	Males (n=4)	Females (n=7)	Total (N=11)	Males (n=4)	Females (n=7)
4.86 ± 2.18 1.5 to 7.0	4.50 ± 2.68 1.5 to 7.0	5.07 ± 2.05 2.0 to 7.0	4.41 ± 1.95 1.5 to 7.0	4.86 ± 1.75 3.0 to 7.0	4.14 ± 2.14 1.5 to 7.0

Note: values are mean ± SD and range. Comparisons are independent t-tests t(p) or Mann–Whitney U.

5.7.1 SDF and SDA Scores

On the SDF scale, scores can range from 0 to 56; higher scores indicate a greater frequency of driving in challenging situations. Meanwhile, on the SDA scale, scores can range from 0 to 20; higher scores indicate more avoidance of challenging driving situations. Scores on the SDF and SDA scales were significantly correlated (*rho* =-.70, p<.01).

The situations reportedly avoided most often by SV participants (n=25) were: driving in fog (68%), driving at night, overall (56%) and especially in bad weather (64%), and driving in rural areas (56%). In comparison, the situations avoided most often by LV participants (n=10) were: driving at night in bad weather (50%), driving in heavy traffic or rush hour on the highway (50%), and driving with passengers who might distract them (50%).

As shown in **Table 5.14**, the LV group had higher mean SDF and lower mean SDA scores, although not significant. Overall, men scored significantly higher on the SDF (t=3.039, p=0.005), and significantly lower on the SDA (z=-3.205, p=0.001). Scores on the SDF were significantly higher in married versus non-married participants in the LV sample (37.00 ± 8.42

versus 22.00 ± 1.41), (t=-2.045, p=0.043). Although married participants in the SV sample also had higher mean SDF scores, this difference was not significant. A similar pattern emerged for the SDA scores. In the SV group, those who were married had lower avoidance scores (3.57 ± 4.65 versus 9.56 ± 6.21), (z=-2.043, p=0.041).

Table 5.14: SDF and SDA Scores by Village Location and Gender

	SV Sample (N=27)	LV Sample (N=11)	Total Sample (N=38)	Males (n=16)	Females (n=22)
SDF[b]	n=24 27.00 ± 11.26 6 to 50	n=10 34.00 ± 9.76 21 to 49	n=34 29.06 ± 11.17 6 to 50	n=14 35.29 ± 7.98 25 to 50	n=20 24.70 ± 11.17 6 to 46
SDA[b]	n=25 7.88 ± 6.34 0 to 18	n=10 5.70 ± 5.68 0 to 13	n=35 7.26 ± 6.16 0 to 18	n=14 3.07 ± 4.70 0 to 15	n=21 10.05 ± 5.45 0 to 18

Note: missing cases were described earlier. Values are mean ± SD and range; Comparisons are independent t-tests, t(p) or Mann-Whitney U test, z(p). [a] significant group differences [b] significant gender differences for total sample.

Extreme scorers. Two outliers who had extreme scores on the above scales, as well other measures were profiled further. One participant (HINI) had the lowest score on the SDF (6), on the PDA (18), and the DCS-N (0). This person also had a fairly low DCS-D score of 21.15, compared to the rest of the SV sample (61.64 ± 23.79). HINI was an 87 year old widow who resided in a single room on the main floor. She used a cane to walk outside and reported three diagnosed conditions: cataracts, glaucoma and hearing problems. She had a MoCA score of 26, and was not depressed according to the GDS (score of three). According to her trip logs, she only drove one day over the two-week monitoring period. She reported being ill during this period, so her son drove, but did report in her interview that she normally would have driven more.

The second individual (JOSM), meanwhile, had the lowest DCS-D score (13.46) of the sample. She was an 86 year old widow who resided in an independent apartment in a SV. She did not use assistive devices for walking, and reported two diagnosed conditions: cataracts and osteoporosis. Unfortunately, she did not complete the MoCA or the GDS-15. As previously

mentioned, she did not want her vehicle equipped. Nonetheless, both participants were included in the analyses where data were provided.

5.8 Actual Driving Behaviour

As previously noted, usable data was obtained from 32 CarChips and 19 Ottos. All participants included in these analyses had driven at least once over the two weeks. Driving exposure data came from the CarChip recordings and trip logs were used for verification and to combine segments into complete trips. Data from the Otto device was used to calculate trip radius (distance driven from home), which is presented in the next section (patterns).

5.8.1 Exposure

The results concerning indicators of driving exposure are shown in **Table 5.15.** In the combined sample, there were a total of 13 men and 19 women and no significant differences emerged for any of the variables. Overall, the sample drove an average of three days and 87 km a week, however there was substantial variability in these and the other driving indicators. Compared to the SV group, those from LV had higher average scores on every indicator (days, trips, stops, distance and duration), although only a few differences were statistically significant.

Table 5.15: Driving Exposure

	SV Sample (N=23)	LV Sample (N=9)	Combined Sample (N=32)
# Days			
Total for 2 wks	5.65 ± 2.87 1 to 12	8.00 ± 3.84 1 to 13	6.31 ± 3.29 1 to 13
Week 1 total	2.61 ± 1.59 0 to 6	4.11 ± 2.09 1 to 7	3.03 ± 1.84 0 to 7
Week 2 total	3.00 ± 1.62 0 to 6	3.89 ± 1.97 0 to 6	3.25 ± 1.74 0 to 6
Averaged to 1 wk	2.83 ± 1.44 0.5 to 6.0	4.00 ± 1.92 0.5 to 6.5	3.16 ± 1.64 0.5 to 6.5

Table 5.15 Continued

	SV Sample (N=23)	LV Sample (N=9)	Combined Sample (N=32)
# Trips			
Total for 2 wks	6.26 ± 3.48 1 to 13	10.89 ± 6.35 1 to 19	7.56 ± 4.85 1 to 19
Week 1 total[b]	2.74 ± 1.74 0 to 6	6.00 ± 3.84 1 to 11	3.66 ± 2.86 0 to 11
Week 2 total	3.52 ± 2.15 0 to 8	4.89 ± 2.85 0 to 8	3.91 ± 2.40 0 to 8
Averaged to 1 wk	3.13 ± 1.74 0.5 to 6.5	5.44 ± 3.18 0.5 to 9.5	3.78 ± 2.42 0.5 to 9.5
# Stops			
Total for 2 wks[b]	12.76 ± 8.39 1 to 34	21.56 ± 12.42 1 to 40	15.23 ± 10.29 1 to 40
Week 1 total[b]	5.65 ± 4.05 0 to 13	12.44 ± 8.23 1 to 26	7.56 ± 6.23 0 to 26
Week 2 total	7.11 ± 5.36 0 to 23	9.11 ± 4.70 0 to 14	7.67 ± 5.19 0 to 23
Averaged to 1 wk[b]	6.38 ± 4.19 0.5 to 17	10.78 ± 6.21 0.5 to 22	7.62 ± 5.14 0.5 to 22
Distance (km)			
Total for 2 wks	141.93 ± 134.47 6.20 to 499.10	252.63 ± 225.51 5.60 to 664.30	173.06 ± 168.86 5.60 ± 664.30
Week 1 total	57.84 ± 59.35 0 to 237.90	134.39 ± 137.30 5.60 to 391.40	79.37 ± 92.67 0 to 391.40
Week 2 total	84.09 ± 105.11 0 to 469.00	118.24 ± 110.49 0 to 348.80	93.69 ± 106.00 0 to 469.00
Averaged to 1 wk	70.96 ± 67.24 3.10 to 249.60	126.32 ± 112.75 2.80 to 332.20	86.53 ± 84.43 2.80 to 332.20

Table 5.15 Continued

	SV Sample (N=23)	LV Sample (N=9)	Combined Sample (N=32)
Duration (hr:min)			
Total for 2 wks	3:58 ± 2:45 0:23 to 9:48	6:45 ± 4:56 0:16 to 15:30	4:45 ± 3:39 0:16 to 15:30
Week 1 total	1:44 ± 1:21 0:00 to 5:04	3:44 ± 3:04 0:16 to 8:28	2:18 ± 2:08 0:00 to 8:28
Week 2 total	2:15 ± 1.49 0:00 to 6:09	3:01 ± 2:04 0:00 to 7:01	2:28 ± 1:53 0:00 to 7:01
Averaged to 1 wk	1:59 ± 1:23 0:12 to 4:54	3:22 ± 2:28 0:08 to 7:45	2:23 ± 1:49 0:08 to 7:45

Note: values are mean ± SD and range. Comparisons are independent t-tests t (p) or Mann–Whitney U.
[a] Significant group difference ($p < .01$). [b] Significant group difference ($p < .05$).

The total sample averaged 1.98 ± 0.62 stops per trip (range 1.00 to 3.75) and 19.88 ± 12.79 km per trip (range 5.60 to 62.39) over the two weeks. The SV and LV group similarly made an average of two stops per trip, with 2.00 ± 0.68 stops per trip (range 1.00 to 3.75) and 1.93 ± 0.46 stops per trip (range 1.00 to 2.50) respectively. Also comparable were kilometres per trip, with the SV group averaging 19.86 ± 13.66 km per trip (range 5.63 to 62.39) and the LV group with 19.94 ± 10.99 km per trip (range 5.60 to 36.91).

5.8.2 Patterns

This section presents the results of when participants drove, including night driving, radius or distance from home, and weekday versus weekend driving. Trip purposes and weather conditions over the monitoring period are also examined.

5.8.2.1 Night Driving and Radius

As noted in Chapter 4, night trips were defined as those that started and ended in darkness. Only 8/32 or 25% of the sample (four men and four women) drove at least once at night over the two week monitoring period. A higher proportion of the SV group (30% or 7/23),

than the LV group (11% or 1/9) drove at night at least once. In the SV sample, seven residents made a total of 16 night trips over the two weeks. Comparatively, one individual from LV made two trips at night, both partial (meaning that the trip started in day light and ended after sunset). Indicators of night driving (averaged to one week) did not differ significantly by group or gender. The combined sample made a total of 3.52 ± 8.62 (0 to 34.2) kilometers per trip at night. Results for the total sample and each group are shown in **Table 5.16**.

Table 5.16: Night Driving and Radius

	SV Sample (N=23)	LV Sample (N=9)	Combined Sample (N=32)
Nights driven			
Total for 2 wks	0.57 ± 0.99 0 to 3	0.22 ± 0.67 0 to 2	0.47 ± 0.92 0 to 3
Week 1 total	0.35 ± 0.57 0 to 2	0.11 ± 0.33 0 to 1	0.28 ± 0.52 0 to 2
Week 2 total	0.26 ± 0.62 0 to 2	0.11 ± 0.33 0 to 1	0.22 ± 0.55 0 to 2
Averaged to 1 wk	0.28 ± 0.50 0 to 1.5	0.11 ± 0.33 0 to 1	0.23 ± 0.46 0 to 1.5
Night trips			
Total for 2 wks	0.65 ± 1.11 0 to 3	0.22 ± 0.67 0 to 2	0.53 ± 1.02 0 to 3
Week 1 total	0.39 ± 0.66 0 to 2	0.11 ± 0.33 0 to 1	0.31 ± 0.59 0 to 2
Week 2 total	0.26 ± 0.62 0 to 2	0.11 ± 0.33 0 to 1	0.22 ± 0.55 0 to 2
Averaged to 1 wk	0.33 ± 0.56 0 to 1.5	0.11 ± 0.33 0 to 1	0.27 ± 0.51 0 to 1.5

Table 5.16 Continued

	SV Sample (N=23)	LV Sample (N=9)	Combined Sample (N=32)
Night km			
Total for 2 wks	11.82 ± 25.23 0 to 86.6	0.74 ± 2.23 0 to 6.7	8.71 ± 21.88 0 to 86.6
Week 1 total	9.06 ± 20.77 0 to 68.3	0.21 ± 0.63 0 to 1.9	6.57 ± 17.96 0 to 68.3
Week 2 total	2.76 ± 6.50 0 to 27.2	0.53 ± 1.60 0 to 4.8	2.13 ± 5.63 0 to 27.2
Averaged to 1 wk	5.91 ± 12.61 0 to 43.3	0.37 ± 1.12 0 to 3.4	4.35 ± 10.94 0 to 43.3
Night duration (h:min)			
Total for 2 wks	0:22 ± 0:46 0:00 to 2:45	0:02 ± 0.07 0:00 to 0:21	0:17 ± 0:40 0:00 to 2:45
Week 1 total	0:14 ± 0:30 0:00 to 1:51	0:01 ± 0:02 0:00 to 0:07	0:10 ± 0:26 0:00 to 1:51
Week 2 total	0:09 ± 0:23 0:00 to 1:47	0:02 ± 0:05 0:00 to 0:21	0:07 ± 0:20 0:00 to 1:47
Averaged to 1 wk	0:11 ± 0:23 0:00 to 1:23	0:01 ± 0:03 0:00 to 0:11	0:08 ± 0:20 0:00 to 1:23
Average Radius (km)	N=11 6.55 ± 5.47 2.00 to 17.80	N=8 8.85 ± 6.92 2.46 to 20.37	N=19 7.52 ± 6.05 2.00 to 20.37
Maximum Radius (km)	N=11 14.52 ± 16.03 2.47 to 55.00	N=8 46.98 ± 48.84 2.46 to 119.00	N=19 28.19 ± 36.62 2.46 to 119.00

Note: values are mean ± SD and range. Comparisons are independent t-tests t(p) or Mann–Whitney U.

As shown at the bottom of **Table 5.16**, the LV group drove a greater distance from home (regardless of time of day), although group differences were not significant. Maximum and average radius also did not differ significantly according to: gender, marital status (married versus not married), education level (less than college versus college or more), income (≤$50 000 versus >$50 000), use of cane/walker outdoors, or the ability to walk a quarter mile. However, maximum (z=-2.000, p=0.046) and average radius (z=-2.400, p=0.016) did differ

significantly by whether they had fallen in the last year. Fallers drove significantly closer to home as shown in **Table 5.17**.

Table 5.17: Maximum and Average Driving Radius by Fall Status

Maximum radius (km)		Average radius (km)	
Non-fallers (n=15)	**Fallers (n=4)**	**Non-fallers (n=15)**	**Fallers (n=4)**
34.26 ± 39.15 3.33 to 119.00	5.41 ± 4.41 2.46 to 11.80	8.80 ± 6.22 2.22 to 20.37	2.73 ± 0.68 2.00 to 3.62

Values are mean ± SD and range

5.8.2.2 Weekday and Weekend Driving

As can be seen from **Table 5.18**, both groups drove more (# days, trips, km) and for longer durations on weekdays than on weekends. LV participants drove significantly more days during the week than the SV sample (t=-2.182, p=0.037). Average scores were generally higher for the LV group, except for driving distance per trip and duration on the weekends.

Table 5.18: Weekday and Weekend Driving

	SV Sample (N=23)	LV Sample (N=9)	Total Sample (N=32)
Weekday			
Days driven[b]	4.26 ± 2.49 0 to 10	6.56 ± 3.13 1 to 9	4.91 ± 2.83 0 to 10
Trips per day	1.04 ± 0.28 0 to 1.67	1.23 ± 0.29 1.00 to 1.78	1.10 ± 0.29 0 to 1.78
Distance (km) per trip	18.61 ± 12.40 0 to 43.85	20.61 ± 11.59 5.60 to 38.11	19.17 ± 11.81 0 to 43.85
Duration over two weeks (hr:mm)	3:06 ± 2:26 0 to 7:59	5:38 ± 4:06 0:16 to 11:53	3:49 ± 3:08 0:00 to 11:53
Weekend			
Days driven	1.39 ± 1.03 0 to 3	1.56 ± 1.51 0 to 4	1.44 ± 1.16 0 to 4
Trips per day	0.78 ± 0.42 0 to 1	0.86 ± 0.52 0 to 1.50	0.80 ± 0.44 0 to 1.50
Distance (km) per trip	16.50 ± 30.29 0 to 148.33	11.17 ± 11.76 0 to 33.78	15.00 ± 26.32 0 to 148.33
Duration over 2 weeks (hr:mm)	1:45 ± 2:17 0 to 7.51	1:04 ± 1:22 0:00 to 3:47	1:34 ± 2:04 0:00 to 7:51

Note: values are mean ± SD and range. Comparisons are independent t-tests t(p) or Mann–Whitney U.
[a] Significant group difference (p < .01). [b] Significant group difference (p < .05).

5.8.2.3 Trip Purposes

Similar to previous naturalistic driving studies, trip purposes were taken from subject logs and categorized into predetermined categories (as detailed in **Appendix F**). Each trip segment was then placed into a category and frequencies (displayed below) were calculated. Overall, trip purposes or destinations were not specified in the logs (missing) for about 20% of the trip segments. As shown in **Table 5.19** below, the greatest proportion of trip segments for both groups was for shopping and errands, followed by social and entertainment. Additionally, trips were classified according to whether they were out-of-town. About 16% of the trip segments were considered out-of-town (15% of SV trips and 18% of LV trips).

Table 5.19: Number of Trip Segments for Various Purposes

Categories	# of trip segments SV (n=307)	# trip segments LV (n=195)	# of trip segments total (n=502)
Shopping and errands	153 (64.0)	110 (67.1)	263 (65.3)
Social, entertainment, education recreation	44 (18.4)	29 (17.7)	73 (18.1)
Assisting others	7 (2.9)	9 (5.5)	16 (4.0)
Physical activities	0 (0)	0 (0)	0 (0)
Religious activities	18 (7.5)	1 (0.6)	19 (4.7)
Paid work	0 (0)	0 (0)	0 (0)
Medical appointments	16 (6.7)	12 (7.3)	28 (6.9)
Volunteer activities	0 (0)	3 (1.8)	3 (0.7)
Other	1 (0.4)	0 (0)	1 (0.2)
Missing	*68 (22.1)*	*31 (15.9)*	*99 (19.7)*

Values are frequencies (valid %). Example: SV N=307 – 68 missing = 239 used in the denominator. Some trips had multiple purposes.

Table 5.20 displays the associations between the number of trip segments for each purpose and the driving indicators (averaged to one week) for the combined sample. Shopping, social activities, helping others and out of town trips were significantly associated with several of the driving indicators (#days driven, trips, stops, distance, duration) and radius. Trips for medical reasons were significantly associated with days driven, trips, stops, distance and duration. Significant associations with the night driving indicators emerged for social or recreational trips.

Night km was also significantly correlated (*rho*=.36, *p*=<0.05) with "other" trip purposes (i.e., visiting someone in hospital). No significant associations emerged for volunteer work or trips for religious purposes. Weekdays driven were significantly associated with shopping/errands (*r*=.79, *p*=<0.01), social (*r*=.62, *p*=<0.01), medical (r=.52, *p*=<0.01) and out-of-town trips (*r*=.36, *p*=<0.05). Weekends driven were significantly associated with religious trip purposes (*rho*=.55, *p*=<0.01), social (*rho*=.39, *p*=<0.05) and out-of-town trips (*rho*=.40, *p*=<0.05).

Table 5.20: Associations between Driving Indicators and Trip Purposes

Driving Indicators	Shopping	Social	Helping Others	Medical	Out of town trips
# Days	**.80****	**.74****	**.46****	**.48****	**.60****
# Trips	**.85****	**.77****	**.53****	**.50****	**.68****
# Stops	**.89****	**.72****	**.63****	**.56****	**.74****
Distance (km)	**.75****	**.72****	**.41***	**.52****	**.76****
Duration (hr:min)	**.83****	**.78****	**.47****	**.54****	**.73****
Radius (avg)	**.64****	.43	.46	.27	**.68****
Radius (max)	**.80****	**.57***	**.50***	.37	**.83****
Nights driven	.22	**.44***	.04	.17	.05
Night trips	.25	**.47****	.07	.19	.09
Night km	.15	**.43***	-.01	.12	.04
Night duration	.16	**.44***	.01	.13	.04

Note: All values are Spearman rho. * p < .05; ** p < .01; *** p < .001. Physical activity and paid work were not included as none of the logs specified these trip purposes.

5.8.2.4 Weather Conditions

Of those with objective driving data, 31 of the 32 participants had 14 consecutive days of monitoring (vehicles equipped); one had only 12 days. Thus, there were a total of 446 days or potential opportunities for participants to drive (at least once on a particular day). Similar to prior studies (by Blanchard, Trang and Crizzle), weather descriptions were obtained from participant trip logs and internet archives and the number of days people drove/did not drive on days with inclement weather examined.

Over the monitoring period (from early February to mid-July), there were 303 days (68%) of clear weather and 143 days (32%) with inclement weather; primarily rain (105/446

days or 24% of total opportunities). There were only 38 days with snow (8.5% of total opportunities). Three-quarters of the sample (73%) did not drive on days when it rained (77/105 days), while 76% did not drive on days when it snowed (29/38 days). Overall, 74% of the sample did not drive on days with rain or snow (106/143). Only one day (February 17, 2013) had an extreme cold advisory (≤ -15ºC); of the 10 people whose vehicle was equipped on that day, 60% (6/10) did not drive. Three days in July, 2013 had extreme heat advisories (≥ 32ºC); the one person in the study at this time drove on two of the three days.

5.8.3 Other Associations with Objective Driving Indicators

Associations with trip purposes were presented above. This section examines other possible associations between the driving indicators (averaged to one week), selected characteristics and scores on key measures. Although not shown in the table, the driving variables were not significantly associated with the number of diagnosed conditions or driving problems. As shown in **Table 5.21**, age, ABC-16, GDS-15 and MoCA scores were not significantly associated with any of the driving indicators. Scores on the ABC-27 were significantly and positively associated with number of trips. VPS scores, however, were significantly and positively associated with all indicators of night driving except for night km.

Table 5.21: Associations between Driving and Selected Characteristics

Driving Indicators	Age	ABC-27	ABC-16	MoCA	GDS	VPS
# Days	-.18	.33	.28	-.04	-.15	.05
# Trips	-.24	**.39***	.33	.04	-.20	.11
# Stops	-.30	.35	.34	.03	-.24	.12
Distance (km)	-.28	.23	.18	.02	-.11	.11
Duration (hr:min)	-.25	.31	.27	.04	-.16	.14
Radius (avg)	-.35	-.12	-.20	.02	-.39	-.03
Radius (max)	-.40	-.19	-.27	-.07	-.33	-.16
Nights driven	.02	.18	.25	.16	-.08	**.42***
Night trips	.01	.21	.27	.17	-.10	**.44***
Night km	.12	.22	.27	.13	-.03	.34

Table 5.21 Continued

Driving Indicators	Age	ABC-27	ABC-16	MoCA	GDS	VPS
Night duration (h:min)	.11	.22	.27	.15	-.03	**.36***

Note: Spearman rank (GDS-15, VPS, distance, duration, radius, and all night indicators) * significant at $p < .05$, ** significant at $p < .01$

As shown in **Table 5.22**, driving comfort at night (DSC-N) and perceived abilities (PDA) scores were positively associated with all of the driving indicators (except distance and radius). Daytime comfort, meanwhile, was significantly associated with night driving indicators. Scores on the restriction measures were also associated with multiple indicators. Of interest, only SDF scores were significantly associated with radius. Scores on the SDA, meanwhile, were associated with the night indicators, not surprisingly as several items on the SDA pertain to night driving. There were no significant associations between the GDS scores and the driving indicators.

Table 5.22: Associations between Driving, Perception and Restriction Scores

Driving Indicators	DCS-D	DCS-N	DCS-N Item #1	PDA	SDF	SDA
# Days	.34	**.38***	.21	**.48****	**.55****	**-.37***
# Trips	.33	**.36***	.20	**.45***	**.58****	**-.37***
# Stops	.33	**.38***	.20	**.38***	**.59****	**-.37***
Distance (km)	.29	.32	.11	.30	**.58****	-.32
Duration (hr:min)	.34	**.38***	.22	**.36***	**.62****	**-.42***
Radius (avg)	.19	.15	.08	.27	**.55***	-.24
Radius (max)	.19	.11	-.11	.33	**.65****	-.17
Nights driven	**.42***	**.37***	.28	**.37***	.31	**-.47****
Night trips	**.43***	**.38***	.29	**.36***	.28	**-.48****
Night km	**.44***	**.40***	.27	**.39***	.32	**-.50****
Night duration (h:min)	**.44***	**.41***	.29	**.38***	.31	**-.50****

Note: Pearson or Spearman rank (DCS-N item #1, SDA, distance, radius, duration, and all night indicators) * significant at $p < .05$, ** significant at $p < .01$

5.9 Participant Driving Experiences

Interviews were completed with 21/27 SV and 10/11 LV participants. No one felt the devices affected their driving, nor did they report any driving problems over the two weeks. Only one person reported driving someone else's vehicle over the period. This resident (CABO) drove her husband's vehicle only once and for a short distance.

Twelve residents from the SVs (57%) reported driving the same amount as usual, six (29%) less than usual, and 3 (14%) more than usual. Residents that drove less than usual often did so because of the weather, especially those in WP (monitored in February and March). The lady (HINI) who drove only once over the period said she was ill so her son drove her. Her doctor also suggested she temporarily stopped driving due to hearing problems. Two residents, who drove more than usual, (EDSH and CYHE) had visitors from out of town.

Only two residents from LV said they drove more than usual in the two weeks and 8/10 drove about the same amount. One who drove more said it was due to the weather (humidity) which affected her asthma; so she drove rather than walk. Another said they had an unusually busy two weeks with more out of town trips. Only one person (JOTA) reported cancelling a trip to the movies due to extremely hot weather that day (in June). This same person also mentioned that because of her husband's poor health, she returned home several times to check on him, whereas she usually did more errands in a single trip. Another circumstance was an out of town visitor (their son) who drove her (MAPF) and her husband in the son's vehicle during the visit.

5.10 Alternate Modes of Transportation and Travel

This section presents the results from the Transportation Use questionnaire (shown in **Appendix I – Table I6**), followed by the findings from the travel diaries. On the questionnaire, participants were asked to indicate how often (weekly or more to never) they used alternate modes of transport (apart from driving themselves) to travel outside the village. Results are shown in **Table 5.23**. For the SV group, the most frequently used modes of transport were: 1. being a passenger in a vehicle; 2. village bus; 3. taxi; and 4. public transit. In the LV group, meanwhile, the most frequent modes of transport were: 1. being a passenger in a vehicle; 2. taxi;

3. public transit; and 4. village bus. As noted in Chapter 3, unlike the SVs, the LV does not have a permanent, on-site bus for their residents.

Table 5.23: Frequency of Use of Alternative Modes of Transportation

	Frequently (weekly or more)	**Sometimes** (few times a month)	**Rarely** (less than once a month)	**Never**
Passenger in a Vehicle				
Male (SV)*	0 (0)	3 (27.3)	6 (54.5)	2 (18.2)
Female (SV) **	3 (21.4)	4 (28.6)	5 (35.7)	2 (14.3)
SV Total (N=25)	**3 (12.0)**	**7 (28.0)**	**11 (44.0)**	**4 (16.0)**
Male (LV)	1 (33.3)	1 (33.3)	1 (33.3)	0
Female (LV)	4 (57.1)	2 (28.6)	1 (14.3)	0 (0)
LV Total (N=10)	**5 (50.0)**	**3 (30.0)**	**2 (20.0)**	**0 (0)**
Public Transit				
Male (SV)	0 (0)	0 (0)	3 (27.3)	8 (72.7)
Female (SV)	0 (0)	2 (14.3)	1 (7.1)	11 (78.6)
SV Total (N=25)	**0 (0)**	**2 (8.0)**	**4 (16.0)**	**19 (76.0)**
Male (LV)	0 (0)	1 (33.3)	0 (0)	2 (66.7)
Female (LV)	0 (0)	1 (14.3)	1 (14.3)	5 (71.4)
LV Total (N=10)	**0 (0)**	**2 (20.0)**	**1 (10.0)**	**7 (70.0)**
Taxi				
Male (SV)	0 (0)	0 (0)	3 (27.3)	8 (72.7)
Female (SV)	0 (0)	1 (7.1)	6 (42.9)	7 (50.0)
SV Total (N=25)	**0 (0)**	**1 (4.0)**	**9 (36.0)**	**15 (60.0)**
Male (LV)	0 (0)	0 (0)	1 (33.3)	2 (66.7)
Female (LV)	0 (0)	0 (0)	4 (57.1)	3 (42.9)
LV Total (N=10)	**0 (0)**	**0 (0)**	**5 (50.0)**	**5 (50.0)**
Village Bus				
Male (SV)	2 (18.2)	1 (9.1)	5 (45.5)	3 (27.3)
Female (SV)	0 (0)	3 (21.4)	8 (57.1)	3 (21.4)
SV Total (N=25)	**2 (8.0)**	**4 (16.0)**	**13 (52.0)**	**6 (24.0)**
Male (LV)	0 (0)	0 (0)	1 (33.3)	2 (66.7)
Female (LV)	0 (0)	1 (14.3)	1 (14.3)	5 (71.4)
LV Total (N=10)	**0 (0)**	**1 (10.0)**	**2 (20.0)**	**7 (70.0)**

*,** : for all transportation modes, N=11 (males) and N=14 (females). Values are frequencies (valid %)

Although not shown in the table above, respondents were also asked how often, if ever, they used paratransit services, as well as motorized scooters or wheelchairs. Only two people, both from the SVs, checked paratransit services (one used frequently, the other rarely). One

person (SV) reported using a motorized scooter (rarely), while another (LV) did sometimes. Use of a motorized wheelchair was only reported by one SV participant (used rarely).

Participants who never used public transit drove more days (n=22, 3.52 ± 1.58 versus n=9, 2.39 ± 1.65) and took more trips (n=22, 4.32 ± 2.47 versus n=9, 2.67 ± 2.03) on average than those who reported using it at least once (rare, sometimes or frequently), although not significant. Findings were similar for use of the village bus (not significant), where never users had driven more days (n=10, 3.75 ± 1.65 versus n=21, 2.92 ± 1.63) and taken more trips (n=10, 4.35 ± 2.17 versus n=21, 3.60 ± 2.57). Additionally, ABC-27 scores were compared for those who reported using public transit (n=9) and those who did not (n=26). Although balance confidence scores were slightly higher in the former group (84.57 ± 13.07 versus 83.23 ± 16.40), the difference was not significant.

Only 2/25 respondents from the SVs indicated they never received rides from others (**Table 5.24**), although four reported never being a passenger on the prior question (see **Table 5.23** above). For those who did report receiving rides from others (92%, 23/25), most commonly rides were from their children (son: 52%; daughter: 44%), adult grandchildren (32%), son-in-law (28%) or a friend in the village (28%). All 10 in the LV sample reported receiving rides from someone; most commonly from their spouse (50%), daughter (50%), adult grandchild (50%) and a friend outside the village (50%).

Participants were also asked if they had any concerns or reservations about taking taxis, public transit or the village bus. Results shown in **Appendix I - Table I6** indicate that 25% had various concerns about public transit, 20% with taxis and 8% with the village bus.

Table 5.24: Rides Received from Others by Location and Gender

	SV Sample (N=25)	LV Sample (N=10)	Total Sample (N=35)	Males (n=14)	Females (n=21)
Spouse	1 (4.0)	5 (50.0)	6 (17.1)	3 (21.4)	3 (14.3)
Son	13 (52.0)	3 (30.0)	16 (45.7)	7 (50.0)	9 (42.9)
Daughter	11 (44.0)	5 (50.0)	16 (45.7)	7 (50.0)	9 (42.9)
Son-in-law	7 (28.0)	3 (30.0)	10 (28.6)	3 (21.4)	7 (33.3)
Daughter-in-law	5 (20.0)	3 (30.0)	8 (22.9)	2 (14.3)	6 (28.6)
Adult grandchild	8 (32.0)	5 (50.0)	13 (37.1)	4 (28.6)	9 (42.9)
Sibling	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other family member	1 (4.0)	1 (10.0)	2 (5.7)	0 (0)	2 (9.5)
Friend in the Village	7 (28.0)	3 (30.0)	10 (28.6)	2 (14.3)	8 (38.1)
Friend outside the Village	3 (12.0)	5 (50.0)	8 (22.9)	0 (0)	8 (38.1)
Volunteer drivers	3 (12.0)	0 (0)	3 (8.6)	0 (0)	3 (14.3)
Don't receive rides	2 (8.0)	0 (0)	2 (5.7)	1 (7.1)	1 (4.8)

Values are frequencies (valid %). Note: participants could have provided multiple responses

5.10.1 Results from Travel Diaries

The two-week travel diaries were used to capture data on other modes of travel apart from driving oneself. Travel diaries were obtained from 23 participants in the SV group and 10 from the LV group. As shown in **Appendix F**, the travel diaries requested date and time of departure and return, mode(s) of travel to destination and back home, and trip purposes. If the same mode of travel was used in both directions (e.g., by taxi), this was counted as one round trip. This happened to be the case for all our participants. Had different modes been used (e.g., walked to store and took a taxi back), each would be considered half a trip.

