IMPLEMENTING TRANSPORTATION PLANNING WITH OLDER ADULTS AFTER DRIVING CESSATION: OBSERVING COMMUNITY MOBILITY, SOCIAL PARTICIPATION, AND QUALITY OF LIFE

By

Kathryn Moore

December, 2021

Director of Thesis: Dr. Lynne Murphy

Major Department: Occupational Therapy

Rationale: Social participation and quality of life decrease for older adults after driving cessation. As life space reduces with the transition out of the driver's seat, community mobility decreases and older adults are at risk of declining physical and mental health outcomes. Transportation planning seeks to create and preserve opportunities for social connection and ventures outside the home.

Purpose: This study explored potential best practices in transportation planning and the influence of transportation planning on older adults who are facing driving retirement, specifically in supporting social participation and quality of life and the impact on community mobility.

Design: A descriptive case series investigated methods for implementing transportation plans and identifying related barriers, along with facilitatory and inhibitory factors associated with community mobility for three older adults who received the recommendation to cease driving. Data was collected during transportation planning sessions and through pre and post assessments regarding social participation, quality of life, and community mobility.

Methods: Participants engaged in three intervention sessions to create and implement an individualized transportation plan based on their habits, needs, and supports.

Results: Overall, minimal change was noted on the pretest and posttest assessments measuring social participation, quality of life, and community mobility. The data does not demonstrate a consistent increase or decrease in any outcome measure. Strategies for implementing transportation planning include considering differences among participants and conducting sessions in person. Barriers to implementing transportation plans include negative attitudes and emotions, limited transportation alternatives, decreased insight to deficits, and distractions from the transportation planning process. Factors that facilitate community mobility were identified, including access to a large support network and receiving rides from friends and family. Inhibitory factors for community mobility include reluctance to ask others, living in rural areas, and impaired physical mobility.

Conclusion: Meaningful trends and perspectives of older adults were identified as they transitioned to a stage in their life in which they are no longer driving. Influential factors on transportation planning observed in this case series appear to be highly individualized. Further research is indicated to more closely examine the relationship between transportation planning and social participation, quality of life, and community mobility.

IMPLEMENTING TRANSPORTATION PLANNING WITH OLDER ADULTS AFTER DRIVING CESSATION: OBSERVING COMMUNITY MOBILITY, SOCIAL PARTICIPATION, AND QUALITY OF LIFE

A Thesis

Presented To the Faculty of the Department of Occupational Therapy

East Carolina University

In Partial Fulfillment of the Requirements for the Degree

Master of Science in Occupational Therapy

By

Kathryn Moore

December, 2021

IMPLEMENTING TRANSPORTATION PLANNING WITH OLDER ADULTS AFTER DRIVING CESSATION: OBSERVING COMMUNITY MOBILITY, SOCIAL PARTICIPATION, AND QUALITY OF LIFE

By

Kathryn Moore

APPROVED BY:

DIRECTOR OF THESIS: _____
Lynne Murphy, EdD, OTR/L

COMMITTEE MEMBER: _____
Anne E. Dickerson, PhD, OTR/L, SCDCM, FAOTA, FGSA

COMMITTEE MEMBER: _____
Young Joo Kim, PhD, OTR/L

COMMITTEE MEMBER: _____
Qiang Wu, PhD, PStat®

CHAIR OF THE DEPARTMENT
OF OCCUPATIONAL THERAPY: _____
Denise Donica, DHSc, OTR/L, BCP, FAOTA

DEAN OF THE
GRADUATE SCHOOL: _____
Paul J. Gemperline, PhD

ACKNOWLEDGEMENTS

I would specifically like to thank my parents, my fiancé, and my roommate for their crucial role in supporting me through this challenging journey. Completing this thesis was made possible by their uplifting encouragement and reassurance. I would like to recognize my committee members, Dr. Anne Dickerson, Dr. Young Kim, and Dr. Qiang Wu, for their participation and feedback. A special thank you to Dr. Lynne Murphy who poured in her knowledge, experience, and patience into me and this project. I am sincerely grateful.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: INTRODUCTION

Community mobility is the process of planning and navigating one's community through a variety of means. This can include private or public transportation such as driving, walking, biking, buses, or taxis (American Occupational Therapy Association [AOTA], 2020). Driving and community mobility, an instrumental activity of daily living (IADL), can influence an individual's engagement in other occupations including social participation, work, leisure, and other IADLs. Moving from one place to another within one's environment typically requires some type of transportation when venturing to places outside the home. Although driving a car is closely tied with community access and mobility, it's necessary to consider alternative transportation options for those who can no longer drive (Choi & DiNitto, 2016).

For older adults, driving is strongly connected to one's autonomy, freedom, and participation in valuable occupations and roles (Golisz, 2019). In communities that are best accessed by car, driving and community mobility are closely associated and are considered occupation enablers (Stav & Lieberman, 2018). Medical risk factors typically acquired with age, including motor, visual, and cognitive impairments, cause many older adults to outlive their driving abilities (Foley et al., 2002). Because social participation and community interaction are linked with driving and community mobility, older adults often encounter significant challenges to quality of life and social participation as they reach the stage in their life in which they must retire from driving (Liddle et al., 2012). Therefore, planning for mobility transition and implementing different transportation strategies to support community mobility may facilitate opportunities for continued social participation and quality of life.

When addressing challenges to community mobility, the role of occupational therapy is to support a client's engagement in meaningful occupations through evaluation, education, and

exploration of strategies for community mobility alternatives beyond driving years (AOTA, 2016). Occupational therapy practitioners can collaborate with clients to design a transportation plan specific to the client's personal and environmental contexts that addresses their unique needs for occupational engagement in the community. Implementation of the plan for alternative means of transportation may support continued social connection and contribute to a satisfying quality of life.

Alternative transportation, within the context of older adults and driving cessation, refers to methods of traveling from one place to another that do not involve an individual driving themselves (Kim, 2011). The number and type of options available can depend on a person's geographical location, relationships with others, socioeconomic and cost aspects, among other factors. Some common examples of alternative transportation include bus lines and paratransit open to the public, ridesharing apps like Uber or Lyft, pay-for-service models such as taxis, and rides without associated costs such as those from family members, friends, or volunteers. In this study, transportation planning entails working with a client and their caregiver (when appropriate) to coordinate rides, usually from various providers, to design a model that fits their schedule and their routine, health, and social needs.

The literature has established the decline in social participation and quality of life observed for older adults after driving cessation (Donoghue et al., 2019; Liddle et al., 2012). Transportation planning offers a potential solution in maintaining a level of community mobility to promote social participation and quality of life; however, exactly how transportation planning should be conducted, and exploration of potential outcomes has not yet been addressed in the literature. Therefore, this descriptive case series was undertaken to explore potential best practices in transportation planning that support the community mobility needs of older adults

after driving cessation in regard to their social participation and quality of life. In addition, this case series explored how transportation planning influenced social participation and quality of life (primary outcome measures) and community mobility (secondary outcome measure). The experiences of three older adults who participated in the transportation planning process were investigated to more clearly understand how transportation planning can be implemented and what factors facilitated or inhibited community mobility. Upon examination of results, adjustments to the process and recommendations for future research are possible, to increase the effectiveness of transportation planning.

CHAPTER 2: LITERATURE REVIEW

Community Mobility and Life Space

An individual's level of functional and community mobility is associated with their life space, a term used to describe "the size of the spatial area a person purposefully moves through in daily life" with regard to frequency and level of assistance needed for travel (Tsai et al., 2016, p. 1466). Life space, which varies in size depending on the individual, measures the extent of travel into the environment that is accessible through independent or supported means and can range from areas within the home to destinations outside one's residence or immediate community (Tsai et al., 2016). Life space can serve as an indicator of health in older adults; for example, Barnes et al. (2007) found that larger life spaces are associated with physical health benefits as well as supported social, cognitive, and emotional health. Moreover, the decline of both functional and community mobility in later years, resulting in smaller life spaces, can negatively impact quality of life and may lead to quicker declines in cognitive function (Britto et al., 2018; James et al., 2010). When life space extends outside the home, community mobility influences the level of engagement available to an individual.

Mobility, broadly defined as "the ability to move oneself (either independently or using assistive devices or transportation) within environments that expand from one's home to the neighborhood and to regions beyond," includes and influences one's level of community mobility and, in the United States, can be considered practically synonymous with driving one's car (Choi & DiNitto, 2016; Webber et al., 2010, p. 444). Preserving mobility is an important factor in maintaining independence and active lifestyles for older adults in later life years and restricted mobility presents increased health risks and negative impacts on general safety and well-being (Meyer et al., 2014; Stalvey et al., 1999). Older adults that experience a lack of

mobility are more likely to suffer from depression and social isolation, as well as increased morbidity and mortality (Julien et al., 2013; Stalvey et al., 1999; Steptoe et al., 2013). Community mobility and access to life space are essential to active aging, general well-being, and high quality of life (Stalvey et al., 1999; Webber et al., 2010). Furthermore, community mobility has a strong influence over one's self identity and social identity- how the individual perceives oneself as a unique entity and oneself as part of a social group, respectively (Gardner, 2014). These identities are rooted in one's environment and the interactions that take place between the individual and their surroundings (Gardner, 2014). The collective evidence overwhelmingly demonstrates the value of supporting community mobility to achieve positive health outcomes and quality of life for older adults.

In driving-dependent communities, which are present in many areas of the United States, many regard driving as essential to remaining engaged with their community and preferred lifestyle (Curl et al., 2014). Possession of a driver's license symbolizes functional independence and social competency for older adults (Golisz, 2019). Many life spaces and communities are not easily accessible without a car, especially in sprawling rural and suburban districts. Using public or private transportation services is often unfamiliar territory; therefore, education on specific supports and barriers for transportation alternatives related to client and environmental factors should be addressed with clients to assist with the transition to transportation alternatives (Dickerson & Davis, 2020). The physical layout of a community- the arrangement of structures and distances between them- is important when considering transportation, including alternatives to driving. For example, destinations considered within walkable distance for a typical healthy adult may not be feasible for those that lack the physical ability to walk long distances safely. Many physical client factors visibly impact mobility in noticeable ways; however, other factors

that influence community mobility may not present with obvious outward manifestations. Cognitive impairments are associated with poor mobility and can cause safety issues for older adults, even with those who have full physical function (Schepker et al., 2016). Additional demographics that influence limitations regarding driving and social participation include marital and socioeconomic status, race and ethnicity, and physical and mental health restrictions (Pristavec, 2018).

Social Participation

Relationships and social interactions have long been considered essential to the human experience and state of well-being; in fact, research shows an increased risk of death among persons with low quantity or quality of social relationships (House et al., 1988). A lack of social contact contributes to a decreased network of people who may prompt necessary medical attention in older age (Udell et al., 2012). Conversely, social contact in itself may have positive biological consequences that support health maintenance (Loucks et al., 2006; Shankar et al., 2011). Within occupational therapy, social participation is considered one of the nine occupations, identified as an activity individuals want or need to do that brings meaning and purpose to life (AOTA, 2020). In fact, participation differs from activities specifically with the condition of involving others, according to the International Classification of Functioning, Disability, and Health, identifying the inherent social aspect of participation (Meidert et al., 2018). Occupational therapy often examines participation as a reflection of the quantity and value of one's roles (Meidert et al., 2018).

The literature demonstrates community mobility's influence over social identity and driving retirement's association with fewer roles (Gardner, 2014; Liddle et al., 2012). Social participation, leisure activities, and other discretionary pursuits that occur outside the home may

be perceived as less valuable than other IADLs that are considered more important (e.g. grocery shopping or doctor's appointments) by retired drivers or the people who care for them, leading to a greater decline in leisure activities and social experiences (Liddle et al., 2014). For older adults with mobility restrictions, relationships and social participation can suffer even more than employment and other formal activities, as social engagement seems to be largely dependent on driving (Choi & DiNitto, 2016; Curl et al., 2014). Mezuk and Rebok (2008), determined that the size of friendship networks significantly decreased for those who stopped driving. Liddle et al. (2012) found that retired drivers participate in significantly fewer roles than current drivers. Therefore, older adults who have stopped driving may require additional support regarding their participation and well-being to maintain engagement in meaningful occupations (Liddle et al., 2012).

