

**Exploring physical and social environmental barriers and  
facilitators that affect older adults' fear of falling: A sample  
funding proposal**

**by**

**Tasha Beth Lorenzen-Ewing**

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# Approval

**Name:** Tasha Beth Lorenzen-Ewing  
**Degree:** Master of Arts  
**Title:** *Exploring physical and social environmental barriers and facilitators that affect older adults' fear of falling: A sample funding proposal*  
**Examining Committee:** **Chair:** Dr. Barbara Mitchell  
Professor and Graduate Program Chair

**Dr. Atiya Mahmood**  
Senior Supervisor  
Associate Professor

---

**Dr. Andrew Sixsmith**  
Supervisor  
Professor

---

**Dr. Fabio Feldman**  
External Examiner  
Adjunct Professor  
Department of Biomedical Physiology  
and Kinesiology

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## **Abstract**

Fear of falling (FOF) has been described as "a potential health problem of equal importance to a fall" (Zilistra, Van Haastregt, Van Eijk, Van Rossum, Stalenhoef & Kempen, 2007, p.304). Therefore, the focus of the proposed study is to conduct a comprehensive investigation of FOF amongst community-dwelling older adults focusing on physical environment and social support factors. A mixed methods approach will be used and includes: SWEAT-R, an environmental audit, to analyze 3 urban and 3 suburban neighbourhoods, a four part survey to be completed by older adults living in these neighbourhoods, and, Photovoice, a participatory tool with a discussion group component. The grant proposal, found in Chapter 5, will follow the guidelines of the CIHR Project Scheme: 2016 1st Live Pilot grant. The primary objective of the proposed study is to uncover what factors of the physical environment and social supports are linked to FOF among community-dwelling older adults.

**Keywords:** Fear of Falling (FOF); Older Adults; Physical Environment; Social Supports; Barriers and Facilitators; Neighbourhoods

*This Capstone project is dedicated to Fyola and Hank Lorenzen; more affectionately known to me as Amma and Hank. I am grateful for having had the opportunity to live with you during such an influential time in my life and the chance to learn so much from both of you. The example you set by being engaged and active seniors inspired me to choose this field of education.*

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## List of Acronyms

FOF	Fear of Falling
FFABQ	Fear of Falling Avoidance-Behaviour Questionnaire
ICECAP-O	ICEpop CAPability Measure for Older People
NEWS	Neighbourhood Environment Walkability Scale
SWEAT-R	Senior Walking Environmental Audit Tool - Revised

## Glossary

Fear of falling	A serious psychological public health issue that primarily affects older adults, including those who have and have not experienced a fall, and can lead to unnecessary activity restriction resulting in a lower quality of life (Scheffer et al., 2008; Zilistra et al., 2007; Lach, 2005).
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# Chapter 1.

## Introduction

### 1.1. Topic Background & Study Rationale

Statistics Canada (2012) reported that the population of older adults, 65 years and older, will more than double between 2009 and 2036 and reach between 9.9 and 10.9 million. It is also estimated that one third of community-dwelling older adults will experience a fall at least once a year and that frequency increases with age (Masud & Morris, 2001). At this rate, with one third of the aging population predicted to fall each year and the aging population doubling, the number of falls experienced by older adults in 2036 will be at least 3.3 million (Scott, Wagar & Elliot, 2010). The aging population is in a similar situation in the United States where it is also estimated to double from 35 million to 71.5 million by 2030 (Humes, 2005). The potential number of falls, the injuries sustained and the lifelong consequences that accompany falls will rise proportionately alongside the increasing aging population. As a result, falls have become a highlighted public health issue and fall prevention has been identified as a top priority in the health care field (LHIN Collaborative, 2011).

Falls and fall prevention efforts are focused on older adults because the risk of falling is greater among the aging population compared to younger age groups and the consequences of falls for older adults are much more severe (Gulwadi & Calkins, 2008). Falling is cause for great concern among older adults because they threaten to result in extreme disability, loss of independence and can even lead to a premature death (WHO: Europe, 2004). For example, falls are the cause of the majority of hip fractures among older adults and 20% of older adults who suffer from a hip fracture will die within the first year (Public Health Agency of Canada, 2005 in Scott, Wagar & Elliot, 2010). Falls are also a significant issue for the health care system because there are great cost related

consequences, for example “the annual average cost is \$75 million for all senior hip fracture hospitalization cases in B.C.” (Herman, Gallagher & Scott, 2006, p.9). In 2004, health care costs directly related to falls and fall-related injuries among older adults was \$2 billion. This cost is set to double alongside the aging population in 2036 if nothing is done to successfully reduce the number of falls among older adults (SmartRisk, 2010 in Scott, Wagar & Elliot, 2010).

In the shadows of the public health issue of falls has been fear of falling (FOF). FOF is “a common and potentially disabling problem among community-living older persons” (Murphy, Dubin & Gill, 2003, p.43). The concept ‘fear of falling’ was originally introduced in academic research in 1982 as “post-fall syndrome” (Murphy, Dubin & Gill, 2003). Then it was referred to as “ptophobia” by O’Donnell, and Thopil, and described as the phobic reaction to standing or walking (Legters, 2002). Now, literature refers to this issue as ‘fear of falling’ and it is used “to describe an exaggerated concern of falling that leads to excess restriction of activities” (Lach, 2005, p. 45). This is one of the many FOF definitions, which all vary in description and content but, overall, describe FOF as involving a significant amount of anxiety towards falling. The anxiety caused by FOF can cause a decrease in the number of activities an older adult chooses to participate in and, in turn, affects their quality of life (Nourhashémi, Andrieu, Gillette-Guyonnet, Vellas, Albarède, and Grandjean, 2001). In fact, several studies have come to the consensus “that increased FOF is associated with decreased quality of life in older adults” because it can lead to problems, such as, depression, low life satisfaction and poor mobility (Legters, 2002, p. 268; Lach, 2005).

There is a strong relationship that exists between falls and fear of falling and it is understandable that FOF has been so closely associated to falls. For example, Friedman, Munoz, West, Rubin and Fried (2002) found falls and FOF to be predictive of one other. A history of falls results in a higher rate of FOF being reported and the degree of FOF increases as the number and severity of the falls increase (Legters, 2002; Howland, Peterson, Levin, Fried, Pordon & Bak, 1993). As a result, FOF was initially recognized and studied solely as a risk factor and consequence of falling (Filiatrault, Desrosiers & Trottier, 2009). It has been principally assumed that FOF only exists among older adults who have already experienced a fall yet, many studies have

found that approximately 50% of older adults who suffer from a FOF, in fact, have no history of falls (Filiatrault, Desrosiers & Trottier, 2009; Lach, 2005). For many years, FOF was also considered to be a problem that was simply a part of the aging process (Legters, 2002). However, more recent research has discovered that FOF has its own set of risk factors that include many more aspects than age as well as predisposing characteristics that are separate from falls.

Zilistra, Van Haastregt, Van Eijk, Van Rossum, Stalenhoef and Kempen (2007), Cumming, Salkeld, Thomas and Szonyi (2000) and McAuley, Mihalko and Rosengren (1997), have reported that fear of falling is an extensive health issue that is considered to be as, if not more, prevalent than falls among older adults. This inference is made because all older adults are susceptible to suffering from FOF, including those who have and have not experienced a fall in the past (Legters, 2002). Since FOF has been found to be independent of the risk of falls it needs to be studied and treated separately. FOF must be studied as its own public health issue because decreasing the risk of falls may not reduce FOF. FOF itself needs to be addressed and reduced. Research focused directly on FOF would also ensure that older adults who do not have a history of falls are included (Legters, 2002). Including this group of older adults is important, in large part, due to educational reasons. When an older adult, or their family members, have only ever heard about the consequences of falls and imagine them as being “catastrophic events involving fractures, hospitalization, and nursing home admission” they may overreact and restrict daily activities, which can in itself result in an increased risk of falling (Cumming et al., 2000, p.303).

Fear of falling is a timely topic with the aging population in North America expected to double in the next 15-20 years. However, research that looks at linking FOF among older adults to environmental factors is limited. Gulwadi and Calkins (2008) have found that the common focus in current literature is on the intrinsic factors of older adults. In other words, the majority of falls research and intervention methods are focused on fixing individual weaknesses, such as decreased physical function. These methods are non-preventative and are applied after the problem has manifested. The majority of fall prevention initiatives either involve exercise programs or they address home safety, both of which depend on the older adult's individual effort if they do not

have additional social support (Filiatrault et al., 2013). Consequently, fall prevention initiatives have taken a biomedical stance and focus on the individual older adult and their faults. These interventions have the potential of being interpreted as victim-blaming and can cause older adults to develop low self-esteem and/or poor self-rated health perceptions. Research has suggested that FOF should be addressed in fall prevention initiatives, however, it should be done in a more holistic manner (Filiatrault et al., 2013).

The ecological Model and systems Theory Approach are two comprehensive theories used to develop the proposed conceptual framework. The ecological model encompasses the social and physical environment, individual factors, and policies to determine why people choose to behave in certain ways (Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006). Researchers have been using multilevel ecological approaches rather than the traditional individual based theories to determine why certain seniors choose to remain active in their communities while others do not and use this information to develop more successful interventions. Sallis et al. (2006) use the ecological theory to represent “people’s interactions with their physical and sociocultural surroundings”, which is what this study is exploring, specific to older adults and FOF in their communities. The systems theory approach recognizes that human error is uncontrollable and looks to improve environmental factors to help prevent falls among older adults (Zecevic, Salmoni, Lewko, Vandervoort and Speechly, 2009). The systems theory approach is a recent and holistic method of examining falls where falls are considered as a failure of various factors, including personal, social, physical environment, and situational factors (Zecevic et al., 2009). This systematic approach calls for the community, as a whole, to be analyzed and considers the potential deficits of the physical environment and how they may lead to falls.

Current research has focused primarily on falls and FOF in the home environment while little attention has been paid to uncovering the risk factors that exist within the outdoor environment (Phillips, Walford, Hockey, Foreman & Lewis, 2013; Curl, Ward Thompson, Aspinall & Ormerod, 2015). The lack of understanding surrounding what external, physical environmental factors may lead to an increased risk for falls among older adults as well as what factors create a FOF and dissuade older adults from using certain outdoor spaces may be due to the fact that older adults "represent a subset

of the population who are likely to perceive the environment differently" and this has not been taken into consideration (Nyman, Ballinger, Phillips & Newton, 2013; Curl et al., 2015, p.2). Therefore, the proposed study takes an innovative approach by exploring FOF among older adults in the external physical and social environment and aims to determine what features act as potential barriers and facilitators. In the proposed study, social supports will be considered as the relationships that an older adult has with their neighbours and the sense of belonging that they feel in their neighbourhood. In other words, strong social supports in the proposed study are based on whether or not the older adults feel that they are able to reach out to other community members and have services available to them in their neighbourhoods.