As can be seen in **Table 5.25**, walking was the most frequent mode of travel outside the village (accounting for 80/121 or 66% of all trips), followed by being a passenger in someone else's vehicle (almost 30% of all trips). Neither group reported using paratransit, scooters, wheelchairs or other modes of travel (e.g., volunteer driver, bicycles) in their two week diaries.

The mean number of non-driving trips recorded on the travel diaries by the 23 from the SVs was 2.78 ± 5.98 (range 0 to 29 trips); when the four people who did not hand in the travel

diaries but reported 0 trips are included (n=27), the mean is 2.37 ± 5.59 (range 0 to 29 trips). Of the 64 trips in total, almost half (29 or 45%) were by one resident due to the fact that she walked her dog daily (often more than once). The most common modes of travel for the SV group were walking, followed by being a passenger, village bus trips, public bus and taxi.

The average number of trips by the LV participants with travel diaries (n=10) was 5.70 ± 7.80 (range 0 to 20). In this group, only two types of transportation were used during the two-week period; the most popular of which was walking followed by being a passenger in a vehicle. Although the difference was not statistically significant, the LV group did report a higher average number of walking and passenger trips than the SV group.

Table 5.25: Number of Non-Driving Trips over Two Weeks

	SV Sample (N=23)		**LV Sample (N=10)**		**Total Sample (N=33)**	
Travel Mode	**Mean # of Trips**	**Total # Trips**	**Mean # of Trips**	**Total # Trips**	**Mean # of Trips**	**Total # Trips**
Walking	1.61 ± 4.85 0 to 23	37 (57.81)	4.30 ± 7.80 0 to 19	43 (75.44)	2.42 ± 5.91 0 to 23	80 (66.12)
Passenger	0.91 ± 1.47 0 to 5	21 (32.82)	1.40 ± 2.07 0 to 6	14 (24.56)	1.06 ± 1.66 0 to 6	35 (28.93)
Public bus	0.04 ± 0.21 0 to 1	1 (1.56)	0.00 ± 0.00 0 to 0	0 (0)	0.03 ± 0.17 0 to 1	1 (0.83)
Taxi	0.04 ± 0.21 0 to 1	1 (1.56)	0.00 ± 0.00 0 to 0	0 (0)	0.03 ± 0.17 0 to 1	1 (0.83)
Village bus*	0.17 ± 0.39 0 to 1	4 (6.25)	0.00 ± 0.00 0 to 0	0 (0)	0.12 ± 0.33 0 to 1	4 (3.31)
Total trips		**64**		**57**		**121**

Note: values are mean ± SD, range or frequencies (valid %). * Recall LV doesn't have a permanent on-site village bus

Total number of trips from the travel diaries was examined in relation to the actual driving data for participants who had both sources of data for the two week monitoring period. Significant and inverse associations emerged with number of days driven (p= -.50), trips (p= -.50), stops (p= -.48), distance (p= -.45) and duration (p= -.46).

The diaries also asked people whether they chose not to drive themselves on a particular trip due to bad weather (check Yes or No). None of the respondents checked "Yes". As **Table 5.26** depicts, for both groups, non-driving trips for recreational and social purposes were most common. It's interesting to note that while none of the SV participants reported trips for religious purposes, 11% of LV participants did. When comparing the two samples, significant differences emerged regarding only trips for religious purposes (z=-2.656, p=0.008), indicating that residents in the LV sample made significantly more trips without their vehicle for this reason.

Table 5.26: Trip Purposes by Village

	SV Sample (N=22)		LV Sample (N=10)	
Trip purpose	**Mean # of Trips**	**Total # Trips (out of 64)**	**Number of Trips**	**Total # Trips (out of 57)**
Shopping	0.36 ± 0.73 0 to 3	8 (11.59)	0.50 ± 1.08 0 to 3	5 (8.77)
Errands	0.23 ± 0.53 0 to 2	5 (7.25)	0.40 ± 0.84 0 to 2	4 (7.02)
Recreation and Social	2.36 ± 5.68 0 to 27	52 (75.36)	4.30 ± 5.42 0 to 15	43 (75.44)
Religious	0 ± 0 0 to 0	0 (0)	0.60 ± 0.97 0 to 2	6 (10.53)
Medical	0.18 ± 0.66 0 to 3	4 (5.80)	0.10 ± 0.32 0 to 1	1 (1.75)

Note: Values are mean, SD, range or n (%). Percentages are greater than 100% as some trips had multiple purposes. Although 23 diaries were returned, n=22 for the SV group as one participant reported they did not make any non-driving trips over the two weeks.

5.10.2 Participant Feedback on Alternate Modes of Travel

Only three residents (all female) from the SVs reported that their travel patterns (apart from driving) were not typical over the prior two weeks. In one case, a resident (EDSH) said she made fewer walking trips than normal due to poor weather. Another (LOMC) noted that although she does not normally use taxis, she did so because of her husband (reason unknown). As noted earlier, HINI was driven by her son due to illness, thus had more trips as a passenger than usual.

Participants from LV reported that their travel patterns, including mode of travel, were fairly typical, with a few exceptions. As noted earlier in the chapter, one lady's (MAPF) son visited from out of town and drove her and her husband in his vehicle during the visit. Thus, she had more trips as a passenger and fewer driving trips than normal. Another with asthma (CABO) walked less than usual due to high humidity.

When discussing alternate modes of transportation such as public buses and paratransit, several mentioned they were not very experienced or knowledgeable about the services as they were not yet at the stage where they might need to rely on these. The interview also asked participants about their experiences with ridesharing within the village. Of the 21 interviewed from the SVs, 11 (52.4%) reported having given rides in their vehicles to other residents (anywhere from weekly to a few times a year). In the LV group (n=10), six (60.0%) reported giving rides to others in the village, ranging from once a week to occasionally.

In the SV group, seven (33.3%) reported receiving rides from other residents, with frequencies ranging from once due to an emergency to once a month. For the LV group, 50% of residents reported receiving rides from others, with frequencies ranging from one occasion to once or twice a week. Most residents felt that they could not ask another resident for a ride: either because they did not know who to ask (i.e., not sure who would be willing to drive) and/or they did not want to be a burden.

Most were hesitant when asked about the idea of a 'formal' ridesharing system at their village. Although many residents reported having never thought about ridesharing before, most came to the conclusion that it could be something that residents might be interested in depending on how it would work at the village, as well as issues of insurance and liability.

5.11 Use of Services and Amenities and Participation in Village Activities

This section presents the primary results from the Services and Amenities checklist (SV: n=25, LV: n=10); full details can be found in **Table I7** in **Appendix I**. The most frequently used service by SV participants was the on-site café (72% in the last month), followed by meals in the dining room (64%), the hair salon (60%), on-site library (56%) and the general store (52%). For those who reported eating in the dining area (n=16), 28% ate three meals a day, 24% two, and 12% one meal a day. It is important to keep in mind that some of the services provided vary across the SVs. For example, in HH, even those who live in independent apartments must purchase lunch and dinner meal plans (breakfast on their own), while in TM residents in the apartments are not required to purchase any meal plan and have large, fully furnished kitchens.

In LV, the most frequently used services were the on-site café (80%), followed by the on-site library (60%), Martin's restaurant (40%), hair salon (40%), general store (30%) and physician services (30%). All four of the residents who had eaten at Martin's restaurant had done so for dinner, with half of them also reporting eating a lunch meal there in the last month. One person in the LV group reported purchasing services from outside agencies, while no one in the SV group had done so. Unique to the LV location, residents could also purchase services from the village itself (one did so, specifically dry cleaning). Almost three-quarters of the SV residents reported usually participating in a music, theatre or movie related group activities organized by the villages, followed by physical activities (48%), religious services (40%), games (32%), arts and crafts (28%) and special outside events organized by the village (28%) (**Appendix I**, **Table I7**). For the SV sample that completed this checklist, 80% reported usually participating in at least one of these organized village activities. Frequency of participation in organized group activities did not differ significantly by gender.

In the LV sample, physical activity classes were the most popular (60%), followed by games, special events outside LV (40%), music, theatre or movies (40%), religious services (30%) and arts and crafts (10%). Except for one man who attended a regular physical activity class (on average twice a week), none of the other men reportedly participated in any of the organized village activities.

Of the 12 SV residents (five men and seven women) who participated in organized physical activity classes at the village, the average frequency of attendance in the last week (prior to survey completion) was 2.83 ± 2.13 (range 1 to 7 days). Although not significant, men attended more often on average than women (3.60 ± 2.41, range 1 to 7 versus 2.29 ± 1.89, range 1 to 5). For the ten LV residents (three men, seven women) who took part in such classes or groups, average attendance in the prior week the last week was 1.50 ± 1.65 (range 0 to 5 days). Women attended more often than men (1.86 ± 1.77, range 0 to 5 versus 0.67 ± 1.16, range 0 to 2), although not statistically significant. Frequency of physical activity attendance in the past week was not significantly associated with VPS, GDS or ABC-27 scores in either group. When asked to rate their sense of belonging to the village community, a greater proportion of those from LV, compared to the SVs (80% versus only 32%) rated this as "very strong".

5.12 Community Engagement

This section presents the results of various aspects of broader engagement, including contact with family and friends, participation in groups and activities outside their village and changes in the size of their social networks.

5.12.1 Contact with Family and Friends

When asked if they had relatives within 15 miles or 4 km of their village, about three-quarters of the SV group and half of the LV group reported having relatives close by.

Table 5.27: Close Proximity to Relatives

	SV sample (N=25)	SV males (n=10)	SV females (n=15)	LV sample (N=11)	LV males (n=4)	LV females (n=7)
No	6 (24.0)	2 (20.0)	4 (26.7)	5 (45.5)	2 (50.0)	3 (42.9)
Yes	19 (76.0)	8 (80.0)	11 (73.3)	6 (54.5)	2 (50.0)	4 (57.1)

Note: values are frequencies (valid %)

Table 5.28 displays the frequency of contact with friends and family (outside the village), reported by 24 participants from the SVs and 10 from LV. Only two people from each group said that family and friends never visit them at their village, however everyone reported speaking to friends or relatives by phone (further details can be found in the table).

Table 5.28: Frequency of Contact with Family and Friends outside the Village

	At least once a week	Few times a month	Infrequently	Never
They visit me at the Village				
SV sample (N=24)	7 (29.2)	9 (37.5)	6 (25.0)	2 (8.3)
LV sample (N=10)	3 (30.0)	4 (40.0)	1 (10.0)	2 (20.0)
I visit them at their home				
SV sample (N=24)	2 (8.3)	8 (33.3)	10 (41.7)	4 (16.7)
LV sample (N=10)	1 (10.0)	6 (60.0)	3 (30.0)	0 (0)
We get together at a restaurant or other location in town				
SV sample (N=24)	2 (8.3)	4 (16.7)	13 (54.2)	5 (20.8)
LV sample (N=10)	1 (10.0)	2 (20.0)	5 (50.0)	2 (20.0)
We talk on the phone				
SV sample (N=24)	20 (83.3)	0(0)	4 (16.7)	0 (0)
LV sample (N=10)	6 (60.0)	3 (30.0)	1 (10.0)	0 (0)
We get in touch by email				
SV sample (N=24)	9 (39.1)	7 (30.4)	4 (17.4)	3 (13.0)
LV sample (N=10)	8 (80.0)	1 (10.0)	0 (0)	1 (10.0)

Note: values are frequencies (valid %)

5.12.2 Participation in Activities outside the Villages

Most (87.5%) of the SV individuals who completed this checklist (21/24) indicated that they had left their village in the last week; the other three within the last month. In the LV group, 100% (10/10) said they had left their village in the last week. Also, about 80% of both groups felt moderately to very well connected with the outside community.

Table I8 in **Appendix I** shows the types of groups people belonged to and whether they attended regularly. For the SV sample, the most popular groups were: recreation/hobby (29%), cultural/education (25%), and religious (17%). Only two people (one man and one woman) said they belonged to sports-related groups and three people from the LV sample (two men and one woman). Other popular groups for the LV sample were: recreation/hobby (50%), cultural or educational (30%) and service clubs (20%). Of those who completed this checklist, overall less than a third of those from the SVs and less than half of those from the LV reported membership in any type of group outside their village.

Table 5.29 shows the most popular activities outside the village, which for both groups were shopping and errands, followed by eating at restaurants. Interestingly, 60% of the LV sample, but none of the SV sample is involved in volunteer work in the community (on average 22 hours a month). As seen in the table, many activities were done with others versus alone. Only one person (man from LV) reported trips out of the province and country over the last month.

Table 5.29: Activities outside the Village in the Prior Month

	SV sample (N=24)	**SV males (n=11)**	**SV females (n=13)**	**LV sample (N=10)**	**LV males (n=3)**	**LV females (n=7)**
Shopping or errands	23 (95.8)	10 (90.9)	13 (100)	10 (100)	3 (100)	7 (100)
Ate at a restaurant	21 (87.5)	9 (81.8)	12 (92.3)	9 (90.0)	2 (66.7)	7 (100)
Alone	*1 (4.8)*	*1 (11.1)*	*0 (0)*	*0 (0)*	*0 (0)*	*0 (0)*
With Others	*20 (95.2)*	*8 (88.9)*	*12 (100)*	*9 (100)*	*2 (100)*	*7 (100)*
Ate at someone's home	16 (66.7)	7 (63.6)	9 (69.2)	9 (90.0)	2 (66.7)	7 (100)
Movie, concert, etc.	8 (33.3)	3 (27.3)	5 (38.5)	9 (90.0)	2 (66.7)	7 (100)
Alone	*0 (0)*	*0 (0)*	*0 (0)*	*0 (0)*	*0 (0)*	*0 (0)*
With Others	*8 (100)*	*3 (100.0)*	*5 (100)*	*9 (100)*	*2 (100)*	*7 (100)*
Sporting event/ casino	6 (25.0)	4 (36.4)	2 (15.4)	2 (20.0)	1 (33.3)	1 (14.3)
Alone	*1 (16.7)*	*1 (25.0)*	*0 (0)*	*0 (0)*	*0 (0)*	*0 (0)*
With Others	*5 (83.3)*	*3 (75.0)*	*2 (100)*	*2 (100)*	*1 (100)*	*1 (100)*
Educational event	9 (37.5)	3 (27.3)	6 (46.2)	4 (40.0)	1 (33.3)	3 (42.9)
Alone	*2 (22.2)*	*0 (0)*	*2 (33.3)*	*0 (0)*	*0 (0)*	*0 (0)*
With Others	*7 (77.8)*	*3 (100.0)*	*4 (66.7)*	*4 (100)*	*1 (100)*	*3 (100)*

Table 5.29 Continued

	SV sample (N=24)	SV males (n=11)	SV females (n=13)	LV sample (N=10)	LV males (n=3)	LV females (n=7)
Church, temple etc. *Alone* *With Others*	12 (50.0) *7 (58.3)* *5 (41.7)*	4 (36.4) *2 (50.0)* *2 (50.0)*	8 (61.5) *5 (62.5)* *3 (37.5)*	5 (50.0) *1 (20.0)* *4 (50.0)*	1 (33.3) *0 (0)* *1 (100)*	4 (57.1) *1 (25.0)* *3 (75.0)*
Volunteer work in the community *Mean hours per month, S.D, range*	0 (0) -	0 (0) -	0 (0) -	6 (60.0) *21.67 ± 15.97* *6 to 50*	2 (66.7) *16.00 ± 0.00* *16 to 16*	4 (57.1) *24.50 ± 19.82* *6 to 50*
Full day outing	2 (8.3)	2 (18.2)	0 (0)	7 (70.0)	3 (100)	4 (57.1)
Overnight trip	1 (4.2)	0 (0)	1 (7.7)	3 (30.0)	1 (33.3)	2 (28.6)

Note: values are frequencies (valid %)

A "community engagement" score was calculated to examine the average number of activities (list of 10 shown above in **Table 5.29**). It was considered too onerous to ask people to report the frequency of outings for each activity. The mean community engagement score for the total sample (n=34) was 4.76 ± 1.83 (range 2 to 9). The mean score for SV respondents (N=24) was 4.08 ± 1.53 activities over the last month (range 2 to 7, of a possible 10). The mean score for the LV (N=10) respondents (6.40 ± 1.43; range 4 to 9) was significantly higher, t=-4.097, p=0.000. Overall (combined groups), women had a higher score than men (5.10 ± 1.89 versus 4.29 ± 1.68), although not significant. Residents who were married (versus not married) had a significantly higher score (n=15, 5.47 ± 2.10 versus n=19, 4.21 ± 1.40) (t=-2.090, p=0.045), as did those whose income was over $50 000 (5.42 ± 2.09 versus 3.91 ± 1.04 for those <$50,000), ($t$=-2.232, p=0.034). The community engagement score (total sample) was also significantly associated with age (*rho*=-.573, p=0.000) and the ABC-27 (*rho*=.352, p=0.041). Scores did not differ by education level, VPS score, whether they had relatives in the area, MoCA cut-offs (26 and 23) or whether they fell in the past year.

Participants were also asked whether the size of their social networks or involvement in community-based activities had changed since moving to the village. Findings are shown in

Table 5.30. Comparatively, a greater proportion of the SV group (25% versus 10% for the LV group) felt their social network had decreased. About a third of each group felt involvement in community-based activities had decreased. About half felt both aspects had stayed the same.

Table 5.30: Change in Social Network and Community Involvement since Moving

	Increased	Stayed the same	Decreased
Social network size			
SV Total Sample (N=24)	7 (29.2)	11 (45.8)	6 (25.0)
Males (n=11)	*2 (18.2)*	*5 (45.5)*	*4 (36.4)*
Females (n=13)	*5 (38.5)*	*6 (46.2)*	*2 (15.4)*
LV Total Sample (N=10)	4 (40.0)	5 (50.0)	1 (10.0)
Males (n=3)	*0 (0)*	*3 (100.0)*	*0 (0)*
Females (n=7)	*4 (57.1)*	*2 (28.6)*	*1 (14.3)*
Involvement in community-based activities			
SV Total Sample (N=24)	3 (12.5)	13 (54.2)	8 (33.3)
Males (n=11)	*0 (0)*	*7 (63.6)*	*4 (36.4)*
Females (n=13)	*3 (23.1)*	*6 (46.2)*	*4 (30.7)*
LV Total Sample (N=10)	1 (10.0)	6 (60.0)	3 (30.0)
Males (n=3)	*0 (0)*	*2 (66.7)*	*1 (33.3)*
Females (n=7)	*1 (14.3)*	*4 (57.1)*	*2 (28.6)*

Note: values are frequencies (valid %)

When examining the involvement in community groups (**Table I8 - Appendix I**), less than a third of SV participants belonged to any group outside the village, of which the most popular was a recreational/hobby group (29%) and a cultural/education group (25%). Of those groups, most reported attending regularly. In the LV group, less than half of the sample reported belonging to a group and similar to the SV group, recreational /hobby (50%) and cultural/educational (30%) and sports-related (30%) groups were most popular.

5.13 Thoughts Concerning Future Driving

In the total sample (N=38), 20 people reported on the DHHQ they had thought about giving up driving in the next few years (**Appendix I - Table I2**). The most frequent response (open ended: if so, why?) was about declining health or abilities. For example, “Because of poor

eyesight" and "If I am not well enough to drive safe." The next most common response pertained to mandatory license renewal, for example, "Once I fail my driver's test, then I give up!"

The interview further explored this issue. Similar to the questionnaire findings, people most often mentioned health concerns (particularly vision) might lead them to stop driving. Other changes frequently mentioned were loss of confidence or comfort, feeling more nervous and having slower reaction times. Some mentioned a traumatic or unnerving driving experience, like a serious car accident, would lead them to stop driving. A few mentioned they would stop driving if told by others (e.g., physician) that they were unable to drive, particularly if they failed the driving test. Several noted that it would take serious health concerns, as manageable problems would not necessarily make them quit driving and several expressed their reluctance to 'just give it up' too easily, as illustrated in the following quote:

> "Well I suppose if a doctor recommended it because of my health…I'm not going to give it up because somebody says you are too old, to just let it go at that, they better have a better reason than that!" (JACH, WP)

It is interesting to note that one man in LV (ANBR) reported that he had actually stopped driving for about five months before the study, but had recently resumed driving. ANBR was 71 years old and lived in a condo. On the following scales his scores were: 1 (SDA); 25 (SDF); 26 (PDA); 80.77 (DCS-D); 67.19 (DCS-N); and 27 (MoCA). This resident mentioned several occasions where he doubted his driving abilities due to health and felt that he needed to stop driving until these issues were resolved. In his case, meetings with a gerontologist and physicians revealed that he was fine to resume driving again. This resident was particularly cognizant of his driving abilities, and mentioned he would consider driving cessation again if similar feelings arose. He also mentioned that he and his wife (MABR) were actively trying to use other transportation modes and were both very involved in promoting these in the village. He took a

total of 19 non-driving trips over the two weeks and drove four days (no night trips and an average radius of 4km) over the monitoring period.

People were also asked which aspects of their life would be most affected if they had stopped driving. Generally they talked about how no longer driving would impact their independence and regular activities, including staying connected to family/friends and continuing with volunteer work, committees and other activities outside the village. The following discussion among two WP residents illustrates the perceived impact of driving cessation for many: "…I think I would deteriorate pretty fast if I can't drive…*Yes I would too* (LOMC, WP)…because I just enjoy getting out and driving. Yeah I think that would just about do me in." JACH, WP.

As noted by some residents who had recently move to the villages (SV or LV), giving up their license would be particularly difficult as they were new to the city and/or still adjusting to village life and needed their vehicle to remain connected to people and activities in the community. The following quote from a man who had just recently (five months prior) moved to a SV illustrates the perceived impact:

> "…just about everything. Even though I am here in this home, there is hardly a day that I am not down in the garage, hoping in my car and running out there to the drugstores, shopping, concerts and everything else. I do all that stuff. I just automatically hop in my car and away I go. I haven't got into life yet because I have a lot of things outside. I haven't really got into my social aspect here." (ROKE, TM)

However, not everyone felt that the impact would be as dramatic, as illustrated by the following quote: "I don't think anything would be affected. If I am going to go out to a movie I will somehow or other get there, or if I am going to get groceries I will find a way. Nothing stops me!" (JOTA, LV). Similarly, other residents noted that although it would be difficult to do things (e.g., see their children or get their groceries), they could use public transit/taxis as a last resort.

Additionally, participants were asked if they felt they had the resources and support needed if and when they decided to stop driving. Many of those who said yes noted they had family and friends close by who they would be able to rely on. Some, however, were hesitate or uncertain. For example, one male (ROKE) from TM stated, "I guess I don't know. I presume that there are taxis and they have a bus here that takes you to places…so I guess yes. I guess there are resources." Although all the LV residents replied 'yes' to this question, some made suggestions for additional supports such as a permanent village bus (described below).

5.14 Feedback on Village Transportation Services

During the interviews, participants were probed for their thoughts and suggestions regarding transportation services available at their village, as well as suggestions for improvement. This section presents the results pertaining to the village bus in particular, followed by transportation more generally.

5.14.1 Village Bus

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Although over half of the SV sample rarely used the village bus (a quarter never used), participants were generally satisfied with this service. Those from WP in particular said how much they appreciated the drivers. Suggestions for improvements, with illustrate quotes, included the following:

- Offer the same programing but more often (add a second trip):
    - "With grocery they might have a whole bus full on the Tuesday and you might not get a chance to get in. Can they do it twice in a day? Offer more opportunities?" DOWE (WP)
- Add more evening trips:
    - "One of the restrictions is evenings. The one time they took us to Elora to see the races but we had to leave after the third race because of the time schedule for the staff. There would maybe be people who would like to go to the theatre in the evening…" MAKI (WP)
- Improve the comfort of the bus

- Increase availability:
    - "I don't think the bus is used as much as it could be used and it's because they need a staff person to drive it. And the staff people are all busy with their programs…we used to in the past have a volunteer that came in (with a special license) but I don't know why we don't have them anymore. Perhaps we could bring in a volunteer, someone who is qualified and interested, so that we can use the bus more often...staff are busy doing their jobs." MAKI (WP)
    - "Just make it available, because if we try to plan something all we need is a driver" DOWE (WP)
- Improve the sign-up process (particularly at TM)
- Address the issue of residents who sign up but do not show up for trips

As previously mentioned, LV currently does not have a permanent bus, but rents vehicles based on sufficient sign-ups for various events. For study participants who had used this service, most were generally satisfied with the promotion of upcoming trips, the ease of sign-up and the nature of trips they had taken. Nonetheless, many commented that they could do more, including having a permanent bus, as discussed in the next section. Those who never gone on these outings said they could drive to the same locations when they wanted and some noted that it would be "unfair to take a spot from people who needed it". A few residents did not take the village bus because the destinations/activities were not of interest to them. One man made the following, interesting remark:

> "It's a loss of independence for me. There is another factor I need to build into my schedule. I have to be there at a certain time to get this bus, I may have to wait, I have to follow the schedule the bus goes on and comes back on. It is limiting my flexibility and that is part of being dependent, and I am not ready for that yet." – HAFO (LV)

5.14.2 Other Transportation Suggestions

The final part of the interview asked residents, "do you have any other suggestions for how the village might better meet your transportation needs and those of other residents, particularly those who no longer drive?" It's noteworthy that some struggled with this question, for example: "you see the problem hasn't arisen yet and therefore I haven't given it much

thought" CYHE (HH). Regardless of location, residents often mentioned the administrative and cost considerations that often obstruct the execution of these ideas. Most often mentioned was the concern about the additional costs that these suggestions might lead to. For some, they often qualified their suggestions as illustrated by the following quote between two females:

> DOWA (WP): "It's all about the budget!" MACR (WP) responds, "you know all of these people here pay a good amount of money to live here. Now they get their money's worth, but every time something happens, the cost is going to go up and we are all on a fixed income. So that enters into the picture. You might want something more, but it's not worth pushing because that means additional costs."

Keeping in mind their cost concerns, suggestions from the SV group on improvements included:

- Villages should come up with a way of asking all of the residents for suggestions on the kinds of bus trips they want.
- Develop resources that allow the residents to make decisions about transportation methods (e.g., information booklet):
    - "It would be nice to weigh the pros and cons and then be able to take action and sign-up." DOWE (WP)
    - "Do you know? Do they take us to doctor's appointments? See I am not sure and I have only been here for a year and a half." OLRO (TM)
- Look into the possibility of having a car on premise for residents to use instead of their vehicle (e.g., using a local car share program).
- Consider the possibility of having a smaller vehicle as opposed to the bus for smaller more essential trips (e.g., taking residents to clinics).
- Arrange with taxis for special costs or reduction based on a partnership with SVs.
- Have the village encourage driver sharing:
    - DOPR "I would like to see the Village encourage driver sharing, they don't and that is a difficult thing to do because you can get in a lot of trouble. It would be good if they could take away the concern" DOPR (TM)

Earlier in the year, LV residents organized a 'transportation fair' that brought in vendors and key informants (i.e., Grand River Transportation) to help explain the different transportation options, how to use them and how much they cost. Some residents mentioned this fair in the interviews, noting how well organized and tremendously helpful this was. One suggestion was to hold this fair more often. Other suggestions from the LV group included:

- Have a permanent vehicle like other retirement villages.
    - "I think they could do more. A lot of these places you see a van driving around and it belongs to the place. Takes the seniors around. There's 500 people here…so you would think even if they charged for it, it would pay for itself. But not a school bus!" DASM
- If it is not possible to get a permanent vehicle, LV should consider a partnership with a taxi service for reduced rates.
    - "I have often wondered if Luther Village could make an arrangement with a particular taxi company that would give people a slight discount, which would therefore encourage people to use cabs more rather than drive." MABR
- Provide transportation information to all residents, especially those who do not drive and those who move to the Village from outside the city.
    - "We are new here so we are learning how to get around. There are a lot of things that you don't know. I think this is something that could be published once a year. For instance, if you need a drugstore the closest one is….and maybe it's on a map. I can go online, but a lot of these people don't use computers. The parking issue, where to park, can be difficult at times. We're from a small village so this can be daunting at times…particularly to learn more for people who are coming here from outside the city." HAFO
- Improve the Village grounds (i.e., pavement, potholes)

Although 7/10 participants from LV expressed the need for a permanent 'village bus', three did not feel it was necessary, with two noting (female and male):

> "I know that a number of people would like it if we had some sort of Village transport. But, I also am aware of the liabilities that Luther Village would assume and it might be more expensive than people using cabs right now. And I am not sure how much more convenient it would be." (MABR) to which ANBR responded, "…and I really don't know that the location of this place justifies it. It's not as if we are out like most of the retirement homes are, we are so central."

Chapter 6: Discussion

6.1 Introduction

At least 40,000 seniors in Ontario currently live in retirement communities, yet little is known about their mobility and transportation patterns. Given the lack of research in this area, increasing popularity of retirement communities, and the importance of transportation for continued mobility and independence in older adults, it is important to learn more about this segment of the senior population. At the outset of this project we speculated that people in retirement villages may be less reliant on driving than those in the community for basic needs (such as grocery shopping), as well as social and recreational activities given the services and amenities available on site. We also speculated that challenges with driving may be one reason people chose to relocate to retirement villages.

To the best of our knowledge, this is the first project to examine driving status and transportation use in older adults living in retirement communities through two surveys conducted in four of the Schlegel Villages as described in Chapter 3. This project afforded the opportunity to learn more about residents who had recently stopped driving (Janssen-Grieve, 2013), as well as those who continue to drive (present study). In addition to determining the proportion of retirement seniors who are still driving, it is also important to examine their actual driving patterns and the role driving plays in their lives.

The primary objective of this study was to examine the actual driving practices (using electronic vehicle devices) of older adults in retirement homes, as well as their travel patterns using other modes of travel (including walking) using real-time daily dairies. Reasons for leaving the village (trip purposes) were examined for both driving and non-driving trips over the two week monitoring period, as were weather conditions. Other factors examined in relation to

driving practices were driver characteristics and perceptions, cognitive function, and indicators of well-being (depression and vitality). Finally, we wanted to examine whether level of engagement in groups and activities outside their village might be related to driving.

This chapter begins by discussing sample representativeness, followed by sample characteristics (demographic, health, mobility, well-being and cognitive function). Findings concerning self-reported driving patterns, changes in driving practices (before and after moving to the villages) and driving restrictions (secondary objective of the study) are then discussed, followed by actual driving practices (exposure and patterns) and other modes of travel. The next sections address community and village engagement and planning for driving cessation. Study challenges and limitations are then discussed, followed by plans for further examination of the data (next steps), implications for the villages, directions for future research and finally summary and overall conclusions.

Throughout the discussion, findings are compared to prior studies which have objectively examined naturalistic driving practices in community dwelling older drivers, namely the studies by Blanchard (2008); Trang (2010); and the Crizzle (2011) study. Key comparisons are shown in **Appendix J**. Some comparisons are also made to the large Candrive II cohort sample (e.g., characteristics, MoCA, perception and restriction scores) reported in the articles by Tuokko et al. (2013) and Rapoport et al. (2013), although the driving results are not yet published.

6.2 Sample Representativeness

The surveys conducted in the four SVs (described in detail in Chapter 3) were used to determine the proportion of residents who were still driving as well as eligibility for the in-depth studies on former and current drivers, respectively. According to the initial survey, 29% of residents were still driving, although the response rate was only 30%. The mean age of current

drivers was 84.5 ± 5.2 (72 to 97), 39% were male, 41% married and most (70%) lived in the apartments. According to the RTPS (n=399, which had a higher response rate 56%), 21% of residents across the four villages were still driving. The mean age of current drivers was 84.8 ± 4.2 (range 73 to 94), 41% were male, and most lived in apartments (81%). Men and those living more independently reportedly drove significantly more often (≥ 3 days/week).

The sample who participated in the present study from the SVs (n=27) were not significantly different from those who were eligible but chose not to participant (n=47) with respect to age, gender, level of independence (based on type of accommodation and services received), year of move and how often they reportedly drove per week. Unfortunately questions on marital status, education were not asked on the RTPS. Although the study sample appeared to be representative of residents still driving in the SVs, only 36% (27/74) of those who completed the RTPS took part. It is important to note that 10 people who completed the RTPS were not eligible for the study: nine drove less than once a week and one did not have a vehicle. Thus the study may not have captured residents who were driving less frequently.

As the RTPS was not distributed to the Luther Village (LV), sample representativeness could not be determined. The sample for this thesis included only 11 participants from LV: seven from the townhomes; three from the condos/suites and one from the assisted living (AL) Sunshine Centre. As residents from the townhomes were overrepresented, it was not surprising that the LV group was younger, more likely to be married, had better MoCA scores, and drove more than those from the SVs. Although interesting, caution is warranted in interpreting these findings given the very small number of LV participants.