Quality of Life

Quality of life encompasses a multitude of subjective and objective factors, and is defined by the World Health Organization as "an individual's perception of his or her position in life in the context of the culture and value system where they live, and in relation to their goals, expectations, standards, and concerns" (World Health Organization, 2020, para. 1). Quality of life involves the interactions of experiences, circumstances, health, social well-being, values, perceptions, and psychology as it relates to an individual and their unique context (Bowling et al., 2003).

The complex and individualized nature of this concept makes it difficult to characterize for a population; however, the literature demonstrates recurring themes that contribute to many people's perceptions of quality of life. Bowling et al. (2003) identified seven key contributing factors for older adults' quality of life, namely social relationships, social roles and activities,

health, psychological well-being, home and neighborhood, financial circumstances, and independence; social relationships were identified as the leading theme positively contributing to quality of life. Social relationships are threatened as older adults retire from driving, as this population has significantly fewer social roles than those who are currently driving (Liddle et al., 2012). Because social relationships, roles, and activities play a large part in quality of life, this decline in occupational engagement could cause more negative perceptions concerning one's quality of life (Bowling et al., 2003).

Donoghue et al. (2019) found that quality of life is lower for older adults who have stopped driving in comparison to those who have maintained their level of driving. Quality of life is likely to be negatively affected as community mobility declines, adversely affecting social identity, increasing isolation, and reducing participation (Donoghue et al., 2019; Gardner, 2014; Liddle et al., 2012; Liddle et al., 2014). Providing older adults with assistance supporting social relationships, roles, and activities after driving cessation may promote satisfying lifestyles and holistic well-being that contribute to higher quality of life.

Reasons for Driving Cessation

Older adults outlive their driving abilities because they typically acquire medical risk factors with age that can affect physical, visual, and cognitive function (Foley et al., 2002). An older adult's ability to drive safely may decline suddenly, such as with a stroke, or over a prolonged period of time due to a gradual decline. In both scenarios, other means of transportation must ultimately be considered as alternatives to driving.

There are several demographic factors and characteristics that often play a role in driving cessation. Gender influences the timing during which driving cessation tends to occur; men experience approximately 6 years of non-driving transportation and women experience 10 years

(Foley et al., 2002). Income and socioeconomic status (SES) are also important factors in driving limitation and cessation (Grengs, 2010; Ragland et al., 2004). Individuals of low SES are at higher risk for driving cessation and nondrivers are more likely than drivers to have socioeconomic disadvantages (Choi & DiNitto, 2016; Ragland et al., 2004). Groenou and Tilburg (2003) found that those with low lifetime SES or decreased SES mobility had smaller networks and lower instrumental and emotional support from non-kin (friends, neighbors, etc.) as compared to those with high lifetime SES or upward SES mobility. Interestingly though, the low SES group had higher instrumental support from kin than the high SES group (Groenou & Tilburg, 2003). Ultimately, the study concluded those with higher SES benefited from larger social networks and increased support from non-kin, making those with lower SES more vulnerable to be left without the necessary support when family is unable or unwilling to help (Groenou & Tilburg, 2003).

Certain physical components, such as poor balance and weakness in the lower limbs, are associated with unsafe driving (Lacherez et al., 2014). Significant medical conditions can affect driving. Individuals who experience a stroke or congestive heart failure have the potential to suffer from decreased balance and strength, which negatively influences their driving ability (Edwards et al., 2008). Decline of visual capacities, including contrast sensitivity, visual field, visual processing, and spatial ability, are significant risk factors for driving cessation (Huisingh et al., 2016).

Cognitive deficits also significantly impact driving abilities. Reduced processing speed increases the risk of driving cessation (Edwards et al., 2008). Edwards et al. (2008) found that even when adjustments were made for other factors such as physical performance, health, and demographics, processing speed was still associated with risk of driving cessation, indicating its

particular influence over driver behavior. Performance in multitasking declines with age, a skill that allows drivers to adapt to changes in the driving environment (Anguera et al., 2013; Jokinen et al., 2020). Memory is also considered a necessary function for driving; therefore, conditions that diminish memory, such as dementia, predict driving cessation (Connors et al., 2018). Although presentation and severity of deficits differ, it's important to recognize these various impairments- physical, visual, or cognitive- can cause driving to become dangerous for the individual as well as others on the road.

Driving cessation can present a multitude of challenges and is not an easy transition for many older adults. Numerous factors related to the individual and the context can influence the transition to life beyond driving years. Liddle et al. (2016) described the driving cessation process for adults with dementia and their family caregivers. The experiences of these families were described along a continuum, ranging from "in it together" to "at odds," indicating potential for conflict and increased tension during the transition (Liddle et al., 2016, p. 133). Therefore, the specific needs of each individual with dementia and their family must be taken into consideration when supporting older adults' transition into driving retirement (Liddle et al., 2016).

Environmental factors, such as geographical location and community layouts, can shape perceptions of driving importance among older adults. While driving is considered to be of high importance across the older adult general population, individuals living in rural areas are more likely to identify driving as having a higher impact on their daily lives as compared to those living in urban or suburban areas (Strogatz et al., 2019). When driving is the primary mode of transportation for an individual, the effects of cessation can be numerous and far-reaching. Participation in volunteer and employment occupations decreases with driving cessation and as

the frequency of incidences away from home decline, social isolation and depression increase while life satisfaction and engagement in valued roles decrease (Curl et al., 2014; Liddle et al., 2014).

Driving Cessation

Transitioning to a life without driving can be difficult for a number of reasons, including perceptions about one's autonomy and independence (Golisz, 2019). King et al. (2010) identified a recurring theme consistent across older adults, namely fear of dependence as a result of future mobility loss. Independence, considered by many to be an essential component to a good quality of life, decreases with driving cessation as perceived by older adults (Bowling et al., 2003; Golisz, 2019). These adjustments often bring about unwelcome change and can be met with frustration and resistance.

Education and planning for driving cessation has the potential to make individuals feel more prepared for the transition and enable them to better maintain their emotional and mental well-being (Liddle et al., 2014). On the other hand, driving cessation can be particularly difficult when an individual is not able or willing to plan ahead in consideration of other transportation options until he or she is required to stop driving (Liddle et al., 2014). When steps for adequate preparation are not taken, or when the need to stop driving occurs suddenly, older adults have less time to mentally and logistically plan for transportation alternatives. This carries potential for their health and quality of life to suffer negative impacts. Studies that indicate increased anxiety and depressive symptoms accompanying driving retirement have important implications when considering strategies and approaches in collaboratively creating a transportation plan (Dickerson et al., 2019; Liddle et al., 2014). Retired drivers who have experienced a sudden loss

of driving abilities may require increased mental and emotional support as they plan for the future.

When the time comes to transition out of the driver's seat, creating a transportation plan may have potential to support community mobility and therefore provide access to a greater range of occupations that encourage healthier habits and positive outcomes regarding social participation and quality of life. Within this context, occupational therapy seeks to support clients' meaningful engagement in valued activities and roles. Transportation planning may be a useful tool for identifying new methods of navigating one's community and maintaining channels for social connection relevant to a client's unique situation and preferences.

Alternative Transportation Options

One aspect of a transportation plan is the specific physical environment through which one travels (Dickerson et al., 2019). Organizations such as the *Complete Streets Initiative* and *Age-Friendly Philadelphia* have made initiative-directed changes including age-friendly bus stop features that provide shelter, seating, and lighting to accommodate for the needs of older adults and zoning code revisions to allow for construction of new shelters within close proximity to senior centers (Glicksman et al., 2014). These changes alter the physical context of the community to better support mobility and accessibility for older adults who are no longer driving (Dickerson et al., 2019).

Beyond walking and public transportation, ride receipt and ridesharing services can also fill community mobility needs. Ride services can be particularly useful when client deficits, such as dementia affecting memory and cognitive processes, prevent the use of public transportation in a safe or successful manner (Dickerson et al., 2019). Ridesinsight.org, created by the Independent Transportation Network of America (ITN), is one example of a volunteer-based

driving program that is designed specifically for senior transportation (ITN America, 2016). This program uses state and zip code information to locate nearby transportation options with a feature that filters by keyword, such as “wheelchair” or “free” for clients that may have specific needs (ITN America, 2016). In addition to transportation services, ITN provides opportunities for education, policy change, and related research (ITN America, 2016).

Besides volunteer or pay-based rides, receiving private rides from friends or family can assist in keeping older adults connected with their community. Choi and DiNitto (2016) found that the majority of older adults who have ceased driving primarily depend on informal supports, such as family members or friends, to get them where they need to go. Ride receipt increases the likelihood of social participation, which can support occupations such as civic engagement, attending religious services, and gathering for social events (Pristavec, 2018).

When considering alternative transportation options, it is essential that the client perceives a mode of transportation as accessible and suitable for their needs in order for them to use it. Driving or riding in a car has been identified as the most popular transportation method among older adults while public transit systems remain the least popular, despite public transit services made available to them (Burkhardt et al., 1998; Choi & DiNitto 2016). Whether a client feels safe and competent enough to navigate a particular public transit system or ridesharing app influences the viability of that option in their situation. Geographic location and the size of one’s community must also be considered as rural areas often have less alternative transportation options, putting older adults who retire from driving in rural areas at greater risk of becoming socially isolated and experiencing negative health outcomes (Hansen et al., 2020). Potential barriers specific to the older adult population must be understood by caregivers, occupational

therapists, and the community to maximize opportunities to overcome obstacles and identify relevant and useful options for older adults.

Occupational Therapy's Role

Occupational therapy may provide a distinct and unmatched perspective on driving cessation and community mobility, integrating vital aspects of medical and clinical knowledge, prioritizing meaningful roles and occupations, and advocating for the needs and preferences of clients. Occupational therapists are uniquely qualified to assess, address, and assist clients in accomplishing their community mobility goals. In fact, the American Occupational Therapy Association (2016) has identified specific research needs related to driving, community mobility, and older adults for education programs that inform participants about mobility transition choices and features that can increase their knowledge of community mobility options.

Occupational therapy providers are capable of evaluating driving, recommending adaptations, and assisting with maintenance of driving as an occupation; however, the resources and support available to older adults *after* driving cessation is not sufficient to address the needs and social roles of many retired drivers (Donoghue et al., 2019; Liddle et al., 2012; Liddle et al., 2014). When driving is no longer a safe option, there is opportunity for occupational therapy to play a significant role in modifying and supplementing a client's habits and desires to support continued access to the community and promote opportunities for social interaction. A decline in quality of life following driving cessation may be avoided if an effective transportation plan is created and implemented. As a discipline, occupational therapy has the ethical responsibility to preserve and cultivate valued occupations, especially in the midst of transportation and lifestyle changes.

Summary

The negative results of driving cessation for older adults have been clearly identified in the literature. The physical and mental health of older adults is influenced by community mobility, as well as aspects as fundamental and essential as one's own self and social identities (Gardner, 2014). Reduced life space, influenced by limited community mobility in advanced age, can contribute to lower health outcomes and quality of life as well (Britto et al., 2018; James et al., 2010). Many older adults perceive driving to be a symbol of independence and pivotal in maintaining connection with their community and engaging in their lifestyle and routine preferences (Curl et al., 2014; Golisz, 2019). Depending on the geographical location, physical layout, and available support in a community, accessing transportation and supporting mobility can be challenging for older adults who are no longer driving. In the United States, driving is often conceptualized as interchangeable with community mobility; therefore, many individuals may be unaware of alternative transportation options provided through county or local governments, private pay-by-ride services, or volunteer-based programs offered in their area (Choi & DiNitto, 2016). When alternatives are unknown, driving cessation can represent limitations on community mobility, independence, and social competency (Golisz, 2019).