The goal of the proposed study is to make suggestions towards what factors should be altered in order to avoid the development or intensification of FOF. Studying the impact of the physical environment on FOF among older adults is necessary because the "the complexity of the environment in terms of hazards and risks increases multifold in community settings" (Desphande, 2009, p.91). The home setting is much more familiar to older adults compared to the community environment and older adults are more comfortable and confident navigating their way through their homes (Desphande, 2009). FOF will be more significant in older adults' neighbourhood environment setting because the challenges and factors are greater in number and less predictable.

## **1.2. Purpose and Research Questions**

The proportion of older adults at risk for falls is increasing and, as a result, the proportion of older adults at risk of suffering from a fear of falling is even greater considering that FOF affects both older adults who have and have not experienced a fall. A comprehensive study that includes aspects beyond personal factors and explores the physical environment and social factors that may influence FOF will help to develop more effective fall prevention strategies. The goal of this Capstone study is to develop a grant proposal based on a research project that will guide the development of effective fall prevention programs, which include and address FOF, improve health care practitioners and older adults' awareness and understanding of FOF and positively affect

the health and quality of life of older adults. The proposed study aims to look beyond the occurrence of falls and examine how FOF affects older adults' lives by investigating the physical environment and social support factors.

The objectives are:

1. Discover the linkages between fear of falling and older adults' perceptions of the physical environment and social support.
2. Identify how the linkages between fear of falling and older adults' perceptions of the physical environment and social support can be measured.

Corresponding to the objectives listed above, the questions that will direct this capstone project are as follows:

1. What are the objective and subjective physical environment and social support barriers and facilitators related to fear of falling of older adults and how does that impact their quality of life?
  - a) What are the objective physical environment barriers and facilitators in falls or fall prevention of older adults? What are some of the subjective environmental barriers and facilitators that affect fear of falling?
  - b) Are the objective physical environmental barriers and facilitators congruent with older adults' perceptions of environmental barriers and facilitators that generate fear of falling?
  - c) How do older adults' perceptions of these barriers and facilitators of the physical environment affect fear of falling among older adults?
  - d) What are the social support factors (or lack of support) that affect older adults fear of falling?
2. How can we measure the linkage between fear of falling and physical environment and social support facilitators and barriers?

### **1.3. Study Design and Research Setting**

This proposed study will utilize a mixed methods approach in order to explore the objective and subjective barriers and facilitators of fear of falling and be able to compare them. First, each neighbourhood involved in the study will be examined using the Safety and Comfort and Functionality domains of the SWEAT-R environmental audit to determine what physical environmental factors exist as potential barriers and facilitators to older adults' comfort and mobile function in their neighbourhoods, which can influence FOF (Michael, Keast, Chaudhury, Day, Mahmood & Sarte, 2009). This environmental

audit will serve as the objective explorative portion of the study. Second, a survey comprised of four sections, including the physical environment, demographic factors, social support and quality of life, will be completed by participants from each neighbourhood included in the study. The survey is designed to determine older adults' perceptions of what physical environment and social support factors act as facilitators or barriers to FOF in their communities. Last, a smaller group of participants will be asked to share their perspectives of their environment through photography using a participatory method called Photovoice. Follow-up discussion groups will be held with these participants to analyze the barriers and facilitators of the physical environmental and social support factors captured in their photos. These subjective findings will be compared and contrasted to the objectively determined factors found using the environmental audit as well as analyzed against the survey results. A more detailed description of the study sites and instruments are included in Chapter 3 - Research Methods.

The first four chapters of this Capstone paper includes the (1) introduction, (2) a literature review of current research on FOF studies, falls and FOF education programs, (3) a thorough description of the research methods and (4) a proposed conceptual model developed from two established theories. The fifth and final chapter is comprised of the grant proposal formatted to address the requirements of the Project Scheme: 2016 1st Live Pilot and will seek out funding from the Canadian Institutes of Health Research (CIHR) from the Institute of Aging (IA) division. This study's objectives complement the Project Scheme: 2016 1st Live Pilot grant requirements (Appendix G) in many capacities, which will be further discussed in Chapter 5 – Grant Proposal.



## **Chapter 2.**

### **Literature Review**

#### **2.1. Fear of falling definitions**

Over the course of many years, and as a result of being the subject of several studies, fear of falling has developed various definitions. However, the trend is that many fear of falling definitions contain some of, but not all factors that are significant to FOF. In other instances, FOF is not clearly defined by researchers in some studies. Instead, it is inferred that FOF and what it encompasses is already understood resulting in no specific description being determined. In 2002, Suzuki defined FOF as something that "may create a fear of spontaneous collapse and a loss of control" (p.155). This is a very rudimentary and ambiguous definition that does not provide any insight into the cause of FOF, who are most at-risk or the potential health consequences of FOF. Tinetti and Powell's (1993) FOF definition includes more detail and is also referenced in several studies. They define FOF as a continuous concern revolved around falling that leads to a restriction of daily activities, which threatens one's physical function (Tinetti & Powell, 1993). This definition gives a good description of FOF and its potential lifestyle consequences but does not mention the at-risk aging population, which is important in order to know where to focus intervention efforts. Murphy, Dubin and Gill (2003) identify the at-risk population but do not identify the potential causes or expand on any health consequences as they define FOF as "a common and potentially disabling problem among community-living older persons". Myers et al. (1996) developed their own definition of FOF by combining definitions from researchers and authors they came across while writing *Psychological Indicators of Balance Confidence: Relationship to Actual and Perceived Abilities*. They stated that FOF, "associated with the 'post-fall syndrome', is believed to lead to activity restriction and loss of independence beyond that warranted by physical injuries resulting from the fall itself" (Murphy et al, 1996,

p.37). This definition has the advantage of having mentioned some of the consequences of FOF but, on the other hand, did not clarify that FOF can develop without the presence of a history of falls and that the at-risk population is older adults.

Lach (2005), Zilistra et al. (2007) and Scheffer, Schuurmans, van Dijk, van der Hooft and Rooij, (2008) provide some of the most recent and comprehensive definitions. First, Lach (2005) provides a straightforward outlook, which is that FOF is meant "to describe an exaggerated concern of falling that leads to excess restriction of activities" and she also addresses the potential consequences by saying that it can be the "cause of excess disability and an emerging public health problem" due to the restriction of activities. This is one of the more well-rounded definitions and includes many FOF aspects. However, it does not mention that FOF is a psychological health issue or specify the population that is most at-risk of suffering from a FOF. Zilistra et al. (2007) describes FOF as being "a potential health problem of equal importance to a fall and may also affect society as health care utilisation and costs increase" (p.304). This definition is beneficial because it identifies FOF as a public health issue, which can draw attention to it in order to start developing solutions. However, this definition fails to mention what the health consequences are or who is at-risk of this public health issue and, therefore, where resources should be focused. Scheffer et al. (2008) definition recognizes FOF as being a "major health problem among the elderly living in communities, present in older people who have fallen but also in older people who have never experienced a fall" (p.19). Although this definition does not mention the health or quality of life consequences, it clearly identifies the at-risk population and brings attention to the fact that it is a significant health issue.

Having so many definition possibilities can cause confusion because one reader's definition may not suit what the researcher had in mind for FOF when conducting their study. Therefore, in order to have a common understanding, establishing a common definition is necessary. In the proposed study, FOF will be defined as: a serious psychological public health issue that primarily affects older adults, including those who have and have not experienced a fall, and can lead to unnecessary activity restriction resulting in a lower quality of life. This definition uses components

from the aforementioned definitions of Scheffer et al. (2008), Zilistra et al. (2007) and Lach (2005), in order ensure that all FOF aspects are included.

## **2.2. Measuring Fear of Falling**

The variation in all of the fear of falling definitions has resulted in the development of diverse measuring instruments and, as a result, created a lack of uniformity in its overall evaluation (Scheffer et al., 2008). In some instances, older adults may prefer to express that they are “worried” about falling rather than wanting to report “being afraid” or “fearful” of falling. This consequently skews the results because older adults have their own, subjective, interpretation of what FOF means to them personally (Legters, 2002). It has been determined that the most straightforward way of finding the at-risk population of older adults that have a FOF is by asking them “Are you afraid of falling?”. However, this question has been criticized for its insensitive nature and older adults will be less likely to openly admit to having a FOF, especially if they feel as though they will be stigmatized or lose their independence and be forced to relocate to a care facility (Filiatrault, Belley, Laforest, Gauvin, Richard, Desrosiers, Parisien & Lorthios-Guilledroit, 2013). The potential misrepresentation reflected from the response to the question: “Are you afraid of falling?” is particularly a concern for men who are less inclined to disclose their sense of FOF compared to women; in this case, the question becomes invalid and ineffective (Murphy et al., 1996). In any case, before questions for FOF screening are determined, it is necessary that there are “specific measures based on a concise definition” in order to achieve more accurate results (Legters, 2002, p.271).

No matter the methodology, measurement or definition given for fear of falling, researchers agree that the cause of FOF is multifactorial and is deserving of research attention. Since FOF is a complex, psychological health issue it can be difficult to develop a single instrument that can completely measure and analyze it (Legters, 2002). Also, many tools used to measure FOF rely on subjective interpretation, which can result in skewed results (Legters, 2002). This reveals the need for a study that includes an objective component, which, in the proposed study, is an environmental inventory of the physical environment in order to identify what factors may act as facilitators to falls and FOF.

## **2.3. Prevalence of Fear of Falling**

The prevalence of fear of falling also varies greatly. A recent systematic review indicated that the prevalence rates of FOF among community-dwelling older adults ranges as much as 20% to 85% (Scheffer et al., 2008). Although the prevalence for FOF is reported to be greater among older adults who have already experienced one or more falls, studies have shown that more than half of non-fallers have a FOF as well (Lach, 2005). In fact, Myers et al. (1996) found that a greater number of ambulatory, community-dwelling older adults with no history of falls rated a higher level of FOF compared to those who did have a history of falls. In this case, it was determined that a higher FOF was reported among non-fallers due to psychological factors, such as low balance confidence (Myers et al., 2006). This was surprising since, originally, “researchers discussed FOF as resulting from the psychological trauma of the fall” and not for other psychological reasons (Legters, 2002, p.264).