Overall, people who volunteered for this study lived in the more independent areas of the villages (apartments at SV and townhomes or suites at LV). No one from the AL areas of the

SVs took part. In fact, only 1/59 and 0/82 on the initial survey and RTPS, respectively, indicated they still drove. The one AL participant from LV had recently moved to the Sunshine Centre from another part of the village as her husband needed more care. Although she herself liked the convenience of the meal plan and not having to clean and do laundry as she has arthritis, she was still an active driver and may not be typical of AL residents in general. The Wellness Coordinator at LV speculated that less than 10% of residents in the Sunshine Centre still drive. Jenkins et al. (2002) similarly reported that a much greater proportion of people in the independent versus assisted living section of retirement villages still drove, however they did not report actual numbers in their article.

6.3 Sample Characteristics

6.3.1 General Demographics

The average age of the present sample (N=38) was 81.92 ± 5.58 (range 70 to 91). Except for the Blanchard study (mean age 80.4), this sample was considerably older than the samples of community drivers (**Appendix J**), and the Candrive cohort (mean age 76.2). Gender distribution (42% men; 58% women) was fairly equal (similar to Blanchard and Trang's samples), whereas the Crizzle and Candrive studies (62% men) had higher proportions of men. Almost half (45%) of the present sample was married; 42% were widowed and 13% never married. The SV group was less likely to be married than the LV group. Most of the sample resided in independent living units within the village.

The sample was also highly educated as 56% reported completing college or higher (11/25, 44% for SV and 9/11, 82% for LV), compared to the estimated 40% of Canadian seniors who have completed high school (Rudman et al., 2006). Compared to prior studies with older drivers, a higher proportion of the Trang and Crizzle (PD and control) samples had completed

college or more (36/47 or 77% and 34/47 or 72% respectively); while the same proportion as the present sample was found in the Blanchard study (56%, 34/61). None of the retirement participants were working, comparable to low proportions in the Blanchard (8%) and Trang (2%) samples. In contrast, 21% of the Crizzle sample were still were working. Driving to work may account, at least in part, for the greater driving distances (km) found by Crizzle, particularly for the younger control group.

6.3.2 Health, Mobility, Well-being and Cognition

Overall, 92% of the sample rated their health as good or excellent; the remainder as fair. Most of the residents did not use a cane or walker, and felt that they were able to walk a quarter mile. Almost a quarter reported falling in the last year, although balance confidence scores were relatively high. The average score on the ABC-27 scale for the SV group was 79.92 ± 16.05, falling in the upper limit of seniors with a moderate level of functioning (50 to 80), while the mean for the LV group (91.50 ± 7.00) was in the higher functioning range (Myers et al., 1998). Over half the sample reported participating in physical activity classes in the village, on average two times per week (2.23 ± 2.00, range 0 to 7).

All participants fell within the normal range on the GDS-15 indicating no suspected or probable depression. In the Crizzle sample, only one control (5%) and two PD (7%) participants had suspected depression. General psychosocial well-being as measured by the VPS (e.g., energy level, sleep quality, appetite and mood) was also generally good (39.47 ± 6.21 out of a possible 50). However, 68% of the sample fell below the 26 cut-off on the MoCA, indicating potential mild cognitive impairment; those scoring below were significantly older. Mean scores for our total sample were not that much higher than for the PD group in the Crizzle study as shown in **Appendix J**. Comparatively Crizzle's control group had a mean of 25, similar to the Candrive

cohort (25.95 ± 2.49) (Rapoport et al., 2013). MoCA scores for the LV group were comparable to healthy community drivers (25.60 ± 3.72), likely due to similarity in age. In comparison, the SV sample was about eight years older on average and scored lower on the MoCA.

6.4 Self-reported Driving Behaviours and Restrictions

Overall, participants reported driving less often (days/week) after moving to the villages. However, the decrease in driving frequency was more pronounced for the SV group, particularly for the women. Even though the LV group had lived in the retirement village longer than the SV on average (6.27 ± 4.71 versus 3.23 ± 3.36 years), they were also younger and most (7/11) lived in the townhomes. The townhomes function as very independent homes and are physically separated from the other buildings on the LV premises, which may account in part for why these residents had not substantially changed their driving practices. In contrast, the apartments in the SVs are attached to the main building. Availability of meal plans is another important distinction.

Consistent with prior studies, the majority of the present sample (82%) preferred to drive themselves. Men reported driving significantly more at night and on highways, although the two-week driving data showed that equal proportions (four men and four women) drove at least once at night. Two measures (the SDF and SDA scales) were used to assess self-reported driving restrictions. As shown in **Appendix J**, the retirement sample had lower scores on SDF and higher scores on the SDA (except for Blanchard's sample and Crizzle's PD group). Average scores in the Candrive sample were higher on the SDF (35.27 ± 7.34) and lower on the SDA scale (5.32 ± 4.12) (Rapoport et al., 2013). Overall, men reported higher frequency of driving in challenging situations (SDF scores) and less avoidance of challenging driving situations (SDA scores) than females, consistent with findings from community studies.

6.5 Actual Driving

According to the interviews, the devices did not appear to affect participant driving behaviours, consistent with previous studies using electronic devices (Blanchard and Myers, 2010; Blanchard et al., 2010; Crizzle & Myers, 2013; Huebner et al., 2006; Myers et al., 2011). Most of the sample also reported their two-weeks of driving data were fairly typical, although illness and other circumstances (noted in Chapter 5) altered the driving behaviour for some.

One interesting finding was that some residents from LV drove their cars between their townhomes and the main building (e.g., to attend the weekly coffee hour or use the wellness centre, café, store, etc.). Some explained that they did so on days when it was raining or extremely humid. They were asked not to record these trips in their trip logs. The distance from townhomes (middle of furthest row) to the main building was approximately 200 meters or .2 km, so even if they made one round trip per day, over the week this would only account for 2.8 km in total. Thus, inclusion of these trips would not have substantially affected the results.

In order to compare the results to previous naturalistic driving studies, values were averaged to one week. However, it is important to note variations in study inclusion criteria (minimal driving frequency). Similar to the present study, Blanchard (2008) and Trang (2010) required that participants drove at least once a week; the Trang study further specified at least once a week in the winter. In contrast, Crizzle (2011) required his study participants (both the group with Parkinson's and the controls) to drive at least three times a week. In the Candrive cohort study, the entry criteria was driving a minimum of four times a week which likely contributed to the high functioning level of this sample (Tuokko et al., 2013).

6.5.1 Exposure

Overall, the sample drove an average of 3.2 days a week over the two week monitoring period; much less than community drivers in previous studies (**Appendix J**). They also drove substantially fewer km on average. The SV and LV groups drove a similar amount per trip; averaging approximately 20 km/trip. One finding that is particularly noteworthy is that a much greater proportion of the present sample (almost half) was classified as "low mileage drivers" when weekly values were extrapolated to annual equivalents. As noted in the literature review and methods, low mileage drivers tend to do most of their driving in congested urban areas and thus are at greater risk of collisions (Langford et al., 2006).

As indicated by the number of trips per days driven (3.78 trips/3.16 days), residents made 1.2 driving trips on average outside their village per day. Comparatively, the results in the community studies were: 1.37 trips/day (Blanchard, 2008); 1.50 trips/day (Trang, 2010); and 1.37 trips/day in the PD group and 1.62 trips/day in the control group (Crizzle, 2011). Retirement living residents, particularly those who have meal plans, may not need to leave their homes as often for grocery shopping and even those who have to make their own meals can purchase food on-site from the café and store. Thus, it is important to examine not only amount of driving but also reasons for driving.

With respect to trip chaining (making multiple stops per trip), the present sample made on average two stops per trip. This was comparable to the Blanchard (2008): 2.08 stops/trip, and the Trang (2010) sample: 2.26 stops/trip. Comparatively, Crizzle's (2011) younger control group made an average of 2.41 stops/trip and the PD group made 2.45 stops/trip.

6.5.2 Patterns

Although this sample drove less (fewer trips and kilometres), they drove further from home on average when they did make trips than the community drivers. As can be seen in **Appendix J**, average radius was comparable but maximum radius was considerably higher except for Crizzle's younger control group. The most likely explanation for this finding is a number of participants reported out-of-town trips.

In other respects, the sample showed more restricted driving patterns when compared to community driver samples; driving substantially less at night (trips and distance). Only 25% or 8/32 drove at least once at night over the two week monitoring period, much less than the Trang and Crizzle samples (even the PD group). Although only 28% of the Blanchard (2008) sample drove at night, they were only monitored for one week. Consistent with the prior studies of community drivers (Blanchard, 2008; Trang, 2010; Crizzle, 2011) males drove more at night (trips, distance and duration) than females. It's important to also acknowledge the role of seasonal effects on the amount of night driving in this sample. The SV sample drove more at night than the LV group, likely due to there being less daylight in the months January to May; therefore the devices could capture more night driving. The summer months in June and July at LV had more daylight which is likely why less night driving was captured.

Concerning driving on weekdays versus the weekend, results were consistent with prior research that suggests older drivers prefer driving on weekdays versus weekends (Keall & Frith, 2004). Although residents drove more kilometres during the week, weekend kilometres were comparable. Further analysis revealed that weekday driving was significantly associated most with shopping/errands, followed by social reasons, helping others and out-of-town trips.

However; weekend driving was most significantly associated with religious trip purposes (Sunday church services) social and out-of-town trips.

The present study, which spanned from February to mid-July, featured mostly (68%) clear driving weather. Days with inclement weather (32%) were primarily due to rain (24%); with only 8.5% of driving opportunities where snow was reported. Compared to prior studies, the proportion of the retirement sample that did not drive on days with bad weather (74%) was substantially higher than community living seniors. In Blanchard (2008), drivers were monitored in the spring to early fall (i.e., no snow) for a week. Only 23% of the days in the monitoring period were considered inclement and the sample did not drive on 19% of the inclement days.

The Crizzle (2011) study found that 32% of PD drivers and 12% of control drivers did not drive on days with poor weather; or 24% of the total sample. The Crizzle study had a lower proportion of days with inclement weather (20.5% versus 32% in the present study) over the monitoring period. In the Trang (2010) study, over half the monitoring period (56%) had bad weather conditions, since the study took place in the winter (mostly snow, and rain/freezing rain). The sample did not drive on 31% of days with inclement weather.

Compared to studies in the community, village residents may have less need to go out and drive on days with inclement weather (e.g., for grocery shopping) and social activities, given the on-site services and amenities (e.g., restaurant, store, meals). In the interviews, residents occasionally mentioned that if it was bad weather they would have no trouble cancelling or postponing a trip (unless it was an emergency). The researcher has yet to examine the percent of the sample that did not drive on days with good weather. Unlike Trang (2010), road conditions were not examined in the current study to minimize the burden completing the trip logs.

6.5.3 Trip Purposes

Consistent with prior studies (Blanchard, 2008; Trang, 2010; Crizzle, 2011) the most common driving trip purposes were for shopping and errands, followed by social and entertainment purposes. Shopping and errands, social activities, helping others and out of town trips were significantly associated with several of the day driving indicators (# days driven, trips, stops, distance, duration) and radius. Therefore residents are shopping and running errands, helping others and making out-of-town trips primarily more during the day. Trips for social purposes were also significantly associated with night driving, as were trips for "other" purposes such as trips to visit someone in hospital.

Approximately 16% of trip segments (total sample) were considered to be out-of-town. In the SVs, most of the out-town-trips were by residents from TM, three of whom mentioned that they still saw their family doctors where they lived before (e.g., in Scarborough). Some trips were also to larger cities like Oshawa (e.g., driving their grandson to his hockey game).

Although five people belonged to sports clubs and reported attending regularly, no one drove or used other modes of travel for this reason over the study period. It is possible that the considerable opportunities to engage in physical activities at the villages (or via village bus) may be meeting the needs of many of the more active residents. Also, weather and proximity to active environments (e.g., the recreation complex next to LV) are likely to affect whether residents leave the village (driving or non-driving). Similar to previous studies (e.g., Blanchard, 2008 and Crizzle, 2011), participants said if the weather was bad, they felt ill or did not feel like driving they would certainly cancel discretionary trips like social outings and shopping.

6.6 Factors Related to Driving Practices

No significant associations with driving practices were found for age, depression or cognitive scores. Higher scores on the ABC-27, however, were positively associated with number of driving trips over the monitoring period (*rho*=.39, $p<0.05$). Vitality scores were also significantly and positively associated with night driving (# of nights, trips and duration.

Driver perceptions, particularly driving comfort, is considered a key factor concerning restricted driving practices in self-regulation in older drivers (e.g., Baldock et al., 2006; Charlton et al., 2006; MacDonald et al., 2008; Marottoli and Richardson, 1998; Molnar and Eby, 2008; Myers et al., 2008; Rudman et al., 2006). Compared to prior community samples (**Appendix J**), as well as the Candrive II cohort (DCS-D: 76.21 ± 15.97, DCS-N: 68.15 ± 20.73), the present sample had much lower driving day and night comfort scores. Although still lower, mean comfort scores were the most comparable to the older Blanchard (2008) sample.

Similar to prior findings, including the Candrive cohort (Tuokko et al., 2013), mean scores on the DCS-D were higher than those on the DCS-N scale, and men scored significantly higher on the DCS-D and DCS-N scales (including the first night item). For older adults, night driving is particularly problematic due to vision (e.g., Myers et al., 2008). Although not significant, current participants who reported vision problems (i.e., cataracts, glaucoma or macular degeneration) had lower night comfort scores and perceptions of driving abilities. Mean PDA scores were higher for men consistent with other studies, and comparable to the values found in the Blanchard and Trang studies, and for the Crizzle PD group.

Consistent with prior findings, DCS and PDA scores were related to self-reported restrictions (i.e., scores on the SDA and SDF scales), as well as the objective indicators of driving exposure and patterns. The day-time comfort score was significantly associated with

night km (as found by Myers et al., 2011 for the Trang sample, as well as Blanchard & Myers, 2010), total trips and duration (as with Myers et al., 2011), and also nights driven in this study. Similar to these studies, the nighttime driving comfort and PDA scores were significantly associated with many of the driving indicators. Scores on the first DCS-N item (driving at night in good conditions), however, was not significantly associated; in contrast to Blanchard & Myers (2010) and Myers et al. (2010). No associations emerged between comfort and abilities scores and radius, in contrast to the Blanchard and Trang studies, but consistent with Crizzle's findings.

6.7 Other Modes of Transport

In addition to driving themselves, this study examined other modes of travel. Not surprisingly, other modes of travel to leave the village increased as amount of driving decreased. Based on those who returned the travel diaries (n=33), 9 (27.3%) participants did not take any non-driving trips over the two weeks. A third of the sample made only took one non-driving trip outside the village. The remainder showed a lot of variability ranging from two to 29 round trips over the monitoring period. As previously mentioned, there was one resident (from a SV) who walked her dog more than once a day, accounting for 23/29 of her trips. Even with this resident's walking trips removed, walking was still the most popular means of transportation for the sample overall, followed by being a passenger in a vehicle. As previously mentioned in Chapter 3, all of the locations except for HH were located within walking distance from shops. Since only two HH residents were included in this study, it is difficult to draw valid comparisons.

Non-driving trips were most often for recreational and social reasons, followed by shopping trips, trips for running errands, and then religious and medical reasons. None of the sample said that they used alternate transportation (as opposed to driving) because of the

weather. It's possible that even if the weather was inclement, residents would be more open to postponing or cancelling trips than arranging for alternate transport.

As opposed to relying on others for rides, most of the sample that reported being a passenger in a vehicle did so as part of a social outing in a group where they take turns driving, because family came to stay with them (i.e., son came to visit so he drove), and in one case a female was always picked up by a male friend when they went out together. Only one resident was driven by her son because she was ill and did not drive herself.

Similar to community seniors, the use of public transit by this sample of current drivers was low (e.g., Dahan-Oliel et al., 2010; Dickerson et al., 2007; Turcotte, 2012). The majority of the sample (SV: 76% and LV: 70%) reported never using public transit, with only four residents in the combined sample reporting using it sometimes (a few times a month). These findings were not surprising as previous studies (e.g., Glasgow et al., 2000; Kostyniuk & Shope, 1999) found that limited access and travel times, wait times, fixed routes and flexibility were all perceived inconveniences to public transportation use by older adults. Only 9/34 (26%) of the present sample said they had concerns/reservations about public transit. For the remainder (74%) it could be that the ability to drive themselves has not led them to use other transit or have any concerns at this point in their lives. Over the two-week monitoring period, only one resident (SV female) took a round trip using public transit to get groceries.

As shown in Turcotte (2012), before the age of 85, few Canadian seniors use accessible transit or taxis for transportation; often considering these modes as a last resort. Based on the questionnaire responses, only two residents (SV females) reported ever using paratransit and 15/35 (43%) residents reported ever using a taxi (n=14 said rarely). Over the monitoring period,

no trips were made using paratransit (accessible transit) and only one round trip via taxi was made by a female SV resident.

Previous research (e.g., Choi et al., 2012a; Choi, 2010) have suggested that ride-sharing plays an important role in meeting the transportation needs of older adults and reducing isolation, especially for older adults in retirement communities where seniors can live quite independent from others. In the present sample, few residents reported receiving rides from others and except for an emergency situation, the residents did not rely on the others to drive them, rather it was just circumstantial (i.e., someone else offered to drive that day). As seen with other older adult samples, the participants expressed being especially concerned with not wanting to be a burden on others. Some residents at LV were particularly vocal about their fear and distrust in the driving skills of other older drivers at the village.

More than half of the sample reported having given rides in their vehicles to other residents. These residents felt positive about being able to help others and enjoyed being able to build and maintain their social networks by providing rides. Some mentioned that they have not had the occasion to drive others (i.e., never been asked), while others felt strongly against driving other residents. These residents expressed similar concerns as described in the literature, where there is reluctance to participate in ridesharing due to issues of safety and insurance costs (Choi, 2010). Overall, residents were hesitant about the idea of an organized ride-sharing program at the village due to liability reasons and lack of flexibility as the driver.

Based on feedback from this sample, there appears to be an informal system of ridesharing among close acquaintances. A more formal system, including sign-ups and efforts to solicit willing drivers in the village, received less support. Given their concerns about insurance

policies and the responsibilities surrounding transporting other residents, particularly those with mobility or health issues, many residents were hesitant about driving others in their vehicle.

Unique to the older adults living in retirement communities are buses or shuttles run by the facility. These buses provide transportation within a relatively small geographical area, with trips to shopping malls, and for various social outings. Unlike public transit, these shuttles are often more tailored for the needs of older residents and may therefore be more popular and provide better transportation support. In both samples, the village bus was not as frequently used as being a passenger in a vehicle, or walking. All village bus trips (n=4) came from the SVs (as expected), of which three were from TM and one from WP. All three participants from TM went on the village bus to the local recreation centre for a swim (a popular outing as mentioned in their interviews), and the resident from WP went on a shopping trip to the local mall. Interestingly, three of the four village bus users (over the two weeks) were males.

It must be kept in mind that village bus trips are often held weekly or only a couple times a month, this may be why its use is not as frequent as other methods. As discussed in the interviews, the residents' ability to drive themselves often led to seldom use of the village bus or not using it at all. It's interesting to note that some of these residents mentioned that they still took part in the outing, but chose to drive to the destination instead. Residents who had never used the village bus or public transit drove more days and took more trips then those who have used either method.

As shown in previous research (Choi, 2010), flexible and accessible alternate transportation is an important factor in an older adults' decision to stop driving, and perhaps also in their decision to reduce or regulate their current driving behaviours. Given the limitations of local public transport and restricted availability of rides from others (i.e., family members),

retirement communities should examine how their village buses can help to meet the transportation needs of their residents (both former and current drivers restricting their driving).

6.8 Community and Village Engagement

One of the objectives of this study was to examine how living in the villages and driving status affected the extent to which participants were able to remain connected with the broader community. As previously mentioned, the researchers hypothesized that the availability of services and amenities on the village premises might reduce the need or desire for residents to leave the village. Most of the sample (91%) reportedly left their village in the prior week and 9% in the last month (all from the SVs). Less than a third of SV participants and less than half of LV participants were involved in any type of group outside the villages. Participants were most often involved in recreation/hobby groups and cultural/education groups outside the villages.

A large proportion of the LV group (60%) reported being involved in volunteer work in the community (average of 22 hours a month) compared to none of the SV residents. Younger age and higher education have been associated with volunteerism among Canadian seniors (National Council on Aging, 2010), which may account for differences between SV and LV.

Although the LV group reported being very involved with volunteer activities, only three car trip segments for this purpose (2% of their segments) were captured over the two week monitoring period. According to the travel diaries, they did not use other modes of travel for this purpose. However; it should be noted that not all volunteers may have consider involvement in community activities as volunteering and volunteer activities within the village were not captured by the question; therefore some volunteer work may be underrepresented.

Approximately a third of the sample reported decreased involvement in community-based activities since moving to the village and only 12% reported an increase. On item two of the

GDS-15 scale (36 completed), 17% (5/25 people from SVs and 1/11 from LV) said they had dropped many of their activities and interests. As noted by one of the participants, dropping activities was not necessarily a 'bad thing' but rather a natural part of moving to a new place. Unfortunately the questionnaire did not capture reasons for changes in community engagement. It is possible that by moving to a new location people naturally decrease their activity. This is also a single snapshot and it's possible that residents not involved at the present time but increase involvement as they become more adjusted to the community.

Community engagement scores were significantly associated with lower age, higher income, being married and higher balance confidence scores (ABC-27), but not the driving indicators. The LV group also had a significantly higher community engagement score than the SV group. Age may be the determining factor as involvement in activities outside the villages decreased as age increased. The LV group was younger than the SV group.

Group activities organized by the villages were well attended by participants, including popular activities like music, theatre and movie related entertainment, physical activity classes and games. Size of social networks was reported to have stayed the same since moving for the greatest proportion of the sample (47%), followed by 32% who had an increase and 21% who decreased their social network size. Participants also reported regularly keeping in contact with friends and family outside the village; most often by telephone.

6.9 Thoughts about Driving Cessation

As described in the literature, driving cessation is often a gradual process for older adults with the transition taking several years, preceded by self-regulation or reductions in driving frequency and changes in driving patterns (e.g., Dellinger et al., 2001; Dickerson et al., 2007). Although retrospective, only one person (male from SV) said they had considered giving up their

license before the move. Everyone said that they were glad they kept driving. Driving was still considered moderately to extremely important by many, particularly due to wanting to maintain their present lifestyle and freedom, followed by not wanting to bother others, feeling that public transit was inconvenient, providing rides to others, needing to meet commitments and finally due to a physical difficulty walking or using public transit.

Nonetheless, over half the sample now said they had thought about giving up driving in the next few years. This proportion is much higher than found in community older drivers. Specifically, only 1/46 (2%) of the Trang (2010) sample; none of the controls and 4/27 (15%) in the PD group in the Crizzle (2011) sample, and 6/61(10%) of the Blanchard (2010) sample said they had thought about reducing or stopping driving. The present sample is considerably older and has a higher proportion of females than the community studies (Crizzle and Trang) which may explain why a greater proportion is thinking about driving cessation. Given that Blanchard's sample is the most similar in terms of age and gender distribution, it may well be the retirement living environment that may be fostering the transition to non-driving.

In addition to residents thinking more about driving cessation after moving, the sample (specifically those from the SVs) reported reduced driving frequency (days/week) after moving to the village. The decrease for LV residents was minimal despite the fact that they have lived in their village longer on average compared to the SV group.

Previous studies have shown that older adults often indicate health concerns as the primary factor that would have them consider driving cessation (e.g., Whelan et al., 2006; Charlton et al., 2003). In the present sample, declining health/abilities was most frequently mentioned; particularly concerns with vision.

As suggested by other researchers (e.g., Oxley & Fildes, 2004; Harrison & Ragland, 2003; Dickerson et al., 2007) although older adults do not often plan for driving cessation, proper planning may ease the transition to non-driving, making it less stressful and ensuring mobility is not completely compromised. They also argue that part of this planning should include ensuring adequate transportation options are available, which for some can mean relocation to another location where driving is less essential for fulfilling their basic needs. Therefore it's possible that retirement facilities can help mitigate the transition to driving cessation by providing on-site services and alternate transportation.

It is interesting that when asked about reasons for moving to the villages, no one specifically mentioned transportation support provided by the villages; however, participants mentioned the ability to age in place and be closer to family and friends. Proximity to family and friends in many cases is related to transportation support, for instance in the case of our participant whose son drove her when she was not feeling well. Having services and supports at the village also reduces the need for driving.

Oxley and Fildes (2004) also argue that for those who are still driving, familiarizing themselves with alternate transportation is beneficial in the planning process for driving cessation. Although some residents felt that it was not necessary to use alternate transportation since they were still able to drive, these researchers argue that substituting some driving trips with alternate methods can help older adults transition more easily when/if the time comes. Although it is not clear from the diaries if participants purposefully chose to use another mode of travel (i.e., deciding to walk versus drive), the researcher was aware of the couple at LV who reported trying to use alternate methods (in general) more often.

6.10 Challenges and Limitations

The main challenge in this study was sample recruitment. Only 36% of residents at the SVs who were eligible for the study (27/74) were successfully recruited. It was difficult to make contact with the residents, both door-to-door and over the telephone due to busy resident schedules. Some SV residents specifically mentioned that they were participating in other research studies at the village. A few residents at HH, including the two that participated, mentioned that they were concerned the results would be used by their village as a means to impose additional taxes/fees on their parking spots. This may have been a factor in the decision of other residents who were eligible but chose not participate in the study.

In the case of recruitment at LV, some residents expressed interest in participating at a later date since they were very busy and going on vacations during the summer months. A lesson learned from recruitment at both the SVs and LV was that individual, face to face contact was the most successful. Although presentations to large groups (e.g., the weekly coffee clubs at LV) generated interest, it was still important to speak to individuals afterwards. Leaving information packages or letters in mailboxes generated very little response.

Given the study time requirements (i.e., two appointments and two weeks of filling out trip and travel logs), providing an incentive for participation may have helped recruit more residents. This was not possible due to a lack of funding, as well as the RIA policies which do not permit the use of incentives.

In general, older adults who volunteer for driving studies tend to be more educated, healthier, lead more active lifestyles (e.g., Baldock et al., 2006; Charlton et al., 2006; Rudman et al., 2006) and do not have significant motor or cognitive deficits (Molnar & Eby, 2008). Apart from the MoCA scores, this also appears to be the case for retirement communities. Also, the

study criteria (driving at least once per week) may not have captured residents who drove even less (and may be further along the transition to non-driving).

As in previous studies of naturalistic driving, some missing driving data was expected. Only 19 people had Otto data due in part to not having the maps for Whitby in time for the TM group. In the case of the missing Otto data, it is likely that cold starts and GPS signal losses lead to the partial losses of Otto data (Myers & Blanchard, 2010). Some vehicles had a "live socket" (power supplied to the Otto even when ignition is off) and in such vehicles, residents were asked to unplug the device each time they turned off the car, and plug it in for the next trip. Unfortunately, some participants may not have followed this protocol, therefore leading to incorrect and incomplete data. Also some residents (especially those in the colder months) reported the cables occasionally coming loose (possible due to the cold making the cord stiffer).

Participants were given a list of Frequently Asked Questions (to help with potential difficulties with the devices) and they were encouraged to contact the researcher with any difficulties or questions. One person called about the devices, while another asked for clarification on completing the travel diaries. Most did not report any problems with the devices or the logs until the second session. As previously noted, several of the trip logs were missing information on passengers, odometer readings and occasionally on trip purposes. Since 68% of the sample had scores suggesting mild cognitive impairment, it's possible that they may have had problems with recall of the missing information on the logs and diaries.

6.11 Next Steps and Future Research

This study collected a wealth of information and it was not possible to completely analyse all of it for the thesis itself. With respect to the qualitative data, it is important to verify

the categories and themes which emerged by an independent researcher prior to submitting the results for publication. Other data that requires further examination includes the following:

1. Data collected from the Ottos (driving patterns), travel diaries (time of day they left and returned to the villages) and odometer readings;
2. Detailed weather analysis, particularly the proportion who did not drive on days with favorable weather and examination of possible gender and seasonal differences;
3. The year moved to the village (i.e., recency of move) to see if people who lived there longer drove less;
4. Comparisons by type of accommodation (level of independent living) to examine associations with driving and travel patterns and village and community activities; and
5. Potential differences in driving practices of people with shared vehicles.

The small sample size coupled with the missing data (particularly the Otto driving data) limited analyses and precluded certain comparisons. A larger sample size would allow for regression modelling examining predictors of driving practices and community engagement, respectively. Prospective studies (ideally beginning with applicants to the villages before they actually move) are needed to confirm temporality of changes in driving practices and follow residents as they transition to driving cessation. For example, it would be interesting to see if these older drivers have a different experience (i.e., less negative effects) when transitioning to non-driving. Compared to community-dwelling older adults, it's possible that the transportation support (provided by the villages and other residents), and proximity to shops and services may or may not lead them to stop driving sooner.

Research has shown driving behaviour can change from week to week as well as seasonally (Grengs, Wang & Kostyniuk, 2008; Sabback and Mann, 2005). This may have been

particularly true for WP (the first wave of the study) where the study took place in the winter. However, the different waves captured different seasons. Future research should explore the seasonal effects on driving exposure and patterns (noted above).

As described in Chapter 3, the next phase by SG will examine falls data (incident reports from the Villages, as well as the functional assessments (sub-scores on the MoCA, Trails B, Rapid Paced Walk, and contrast sensitivity). Additionally he will merge the databases to permit statistical comparisons of the current and former drivers, for instance concerning level of community engagement. Equally important, SG is assessing additional residents from the LVs using the same protocol to increase the overall sample size.

Although actual driving was only captured for two-weeks, the findings help to extend the current field of knowledge and provide directions for future exploration. The study featured numerous data sources that could be triangulated to help account for some of the limitations of each method, therefore providing a more sound understanding of driving and other transportation use. Qualitative data also provided rich context to the abundance of quantitative data collected.

6.11.1 Implications for the Villages

As part of the partnership with the RIA, the findings from the surveys and all the in-depth studies have provided important information on the transportation use and needs of SV residents. As mentioned earlier, the RTPS survey was not completed by LV residents. LV could consider distributing this survey in order to get a profile of what proportion of their residents are driving. One important message for marketing personnel is not to encourage applicants to give up their driver's license and sell their vehicles before they move to the villages. The entire sample was glad they had continued to drive and as some noted, driving was particularly important when they were first adjusting to retirement living.

It is important that residents are aware of the different transportation alternatives so that if and when they make the choice to limit or stop driving there are transportation support options that are suited to their needs. Alternative transportation support among older drivers in retirement communities may also help residents cope with the difficulties of driving cessation. Therefore the villages could consider exploring options for disseminating knowledge about other transportation methods on a more regular basis or specifically at the time new residents enter the village. One way this could be accomplished is through presentations similar to the transportation fair held that LV or through an information package similar to the one at TM. Given the variations in the environments surrounding the villages, it's important that, where possible, the information is tailored to locale.

Although residents were not particularly interested in formal ride sharing programs, village councils could consider engaging residents in further discussions on this topic. The villages should consider gathering feedback from both former and current drivers as the samples in the present study and CJG study have provided multiple perspective on this topic.

Given that a third of both the SV and LV samples felt that their involvement in community based activities had decreased since moving to the village, future research could explore the reasons for this decrease. The decrease could reflect the adoption of activities on-site rather than off site or it could also point to factors impeding residents' ability to stay connected (e.g., transportation). Fortunately, the majority of the sample felt a strong sense of belonging to the village community.

Village staff or future researchers could 'check-in' and see if the residents are still using the services and amenities. Although this study and the Janssen-Grieve (2013) study with former

drivers showed that residents were making good use of the services/amenities on-site, these did not gather resident feedback on these services or examine regularity of attendance.

6.12 Conclusions

Generalizability of the findings is limited to a convenience sample of healthy, active older drivers living in urban retirement communities in Southern Ontario. Nonetheless, this is the first study to objectively examine naturalistic driving practices and other modes of travel using real-time diaries. Overall the findings indicate that seniors living in retirement villages drive less and have more restricted practices (such as driving at night and in bad weather) than community dwelling seniors. They also have lower driving comfort scores in keeping with their more restricted driving practices.

Apart from some concern with their cognitive scores, none were depressed and vitality scores were high. Most of the sample stayed in touch with family and friends, and made use of village services, amenities and programming while still remaining fairly active in clubs and activities out in the community. When participants did leave the villages, trips were most often during the week and for shopping and errands. Generally they did not use alternate transportation very often, except for a few residents who were quite active and took several non-driving trips over the two weeks (most often walking). Non-driving trips were most often made for recreational and social reasons and were not chosen as alternatives to driving in unfavourable weather. While few had reported/thought about driving cessation before moving to the villages, over half were considering stopping in the next few years. Future studies with more residents are needed to allow for a more in-depth look at factors unique to retirement living that may influence the transition to non-driving.