There is a need to maintain ventures and connections outside the home to support older adults in the transition away from driving to maintain social participation and quality of life, both of which demonstrate decline associated with driving cessation (Donoghue et al., 2019; Liddle et al., 2012). Education and coordination regarding alternative transportation options available to an individual could provide the knowledge and resources necessary to stay socially connected and support one's quality of life, even when driving is no longer an option. This process is called transportation planning; its purpose is to consider the unique aspects of a person within the

context of their environment, routines, and preferences and create a system in which the person can access their destinations of choice via alternative transportation options.

Addressing continued community mobility for older adults, which falls within the scope of occupational therapy, can contribute to more positive outcomes for the health and wellness, occupations, and quality of life for this population. Therefore, this study was undertaken to more clearly explore the process and the potential benefits of transportation planning to facilitate community mobility for older adults who outlive their ability to drive. Occupational therapists have the unique ability to address obstacles related to a successful transition out of the driver's seat and meet the occupational needs of clients as they face a shift in routines and methods of transportation. Ultimately, continued community mobility through the design and execution of a transportation plan may support social participation and quality of life for older adults retiring from driving.

The purpose of this study was to explore potential best practices in transportation planning and the influence of transportation planning on older adults who are facing driving retirement, specifically in supporting social participation and quality of life and the impact on community mobility. Understanding this process for a few individuals contributed to exploring the factors that may influence success, as well as identifying improved practices for providing the transportation planning services to others. There were three main research questions examined in this study:

1. How can transportation planning be implemented with older adults who are facing retirement from driving and what barriers exist?
2. What factors facilitate or inhibit community mobility for individuals who have received a recommendation to cease driving?

3. How does transportation planning influence social participation, quality of life, and community mobility?

CHAPTER 3: METHODS

Design

A descriptive case series design was utilized to investigate methods for implementing transportation plans and identify related barriers, along with facilitatory and inhibitory factors associated with community mobility for three older adults who received the recommendation to cease driving. Information pertaining to the first two research questions was gathered during the transportation planning sessions through discussion. In addition, this study examined how transportation planning impacted participants' social participation, quality of life, and community mobility. A pretest of these domains was conducted for individuals who were participating in a driving fitness evaluation. Once they were given the recommendation to cease driving, three participants engaged in the transportation planning intervention. Then, assessments were repeated as a posttest. Following approval by the University & Medical Center Institutional Review Board (Appendix A), data collection began.

Participants

This study used non-probability convenience sampling to recruit participants. The target population was older adults who received a comprehensive driving evaluation through Vidant Medical Center's occupational therapy Fitness to Drive program and received the recommendation to cease driving. To be eligible for screening, individuals were required to be 60 years or older, fluent in English, and demonstrate functional cognition to participate in transportation planning, as determined by the occupational therapist conducting the Fitness to Drive evaluation. Pretest data was collected from screened individuals by a member of the research team following informed consent, but before the outcome of the driving evaluation was known, to reduce the influence of recommendations viewed to be negative or problematic by the

participant. However, engagement in the transportation planning process was contingent on the recommendation to cease driving.

A total of 19 individuals were screened for the study between September 2020 and April 2021 and nine received the recommendation to cease driving. Of those nine, three individuals agreed to participate in the transportation planning process and the posttest assessments. These three participants were included in the descriptive case series.

Instruments

Demographics

Data on the participant's date of birth, gender, ethnicity, marital status, education level, income level, relevant medical history, and contact information was self- or caregiver-reported. The demographic form was created by the research team. In addition, diagnostic information pertinent to the driving evaluation was shared with the research team by the occupational therapist who conducted the Fitness to Drive evaluation.

Role Checklist Version 3 (RCv3)

The *Role Checklist version 3* (Scott et al., 2019) measured social participation, a primary outcome measure, through a client's perceived role incumbency (i.e. number of roles), satisfaction with current roles, and desire for future role engagement (Scott et al., 2019). Social participation is defined in the most recent edition of the *Occupational Therapy Practice Framework* (*OTPF-4*) as "activities that involve social interaction with others, including family, friends, peers, and community members, and that support social interdependence" (AOTA, 2020, p. 34). The *RCv3* provides structure for participants to identify roles they participate in that inherently involve social interaction and underpin social interdependence. Specifically, the roles as a family member, friend, peer (including roles as student, worker, volunteer, caregiver,

religious participant, hobbyist/amateur) and member of an organization correlate with examples of social connections highlighted in the *OTPF-4* definition. Within the scope of occupational therapy, participation is often measured using versions of the *Role Checklist* because roles reflect social participation (Liddle et al., 2021; Meidert et al., 2018). Therefore, the *RCv3* was used to collect data on social participation through the lens of role engagement, operationalizing social participation by measuring the individual's number of roles, satisfaction with roles, and the desirability for future roles.

For each of the 10 roles, participants indicated whether they participated in that particular role; the total number of roles they participated in equals the participant's role incumbency. If they participated in a role, they reported their satisfaction with that role; if not, they reported their desire to perform the role now, in the future, or not at all (Scott et al., 2019). Satisfaction per role was ranked using a Likert scale (very dissatisfied to very satisfied) and desired performance per role was indicated by their wish to perform that role now, in the future, or not at all. Role satisfaction scores were calculated by dividing the current number of mostly and very satisfied roles by the total number of current roles. Therefore, the highest possible score for role satisfaction is 1.00. The desired performance scores were calculated by dividing the current number of roles by the sum of the current number of roles plus roles they want to perform now. Again, the highest possible score was 1.00.

Using the Cohen's Kappa and Cronbach's alpha mirrored analysis, test-retest reliability for the *RCv3* ranges from acceptable to excellent across the assessments three segments- present role incumbency ($\kappa = 0.74\text{-}1.00$), desired future role engagement ($\kappa = 0.44\text{-}1.00$), and satisfaction with performance ($\alpha = 0.77\text{-}0.98$) (Scott et al., 2019). Additionally, concurrent validity with the Occupational Circumstances Assessment and Rating Scale (OCAIRS) has been established and,

since roles have remained the same throughout revisions, content validity has been maintained (Scott et al., 2019). The established utility and feasibility of the *RCv3* demonstrates the useful and user-friendly nature of the assessment as a measure of role participation (Scott et al., 2019).

CASP-19

Quality of life, a primary outcome measure, was measured using the *CASP-19* composed of four domains which form the acronym of the instrument title; namely Control, Autonomy, Self-realization, and Pleasure. These four domains encompassed the beneficial experiences related to quality of life of older adults and were not limited to the medical and social problems typically associated with older age (Hyde et al., 2003). The *CASP-19* measured quality of life using four-point Likert scales (i.e., *often*, *sometimes*, *not often*, and *never*) on 19 items across the four domains and has been shown to reflect changes in quality of life over time (Bowling, 2009; Sim et al., 2011). The highest score for each of the 19 items is 3; therefore, the highest score possible total score is 57. Higher total scores indicate a higher quality of life (Bowling, 2009). The *CASP-19* has established internal consistency and convergent construct validity, demonstrating a strong positive correlation ($r= 0.63$, $p= 0.01$) with the Life Satisfaction Index–Well-being scale (Hyde et al., 2003). The Life Satisfaction Index– Well-being scale is a tool designed to measure one's acceptance-contentment with life, a construct similar to quality of life (Hyde et al., 2003).

Modified Driving Habits Questionnaire (*MDHQ*)

The *Modified Driving Habits Questionnaire* was used to measure one's degree of community mobility, a secondary outcome measure, including where, how often, and how far an individual traveled. Community mobility was quantified based on trips outside the home and the frequency of which these trips are made. In this study, places outside the home were defined as

the places a participant goes in a typical week and trips were quantified by the number of times per week a participant traveled to a particular destination and the destination's distance from the home in miles. The *Driving Habits Questionnaire*, developed by Owsley et al. (1999) which served as the basis for the modified version used, established good test-retest reliability as a measure of self-reported driving behavior for older adults (Song et al., 2015). Good internal consistency was also demonstrated among the assessment's four domains: dependence, difficulty, crashes and citations, as well as driving space (Song et al., 2015).

Dependence and driving space were of particular interest in this study and a modified, shorter version was used to focus on community mobility exposure. The original version was adapted by the research team to elicit descriptive data on participants' driving habits and their current level of community mobility.

Intervention

Transportation planning refers to the process of exploring community mobility alternatives to driving with an individual based on their driving habits, desired destinations, and resources available in their community. Prior to meeting with the participants, the research team reviewed the participant's driving destinations and frequency data from the *MDHQ* to determine the client's needs and to identify preliminary driving alternatives for public and private-pay transportation available in their geographical location. This typically included identifying the county Council on Aging, making note of any accessible bus lines or paratransit options, contacting facilities to inquire whether they provided transportation for older adults who cannot drive themselves, and internet searches of companies that provide fee-based rides, such as Ubers, Lyft, or taxis.

The following resources were available to the research team to assist in identifying potential transportation alternatives, guide the discussion with the participant, and organize the transportation plan: Plan For The Road Ahead website (Appendix B) and two Hartford guide resources: *Driving Activities: When, Where, and Why* (Appendix C) and *Getting There: Using Alternative Transportation* (Appendix D) (The Hartford, 2015).

The Plan For The Road Ahead website is a source of driving and community mobility information and potential resources for older adults who plan to retire from driving and for those who are currently making or have already made the transition. The website offers a transportation plan feature to provide structure in planning for alternative transportation to support community mobility when considering driving cessation. Participants were informed of the website; however, this site is designed to be used independently by a consumer and did not offer the problem-solving and individualized support that occurred during the transportation planning process utilized in this study.

The Hartford Center for Mature Market Excellence and the MIT AgeLab have published several educational guides designed to support older adults and their families in the transition away from driving (The Hartford, 2015). *Driving Activities: When, Where, and Why?* is a table that organizes community mobility habits and needs. *Getting There: Using Alternative Transportation* organizes resources and availability relating to transportation options (The Hartford, 2015). A combination of the Hartford tables was adapted and referenced during the sessions to identify transportation options according to the participant's unique community mobility needs and expectations.

These resources were utilized, as appropriate, to assist with problem-solving in designing the transportation plan. During this preparation phase, a list of viable resources and

transportation alternatives specific to a particular client was compiled in preparation for Session 1.

Session 1 was scheduled for approximately 45 minutes and participants chose a delivery method of either in person, over the phone, or via video conferencing. The research team, participant, and caregiver (when applicable) discussed client needs and potential transportation options according to their preferences, routines, and geographical area. Initial transportation planning included identifying viable alternative transportation options and problem-solving through logistics of community mobility- schedules, costs, and relationships with others. The transportation plan template (Appendix E) was used for each participant to guide the process and included an outline for the participant's driving destinations and frequency along with potential alternative transportation options for each location. In addition, the template was designed with structured categories of transportation alternatives available to the participant that could be explored if options listed for a specific destination were not feasible or effective. These categories included *Family / Friends*, *Public Transportation*, *Ridesharing,* and *Community Organizations*.

Initial transportation alternatives developed by the research team were presented and discussed. The participant was asked to identify individuals who could potentially provide rides. These informal arrangements were listed under *Family / Friends* and could also include neighbors, members of a common organization, or others who may be able to give them repeated or occasional rides. For this option, it was useful to identify people who already participated in events and routines at the client's identified meaningful locations. The research team and client discussed specific plans of action for how to build a transportation network and request rides

from others, such as members of one's church congregation to provide a weekly ride to Sunday morning worship.

Listed in the *Public Transportation* section of the transportation plan template, details were provided for each agency or government service. Specific qualifications for access were listed (i.e. transportation for Medicare patients), along with methods of access (i.e. van services to medical appointments), schedules, and contact information for each option.

The purpose and operation of *Ridesharing* was explained to participants and listed on the transportation plan template. Members of the research team demonstrated how to use Uber and Lyft apps on a smartphone. GoGo Grandparent's unique design was explained to increase comfort with a blend of old and new technology, as this service provides access to ridesharing through phone calls rather than apps and can be monitored by family. Similar to other ridesharing services, however, no money is exchanged during the trip.

In *Community Organizations*, facilities local to the participant with resources or transportation assistance were listed. The Council on Aging for the participant's county was included with types of services provided and methods of access depending on the county. For example, some only offered medical transport for those over 60 who did not have Medicaid, while others also covered general transportation for those over 60.