The majority of falls do not result in serious injury, however, it is these serious injuries, such as a broken hip, that older adults focus on when considering or imagining the consequences of falls. The attention that is paid to the worst case scenario of falls is what can foster a psychological based FOF among older adults, whether or not there is a viable threat for falls. For example, Cumming and his colleagues (2000) found a group of older adult adults sought out admission to a care facility specifically because they had a FOF. This group of older adults had not experienced a fall in the past but were fearful enough of the consequences of falling that they prematurely surrendered their independence and opportunity to age-in-place (Cumming et al., 2000). Chamberlin, Fulwider, Sanders and Medeiros (2005) also determined that FOF can be a factor, alongside aging stereotypes and pathological age-related changes, which influence gait pattern changes. In other words, older adults may begin to walk “with decreased stride length and speed and increased stride width and double support time” because they have come to understand that, in their older age, they are at a higher risk of falling and fear the consequences of falling. This results in older adults making mechanical adjustments in the way they walk to try and avoid falling (Chamberlin et al., 2005, p.1163).

There are a number of issues surrounding fear of falling, one being that it is a psychologically based health issue that also has psychological based risk factors. As a result, it makes this a particularly difficult health issue to identify and intervene upon because there are no physical indicators. The challenge in identifying FOF makes it more difficult to confidently determine the prevalence. In conclusion, everything from “methodological considerations, such as sample selection procedures, eligibility criteria, and methods used to assess FOF and categorize fearful seniors, are among the sources of this large variation from one study to another” (Filiatrault, Desrosiers & Trottier, 2009, p.882). The variance in the range of FOF may also be due to the number of definitions that are being used throughout (Legters, 2002).

## **2.4. Fear of Falling Risk Factors**

Fear of falling has traditionally been studied solely as a risk factor of falls. However, although Friedman et al. (2002) found that FOF and falls share similar predisposing factors and are predictive of each other, Legters (2002) supports the need for FOF to be examined separate from falls. Murphy, Dublin and Gill (2003) also agree that “the relationship between falls and FOF is likely bidirectional... [However] despite this complex relationship, FOF has been recognized as an important health problem distinct from falls” (p.946). FOF should be considered as its own public health issue on the basis that it is a something that can affect older adults, whether or not they have a history of falls. Therefore, it is essential that health professionals understand that FOF is a significant health concern among the aging population and treat it as such. It is also important to understand that FOF is a separate health issue from falls so that older adults who do not have a history of falls are included in the at-risk populations being considered for FOF.

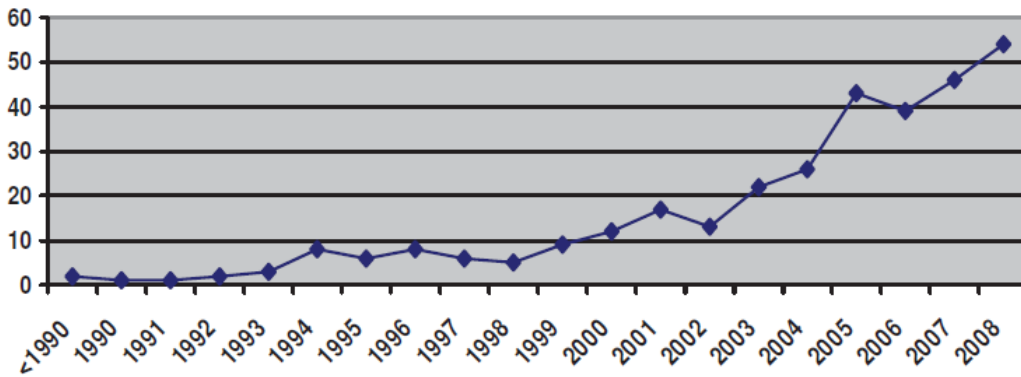
Lach (2005) conducted a longitudinal study over a period of 2 years with a total of 600 participants who completed the entire study. Data was collected through annual interviews and, at the conclusion of the study, it was found that the prevalence of FOF had almost doubled from 23% to 46% (Lach, 2005). It was established that the significant increase in the reporting of FOF was the result of having experienced a fall, developing a feeling of unsteadiness, and reporting having a fair or poor level of health

status (Lach, 2005). These risk factors were all found to be independent of one another in developing a FOF.

In 1988 Tinetti and his co-workers discovered, after 1-year following a fall experience, 48% of older adults had developed a FOF. These findings are noteworthy because it demonstrates that the mental and physical state of older adults can change rapidly and, within the span of a year, these changes can result in the development of a FOF. This trend continued when Murphy and Isaacs (1982) found that 72% of hospitalized patients who had experienced a fall had become fearful of falling and 59% of older adults in a study conducted by Maki et al. (1991) were “very or somewhat afraid of falling” (Howland et al., 1993, p. 241). Other cross-sectional studies have found that the independent risk factors associated with FOF include having: a history of falls, a visual impairment, poor mobility, poor physical function, poor ability to complete ADLs, decreased mental health, few social contacts, a sedentary lifestyle and being a female (Murphy, Dubin & Gill, 2003). Sedentary lifestyle and emotional support are modifiable predisposing risk factors and can be targeted as the focus of prevention initiatives.

## **2.5. Built Environment and Fear of Falling**

Public health literature has paid an increasing amount of attention to fear of falling among older adults over the past three decades as can be seen in Figure 2.1 (Perez-Jara, Walker, Heslop & Robinson, 2010). FOF has become increasingly common among the aging population because older adults are becoming more aware of the negative consequences that can result from a fall and they are fearful of their own safety and health (Lach, 2005). FOF is even rated most highly next to other fears such as “criminal violence, financial crisis, or adverse health event” (Deshpande, Metter, Lauretani, Bandinelli & Ferrucci, 2009, p.91). Most studies on FOF have been done in homes or care facilities and, as a result, not much focus has been on community environments. An evolving field of study is the physical neighbourhood environment and the influence it has on older adults’ mobility and active living, which is linked to FOF.



**Figure 2-1. Number of articles published since 1990 with fear of falling as the main outcome**

Fear of falling does exist within the home, especially considering that many older adults can spend 90% of their time inside their homes (National Center for Healthy Housing, 2008). However, in many instances, FOF can have a greater impact in the physical environment of the surrounding community because it is an environment that is less familiar and creates more opportunity for deviations from the norm, which poses more challenges to older adults (Deshpande et al., 2009). “Research in this area addresses the mechanisms through which community design can influence daily physical activity, and how these findings can be used to develop evidence based policy aimed at creating user-friendly environments” (Sugiyama, Francis, Middleton, Owen & Giles-Corti, 2010). Developing policy, design and planning guidelines to create user-friendly and supportive environments may assist in reducing FOF among older adults. The findings from Ward-Griffin’s et al. (2004) study highlighted “the need for elder health programs and policies that address both the need for safety and independence of community-dwelling elders who have fallen or have a FOF” (p. 315). The findings from the Ward-Griffin et al. (2004) study may be difficult to generalize due to the low number of participants, however, it provides significant insights and guidance to what future researchers need to consider examining in their studies.

A correlation has been found between the features of the physical environment and the desire to be active in the community when "a review of the health and behavioral science literature found relatively consistent positive associations between physical activity and accessibility to recreational facilities and aesthetic attributes"; this is true for

older and young adults alike (Cerin, Saelens, Sallis & Frank, 2006, p. 1682). Adopting an active lifestyle in old age is highly encouraged in order to improve one's quality of life. For that reason, gaining a better understanding of how the physical environment can influence FOF, which, in turn, impacts the desire of older adults to be physically active, is crucial. However, compared to falls in the home, little public attention or research has been put towards outdoor falls and what may dissuade older adults from using outdoor spaces despite the fact that falls outside the home occur at least as often as those that occur within the home regardless of the amount of time spent in each environment (Li, Keegan, Sternfeld, Sidney, Quesenberry & Kelsey, 2006; Nyman et al., 2013). The difference between indoor and outdoor falls is that falls that occur within the home are more often among more elderly frail older adults and outdoor falls are mostly experienced by active older adults (Li et al., 2006).

Stevens, Mahoney and Ehrenreich (2014) found that older adults over the age of 85 have been found to be more likely to fall inside of their home compared to their younger counterparts. Stevens, Mahoney and Ehrenreich (2014) also found that, among their participants, approximately 26% of falls occurred outside of the home while other studies have reported that at least 50% of falls occur outdoors (Kelsey, Berry, Procter-Gray, Quach, Nguyen, Li, Kiel...Hannan, 2010; Bergland, Jarnlo and Laake, 2003). Outdoor falls are also more significantly influenced by characteristics of the physical environment. "Precarious weather conditions seemed to heighten their awareness and FOF" among the participants in Ward-Griffin et al. (2004) study (p.313). This could be a very significant factor to FOF depending on where older adults live and are aging-in-place. Furthermore, it has been discovered that neighbourhoods that are designed with accessibility and safety in mind for seniors are also conducive to the needs of new, young families; and vice versa. Therefore, the structural, environmental needs for an entire population can be addressed at once; what is good for one generation provides the same benefits and is good for the next generation as well (Lockett, Willis & Edwards, 2005).

In 2006, Li et al. released the results of a study analyses, from a study conducted in Northern California, where they looked at a control group of 2,193 adults over the age of 45 who had experienced a fall within the past year. This control group experienced a



greater number of outdoor versus indoor falls and 73% of these outdoor falls were the result of physical environmental failures such as uneven sidewalks or slippery surfaces and there are simple and effective ways to improve these areas. For example, “cleaning sidewalks and streets frequently, installing ramps at intersections, painting/marketing curbs, fixing cracks or removing bumps, providing better lighting, and timely removal of construction debris and snow” (Li et al., 2006, p. 1200). These findings reflect that the majority of falls that take place outside of the home are due to modifiable physical environmental factors.