As people age, travel and mobility needs continue to be an important part of their lives and for older adults driving a private vehicle is the dominant mode of transportation. The ability to drive a private automobile has been synonymously associated with feelings of independence, control and freedom in the lives of older adults. The transportation needs of older adults is important to help ensure ongoing mobility support, as mobility plays an integral role in their independence, well-being and their ability to interact with their community and society at large. As part of the larger project, this study helps further our understanding of the driving practice and travel patterns of older adults residing in retirement communities.

References

Adler, G., Rottunda, S. (2006). Older adults' perspectives on driving cessation. *Journal of Aging Studies, 20*(3), 227-235.

Alvarez, F. J., Fierro, I. (2008). Older drivers, medical condition, medical impairment and crash risk. *Accident Analysis and Prevention, 40*, 55-60.

Andrey, J. (2010). Long-term trends in weather-related crash risks. *Journal of Transport Geography, 18*, 247-258.

Baker, T.K., Falb, T., Voas, R., Lacey, J. (2003). Older Women Drivers: Fatal Crashes in Good Conditions, *Journal of Safety Research, 34*, 399–405.

Baldock, M.R.J., Mathias, J.L., McLean, A.J., Berndt, A. (2006). Self-regulation and its relationship to driving ability among older adults. *Accident Analysis & Prevention, 38*(5), 1038-1045.

Ball, K., Owsley, C., Stalvey, B., Roenker, D.L., Sloane, M.E., Graves, M. (1998). Driving avoidance and functional impairment in older drivers. *Accident Analysis & Prevention, 30*(3), 313-322.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84*(2), 191-215.

Bandura, A. (1986). *Social foundations of thought and action: a social cognitive theory.* Englewood Cliffs, N.J.: Prentice-Hall.

Bauer, M.J., Adler, G., Kuskowski, M., Rottunda. (2003). The influence of age and gender on the driving patterns of older adults. *Journal of Women & Aging, 15*(4), 3-16

Bédard, M., Stones, M.J., Guyatt, G.H., Hirdes, J.P. (2001). Traffic-related fatalities among older drivers and passengers: Past and future trends. *The Gerontologist,* 41, 751-756.

Benekohal, R.F., Michaels, R.M., Shim, E., Resende, P.T. (1994). Effects of aging on older drivers' travel characteristics. *Transportation Research Record, 1438*, 91-98.

Biggs, S., Bernard, M., Kingston, P., Nettleton, H. (2000). Lifestyles of belief: Narrative and culture in a retirement home. *Ageing and Society, 20*, 649-672.

Blanchard, R. A. (2008). Examination of older driver perceptions and actual behavior in sole household drivers and driving couples. (Unpublished doctoral dissertation). University of Waterloo, Waterloo, Ontario, Canada.

Blanchard R.A., Myers, A.M. (2010). Examination of driving comfort and self-regulatory practices in older adults using in-vehicle devices to assess natural driving patterns. *Accident Analysis and Prevention, 42*, 1213-1219.

Blanchard, R.A., Myers, A.M., Porter, M.M. (2010). Correspondence between self-reported and objective measures of driving exposure and patterns in older drivers. *Accident Analysis and Prevention, 42*, 523-529.

Braitman, K.A., Williams, A.F. (2011). Changes in self-regulatory driving among older drivers over time. *Traffic Injury Prevention, 12*, 568-575.

Burns, P.C. (1999) Navigation and the mobility of older adults. *Journal of Gerontology: Psychological Sciences and Social Sciences, 54B*, S49-S55.

Burkhardt, J.E., Berger, A.M., Creedon, M., McGavock, A.T. (1998). *Mobility and Independence:Changes and Challenges for Older Drivers.* Bethesda, MD: Ecosometrics, Inc.

Burkhardt, J. E., McGavock, A. T. (1999). Tomorrow's older drivers Who? How many? What impacts? *Transportation Research Record, 1693, 99-1501,* 62-70.

Casson, E.J., Racette, L. (2000). Vision standards for driving in Canada and the United States: A review for the Canadian Ophthalmological Society. *Canadian Journal of Opthalmology, 34*(4), 192-203.

Charlton, J., Oxley, J., Fildes, B., Oxley, P., Newstead, S., O'Hare, M., Koppel, S. (2003). Self-regulatory driving practices of older drivers. (Report No: 208) Melbourne, Australia, Monash University Accident Research Centre.

Charlton, J.L., Oxley, J., Fildes, B., Oxley, P., Newstead, S., Koppel, S., O'Hare, M. (2006). Characteristics of older drivers who adopt self-regulatory driving behaviours. *Transportation Research Part F, 9* (5), 363 – 373.

Chee, D., Lee, H., Flakmer, T. (2010). Cognitive overload and its effects on driving performance in people with Parkinson's Disease: A pilot study. Paper delivered at The 12th International Conference on Mobility and Transport for Elderly and Disabled Persons (TRANSED), held in Hong Kong on 2-4 June, 2010.

Choi, M. (2010). The Role of Transportation Support in the Driving Cessation Process among Community-Dwelling Older Adults. (Doctoral Paper for 22nd National Symposium on Doctoral Research in Social Work). Cape Western Reserve University, Cleveland, Ohio, United States of America.

Choi, M., Adams, K. B., Kahana, E. (2012a). The impact of transportation support on driving cessation among community-dwelling older adults. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences, 67 B*(3), 392-400.

Choi, M., Adams, K. B., Mezuk, B. (2012b). Examining the aging process through the stress-coping framework: Application to driving cessation in later life. *Aging & Mental Health, 16*(1), 75-83.

Collia, D.V., Sharp, J., Giesbrecht, L. (2003). The 2001 national household travel survey: A look into the travel patterns of older Americans. *Journal of Safety Research, 34,* 461-470.

Coughlin, J. F. (2001). Transportation and Older Persons: Perceptions and Preferences. Washington, DC: AARP Public Policy Institute.

Cress, E.M., Orini, S., Kinsler, L. (2011). Living Environment and Mobility of Older Adults. *Gerontology, 57,* 287-294.

Crizzle, A. M. (2011). Self-regulatory driving behaviour, perceived abilities and comfort level of older drivers with Parkinson's disease compared to age-matched health controls. (Unpublished doctoral dissertation). University of Waterloo, Waterloo, Ontario, Canada.

Crizzle, A.M., Myers, A.M. (2012). Examination of naturalistic driving practices in drivers with Parkinson's disease compared to age and gender-matched controls. *Accident Analysis and Prevention, 50,* 724-731.

Crizzle, A.M., Myers, A.M., Almeida, Q.J. (2013). Self-regulatory practices of drivers with Parkinson's disease: Accuracy of patient reports. *Parkinsonism and Related Disorders*, 19, 176-180.

Crizzle, A.M., Myers, A.M., Roy, E., Almeida, Q.J. (2013). Drivers with Parkinson's disease: Are the symptoms of PD associated with restricted driving practices? *Journal of Neurology*, *260*(10): 2562-2568.

Cyarto E.V., Myers, A.M., Tudor-Locke, C. (2004). Pedometer accuracy in nursing home and community-dwelling older adults. *Medicine & Science in Sports & Exercise, 36,* 205-209.

Dahan-Oliel, N., Mazer, B., Gélinas, I., Dobbs, B., Lefebvre, H. (2010). Transportation use in community-dwelling older adults: Association with participation and leisure activities. *Canadian Journal on Aging*, *29*(4), 491-502.

Davey J., Nimmo, K. (2003). Older People and Transport. Scoping paper. Prepared under contract between Victoria Link Ltd and the Land Transport Safety Authority, the Ministry of Transport and the Office for Senior Citizens, pp.1-18.

Davey, J.A. (2007). Older people and transport: coping without a car. *Ageing & Society*, *27*(1), 49–65.

Davis Instruments. (2008). Retrieved on October 2012, from http://www.davisnet.com/drive/products/drive_product.asp?pnum=08226

Dellinger, A. M., Sehgal, M., Sleet, D. A., Barret-Connor, E. (2001). Driving cessation: What older former drivers tell us. *Journal of American Geriatrics Society, 49*(4), 431-435.

Dickerson, A.E., Molnar, L.J., Eby, D.W., Adler, G., Bedard, M., Berg-Weger, M., Classen, S., Foley, D., Horowitz, A., Kerschner, H., Page, O., Silverstein, N.M., Staplin, L., Trujillo, L., (2007). Transportation and aging: A research agenda for advancing safe mobility. *The Gerontological Society of America, 47*(5), 578-590.

Dobbs, B.M. (2008). Aging baby boomers – A blessing or challenge for driver licensing authorities. *Traffic Injury Prevention, 9,* 379-386.

Donorfio, L.K.M., D'Ambrosio, L.A., Coughlin, J.F., Mohyde, M. (2009). To drive or not to drive, that isn't the question – the meaning of self-regulation among older drivers. *Journal of Safety Research, 40,* 220-226.

Eberhard, J. (1996). Safe mobility of senior citizens. *Journal of International Association of Traffic and Safety Sciences, 20*(1), 29–37.

Eby, D.W., Molnar, L.J. (2009). Older adult safety and mobility: Issues and research needs. *Public Works Management & Policy, 13*(4), 2009.

Edwards, J.D., Perkins, M., Ross, L.A., Reynolds, S.L. (2009). Driving status and three-year mortality among community-dwelling older adults. *Journal of Gerontology: Medical Sciences, 64* (2), 300-305.

Ferrini, R.L., Ferrini, A.F. (2013). *Health in the Later Years.* New York, NY: McGraw Hill.

Finn, J., Sterns, H.L. (2004). The mobile elder: getting around in later life. *Generations: Journal of the American Society on Aging*, 8-13.

Fonda, S.J., Wallace, R.B., Herzog, A.R. (2001). Changes in driving patterns and worsening depressive symptoms among older adults. *The Journals of Gerontology.Series B, Psychological Sciences and Social Sciences, 56*(6), S343-51.

Freeman, E.E., Gange, S.J., Munoz, B., West, S.K. (2006). Driving status and risk of entry into long-term care in older adults. *American Journal of Public Health, 96* (7), 1254-1259.

Gallo, J.J., Rebok, G.W., Lesikar, S.E. (1999). The driving habits of adults aged 60 years and older. *Journal of the American Geriatrics Society* 1999; 47:335-41.

Gardner, I.L., Browning, C., Kendig, H. (2005). Accommodation options in later life: retirement village or community living? *Australian Journal on Ageing, 24*(4), 188-195

Gibler, K.M., Moschis, G.P., Lee, E. (1998). Planning to move to retirement living. *Financial Services Review, 7,* 291-300.

Gill, D.J., Freshman, A., Blender, J.A., Ravina, B. (2008). The Montreal Cognitive Assessment as a screening tool for cognitive impairment in Parkinson's disease. *Movement Disorders, 23*(7), 1043-1046.

Glasgow, N., Blakely, R.M. (2000). Older nonmetropolitan residents' evaluations of their transportation arrangements. *Journal of Applied Gerontology, 19,* 95-116.

Grengs, J., Wang, X., & Kostyniuk, L. (*2008*). Using GPS data to understand driving behavior. *Journal of Urban Technology, 15*(2), 33-53.

Gwyther, H., Holland, C. (2012). The effect of age, gender and attitudes on self-regulation in driving. *Accident Analysis and Prevention, 45,* 19-28.

Hakamies-Blomqvist, L., Johansson, K., Lundburg, C. (1996). Medical screening of older drivers as a traffic safety measure: A comparative Finnish–Swedish evaluation study. *Journal of the American Geriatrics Society, 44*(6), 650–653.

Hakamies-Blomqvist, L., Wahlström, B. (1998). Why do older drivers give up driving? *Accident Analysis & Prevention, 30*(3), 305-312.

Hakamies-Blomqvist, L., Raitanen, T., O'Neill, D. (2002). Driver ageing does not cause higher accident rates per km. *Transportation Research Part F, 5*, 271-274.

Harrison, A., Ragland, D.R. (2003). Consequences of driving reduction or cessation for older adults. *Transportation Research Record, 1843*, 96-104.

Higgins, K.E. (2003). Driving and Vision in an Aging Society. *Generations, 21*(1), 57-63.

Hildebrand, E.D., Gordon, M.J., Hanson, T. (2004). *Understanding the Travel Behaviour of the Rural Elderly*, Proceedings of the 39th Annual Conference of the Canadian Transportation Research Forum: Revolutions in Transportation, Calgary, AB.

Hopkins, R.W., Kilik, L., Day, D., Rows, C., Tseng, H. (2004). Driving and Dementia in Ontario: A Quantitative Assessment of the Problem. *Canadian Journal of Psychiatry*, 49, 424-438.

Huebner, K., Porter, M.M., Marshall, S.C. (2006). Validation of an electronic device for measuring driving exposure. *Traffic Injury Prevention*, 7, 76-80.

Janke, M.K. (1991). Accidents, mileage, and the exaggeration of risk. *Accident Analysis & Prevention, 23* (2/3), 183-188.

Janssen-Grieve (2013). Driving cessation and relocation to retirement villages: a preliminary examination of associations between these transitions and their influence on travel patterns and community engagement. (Unpublished master's thesis). University of Waterloo, Waterloo, Ontario, Canada.

Janssen-Grieve, C., Myers, A.M., Crizzle, A.M. (2012). Survey on the driving status of retirement home residents in four Schlegel Villages. Report prepared for the Schlegel-UW Research Institute for Aging. March 30, 2012.

Jenkins, K. R., Pienta, A. M., Horgas, A. L. (2002). Activity and health-related quality of life in continuing care retirement communities. *Research on Aging, 24*(1), 124-149.

Johnson, J.E. (1999). Urban older adults and the forfeiture of a driver's license. *Journal of Gerontological Nursing*, 12-18.

Johnson, E. J. (2002). Why rural elders drive against advice. *Journal of Community Health Nursing, 19*(4), 237-244

Jorstad, E.C., Hauer, K., Becker, C., Lamb, S.E. (2005). Measuring the Psychological Outcomes of Falling: A systematic review. *Journal of the American Geriatrics Society, 53*, 501-510.

Keall, M.D., Frith, W.J. (2004). Older driver crash rates in relation to type and quantity of travel. *Traffic Injury Prevention, 5*, 26-36.

Keall, M.D., Frith, W.J. (2006). Characteristics and risks of drivers with low annual distance driven. *Traffic Injury Prevention, 7*(3), 248-255.

Kelley-Moore, J. A., Schumacher, J. G., Kahana, E., Kahana, B. (2006). When do older adults become "disabled"? social and health antecedents of perceived disability in a panel study of the oldest old. *Journal of Health and Social Behavior, 47*(2), 126-141.

Kilpelainen, M., Summala, H. (2007). Effects of weather and weather forecasts on driver behaviour. *Transportation Research Part F*, 288 – 299.

Kostyniuk, L.P., Molnar, L.J. (2008). Self-regulatory driving practices among older adults: Health, age and sex effects. *Accident Analysis and Prevention, 40*, 1576-1580.

Kostyniuk, L., Trombley, Shope, J. (1998). Reduction and cessation of driving among older drivers: Focus Groups. (Report UMTRI-98-26). Michigan, Transportation Research Institute, University of Michigan.

Kostyniuk, L.P, Shope, J.T. (1999). Choice of transportation mode among older drivers and former drivers. (Report UMTRI-99-45). Michigan, Transportation Research Institute, University of Michigan.

Kostyniuk, L.P., Shope, J.T. (2003). Driving and alternatives: Older drivers in Michigan. *Journal of Safety Research, 34*, 407-414.

Kowalski, K., Love, J., Tuokko, H., Macdonald, S., Hultsch, D., Strauss, E. (2012). The influence of cognitive impairment with no dementia on driving restriction and cessation in older adults. *Accident Analysis and Prevention, 49*, 308-315.

Krout, J.A., Moen, P., Holmes, H.H., Oggins, J., Bowen, N. (2002). Reasons for relocation to a continuing care retirement community. *Journal of Applied Gerontology, 21*(2), 236-256.

Kulikov, E. (2011). The social and policy predictors of driving mobility among older adults. *Journal of Aging & Social Policy, 23,* 1-18.

Langford, J., Methorst, R., Hakamies-Blomqvist, L. (2006). Older drivers do not have a high crash risk – A replication of low mileage bias. *Accident Analysis & Prevention, 38*, 574-578. Lyman et al., 2002

Lerner-Frankiel, M.B., Vargas, S., Brown, M., Krusell, L., Schoneberger, W. (1990). Functional community ambulation: What are your criteria? *Clinical Management, 6*, 12-15.

Liddle, J., Turpin, M., Carlson, G., McKenna, K. (2008). The needs and experiences related to driving cessation for older people. *British Journal of Occupational Therapy, 71*(9), 379-388.

Lovegreen, L.D., Kahana, E., Kahana, B. (2010). Residential relocation of amenity migrants to florida: "unpacking" post-amenity moves. *Journal of Aging and Health, 22*(7), 1001-1028.

Luis, C.A., Keegan, A.P., Mullan, M. (2009). Cross validation of the Montreal Cognitive Assessment in community dwelling older adults residing in the Southeastern US. *International Journal of Geriatric Psychiatry*. 24: 197–201

Luther Village. (2013). Services & Amenities. Retrieved from http://www.luthervillage.org/services-amenities/services-amenities.

Lyman, S., Ferguson, S.A., Braver, E.R., Williams, A.F. (2002). Older driver involvements in police reported crashes and fatal crashes: trends and projections. *Injury Prevention, 8,* 116-120.

Lyness, J.M., Noel, T.K., Cox, C., King, D.A., Conwell, Y., Caine, E.D. (1997). Screening for depression in elderly primary care patients. *Archives of Internal Medicine, 157,* 449-454.

MacDonald, L.M., Myers, A.M., Blanchard, R.A. (2008). Correspondence among older drivers' perceptions, abilities, and behaviors. *Topics of Geriatric Rehabilitation, 24*(3), 239-252.

Marotolli, R.A., Ostfield, A.M., Merrill, S.S., Perlman, G.D., Foley, D.J., Cooney, L.M. (1993). Driving cessation and changes in miles driven among elderly individuals. *Journal of Gerontology: Social Sciences, 48,* S255-S260.

Marottoli, R.A., de Leon, C.F., Glass, T.A., Williams, C.S., Cooney, L.M., Jr, Berkman, L.F., Tinetti, M.E. (1997). Driving cessation and increased depressive symptoms: Prospective evidence from the New Haven EPESE established populations for epidemiologic studies of the elderly. *Journal of the American Geriatrics Society, 45*(2), 202-206.

Marottoli, R.A., Richardson, E.D. (1998). Confidence in, and self-rating of, driving ability among older drivers. *Accident Analysis & Prevention, 30*(3), 331-336.

Marottoli, R.A., Mendes de Leon, C.F., Glass, T.A., Williams, C.S., Cooney, L.M., Berkman, L.F. (2000). Consequences of driving cessation: Decreased out-of-home activity levels. *Journal of Gerontology, 55B(6),* S334-S340.

Marshall, S.C., Wilson, K.G., Molnar, F.J., Man-Son-Hing, M., Stiell, I., Porter, M.M. (2007). Measurement of driving patterns of older adults using data logging devices with and without global positioning system capability. *Traffic Injury Prevention, 8*(3), 260-266.

Marshall, S.C., Man-Son-Hing, M., Charlton, J., Koppel, S., Langford, J., Tuokko, H.,et al. Protocol for Candrive II/Ozcandrive, a multicentre prospective older drivercohort study. *Accident Analysis in Prevention,* in press.

Metz, D. (2000). Mobility of older people and their quality of life. *Transport Policy, 7,* 149-152.

Mezuk, B., Rebok, G. W. (2008). Social Integration and Social Support Among Older Adults Following Driving Cessation. *Journal of Gerontology: Social Sciences, 63B*(5), S298-S303.

Michon, J.A. (1985). A critical review of driving behaviour models: What do we know, what should we do? In R. Schwing & L. Evans (Eds.), *Human Behavior and Traffic Safety* (pp. 487-525). New York: Plenum Press.

Ministry of Transportation of Ontario. (2012). Senior drivers in Ontario. Retrieved from http://www.mto.gov.on.ca/english/dandv/driver/senior/#1

Mollenkopf, H., Marcelli, F., Ruoppila, I., Flaschentrager, P., Gagliardi, C., Spazzafumo L. (1997). Outdoor mobility and social relationships of elderly people. *Archives of Gerontology & Geriatrics, 24*, 295-310.

Mollenkopf, H., Marcelli, F., Ruoppila, I., Szeman, Z., Tacken, M., Wahl, H.W. (2004). Social and behavioural science perspectives on out-of-home mobility in later life: Findings from the European project MOBILATE. *European Journal on Ageing*, *1*, 45-53.

Molnar, L.J., Eby, D.W. (2008). The relationship between self-regulation and driving-related abilities in older drivers: An exploratory study. *Traffic Injury Prevention, 9*(4), 314-319.

Molnar, L., Eby, D., Roberts, J., St. Louis, R., Langford, J. (2009). A new approach to assessing self-regulation by older drivers: development and testing of a questionnaire instrument. Report No. M-CASTL-2009-04, University of Michigan Transportation Research Institute, Ann Arbor.

Myers, A.M., Powell, L., Maki, B., Holliday, P., Brawley, L., Sherk, W. (1996). Psychological indicators of balance confidence: Relationship to Actual and Perceived Abilities. *Journal of Gerontology: Medical Sciences, 51A*(1), M37-43.

Myers, A.M., Fletcher, P.C., Myers, A.H., Sherk, W. (1998). Discriminative and evaluative properties of the Activities-specific Balance Confidence (ABC) Scale. *Journal of Gerontology: Medical Science, 53,* M287-94.4

Myers, A.M., Malott, O.W., Gray, E., Tudor-Locke, C., Ecclestone, N.A., O'Brien Cousins, S., Petrella, R. (1999). Measuring accumulated health-related benefits of exercise participation for older adults: The Vitality Plus Scale. *Journal of Gerontology: Medical Sciences, 54(A),* M456-M466.

Myers, A.M., Cyarto, E.V., Blanchard, A. (2005). Challenges in quantifying mobility in frail older adults. *European Review of Aging and Physical Activity, 2,* 13-21.

Myers, A.M., Paradis, J., Blanchard, R. (2008). Conceptualizing and measuring driving confidence in older adults. *Archives of Physical Medicine and Rehabilitation*, *89*, 630- 640.

Myers, A.M., Trang, A., Crizzle, A.M. (2011). Naturalistic study of winter driving practices by older men and women: Examination of weather, road conditions, trip purposes and comfort. *Canadian Journal of Aging, 30* (4): 577-589.

Nasreddine, Z.S., Phillips, N.A., Bedirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J.L., Chertkov, H. (2005). The Montreal Cognitive Assessment , MoCA: A brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society, 53*(4), 695-699.

National Council on Aging. (2010). Report of the National Seniors Council on Volunteering Among Seniors and Positive and Active Aging. Retrieved from: http://www.seniorscouncil.gc.ca/eng/research_publications/volunteering.pdf

Naumann, R.B., Dellinger, A.M., Kresnow, M. (2011). Driving self-restriction in high-risk conditions: How do older drivers compare to others? *Journal of Safety Research, 42,* 67-71.

Nazem, S., Siderowf, A.D., Duda, J.E., Have, T.T., Colcher, A., Horn, S.S., Moberg, P.J., Wilkinson, J.R., Hurtig, H.I., Stern, M.B., Weintraub, D. (2009). Montreal Cognitive Assessment performance in patients with Parkinson‟s Disease with normal global cognition according to Mini Mental State Examination score. *Journal of the American Gerontological Society*, 57, 304-308.

Oxley, J., Fildes, B. (2004). Retiring from driving: The process of reduction and cessation of driving and the role of a handbook to assist in this process. *Monograph 1, Road Safety Issues for Older Road Users. Selection of papers from the Older Road User Safety Symposium,* 26 November, Brisbane, Australia. Centre for Accident Research and Road Safety – Queensland.

Persen Technologies. (2008). Retrieved September, 2013, from www.myottomate.com.

Persson, D. (1993). The elderly driver: Deciding when to stop. *The Gerontologist, 33*(1), 88-91.

Powell, L.E., Myers, A.M. (1995). The Activities-specific Balance Confidence (ABC) Scale. *Journal of Gerontology: Medical Science, 50,* M28-M34.

Preusser, D.F., Williams, A.F., Ferguson, S.A., Ulmer, R.G., Weinstein, H.B. (1998). Fatal crash risk for older drivers at intersections. *Accident Analysis & Prevention, 30,* 151-159.

Pucher, J., Renne, J.L. (2005). Rural mobility and mode choice: Evidence from the 2001 National Household Travel Survey. *Transportation, 32*, 165-186.

Ragland, D.R., Satariano, W.A., MacLeod, K.E. (2004). Reasons given by older people for limitation or avoidance of driving. *The Gerontologist, 44*(2), 237-244.

Ragland, D.R., Satariano, W.A., MacLeod, K.E. (2005). Driving cessation and increased depressive symptoms. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 60*(3), 399-403.

Rapoport M.J., Naglie, G., Weegar, K., Myers, A.M., Cameron, D., Crizzle, A.M., Korner-Bitensky, N., Tuokko, H., Vrkljan, B., Bedard, M., Porter, M., Mazer, B., Gelinas, I., Man-Son-Hing, M., Marshall, S. (2013). The relationship between cognitive performance, perceptions of driving comfort and abilities, and self-reported driving restrictions among healthy older adults. *Accident Analysis and Prevention, 61,* 288-295.

Rosenbloom, S. (1999). The mobility of the elderly: there's good news and bad news. Paper presented at the conference on transportation in an aging society: A decade of experience, Transportation Research Board, Maryland, USA.

Rosenbloom, S. (2003). The Mobility Needs of Older Americans: Implications for Transportation Reauthorization in *Taking the High Road: A Metropolitan Agenda for Transportation Reform*, (pp. 227-254). Bruce Katz and Robert Puentes (Eds.), Brookings Institution Press. Retrieved September 16, 2012, from: http://www.brookings.edu/reports/2003/07transportation_rosenbloom.aspx

Rudman, D., Friedland, J., Chipman, M., Sciortino, P. (2006). Holding on and letting go: The perspectives of pre-seniors and seniors on driving self-regulation in later life. *Canadian Journal on Aging, 25*(1), 65-76.

Sabback, F., Mann, W.C. (2005). The influence of climate and road conditions on driving patterns in the elderly population. *Physical & Occupational Therapy in Geriatrics, 23* (2/3), 63 – 74.

Shippee, T.P. (2009). "But I am not moving": Residents' perspectives on transitions within a continuing care retirement community. *The Gerontologist, 49*, 418-427.

Siren, A., Hakamies-Blomqvist, L., Lindeman, M. (2004). Driving Cessation and Health in Older Women. *Journal of Applied Gerontology*, 23:58-69.

Staplin, L., Lococo, K., Gish, K., Decina, L. (2003). *Model Driver Screening and Evaluation Program Final Technical Report, Volume 2: Maryland Pilot Older DriverStudy*. (No. DOT HS 809 583).Washington, DC: National Highway Traffic Safety Administration.

Suen, S.L., Sen, L. (2004). Mobility options for seniors. *Transportation in an ageing society: A decade of experience, proceedings, 27*, 97-113. Washington DC, Transportation Research Board.

Trang, A. (2010). Examination of Winter Driving using in-vehicle devices and the perceptions of older drivers. Unpublished master's thesis, University of Waterloo, Waterloo, Ontario, Canada.

Transport Canada (2007). Canadian Motor Vehicle Traffic Collision Statistics: Number of licensed drivers by gender and by age. Ottawa, ON: Catalogue no. T45-3.

Transport Canada. (2010). *A quick look at fatally injured vulnerable roads users*. Road Safety and Motor Vehicle Regulation Directorate. Fact Sheet TP 2436E.

Transport Canada. (2011). Road safety in Canada. Road Safety and Motor Vehicle Regulation Directorate. TP 15145E. Retrieved from http://www.tc.gc.ca/eng/roadsafety/tp-tp15145-1201.htm#s38\

Tuokko, H., McGee, P., Rhodes, R.E. (2006). Decisional balance and readiness to change driving behavior in older adults: A pilot study. *Physical & Occupational Therapy in Geriatrics, 24*(3), 1-12.

Tuokko, H., Myers, A., Jouk, A., Marshall, S., Man-Son-Hing, M., Porter, M., Bedard, M., Gelinas, I., Korner-Bitesky, M., Mazer, B., Nagile, G., Rapoport, M., Vrkljan, B. (2013). Associations between age, gender, psychosocial and health characteristics in the Candrive II study cohort. *Accident Analysis in Prevention, 61*, 267-271.

Turcotte, M. (2006). Seniors' access to transportation. Canadian Social Trends, 82, Statistics Canada Catalogue no. 11-008, 43-50.

Turcotte, M. (2012). Profile of seniors' transportation habits. *Canadian Social Trends, Statistics Canada Catalogue no. 11-008-X*, 1-16.

Webber, S.C., Porter, M.M., Menec, V. H. (2010). Mobility in older adults: A comprehensive framework. *The Gerontologist, 50,* 443-450.

Whelan, M., Langford, J., Oxley, J., Koppel, S., Charlton, J. (2006). The elderly and mobility: a review of the literature. Report no 255. Monash University. Accident Research Centre.

Windsor, T.D., Anstey, K.J., Butterworth, P., Luszcz, M.A., Andrews, G.R. (2007). The role of perceived control in explaining depressive symptoms associated with driving cessation in a longitudinal study. *The Gerontologist, 47*(2), 215-223.

Wolf, J., Guensler, R., Washington, S., Frank, L. (2001). Use of electronic travel diaries and vehicle instrumentation packages in the year 2000: Atlanta Regional Household Travel Survey. *Transportation Research Circular,* 413-429.

Zadikoff, C., Fox, S.H., Tang-Wai, D.F., Thomsen, T., de Bie, R.M.A., Wadia, P., Miyasaki, J., Duff-Canning, S., Lang, A.E., Marras, C. (2008). A comparison of the Mini Mental State Exam to the Montreal Cognitive Assessment in identifying cognitive deficits in Parkinson‟s Disease. *Movement Disorders, 23*(2), 297-299.

Zhang, J., Lindsay, J., Clarke, K., Robbins, G., Mao, Y. (2000). Factors affecting the severity of motor vehicle crashes involving elderly drivers in Ontario. *Accident Analysis & Prevention, 32,* 117-125.

Appendix A

Continuum of Senior Living and Health Care

SCHLEGEL VILLAGES

Independent Living Apartments	Seniors Independent Retirement Apartments with Supports	Retirement Home	Intermediate Supportive Care	Intermediate Assisted Care	Long-Term Care
Urban design features that facilitate independence and "neighbour helping neighbour" Home adaptations Access to all recreation activities, amenities entertainment events, wellness services to extend "aging in place"	Access to all recreation activities, amenities entertainment events, wellness services to extend "aging in place" Supports based on client need and choice: Housekeeping, laundry, light maintenance 1 meal daily 24-hour emergency nurse call Health Care Concierge Service Wellness assessment Chaplaincy	Housekeeping, linens, meals Access to recreation, entertainment, amenities plus Medication administration Regular daily nursing and personal care (30 - 45 min per day on average) Functional Abilities Program	Retirement Home services plus Additional supports for those with early memory loss: Additional security Supervision Regular daily nursing and personal care (1.7 hr per day on average)	Retirement Home Services plus Additional supports for cognitively alert seniors with physical limitations: Assistance with washing, dressing, transfers, continence care Regular daily nursing and personal care (1.7 hr per day on average)	Heavier care regulated and funded by MOHLTC 32 bed Resident Home Areas with subcare populations Dementia Care Continuum Special Needs Transition Care from Hospitals
AVAILABLE IN: Etobicoke Kitchener Whitby	**AVAILABLE IN:** Etobicoke Kitchener Whitby	**AVAILABLE IN:** Etobicoke Guelph Kitchener Whitby	**AVAILABLE IN:** Etobicoke Guelph Kitchener	**AVAILABLE IN:** Etobicoke Guelph Kitchener Whitby	**AVAILABLE IN:** All locations

RIA Research Institute for Aging
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SCHLEGEL VILLAGES

Resident Transportation Patterns Survey

This survey is meant for you! By completing this survey you will help the RIA and the Schlegel Villages to better understand the transportation needs of all retirement living residents.