During Session 1, supplementary internet searches were conducted as needed to address specific questions (i.e. "Where is the Council on Aging?") or to identify additional agencies or companies that could be of use to the participant.

After the template was filled out and following discussion of transportation options during Session 1, the participant was encouraged to use the options listed according to the schedule and availability that worked best for them and/or the party providing the ride. Before

concluding Session 1, the research team and participant discussed any additional concerns and expectations for the intervention that the participant may have had. The physical copy of the transportation plan was given to the participant to take home. They were also given the phone number of a member of the research team and, if there were any questions pertaining to their transportation plan in the meantime, they were instructed to call. Each participant was told they would be contacted in two weeks for Session 2 to discuss the transportation plan and make any changes if necessary.

Session 2, scheduled for approximately 30 minutes, was conducted two weeks later, offered in person or by phone or video conference. During this session, the participant and research team discussed how the participant perceived the practicality and effectiveness of the initial plan and considered the participant's level of satisfaction with their current community mobility. First, the participant was asked how they had been able to generally access their community. Then, the research team asked about transportation to specific destinations, based on the initial transportation plan, and whether the particular transportation alternatives listed were working. For example, if a participant listed their son as someone who could take them to the grocery store, they were asked how many times that had actually occurred. For resources suggested by the research team during Session 1 that were unfamiliar to the participant, follow-up questions were asked to assess whether these resources were being utilized (i.e. "Have you contacted the Council on Aging," "Have you tried ordering an Uber on your phone?"). The participant was asked if there were any changes or additions they would like to make to their transportation plan. If so, contacts were added to the transportation plan as additional resources for alternative transportation to be used moving forward. If there were no changes, the transportation remained in its original form. Lastly, the participant was informed they would be

contacted again in two to three weeks for Session 3 and was instructed to call a member of the research team if any questions or concerns arose before that time.

Two to three weeks later, the transportation plan was again reviewed over the phone during Session 3, scheduled for approximately 30 minutes, which served as the final opportunity to review and refine the transportation plan with a member of the research team. Participants were asked how using transportation alternatives was going and if there were any changes or additions they wanted to make to their plan. Follow-up questions were asked according to the participant's particular situation (i.e. if it was discussed that the participant would ask a new friend for a ride, did they do it? How did it go?). At the close of the final session, participants were encouraged to continue utilizing the transportation alternatives listed on their plan and reach out to additional organizations and companies when they encountered a transportation need that could not be met with their current plan.

Throughout interactions with the participants across sessions, data was gathered from discussions between the participant and the research team on the various perspectives of the effectiveness of the transportation plan, factors that were facilitating or inhibiting its implementation, and possibilities of ways to make improvements. This ensured the transportation plan was client-centered and provided opportunities for the research team to gather data based on the participants' experiences in order to better understand best practices in transportation planning.

Procedure

University and Medical Center Institutional Review Board determined this study as exempt prior to recruitment of participants. A member of the research team was present during the Fitness to Drive Evaluations and verified eligibility criteria for screening during the

evaluation. All eligible individuals were informed of the purpose of transportation planning and invited to participate in the study. Following informed consent (Appendix F), initial data was gathered from the individual (and/or caregiver as appropriate) including demographic information and pretest assessments. This was done during the driving evaluation prior to the participant receiving final recommendations from the evaluation. Each individual that completed pretests received a $10 gift card and was informed that, if the outcome of the evaluation was a recommendation to cease driving, they would have the opportunity to participate in transportation planning and earn two more $10 gift cards, specifically one following Session 2 and one following Session 3.

At the end of the driving evaluation, participants who received a recommendation to cease driving were invited to participate in the transportation planning intervention. A member of the research team restated the purpose and process of transportation planning and communicated that the participant or caregiver would receive a call within three days to schedule Session 1. Each individual who was given the recommendation to cease driving received a notecard reminding them of the purpose and potential benefits of transportation planning and next steps for participation in the research study. Names, pictures, and contact information for members of the research team were also included.

Within the next three days, a member of the research team called the individual to set a date and time for Session 1, the first transportation plan meeting out of three. Caretakers, spouses, or other family members were invited to participate in the transportation planning process as they were valuable members of the individual's transportation network and could provide support in the transportation planning process in the form of brainstorming and planning for transportation alternatives.

Transportation planning took place over three sessions spanning five to six weeks. Session 2 was conducted two weeks after Session 1 and Session 3 occurred two to three weeks after that. Participants were sent a total of two more $10 gift cards, one after Session 2 was completed and the other immediately following the conclusion of Session 3.

Posttests were conducted following the completion of the transportation planning portion of Session 3.When the posttests were completed, participation in the study concluded.

Data Analysis

A descriptive case series design was used to explore methods of and barriers to implementation of the transportation planning process for older adults who were facing driving retirement, and to better understand the factors that facilitated or inhibited community mobility for individuals who participated in transportation planning. In addition, preliminary data was examined regarding the influence of transportation planning on social participation, quality of life, and community mobility for older adults who were retiring from driving. This laid the groundwork for improvements to future implementation of transportation planning and subsequent research.

To address the first two research purposes, cases were described according to the demographic and background information gathered during the pretests and the data obtained during the transportation intervention sessions. Data elicited from discussion during the sessions focused on methods to be used in transportation planning, ways it can be implemented with older adults who received a recommendation to cease driving, and barriers to transportation planning encountered in this study. Additionally, this data was used to identify facilitators and inhibitors of community mobility among this population. The data from the *MHDQ* was used to explore changes in weekly mileage to the driving and community mobility habits of the participants from

pretest, when they were not limited from driving, and the posttest, when the transportation plan had been implemented. Statistical analysis for this measure was not appropriate as it provides descriptive data only. However, it facilitated a greater understanding of the transportation planning intervention for each participant. Changes in weekly mileage from pretest to posttest were compared for the research purposes of understanding the influence of transportation planning on social participation and quality of life using the *RCv3* and the *CASP-19*, respectively. Statistical analysis of results of the *RCv3* and the *CASP-19* was not appropriate due to the small sample size; however, preliminary use of these assessments could assist in determining the utility of these instruments to inform future research.

CHAPTER 4: RESULTS

The three cases included in the series were retired older men residing in rural Eastern North Carolina. All participants, regardless of diagnosis or condition, had some level of motor, visual, or cognitive impairments. Motor and visual deficits affected physical mobility and interaction with the environment. Cognition deficits included processing speed, cognitive flexibility, complex problem solving, and the use of technology; all of which are important considerations for driving safety. Although all participants met inclusion criteria of functional cognition to participate in transportation planning, cognitive challenges were noted in all three participants during the transportation planning process and were noted to impact participation and implementation of the transportation plan.

Participant 1: Albert

Demographics and Background

Albert was a Black 80-year-old man, referred for a Fitness to Drive evaluation due to neurocognitive disorder, namely Alzheimer's with dementia, and Parkinsonian features. He presented with intention tremors and moderate cognitive deficits, notably slower processing during discussion and difficulty sequencing tasks during the Fitness to Drive evaluation. Albert's vision and motor abilities were within functional limits. He had a bachelor's degree, reported an income bracket of $75,000-$99,999, and lived with his wife, who was able to drive him to the majority of places he identified as important on the MDHQ. However, both Albert and his wife indicated they would have preferred avoiding driving cessation as the wife wanted autonomy for her husband and was hesitant to assume full responsibility for her husband's transportation. Prior to the driving evaluation, he was driving without any self-imposed restrictions, typically drove no more than 4 miles from his home, and reported driving with no difficulty at all.

Albert was well-connected in his community as he reported involvement in several organizations including the Freemasonry, his fraternity, and local events and initiatives. He said he was expected to be present at certain community affairs and gave an example of helping Town Hall to organize last year's parade.

Intervention Session 1

During Session 1 for the initial transportation plan meeting, Albert and his wife considered individuals that could conceivably provide transportation support when the wife was unavailable to drive him to the desired location. They shared that they had one daughter who lived close by and could potentially assist with transportation; however, they expressed hesitation to ask for her help because she had been reluctant to help in the past. They also identified one friend who would provide transportation if asked. The research team shared local public transportation options, including the county Office of Aging, and introduced ridesharing options including Uber, Lyft, and GoGo Grandparent. Because of Albert's close ties to the community and membership in several organizations, the research team encouraged him and his wife to ask for rides from fellow community and organization members when his presence was requested at a particular event.

Intervention Session 2

During the review of Albert's initial transportation plan in Session 2, his wife reported he was "navigating pretty well so far" and she drove him most places he needed to go. However, the wife also reported his status as a non-driver was putting more pressure on her and he felt aggravated when he had to frequently ask for a ride from her or others. She reported they had not contacted the local Office of Aging, public transportation options, or ride sharing services; however, they had identified another friend through their church that provided transportation to

the participant when the wife was sick. Albert and his wife were attempting to pursue the appeal process with the Department of Motor Vehicles (DMV) to reverse the driving cessation decision. During Session 2, the wife asked the research team for guidance on this process but was informed the scope of the research team was to collaboratively problem-solve, create, and put into motion a transportation plan and that the DMV appeal process fell outside of that scope. Considerable time and effort were spent on the appeal process which limited the time Albert and his wife were able to invest in a transportation plan that worked well for him.

Intervention Session 3

At the time of Session 3, Albert was still pursuing the DMV appeal and did not report utilizing additional avenues for alternative transportation since the previous session. As indicated by his *RCv3* posttest assessment, Albert had added one role since pretest, namely that of a hobbyist. However, there was no change from pretest indicated by his role satisfaction or desired role performance. His CASP-19 data indicated a slight decrease in quality of life score. Finally, since his recommendation of driving retirement, Albert's miles travelled per week decreased slightly according to the *MDHQ*.

Table 1

Albert: Difference between Pretest and Posttest Scores

	Pretest	Posttest	Difference
RCv3 Number of Roles	4	5	+1
RCv3 Role Satisfaction	1.00	1.00	no change
RCv3 Desired Role Performance	1.00	1.00	no change
CASP-19	43	42	-1
MDHQ	11.9	10.5	-1.4

Note. Each *MDHQ* value represents the number of miles travelled per week.
RCv3 = Role Checklist version 3
MDHQ = Modified Driving Habits Questionnaire

Participant 2: Ben

Demographics and Background

Ben was a White 72-year-old man referred for the Fitness to Drive evaluation due to Parkinson's Disease and involvement in three motor vehicle crashes within the past 18 months, two of which resulted in the vehicle he was driving being declared as totaled. He presented with visual acuity and visual field impairments and demonstrated difficulty with functional mobility. He was observed to have mild to moderate cognitive impairments.

Ben, divorced and living with his son and three granddaughters at the time, had a high school degree and reported a $35,000-$49,999 income bracket. He also reported that prior to his driving evaluation he had stayed generally within his immediate neighborhood since his most recent motor vehicle crash. Sometimes he drove his four-wheeler, rather than his car, to the store which was about a half mile from his home. He said he had no concerns with his driving, stating that he was "very careful," and reported he could drive with no difficulty at all.

Intervention Session 1

When listing potential resources for alternative transportation, Ben reported he had a home health aide that came to the house three times a week and was available to take him places. He said his son was sometimes able to drive him, but the son's availability depended on his work schedule. In addition, he listed his brother as a potential resource, but the brother's availability varied as well. Ben reported he had vacation plans to visit Disney World and take an Alaskan Cruise. He used a motorized scooter for long distances and a rollator for short distances and was concerned about how his community and functional mobility might limit his participation on vacation. Ridesharing services including Uber, Lyft, GoGo Grandparent were introduced and,

following a verbal description of the purpose and instructions for use, Ben was provided with step-by-step Uber instructions through the mail.

Intervention Session 2

During the Session 2 review of his initial transportation plan, Ben reported he had not tried, nor was he currently interested in, the local medical transit bus for transportation to his appointments. He explained the only way he could get to the bus stop closest to his home was to drive his scooter, but he would then have to leave it at the bus stop as there was no way to load the scooter onto the bus to take it with him. Ben reported his son, his brother, and the aide were busy and unavailable to take him where he needed to go according to his schedule. He reported that he had received the Uber instructions in the mail but that they were confusing. He also reported that he was not interested in learning about ridesharing at the time because he was attempting to appeal the driving cessation decision with the DMV to get his license back. Ben appeared to be investing much of his energy into the appeal process rather than creating and following a transportation plan that worked for him.