These findings were interesting considering the majority of outdoor falls happened to older adults who engaged in more leisure-time physical activities and also, on average, had better health and better physical functioning compared to non-fallers (Li et al., 2006). These results show that falls are not only a risk for the frail and elderly and that they can happen to healthy older adults who have a high level of physical functioning. Other studies have also found that active and healthy older adults are more likely to fall outdoors and Li et al. (2006) determined that these findings were consistent with those reported in other countries including Canada (Stevens, Mahoney & Ehrenreich, 2014; Mänty, Heinonen, Viljanen, Pajala, Koskenvuo, Kaprio and Rantanen, 2009; Kelsey, Procter-Gray, Hannan and Li 2012). These discoveries must be taken into consideration because it ascertains that active older adults should not be overlooked in the development of fall and FOF prevention programs.

## **2.6. Fear of Falling and Activity Restriction**

Howland et al. (1993) interviewed 196 community-dwelling older adult, over the age of 58 living in one of two housing complexes for older adults in Massachusetts. The participants were asked about their level of fear concerning several issues including falls, criminal violence, financial struggles, losing belongings and forgetting appointments. In the end, 26% of respondents reported being “very or somewhat afraid that they would fall” and that was 9% higher than the next fear, which was robbery. A greater number of older adults had a FOF if they knew of someone who had experienced a fall compared to those who did not. Furthermore, a little over a quarter of the respondents thought about falling either on a daily or weekly basis and, again, this is

compared to robbery that was considered by a tenth of the participants. Lastly, 35% of the respondents admitted there were “things that they would like to do but did not do because they [were] afraid they might fall” and 19% of this group disclosed that these ‘things’ included routine errands (Howland et al., 1993, p.234). These result revealed that one third of older adults stopped doing activities they would have liked to do due to a FOF. This was also found by Fletcher and Hirdes (2004) who conducted a study where 41.2% of the community-dwelling older adults also reported restricting their activities as a result of having a FOF. Furthermore, in the study conducted by Zijlstra, Van Haastregt, Van Eijk, Van Rossum, Stalenhoef and Kempen (2007) over 4000 community-dwelling older adults responded to a questionnaire regarding FOF and activity restriction. These participants were over the age of 70 and lived in two urban areas in the Netherlands. Out of these 4000 participants, more than half reported having a FOF and 38% reported restricting their activity participation due to their FOF. These prevalence rates were found to be comparable to several other studies that researched similar topics (Zijlstra et al., 2007).

The physical environment is significantly influential on people’s involvement in physical activity in the community because it is comprised of barriers or facilitators to their activities (Brownson et al., 2004). Walking is the leading form of exercise used by older adults and walking is also how many older adults commute throughout their communities (Chaudhury, Sarte, Michael, Mahmood, Keast, Dogaru & Wister, 2011). Therefore, the influence of the physical environment undeniably influences older adults’ daily activities. Furthermore, cues from the physical environment can foster a FOF and discourage older adults from leaving their homes and walking outside, whether or not they have the intention of walking for physical activity purposes. Despite the significance of the physical environment there is little information in current literature on the best tools to measure its various physical features, such as sidewalks and traffic intersections (Brownson et al., 2004).

## **2.7. Social Support and Fear of Falling**

Murphy, Dubin and Gill (2003) evaluated 313 community-dwelling women, 72 years and older, who did not have a fear of falling in an attempt to determine if and why

they would develop a FOF over the next year. When reassessed one year later 27% (84) of the participants had developed a FOF and the four dominant predisposing factors to the development of this FOF was being 80 years old or older, visual impairment, having a sedentary lifestyle and/or lack of emotional social support. All of these factors reflect the importance of social support and physical environment factors. For example, improving the physical environment can assist in making those older adults with visual impairments and sedentary lifestyles to feel more secure in their community environments and, as a result, encourage them to take part in their regular daily, social activities. The majority of interventions relating to FOF and falls have dealt with the physical characteristics and abilities of older adults, such as exercise programs. However, FOF requires more than just physical interventions. Older adults need to feel safe and confident and this is, in part, done through a supportive physical environment and available social supports (Legters, 2002).

Also, in correspondence with social support, Filiatrault, Desrosiers and Trottier (2009) led a study that included data collected between 2005 and 2006 that recorded social participation among community-dwelling older adults. The 350 participants included in the study were recruited from the Quebec health insurance board and were all residents of Quebec, Canada. The subsection of the study that was looking at FOF specifically surveyed 82% (288) of the original sample. Most significantly, older adults who were more socially isolated and had less people to rely on for social support were more likely to report a FOF. The resulting lack of socialization, which can be a result of restricted daily or physical activities, puts older adults at a risk of developing and suffering from depression and an overall decrease in mental health. Depression, caused by a FOF is often accompanied by fatigue “which may make people less secure about their physical abilities and therefore fearful of falling”; this reflects another negative cyclical effect of FOF (Legters, 2002, p. 268). Depression can also lead to symptoms such as a decrease in self-efficacy, fear, and a lowered level of confidence (Denkinger, Lukas, Nikolaus & Hauer, 2015).

Ward-Griffin et al. (2004) used a phenomenological investigation to interview nine older adults who had experienced a fall and/or who had a FOF. The analysis of the second phase of this study determined that restricting activities is a strategy that older

adults use to protect themselves from the risk of experiencing a fall without understanding the real risk factors and negative consequences associated with restricting daily activities. Also, in many instances, “in order to be socially active, participants had to put aside or live with their FOF” (Ward-Griffin et al., 2004, p. 314). The participants also had other strategies to combat FOF, which included eliminating hazards and selecting safe spaces (Ward-Griffin et al., 2004, p. 314). Both of these elements, a supportive and safe design, could be accomplished by and enhanced through the improvement of the physical environment. If community design and support services became more conducive to the needs and abilities of older adults they would not need to eliminate hazards themselves and would have more safe spaces where they could explore and spend time. In fact, many of the participants in this study mentioned that they would be more likely to take part in social events in the community if the surrounding physical environment was more accommodating to their needs, such as a walker or wheelchair (Ward-Griffin et al., 2004).

Lastly, Yardley and Smith (2002) found that 224 older adults, 75 years and older, reported that they were not only concerned about functional decline and loss of independence as a result of falls but were also worried about losing their dignity, being embarrassed in their social lives and suffering a loss of identity. Overall, social support can have a substantial influence over the incidence on FOF among older adults. Research has discovered that seniors are more likely to remain active if they have the support of family and friends despite having a FOF (Ward-Griffin et al., 2004, p.308). Family, friends and community members have the ability to help prevent the FOF that an older adult may experience through the amount of social support that they provide, both emotionally and physically. Malik (2000) reinforced this by arguing that support from family and friends helps older adults remain active, limiting unsafe activities and assisting with difficult activities. Furthermore, Fletcher and Hirdes’ (2004) research has demonstrated that FOF and fear-related activity restriction was more prevalent among seniors who had no or little social interaction and were alone the majority of the day.

## 2.8. Quality of Health and Fear of Falling

Howland's et al. (1993) study was the first that measured the frequency and degree of FOF among community-dwelling older adults and determined "that FOF may compromise quality of life" (p.241). This study guided many future studies in this topic area and its findings were found to be accurate. For example, Curl, Ward Thompson, Aspinall and Ormerod (2015) determined that "falling and fear of falling threaten the ability to get outdoors and maintain quality of life for older adults" and Perez-Jara et al. (2010) established that activity restriction due to FOF is a negative outcome that can effect an older adult's quality of life. Nourhashemi and her colleagues (2001) also established that FOF has a cumulatively negative effect on quality of life. First, suffering from a FOF can increase the risk of older adults decreasing their participation in regular daily activities. These daily activities could include anything from leaving the home to get groceries, walking around the park or neighbourhood, going to the community centre or meeting friends for lunch; anything that any older adult would regularly do.

The decrease in daily activities and socialization caused by FOF leads to weaker physical condition, decreased independence and an overall lower quality of life that all contribute to an increase risk for falls. This increased risk for falls then turns into a greater FOF, which is described as "the vicious circle of FOF" (Filiatrault et al., 2013, p.199). Furthermore, low quality of life in older adults, caused by FOF, can negatively impact life expectancy (Suzuki et al., 2002). Quality of life is strongly associated with maintaining independence, accessing resources and services, remaining physically and socially active among older adults as well as retaining an active role in the local community (Gabriel & Bowling, 2004). In addition, FOF and its consequences do not only affect older adults but may also impact others indirectly (Perez-Jara et al., 2010). For example, those who act as social supports to the older adult suffering from a FOF may have to undertake the 'activities', such as grocery shopping, that the older adult is no longer able to perform or the 'activities' may be completed through social services and, therefore, utilize tax payers money. These additional consequences highlight the need for preventative interventions. Therefore, the negative affect that FOF has on quality of life is concerning and impacts older adults in many aspects of their life as well as, incidentally, those around them and society.

## **2.9. Preventative measures for Fear of Falling**

In the past few years FOF has been acknowledged as a public health issue that threatens the independence of older adults but it has also been determined as being one of the most potentially modifiable problems among the aging population (Denkinger et al., 2015). If considered as a continuum, fear of falling can be seen as having positive or negative consequences where it can become overwhelming if experienced on the far end of the negative end of the spectrum. An excessive FOF can have a negative outcome and cause older adults to restrict their participation in daily activities (Lachman, Howland, Tennstedt, Jette, Assmann & Peterson, 1998). The consequence of FOF, such as social isolation and cessation from regular daily activities, makes it “a potential cause of excess disability” (Lach, 2005, p. 45). On the other hand, a certain degree of FOF may have a preventative and positive effect. It can lead to positive, adaptive behaviour, such as avoiding walking on icy sidewalks, using handrails on stairs or implementing home modifications. As a result, FOF may encourage older adults to be more cautious and employ more safety focused behaviour when doing their daily activities.

Suzuki, Ohyama, Yamada and Kanamori (2002) have suggested that older adults with a FOF make appropriate home modifications, participate in fall prevention exercise and rehabilitation programs and even consider using a cane while walking. These suggestions are made to ensure that older adults who have the ability to perform daily activities do not become house-bound due to a FOF. Furthermore, these “preventive efforts to reduce FOF may also decrease the likelihood of falling” (Murphy, Dubin & Gill, 2003, p.946). Since these recommendations, such as using a cane or walker to walk, depend on older adults making substantial changes to how they function in their everyday lives, they can seem farfetched to some older adults. However, the goal of these suggestions is to provide support and increase confidence among older adults who have a FOF and they are also preventative measures to falls (Suzuki et al., 2002). The preventative nature of these home modifications, exercise programs and the benefits of walking and staying involved with social activities should be explained to older adults, rather than forced upon them, so that they understand the benefits and can adopt the use of them with less apprehension.