SECTION 1: To be completed by ALL residents

1. Room #_____

2. Gender? ☐ Female ☐ Male

3. When is your birthday (dd/mm/yyyy)? _____/_____/_____

4. Which Village are you from?

☐ Winston Park ☐ Riverside Glen ☐ Humber Heights ☐ Taunton Mills

5. When did you move to this Village (if you recall)?

Year:_____ Month: _____

6. Where did you live before moving to the Village? (Name of city, town or village)

_____

7. Do you participate in outings that use the Village's bus? ☐ YES ☐ NO

If Yes, approximately how often?
☐ less than once a month
☐ about once a month
☐ more than once a month

8. Do you get rides from other people? ☐ YES ☐ NO

If YES, who drives you the **most**?
☐ spouse ☐ friend
☐ child ☐ volunteer
☐ other relative

How often do they drive you?
times per week: _____
OR
times per month: _____

Do they live in the Village? ☐ YES ☐ NO

Please continue on next page…

9. Do you use any of the following forms of transportation? (check all that apply)

☐ public buses ☐ taxis ☐ paratransit services ☐ motorized scooter

---

10. Do you currently drive? ☐ YES ☐ NO

If **YES**, please complete Section 2.
If **NO**, please complete Section 3.

SECTION 2: To be completed only by residents who CURRENTLY drive.

11. How many days a week do you usually drive?

☐ 5 days or more
☐ 3 to 4 days
☐ 1 to 2 days
☐ Less than once a week

---

12. Do you have a car? ☐ YES ☐ NO

If Yes, where do you keep it?

☐ At the Village
☐ Elsewhere

SECTION 3: To be completed only by residents who do NOT currently drive.

13. Did you used to drive? ☐ YES ☐ NO, I have never driven

If YES, **when** did you stop driving (if you recall)?
Year:_____ Month:_____

Did you stop driving:

☐ Before you moved to the Village?
☐ After you moved to the Village?
☐ At the same time you moved to the Village?

Do you still have a **valid** driver's license? ☐ YES ☐ NO

Thank you for completing this short survey.
Please return it to the main office by Wednesday, October 31st, 2012 in the envelope provided.

Information on other Transportation Options

Table A1: Cost of seniors (65 years old plus) public transit fares

Village & Primary Transit Company	Fare Type	Cost ($)
TM – Durham Transit	Single fare Monthly fare 10 rides	2.00 41.50 19.00
WP/LV – Grand River Transit	Single fare Monthly fare 5 rides	3.00 56.00 9.00
HH – Toronto Transit Commission	Single fare Monthly fare 5 rides 10 rides Day pass	2.00 106.00 9.00 18.00 10.75
RG – Guelph Transit	Single fare Monthly fare 10 rides Day pass	3.00 62.00 20.00 7.25

Note: Costs reflect the prices as of July 1, 2013. *other fare options available (e.g., weekly passes). When passengers board, they can also get a transfer ballot (valid for one hour), that allows them to complete round-trips (including transferring to a different bus) all on one fare.

Taxi Services

Taxi services are available in all of the village locations. In addition to regular taxi use, the city transit services also offer the 'TaxiSCRIP' service. In this case, persons with mobility concerns or with a wheelchair/scooter are able to purchase $40.00 worth of cab fare for only $20.00. Although details may vary, generally people must apply or be registered with a mobility service (i.e., MobilityPLUS user) then go to a transit terminal or service office to purchase the coupons. These coupons can also be used with taxi companies that offer accessible vehicles.

Paratransit Services

Paratransit services provide specialized transit for people with mobility impairments, seniors and people with other disabilities. In the study location regions, these services take the form of a small bus or taxi van that picks up the passengers (by appointment) and drops them off at their destination. Since this is a shared ride service, the bus picks up other passengers along the route, and this can often extend the length of an individual's trip. All study regions featured at least one main paratransit service that function similarly.

WP and LV (Kitchener-Waterloo)

A specialized service called MobilityPLUS is used to take registered people anywhere within the Kitchener-Waterloo and Cambridge area on an accessible small bus. To be eligible for the MobilityPLUS services, a person must meet one of the following criteria: a) physically unable to climb or descend steps on conventional public transportation; b) unable to walk a distance of 175 metres (575 feet); c) suffer from a temporary disability, such as a broken leg; and

d) registered with CNIB. Trips must be booked seven day in advanced and subscription bookings (regularly scheduled rides at the same time and date) are also available. Service is available Monday to Friday (5:15 a.m. – 1:15 a.m.), Saturday (5:30 a.m. – 1:15 a.m.), and Sundays/statutory holidays (7:15 a.m. – 1:15 a.m.). The cost of using MobilityPLUS services is on par with the cost seniors would incur using the regular public transit.

TM (Whitby)

The paratransit service in Whitby falls under the Durham Region Transit system and is known as DRT Specialized Services. This provides door-to-door accessible transit for disabled (temporarily or permanent) residents in the Durham Region that cannot use public transit or walk 175 metres. Residents must complete an application form in order to qualify. Another paratransit service in Whitby, which also serves the surrounding areas like Oshawa, Bowmanvile and Port Perry, is known as Oshawa Handi Transit. This service provides accessible (lift-equipped) vehicles that provide door-to-door transportation for persons with disabilities or people who cannot use public transit due to reduced mobility. This service operates Monday to Friday (8:00 a.m. to 10:00 p.m.) and Saturday to Sunday (9:30 a.m. to 10:00 p.m.). Like the MobilityPLUS service, the cost of using the Specialized Services is identical to that of regular Durham Region Transit fares.

RG (Guelph) and HH (Etobicoke)

Much like MobilityPLUS, the Guelph area has Guelph Mobility Services providing accessible vans for door-to-door service to people with disabilities that are unable to use public transit or walk 175 metres. Advanced notice for booking and cancellation is needed, with trips occurring on a first come, first call basis. The service operates Monday to Saturday (5:45 a.m. to 12:15 a.m.) and Sunday till 6:15 p.m. For people in a wheelchair, service is subject to availability after 6:00 p.m. Costs of travel vary from free (for CNIB registered users) to subsidized costs for passengers under their various accessibility programs. The Etobicoke region features many different transit companies capable of providing paratransit services. The companies range in service cost and availability.

Other Services

Across the province, volunteer driver services are available from organizations such as the Red Cross, local Royal Canadian Legion branches and Older Adult Centres. Many of the villages also have access to car share programs (e.g., Grand River CarShare) that offer members access to vehicles across the city for exclusive use during a member's pre-booked date and duration. These programs provide the vehicles to members on a pay per-hour and pay per-kilometre basis.

Appendix B: Study Timeline and Milestones

October 17, 2012 – RTPSs sent out to all Villages (delivered to residents by late October)

October 24/26, 2012 – Presentations to HH and RG

November 5, 2012 – Return date for RTPSs requested in cover letter

November 9, 2012 – Information packages distributed to designated resident mailboxes

November 14/15, 2012 – Presentations to WP and TM

December 6, 2013 – Proposal presentation and committee approval

January 14, 2013 – ORE Approval

January 30, 2013 – Recruitment booth at WP

February 4, 2013 to March 13, 2013 – Data collection at WP

February 21, 2013 – Recruitment booth at TM

April 18, 2013 – Recruitment (door-to-door) at TM

February 26, 2013 to May 15, 2013 – Data collection at TM

May 3, 2013 – Recruitment booth at RG

May 16, 2013 – Recruitment booth at HH

May 17, 2013 – Data collection at RG

May 23, 2013 – June 14, 2013 – Data collection at HH

May 31, 2013 – Removal of devices from participant at RG (withdrew from study)

June 7, 2013 - ORE approval of modifications (Form 104) for recruitment at LV

June 17, 2013 – Recruitment booth at LV

June 24, 2013 – Recruitment booth at LV

June 17, 2013- July 18, 2013 – Data collection at LV

August 16, 27 and 29 2013 – Presentation of findings at WP, RG, and HH (respectively)

August 2013 to October 2013 – Data analysis and thesis writing

Appendix C

UNIVERSITY OF
WATERLOO

RESIDENT DRIVING & TRANSPORTATION STUDY
(Current Drivers)

INFORMATION LETTER

Primary Investigator: Professor Anita Myers, School of Public Health and Health Systems.
PHONE: 519.888.4567 ext. 33664. EMAIL: amyers@uwaterloo.ca

Student Researchers:

Sarah Sousa (MSc Candidate)
PHONE: XXX.XXX.XXXX
EMAIL: xxxxxx@uwaterloo.ca

Spencer Gooderham (MSc Candidate)
PHONE: 519.888.4567 ext. 36786
EMAIL: segooder@uwaterloo.ca

……

You are invited to participate in a research study! Sarah Sousa and Spencer Gooderham, under the supervision of Anita Myers, PhD, are conducting a research study on residents who currently drive. To decide whether or not you want to participate, you should be aware of what is involved. This letter gives detailed information about the study.

This study has been reviewed and received ethics clearance from the University of Waterloo, Office of Research Ethics. If you have questions regarding your rights as a research participant, contact: Director of the Office of Research Ethics, Dr. Maureen Nummelin by phone at 519-888-4567 ext 36005 or EMAIL: maureen.nummelin@uwaterloo.ca

A NOTE FROM SARAH

My name is Sarah Sousa and I am a graduate student at the University of Waterloo. You may recall completing a survey on transportation patterns distributed to residents in October. This survey provided a valuable, general profile of driving and transportation patterns across four of the Villages and helped the RIA identify residents who are eligible to participate in further studies. For my Master's thesis, described below, I am trying to learn more about the travel and activity patterns of residents **aged 65 and over who are still driving**. Another study by my colleague, Courtney Janssen, is looking at retirement living seniors who have recently stopped driving.

SIGNIFICANCE OF THE WORK AND THE NEED FOR THE STUDIES

The information gathered in this study will help in the completion of Sarah Sousa's master's thesis. From a research perspective, this will be the first study on driving patterns and transportation use by older adults living in retirement facilities, as opposed to the general community. We believe that where people live may have a significant influence on their transportation patterns and needs and this study will allow us to examine such factors. The Schlegel Villages are committed to assisting their residents. You and others who participate in this study will have the opportunity to provide feedback on available transportation services (example, the Village bus and proximity to public bus stops) as well as suggestions for additional programs and services (for instance transportation clubs, ridesharing and support for people who have recently stop driving or are thinking about quitting). Your input is important in helping the Villages plan to better meet the needs of all residents.

WHO IS ELIGIBLE TO PARTICIPATE IN THE STUDY

This project is open to anyone aged 65 and over who lives in an apartment/condo or on the main floor retirement (including assisted care) and drives **at least once a week**. Participant vehicles must also be 1996 or newer, gasoline powered (not a hybrid) and kept at the Village.

If you live with another current driver, they are also welcome to participate in this study, whether you share a vehicle or both have your own vehicle.

The appropriate Village team members have met with the research team to discuss this project in general and to discuss resident eligibility and we'd like to invite you to take part in this study. We would appreciate it if you complete the attached form indicating whether or not you are interested in this study.

ARE THERE ANY RISKS ASSOCIATED WITH MY PARTICIPATION?

Participants may worry that information collected from the questionnaires or interviews about their driving (e.g., if they had crashes) or from their vehicles (e.g., speeding) may be reported to the police or licensing authorities. Rest assured that all of the information provided to the researchers or collected from participant vehicles will be kept strictly confidential; names will not be used in any reports or publications, and will never be reported to any outside parties.

Another possible concern is that the electronic devices we install in your vehicle (described below) may harm your vehicle or affect your driving. Rest assured that this is not the case. We have conducted such studies many times with older drivers and the devices did not affect their driving or vehicle in any way. In fact most said they barely noticed the devices.

WHAT WILL I BE ASKED TO DO?

The total time commitment for this project is approximately 2 1/2 hours over two week.

If you choose to be involved you will be asked to:

1. Meet with the researcher for about an hour (possibly with a few other residents) to:

    a. Complete a consent form, questionnaires to gather background and driving history information, as well as three short questionnaires on mood, confidence and general well-being.

    b. Show you the devices and explain how these will be installed in your vehicle for the two weeks (with your permission), as well as how to complete the car trip logs and travel diaries. I will also go over some commonly asked questions about the devices. These will not harm your vehicle in any way nor will you have to do anything with these devices (just drive normally).

    c. If you agree, I will accompany you to your vehicle to record your odometer reading, install the electronic devices and leave the trip logs on a clipboard. The first device (the CarChip) plugs into a slot under your steering wheel (the same one your mechanic uses for diagnostic tests). The other (a Global Positioning Device), which is also small (fits in the palm of your hand), will be placed on your dashboard using a removable sticky pad. As you will see, this device will not block your view. Both devices record information from your vehicle's on-board computer (e.g., how far the vehicle travelled and for how long).

2. Over the next two weeks you will simply drive as usual. However you will be asked to complete a simple checklist (or log) for each driving trip (such as who drove, if there were any passengers and what the weather was like). This should only take a few minutes. For trips you make where you do not drive (e.g., take a taxi), we will ask you to note this on a travel diary. Again, this should only take a few minutes. On the days you do not leave the village you will not have to do anything.

3. We will arrange to meet again after the two weeks for 90 minutes or less so that I can collect your trip logs and travel diaries, remove the devices, and gather some further information. Also, you will be asked to:

    a. Complete a few checklists on transportation and activities you do in and outside the Village.

    b. Complete some short questionnaires concerning how often you drive in various situations your comfort level, as well as a puzzle, walking and vision task.

    c. Although optional, you may wish to complete the scale regarding balance confidence again so we can examine reliability; that is, the extent to which the scale shows consistent results across the two times you complete it.

    d. And finally a short interview to find out about your experiences over the past two weeks and to get your feedback on transportation available in your Village (e.g., Village bus; resident ridesharing) and nearby (e.g., bus routes). We are also interested in your suggestions for how services could be improved.

If you agree to participate, you will also be asked for your permission for the research team to access the data that the Village routinely collects regarding the number of falls and/or accidents you may have had over the last few years.

WHAT ARE THE POTENTIAL BENEFITS ASSOCIATED WITH MY PARTICIPATION?

Participants will have an opportunity to provide feedback on existing services and programs, and make suggestions for additional services to better meet the needs of all residents.

WHAT HAPPENS IF I WANT TO WITHDRAW FROM THE STUDY?

You decide which aspects of the study you want to do (e.g. completing questionnaires, checklists, travel diaries), having the electronic devices installed in your vehicle, as well as how much you want to share in the interview. We encourage you to participate in all the study components if possible so that we can get a complete and accurate picture of your experiences and needs, as well as, those of other residents.

If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You can request that your results be removed from the study. You may also refuse to answer any questions and still continue in the study. A decision to participate or withdraw will have no effect on the care or services you receive from the Village. This study will in no way affect your license renewal now or in the future.

WHAT PROCEDURES ARE IN PLACE TO ENSURE CONFIDENTIALITY?

All of the information you provide (e.g., on questionnaires, trip logs, or interviews) will be kept completely confidential. Names will not be used in Sarah's thesis or in any reports or publications based on this study. Instead, data will be summarized across all participants from several Villages. Sarah **will not report** speeding or any other driving infractions. None of the electronic data recorded by the devices will be shared with any authorities.

Although your name will appear on the consent form, these forms will be returned to the RIA, kept in a locked cabinet and identification numbers will be assigned to each person. Electronic data entered into a computer for analysis will not contain ANY names. Illustrative quotes from the discussion will also be anonymous. During the study only the researchers (not the RIA) will have copies of the electronic, password protected database. The RIA will receive summaries of the findings and at the end of the study a copy of the database. All paper, electronic, and audio data will be kept secure and destroyed 5 years after data collection.

WILL I BE PAID FOR PARTICIPATING IN THE PROJECT?

Participants will not be paid for their participation in the project.

WHO CAN I CONTACT IF I HAVE QUESTIONS?

If you have any questions about your participation in this project, or about the recruitment process, please contact Kaylen Pfisterer (Assistant Research Coordinator) at the Schlegel-UW Research Institute for Aging: 519.571.1873 ext. 109.

HOW WILL I LEARN ABOUT THE RESULTS OF THE PROJECT?

A summary of results will be made available to you upon completion of the study. The results from the study may also be published in a research journal. If you wish, we can provide you with a copy of any or all research articles that are published from this project. If you would like to receive copies of research articles published from this project, please complete the Publications Request Form and mail to Kaylen Pfisterer at the Research Institute for Aging. In addition, the research team will be instrumental in integrating the results of this project into practice at the Schlegel Villages.

HAS THE PROJECT RECEIVED CLEARANCE FROM A RESEARCH ETHICS BOARD?

You are not waiving any legal claims or rights by being part of this research study. This study has been reviewed and received approval from the Schlegel-UW Research Institute for Aging as well as ethics clearance from the University of Waterloo, Office of Research Ethics. If you have questions regarding your rights as a research participant, contact:

Director of the Office of Research Ethics
Dr. Maureen Nummelin 519-888-4567 ext 36005 or maureen.nummelin@uwaterloo.ca

Resident Driving & Transportation Study

Information Letter for Current Drivers

Primary Investigators:

Professor Anita Myers (PhD)
School of Public Health and Health Systems
University of Waterloo
PHONE: 519.888.4567 ext. 33664
EMAIL: amyers@uwaterloo.ca

Sarah Sousa (MSc Candidate)
School of Public Health and Health Systems
University of Waterloo
PHONE: XXX.XXX.XXXX
EMAIL: xxxxxx@uwaterloo.ca

……

Sarah Sousa, under the supervision of Anita Myers, PhD, is conducting a research study on residents who currently drive. To decide whether or not you want to participate, you should be aware of what is involved. This letter provides a brief overview of the study, as well as an interest form if you like to speak to the researcher directly.

If you have any questions about this process, please do not hesitate to contact:

Kaylen Pfisterer
Assistant Research Coordinator
Schlegel-UW Research Institute for Aging
325 Max Becker Drive, Suite 202
Kitchener, ON, N2E 4H5
519.571.1873 ext. 109 - kpfister@uwaterloo.ca

Dear Resident,

My name is Sarah Sousa and I am a graduate student at the University of Waterloo. For my Master's thesis I am trying to learn more about the driving, travel and activity patterns of seniors living in retirement villages. According to the recent transportation survey you completed, you indicated that you currently drive at least once a week and thus may be eligible for my study, beginning January, 2013.

My study entails two meetings (each lasting about an hour), scheduled two weeks apart at your convenience. If possible, I may meet with two or three residents at a time. At the first meeting, you would be asked to complete some questionnaires on background information, driving history and habits, mood, confidence and general well-being.

Over the next two weeks, you would be asked to drive as usual with two small electronic devices installed in your vehicle that automatically record data from the vehicle's computer (like the distance the car travels). You will not have to do anything with the devices nor will they damage your car.

At the first meeting, I will show you these devices and <u>you can decide then</u> whether you are okay with having these installed in your vehicle. If so, I will accompany you to your car. I will also ask you to complete a simple checklist for each driving trip (e.g., who drove, if there were passengers in the vehicle, what the weather was like). I will go over these with you, as well as travel diaries for trips where you do not take your vehicle (e.g., go by taxi). These should only take a few minutes each day (and no time at all for the days you do not drive your vehicle or leave the Village).

At the second meeting, we will discuss your experiences over the past two weeks and complete a few more things such as a puzzle, walking, and vision tasks and checklists on activities you do. I will also ask for your feedback on available transportation services (e.g., the Village bus) and how these could be improved.

It is important for you to know that all information will be kept totally confidential and **none** of the data (including the driving data) will be shared with licensing authorities. Participants will be given a confidential identification code (ID) to use in place of their name. A list with the participants' names and IDs will be protected by the Research Institute for Aging (RIA). Information from this study will be summarized across all participants and shared with the RIA.

If you are interesting in hearing more about my study, please complete the attached form and return it to your Village office in the envelope provided.

With your permission I will call you to answer any questions you may have and verify some information, including: that your vehicle is not a hybrid, and is a model year that is 1996 or newer, that you still drive your vehicle at least once a week, and that you keep your vehicle at the Village. This should only take about 15 minutes. After our conversation, if you want to participate, we will schedule a time to meet at your convenience.

Sincerely,

_____
Sarah Sousa

RESIDENT INTEREST FORM

Resident Driving & Transportation Study

Please complete this form and return it to your Village office in the envelope provided within the next week if possible.

If you prefer, you can call or email Kaylen about your interest or if you have any questions. Please provide your name, village, room and phone numbers.

PHONE: 519.571.1873 ext. 109
EMAIL: kpfister@uwaterloo.ca
Kaylen Pfisterer, Assistant Research Coordinator, Schlegel-UW Research Institute for Aging

Please check one of the following boxes.

☐ **YES, I am interested in hearing more about this study and give the researcher (Sarah Sousa) permission to call me and possibly arrange a time to meet if I decide to participate.**

NAME: _____

VILLAGE: _____ ROOM #:_____

TELEPHONE #: (_____)_____

☐ **NO, I AM NOT INTERESTED in participating in this study.**

☐ **NO, I AM NOT INTERESTED in participating in THIS OR ANY OTHER study and would like to be added to the "DO NOT CONTACT" list.**

BY CHECKING EITHER OF THESE BOXES, I ACKNOWLEDGE THAT MY DECISION TO NOT PARTICIPATE WILL IN NO WAY AFFECT THE CARE I RECEIVE FROM SCHLEGEL VILLAGES NOR WILL IT AFFECT ANY RELATIONSHIP WITH THE RIA OR THE UNIVERSITY OF WATERLOO.

NAME:_____
VILLAGE:_____

PARTICIPANT RESPONSE FORM

Please complete this form and return to the Village Office.

- ☐ I am a Current Driver.
- ☐ I am a Former Driver.
- ☐ **I would like to participate.** Please pass on my information (as indicated below) to the researchers to establish a meeting time that is suitable for me.
- ☐ **I would like more information.** I give permission for the researcher to call me at the telephone number below.
- ☐ **I would not like to participate.**
- ☐ **Please add me to the "do not contact list".** I would not like to participate in any research projects.

NAME: _____

_____

VILLAGE: _____

_____

PHONE #:

_____

ROOM #: _____

WHY IS TRANSPORTATION IMPORTANT?

Transportation is a key factor in maintaining independence. Control over your transportation options can promote health and quality of life. For many older Canadians, independent mobility is equated with the private automobile (namely driving or having someone else to drive them).

Transitions from community living to retirement living and transitions from driving to non-driving can greatly impact one's health and well-being.

We would like to explore the transportation patterns of residents that are former and current drivers living in retirement residences.

This is your invitation to participate in this upcoming study being conducted by:

Professor Anita Myers

University of Waterloo

WHAT IS THE RIA?

The Schlegel-UW Research Institute for Aging (RIA) promotes research relevant to aging in community and congregate settings. It focuses on practice-relevant research as a driving force behind innovation and quality care.

Through partnerships with the University of Waterloo and Conestoga College, the RIA attracts research projects to "living research environments" within Long Term Care and retirement communities, with a view to immediate translation of research to practical training applications for caregivers.

Materials and information generated through our research-to-practice initiatives
are shared with other LTC facilities and system networks to promote research-informed quality care.

RIA is a product of the philanthropic spirit and vision of Dr. Ron Schlegel, whose family has been providing long-term care to Ontario residents since the 1950s. Owners of the 12 LTC facilities operating as Schlegel Villages, the Schlegel family has committed over $40 million to develop the Institute. Additional funds and in-kind supports were secured and continue to be solicited.

UNIVERSITY OF WATERLOO

RESIDENT TRANSPORTATION STUDY

Former Drivers
Current Drivers

RIA Research Institute for Aging

Schlegel • UWaterloo • Conestoga

RESIDENT TRANSPORTATION STUDY

RIA Research Institute for Aging — Schlegel · UWaterloo · Conestoga

Schlegel Villages

WHAT WILL YOU BE ASKED TO DO?

CURRENT DRIVERS:

- ONE MEETING with Sarah for group session to learn about the real-life driving study (**approximately one hour**)
- Complete DRIVING CHECKLISTS for 2 weeks (**approximately 5 minutes per day**)
- ONE FOLLOW-UP INTERVIEW and scale completion (**approximately 1 ½ hrs**)

FORMER DRIVERS

- ONE MEETINGING with Courtney for a **one-hour session** with 1-2 other former drivers where you will be asked to complete questionnaires and scales and discuss:
  - transition to non-driving
  - current transportation use
  - Village support
- Complete an optional 2-week travel diary (**approximately 5 minutes per day**)
  - used to understand actual transportation patterns of former drivers.

COME MEET THE RESEARCHERS!

Courtney Janssen
Sarah Sousa

University of Waterloo

Please come and speak to us about the details of this study! We will have a booth set up by the main floor dining room. **Sign up for the study with us!**

TIME:

DATE:

LOCATION:

CONFIDENTIALITY

All information collected from you will be kept strictly confidential and data resulting from your participation that may be published in scientific journals, texts, or other media will not reveal your identity.

This study has been reviewed by, and received ethics clearance through the Office of Research Ethics at the University of Waterloo.

FOR MORE INFORMATION, PLEASE CONTACT:

Kaylen Pfisterer

Assistant Research Coordinator
Schlegel-UW Research Institute for Aging
325 Max Becker Dr., Kitchener, ON
N2E 4H5
519.571.1873 ext. 109
kpfisterer@uwaterloo.ca

PUBLICATIONS REQUEST FORM

If you would like copies of any publications that result from this project (even if you choose not to participate) please complete this form and return it to Kaylen Pfisterer at the RIA.

NAME: _____

_____

ADDRESS: _____

_____

CITY: _____

POSTAL CODE: _____

EMAIL: _____

☐ Please add me to the electronic mailing list of Research Institute for Aging (RIA).

☐ Please add me to the distribution list for the RIA's Quarterly Newsletter.

☐ Please add me to the electronic mailing list (Agri-Food for Healthy Aging Program).

RIA Research Institute for Aging
Schlegel • UWaterloo • Conestoga

UNIVERSITY OF WATERLOO

SCHLEGEL VILLAGES

RESIDENT DRIVING & TRANSPORTATION STUDY

Consent Form

RESIDENT NAME: _____ **VILLAGE**: ❍ Winston Park ❍ Riverside Glen ❍ Humber Heights ❍ Taunton Mills

I have read the information letter about a study being conducted by **Sarah Sousa** and **Anita Myers**, PhD, from the School of Public Health and Health Systems at the **University of Waterloo**. This study has been explained to my satisfaction and I have had the opportunity to ask questions. I was informed that my participation in this study (including completing materials or contributing to discussions) is voluntary and will in no way affect the services provided to me by the Schlegel Villages, the University of Waterloo or the Schlegel-UW Research Institute for Aging, now or in the future. In addition, I was informed that:

- I may withdraw from the study at any time
- All identifying information collected will be kept totally confidential
- The study results will be summarized across all study participants from multiple Villages
- Consent forms will be kept in a locked cabinet and will be destroyed after five years

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact Dr. Maureen Nummelin, Director, Office of Research Ethics at (519) 888-4567 ext. 36005 or maureen.nummelin@uwaterloo.ca.

I understand that in order to gain a complete understanding of functional independence and mobility associated with transportation use, the research team would like to access data routinely collected by the Village on the number of falls and accidents residents may have had over the last few years.

I agree to allow the researchers to access information routinely collected by the Village on the number of falls and accidents I have had over the last few years. ☐ YES ☐ NO

(…OVER…)

By signing this consent form, I am not waiving my legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study. ☐ YES ☐ NO

Resident Name: _____
(please print)

Signature: _____

Date: _____

Name of Witness: _____
(please print)

Signature: _____

Date: _____

Appendix D

UNIVERSITY OF WATERLOO

UNIVERSITY OF WATERLOO | SCHOOL OF PUBLIC HEALTH AND HEALTH SYSTEMS

RESIDENT DRIVING & TRANSPORTATION STUDY (Current Drivers)

INFORMATION LETTER

Primary Investigator: Professor Anita Myers, School of Public Health and Health Systems.
PHONE: 519.888.4567 ext. 33664. EMAIL: amyers@uwaterloo.ca

Student Researchers:

Sarah Sousa (MSc Candidate)
PHONE: XXX.XXX.XXXX
EMAIL: xxxxxx@uwaterloo.ca

Spencer Gooderham (MSc Candidate)
PHONE: 519.888.4567 ext. 36786
EMAIL: segooder@uwaterloo.ca

……

You are invited to participate in a research study! Sarah Sousa and Spencer Gooderham, under the supervision of Anita Myers, PhD, are conducting a research study on residents who currently drive. To decide whether or not you want to participate, you should be aware of what is involved. This letter gives detailed information about the study.

This study has been reviewed and received ethics clearance from the University of Waterloo, Office of Research Ethics. If you have questions regarding your rights as a research participant, contact: Director of the Office of Research Ethics, Dr. Maureen Nummelin by phone at 519-888-4567 ext 36005 or EMAIL: maureen.nummelin@uwaterloo.ca

If you have any questions about this project please contact

Sarah Sousa or **Spencer Gooderham**.

A NOTE FROM SARAH and SPENCER

My name is Sarah Sousa and I am a graduate student at the University of Waterloo. For my Master's thesis I am trying to learn more about the travel and activity patterns of seniors aged 65 and over living in retirement villages who drive at least once a week. Spencer Gooderham is also working on this study and will be using some of the data for his Master's thesis.

SIGNIFICANCE OF THE WORK AND THE NEED FOR THE STUDIES

The information gathered in this study will help us complete our Master's theses. From a research perspective, this will be the first study on driving patterns and transportation use by older adults living in retirement facilities, as opposed to the general community. We believe that where people live may have a significant influence on their transportation patterns and needs and this study will allow us to examine such factors. You and others who participate in this study will have the opportunity to provide feedback on available transportation services (example, the Village bus) as well as suggestions for additional programs and services. Your input is important in helping Luther Village on the Park plan to better meet the needs of all residents. It is important to note that we are also conducting this study in other retirement Villages to determine if factors such as services provided and proximity to shopping areas influence travel patterns.

WHO IS ELIGIBLE TO PARTICIPATE IN THE STUDY?

This project is open to anyone **aged 65 and over** who lives in retirement villages (in this case, Luther Village), and drives **at least once a week**. Participant vehicles must also be 1996 or newer, gasoline powered (not electric cars or hybrids) and kept at the Village.

If you live with another current driver, they are also welcome to participate in this study, whether you share a vehicle or both have your own vehicle.

ARE THERE ANY RISKS ASSOCIATED WITH MY PARTICIPATION?

Participants may worry that information collected from the questionnaires or interviews about their driving (e.g., if they had crashes) or from their vehicles (e.g., speeding) may be reported to the police or licensing authorities. Rest assured that all of the information provided to the researchers or collected from participant vehicles will be kept strictly confidential; names will <u>not</u> be used in any reports or publications, and will never be reported to any outside parties.

Another possible concern is that the electronic devices we install in your vehicle (described below) may harm your vehicle or affect your driving. Rest assured that this is not the case. We have conducted such studies many times with older drivers and the devices did not affect their driving or vehicle in any way. In fact most said they barely noticed the devices.

WHAT WILL I BE ASKED TO DO?

The total time commitment for this project is approximately 2 1/2 hours spread over 2 weeks.

If you choose to be involved you will be asked to:

1. Meet with the researcher for about an hour (possibly with a few other residents) to:

    a. Complete a consent form, questionnaires to gather background and driving history information, as well as three short questionnaires on mood, confidence and general well-being.

    b. Show you the devices and you can decide then whether you are okay with putting these in your vehicle for two weeks. I will be sure to explain how these will be installed in your vehicle, as well as how to complete the car trip logs and travel diaries. I will also go over some commonly asked questions about the devices. These will <u>not harm your vehicle</u> in any way nor will you have to do anything with these devices (just drive normally).

    c. If you agree, I or Spencer will accompany you to your vehicle to record your odometer reading, install the electronic devices and leave the trip logs on a clipboard. The first device (the CarChip) plugs into a slot under your steering wheel (the same one your mechanic uses for diagnostic tests). The other (a Global Positioning Device), which is also small (fits in the palm of your hand), will be placed on your dashboard on a removable non-slip pad. As you will see, this device will not block your view. Both devices record information from your vehicle's computer (e.g., how far the vehicle travelled and for how long).

2. Over the next two weeks you will simply drive as usual. However you will be asked to complete a simple checklist (or log) for each driving trip (such as who drove and what the weather was like). This should only take a few minutes. For trips you make where you do not drive (e.g., take a taxi), we will ask you to note this on a travel diary. Again, this should only take a few minutes. On the days you do not leave the village you will not have to do anything.

3. We will arrange to meet again after the two weeks for less than 90 minutes so that I can collect your trip logs and travel diaries, remove the devices, and gather some further information. Also, you will be asked to:

    a. Complete a few checklists on transportation use and activities you regularly do in and outside the Village.

    b. Complete some short questionnaires concerning how often you drive in various situations, your comfort level, as well as a puzzle, walking and vision task.

    c. Although optional, you may wish to complete the scale regarding balance confidence again so we can examine reliability; that is, the extent to which the scale shows consistent results across time for multiple respondents. .

    d. And finally a short interview or small group discussion with other residents concerning experiences over the past two weeks and to get feedback on transportation available in your Village (e.g., Village bus)) and nearby (e.g., bus routes). We are also interested in your suggestions for how services could be improved.