Intervention Session 3

He was still attempting an appeal at the time of Session 3 and did not report additional methods of transportation from Session 2.

As indicated by *RCv3* posttest assessments, Ben had not changed the roles in which he participated, although his role satisfaction decreased slightly, and desired roles increased slightly. Similar to Albert, Ben's quality of life scores decreased slightly since pretest according to the *CASP-19*. However, Ben was travelling approximately 4.3 miles more per week than he had been prior to the transportation planning process according to the *MDHQ*.

Table 2

Ben: Difference between Pretest and Posttest Scores

	Pretest	Posttest	Difference
RCv3 Number of Roles	5	5	no change
RCv3 Role Satisfaction	0.8	0.6	-0.2
RCv3 Desired Role Performance	0.71	0.83	+0.12
CASP-19	31	29	-2
MDHQ	1.3	5.6	4.3

Note. Each *MDHQ* value represents the number of miles travelled per week
RCv3 = Role Checklist version 3
MDHQ = Modified Driving Habits Questionnaire

Participant 3: Chris

Demographics and Background

Chris was a White 77-year-old man referred for a driving evaluation due to episodes of syncope with suspected transient ischemic attack and/or seizure resulting in a motor vehicle crash. His motor skills were within functional limits, but he presented with memory deficits, slowed processing speed, and visual impairments.

Chris was separated and lived alone in a mobile home on his sister's property with other family members and neighbors living within a short walking distance. He reported his education level as less than a high school diploma and his income bracket at $20,000-$34,999. At the time of his driving evaluation, he did not self-restrict any driving habits and reported that he drove with no difficulty at all. At that time, he was currently driving approximately 8 miles to most destinations (restaurants, church, the store) but drove up to 25 miles to friend's homes or for appointments once a week.

Intervention Session 1

He was able to name two family members and three neighbors that lived close by and who could provide transportation or other assistance if needed. Chris reported he had attempted

to use the Uber rideshare app, which his daughter helped him set up, since his recent motor vehicle crash. However, Ubers were not available where he lived due to his rural location. He was informed of the public transportation bus and van services in his area that provided medical trips with reservations.

Intervention Session 2

During Session 2, Chris reported he was going to the same places and getting around just fine with the help of his family members that lived close by. He said he had not explored public transportation options and access to Ubers remained problematic in his rural location. He reiterated the number of people he could call on (identified five by name, along with "other next-door neighbors") if he needed transportation.

Intervention Session 3

Chris maintained he had people to assist him with transportation planning and he was not seeking an appeal with the DMV to get his license back. According to the *RCv3*, Chris indicated no change to the number of roles in which he participated after the recommendation to cease driving and transportation planning; nor were there changes to his role satisfaction or desired role performance. Chris' *CASP-19* posttest data indicated a slight increase in quality of life score. Finally, Chris was travelling 35 more miles per week when compared to pretesting; this was due primarily to more frequent visits to a friend's home at the time of posttest (from once a week to twice a week), 25 miles away, via a ride from his sister or a friend.

Table 3

Chris: Difference between Pretest and Posttest Scores

	Pretest	Posttest	Difference
RCv3 Number of Roles	7	9	no change
RCv3 Role Satisfaction	1.00	1.00	no change
RCv3 Desired Role Performance	1.00	1.00	no change
CASP-19	49	51	+2
MDHQ	60.8	95.8	+35

Note. Each *MDHQ* value represents the number of miles travelled per week
RCv3 = Role Checklist version 3
MDHQ = Modified Driving Habits Questionnaire

Summary of Assessment Data for All Participants

Social participation, a primary outcome measure, was measured by the *RCv3* through a self-report assessment of the client's number of roles, satisfaction with current roles, and desire for future role engagement. Only one participant added a role, there was no change in role satisfaction for two of the three participants, and no change in desired role performance for two of the three participants (see Table 4).

Table 4

Role Checklist version 3 Pretest and Posttest

	RCv3 Number of Roles			RCv3 Role Satisfaction			RCv3 Desired Role Performance		
	Pre test	Post test	Difference	Pre test	Post test	Difference	Pre test	Post test	Difference
Albert	4	5	+1	1.00	1.00	no change	1.00	1.00	no change
Ben	5	5	no change	0.8	0.6	-0.2	0.71	0.83	+0.12
Chris	7	7	no change	1.00	1.00	no change	1.00	1.00	no change

Note. RCv3 = Role Checklist version 3

Quality of life, the other primary outcome measure, was measured using the *CASP-19* with four domains: Control, Autonomy, Self-realization, and Pleasure. For one participant that demonstrated no change in any of the *RCv3* role measures (incumbency, satisfaction, desired

performance), quality of life increased slightly. For the participants who demonstrated very minor changes in role measures, quality of life decreased (see Table 5).

Table 5

CASP-19 Pretest and Posttest Raw Scores

	CASP-19 total scores		
	Pretest	Posttest	Difference
Albert	43	42	-1
Ben	31	29	-2
Chris	49	51	+2

Note: The maximum *CASP-19* total score is 57

Data elicited from the *MDHQ* (see Table 6) revealed that weekly mileage from the home for Albert decreased by 1.4 miles. However, weekly mileage from the home increased by 4.3 miles and 35 miles for Ben and Chris, respectively.

Overall, minimal change was noted on any of the pretest and posttest assessments. The data does not demonstrate a consistent increase or decrease in any outcome measure- social participation or quality of life. Chris did have a notable increase in community mobility as a result of transportation planning, although the increase was based on a single trip and therefore it does not represent a true trend in the data.

Table 6

Modified Driving Habits Questionnaire (MDHQ)Weekly Mileage Pretest and Posttest

	MDHQ		
	Pretest	Posttest	Difference
Albert	11.9	10.5	-1.4
Ben	1.3	5.6	+4.3
Chris	60.8	95.8	+35

Note. Each value represents the number of miles travelled per week.

CHAPTER 5: DISCUSSION

The purpose of this study was to explore how transportation planning can be implemented with older adults retiring from driving and identify related barriers, to examine factors that facilitate or inhibit community mobility, and to investigate the influence of transportation planning on social participation, quality of life, and community mobility.

Strategies for implementing transportation plans were identified. These included considering the individual's level of support, using medical history and current status to inform the plan, and having interaction take place in person whenever possible. Barriers to transportation plan implementation included emotional and attitudinal barriers, reluctance to engage in transportation planning, limited insight to deficits, and becoming distracted from the process. Factors observed to facilitate community mobility were having an established social network and ride receipt from family and friends. Factors observed to inhibit community mobility were the tendency to avoid asking others for a ride, residing in a rural area, and impaired physical mobility. Preliminary data measuring social participation, quality of life, and community mobility did not yet indicate notable changes by transportation planning.

Implementing Transportation Plans

There were differences among the cases that dictated how each transportation plan was created and potentially influenced participant perception toward the success of the transportation plan. First, each participant had a different income bracket, marital status, and living situation; one lived with his spouse, one was divorced living with his adult child and grandchildren, and one was separated and living independently on his sister's land with family and neighbors within walking distance. This information guided the process of creating and implementing the transportation plan regarding the participant's level of support: who was available to help and

how often.

Participants also varied in their conditions and deficit areas. Although each had some level of cognitive deficits, their motor abilities differently affected functional mobility. Albert, the oldest individual, had a shuffling gait and intention tremors that impaired coordination and fluidity of movement. Ben also had a shuffling gait and ambulated with a rollator. His impaired dynamic balance impacted his ability to reach outside his base of support and complete bilateral tasks while standing. Chris did not present with significant motor deficits at the time of his driving evaluation. Motor and cognitive impairments contributed to the outcome of the driving evaluation and the recommendation to cease driving. At the same time, these impairments also informed the process in which a transportation plan was created. For example, Ben described difficulty using public transportation not because of the bus itself, but because he wasn't able to walk to the nearest bus stop and therefore couldn't access the bus line. Synthesizing and understanding one's medical history and current condition provided pertinent information for how a transportation plan could best meet the individual's needs.

Albert, along with his wife, was the only participant to conduct the initial transportation plan with the research team, along with his wife, in person rather than over the phone. All three participants conducted Sessions 2 and 3 over the phone. Albert's in-person transportation plan meeting yielded more detailed information, encouraged more discussion, and guided prompting about community mobility habits and transportation options as compared to the other two participants' meetings. It also provided an opportunity to build rapport between the participant and the research team. Increased data collected during Albert's in-person meeting allowed the research team to better understand his specific environmental and relational circumstances and therefore make tailored suggestions for his transportation needs. A lack of opportunity to

interpret body language and facial expressions during phone conversations with other participants may have not resulted in the same level of communication and therefore resulted in less information. It was observed that conducting transportation planning in person led to a greater amount of information which in turn allowed for the research team to assist in creating a more thorough transportation plan. A detailed transportation plan fueled specific, more direct questions during subsequent sessions which gave the research team a clearer picture of what methods were and were not working.

Barriers to Implementing Transportation Plans

When participants received the recommendation to stop driving, they generally demonstrated observable signs of dejection or frustration. For example, they avoided eye contact, dropped their head, sighed, and even made statements like "well, that is horrible news." Emotional and attitudinal barriers to driving cessation, manifested as such, proved to be challenges to initiating and progressing through the transportation planning process. Because participants were initially upset by the outcome of their evaluation, working with participants to overcome these barriers was a critical part of transportation planning. Identifying impacts of these influential attitudinal and emotional barriers will provide direction for future research, as the procedure and methods can be refined to account for various levels of readiness for transitioning to transportation alternatives. Individuals that indicate high self-reliance tendencies and an unwillingness to burden others may need additional or alternative support for the transition away from driving (Meuser et al., 2013).

For each of the participants, losing the ability to drive was an unwanted change, consistent with previous research on attitudes and emotions associated with driving cessation (King et al., 2010). With disappointment and frustration, often came skepticism or hesitation to

commit to the transportation planning process. Lack of client buy-in challenged the potential and efficiency of transportation planning, as the clients were the ones with the greatest amount of knowledge pertaining to specific people or organizations they were comfortable asking to support their transportation needs. When participants weren't able or were uncomfortable with trying a new method or asking for help, the transportation planning options available to them were further limited. Encouraging client buy-in may increase engagement in the process of implementing the transportation plan with potential to identify more options and connections in their transportation plan network.

All participants reported they drove with "no difficulty at all" on the *MDHQ* pretest at the time of their evaluation, prior to receiving the recommendation to cease driving. This limited insight of deficits could exacerbate an individual's readiness for transition and lead to difficulties with putting the transportation plan into action. This was further demonstrated in two of the three participants that were in the process of appealing the driving evaluation decision in efforts to get their license back.

All participants voiced concerns over transitioning to using alternative transportation, including those associated with cost, logistics with organizing, feeling like a burden to others, and resistance to losing independence. While these concerns represented legitimate obstacles, sometimes the focus during a session would shift to reasons why transportation planning wouldn't work rather than how transportation planning could be used to their benefit. Misdirected discussion often served as a distraction away from the transportation planning process, therefore limiting its progress and potential practical application.

Factors that Facilitate Community Mobility

According to data collected during the pretests and transportation planning process, some differences between the participants did not appear to have a notable influence on community mobility. The ages of participants (ranged 72-80), ethnicity (one Black and two White), and education level varied. Chris, with the least amount of schooling (less than a high school diploma), had the greatest increase in weekly mileage and was the only one to increase in quality of life. The other participants, a bachelor's degree and a high school degree, decreased by one and two points respectively. Highlighting a relatively low socioeconomic factor as compared to other participants, this particular set of data does not align with findings by Groenou and Tilburg's (2003) that individuals of low/decreased lifetime SES had smaller networks and less support. However, the inclusion of only three cases and lack of statistical analysis in this case series may account for this difference from the literature. It could not be determined that age, ethnicity, and education had any influence on community mobility one way or another.