## **2.10. Falls education in Fear of Falling**

BC's Ministry of Health and the Public Health Agency of Canada have extensive Fall Prevention initiatives with entire webpages filled with facts and resources dedicated to older adult's falls in Canada (Herman, Gallagher & Scott, 2006; Seniors' Falls in Canada, 2014). However, they only refer to FOF as a risk factor of falls and do not address it as its own individual public health issue. Furthermore, current falls education and intervention programs may have played a part in fostering the development of FOF because they make older adults aware of the potential consequences of falls and make them anxious and apprehensive. In some cases "FOF can be an appropriate reaction leading to safe behaviors when performing activities of daily life (e.g., avoid walking on icy sidewalks)", but it can also sometimes result in unnecessary activity restriction (Filiatrault et al., 2013, p. 199). This is important to note because the goal is not to make older adults feel incapable. If all that is presented to older adults through these intervention initiatives is that they have poor health or that the risk of falling is their responsibility, they will develop a low self-perception of health leading to more negative consequences (Friedman et al., 2002).

Education programs involving FOF should include an overview of the consequences of falls and FOF but it should not overwhelm or burden older adults with such fear that they negatively alter their lives in such a way that decreases their quality of life. More importantly, the majority of these educational programs should include ways that older adults can manage their FOF in order to increase their self-confidence, ensure that they make safe and cautious decisions and understand the reality of their abilities. Education programs also need to contain suggestions for environmental modifications that can be made in the home and community environment, which play a role in decreasing FOF and the risk of falls, so that older adults are not accused for their personal characteristics and are empowered to take control of their own safety. Lastly, a list of public programs where older adults can seek help are needed so that older adults know that they do not have to address FOF on their own. Having a support system where older adults are able to talk openly about their FOF could help them to gain confidence and remain active.

The majority of research regarding FOF has centered on individual characteristics and risk factors. As a result, “little information is available in the current literature regarding environmental characteristics linked to FOF” (Filiatrault, Desrosiers & Trottier, 2009, p.884). Furthermore, “current research on falls and falls prevention among older people tends to use a quantitative, biomedical and behavioural approach to seniors’ health, focusing on assessment of risk factors, injury prevention, and health protection” and does not take into account the subjective experience of falls or FOF (Ward-Griffin et al., 2004, p.308). Understanding personal experience of FOF among older adults is vital in developing intervention programs that are more effective and adopted by this at-risk population because older adults “represent a subset of the population who are likely to perceive the environment differently” (Curl et al., 2015, p.2). Also, many of the studies that have included environmental changes have primarily focused on home modification and have not extended outside of the home to the physical environment of the surrounding community (Ward-Griffin et al., 2004). For example, in 2009, Gillespie, Robertson, Gillespie, Lamb, Gates, Cumming and Rowe did a comprehensive review of 62 fall prevention interventions and they discovered that none of these programs included elements that dealt with outdoor physical environment modifications or maintenance. The minimal amount of attention that is paid to outdoor physical factors of the neighbourhood that could contribute to falls may be due to the assumption that older adults spend the majority of the time inside so outdoor factors are less of a concern (Li et al., 2006). However, encouraging active lifestyles among older adults is on the policy agenda in order to inspire older adults to remain active, healthy and independent for as long as possible. Yet, older adults who are possibly at risk of experiencing a fall and are encouraged to be active in an urban environment become vulnerable. Therefore, studying the outdoor environment is crucial in order to enhance the safety of active, community-dwelling older adults.

As a result, a study is proposed in this Capstone paper that addresses the role of the physical environment in falls and fear of falls and explores how older adults’ perceptions of outdoor physical environment affects their FOF. This proposal includes the investigation of the social environment as it relates to FOF, seeing as it is a component of the neighbourhood environment (Li et al., 2006).



## **2.11. Gaps in Literature**

The proposed study addresses some of the gaps that exist in current research on fear of falling. An extensive analysis of the environment, physical and social, in relation to its influence on the FOF has not yet been done. The proposed study identifies and measure both objective and subjective barriers and facilitators of FOF through the use of multiple methods of data collection. Furthermore, to date, many studies have reported a significant variance in the prevalence of FOF due to inconsistent definitions and over-simplified questioning. The proposed study will attempt to combat these inconsistencies by supplying a comprehensive FOF definition as well as a more inclusive survey. The survey is comprised of open-ended and ordinal scaled questions in order to allow older adults to express their opinions and feelings towards FOF as precisely as possible. Furthermore, to date, a large majority of the studies that exist focus on urban settings. The proposed study will include both the urban and suburban settings.

## Chapter 3.

### Research Methods

The grant proposal presented in Chapter 5 provides a condensed description of the methods due to the word limit requirements of the agency. This chapter of the Capstone paper is to give the reader a more detailed description of the strategies and plans of the research methods and instruments. The extended discussion of the methods and instruments links the research questions of this capstone project to the forms of data collection techniques.

**Table 3-1. Research Questions**

Research Questions
1. What are the objective and subjective physical environment and social support barriers and facilitators related to fear of falling of older adults and how does that impact their quality of life?  a) What are the objective physical environment barriers and facilitators in falls or fall prevention of older adults? What are some of the subjective environmental barriers and facilitators that affect fear of falling? b) Are the objective physical environmental barriers and facilitators congruent with older adults' perceptions of environmental barriers and facilitators that generate fear of falling? c) How do older adults' perceptions of these barriers and facilitators of the physical environment affect fear of falling among older adults? d) What are the social support factors (or lack of support) that affect older adults fear of falling?
2. How can we measure the linkage between fear of falling and physical environment and social support facilitators and barriers?

The research questions demonstrate that both objective and subjective types of data collection are required. Question 1 and its sub-questions leads itself well to both quantitative observation data and qualitative, participatory research tool; thus, a SWEAT-R environmental audit and Photovoice will be used to address these questions, respectively. Question 2 is best addressed through a qualitative, self-reported survey as well as through the comparative analysis involving all of research tools.

### **3.1. Instrument Validity**

SWEAT-R was tested for reliability in 2007 by auditing 12 different neighbourhoods in Portland; this included 30 randomly selected segments from each neighbourhood, totalling 321 segments where the environmental audit was used (Michael et al., 2009). Observers were paired together and completed the SWEAT-R audit individually in order to test inter-reliability and 88% of the items audited were found to have good or excellent inter-rater reliability. Also, when analyzing intra-rater reliability 75% of the items audited were found to have good or excellent intra-rater reliability; 63 of the audits were repeated to come to this result (Michael et al., 2009). The reliability of SWEAT-R was shown to have been enhanced in each section and among all items from the original environmental audit (SWEAT). As a result, it is certain that it will serve as a dependable tool to collect data. The survey is comprised of pre-established surveys and questionnaires, including NEWS, FFABQ, ICECAP-O, and Social Neighbourhoods; therefore, the survey is expected to bring forth rich data.

Photovoice has been used extensively in past studies among varying disciplines to explore a variety of issues. In fact, Hergenrather, Rhodes, Cowan and Bardhoshi (2009) identified 31 studies from seven different countries that used a methodology that included Photovoice. In a study conducted by Mahmood et al. (2012), Photovoice was found to be a valuable instrument of inquiry and it was determined that Photovoice had the potential to empower older adults to involve themselves with the issues at hand in their communities. More advantages were found by Lockett, Willis and Edwards (2005) where "the use of Photovoice as a method was well received by the participants, indicating a feeling of empowerment and a heightened awareness to avoiding fall hazards in the neighbourhood" (in Mahmood et al., 2012, p.1182). Photovoice is a valuable data collection technique because "even the most experienced researchers focusing on age-related issues might learn from the images and stories generated through this method" (Baker & Wang, 2006, p.1410). By allowing older adults to directly express their concerns, it provides an opportunity for researchers, policy makers and health care providers to gain alternative forms of information to analyze and consider.

### 3.2. Study design

The goal of this proposed study is to discover what physical environment and social support factors act as barriers and facilitators to older adults' FOF in their communities. The instruments that will be used to collect data are an environmental audit, a set-response survey and Photovoice; making this a mixed methods quantitative based study with an additive qualitative element. Mixed methods is defined as combining components of quantitative and qualitative research approaches within a single study for the purpose of increasing the breadth and depth of understanding of a particular topic (Johnson, Onwuegbuzie & Turner, 2007). It is a particularly appealing study method for many researchers because it has the potential to increase a study's comprehensiveness and enhance a study's implications by facilitating rich data and increasing the value of findings (Collins, Onwuegbuzie & Sutton, 2006). The instruments used in this mixed methods study are complementarity since the survey has some overlapping qualities with the other two methods. The SWEAT-R environmental audit and the survey complement one another seeing as they involve quantitative method and, therefore, can be compared. This is also the case for the survey and Photovoice, which are comprised of subjective input. The overlapping characteristics of these instruments help to solidify and clarify the results as well as to expand the scope and range of the inquiry (Greene, Caracelli & Graham, 1989). Table 2 will provide a brief description of each of the instruments and methods to provide an overview of the exploratory nature of the study. The complete details of the research strategy will be discussed in detail in a following section of this chapter.

**Table 3-2. Instruments and Methods**

Instrument & Method	Definition
SWEAT-R: Quantitative & Objective	An environmental audit used by researchers to determine what features act as barriers and facilitators to a neighbourhood's level of walkability.
Survey: Quantitative & Subjective	A series of questions that are meant to analyze the participants' opinions on a given subject.
Photovoice: Qualitative & Subjective	A research technique that consists of the participants' of the study being directly involved in data collection by taking pictures of their community environments and discussing the positive and negative aspects that they captured in their pictures.