If you agree to participate, you will also be asked for your permission for the research team to access the data that the Village routinely collects regarding the number of falls and/or accidents you and other residents may have had over the last few years.

WHAT ARE THE POTENTIAL BENEFITS ASSOCIATED WITH MY PARTICIPATION?

Participants will have an opportunity to provide feedback on existing services and programs, and make suggestions for additional services to better meet the needs of all residents.

WHAT HAPPENS IF I WANT TO WITHDRAW FROM THE STUDY?

You decide which aspects of the study you want to do (e.g. completing questionnaires, checklists, travel diaries), having the electronic devices installed in your vehicle, as well as how much you want to share in the interview or small group discussion. We encourage you to participate in all the study components if possible so that we can get a complete and accurate picture of your experiences and needs, as well as, those of other residents.

If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You can request that your results be removed from the study. You may also refuse to answer any questions and still continue in the study. A decision to participate or withdraw will have no effect on the care or services you receive from the Village. This study will in no way affect your license renewal now or in the future.

WHAT PROCEDURES ARE IN PLACE TO ENSURE CONFIDENTIALITY?

All of the information you provide (e.g., on questionnaires, trip logs, or interviews) will be kept completely confidential. Names will not be used in Sarah's or Spencer's theses or in any reports or publications based on this study. Instead, data will be summarized across all participants from several retirement Village locations. The researchers **will not report** speeding or any other driving infractions. None of the electronic data recorded by the devices will be shared with any authorities.

Although your name will appear on the consent form, these forms will be kept in a locked cabinet and participants will be given a confidential identification code (ID) in place of their name. The master list (names and IDs) will be kept by the primary investigator (Anita Myers, PhD) on a password protected computer. Data entered into a computer for analysis will not contain ANY names. Illustrative quotes from discussions will also be anonymous. All paper, electronic, and audio data will be kept secure and destroyed 5 years after data collection.

WILL I BE PAID FOR PARTICIPATING IN THE PROJECT?

Participants will not be paid for their participation in the project.

HOW WILL I LEARN ABOUT THE RESULTS OF THE PROJECT?

A summary of the results will be made available to you and all other study participants shortly after the completion of the study.

HAS THE PROJECT RECEIVED CLEARANCE FROM A RESEARCH ETHICS BOARD?

You are not waiving any legal claims or rights by taking part in this research study. This study has been reviewed and received ethics clearance from the University of Waterloo, Office of Research Ethics. If you have questions regarding your rights as a research participant, contact: Director of the Office of Research Ethics, Dr. Maureen Nummelin by phone at 519-888-4567 ext 36005 or EMAIL: maureen.nummelin@uwaterloo.ca

Study interest and permission to contact form
Resident Driving & Transportation Study

Please complete this form return it to your Village office in the **next week** if possible. If you prefer, you can call or email Sarah about your interest or if you have any questions.

PHONE: XXX.XXX.XXXX
EMAIL: xxxxxxx@uwaterloo.ca

NAME: _____ (print)

Signature:_____

Suite #:_____ TELEPHONE #: (_____)_____

Best days to reach me: _____

Best time to reach me: _____

Please check **one** of the following boxes:

☐	Yes, I **would like to participate**. I give the researchers (Sarah Sousa or Spencer Gooderham) permission to call me and possibly arrange a time to meet.
☐	I am **not sure** if I want to participate, I would like to hear more. I give the researchers (Sarah Sousa or Spencer Gooderham) permission to call me and have a brief conversation to explain the study further and answer any questions I have.

UNIVERSITY OF WATERLOO

School of Public Health and Health Systems

RESIDENT DRIVING & TRANSPORTATION STUDY

Consent Form

RESIDENT NAME: _____ **SUITE #**: _____

I have read the information letter about a study being conducted by **Sarah Sousa** and **Anita Myers**, PhD, from the School of Public Health and Health Systems at the **University of Waterloo**. This study has been explained to my satisfaction and I have had the opportunity to ask questions. I was informed that my participation in this study (including completing materials or contributing to discussions) is voluntary and will in no way affect the services provided to me by Luther Village on the Park and the University of Waterloo. In addition, I was informed that:

- I may withdraw from the study at any time
- All identifying information collected will be kept totally confidential
- The study results will be summarized across all study participants
- Consent forms will be kept in a locked cabinet and will be destroyed after five years

This project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact Dr. Maureen Nummelin, Director, Office of Research Ethics at (519) 888-4567 ext. 36005 or maureen.nummelin@uwaterloo.ca.

I understand that in order to gain a complete understanding of functional independence and mobility associated with transportation use, the research team would like to access data routinely collected by the Village on the number of falls and accidents residents may have had over the last few years.

I agree to allow the researchers to access information routinely collected by the Village on the number of falls and accidents I have had over the last few years. ☐ YES ☐ NO

(…OVER…)

By signing this consent form, I am not waiving my legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study. ☐ YES ☐ NO

Resident Name: _____
(please print)

Signature: _____

Date: _____

Name of Witness: _____
(please print)

Signature: _____

Date: _____

Appendix E

Note: Minor changes made for LV residents are highlighted

Checklist for Session One

Participant ID: _____ Date: _____

Time (start): _____ Time (end): _____

		Notes
Consent form	☐	
Background Questionnaire	☐	
Driving Habits Questionnaire	☐	
GDS-15 and Health & Wellness Slips	☐	
ABC Scale	☐	
VPS Scale	☐	
Trip Logs, Travel Diaries & instructions	☐	
FAQ Sheet (give to them)	☐	
Install CarChip	☐	
Install Otto (adapter, pad)	☐	
Record odometer reading	☐	
Clipboards w/ pen and logs	☐	

Device Information

CarChip Number: _____

Otto Number: _____

Adapter Number: _____

Otto Connecting Wire Number: _____

Background Questionnaire

Part A: Please tell us about yourself.

1. Age? _____ 2. Gender? ☐ Male ☐ Female

3. Highest level of education:
☐ some high school
☐ completed high school
☐ some college or university
☐ completed college or university
☐ graduate or professional degree

4. Are you still employed: ☐ full-time ☐ part-time ☐ retired ☐ did not work out of home

5a) If you are retired, how long ago did you retire? _____ (# years)

b) Primary occupation: _____

6. When did you move to this Village? __ __ __ __ year; __ __ month (if recall)

7. Do you live in:
☐ an apartment with full kitchen
☐ an apartment with kitchenette (mini fridge)
☐ a room on the main floor

8. Are you currently:
☐ married ☐ divorced ☐ widowed ☐ never married

9)a. If **married**, where does your spouse live? (if not married go to **Question 10**)
☐ in the same room, apartment or condo as me
☐ in another part of this village
☐ in a house, apartment/condo in the <u>same city</u>
☐ in a house, apartment/condo in <u>another city or town</u>:_____ (name)
☐ in another type of housing, specify:_____

b) If married, does your spouse still drive? ☐ No ☐ Yes

Please continue to the next page…

10. Do you have relatives in the area (within about 15 kilometers or 10 miles)?
☐ No ☐ Yes

11. Please estimate your gross annual income from all sources, before taxes :
☐ less than $50,000 ☐ $50,001 – $74, 999 ☐ $75, 000 or over

Part B: Now a few questions on where you lived before you moved to the Schlegel Village.

1. Name of the city, town, or country: _____

2. Before you moved to the Schlegel Village, did you live in a:

☐ house or townhouse If so, was it? ☐ single level OR ☐ multi-level
☐ apartment or condo
☐ another retirement complex

3. Please describe the main reason(s) you moved to the Schlegel Village? _____
_____
_____

Part C: Now a few questions about your health and activities

1. Overall, would you say your health is:
☐ Excellent ☐ Good ☐ Fair ☐ Poor

2. Do you ever use a cane or walker outdoors? ☐ No ☐ Yes
indoors? ☐ No ☐ Yes

3. Do you ever use a motorized wheelchair? ☐ No ☐ Yes
scooter? ☐ No ☐ Yes

4. Are you able to walk a quarter mile (or 400 meters) with or without assistance?
☐ No ☐ Yes ☐ Not sure

Please continue to the next page…

5. In the **past year**, have you fallen (ended up on the ground or floor)? (If no, go to **Question 6**) ☐ No ☐ Yes

If yes, please answer the following questions:

Have you fallen more than once? ☐ No ☐ Yes

Were you injured as a result of the fall(s)? ☐ No ☐ Yes

Did you have trouble getting up? ☐ No ☐ Yes

6. Have you been **diagnosed** with any of the following? Check all that apply.

☐ arthritis ☐ osteoporosis ☐ diabetes

☐ Parkinson's ☐ stroke ☐ hearing problems

☐ Multiple Sclerosis ☐ high blood pressure, cholesterol, heart problems

☐ glaucoma ☐ macular degeneration ☐ cataracts (even if repaired)

7. Do you wear **prescription** glasses or contacts for driving?

☐ All the time ☐ Sometimes ☐ Never

8. Compared to others your age, would you say your **eyesight** is:

☐ Better than most ☐ About the same ☐ Worse than most

9. Are you currently taking any **prescription medications**? ☐ No ☐ Yes

10. Do you experience any of the following **difficulties**? Check all that apply.

☐ staying awake or remaining alert
☐ keeping your balance
☐ initiating movement (e.g., walking after standing still)
☐ persistent pain
☐ limited strength or movement

Thank you for completing this.

Please let us know if any of the questions were not clear.

NOTE: Question #7 replaced with the following for the LV sample:

7. Do you live in: ☐ townhome (Garden Villa Suites)
☐ condo (indoor) Atrium Suites
☐ a rented room (assisted care)

Driving History and Habits Questionnaire

Part A: Please tell us about your driving history.

1. How old were you when you got your driver's license? _____

2. Did you drive to work (more than 1 hour each way)? ☐ No ☐ Yes

Before you moved to the Village:

3. Were there any **other drivers** in your household? ☐ No ☐ Yes

   If yes, who? ☐ spouse ☐ other

   If yes, who was the primary driver? ☐ me ☐ my spouse ☐ other

4. Did anyone rely on you to drive them? ☐ No ☐ Yes

5. In the **month before** you moved, how often did you drive? _____ (~ days/week)

6. Did you consider or did anyone suggest giving up your license or car (thinking you might not need to drive anymore once you moved to the Village)?

   ☐ No ☐ Yes Regardless, are you glad you kept driving? ☐ Yes ☐ No

Part B: Now, please tell us about your **current** driving habits.

7. How many **days a week** do you **normally** drive now? _____

8. Compared to other seasons, in the **winter** do you tend to drive:

   ☐ much less often ☐ a little less ☐ about the same ☐ more often

9. What **types of roads** do you typically drive on? Check all that apply.

   ☐ residential streets ☐ main city streets ☐ rural roads

   ☐ freeways (e.g., 400 series) ☐ highways (e.g., Hwy 6,7, and 8)

10. What **time(s) of the day** do you usually drive? Check all that apply.

   ☐ morning ☐ afternoon ☐early evening (before dark) ☐ at night (after dark)

Please continue on next page…

11. Overall, **compared to 10 years ago**, do you drive:

☐ much less often ☐ a little less ☐ the same ☐ more often

12. How do you **prefer** to get around?

☐ drive yourself ☐ have someone drive you ☐ taxis ☐ bus

☐ special transit services ☐ walk ☐ Village Shuttle

13. Do you prefer to drive alone or with a passenger? ☐ alone ☐ with passenger

14. Does anyone **rely on you** to drive them? ☐ No ☐ Yes
(Note: this person may or may not live with you)

15. To what extent **do you worry about car related expenses**? (such as gas, maintenance, repairs, licensing and insurance costs)

☐ Often ☐ Sometime ☐ Rarely ☐ Never

16. Who takes your household vehicle in for **regular servicing**?

☐ Myself ☐ Other: (relation, e.g., son) _____

17. Do you change your tires in the winter? ☐ No ☐ Yes

18. Have you **discussed your driving** with any of the following people?

a. An eye care professional ☐ No ☐ Yes

b. A physician ☐ No ☐ Yes

c. Family members ☐ No ☐ Yes

c. Friends ☐ No ☐ Yes

19. Has anyone **suggested** that you **limit** or **stop driving**? ☐ No ☐ Yes
If **yes**, who? Check all that apply.

☐ Family ☐ Friends ☐ Your physician ☐ An eye care professional

Please continue on next page…

20. Have you yourself thought about **giving up driving** in the next few years?

☐ No ☐ Yes If so, why? _____

_____

21. Do you ever have difficulty staying awake or alert when driving?

☐ Often ☐ Sometimes ☐ Never

22. Have you recently (past few years) taken **any driving courses**? ☐ No ☐ Yes

If **yes**, with whom? (e.g., CAA) _____

23. All Ontario drivers aged 80 and over are required to take the Ministry's Senior Driver Renewal Course. If you are over 80, when did you last take this course?

__ __ __ __ (year) ☐ Not applicable, I am not 80 yet

Regardless, how do you feel about this mandatory renewal process for seniors?

☐ I think it is a good idea ☐ Personally, I don't want to go through this

Other thoughts?_____

_____

24. In the past year, have you had any of these **problems when driving**?

a. Accidents involving another vehicle ☐ No ☐ Yes
   If **yes**, how many accidents? _____
b. Were you at fault in any of these accidents? ☐ No ☐ Yes
c. Near misses (almost an accident) ☐ No ☐ Yes
d. Backing into things besides other cars ☐ No ☐ Yes
e. Getting lost ☐ No ☐ Yes
f. Traffic violations with loss of demerit points ☐ No ☐ Yes

Please continue on next page…

25. Have you even been asked by the Ministry of Transportation:

a. To have a vision or medical examination? ☐ No ☐ Yes
b. To take a road test ☐ No ☐ Yes
c. To do a comprehensive or rehabilitation driving assessment ☐ No ☐ Yes

26. What are the **main reasons** that you continue drive? (Check all that apply)

☐ to do shopping, banking and other errands
☐ to get to appointments (e.g., with doctor, dentist, lawyer)
☐ to visit family and friends
☐ to attend religious services
☐ to get to recreational facilities, social, cultural or sports events
☐ other (volunteer, employment), specify: _____

27. How **important** is it for you, personally, to **continue** to drive? (circle **one**).

1	2	3	4	5
Extremely	Very	Moderately	Somewhat	Not that Important

28. Using the scale above, please rate **how important** (1 to 5) it is for you to **keep driving** for each of the following reasons:

a. To maintain my present lifestyle (go when & where I want) _____
b. To maintain my freedom and independence _____
c. To meet commitments such as volunteer work _____
d. Public transportation is inconvenient _____
e. Other people count on me to drive them _____
f. I don't want to bother others for rides _____
g. I have physical difficulty walking or using public transport _____

Thank you for completing the questionnaire.

GDS-15 Scale **(Removed for participants)**

Mood Scale

Choose the best answer for how you have felt over the **past week**:

1. Are you basically satisfied with your life? YES / NO

2. Have you dropped many of your activities and interests? YES / NO

3. Do you feel that your life is empty? YES / NO

4. Do you often get bored? YES / NO

5. Are you in good spirits most of the time? YES / NO

6. Are you afraid that something bad is going to happen to you? YES / NO

7. Do you feel happy most of the time? YES / NO

8. Do you often feel helpless? YES / NO

9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO

10. Do you feel you have more problems with memory than most? YES / NO

11. Do you think it is wonderful to be alive now? YES / NO

12. Do you feel pretty worthless the way you are now? YES / NO

13. Do you feel full of energy? YES / NO

14. Do you feel that your situation is hopeless? YES / NO

15. Do you think that most people are better off than you are? YES / NO

The Activities-specific Balance Confidence (ABC) Scale

For each of the following activities, please indicate your level of self-confidence from 0 (no confidence) to 100% (completely confident).
If you normally do not do an activity, try and imagine yourself in the situation.

How confident are you that you can maintain your balance and remain steady when you....

	No confidence		Moderately		Completely
	0%	**25%**	**50%**	**75%**	**100%**
1. walk around inside your apartment & the Village?	☐	☐	☐	☐	☐
2. walk around outside (on the Village grounds)?	☐	☐	☐	☐	☐
3. walk outside at night?	☐	☐	☐	☐	☐
4. bend over and pick up a slipper from the front of a closet floor?	☐	☐	☐	☐	☐
5. walk up or down stairs?	☐	☐	☐	☐	☐
6. reach for a small can off a shelf at eye level?	☐	☐	☐	☐	☐
7. stand on your tip toes and reach for something above your head?	☐	☐	☐	☐	☐
8. stand on a chair and reach for something?	☐	☐	☐	☐	☐
9. get in or out of a shower or bathtub?	☐	☐	☐	☐	☐
10. sweep or vacuum the floor or carpet?	☐	☐	☐	☐	☐

~Please continue on next page~

How confident are you that you can maintain your balance and remain steady when you....

	No confidence		Moderately		Completely
	0%	**25%**	**50%**	**75%**	**100%**
11. walk outside to a car parked in the driveway?	☐	☐	☐	☐	☐
12. get into or out of a car, van or taxi?	☐	☐	☐	☐	☐
13. walk across a busy parking lot?	☐	☐	☐	☐	☐
14. walk up or down a ramp?	☐	☐	☐	☐	☐
15. walk in a crowded mall, where people rapidly walk past you?	☐	☐	☐	☐	☐
16. are bumped into by other people as you walk through the mall?	☐	☐	☐	☐	☐
17. step onto or off of an escalator while holding onto a railing?	☐	☐	☐	☐	☐
18. walk down stairs or ramps when carrying something in one hand?	☐	☐	☐	☐	☐
19. walk outside on icy or slippery sidewalks?	☐	☐	☐	☐	☐
20. walk outside when it is very windy?	☐	☐	☐	☐	☐
21. walk in heavy rain while holding an umbrella?	☐	☐	☐	☐	☐
22. walk on uneven paths or sidewalks?	☐	☐	☐	☐	☐
23. step on or off a sidewalk curb or median?	☐	☐	☐	☐	☐

~Please continue on next page~

How confident are you that you can maintain your balance and remain steady when you....

	No confidence		Moderately		Completely
	0%	**25%**	**50%**	**75%**	**100%**
24. get on and off a bus?	☐	☐	☐	☐	☐
25. stand on a bus or train when it starts or stops?	☐	☐	☐	☐	☐
26. cross a busy street at a timed or signaled pedestrian crosswalk?	☐	☐	☐	☐	☐
27. cross a busy street with no pedestrian crosswalk?	☐	☐	☐	☐	☐

Thank You! Let us know if you have any questions.

Note: Highlighted numbers reflect the items that were slightly modified from the ABC-16

Vitality Plus Scale

This scale looks at how you are **currently feeling**. For each statement, circle a number from 1 to 5 that best describes you. For example, if you usually fall asleep quickly then you want to circle (5). Otherwise, circle a number from 1 to 4, depending on how much difficulty you usually have falling asleep.

Takes a long time to fall asleep	1	2	3	4	5	Fall asleep quickly
Sleep poorly	1	2	3	4	5	Sleep well
Tired or drowsy during the day	1	2	3	4	5	Feel rested
Rarely hungry	1	2	3	4	5	Excellent appetite
Often constipated	1	2	3	4	5	Do not get constipated
Often have aches & pains	1	2	3	4	5	Have no aches & pains
Low energy level	1	2	3	4	5	Full of pep & energy
Often stiff in the morning	1	2	3	4	5	Not stiff in the morning
Often restless or agitated	1	2	3	4	5	Feel relaxed
Often do not feel good	1	2	3	4	5	Feel good

Frequently Asked Questions (FAQs) About the Devices

At our first appointment, I will explain the two devices that are being installed in your vehicle for the two week monitoring period. This sheet also explains how the devices work, what you can expect and what you should do in certain circumstances.

1. How do the devices work?

The CarChip is the small device that plugs into your diagnostic port (usually located under the steering wheel). The second device is a Global Positioning System (GPS) unit (called the Otto) which is mounted on your dashboard via a sticky pad and plugged into your lighter/cigarette adapter. Together, these devices store data from your car's computer, including: distance traveled, duration and general location (using the GPS system and local maps). The data is recorded each time the car is turned on.

In most cases **you do not have to do anything** with these devices nor will they affect your vehicle in any way. However there are some important things you should know.

2. What if I need to take my car in for servicing?

As we discussed, try your best not go in for regular servicing over this two week period. However, if you need to please remind the mechanic to put the CarChip back in if they remove it (for diagnostic purposes). I will also show you how to do this. The Otto on the dashboard should be okay, however, the cables (connections) may get bumped (disconnected). I will show you how to reconnect these.

3. Why is it important that the Otto stay on the dashboard?

The Otto will not affect your view, but it is important that it stays on the dashboard to pick up satellite signals through your windshield. If moved (example to the cup holder), it will not pick up these signals. So please leave it on the dashboard.

4. How do I know the Otto is on and working?

When the vehicle is turned on, **a green (LED) light** should appear on the Otto. Don't worry if this takes a few minutes. If the device has been off for several hours it takes time to find the satellite signals. The signal can also temporarily be lost if you go under a bridge or past tall buildings.

5. What if I hear a message ("Outside Coverage Area") or the light flickers?

The Otto has been mapped for your municipal area. If you drive outside this area, you will hear a voice say **"Outside Coverage Area"**. Unfortunately, this cannot be turned off. While it may be annoying, just ignore the message as the device is still working.

When the vehicle goes outside the coverage area, you will also notice that the solid green light starts flashing. Again please ignore, this should stop in two seconds.

6. What if the Otto light stays on after my car is turned off?

In most cars, the Otto lights turn off once your car is turned off. If your light stays on, it means that your socket is "live" and the Otto is being constantly supplied with power. This is a problem for the study as the Otto will keep recording whether the car is on or off and will run out of memory.

If this occurs, we need you to **manually remove** the Otto's power adapter from the socket. Each time you turn off your car, please remember to **unplug** the adapter from the socket and **plug it back in** the next time you turn on your car. I will show you how to do this in case it is necessary. **Please leave a message at XXX-XXX-XXXX if this occurs. And call if you have any difficulty with this.**

7. What should I do if the Otto light keeps going off and on?

This means that the connection is loose. This can happen if you drive over a big bump. When you stop driving, please check if the **power adapter is pressed securely into the socket.** You can feel this when you can no longer turn/twist your adapter. I will also show you how to do this if case this happens.

8. What if I have two power sockets? Which one should I use?

Some vehicles may have more than one power outlet or socket: the main one (located on or near the front panel) and another for an accessory device, which may be on the arm rest or in the glove compartment. The main power source (front panel) is usually best for electronic devices such as the Otto. Do not worry, I will choose the best socket to connect the Otto when I install the device. But it is important you don't change this.

If you have any problems with the devices or questions about the trip logs or anything else over this two week period, **please call XXX-XXX-XXXX**. Leave a voice message if I am not there and I will return your call as soon as possible.

Vehicle Recording Sheet

Name of driver: _____ Participant ID#: _____

VEHICLE INFORMATION

Vehicle make _____ Vehicle year _____

Vehicle model _____

ODOMETER READINGS

	Date	Reading
First Session	_____	_____
Second Session	_____	_____

DEVICE INFORMATION

CarChip Number: _____

Otto Number: _____

Adapter Number: _____

Otto Connecting Wire Number: _____

☐ Given non-participant trip logs

Appendix F

Car Trip Log Instructions

Please leave the clipboard with these logs in your vehicle and **complete one for each driving trip.** An example is provided to assist you.

Before you start your trip, please write in:

- the **date**, **approximate time**, and the **odometer reading**

You can complete the rest of the log when you return. Check off the following:

- **who drove** (you, someone else or shared the driving). If **someone else** drove your vehicle (part or the entire trip), please indicate your **relationship** to this person (partner, friend, son/daughter or other such as granddaughter).

Note: if someone else drove your vehicle and **you were not in the vehicle** (as a passenger), the rest does not need to be completed. Please ask them to fill out the other log on blue paper.

If you drove part of the trip, or were a passenger, please complete the log.

If you drove the entire trip,

- did you have **any passengers**? If so indicate how many and general relationship (see example).
- please describe what the **weather** was like for the trip as best you can.

At the **bottom of the log**, please note:

- **how many stops** you made, approximate **time**, purpose (generally what you did or where you went (e.g., gas station or got gas) & town or city.
- if you did not drive the entire trip, check which parts of the trip you drove
- please put in the **odometer reading** at the end of the trip (back home).

If you have any questions or problems filling this out, please call me.

Sarah Sousa Telephone: XXX-XXX-XXXX Leave a message.

Participant ID: _____ **Driver Initials:** ___

Car Trip Log

Date:_____ **Departure time:** _____ ☐ a.m. ☐ p.m.

Odometer reading at the **start** of the trip: _____ km

☐ **I drove** the entire trip ☐ we **shared** the driving
☐ **someone else drove** the entire trip (**I was a passenger**)
☐ **someone else drove** my vehicle and **I was not in the car***

*do not need to complete the rest. Please ask that person to fill out the blue trip log.

If **someone else** drove and **you were in the vehicle**, who was this person?

☐ Partner ☐ Friend ☐ Son/Daughter ☐ Other: _____
☐ Not applicable, I drove the entire trip

Did you have any passengers? ☐ No ☐ Yes If yes, how many? _____

What is your relationship to the passenger(s)? Check **all** that apply.

☐ Partner ☐ Friend ☐ Son/Daughter ☐ Other: _____

What was the **weather** like?

_____

Odometer reading at the **end of the trip**: _____

Stops	Time	Purpose	Town/City	I drove
1				☐
2				☐
3				☐
4				☐
5				☐
6				☐

Participant ID: WP.2012.132 **Driver Initials:** T.S

Car Trip Log Example

Date: *November 2nd 2012* **Departure time:** *10:15* ☒ a.m. ☐ p.m.

Odometer reading at the **start** of the trip: *92 245* km

☐ **I drove** the entire trip ☒ we **shared** the driving
☐ **someone else drove** the entire trip (**I was a passenger**)
☐ **someone else drove** my vehicle and **I was not in the car***

*do not need to complete the rest. Please ask that person to fill out the blue trip log.

If **someone else** drove and **you were in the vehicle**, who was this person?

☒ Partner ☐ Friend ☐ Son/Daughter ☐ Other: _____
☐ Not applicable, I drove the entire trip

Did you have any passengers? ☐ No ☒ Yes If yes, how many? *1*

What is your relationship to the passenger(s)? Check **all** that apply.

☒ Partner ☐ Friend ☐ Son/Daughter ☐ Other: _____

What was the **weather** like?
Light snow when we left, but sunny on the way home

Odometer reading at the **end of the trip**: *92 291 km*

Stops	Time	Purpose	Town/City	I drove
1	*10:15 a.m.*	*Got Gas*	*Kitchener*	☒
2	*10:30 a.m.*	*Shopping*	*Waterloo*	☒
3	*Noon*	*Met friends for lunch*	*Waterloo*	☒
4	*2:00 p.m.*	*Partner drove home*	*Kitchener*	☐
5				☐
6				☐

Non-Participant Trip Log

Instructions: The owner of this vehicle is currently participating in a driving study conducted by a researcher (Sarah Sousa) from the University of Waterloo. **If others drive their vehicle over the two-week study period, they are being asked to fill out this log (for each round trip: to and from the Village) so we can account for the additional mileage.**

Please follow the example below and enter the information for each round trip. Please be sure to put in the odometer reading at the start of the trip (i.e., before driving) as well as the end (when you return the vehicle to the owner). If you have any questions, please call me (Sarah Sousa) at XXX-XXX-XXXX. Leave a message if I am not there and I will get back to you.

Date	Departure Time	Return Time	Relationship to vehicle owner & your initials	Destination(s) (City/Town)	Odometer reading at the START of the trip	Odometer reading at the END of the trip
10/23/12	9:20 a.m.	11:40 am	Friend, AJ	Guelph	50, 246 km	50, 275 km

Please fill in the log following the example above. Make a separate entry for each day.

Date	Departure Time	Return Time	Relationship to vehicle owner & your initials	Destination (City/Town)	Odometer reading at the START of the trip	Odometer reading at the END of the trip

Travel Diary Instructions
(for trips outside the Village where you did not take your car)

In addition to completing a trip log each time you take your car out over the next two weeks, we would really appreciate it if you could complete this diary concerning trips you made outside the village when someone else was driving or you used other modes of travel (walking, bus, taxi).

This should only take a few minutes. You may wish to fill this out after you return home or at the end of the day if you are making more than one trip.

There are 14 sheets each with a date. Please indicate **how many trips you made outside the village** grounds (using other means of travel besides driving yourself). If you did not leave the village that day, put in zero (0).

Two examples are attached to assist you.

For each trip, please put in the **approximate time** you left (e.g., 9:30, check am or pm), indicate **mode of travel** (e.g., by car or bus), **trip purpose** (generally where you went or what you did (e.g., shopping, volunteer work), **how you got home** (same or different, e.g., took taxi there and got a ride back), as well as the **approximate time** you returned home.

If you travelled **by car,** please indicate **who drove**. You don't need to give their name, just your **relationship** (e.g., daughter, friend) and their **initials**. Also you don't need to provide specific addresses for where you went, but please indicate if you travelled **out of town** and if so where (e.g., Burlington).

Each sheet has room for up to 3 round trips per day. If you made more than 3 trips that day, use the extra sheets provided. Please be sure to put your first name and initial, as well as the **date** at the **top** of the page.

Please call me if you have any questions about these diaries. Leave a message if I am not there and I will return your call as soon as I can.

Sarah Sousa XXX-XXX-XXXX

Travel Diary

Participant ID: _____ Initials: ____ Date: _____ # of Trips Today: _____

TIME LEFT	MODE OF TRAVEL TO DESTINATION	TRIP PURPOSE(S)	MODE OF TRAVEL BACK HOME	RETURN TIME
TRIP 1				
__:__ ☐ am ☐ pm	☐ Walked ☐ Car: _____drove ☐ Public bus ☐ Taxi ☐ Village bus ☐ Paratransit Service	_____ _____ _____ _____ _____	☐ same ☐ different (specify): _____ _____ _____	__:__ ☐ am ☐ pm
Was the reason you chose not to drive on this trip due to bad weather? ☐ Yes ☐ No				
TRIP 2				
__:__ ☐ am ☐ pm	☐ Walked ☐ Car: _____drove ☐ Public bus ☐ Taxi ☐ Village bus ☐ Paratransit Service	_____ _____ _____ _____ _____	☐ same ☐ different (specify): _____ _____ _____	__:__ ☐ am ☐ pm
Was the reason you chose not to drive on this trip due to bad weather? ☐ Yes ☐ No				
TRIP 3				
__:__ ☐ am ☐ pm	☐ Walked ☐ Car: _____drove ☐ Public bus ☐ Taxi ☐ Village bus ☐ Paratransit Service	_____ _____ _____ _____ _____	☐ same ☐ different (specify): _____ _____ _____	__:__ ☐ am ☐ pm
Was the reason you chose not to drive on this trip due to bad weather? ☐ Yes ☐ No				

Travel Diary Examples

Participant ID: W.P.2012.669 Initials: T.S Date: *December 12 2012* # of Trips Today: *3*

TIME LEFT	MODE OF TRAVEL TO DESTINATION	TRIP PURPOSE(S)	MODE OF TRAVEL BACK HOME	RETURN TIME
TRIP 1				
9:00 ☒ am ☐ pm	☐ Walked ☒ Car: *son in-law (J.M)* drove ☐ Public bus ☐ Taxi ☐ Village bus ☐ Paratransit Service	*Went shopping, to the post office, and back to my apartment at the Village.*	☒ same ☐ different (specify):	*10:30* ☒ am ☐ pm
Was the reason why you chose not to drive on this trip due to bad weather? ☒ Yes ☐ No				
TRIP 2				
11:45 ☒ am ☐ pm	☐ Walked ☒ Car: *son in-law (J.M)* drove ☐ Public bus ☐ Taxi ☐ Village bus ☐ Paratransit Service	*Went with my son in-law to have lunch at a local restaurant.*	☐ same ☒ different (specify): *I took a taxi home; my son in-law had to go back to work.*	*1:00* ☐ am ☒ pm
Was the reason why you chose not to drive on this trip due to bad weather? ☒ Yes ☐ No				
TRIP 3				
2:10 ☐ am ☒ pm	☐ Walked ☐ Car: _____ drove ☐ Public bus ☐ Taxi ☒ Village bus ☐ Paratransit Service	*I went on the trip to the local recreation centre to go swimming.*	☒ same ☐ different (specify):	*3:15* ☐ am ☒ pm
Was the reason why you chose not to drive on this trip due to bad weather? ☐ Yes ☒ No				

Categorization of Trip Purposes

Category	Example Responses
Shopping and errands	Shopping (e.g., grocery shopping), trips to the pharmacy, banking, getting gasoline, hair appointments.
Social, entertainment, education recreation	Going out to eat, movie theatres, visiting others, special events (e.g., birthday parties, weddings), shopping with others as a social activity, playing cards, lecture series, attending lecture series or presentations.
Assisting others	Driving others to their destinations (e.g., to shops, appointments), doing shopping for others, house-sitting.
Physical activities	Fitness classes, bowling, hiking, walking at the recreation centre
Religious activities	Going to church, bible studies groups, choir.
Paid work	Full-time or part-time paid work
Medical appointments	Doctor, optometrists, physiotherapist, chiropractor, dentist or massage appointments for the participant or spouse/roommate
Volunteer activities	Meetings and other work done for others that was unpaid
Other	Visiting a sick friend/relative (in hospital or nursing home), car emergency, cemetery visits.
Out-of-town trips (also included in the counts above)	Trips outside of town of the Schlegel Village or Luther Village locations as determined by municipal city boundaries.