Each individual self-reported falling into a different income bracket and income did not have a notable impact on community mobility as it was reported by participants. It is interesting that Chris, the participant in the lowest income bracket, had the greatest increase in weekly mileage and reported slightly increased quality of life; Albert, the participant in the highest income bracket, demonstrated a decrease in weekly mileage and quality of life. Chris also listed the highest number of people whom he felt comfortable asking for transportation, three of which were non-kin. His relatively large network size, as compared to the other participants, further contributes to a counter example of Groenou and Tilburg (2003) but highlights the importance of establishing a social network to maintain options for community mobility.

All three participants utilized the same primary means of alternate transportation, namely reliance on others for rides, and each had at least three individuals they felt comfortable contacting for situations in which they needed a ride somewhere. For these three participants, ride receipt from family, friends, or neighbors facilitated community mobility as this method of transportation was the only way they were getting where they needed and wanted to go. The participants' high reliance on others aligns with findings of Choi and DiNitto's (2015) that those who retire from driving tend to depend on transportation from family and friends.

Factors that Inhibit Community Mobility

Although participants could identify individuals they could ask for rides, all participants distinguished in some way between emergency-type situations in which they would *need* a ride and more casual circumstances in which they *desired* to go somewhere. When participants wanted to go somewhere, but it may not have been perceived as necessary or urgent, they sometimes opted out of asking. All participants voiced some level of concern about inconveniencing or asking too much of others. This finding is supported by research that shows social participation and leisure or discretionary activities can suffer more following driving cessation than other IADLs viewed as more essential (Liddle et al., 2014). This avoidance tendency may have inhibited participants' community mobility for participants as it often limited the frequency at which they left their home for fear of inconveniencing others.

Because all three participants lived in rural areas, each encountered challenges regarding access to public transportation and ridesharing. When a friend or family member could not take them somewhere, they were often left without another option. Public transportation was typically not a realistic or viable option as participants' residences were often a considerable distance from the nearest bus stop. The accessibility limitations to transportation alternatives that participants

experienced echoes findings by Hansen et al. (2020) that rural communities often lack the resources and infrastructure necessary to support older adults who are no longer driving.

Not only could participants not drive to a public transportation stop, but impaired physical mobility dictated they could not walk, bike, or otherwise get to the stop independently- another inhibitory factor to community mobility. To a similar effect, availability of ridesharing varied by region and time of day and was not consistently available in rural communities. This is to be expected when considering the larger picture of insufficient resources available to rural areas (Hansen et al., 2020). Although the unpredictability or unavailability of Ubers and Lyfts in a participant's area fueled hesitation to rely on ridesharing, it was unclear if the reason behind dismissing ridesharing apps was primarily due to limited availability or if reluctance to try a new, unfamiliar method also played a role.

Social Participation, Quality of Life, and Community Mobility

Due to the small sample size, statistical data analysis was unable to be performed to observe potential trends among social participation, quality of life, and community mobility before and after transportation planning. A greater number of participants would have made analysis possible. Currently, no correlations among variables can be identified. However, further research involving more participants may reveal important implications for how transportation planning impacts the social participation, quality of life, and community mobility of an individual following driving cessation.

Implications for Transportation Planning

King et al. (2010) found that, among older adults, fear of dependence is common and often deeply rooted in one's emotions and identity. This study mirrored those findings as one of the most critical themes identified through the transportation process was the resistance and

negative emotions following the recommendation to cease driving. In one way or another, participants expressed they were not ready for mobility transition. This resistance was influenced by emotional and attitudinal components which impacted their level of preparedness for driving cessation, a finding supported by Meuser et al (2013). This was perhaps one of the greatest barriers to transportation planning and providing support to participants. When focus and energy were redirected away from problem solving and instead concentrated on lamenting over or appealing the driving evaluation decision, creating and refining transportation plans required more time and effort and could have impacted its effectiveness for the participant.

As attitudinal barriers were a primary barrier in the transportation planning process, this should be addressed to ensure best practices for more successful implementation of transportation planning. More client accountability for trying new methods of community mobility could support increased use of alternative transportation discussed in the transportation planning meeting, potentially prompting hypothetical solutions into action. Establishing more frequent interaction between the research team and the clients and caregivers to assist them in utilizing new methods of transportation in their own communities may increase compliance. Developing additional meeting methods or locations closer to the clients' homes could create additional, enhanced opportunities to build rapport and establish a deeper relationship that fosters trust and a higher level of support to encourage trying new methods of transportation.

The timing of transportation planning implementation may also contribute to outcomes and client experiences. For two of the three participants who were actively trying to appeal the recommendation to cease driving, implementing a transportation plan was more difficult because the appeal process consumed a large amount of energy and prevented the individuals from viewing transportation planning as a long term solution. A longer period of time between the

driving evaluation results and initial contact could adjust for some of the distress and frustration observed in the participants of this study. Another option that may allow for a gentler, more gradual transition would be to have older adults consider transportation planning prior to the recommendation to cease driving. This may facilitate a smoother transition to alternate means of transportation.

Potential pitfalls were identified in the transportation planning process for individuals living in rural settings that warrant further exploration and understanding. For example, services such as ridesharing and public transportation were much more difficult to access and often were not practical solutions to the transportation needs of participants in rural areas.

Finally, the transportation planning process could be improved with the inclusion of a tool to measure the individual's readiness for transition, such as the *Assessment of Readiness for Mobility Transition*, to gather data on emotional and attitudinal components related to changes in mobility (Meuser et al., 2013). Using such a tool would assist in identifying clients who are considered at risk for coping with a mobility transition due to high self-reliance and an unwillingness to burden others (Meuser et al., 2013). It may be helpful to gauge participants' level of preparedness in the interest of providing insight to the underlying reasons for why a transportation plan supports more or less community mobility for an individual. Identifying individuals who are at risk for coping with a significant mobility transition could better inform intervention planning and interactions with clients. From a more informed perspective, the clinician's approach and therapeutic use of self can be modified to best fit the emotional and psychological needs of the client and potentially adjust the intervention to facilitate readiness.

CHAPTER 6: LIMITATIONS

The most significant limitation in conducting this study was the sustained devastating effect the Covid-19 global pandemic had on the data collection process. Originally, this study intended to use data in a pretest posttest quasi-experimental design and utilize statistical analysis to examine possible differences in social participation and quality of life before and after driving retirement. However, due to a small sample size, inferential analysis was not feasible. Fewer older adults participated in the driving evaluation than expected; therefore, fewer qualified for the study. Covid precautions, including recommendations to avoid interactions with others to limit potential Covid exposures, likely reduced follow-through with individuals that participated in the driving evaluation. Many older adults who qualified for the study and completed the initial assessments declined to participate in transportation planning or any further involvement in the study because of perceived Covid risks involved.

The nature of Covid precautions, as recommended by the CDC and other organizations, is directed toward limiting social interactions as much as possible. For many people, events and routines such as trips to the grocery store, gatherings of friends or neighbors, worship services, and family holiday celebrations were altered or cancelled. Data collection was likely influenced by the resulting change in community mobility and social participation habits as many older adults chose to stay home in accordance with this recommendation. Although data was undoubtedly influenced by Covid precautions and mandates, the influence on the data was *consistent* because all data collection occurred during the pandemic. That is, data collection for this study started after Covid initially emerged in the United States (August 2020) and ended while Covid precautions were still in place (December 2020).

Conducting transportation planning over the phone caused some communication challenges that could likely have been avoided if the interaction had taken place in person. Building a positive relationship with the participant was a crucial step for creating client buy-in to the transportation planning process; establishing and maintaining rapport felt more natural and effective when meetings were conducted face-to-face. Making contact in-person helped older adult participants to connect the researcher's name to a familiar face and, for initial meetings in which in-person contact was made, it reduced subsequent confusion on the phone regarding who was calling and for what reason.

The use of convenience sampling, in which volunteers were recruited for research through the driving evaluation, ultimately limited the number of participants available for the study. The nature of how the assessments were to measure pre and post driving cessation data in this study dictated that participants must cease their driving during the study. To avoid this dilemma, similar studies should be conducted over longer periods of time or through additional avenues for recruiting participants.

CHAPTER 7: FUTURE RESEARCH

Participants available for this study were limited in number because they were recruited exclusively through Vidant's Fitness to Drive evaluation, a single program that serves individuals that are often already going or preparing to go through the transition away from driving. To increase the number of participants, future studies could be conducted over extended periods of time, recruit participants through additional sources, and include individuals who receive driving restrictions in addition to driving cessation. Furthermore, identifying those who are *at risk* of driving restrictions or cessation could provide opportunities for those individuals to benefit from transportation planning in preparation for a smoother transition out of the driver's seat when the time comes. Identifying alternatives to driving and initiating transportation planning early may allow for improved compliance and problem-solving and reduce attitudinal barriers related to readiness. If individuals can be identified before the process of driving cessation begins, transportation planning as a gradual strategy may help participants feel more prepared and avoid emotional barriers encountered in this study.

Further comparison of social participation and quality of life before and after driving cessation, client's perspectives and experiences with transportation planning, and reliable alternative transportation resources for rural communities are important topics for future research. In addition to a readiness tool such as the *Assessment of Readiness for Mobility Transition*, further investigation through qualitative measures is required to better understand the needs of older adults transitioning out of the driver's seat and how to best support them in the transition and beyond. Future research may investigate the client's view of the practicality and value of the transportation planning process, explore which specific barriers prevent older adults from asking for rides, and study the most significant challenges older adults perceive to utilizing

ridesharing services. Systematic data collection on the opinions and perspectives of clients will give further insight into how occupational therapy can better serve this population to uphold the routines and community mobility required to live a fulfilling and socially connected life.

CHAPTER 8: CONCLUSION

This study revealed meaningful trends and perspectives of older adults transitioning to a stage in their life in which they are no longer driving. Influential factors on transportation planning observed in this case series appear to be highly individualized. Attitudinal and emotional barriers demonstrated the most significant hurdles to navigate. To improve transportation planning in the future, readiness factors should be taken into account and strong relationships between participants and the research team should be reinforced. Therapeutic use of self and building a relationship with the individual was a critical part in facilitating buy-in to transportation planning as participants were often hesitant to take part or show confidence in the process. This could be attributed to resistance, or lack of readiness, toward driving cessation and the transition to transportation alternatives.

This study reinforced the principle that transportation alternatives depend a great deal on the client's specific situation, personal factors, and environmental components. In rural areas where communities are more sprawling and spacious, transportation alternatives are often limited. Specifically, these limited resources in rural areas included decreased access to public transportation and ridesharing and a heavy reliance on ride receipt via personal connections-family members, neighbors, and friends. Ultimately, transportation planning may be a viable tool for combatting decline in social participation and quality of life for older adults who must cease driving. Making adjustments to the current process and the research methods could provide valuable evidence and additional support.

References

American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy*, *74*, 7412410010p1-7412410010p87. https://doi.org/10.5014/ajot.2020.74S2001

American Occupational Therapy Association. (2016). Research opportunities in the area of driving and community mobility for older adults. *American Journal of Occupational Therapy, 70*(4), 7004400010. http://dx.doi.org/10.5014/ajot.2016.704001

Anguera, J. A., Boccanfuso, J., Rintoul, J. L., Al-Hashimi, O., Faraji, F., Janowich, J., Kong, E., Larraburo, Y., Rolle, C., Johnston, E., Gazzaley, A. (2013). Video game training enhances cognitive control in older adults. *Nature, 501*(7465), 97-101. https://doi.org/10.1038/nature12486

Barnes, L. L., Wilson, R. S., Bienias, J. L., Mendes de Leon, C. F., Kim, H. N., Buchman, A. S., & Bennett, D. A. (2007). Correlates of life space in a volunteer cohort of older adults. *Experimental Aging Research, 33*(1), 77-93. https://doi.org/10.1080/03610730601006420

Bowling, A. (2009). The psychometric properties of the older people's quality of life questionnaire, compared with the CASP-19 and the WHOQOL-OLD. *Current Gerontology and Geriatrics Research*, 298950. https://doi.org/10.1155/2009/298950

Bowling, A., Gabriel, Z., Dykes, J., Dowding, L. M., Evans, O., Fleissing, A., … Sutton, S. (2003). Let's ask them: A national survey of definitions of quality of life and its enhancement among people aged 65 and over. *International Journal of Aging and Human Development, 56*(4), 269-306. https://doi.org/10.2190/BF8G-5J8L-YTRF-6404

Britto, H. M. J. S., Oliveira, B. S., Gomes, C. S., Pinto, J. M., & Guerra, R. O. (2018). Contextual factors associated with life-space mobility in community-dwelling older adults based on international classification of functioning, disability and health: Protocol for a systematic review. *BMJ Open*, *8*(10), e023468-023468. https://doi.org/10.1136/bmjopen-2018-023468

Burkhardt, J., Berger, A., Creedon, M., & McGavock, A. (1998). *Mobility and independence: Changes and challenges for older drivers*. National Academy Press.