Although these methodological instruments have complementary strengths, it is vital that a study with mixed methods maintain the expectations of each paradigm. The quantitative paradigm, addressed through the SWEAT-R environmental audit and the survey, is positivistic and based on palpable reality that has been established through empirical research (Summer, 2003). In this current case, the SWEAT-R environmental audit is meant to determine what environmental walkability features could act as barriers and facilitators and influence FOF among older adults. The goal of the survey is also to predict what barriers and facilitators exist that could impact FOF among older adults but are, instead, directly determined by older adults' perspectives themselves. The survey has open-ended questions but it remains quantitative because the questions are guided. Photovoice is the qualitative participatory-action research component of the study (Mahmood, Chaudhury, Michael, Campo, Hay & Sarte, 2012). It holds a post-positivistic approach where the process is based on subjective reality (Summer, 2003). The participants' findings gathered through Photovoice are then interpreted by their peers as well as the researchers through a secondary qualitative measure, group discussion observations. Therefore, while the mixed methods have alternative paradigms that guide them, they are applied separately throughout the study and both contribute significantly to the goal of the study. Overall, the quantitative components of the study (SWEAT-R and the survey) will be used to determine both the objective and subjective viewpoints and the qualitative element (Photovoice) will focus on the subjective perspectives. The combination of objective and subjective reviews of the neighbourhood environments is important because it is not yet clear which method provides better understanding of what changes would be best or which findings hold more influence over how to alter neighbourhoods' physical environment to reduce FOF (Brownson, Chang, Eyster, Ainsworth, Kirtland, Saelens & Sallis, 2004).

### **3.2.1. SWEAT-R environmental audit**

The revised Senior Walking Environmental Audit Tool (SWEAT-R) environmental audit will be used in order to objectively investigate the physical environment to determine FOF barriers and facilitators seeing as it was developed in order to help researchers analyze data collected from the physical environment (Michael et al., 2009). The revision of SWEAT made "SWEAT-R more useful for community-based research to

understand the influence of the built environment on physical activity of older adults” (Michael et al., 2009, p.249). SWEAT-R consists of 4 domains which include *functionality, safety*. *Functionality* is comprised of the physical environmental elements that are structural, such as buildings and sidewalks. *Safety and Comfort* includes personal safety aspects as well as traffic safety features, for example. *Aesthetics* refers to the quality of the design of a neighbourhood and the visual appeal this design provides. Lastly, *destinations* denotes the accessibility of resources and services, for example, transportation and grocery stores (Michael et al., 2009). The proposed study will utilize the Safety and Comfort and Functionality Domains because it is focusing on the physical environment, which involves functionality, as well as the perceptions of older adults where safety and comfort is likely to play a role.

SWEAT-R includes 162 items and a user-friendly training module that was created using the IMI materials as a guideline to ensure simplicity. The audit will be conducted by the researchers involved in the study and will provide an objective view of the physical environment that can be compared to the older adults’ perceptions revealed through the survey. For the environmental audit, either 25% or a maximum of 60 blocks will be randomly selected and used to ensure that a relatively similar area is covered in each neighbourhood. Delineating the physical area of each neighbourhood segment is important for the SWEAT-R environmental audit so that each neighbourhood can be more easily compared and analyzed against one another. One criticism of SWEAT-R is that it is too long. However, the proposed study will be using an abbreviated version and will only be using the Safety and Comfort and Functionality domains while auditing the neighbourhoods (see Appendix H for the list of variables included in these two domains) that will all the research team to optimize their time.

Curl et al. (2015), recently developed an audit checklist to evaluate the outdoor environment for falls risk (see Appendix G – listed after SWEAT-R). This environmental audit was "designed to assess the outdoor environment for falls risk, by identifying features that may cause falls or fear of falling, and drawing on the experiences of older adults who have fallen" and was developed using a 3-phase process (Curl et al., 2015, p.3). This audit checklist was drafted based on a review of existing street audit tools including the Scottish Walkability Assessment Tool and extant falls literature (Millington,

Ward Thompson, Rowe, Aspinall, Fitzsimons, Nelson & Mutrie, 2009). Additionally, the research team took walks with 20 older adult participants, 65 and older, who had experienced a fall within the last year in order to gain their perspectives on the outdoor environment, as well as ethnographically observe their mobility within their neighbourhood environment. Finally, healthcare practitioners who assess homes for falls risks were involved in a workshop to revise and discuss the audit checklist and determine what improvements could be made so that it is of practical for use for practitioners.

The audit developed by Curl et al. (2015) is sub-divided into the following sections: weather, type of path, slope, path condition and smoothness, path material, usable width of pavement, permanent path obstructions, steps, road crossing, temporary obstructions, street lighting, and social environment. The audit covers the majority of physical features found within the environment that contribute to falls and the audit tool has space for additional notes to be taken to provide detail and increase specificity about each audit. However, the audit does not categorize its variables into domains as does SWEAT-R, which helps with clarity and organization (Chaudhury et al., 2011). The SWEAT-R environmental audit is more comprehensive and covers most of the items listed in the Curl et. Al tool along with additional items that deal with functional, as well as safety and comfort aspects of the built environmental related to older adults' mobility. As a result, SWEAT-R was selected for use in the proposed study. There were a few items in the Curl et al. (2015) audit checklist that where not in the SWEAT-R tool (e.g. weather, permanent obstructions and social environment) and those will be incorporated within the SWEAT-R tool under the safety and comfort domain to augment the environmental audit of the proposed study and provide more details related to falls in outdoor environments.

### **3.2.2. Survey**

Surveys are beneficial as they allow you to gain subjective insight into some of the challenges and barriers that residents, older adults in this case, see or experience in their neighbourhoods. From this insight, patterns will be revealed on what physical environment features and social support factors older adults consider to be barriers and

facilitators to their FOF (Brownson et al., 2004). In the proposed study a group of approximately 40-50 older adults from each of the six urban and suburban neighbourhoods, totaling 240-300 participants, will be asked to complete a survey. The participants will include both older adults who have and have not experienced a fall in the past year in order to gather perceptions from different peoples altering experiences. The participants recruited and selected for the proposed study will reflect the gender ratio of the population, 35-40% male and 60-65% female, as closely as possible in order to gather all different perspectives (Statistics Canada - Census Profile: Vancouver, 2015). The survey will include four sections that address each of the following topics: (1) physical environment, which will include older adults' perceptions on what aspects of the physical environment they believe contribute to FOF (2) demographic factors (3) social support and (4) quality of life; this section will contain the inquiry of older adults' FOF. The complete survey and all of its components can be found in Appendix D.

In order to obtain accurate results, it is important that surveys are intuitive and easy to follow and complete. Lachman et al., (1998) found that surveys with extensive rating scales and too many components that are not clearly separated caused older adults, especially those with limited education levels, to have difficulty knowing how to fill it out. If participants are confused and unable to accurately fill out a survey then it becomes inoperative and the results mute. As a result, the layout is structured in such a way that is clear and simple to follow in order to be as easy to complete as possible. The survey will be designed to determine older adults' perceptions of what physical environment and social support factors act as facilitators and barriers to FOF. Earlier tools used to measure FOF in the past have been criticized for their limited ability to report appropriate degrees of FOF because they only provided 'yes/no' answers. This study will use scaled questions wherever possible so that participants can report their feelings and opinions on FOF, and the related issues of the physical environment and social supports, most accurately. Throughout the survey there will also be opportunity for older adults to add additional information about the physical features and social supports of the environment of their neighbourhoods as they relate to FOF.

The first section of the survey is made up of the Neighbourhood Environment Walkability Scale (NEWS), which is a scaled questionnaire that provides a detailed



evaluation of what one's neighbourhood consists of, such as types of neighbourhoods, streets and pedestrian safety (Cerin et al., 2006). Demographic factors, the second section of the survey, includes a set of questions developed to gather information from the participants. The items in the Demographic section were compiled from a number of sources, including previously established surveys such as a Public Safety Survey developed at the University of Fraser Valley and a British Household Panel Survey (Cohen, Plecas & McCormick, 2009; British Household Panel, n.d.). These demographic items are meant to gather basic demographic data on older adults' in order to have a comparative baseline and allow researchers to develop an understanding of the aging population included in the proposed study. If there are any outlying or unexpected results from a set of participants in a given neighbourhood, they may be explained by specific characteristics; this is something that could be further explored in a future study. The third social support domain of the survey will include neighbour interaction and neighbourhood cohesion developed by du Toit, Cerin, Leslie and Owen, 2007 and Clarke, Fisher, House, Smith and Weir, 2008, respectively.

Quality of life is the fourth and final section of the survey and it will be measured using the ICEpop CAPability measure for Older People (ICECAP-O) questionnaire (ICECAP-O, 2015) (Appendix D). ICECAP-O (2015) is a single page scaled questionnaire that includes five aspects, *attachment, security, role, enjoyment and control*. These components, combined, are meant to examine older adults overall quality of life (ICECAP-O, 2015). The World Health Organization's Brief (WHOQOL-BREF) and Old (WHOQOL-OLD) Quality of Life scales are two other established tools used to measure quality of life (WHOQOL - BREF, 2004; WHOQOL-OLD manual, 2006). Both of these scales were considered for the survey component of the proposed study because they have useful items. However, the ICECAP-O was selected for the proposed study because it is shorter, has a clearer structure, so it is easier for older adults to follow and complete, and it combines health and socio-behavioural aspects of quality of life in a holistic manner. ICECAP-O also categorizes its components (*attachment, security, role, enjoyment and control*) for increased simplicity during analysis (ICECAP-O, 2015).

The FOF Avoidance-Behavior Questionnaire (FFABQ), developed by Landers, Durand, Powell, Dibble and Young (2011) will be used to gather older adults' perspectives specific to activity avoidance. It is a part of the quality of life section because the participation in daily and physical activities can deeply influence older adults' well-being and overall quality of life. Surprisingly, in a literature review, Perez-Jara et al. (2010) found that very few studies included an activity restriction scale despite its level of importance. The FFABQ is a single page questionnaire that is encompassed of a list of 14 activities and uses a five-level ordinal rating scale (Landers et al., 2011). Using a scale for evaluating survey responses is beneficial as they have been reported to have good reliability and it is also an inclusive investigative method for older adults who have and have not had a history of falls.

The FFABQ was chosen as the appropriate scale to use in the survey of the proposed study to measure activity restriction due to a fear of falling because it is short, easy to complete and was designed specifically to investigate the activity restriction outcomes of FOF among older adults. The Falls Efficacy Scale – International (FES-I) is a common activity avoidance scale that is well established and has been used in a large number of studies addressing falls and FOF. However, it is used primarily to assess FOF within the home and focuses on "concerned with falling, which does not address FOF directly (Denkinger et al., 2015; Yardley, Beyer, Hauer, Kempen, Piot-Ziegler & Todd, 2005; Perez-Jara et al., 2010). The FFABQ is designed specifically to answer activity restriction that results from a FOF and, as a precursor to the listed activity, questions: "Due to my fear of falling, I avoid...". Additionally, the FFABQ is a slightly shorter scale than the FES-I and the FFABQ also has more items related to outdoor activities first putting an emphasis on the outdoor environment (Landers et al., 2011). Thus, FFABQ is more relevant to this project than the FES-I as the proposed study's focus is on the outdoor environment.