Note: definitions have been modified slightly from Crizzle, 2011 (thesis).

Appendix G

Checklist for Session Two

Participant ID: _____ Date: _____

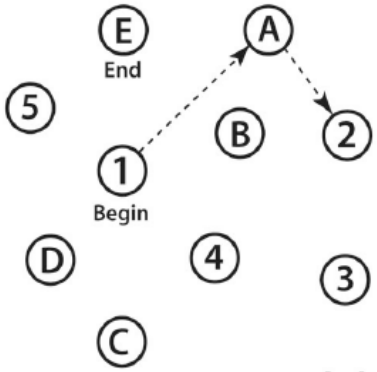
Time (start): _____ Time (end): _____

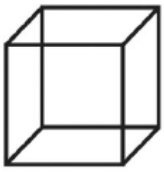
		Notes
Collect trip logs & clipboard	☐	
Remove devices, pad, adaptor cable	☐	
Record odometer reading	☐	
Collect travel diaries	☐	
MoCA	☐	
ABC	☐	
DCS-D and DCS-N	☐	
Pelli-Robson 2 charts, photometer, stand, tools & tape	☐	
Rapid Paced Walk Tape measure, stopwatch, tape	☐	
PDA	☐	
SDF	☐	
SDA	☐	
Transportation Use Questionnaire	☐	
Amenities & Service Use checklist	☐	
Activity Questionnaire	☐	
Village Calendars	☐	
Interview	☐	

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME :
Education : Date of birth :
Sex : DATE :

VISUOSPATIAL / EXECUTIVE





Copy cube

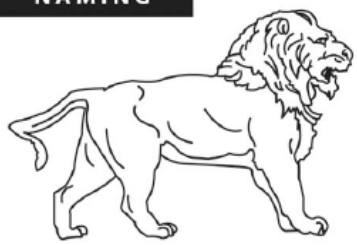
[ ] [ ]

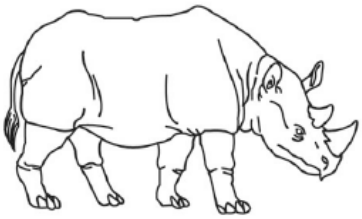
Draw CLOCK (Ten past eleven)
(3 points)

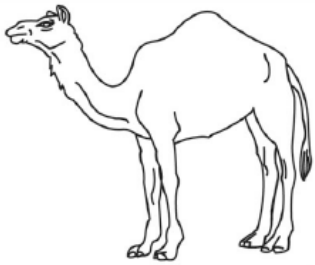
[ ] Contour [ ] Numbers [ ] Hands

POINTS __/5

NAMING







[ ] [ ] [ ] __/3

MEMORY Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1st trial					
2nd trial					

No points

ATTENTION Read list of digits (1 digit/ sec.).

Subject has to repeat them in the forward order [ ] 2 1 8 5 4
Subject has to repeat them in the backward order [ ] 7 4 2 __/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors
[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B __/1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65
4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt** __/3

LANGUAGE Repeat : I only know that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ] __/2

Fluency / Name maximum number of words in one minute that begin with the letter F [ ] _____ (N ≥ 11 words) __/1

ABSTRACTION Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler __/2

DELAYED RECALL

	FACE	VELVET	CHURCH	DAISY	RED
Has to recall words **WITH NO CUE**	[ ]	[ ]	[ ]	[ ]	[ ]
Optional Category cue					
Optional Multiple choice cue					

Points for UNCUED recall only __/5

ORIENTATION [ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City __/6

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Normal ≥ 26 / 30

TOTAL __/30
Add 1 point if ≤ 12 yr edu

Administered by: _____

Driving Comfort Scales

Please rate your level of comfort by choosing one option from the scale (0, 25, 50, 75 or 100 %) and checking the box beside each situation.

If you do not normally drive in the situation, imagine how comfortable you would be if you absolutely had to go somewhere and found yourself in the situation.

In your ratings, consider confidence in your own abilities and driving skills, as well as the situation itself (including other drivers).

Assume **normal traffic flow** unless otherwise specified.

'How **comfortable** are you driving in the **daytime**…?'

Comfort Level	**Not confident** **0%**	**25%**	**Moderately Comfortable** **50%**	**75%**	**Completely Comfortable** **100%**
1. In light rain?	☐	☐	☐	☐	☐
2. In heavy rain?	☐	☐	☐	☐	☐
3. In winter conditions (snow,ice)?	☐	☐	☐	☐	☐
4. If caught in an unexpected or sudden storm?	☐	☐	☐	☐	☐
5. Making a left hand turn with no lights or stop signs?	☐	☐	☐	☐	☐

~ Please continue on next page ~

Comfort Level	**Not confident** **0%**	**25%**	**Moderately Comfortable** **50%**	**75%**	**Completely Comfortable** **100%**
6. Pulling in or backing up from tight spots in parking lots with large vehicles on either side?	☐	☐	☐	☐	☐
7. Seeing street or exit signs with little warning?	☐	☐	☐	☐	☐
8. On two lane highways?	☐	☐	☐	☐	☐
9. Keeping up with the flow of highway traffic when the flow is <u>over</u> the posted speed limit of 100 km/h (60 miles/h)?	☐	☐	☐	☐	☐
10. With multiple transport trucks around you?	☐	☐	☐	☐	☐
11. When other drivers tailgate or drive too close behind you?	☐	☐	☐	☐	☐
12. When other drivers pass on a non-passing lane?	☐	☐	☐	☐	☐
13. When other drivers do not signal or seem distracted?	☐	☐	☐	☐	☐

~ Please continue on next page ~

Now we would like you to rate your level of comfort when driving in the following situations **at night**.

Even if you **do not normally drive at night**, imagine that you were out in the afternoon, got delayed and it was dark on your way back.

In your ratings, consider confidence in your own abilities and driving skills, as well as the situation itself (including other drivers).

'How **comfortable** are you driving **at night** …?'

Comfort Level	**Not confident** **0%**	**25%**	**Moderately Comfortable** **50%**	**75%**	**Completely Comfortable** **100%**
1. In good weather and traffic conditions?	☐	☐	☐	☐	☐
2. In light rain?	☐	☐	☐	☐	☐
3. In heavy rain?	☐	☐	☐	☐	☐
4. In winter conditions (snow,ice)?	☐	☐	☐	☐	☐
5. When there is glare of reflection from lights?	☐	☐	☐	☐	☐
6. In unfamiliar routes (different areas), detours or sign changes?	☐	☐	☐	☐	☐
7. Making a left hand turn with no lights or stop signs?	☐	☐	☐	☐	☐

~ Please continue on next page ~

Comfort Level	**Not confident** **0%**	 **25%**	**Moderately Comfortable** **50%**	 **75%**	**Completely Comfortable** **100%**
8. Pulling in or backing up from tight spots in parking lots with large vehicles on either side?	☐	☐	☐	☐	☐
9. Seeing street or exit signs with little warning?	☐	☐	☐	☐	☐
10. On two lane highways?	☐	☐	☐	☐	☐
11. Keeping up with the flow of highway traffic when the flow is <u>over</u> the posted speed limit of 100 km/h (60 miles/h)?	☐	☐	☐	☐	☐
12. With multiple transport trucks around you?	☐	☐	☐	☐	☐
13. Merging with traffic and changing lanes on the highway?	☐	☐	☐	☐	☐
14. When other drivers tailgate or drive too close behind you?	☐	☐	☐	☐	☐
15. When other drivers pass on a non-passing lane?	☐	☐	☐	☐	☐
16. When other drivers do not signal or seem distracted?	☐	☐	☐	☐	☐

Perceived Driving Abilities (PDA) Scale

How would you rate your **current ability** to…..?
Assume daytime driving unless specified otherwise (night).

	Poor	**Fair**	**Good**	**Very Good**
1. See road signs at a distance	☐	☐	☐	☐
2. See road signs at a distance (night)	☐	☐	☐	☐
3. See your speedometer and controls	☐	☐	☐	☐
4. See pavement lines (at night)	☐	☐	☐	☐
5. Avoid hitting curbs or medians	☐	☐	☐	☐
6. See vehicles coming up beside you	☐	☐	☐	☐
7. See objects on the road (at night) with glare from lights or wet roads	☐	☐	☐	☐
8. Quickly spot pedestrians stepping out from between parked cars	☐	☐	☐	☐
9. Move your foot quickly from the gas to the brake pedal	☐	☐	☐	☐
10. Make an over the shoulder check	☐	☐	☐	☐
11. Quickly find a street or exit in an unfamiliar area and heavy traffic	☐	☐	☐	☐
12. Get in and out of your car	☐	☐	☐	☐
13. Reverse or back up	☐	☐	☐	☐
14. Make quick driving decisions	☐	☐	☐	☐
15. Drive safely (avoid accidents)	☐	☐	☐	☐

Situational Driving Frequency (SDF) Scale

Based on your present lifestyle, on average **how often** do you drive….?
Check one box for each situation.

	Never	**Rarely** Less than once a month	**Occasionally** More than once a month, but not weekly	**Often** 1 - 3 days a week	**Very Often** 4 - 7 days a week
1. In the winter?	☐	☐	☐	☐	☐
2. At night?	☐	☐	☐	☐	☐
3. On two-lane highways?	☐	☐	☐	☐	☐
4. In rural areas?	☐	☐	☐	☐	☐
5. On highways with 3 or more lanes?	☐	☐	☐	☐	☐
6. Over the posted highway speed limit?	☐	☐	☐	☐	☐
7. On one-way trips lasting over 2 hours?	☐	☐	☐	☐	☐
8. In heavy traffic or rush hour in town?	☐	☐	☐	☐	☐
9. In heavy traffic or rush hour on the highway?	☐	☐	☐	☐	☐
10. With passengers?	☐	☐	☐	☐	☐
11. Outside your village, town or city?	☐	☐	☐	☐	☐
12. In new or unfamiliar areas?	☐	☐	☐	☐	☐
13. Making left hand turns at intersections?	☐	☐	☐	☐	☐
14. Parking in tight spaces?	☐	☐	☐	☐	☐

Situational Driving Avoidance Scale

If possible, do you **try to avoid** any of these driving situations?
(*Check all that apply.)*

1. Night	☐
2. Dawn or dusk	☐
3. Bad weather conditions (in general)	☐
4. Heavy rain	☐
5. Fog	☐
6. Nighttime driving in bad weather (e.g., heavy rain)	☐
7. Winter	☐
8. First snow storm of the season	☐
9. Trips lasting more than 2 hours (one way)	☐
10. Unfamiliar routes (different areas) or detours	☐
11. Heavy traffic or rush hour in town	☐
12. Heavy traffic or rush hour on the highway (or expressway)	☐
13. Making left hand turns with traffic lights	☐
14. Making left hand turns with <u>no</u> lights or stop signs	☐
15. Parking in tight spaces	☐
16. Highways with 3 or more lanes and speed limits of 100 km/h or more	☐
17. Changing lanes on a highway with 3 or more lanes	☐
18. Two-lane highways	☐
19. Rural areas at night	☐
20. Driving with passengers who may distract you	☐
21. No: I don't try and avoid any of these situations	☐

Transportation Use Questionnaire

1. By checking the boxes below, please indicate **how often** you use each type of transportation to travel outside the Village.

Type of Transport	Frequently (weekly or more)	Sometimes (a few times per month)	Rarely (less than once a month)	Never
a) passenger in vehicle	☐	☐	☐	☐
b) public bus	☐	☐	☐	☐
c) taxi	☐	☐	☐	☐
d) paratransit	☐	☐	☐	☐
e) motorized scooter	☐	☐	☐	☐
f) motorized wheelchair	☐	☐	☐	☐
g) Village shuttle bus	☐	☐	☐	☐

2. If you receive rides from others in their vehicles, please indicate who drives. (check **all** that apply if you receive rides from more than one individual)

☐ spouse ☐ son ☐ daughter ☐ son-in-law ☐ daughter-in-law

☐ adult grandchild ☐ sibling ☐ other family member

☐ friend living in the Village ☐ friend living outside the Village

☐ volunteer drivers (e.g., from church or other community groups or agencies)

☐ not applicable, I don't receive rides from others

Please continue on next page…

3. Do you have any concerns or reservations about taking **taxis**? (Check **all** that apply.)

☐ No ☐ Yes. If yes, please check which concerns you have below.

☐ cost ☐ safety (do not know the driver) ☐ fear of robbery
☐ inconvenience (e.g., may need to wait or pay for multiple stops)
☐ cleanliness
☐ other (specify): _____

4. Do you have any concerns or reservations about taking **public transit**?

☐ No ☐ Yes. If yes, please check which concerns you have below.

☐ cost
☐ inconvenience (location of bus stops, wait times, routes)
☐ safety concerns
☐ walking distance (to and from bus stops)
☐ waiting for the bus in bad weather
☐ other (specify): _____

5. Do you have any concerns or reservations about taking the **Village bus**?

☐ No ☐ Yes. If yes, please check which concerns you have below.

☐ the bus does not go where I want to go
☐ have to sign-up too far in advance
☐ trips are not frequent enough
☐ Other (specify): _____

Village Service and Amenities Checklist (SV)

1. Please check the **services and amenities** you used over the **last month**:

☐ Hair salon

☐ Spa (manicure/pedicure etc.)

☐ General store

☐ Laundry facilities (if not in your personal unit)

☐ On-site café

☐ On-site library

☐ On-site banking services

☐ On-site optometry services

☐ On-site dental services

☐ On-site pharmacy

☐ Massage therapy

☐ Physiotherapy

☐ Kinesiologist

☐ Physician

☐ Nurse Practitioner

☐ Assistance with medication

☐ Assistance with bathing by Village staff

☐ Meals in the dining room – circle the option you typically you use:

One meal a day

Two meals a day

Three meals a day

2. Do **you** receive services from other agencies? (e.g. home care from the CCAC)

☐ No ☐ Yes

3. Check the types of **organized Village group activities** you usually participate in.

☐ Religious Services

☐ Arts and Crafts (e.g., knitting, crafts, baking, etc.)

☐ Games (e.g., bridge, bingo, shuffleboard) or computer classes

☐ Music, Theatre, Movies or Concerts

☐ Special Events outside the Village (e.g., dining "out" at a restaurant arranged by the Village, mall walk, visit to local park, etc.)

☐ Physical Activities (e.g., Tai Chi, Yoga, Pilates, strength training, Wii, walk groups),

If so, how many times in the **last week? _____**(#)

4. How would you describe your **sense of belonging** to the Village community?

☐ very strong ☐ somewhat strong ☐ somewhat weak ☐ very weak

Village Service and Amenities Checklist (LV)

1. Please check the **services and amenities** you used over the **last month**:

☐ Hair salon

☐ Spa (manicure/pedicure etc.)

☐ General store

☐ Village café

☐ On-site library

☐ On-site banking services

☐ On-site optometry services

☐ On-site dental services

☐ On-site laboratory services

☐ Massage therapy

☐ Physiotherapy

☐ Physician

☐ Wellness coordinator

☐ Martin's restaurant. For lunch? ☐ For dinner? ☐

2. Did you purchase any other services from the Village in the past month? (e.g., cleaning)

☐ No ☐ Yes If yes, please list: _____

3. Did you receive services from other agencies? (e.g. home care, grocery delivery)

☐ No ☐ Yes If **yes**, describe the services you purchase on a regular basis:

_____

Please continue on the next page

4. Check the types of **organized Village group activities** you regularly participate in.

☐ Religious Services

☐ Arts and Crafts (e.g., knitting, crafts, baking, etc)

☐ Games (e.g., bridge, bingo, shuffleboard or computer classes)

☐ Music, Theatre, or Concerts

☐ Special Events <u>outside</u> the Village (e.g., symphony, theatre, picnics)

☐ Physical Activity Classes (e.g., Tai Chi, Yoga, strength training, Wii, walk groups, line dancing),

If so, how many times in the **last week?** _____(#)

5. How would you describe your **sense of belonging** to the Village community?

☐ very strong ☐ somewhat strong ☐ somewhat weak ☐ very weak

Activities Outside the Village

1. Please go through the list of groups below and check the boxes on the left for those you belong to. For the groups you belong to please indicate on the right if you attend regularly.

Check if you belong to any of the groups below:	Attend regularly? YES	NO
☐ Sports-related group (such as a golf club, fitness centre, bowling team)	☐	☐
☐ Recreation, hobby or special interest group (such as quilting or bridge club)	☐	☐
☐ Cultural or educational group (such as book club, theatre group, lecture series)	☐	☐
☐ Service club or fraternal organization (such as Kiwanis, Knights of Columbus, the Legion, Kin Canada (Kinsman or Kinettes)	☐	☐
☐ Religious-affiliated group NOT including services (such as bible study, choir)	☐	☐
☐ Political party or group	☐	☐

2. Below is a list of various types of activities outside the Village. Please check the boxes for the ones you did in the **past month**.

☐ Shopping or errands		
☐ Ate at a restaurant	☐ Alone	☐ With others
☐ Ate at someone's home		
☐ Went to a movie, theatre or concert	☐ Alone	☐ With others
☐ Went to a sporting event / casino / racetrack etc.	☐ Alone	☐ With others
☐ Went to an educational event	☐ Alone	☐ With others
☐ Went to church, temple or synagogue	☐ Alone	☐ With others
☐ Volunteer work in the community	If **yes**, about how many hours/month? ___	
☐ Full day outings	☐ Overnight trips	
☐ Trips out of province	☐ Trips out of the country	

3. Since you moved to the Village, would you say that your involvement in community-based activities has…

☐ Increased ☐ Stayed the same ☐ Decreased

4. Overall, how **connected** to do you feel to the outside community?

☐ Very well connected ☐ Moderately connected ☐ Not well connected

5. Indicate how often you stay in touch with family and friends who live **outside the Village** through each of the following?

	At least once/week	Few times a month	Infrequently (less than once/month)	Never
They visit me at the Village	☐	☐	☐	☐
I visit them at their home	☐	☐	☐	☐
We get together at a restaurant or other location in town	☐	☐	☐	☐
We talk on the phone	☐	☐	☐	☐
We get in touch by e-mail	☐	☐	☐	☐

6. Since you moved to the Village, would you say that the **size of your social network** (number of family/friends you have regular contact with)…

☐ Increased ☐ Stayed the same ☐ Decreased

7. When was the last time you left the Village for any reason?

☐ In the last week ☐ In the last month ☐ In the last 3 months ☐ Don't Recall

Thank you for completing this questionnaire.
Please let us know if any of the questions were not clear.

Interview Script

Name: _____ Date: _____ Village: _____

Part A: Review of Travel Diaries

Go through the travel diaries while they are doing the questionnaires. Make notes on what was missing. Ask the participant about anything missing (i.e., blank travel diaries for certain days: confirm 0 trips) or incomplete. Ask whether they had any difficulty completing the diaries & logs.

Looking at your travel diaries:

1. Would you say that your travel patterns (# of trips outside the Village when you did not drive) over the last two weeks were **fairly typical?**

   ____ Yes ____ No, I took more trips than usual ___ No, fewer trips that usual

2. Do you usually use these modes of travel? ____ Yes ____ No
   If no, explain what was different:

   _____

3. Were there any special circumstances (e.g., illness) events (e.g., birthdays or appointments) or cancellations in the past two weeks that may have affected your usual travel patterns?

   _____

Part B: Driving experiences over the monitoring period

1. How about your driving? Would you say that you drove:
   ___ more than usual ___ less than usual? Or ___ about the same amount

Prompt: any special circumstances or events that caused you to drive more (or less) than usual?

Prompt: was weather a factor? Did you cancel or postpone any trips you planned to make?

2. Would you say that the last two weeks were fairly typical in terms of your usual driving (e.g., how much, when and where, and # of passengers)?

   ☐ Yes ☐ No *Prompt: what was unusual?*

3. Over the last two weeks, did you experience any vehicle or driving problems?
   Probes: car broke down, accidents involving other vehicles, near misses?

4. Do you feel having the devices in your vehicle affected your driving behaviour in any way?
   ☐ No ☐ Yes How so?

Part C: Driving Restrictions & Thoughts on Transitioning to Non-driving

1. Generally speaking, what are the kinds of events/activities you might cancel or postpone if you did not feel like driving (e.g., when you are tired or the weather or road conditions are not good)?

_____

_____

_____

2. Most people eventually stop driving. What kinds of things might lead you to stop driving?

(*Could refer back to Ques. 6, 18-20 in DHHQ)*

_____

_____

_____

3. If you were no longer able to drive, what aspect of your life would be affected the most?

_____

_____

4. Do you feel you have the resources and support that you need when you eventually make the decision to stopping driving? ☐ Yes ☐ No
If **no**, what kind of resources/support might the Village provide?

_____

_____

_____

Part D: Ridesharing experience with other residents

1. Do you ever give rides in your car to other residents in the Village? ☐ Yes ☐ No

   If yes, about how often? _____

2. Do you ever get rides from other residents in their car?

   ☐ Yes ☐ No

   If yes, about how often? _____ More than one person? ☐ Yes ☐ No

If **no**, do you feel you could ask another resident for a ride if needed? ☐ Yes ☐ No

3. *If yes to both*, is this reciprocal (i.e., with the same people), meaning that sometimes you drive and sometimes they drive? "Take turns" ☐ Yes ☐ No

4. (*whether they do this themselves or not)* Do you see any advantages to sharing rides with other residents? (e.g., save gas) Any disadvantages?

_____

_____

_____

5. Do you think ridesharing would be something that might appeal to other residents?

_____

6. Do you think that family members may also be interested in taking turns driving multiple residents say to the same mall or to the same church?

_____

7. Any ideas how people might arrange to share rides and how the Village may help organize?

_____

_____

_____

Part E: Other Comments on SV Transportation Supports

We asked on the transportation questionnaire how often you use the Village bus. Can you tell me if you use it: 1) frequently (weekly or more), 2) sometimes (few times/mo), 3) rarely (less than once a month) or 4) never?

Prompt accordingly: If 1 or 2: what types of outings do you enjoy most?
If 3 or 4: any particular reasons why?

_____

_____

_____

Do you have any suggestions for how the Village might improve this Village Bus service?

_____

_____

_____

Do you have any other suggestions for how the Village might better meet your transportation needs and those of other residents, particularly those who no longer drive?

_____

_____

_____

Note: The LV version included the following question.

5. Did you drive any other vehicles (other than the one equipped) in the past two weeks?

   ☐ No ☐ Yes If yes, approximately how often? _____
   Relationship to the owner of the other vehicle: _____

RIA Research Institute for Aging
Schlegel • UWaterloo • Conestoga

UNIVERSITY OF WATERLOO

SCHLEGEL VILLAGES

RESIDENT DRIVING & TRANSPORTATION STUDY

Consent for Follow-up Contact

RESIDENT NAME: _____ **VILLAGE**: ❍ Winston Park ❍ Riverside Glen ❍ Humber Heights ❍ Taunton Mills

TELEPHONE #: _____ **Room #:** _____

We would like permission to contact you to follow-up with you within the next six months to see if there have been any changes to your driving or transportation use. We would like to contact you by phone or mail and possibly arrange a meeting.

Keep in mind that you are under no obligation to talk to us or provide any information if you do not feel like doing so at that time. Your participation in this is voluntary and will in no way affect the services provided to you by the Schlegel Villages, the University of Waterloo or the Schlegel-UW Research Institute for Aging.

I understand that the researchers would like to gather permission to contact me at a further date to discuss any changes to my driving and transportation use.

I agree to allow Anita Myers (PhD) and her graduate students to contact me in the near future by phone or through the mail.

☐ YES ☐ NO

Name: _____
(please print)

Signature:
_____

Date:
_____

UNIVERSITY OF WATERLOO | SCHOOL OF PUBLIC HEALTH AND HEALTH SYSTEMS

RESIDENT DRIVING & TRANSPORTATION STUDY

Consent for Follow-up Contact

RESIDENT NAME: _____ **SUITE #:** _____

TELEPHONE #: _____

We would like permission to contact you to follow-up with you within the next six months to see if there have been any changes to your driving or transportation use. We would like to contact you by phone or mail and possibly arrange a meeting.

Keep in mind that you are under no obligation to talk to us or provide any information if you do not feel like doing so at that time. Your participation in this is voluntary and will in no way affect the services provided to you by the University of Waterloo or Luther Village on the Park.

I understand that the researchers would like to gather permission to contact me at a further date to discuss any changes to my driving and transportation use.

I agree to allow Anita Myers (PhD) and her graduate students to contact me in the near future by phone or through the mail.

☐ YES ☐ NO

Name: _____
(please print)

Signature:
_____

Date:
_____

Resident Driving & Transportation Study

Date

Dear resident,

Thank you for your participation and generous time commitment to this study called **Resident Driving and Transportation**. You and your fellow residents have contributed to the understanding of the driving and transportation patterns and unmet needs of older adults living in retirement communities.

Please remember that the information you shared with me will be kept strictly confidential. After all the information is collected, I plan to share the results with the larger research community through conference presentations and journal articles. If you would like to receive more information regarding the results of this study, please be sure to fill out a **Publication Request Form**, if you haven't done so already. Meanwhile, if you would like to contact me about any concerns or questions you may have about the study, please feel free to call me at (519) 888 4567, Ext. XXXXX.

As with all University of Waterloo studies, this project has been reviewed by, and received ethics clearance through, the Office of Research Ethics. In the event you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin at 519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Sincerely,

_____

Sarah Sousa, BSc.

School of Public Health and Health Systems
University of Waterloo
519 888 4567 Ext. XXXXX
ssousa@uwaterloo.ca

UNIVERSITY OF WATERLOO | SCHOOL OF PUBLIC HEALTH AND HEALTH SYSTEMS

Resident Driving & Transportation Study

Date

Dear resident,

Thank you for your participation and generous time commitment to this study called **Resident Driving and Transportation**. You and your fellow residents have contributed to the understanding of the driving and transportation patterns and unmet needs of older adults living in retirement communities.

Please remember that the information you shared with me will be kept strictly confidential. After all the information is collected, I plan to share the results with the larger research community through conference presentations and journal articles. Upon the completion of this study, I will be sure to share with you a summary of the findings. Meanwhile, if you would like to contact me about any concerns or questions you may have about the study, please feel free to call me at XXX-XXX-XXXX or Spencer (519.888.4567 ext. 36786).

As with all University of Waterloo studies, this project has been reviewed by, and received ethics clearance through, the Office of Research Ethics. In the event you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin at 519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Sincerely,

_____

Sarah Sousa, BSc.

School of Public Health and Health Systems
University of Waterloo
XXX XXX XXXX
xxxxxx@uwaterloo.ca

Appendix H: Primary Variables and Data Sources for each Objective

	Primary Variables	Data Source(s)
Objective 1: To examine the actual driving practices (exposure and patterns) of retirement living seniors, as well as their travel patterns using various modes of transportation.		
Driving Exposure	Number of days, trips & stops Distance (km) Duration (hr: min)	CarChip and trip logs CarChip and odometer CarChip
Driving Patterns	Weekday versus weekend driving • days, trips/day, distance km/trip & duration (hr:min) Night driving (complete trips) • number of nights, trips, km & duration Radius from home (average and maximum) Number of out of town trips (as driver)	CarChip and trip logs CarChip, trip logs and archives (times sunrise/sunset) Otto and Goggle Earth Trip logs
	General weather conditions over monitoring period • # days not driven in inclement weather Trip purposes Trip cancellations over monitoring period	Environment Canada archives & trip logs CarChip & trip logs Trip logs Follow-up interview (session two)
Other Modes of Travel	Number of car trips as passenger (own or other vehicle) Number of trips using public transit, taxis, Village shuttle, etc. Non-driving trips due to inclement weather	Trip logs, Transportation Questionnaire & Travel diaries Travel diaries (yes/no response)
Objective 2a: To examine associations between actual driving practices (see above) and driver characteristics.		
Driver Characteristics	Demographics: age, gender, spouse, etc. Driving history (e.g., prior accidents) Cognitive score Balance confidence	Background Questionnaire Driving History & Habits Questionnaire MoCA (total score) ABC-16 & ABC-27

Appendix H (continued)

	Primary Variables	Data Source(s)
Objective 2b: To examine associations between actual driving practices (see above) and perceptions.		
Driver Perceptions	Driving comfort scores (daytime and nighttime) Driving abilities	DCS-D and DCS-N scales PDA scale
Objective 2c: To examine associations between actual driving practices and indicators of well-being.		
Indicators of Well-being	Depression Psychophysical well-being	GDS 15 scores VPS scores
Objective 2d: To examine associations between actual driving practices and extent of activity and group participation inside and outside the Village.		
In-Village activity	Number and types of activities/events (exercise, social, religious, etc) regularly participate in. Types of services/amenities used in the Village (past month)	In Village Services and Amenities Checklist
Out of Village activity	Membership in community groups (Q1) Number of activities outside Village in past month (0 to 10) Frequency and modes of staying connected w. family/friends (Q5) ratings (Q3, Q4, Q6, Q7)	Activities Outside the Village Questionnaire
Secondary Objective: To examine self-reported driving restrictions		
Driving Restrictions	Frequency of driving in challenging situations & avoidance Self-reported usual driving habits, intentions to quit Driver characteristics (e.g., gender, cognition, depression)	SDF and SDA scales Driving History & Habits Questionnaire Background Quest,, MoCA, GDS, ABC

Appendix I

Table I1: Additional Results from the Background Questionnaire

	SV Total Sample (N=27)	LV Total Sample (N=11)
Years ago retired	21.71 ± 6.04 11 to 37	19.40 ± 12.04 8 to 49
If married, spouse lives	N=7	N=9
Same room/housing	6 (85.7)	9 (100.0)
In another part of Village	1 (14.3)	0 (0)
In house etc. in the same city	0 (0)	0 (0)
In house etc. in another city	0 (0)	0 (0)
In another type of housing	0 (0)	0 (0)
If married, spouse still drives	n=7	n=9
Yes	2 (28.6)	5 (55.6)
No	5 (71.4)	4 (44.4)
Before move, housing type	n=26	
House or townhouse	17 (65.4)	7 (63.6)
Single level	*8 (57.1)*	*2 (40.0)*
Multi-level	*6 (42.9)*	*3 (60.0)*
Apartment or condo	8 (30.8)	4 (36.4)
Another retirement complex	1 (3.8)	0 (0)
Diagnosed with		
Arthritis	11 (40.7)	7 (63.6)
Osteoporosis	4 (14.8)	0 (0)
Diabetes	2 (7.4)	0 (0)
Parkinson's	0 (0)	1 (9.1)
Stroke	2 (7.4)	0 (0)
Hearing problems	8 (29.6)	3 (27.3)
Multiple Sclerosis	0 (0)	0 (0)
High blood pressure, cholesterol, heart problems	17 (63.0)	7 (63.6)
Glaucoma	3 (11.1)	0 (0)
Macular degeneration	3 (11.1)	0 (0)
Cataracts (even if repaired)	19 (70.4)	2 (18.2)
Prescription glasses for driving		
All the time	20 (74.1)	8 (72.7)
Sometimes	3 (11.1)	2 (18.2)
Never	4 (14.8)	1 (9.1)
Difficulties experienced		
Staying awake or remaining alert	1 (3.7)	0 (0)
Keeping your balance	5 (18.5)	0 (0)
Initiating movement	2 (7.4)	3 (27.3)
Persistent pain	3 (11.1)	0 (0)
Limited strength or movement	9 (33.3)	2 (18.2)

Note: values are frequencies (valid %) and mean ± SD and range. Missing data is indicated by n's for each variable.