CASP-19. (n.d.) CASP-19: Measuring quality of life later in life: Background. Retrieved from https://casp19.com/background/

Choi, N. G. & DiNitto, D. M. (2016). Depressive symptoms among older adults who do not drive: Association with mobility resources and perceived transportation barriers. *The Gerontologist, 56*(3), 432-443. https://doi.org/10.1093/geront/gnu116

Connors, M. H., Ames, D., Woodward, M., & Brodaty, H. (2018). Predictors of driving cessation in dementia: Baseline characteristics and trajectories of disease progression. *Alzheimer Disease & Associated Disorders*, *32*(1), 57-61. https://doi.org/10.1097/WAD.0000000000000212

Curl, A. L., Stowe, J. D., Cooney, T. M., & Proulx, C. M. (2014). Giving up the keys: How driving cessation affects engagement in later life. *Gerontologist*, *54*(3), 423-433. https://doi.org/10.1093/geront/gnt037

Dickerson, A. & Davis, E., S. (2020, October). Checklist of community mobility skills: Connecting client to transportation options. *OT Practice*, *25*(10), 13-16.

Dickerson, A. E., Molnar, L. J., Bedard, M., Eby, D. W., Berg-Weger, M., Choi, M., …& Silverstein, M. N. (2019). Transportation and aging: An updated research agenda to advance safe mobility among older adults transitioning from driving to non-driving. *Gerontologist*, *59*(2), 215-221. https://doi.org/10.1093/geront/gnx120

Donoghue, O. A., McGarrigle, C. A., & Kenny, R. A. (2019). Who's in the driver's seat? impact on social participation and psychosocial wellbeing in adults aged 50 and over. *Transportation Research Part F: Traffic Psychology and Behaviour, 64*, 522-531. https://doi.org/10.1016/j.trf.2019.06.010

Edwards, J. D., Ross, L. A., Ackerman, M. L., Small, B. J., Ball, K. K., Bradley, S., & Dodson, J. E. (2008). Longitudinal predictors of driving cessation among older adults from the ACTIVE clinical trial. *The Journals of Gerontology Series B Psychological Sciences and Social Sciences, 63*(1), 6. https://doi.org/10.1093/geronb/63.1.p6

Foley, D. J., Heimovitz, H. K., Guralnik, J. M., & Brock, D. B. (2002). Driving life expectancy of persons aged 70 years and older in the United States. *American Journal of Public Health, 92*(8), 1284–1289. https://doi.org/10.2105/ajph.92.8.1284

Gardner, P. (2014). The role of social engagement and identity in community mobility among older adults aging in place. *Disability and Rehabilitation, 36*(15), 1249-1257. https://doi.org/10.3109/09638288.2013.837970

Glicksman, A., Clark, K., Kleban, M. H., Ring, L., & Hoffman, C. (2014). Building an integrated research/policy planning age-friendly agenda. *Journal of Aging & Social Policy*, *26*(1-2), 131-146. https://doi.org/10.1080/08959420.2014.854142

Golisz, K. (2019). Occupational therapy and driving and community mobility for older adults. *American Journal of Occupational Therapy, 68*(6), 654-656. https://doi.org/10.5014/ajot.2014.013144

Grengs J. (2010). Job accessibility and the modal mismatch in Detroit. *Journal of Transport Geography, 18*, 42–54. https://doi.org/10.1016/j.jtrangeo.2009.01.012

Groenou, M. B. & Tilburg, T. V. (2003). Network size and support in old age: Differentials by socio-economic status in childhood and adulthood. *Ageing & Society, 23*(5), 625-645. https://doi.org/10.1017/S0144686X0300134X

Hansen, S., Newbold, K. B., Scott, D. M., Vrkljan, B., & Grenier, A. (2020). To drive or not to drive: Driving cessation amongst older adults in rural and small towns in Canada. *Journal of Transport Geography, 86*, 102773. https://doi.org/10.1016/j.jtrangeo.2020.102773

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science (New York, N.Y.), 241*(4865), 540-545. https://doi.org/10.1126/science.3399889

Huisingh, C., McGwin, G., & Owsley, C. (2016). Association of visual sensory function and higher-order visual processing skills with incident driving cessation. *Clinical and Experimental Optometry*, *99*(5), 441-448. https://doi.org/10.1111/cxo.12404

Hyde, M., Wiggins, R. D., Higgs, P., & Blane, D. B. (2003). A measure of quality of life in early old age: The theory, development and properties of a needs satisfaction model (CASP-19). *Aging & Mental Health, 7*(3), 186-194. https://doi.org/10.1080/1360786031000101157

ITN America. (2016). What we do. Retrieved from http://itnamerica.org

James, B. D., Boyle, P. A., Buchman, A. S., Barnes, L. L., & Bennett, D. A. (2010). Life space and risk of Alzheimer Disease, mild cognitive impairment, and cognitive decline in old age. *The American Journal of Geriatric Psychiatry, 19*(11), 961-969. https://doi.org/10.1097/JGP.0b013e318211c219

Jokinen, J. P. P., Kujala, T., & Oulasvirta, A. (2020). Multitasking in driving as optimal adaptation under uncertainty. *Human Factors*. Advance online publication. https://doi.org/10.1177/0018720820927687

Julien, D., Gauvin, L., Richard, L., Kestens, Y., & Payette, H. (2013). The role of social participation and walking in depression among older adults: Results from the VoisiNuAge study. *Canadian Journal on Aging, 32*(1), 1-12. https://doi.org/10.1017/S071498081300007X

Kim, S. (2011). Transportation alternatives of the eldery after driving cessation. *Transportation Research Record: Journal of the Transportation Research Board*, *2265*(1), 170-176. https://doi.org/10.3141/2265-19

King, M. D., Thomas, M. M., Berg-Weger, M. Chibnall, J. T., Harmon, A. C., & Yakimo, R. (2010). Decoding the Miss Daisy Syndrome: An examination of subjective responses to mobility change. *Journal of Gerontological Social Work 54*(1), 29-52. https://doi.org/10.1080/01634372.2010.522231

Lacherez, P., Wood, J. M., Anstey, K. J., & Lord, S. R. (2014). Sensorimotor and postural control factors associated with driving safety in a community-dwelling older driver population. *The Journals of Gerontology: Series A: Biological Sciences and Medical Sciences, 69*(2), 240-244. https://doi.org/10.1093/gerona/glt173

Liddle, J., Gustafsson, L., Bartlett, H., & McKenna, K. (2012). Time use, role participation and life satisfaction of older people: impact of driving status. *Australian Occupational Therapy Journal, 59*(5), 384-392. https://doi.org/10.1111/j.1440-1630.2011.00956.x

Liddle, J., Reaston, T., Pachana, N., Mitchell, G., & Gustafsson, L. (2014). Is planning for driving cessation critical for the well-being and lifestyle of older drivers? *International Psychogeriatrics*, *26*(7), 1111-1120. https://doi.org/10.1017/S104161021400060X

Liddle, J., Tan, A., Liang, P., Bennett, S., Allen, S., Lie, D. C., & Pachana, N. A. (2016). "The biggest problem we've ever had to face": How families manage driving cessation with people with dementia. *International Psychogeriatrics, 28*(1), 109-122. https://doi.org/10.1017/S1041610215001441

Loucks, E. B., Berkman, L. F., Gruenewald, T. L., & Seeman, T. E. (2006). Relation of social integration to inflammatory marker concentrations in men and women 70 to 79 years. *The American Journal of Cardiology, 97*(7), 1010-1016. https://doi.org/10.1016/j.amjcard.2005.10.043

Meidert, U., Bonsaksen, T., & Scott, P. J. (2018). A study of measuring participation according to the international classification of functioning, disability and health with the revised role checklist. *Clinical Rehabilitation, 32*(11), 1530-1539. https://doi.org/10.1177/0269215518782339

Meuser, T. M., Berg-Weger, M., Chibnall, J. T., Harmon, A. C., & Stowe, J. D. (2013). Assessment of readiness for mobility transition (ARMT): A tool for mobility transition counseling with older adults. *Journal of Applied Gerontology*, *32*(4), 484-507. https://doi.org/10.1177/0733464811425914

Meyer, R. U., Janke, M. C., & Beaujean, A. A. (2014). Predictors of older adults' personal and community mobility: Using a comprehensive theoretical mobility framework. *The Gerontologist, 54*(3), 398-408. https://doi.org/10.1093/geront/gnt054

Mezuk, B., & Rebok, G. W. (2008). Social integration and social support among older adults following driving cessation. *The Journals of Gerontology Series B, Psychological Sciences and Social Sciences, 63*(5), 298. doi:63/5/S298

Owsley, C., Stalvey, B., Wells, J., & Sloane, M. E. (1999). Older drivers and cataract: Driving habits and crash risk. *Journal of Gerontology: Medical Sciences* 54 A: M203-M21

Pristavec, T. (2018). Social participation in later years: The role of driving mobility. *The Journals of Gerontology Series B Psychological Sciences and Social Sciences*, *73*(8), 1457-1469. https://doi.org/10.1093/geronb/gbw057

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. https://doi.org/10.1093/geront/44.2.237

Research opportunities in the area of driving and community mobility for older adults. (2016). *American Journal of Occupational Therapy*, *70*(4), 1-2. https://doi.org/10.5014/ajot.2016.704001

Schepker, C. A., Leveille, S. G., Pedersen, M. M., Ward, R. E., Kurlinksi, L. A., Grande, L., … & Bean, J. F. (2016). Effect of pain and mild cognitive impairment on mobility. *Journal of the American Geriatric Society, 64(*1), 138-143. https://doi.org/10.1111/jgs.13869

Scott, P. J., McKinney, K. G., Perron, J. M., Ruff, E. G., & Smiley, J.L. (2019). The revised role checklist: Improved utility, feasibility, and reliability. *OTJR: Occupation, Participation, and Health, 39*(1), 56-63. https://doi.org/10.1177/1539449218780618

Shankar, A., McMunn, A., Banks, J., & Steptoe, A. (2011). Loneliness, social isolation, and behavioral and biological health indicators in older adults. *Health Psychology, 30*(4), 377–385. https://doi.org/10.1037/a0022826

Sim, J., Bartlam, B., & Bernard, M. (2011). The CASP-19 as a measure of quality of life in old age: Evaluation of its use in a retirement community. *Quality of Life Research*, *20*(7), 997-1004. https://doi.org/10.1007/s11136-010-9835-x

Song, C. S., Chun, B. Y., & Chung, H. S. (2015). Test-retest reliability of the driving habits questionnaire in older self-driving adults. *Journal of Physical Therapy Science, 27*(11), 3597-3599. https://doi.org/10.1589/jpts.27.3597

Stalvey, B. T., Owsley, C., Sloane, M. E., & Ball, K. (1999). The life space questionnaire: A measure of the extent of mobility of older adults. *Journal of Applied Gerontology*, *18*(4), 460–478. https://doi.org/10.1177/073346489901800404

Stav, W. B. & Lieberman, D. (2018). From the Desk of the Editor. American Journal of Occupational Therapy, 62(2), 127-129. http://dx.doi.org/10.5014/ajot.62.2.127

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences U S A., 110*(15), 5797-5801. https://doi.org/10.1073/pnas.1219686110

Strogatz, D., Mielenz, T. J., Johnson, A.K., Baker, I. R., Robinson, M., Mebust, S. P., … & Li, G. (2019). Importance of driving and potential impact of driving cessation for rural and urban older adults. *Journal of Rural Health*. https://doi.org/10.1111/jrh.12369

The Hartford. (2015). *At the crossroads: At the Crossroads: Family conversations about Alzheimer's Disease, dementia and driving*. Hartford, CT: The Hartford Financial Services Group, Inc.