The Activities-specific Balance Confidence (ABC) is another scale that was considered but not used for this proposed study. It is a scale designed to examine activity participation among older adults. It has been found to have high validity in numerous studies and in the Landers et al. (2011) study it was found to have an 'excellent correlation' with the FFABQ (Raad, 2015). However, ABC was not chosen for

the proposed study because it includes observations of activities that are concerned with older adults' ability to balance while performing these particular activities (Raad, 2015). As a result, it is focused on individual capabilities in relation to falls and was not designed with FOF in mind.

Another Questionnaire considered (but not included) for this proposed study was Survey of Activities and Fear of Falling in the Elderly (SAFE). SAFE is a tool that was developed by Lachman et al. (1998) and is also used to determine how FOF influences older adults' daily activities. Although SAFE is a well-established and thorough survey it involves older adults answering six questions in relation to eleven activities, totalling 66 questions, and requires answers to yes/no, scaled and open-ended questions (Gagnon & Flint, 2003). The number of questions and combination of ways in which to answer the questions may become confusing to the older adult completing the survey. As a result, it was determined by the researchers of the proposed study that SAFE would be too long for the survey. Overall, it was determined that the single-paged, scaled FFABQ questionnaire was most applicable and suitable for the proposed study's survey.

The quality of life section of the survey also includes a scaled question directly addressing older adults FOF. The questions that directly address FOF were developed by the lead researcher of the proposed study. The first two questions related to hearing about or knowing of another older adults' falls was an exploratory question to discover whether or not social networks could have any influence on FOF. The question "What level of fear of falling do you have?" was designed as a scaled item rather than presence and absence of a factor (in this case FOF) based on the understanding that older adults tend to be more responsive to scaled questions with options, rather than yes or no answers. These questions relating to FOF were placed at the end of the survey in order to give the older adult participants an opportunity to explore the many aspects of FOF. This will allow them to become aware if the fact that FOF is a public health issue that is, to a certain degree, out of their control and can be influenced by their physical and social environments of their neighbourhood. After reflecting upon these external factors that can influence FOF, the older adult participants may be more open to honestly sharing their sense of FOF because they have come to understand that it is a health issue that is not a result of their imperfection.

### **3.2.3. Photovoice**

Photovoice is a research tool in which the participants are given an opportunity to become genuinely involved in the research process and given a certain degree of control and influence over what is happening in the study. Photovoice involves the older adult participants using disposable cameras and taking pictures of anything that represent aspects of their daily physical and social environments that relate to FOF (Lockett, Willis and Edwards, 2005). The pictures that the participants take will allow the researchers to have a unique and first account view of how older adults perceive the physical and social environment that surrounds them. These pictures are also "perceived to offer novel insights and convey the 'feel' of specific events or locations which is often lost with research methods relying on oral, aural or written data" (Rose, 2007, p.1181). Photovoice is an instrument that will allow the researchers to create a bond with the participants, and vice versa. Forming this type of relationship can help participants to be more honest and share more insightful information because they are not intimidated and are less guarded.

For the Photovoice portion of the study a smaller group of 10 older adults (compared to the 40-50 completing the survey) from each of the urban and suburban neighbourhoods will participate; 60 older adults in total. Participants who were already recruited for and completed the survey will be selected and asked to participate. The group of participants who are selected to participate in the Photovoice portion of the study will be chosen based on a number of diverse factors such as age, gender and history of falls that were determined in the survey. The older adults who agree to participate in Photovoice will also have to be considerably mobile or have someone that can assist them due to the fact that they will be required to walk around their neighbourhood. Prior to the start of Photovoice, the participants will be trained at a local community center. At these training sessions the older adult participants will be provided with a disposable camera, shown how to use the cameras by members of the research team, and given an opportunity to practice and ask questions. Hardcopy instructions and contact information will be sent home with the participants in the instance that they have any questions or need help; research assistants will be available to provide this extra assistance (Appendix E).

The participants will be allotted one month to take their pictures after which time the disposable cameras will be collected by the research team. The pictures will be developed and then again returned to the participants within 2 weeks' time from when they were collected. The older adults will be asked to select 5 pictures that most strongly represent the barriers and facilitators of FOF in their community environment. They will be asked to bring these pictures to a follow-up discussion group at their local community centres to analyze these barriers and facilitators with other community-dwelling older adults.

**Table 3-3. Photovoice training**

Step	Requirements
Training	1 day at a local community center, in person, to provide instructions to participants on how to use the disposable cameras. Hard copy instructions will also be provided for the participants to take home.
Photo taking	Participants will be given 1month to take pictures of what they perceive to be fear of falling barriers and facilitators neighbourhood environment.
Photo collection and return	Research assistants will collect the disposable cameras from the participants at their residents and take them to be developed. Once developed, the pictures will be returned to the respective participant to review. This will take place over a period of 2 weeks.
Debriefing	Participants will choose 5 pictures to bring to their discussion group. These discussion groups will take place over one day and at the same local community centers where the training was given. The goal will be to uncover what environmental and social support factors are most significant to fear of falling.

Using the Photovoice technique will allow the older adults to share their point of view and ensure that the study has a thorough understanding of the older adults' opinions. These insights can be compared with the objective feedback collected from the environmental audit.

### 3.3. Research setting

The proposed study will take place within 3 urban and 3 suburban neighbourhoods in the Metro Vancouver area. It is also from these six neighbourhoods

that the study sample will be selected. The neighbourhood boundaries were laid out in the Canadian Census data (Skelton, 2012). The US Census Bureau defines *urban* as being a space or area where the territory and housing units are located within a developed and/or industrialized cluster. It also outlines an urban area as being a densely populated residential area. The *rural* neighbourhood, also defined by the US Census Bureau, includes a region and residential area that is located outside of urban areas and with a lower population density than its urban counterpart (US Department of Commerce, 2002; Sastry, Pebley & Zonta, 2002).

These 3 urban and 3 suburban neighbourhoods were selected because they are areas that are comprised of higher percentages of older adults in British-Columbia according to 2006 and 2011 census data. The urban and suburban neighbourhoods are listed in Table 4 along with their populations.

**Table 3-4. Urban and suburban neighbourhood populations**

Vancouver Coastal Health	Fraser Health	
Urban (*total: 81, 935 older adults)	Suburban (total: 30, 355 older adults)	
Neighbourhood:	Neighbourhood:	Population:
West End Vancouver	White Rock	5, 685
Downtown Eastside Vancouver	Delta	15, 460
South Cambie/Midtown Vancouver	Maple Ridge	9, 210

\*The 2011 Census does not differentiate the population for the smaller neighbourhoods within the central Vancouver district, i.e. the urban neighbourhoods.

The West End is the fourth most densely populated urban neighbourhood, out of the neighbourhoods in Vancouver, with 217 people per hectare. In 2011, the West End was comprised of 7.4% of the entire city's population and 13% of this population was older adults, which is 1% lower than the city's average. Currently, the aging population has been decreasing slightly in the West End since 2006 (West End, 2012). The downtown eastside is the second urban neighbourhood in the study and consists of Chinatown, Gastown and the Strathcona community. One interesting fact about the downtown eastside is that the gender distribution is opposite of that of the rest of the city in that it is comprised of 60% men and only 40% women. This uncommon gender distribution may prove to uncover some interesting results. The aging population is ~20% of the population in the downtown eastside and, as a result, "is a high percentage

of seniors (65+) compared to the city as a whole" (Downtown Eastside, 2013, p. 6). The population growth of the downtown eastside, including the aging population, does not seem to be slowing down especially with all of the "renovation and replacement of older housing and hotel stock with new apartments and condominiums; and the development of sites that had been vacant" (Downtown Eastside, 2013, p. 6). The south Cambie/midtown Vancouver neighbourhood is comparatively small and is the only urban neighbourhood in the study that does not have a population denser than Vancouver's average population. The older adult population, as reported by the City of Vancouver, comprises 14% of the total population and is just slightly higher than that of the average of Vancouver.

White Rock is a suburban neighbourhood and the census data from 2006 determined that "a neighbourhood in White Rock has more senior citizens per capita than any other place in Metro Vancouver". In fact, in certain areas of White Rock, 43.5 % of the residents are made up of older adults over the age of 65. This is over three times the average percentage of older adults found in the rest of Metro Vancouver, which has an average of 13% (Skelton, 2012). The aging population in the suburban Delta neighbourhood is 15.5% of the overall neighbourhood population, which is also more than the Metro Vancouver average. The trend of the older adult population in Delta is that it is on the rise since it has increased from the 2006 to the 2011 census (Govt. of Canada: census subdivision Delta, 2014). Maple Ridge is the third and final suburban neighbourhood that will be included in the study and 12% of the population are older adults. This is slightly below the Metro Vancouver average, however, since the 2006 census, the number of older adults has steadily increased in Maple Ridge (Govt. of Canada: census subdivision Maple Ridge, 2014).

The urban neighbourhoods are located in the Vancouver Coastal Health district and the suburban neighbourhoods in the Fraser Health authority (BC Stats, 2014). Including a diversity of neighbourhoods will help uncover a variety of environmental features that can act as barriers or facilitators to FOF in different types of settings. Furthermore, including neighbourhoods from both health authorities has the added advantage of being able to compare and contrast their findings, which can help to

discern if there are any coinciding issues or recommendations for environmental or social support factors that can be made at the conclusion of the study.

### **3.4. Data Collection & Analysis**

The study will utilize three phases in its data collection process. The first set of data will be collected using an abbreviated version of SWEAT-R. This environmental audit will determine what features in each of the 3 urban and 3 suburban neighbourhoods could act as barriers or facilitators to FOF. The second phase of data collection will be done through the survey, which will provide insight to the older adults' perceptions of what physical environment and social support factors contribute to their FOF in their neighbourhood environment. The data collected from the SWEAT-R environmental audit and survey will be analyzed against one another in order to determine what objective physical environment factors coincide with one another. Then, the third and last phase of data collection will be done through Photovoice and related following-up discussion groups, which will expose concepts and themes in relation to physical and social support factors in the environment that influence FOF. These concepts and themes will be analyzed alongside survey data to discover what the most prominent issues are concerning FOF according to older adults. Determining what congruent objective and subjective barriers and facilitators of FOF exist for older adults will reveal what features and factors are considered to be most significant.