Table I2: Additional Results from the DHHQ

	SV Total Sample (N=27)	SV Males (n=12)	SV Females (n=15)	LV Total Sample (N=11)	LV Males (n=4)	LV Females (n=7)
1. Age obtained Drivers License	N=26 24.00 ± 8.47 16 to 46	n=11 20.45 ± 8.75 16 to 46	n=15 26.60 ± 7.51 16 to 44	N=11 17.27 ± 1.85 16 to 22	n=4 18.00 ± 2.83 16 to 22	n=7 16.86 ± 1.07 16 to 18
2. Commuted 1 hour to work	N=26	n=12	n=13	N=11	n=4	n=7
No	18 (69.2)	7 (58.3)	11 (78.6)	9 (81.8)	4 (100.0)	5 (71.4)
Yes	8 (30.8)	5 (41.7)	3 (21.4)	2 (18.2)	0 (0)	2 (28.6)
Before the move to the Village						
3. Other drivers in household	n=26	n=11	n=15			
No	11 (40.7)	5 (41.7)	6 (40.0)	0 (0)	0 (0)	0 (0)
Yes	16 (59.3)	7 (58.3)	9 (60.0)	11 (100)	4 (100)	7 (100)
3. If yes, who:	n=16	n=7	n=9			
Spouse	13 (81.3)	6 (85.7)	7 (77.8)	11 (100)	4 (100)	7 (100)
Other	3 (18.8)	1 (14.3)	2 (22.2)	0 (0)	0 (0)	0 (0)
4. Rely on for drive						
No	9 (33.3)	3 (25.0)	6 (40.0)	6 (54.5)	3 (75.0)	3 (42.9)
Yes	18 (66.7)	9 (75.0)	9 (60.0)	5 (45.5)	1 (25.0)	4 (57.1)
6. Consider giving up license						
No	26 (96.3)	11(91.7)	15 (100)	11 (100)	4 (100)	7 (100)
Yes	1 (3.7)	1 (8.3)	0 (0)	0 (0)	0 (0)	0 (0)
6. Regardless, glad kept driving	n=24	n=11	n=13			
No	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yes	24 (100)	11 (100)	13 (100)	11 (100)	4 (100)	7 (100)
Current Driving Abilities						
8. Compared to 10 yrs						
Drive much less often	13 (48.1)	5 (41.7)	8 (53.3)			
Drive a little less	11 (40.7)	5 (41.7)	6 (40.0)	2 (18.2)	0 (0)	2 (28.6)
Drive the same	3 (11.1)	2 (16.7)	1 (6.7)	4 (36.4)	2 (50.0)	2 (28.6)
Drive more often	0 (0)	0 (0)	0 (0)	3 (27.3)	1 (25.0)	2 (28.6)
				2 (18.2)	1 (25.0)	1 (14.3)
15. Worry about car expenses						
Often	5 (18.5)	2 (16.7)	3 (20.0)			
Sometimes	8 (29.6)	4 (33.3)	4 (26.7)			

Rarely	10 (37.0)	4 (33.3)	6 (40.0)	1 (9.1)	0 (0)	1 (14.3)
Never	4 (14.8)	2 (16.7)	2 (13.3)	2 (18.2)	1 (25.0)	1 (14.3)
				2 (18.2)	1 (25.0)	1 (14.3)
				6 (54.5)	2 (50.0)	4 (57.1)

	SV Total Sample (N=27)	SV Males (n=12)	SV Females (n=15)	LV Total Sample (N=11)	LV Males (n=4)	LV Females (n=7)
16. Servicing vehicle						
Myself	24 (88.9)	12 (100)	12 (80.0)	10 (90.9)	4 (100.0)	6 (85.7)
Other	3 (11.1)	0 (0)	3 (20.0)	1 (9.1)	0 (0)	1 (14.3)
17. Change tires in winter						
No	22 (81.5)	8 (66.7)	14 (93.3)	9 (81.8)	3 (75.0)	6 (85.7)
Yes	5 (18.5)	4 (33.3)	1 (6.7)	2 (18.2)	1 (25.0)	1 (14.3)
18. Discussed driving with:	n=25	n=13	n=12			
Eye care professional	6 (24.0)	4 (30.8)	2 (16.7)	2 (18.2)	1 (25.0)	1 (14.3)
Physician	3 (12.0)	2 (15.4)	1 (8.3)	2 (18.2)	1 (25.0)	1 (14.3)
Family members	11 (44.0)	6 (46.2)	5 (41.7)	3 (27.3)	1 (25.0)	2 (28.6)
Friends	5 (20.0)	1 (7.7)	4 (33.3)	0 (0)	0 (0)	0 (0)
Not applicable	0 (0)	0 (0)	0 (0)	4 (36.4)	1 (25.0)	3 (42.9)
19. Anyone suggest limiting driving						
No	25 (92.6)	10(83.3)	15 (100)	11 (100)	4 (100)	7 (100)
Yes	2 (7.4)	2 (16.7)	0 (0)	0 (0)	0 (0)	0 (0)
19. If yes, who						
Family	2 (100)	2 (100)	0 (0)	-	-	-
Friends	0 (0)	0 (0)	0 (0)	-	-	-
Physician	0 (0)	0 (0)	0 (0)	-	-	-
Eye care professional	0 (0)	0 (0)	0 (0)	-	-	-
20. Thought about giving up driving (in a few years)						
No	11 (40.7)	7 (58.3)	4 (26.7)	7 (63.6)	2 (50.0)	5 (71.4)
Yes	16 (59.3)	5 (41.7)	11 (73.3)	4 (36.4)	2 (50.0)	2 (28.6)
21. Difficulty staying awake/alert when driving						
Often	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Sometimes	3 (11.1)	2 (16.7)	1 (6.7)	2 (18.2)	1 (25.0)	1 (14.3)
Never	24 (88.9)	10(83.3)	14 (93.3)	9 (81.8)	3 (75.0)	6 (85.7)
22. Past few years, taken driving course	n=26	n=12	n=14			
No	23 (88.5)	10(83.3)	13 (92.9)	10(90.9)	4 (100.0)	6 (85.7)
Yes	3 (11.5)	2 (16.7)	1 (7.1)	1 (9.1)	0 (0)	1 (14.3)
23. Thoughts about mandatory process	n=26	n=11	n=14	n=5	n=3	n=2
It's a good idea	25 (96.2)	11 (100)	14 (93.3)	5 (100)	3 (100)	2 (100)
Don't want to go through it	1 (3.8)	0 (0)	1 (6.7)	0 (0)	0 (0)	0 (0)
	SV Total Sample (N=27)	**SV Males (n=12)**	**SV Females (n=15)**	**LV Total Sample (N=11)**	**LV Males (n=4)**	**LV Females (n=7)**
24. Past yr problems						
Accidents						
No	24 (88.9)	11(91.7)	13 (86.7)	11 (100)	4 (100)	7 (100)
Yes	3 (11.1)	1 (8.3)	2 (13.3)	0 (0)	0 (0)	0 (0)
If yes, at fault						
No	2 (66.7)	0 (0)	2 (100)	11 (100)	4 (100)	7 (100)
Yes	1(33.3)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Near Misses						
No	21 (87.5)	8 (72.7)	13 (100)	9 (81.8)	4 (100)	5 (71.4)
Yes	3 (12.5)	3 (27.3)	0 (0)	2 (18.2)	0 (0)	2 (28.6)
Backing into things			n=13			
No	23 (95.8)	11 (100)	12 (92.3)	8 (72.7)	3 (75.0)	5 (71.4)
Yes	1 (4.2)	0 (0)	1 (7.7)	3 (27.3)	1 (25.0)	2 (28.6)
Getting lost			n=13			
No	24 (100)	11 (100)	13 (100)	9 (81.8)	3 (75.0)	6 (85.7)
Yes	0 (0)	0 (0)	0 (0)	2 (18.2)	1 (25.0)	1 (14.3)
Traffic violation			n=13			
No	24 (100)	11 (100)	13 (100)	11 (100)	4 (100)	7 (100)
Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
25a.Asked by MTO for eye/medical exam	n=26	n=11	n=15			
No	23 (88.5)	11 (100)	12 (80.0)	10 (90.9)	3 (75.0)	7 (100)
Yes	3 (11.5)	0 (0)	3 (20.0)	1 (9.1)	1 (25.0)	0 (0)
25b.Asked for road test	n=25	n=12	n=13			
No	20 (80.0)	11(91.7)	9 (69.2)	11 (100)	4 (100)	7 (100)
Yes	5 (20.0)	1 (8.3)	4 (30.8)	0 (0)	0 (0)	0 (0)
25c.Asked for driving assessment	n=24	n=11	n=13			
No	23 (95.8)	11 (100)	12 (92.3)	11 (100)	4 (100)	7 (100)
Yes	1 (4.2)	0 (0)	1 (7.7)	0 (0)	0 (0)	0 (0)
26. Main reasons to						

drive						
Shopping/errands	27 (100)	12 (100)	15 (100)	11 (100)	4 (100)	7 (100)
Going to appointments	26 (96.3)	12 (100)	14 (93.3)	9 (81.8)	3 (75.0)	6 (85.7)
Visit family/friends	22 (81.5)	11(91.7)	11 (73.3)	10 (90.9)	4 (100)	6 (85.7)
To religious services	15 (55.6)	5 (41.7)	10 (66.7)	3 (27.3)	0 (0)	3 (42.9)
Recreational/Social	16 (59.3)	9 (75.0)	7 (46.7)	8 (72.7)	3 (75.0)	5 (71.4)
Employment/Volunteer	2 (7.4)	1 (8.3)	1 (6.7)	3 (27.3)	1 (25.0)	2 (28.6)

	SV Total Sample (N=27)	**SV Males (n=12)**	**SV Females (n=15)**	**LV Total Sample (N=11)**	**LV Males (n=4)**	**LV Females (n=7)**
27. Driving Importance						
Extremely important	9 (33.3)	5 (41.7)	4 (26.7)	5 (45.5)	2 (50.0)	3 (42.9)
Very important	11 (40.7)	4 (33.3)	7 (46.7)	3 (27.3)	0 (0)	3 (42.9)
Moderately important	6 (22.2)	2 (16.7)	4 (26.7)	2 (18.2)	1 (25.0)	1 (14.3)
Somewhat important	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Not that important	1 (3.7)	1 (8.3)	0 (0)	1 (9.1)	1 (25.0)	0 (0)
28. Reasons to Drive Score	n=24	n=11	n=13			
Maintain lifestyle	1.63 ± .924	1.55 ± 0.69	1.69 ± 1.11	1.73 ± 1.01	2.25 ± 1.50	1.43 ± 0.54
Maintain freedom	1.67 ± 1.05	1.55 ± 0.93	1.77 ± 1.17	1.82 ± 1.33	2.50 ± 1.92	1.43 ± 0.79
	n=23	n=11	n=12			
Meet commitments	3.70 ± 1.64	3.64 ± 1.63	3.75 ± 1.71	2.73 ± 1.62	3.25 ± 1.71	2.43 ± 1.62
	n=22	n=10	n=12			
Poor public transport	3.00 ± 1.45	2.70 ± 1.49	3.25 ± 1.42	3.73 ± 1.49	4.25 ± 1.50	3.43 ± 1.51
	n=23	n=10	n=13			
To drive others	3.61 ± 1.67	3.50 ± 1.96	3.69 ± 1.49	3.36 ± 1.80	4.00 ± 2.00	3.00 ± 1.73
Not bothering others	2.58 ± 1.53	2.82 ± 1.66	2.38 ± 1.45	3.82 ± 1.54	3.75 ± 1.89	3.86 ± 1.46
Physical difficulty	3.88 ± 1.65	3.91 ± 1.58	3.85 ± 1.77	4.73 ± 0.91	5.00 ± 0.00	4.57 ± 1.13

Note: values are frequencies (valid %) and mean ± SD and range. Missing data is indicated by n's for each variable.

Table I3: GDS-15 Item Scores

GDS Items	SV Total Sample (N=27)	LV Total Sample (N=11)
Satisfied with life	n=26	
No	**2 (7.7)**	**0 (0)**
Yes	24 (92.3)	11 (100.0)
Dropped activities	n=25	
No	20 (80.0)	10 (90.9)
Yes	**5 (20.0)**	**1 (9.1)**
Life is empty	n=26	
No	25 (96.2)	11 (100.0)
Yes	**1 (3.8)**	**0 (0)**
GDS Items	**SV Total Sample (N=27)**	**LV Total Sample (N=11)**
Bored	n=26	
No	24 (92.3)	11 (100.0)
Yes	**2 (7.7)**	**0 (0)**
Good spirits	n=26	
No	**0 (0)**	**1 (9.1)**
Yes	26 (100)	10 (90.9)
Afraid something bad will happen	n=26	
No	24 (92.3)	11 (100.0)
Yes	**2 (7.7)**	**0 (0)**
Feel happy	n=26	
No	**0 (0)**	**0 (0)**
Yes	26 (100.0)	11 (100.0)
Feel helpless	n=26	
No	25 (96.2)	11 (100.0)
Yes	**1 (3.8)**	**0 (0)**
Prefer to stay at home	n=26	
No	19 (73.1)	9 (81.8)
Yes	**7 (26.9)**	**2 (18.2)**
Problems with memory	n=26	
No	26 (100.0)	10 (90.9)
Yes	**0 (0)**	**1 (9.1)**
Wonderful to be alive	n=26	
No	**2 (7.7)**	**0 (0)**
Yes	24 (92.3)	11 (100.0)
Are worthless	n=26	
No	25 (96.2)	11 (100.0)
Yes	**1 (3.8)**	**0 (0)**
Full of energy	n=26	
No	**12 (46.2)**	**3 (27.3)**
Yes	14 (53.8)	8 (72.7)
Situation is hopeless	n=26	
No	26 (100.0)	11 (100.0)
Yes	**0 (0)**	**0 (0)**
Most people better than me	n=26	

No **Yes**	25 (96.2) **1 (3.8)**	11 (100.0) **0 (0)**
Total score Normal (0 to 5) Depression suspected (5 to 10)	1.31 ± 1.38 26 (100.0) 0 (0)	0.73 ± 1.01 11 (100.0) 0 (0)

Note: values are frequencies (valid %) and mean ± SD and range. Missing data is indicated by n's for each variable. **Bold** response is used to calculate possible depressive symptoms. One person (SV) did not complete the entirety of the GDS scale.

Table I4: VPS Item Scores

VPS Items*	SV Total Sample (N=27)	LV Total Sample (N=11)
Time till asleep	4.19 ± .90 2 to 5	4.36 ± 0.67 3 to 5
Sleep quality	4.08 ± .86 2 to 5	4.09 ± 0.70 3 to 5
Degree of sleepiness during the day	3.60 ± .91 1 to 5	3.64 ± 0.67 3 to 5
Quality of appetite	4.00 ± 1.20 1 to 5	4.73 ± 0.47 4 to 5
Level of constipation	3.68 ± 1.63 1 to 5	4.45 ± 1.04 2 to 5
Presence aches and pains	3.42 ± 1.17 1 to 5	3.45 ± 0.93 2 to 5
Energy level	3.76 ± .66 3 to 5	3.73 ± 0.65 3 to 5
Stiffness level	3.96 ± .92 2 o 5	3.36 ± 1.29 1 to 5
Level of relaxation	3.92 ± 1.32 1 to 5	4.45 ± 0.52 4 to 5
General wellness feeling	4.36 ± .70 3 to 5	4.36 ± 0.81 3 to 5

Note: values are mean ± SD and range. * Missing data is indicated by n's for each variable.

Table I5: ABC Scale Item Scores

ABC Items	SV Total Sample (N=27)	LV Total Sample (N=11)
1. walk around Village	n=26 99.04 ± 4.90 75 to 100	100 ± 0.00 100 to 100
2. walk around outside	n=25 89.00 ± 12.67 75 to 100	97.73 ± 7.54 75 to 100
3. walk outside (night)	n=25	

	72.00 ± 26.34 0 to 100	97.73 ± 7.54 75 to 100
4. bend over – pick up	87.96 ± 16.07 50 to 100	88.64 ± 17.19 50 to 100
5. walk up/down stairs	n=26 80.77± 22.70 0 to 100	81.82 ± 19.66 50 to 100
6. reach for item at eye level	93.52 ± 16.40 25 to 100	100 ± 0.00 100 to 100

ABC Items	SV Total Sample (N=27)	LV Total Sample (N=11)
7. stand on tip toes and reach	85.19 ± 19.93 25 to 100	93.18 ± 11.68 75 to 100
8. stand on chair and reach	n=26 60.58 ± 30.96 0 to 100	75.00 ± 33.54 25 to 100
9. get in/out of bathtub	85.19 ± 19.93 25 to 100	93.18 ± 11.68 75 to 100
10. sweep floor	n=26 88.46 ± 24.73 0 to 100	100 ± 0.00 100 to 100
11. walk outside to car	n=26 97.15 ± 8.15 75 to 100	100 ± 0.00 100 to 100
12. get in/out of car	95.37 ± 9.90 75 to 100	97.73 ± 7.54 75 to 100
13. walk across busy parking lot	n=26 86.54 ± 16.17 50 to 100	100 ± 0.00 100 to 100
14. walk up/down ramp	n=26 90.38 ±14.28 50 to 100	97.73 ± 7.54 75 to 100
15. walk in crowded mall	n=26 87.50 ± 14.58 50 to 100	97.73 ± 7.54 75 to 100
16. bumped by people in mall	n=24 81.25 ± 18.43 50 to 100	90.91 ± 12.61 75 to 100
17. step on/off escalator holding onto railing	n=26 87.50 ± 21.51 0 to 100	86.36 ± 13.06 75 to 100
18. walk down stairs/ramp carrying something	81.48 ± 22.57 0 to 100	81.82 ± 25.23 25 to 100
19. walk on icy sidewalks	49.07 ± 32.88 0 to 100	68.18 ± 22.61 25 to 100

20. walk outside (very windy)	75.00 ± 25.94 0 to 100	90.91 ± 16.86 50 to 100
21. walk in heavy rain with umbrella	n=26 62.50 ± 31.02 0 to 100	93.18 ± 16.17 50 to 100
22. walk uneven paths or sidewalks	67.59 ± 26.69 0 to 100	84.09 ± 16.86 50 to 100
23. step on/off sidewalk curb	n=26 79.81 ± 21.34 25 to 100	90.91 ± 16.86 50 to 100

ABC Items	SV Total Sample (N=27)	LV Total Sample (N=11)
24. get on/off bus	n=25 74.00 ± 27.46 0 to 100	90.91 ± 16.86 50 to 100
25. stand on moving bus/train	n=25 70.00 ± 25.00 25 to 100	86.36 ± 13.06 75 to 100
26. cross street at timed pedestrian intersection	n=25 83.00 ± 26.73 0 to 100	93.18 ± 11.68 75 to 100
27. cross street with no pedestrian crosswalk	n=25 64.00 ± 28.94 0 to 100	93.18 ± 11.68 75 to 100

Note: mean ± SD and range. Missing data is indicated by n's for each variable.

Table I6: Additional Results from the Transportation Use Questionnaire

	SV Total Sample (N=27)	LV Total Sample (N=11)
Concerns about taxi	n=25	n=10
No	20 (80.0)	6 (60.0)
Yes	5 (20.0)	4 (40.0)
If yes,		
Cost	4 (80.0)	4 (100.0)
Safety	1 (20.0)	0 (0)
Fear of robbery	0 (0)	0 (0)
Inconvenience	0 (0)	0 (0)
Cleanliness	1 (20.0)	0 (0)
Other	0 (0)	1 (25.0)
Concerns about public transit	n=24	n=10
No	18 (75.0)	7 (70.0)
Yes	6 (25.0)	3 (30.0)
If yes,		
Cost	0 (0)	0 (0)
Inconvenience	5 (83.3)	3 (100.0)
Safety concerns	0 (0)	0 (0)

Walking distance	2 (7.4)	1 (33.3)
Waiting for bus (bad weather)	5 (83.3)	3 (100.0)
Other	0 (0)	1 (33.3)
Concerns about village bus	n=25	n=10
No	23 (92.0)	9 (90.0)
Yes	2 (8.0)	1 (10.0)
If yes,		
Doesn't go where want it to	2 (100)	0 (0)
Sign-up too far in advance	1 (50.0)	0 (0)
Limited trip frequency	1 (50.0)	0 (0)
Other	0 (0)	1 (100.0)

Note: values are frequencies (valid %). Missing data is indicated by n's for each variable.

Table I7: Additional Results from the Village Service and Amenities Checklist

	SV Total Sample (N=25)	SV Males (n=11)	SV Females (n=14)	LV Total Sample (N=10)	LV Males (n=3)	LV Females (n=7)
Services/Amenities used over last month						
Hair salon	15 (60.0)	4 (36.4)	11 (78.6)	4 (40.0)	0 (0)	4 (57.1)
Spa	2 (8.0)	0 (0)	2 (14.3)	0 (0)	0 (0)	0 (0)
General store	13 (52.0)	4 (36.4)	9 (64.3)	3 (30.0)	0 (0)	3 (42.9)
Laundry facilities	5 (20.0)	2 (18.2)	3 (21.4)	N/A	N/A	N/A
On-site café	18 (72.0)	8 (72.7)	10 (71.4)	8 (80.0)	2 (66.7)	6 (85.7)
On-site library	14 (56.0)	5 (45.5)	9 (64.3)	6 (60.0)	1 (33.3)	5 (71.4)
On-site banking	1 (4.0)	0 (0)	1 (7.1)	2 (20.0)	1 (33.3)	1 (14.3)
On-site optometry	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
On-site dental	1 (4.0)	0 (0)	1 (7.1)	0 (0)	0 (0)	0 (0)
On-site pharmacy	2 (8.0)	0 (0)	2 (14.3)	N/A	N/A	N/A
On-site laboratory	N/A	N/A	N/A	0 (0)	0 (0)	0 (0)
Massage therapy	1 (4.0)	0 (0)	1 (6.7)	1 (10.0)	0 (0)	1 (14.3)
Physiotherapy	6 (24.0)	2 (18.2)	4 (28.6)	1 (10.0)	0 (0)	1 (14.3)
Kinesiologist	7 (28.0)	3 (27.3)	4 (28.6)	N/A	N/A	N/A
Physician	5 (20.0)	1 (9.1)	4 (28.6)	3 (30.0)	1 (33.3)	2 (28.6)
Nurse practitioner	6 (24.0)	3 (27.3)	3 (21.4)	N/A	N/A	N/A
Medication assistance	1 (4.0)	1 (9.1)	0 (0)	N/A	N/A	N/A
Bathing assistance	2 (8.0)	0 (0)	2 (14.3)	N/A	N/A	N/A
Meals in dining area:	16 (64.0)	7 (63.7)	9 (64.3)	N/A	N/A	N/A
One meal/day	*3 (12.0)*	*1 (9.1)*	*2 (14.3)*	N/A	N/A	N/A
Two meals/day	*6 (24.0)*	*2 (18.2)*	*4 (28.6)*	N/A	N/A	N/A
Three meals/day	*7 (28.0)*	*4 (36.4)*	*3 (21.4)*	N/A	N/A	N/A
Wellness coordinator	N/A	N/A	N/A	2 (20.0)	0 (0)	2 (28.6)
Martin's restaurant						

For lunch	N/A	N/A	N/A	*2 (20.0)*	*0 (0)*	*2 (28.6)*
For dinner	N/A	N/A	N/A	*4 (40.0)*	*1 (33.3)*	*3 (42.9)*
Services purchased (other agencies)						
No	24 (100)	11 (100)	14 (100)	9 (90.0)	3 (100.0)	6 (85.7)
Yes	0 (0)	0 (0)	0 (0)	1 (10.0)	0 (0)	1 (14.3)
Services purchased from LV	N/A	N/A	N/A			
No				9 (90.0)	3 (100.0)	6 (85.7)
Yes				1 (10.0)	0 (0)	1 (14.3)

	SV Total Sample (N=25)	**SV Males (n=11)**	**SV Females (n=14)**	**LV Total Sample (N=10)**	**LV Males (n=3)**	**LV Females (n=7)**
Organized Village group activities						
Religious services	10 (40.0)	3 (27.3)	7 (50.0)	3 (30.0)	0 (0)	3 (42.9)
Arts & crafts	7 (28.0)	3 (27.3)	4 (28.6)	1 (10.0)	0 (0)	1 (14.3)
Games	8 (32.0)	4 (36.4)	4 (28.6)	4 (40.0)	0 (0)	4 (57.1)
Music, theatre, movies	18 (72.0)	7 (63.6)	11 (78.6)	4 (40.0)	0 (0)	4 (57.1)
Special events outside	7 (28.0)	3 (27.3)	4 (28.6)	4 (40.0)	0 (0)	4 (57.1)
Physical activities	12 (48.0)	5 (45.5)	7 (50.0)	6 (60.0)	1 (33.3)	5 (71.4)
Frequency/last week	2.83 ± 2.13 1 to 7	3.60 ± 2.41 1 to 7	2.29 ± 1.89 1 to 5	1.50 ± 1.65 0 to 5	0.67 ± 1.16 0 to 2	1.86 ± 1.77 0 to 5
Sense of belonging						
Very strong	8 (32.0)	2 (18.2)	6 (42.9)	8 (80.0)	2 (66.7)	6 (85.7)
Somewhat strong	13 (52.0)	7 (63.6)	6 (42.9)	1 (10.0)	0 (0)	1 (14.3)
Somewhat weak	2 (8.0)	0 (0)	2 (14.3)	0 (0)	0 (0)	0 (0)
Very weak	2 (8.0)	2 (18.2)	0 (0)	1 (10.0)	1 (33.3)	0 (0)

Note: values are frequencies (valid %) and mean ± SD and range. Missing data is indicated by n's for each variable.

Table I8: Additional Results from the Activities Outside the Village Questionnaire

	SV Sample (N=27)	**SV Males (n=12)**	**SV Females (n=15)**	**LV Sample (N=11)**	**LV Males (n=4)**	**LV Females (n=7)**
Belong to group	n=24	n=11	n=13	n=10	n=3	n=7
Sports-related	2 (8.3)	1 (9.1)	1 (7.7)	3 (30.0)	2 (66.7)	1 (14.3)
Attend regularly:						

No	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Yes	2 (100.0)	1 (100)	1 (100)	3 (100.0)	2 (100)	1 (100)
Recreation & hobby	7 (29.2)	3 (27.3)	4 (30.8)	5 (50.0)	1 (33.3)	4 (57.1)
Attend regularly:						
No	1 (14.3)	1 (33.3)	0 (0)	0 (0)	0 (0)	0 (0)
Yes	6 (85.7)	2 (66.7)	4 (100)	5 (100.0)	1 (100)	4 (100)
Cultural & education	6 (25.0)	2 (18.2)	4 (30.8)	3 (30.0)	0 (0)	3 (42.9)
Attend regularly:						
No	0 (0)	0 (0)	0 (0)	0 (0)	-	0 (0)
Yes	6 (100.0)	2 (100)	4 (100)	3 (100.0)	-	3 (100)
Service club	1 (4.2)	1 (9.1)	0 (0)	2 (20.0)	0 (0)	2 (28.6)
Attend regularly:						
No	0 (0)	0 (0)	-	0 (0)	-	0 (0)
Yes	1 (100.0)	1 (100)	-	2 (100.0)	-	2 (100)

	SV Sample (N=27)	**SV Males (n=12)**	**SV Females (n=15)**	**LV Sample (N=11)**	**LV Males (n=4)**	**LV Females (n=7)**
Religious-affiliated	4 (16.7)	1 (9.1)	3 (23.1)	1 (10.0)	0 (0)	1 (14.3)
Attend regularly:						
No	1 (25.0)	0 (0)	1 (33.3)	0 (0)	-	0 (0)
Yes	3 (75.0)	1 (100)	2 (66.7)	1 (100.0)	-	1 (100)
Political party	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Connection to outside community	n=24	n=10	n=13	n=10	n=3	n=7
Very well connected	5 (20.8)	1 (9.1)	4 (30.8)	3 (30.0)	0 (0)	3 (42.9)
Moderately connected	12 (50.0)	7 (63.6)	5 (38.5)	5 (50.0)	1 (33.3)	4 (57.1)
Not well connected	7 (29.2)	3 (27.3)	4 (30.8)	2 (20.0)	2 (66.7)	0 (0)
Last time left Village	n=24	n=11	n=13	n=10	n=3	n=7
In the last week	21 (87.5)	10 (90.9)	11 (84.6)	10 (100)	3 (100.0)	7 (100.0)
In the last month	3 (12.5)	1 (9.1)	2 (15.4)	0 (0)	0 (0)	0 (0)
In the last 3 months	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Don't recall	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Note: values are frequencies (valid %) and mean ± SD and range. Values larger than 100% because participants could check more than one answer. Missing data is indicated by n's for each variable.

Appendix J: Comparison with Prior Studies on Community Drivers

	Blanchard (2008)[1]	**Trang (2010)[2]**	**Crizzle (2011)[3]**		**Present Study**
	N=61	**N=47**	PD Group N=27	Control Group N=20	**N=38**
Age	80.4±5.5 67 to 92	77.2±6.6 65 to 91	71.6±6.6 57 to 82	70.6±7.9 57 to 84	81.9 ± 5.6 70 to 91
% Male	25 (41%)	24 (51%)	21 (78%)	16 (80%)	16 (42%)
MoCA Score	NA	NA	22.78 ± 3.12	25.25 ± 2.61	23.56 ± 3.24
Perception Scores DCS-D	68.9±15.2 30.8 to 100	70.6±17.1 36.5 to 100	71.1±19.2 28.9 to 100	79.8±13.3 50 to 100	64.2 ± 21.9 13.5 to 100
DCS-N	54.3±24.8 6.3 to 100	58.1±23.0 18.8 to 100	58.6±26.1 1.6 to 100	73.8±15.5 40.6 to 100	52.6 ± 25.7 0 to 96.9
PDA	32.5±6.3 15 to 45	32.5±6.5 21 to 42	33.4±8.7 13 to 44	37.7±5.4 27 to 44	32.7 ± 7.2 18 to 44
Self-Reported Driving SDF	30.2±9.0 12 to 49	33.5+6.5 19 to 51	33.9±8.2 16 to 48	38.8±6.7 23 to 53	29.1 ± 11.2 6 to 50
SDA	9.2±4.8 0 to 19	6.3+4.1 0 to 16	8.5±4.9 0 to 20	4.2±3.3 0 to 9	7.3 ± 6.2 0 to 18
Objective Driving # Days Driven	5.2±1.9 1 to 7	4.88±1.48 1.5 to 7	4.8±1.4 2 to 7	6.1±.8 4.5 to 7	3.2 ± 1.6 0.5 to 6.5
Distance (km)	164.1±158.4 4.2 to 633.3	156.6±108.8 22.7 to 466.1	188.8±102.3 60.95 to 407.9	285.7±174.3 96.1 to 686.9	86.5 ± 84.4 2.8 to 332.2
Mileage Category Low Middle High	 17 (29%) 28 (53%) 13 (22%)	 9 (20%) 31 (67%) 6 (13%)	 0 21 (81%) 5 (19%)	 0 12 (60%) 8 (40%)	 15 (47%) 16 (50%) 1 (3%)
Average Radius	7.4±7.5 1.0 to 45.1	7.0±5.7 1.9 to 26.5	6.0±4.7 1.99 to 21.2	6.7±5.4 1.5 to 23.1	7.5 ± 6.1 2.0 to 20.4
Maximum Radius	21.3±27.4 1.8 to 113.7	18.0±18.3 2.4 to 80.8	18.6±24.2 3.3 to 112.4	37.9±39.9 2.7 to 121.9	28.2 ± 36.6 2.5 to 119.0

	Blanchard (2008)[1]	**Trang (2010)[2]**	**Crizzle (2011)[3]**		**Present Study**
	N=61	**N=47**	PD Group N=27	Control Group N=20	**N=38**
% Drove at Night	28% 16/58	89% 41/46	89% 23/26	90% 18/20	25% 8/32
# Nights	1.5±1.1 1 to 5	1.9±1.5 0 to 6	1.2±.80 0 to 3	2.4±1.5 0 to 5.5	0.2 ± 0.5 0 to 1.5
Night Distance (km)	25.4±34.1 2.7 to 129.4	31.2±39.7 0 to 215.9	16.2±16.7 0 to 73.45	40.4±38.5 0 to 142.7	4.4 ± 10.9 0 to 43.3

Note: Values are Mean ± SD, range or Frequencies (valid %). Present sample perception scores and SDA (n=35), and SDF (n=34). All driving data averaged to one week. Exposure: Present sample (n=32), Crizzle PD Group (n=26), Blanchard (n=58) and Trang (n=46); Radius: Present sample (n=19), Crizzle PD Group (n=26), Control Group (n=19), Blanchard (n=55) and Trang (n=40).

In addition to the respective theses, findings are reported in the following publications: [1] Blanchard & Myers (2010) and Blanchard, Myers & Porter (2010); [2] Myers, Trang, Crizzle (2011); and [3] Crizzle & Myers (2013).