Tsai, L. T., Rantakokko, M., Rantanen, T., Viljanen, A., Kauppinen, M., & Portegijs, E. (2016). Objectively measured physical activity and changes in life-space mobility among older people. *Journal of Gerontology, Series A, 71*(11), 1466-1471. https://doi.org/10.1093/gerona/glw042

Udell, J. A., Steg, P. G., Scirica, B. M., Smith, S. C., Ohman, E. M., Eagle, K. A., . . . & REduction of Atherothrombosis for Continued Health (REACH) Registry Investigators. (2012). Living alone and cardiovascular risk in outpatients at risk of or with atherothrombosis. *Archives of Internal Medicine, 172*(14), 1086-1095. https://doi.org/10.1001/archinternmed.2012.2782

Webber, S. C., Porter, M. M., & Menec, V. H. (2010). Mobility in older adults: A comprehensive framework. *Gerontologist, 50(*4), 443-450. https://doi.org/10.1093/geront/gnq013

World Health Organization. (2020). WHOQOL: measuring quality of life. Retrieved from https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/

Appendix A

IRB Approval Letter for Exempt Certification

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
rede.ecu.edu/umcirb/

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Kathryn Moore
CC: Lynne Murphy
Date: 8/2/2020
Re: UMCIRB 20-001655
Community Mobility with Transportation Planning

I am pleased to inform you that your research submission has been certified as exempt on 7/29/2020. This study is eligible for Exempt Certification under category # 2a.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

Document	Description
CASP-19(0.01)	Standardized/Non-Standardized Instruments/Measures
CASP-19(0.02)	Surveys and Questionnaires
Consent Form final.doc(0.01)	Consent Forms
Current Protocol for IRB July 2.docx(0.01)	Study Protocol or Grant Application
Demographic Intake Form(0.01)	Surveys and Questionnaires
Modified Driving Habits Questionnaire(0.01)	Surveys and Questionnaires
Role Checklist Version 3(0.01)	Surveys and Questionnaires
Role Checklist Version 3(0.01)	Standardized/Non-Standardized Instruments/Measures

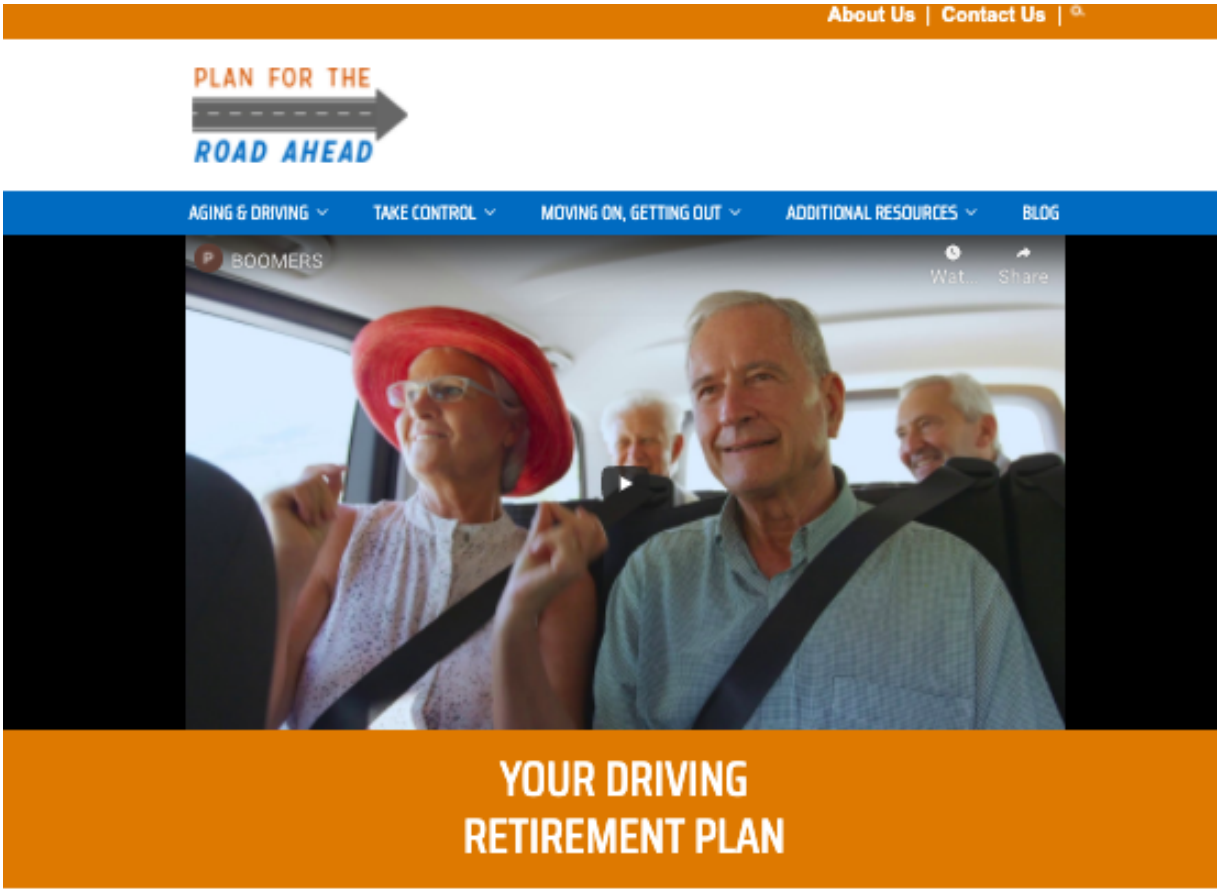
For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

Appendix B

Plan for the Road Ahead Website



When it's time to retire from driving, creating a driving retirement plan can help you adjust to this new life transition, just like planning retirement from work. Making a transportation plan will help you stay mobile and engaged in the community. You may not be behind the wheel as a driver, but you'll still be in the driver's seat—going where you want, when you want to.

Assess Your Needs

The first step in making your plan is to assess your transportation needs. Where do you need to go? Where do you want to go? Will you need transportation on the same days each week, or more randomly? When you consider your available resources and proactively set up your options, you set yourself up for success. Then when it's time to make the transition, you'll be able to maintain your independence, social connections, and engagement in life.

Experiment with new transportation

The transportation plan is a transition process, so take it step by step.

Appendix C

Driving Activities: When, Where, and Why?

Type of Activity	Activity or Destination	How often? What day and time?	Who is he/she with while going to or participating in activity?	What changes could reduce the need to drive?*
Routine: Frequent trips (daily or weekly), usually for tasks (shopping, exercising, visiting, etc.)	*Example: To a local convenience store for milk, bread, etc.*	*2 or 3 times/week*	*Travels alone. Chats with store manager*	
Periodic: Regular, maybe monthly (e.g., doctor's visit, card games with friends)				
Occasional: Special events like a vacation, concert, sporting event, family celebrations, out-of-town visits				

Appendix D

Getting There: Using Alternative Transportation

Transportation Alternatives	Telephone	Availability, Destination (day, time, route)	Cost	Notes (pros & cons)
Family Members:				
Friends:				
Demand-responsive Services:				
Private Program Services:				
Taxi/Car Services:				
Mass Transit:				
Other Local Programs:				

Appendix E
Transportation Plan Template

Transportation Plan for _____

Date: _____

Recommendation from Driving Assessment:

-

Driving Habits Questionnaire

Where do I want to go?	How often do I go there?	What are my transportation options?		

Options to Discuss

Family / Friends

- (names)

Public Transportation Options (location specific with contact info/websites)

-
-
-

Ride Sharing

- Taxi
- Uber / Lyft
- GoGoGrandparent

Community Organizations

- Volunteers / Community Organizations

Appendix F

IRB Consent Form

Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: **Maintaining Social Participation and Quality of Life through Community Mobility after Driving Cessation with Transportation Planning**

Principal Investigator: Kathryn Moore, OTS
Sub-Investigators: Lynne Murphy, EdD, OTR/L and Anne Dickerson, PhD, OTR/L
Department of Occupational Therapy
600 Moye Blvd, Mail Stop 668, ECU, Greenville, NC 27834
252-744-6199

Participant Full Name: _____ Date of Birth: _____
Please PRINT clearly

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?
The purpose of this research is to explore the influence of individualized transportation planning, conducted within the scope of occupational therapy, on driving habits, social participation and quality of life for older adults who retire from driving. We are learning more about whether or not the development of a transportation plan is helpful and meaningful for people who are no longer driving, and if the plan is effective in keeping people engaged and active in their communities. You are being invited to take part in this research because you are participating in a driving assessment program at ECU. If you volunteer to take part in this research, you will be one of about 60 people to do so.

Are there reasons I should not take part in this research?
There is no anticipated harm from participation in this research. The decision to take part in this research is yours to make.

What other choices do I have if I do not take part in this research?
You can choose not to participate, without any consequences.

Where is the research going to take place and how long will it last?
The research will be conducted at the driving simulation lab (Room 1332 of the Health Sciences Building), at the Department of Occupational Therapy at ECU. You will also be asked to participate in phone calls and/or video conferencing to follow up with the transportation plan several times during the study. The exact number of meetings will be determined by your individual needs. The total amount of time you will be asked to volunteer for this study is 3-4 hours over the next 4-6 weeks.

What will I be asked to do?
If you choose to participate in this research, you will be asked to do the following:

- Fill out 3 questionnaires (Modified Driving Habits Questionnaire, CASP-19, Role Checklist ver 3)
- Meet with us to make a transportation plan, which will assist you in continuing your activities in the community
- Talk with us via phone or video conference to see how the plan is working and to make any adjustments
- Fill out the same 3 questionnaires after your plan has been in place for a few weeks

What might I experience if I take part in the research?
We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We hope that you will benefit from the transportation plan by continuing to be able to get out into the community.

Will I be paid for taking part in this research?
We will be able to offer you a $10 gift card for completing the initial assessments during the driving evaluation. If you qualify for the research intervention, you will receive another $10 gift card at the first transportation planning meeting. Whether or not you participate in the transportation planning intervention, you will receive a $10 gift card when you complete the assessments again in approximately six weeks.

Will it cost me to take part in this research?
It will not cost you any money to be part of the transportation planning research study.

Who will know that I took part in this research and learn personal information about me?
The researchers will know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

How will you keep the information you collect about me secure? How long will you keep it?
Your name will not be associated with any of the information that you provide. We will assign a number to all of your surveys so that we can connect the surveys that you complete at different points in time. The list of your name and the number assigned to you, as well as signed consent forms, will be stored in a locked file cabinet in Lynne Murphy's office at ECU. The survey forms will be stored in a locked file cabinet in Anne Dickerson's office at ECU. We will keep a database of the data from the surveys with your assigned number on a secure, password-protected OneDrive file on ECU's server. Your name will NOT be stored electronically with this database.

What if I decide I don't want to continue in this research?
You can stop at any time after it has already started. There will be no consequences if you stop.

Who should I contact if I have questions?
The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact Kathryn Moore at 704-620-3862 or Lynne Murphy at 252-744-6193 between 8 am and 8 pm, 7 days a week.

If you have questions about your rights as someone taking part in research, you may call the University & Medical Center Institutional Review Board (UMCIRB) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director for Human Research Protections, at 252-744-2914.

I have decided I want to take part in this research. What should I do now?
The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

Participant's Name (PRINT)	**Signature**	**Date**

Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above and answered all of the person's questions about the research.

Person Obtaining Consent (PRINT)	**Signature**	**Date**