### **3.5. Sampling and Recruitment**

The survey participants will be recruited through advertisements placed at local community centres, flyer distribution in the desired neighbourhoods as well as through random calling using a phone vendor. Additionally recruitment will be augmented through community outreach to neighbourhood based resource and programming centres. The research team has established contact with community centers, neighbourhood houses, and seniors' centers within the study neighbourhoods and they will work with these organizations to determine how and where participants can be recruited for this study. The study participants will be asked refer this study to other older



adults in their neighbourhood who qualify for this study. It is anticipated that using these multiple methods of recruitment the study team will be successful in recruiting the desired number of participants in each neighbourhood.

All participants must be 55 years or older and cognitively capable of understanding and completing the survey independently. (Researchers will be available for assistance if needed; however, this will be on a limited basis due to a minimal number of research assistants, time and availability.) Older adults recruited for the Photovoice section cannot be homebound and must be physically able to navigate their neighbourhood independently and safely as the proposed study is concerned with FOF factors that exists outside of the home and the research team does not want the participants to be high risk for falls.

The goal is to select older adults who have and have not experienced a fall(s) and who also reflect the gender percentage of the population. The surveys will be mailed to the respondents and will include a pre-paid return envelope so that they can be collected with ease. Subsequently, older adults who take part in Photovoice will be selected from participants who completed the surveys and express an interest in participating in this section of the study. The Photovoice participants will be comprised of a smaller group of older adults, 10 from each neighbourhood, totalling 60 participants. As previously mentioned, these participants will be recruited based on their physical ability to navigate confidently through their neighbourhoods or they must have someone available and committed to helping them complete Photovoice.

### **3.6. Informed Consent**

The consent form, which will be utilized for both the survey and Photovoice, will describe the purpose as well as the benefits and any potential risks (Appendix B). This waiver form will contain details concerning the objectives of the study and outline how the participants can contribute. There are additional information sheets for the survey (Appendix D) and Photovoice (Appendix E) so that the participants are accurately informed and confident about their participation in the study.

### **3.7. Knowledge Translation**

Knowledge translation (KT) involves the distribution of sound, synthesized information in order to more effectively utilize and benefit from research; it "has the potential to improve understanding of, and overcome the barriers to, implementing evidence based practice" (Davis, Evans, Jadad, Perrier, Rath, Ryan, Sibbald... Zwarenstein, 2003, p.33). A growing number of researchers are supporting the need for KT and concluding that it will prove to be increasingly valuable and facilitate a more "rapid uptake of evidence based knowledge by the public, patients, policy makers, and clinicians" (Davis et al., 2003, p. 35). Although KT is a crucial component of research it tends to be overlooked and, unfortunately, a large divide exists between what is known and discovered through research and what is executed by professionals working outside of the research field (Davis et al., 2003, p.33). Therefore, a principle concern of poor KT is that it takes too long for research findings to be integrated into practice. Consequently, the best practices are not being used and improvements are not being made, such as towards the development of effective preventative and intervention programs (Graham, Logan, Harrison, Straus, Tetroe, Caswell & Robinson, 2006).

Knowledge translation is a priority, not only for the improvement of health care but also for the sake of the health care budget. There are a significant amount of resources that are devoted to health sciences and health care, however, it is consistently found that, as a result of ineffective KT, these resources are being squandered (Graham et al., 2006). Graham et al. (2006) stated that poor KT between professionals of differing disciplines "results in inefficient use of limited health care resources" and, when considering the care of the aging population, this means that valuable resources are being wasted (Graham et al., 2006, p.14). The Interprofessional Education Collaborative Expert Panel (2011) described professional competencies in health care as the "integrated enactment of knowledge, skills, and values/attitudes" that can be applied in specific care contexts (p. 2). This definition verifies the significance of KT and its integration into practice in order to cultivate proficient professionals that can successfully care for, in this case, the aging population.

Knowledge translation can include anything from publishing work in peer-reviewed journals to presenting findings at research conferences to sharing research at workshops. The proposed study will produce a report at the conclusion of the study to compile and summarize the most significant findings. Pictures taken during Photovoice will be included in the report to clearly illustrate some of the key barriers and facilitators of FOF that were determined by older adults. Photovoice has emerged as a way of successfully disseminating knowledge to local residents so that they can participate in the improvement of their neighbourhoods (Mahmood et al., 2012). Therefore, including pictures, quotes and information gathered from Photovoice will augment the receptiveness of the report and contribute to the proposed study's KT success. Photovoice has the added benefit of creating leaders among older adults in the community who can share what they have learned with others and raise awareness about FOF. Furthermore, by including community centers as partners in the recruitment process of the proposed study will be extremely beneficial as they are trusted and frequented by many older adults so they can help increase the awareness of FOF and distribute the findings.

The report produced from the proposed study will be suitable for review by other researchers, policy makers, health care professionals, communities throughout Metro Vancouver and community-dwelling older adults themselves. The results of the study and the report will be presented at a minimum of one conference national conference and a poster presentation will be available for presentation at any local conferences or any other relevant gatherings. The study results will also be presented to the appropriate departments of each health authority where the involved communities were situated, Vancouver Coastal Health and Fraser Health, so they may choose to make appropriate alterations to their existing fall prevention programs and, hopefully, include a FOF aspect in an injury prevention capacity. In addition, efforts will be made to reach out to and present findings at seniors' centres, community centers and neighbourhood houses in Metro Vancouver in order to disseminate the knowledge among these organizations and reach as many older adults as possible.

The Canadian Institute of Health Research (CIHR) believes that the true value behind research is the applied practice that comes from the use of health research and

endorses studies that have practical application as a primary outcome (Government of Canada, 2010). The successful advancement of knowledge is of particular importance to the Project Scheme: 2016 1st Live Pilot. It is explicitly stated in the guidelines of the Project Scheme: 2016 1st Live Pilot that KT is a requirement for studies that they select and choose to fund (Research Net, 2015). For that reason, the proposed study includes a significant KT component, which is integrated throughout the study, in order to ensure that the findings are applied in practice to develop effective care and intervention initiatives.

### **3.8. Practical and Policy Implications**

The results from the proposed study will provide health care professionals with insight into what characteristics may be risk factors among older adults in relation to fear of falling and help them to better identify who is at an increased risk of developing a FOF. For example, they can inquire about older adults who live alone and may have low social supports, sedentary lifestyles, live in lower-income and unkempt neighbourhoods, and other relevant risk factors that can lead to a FOF. It is important, however, that health care providers and people who are social supports to older adults do not induce excessive fear among older adults through their efforts to educate them about the consequences of falls and FOF (Ward-Griffin et al., 2004). Extreme caution given about the potential consequences of falls may have an inadvertent effect on older adults and cause them to develop a great FOF, resulting in negative outcomes.

Interventions that include fear of falling as a significant component need to be developed. Then, future research should implement and evaluate the potential effectiveness of these initiatives that include FOF. Fall prevention programs that include physical activity, such as strength or balance training, have been found to prevent or decrease the occurrence of falls among older adults. However, these programs focus on individual ability and can make people feel intimidated or pressure to make positive changes on their own. Furthermore, FOF can pose a threat to current fall prevention programs that include a physical activity component since older adults suffering from a FOF are already at-risk of low self-confidence and may choose not to participate in these prevention programs because they are fearful that these activities will cause a fall rather

than prevent them (Nyman, 2011). Therefore, the goal of the proposed study is not to be in opposition of fall prevention initiatives. On the contrary, the hope is that FOF and fall prevention initiatives be combined in order to better educate older adults about falls and FOF and how each of their consequences, both diverse and comparable, can impact their lives. Another advantage of combining falls and FOF interventions with an injury prevention approach is that the initiatives will be able to reach those older adults who have never experienced a fall. It is important to include and not overlook this group of older adults because they also stand to benefit greatly from these prevention initiatives. These are all factors that need to be taken into consideration with practical and policy implications.

### **3.8.1. Methodological Implications**

One issue that was not addressed in the proposed study is the variability of fear of falling. In the proposed study FOF is investigated in one point in time when, in fact, it has been found that FOF can fluctuate after certain periods of time, such as the time after recovering from a fall, and it may more beneficial to use a longitudinal study (Murphy, Dubin & Gill, 2003). This was demonstrated in the study conducted by Lach (2005), which showed the FOF changed among the participants over a period of 2 years. This change in FOF that happens over time is important to consider when analyzing the results of cross-sectional studies and making recommendations. There is a need for more studies that take a longitudinal approach. Also, many studies involving FOF rely on volunteer participation and, as a result, researchers may not be accessing the most vulnerable older adults of the aging population (Legters, 2002). Future studies must better identify the most at-risk older adults in the aging population in order for intervention initiatives to be successful and reach those in need (Legters, 2002).

### **3.8.2. Future Directions**

The budget and timeline of the proposed study imposes some limitation on the study. A future study that is carried out on a larger scale could include a larger sample of older adults from different age cohorts, culture/ethnic groups with specific health or mobility related restrictions. Denkinger et al. (2015) highlighted the need for future FOF

studies involving more detailed projects with more specific population groups. For example, a future study could study younger older adults between 45 and 65, who are active in the community, to determine what could cause them to develop a FOF and prevent them from being active in the future. This type of study would help to determine what preventative measures could be implemented into neighbourhoods before FOF manifests itself among people as they age, which may develop into more mobility challenges.

Additionally, a larger study with an increased budget could also allow for more extensive knowledge translation (KT) initiatives to ensure that the findings are shared with a larger and more diverse group of older adults than this current study as well as, with health professionals and senior service providers in the communities. A series of videos could be developed in this larger study; one for designers, urban planners and policy makers. This video would present the findings that target specific design and/or policy changes. The second video could be developed for health care practitioners (GPs, occupational therapists, physiotherapists etc.) to raise their awareness of this important public health issue. This would help them to identify certain risk factors among their older adult clients/patients. A third video could primarily be educational in nature and geared to older adults in the community that would help increase the knowledge base concerning FOF among the aging population themselves to help them identify if they may be at risk of suffering from FOF and to ensure that they do not unnecessarily restrict their activity levels. Furthermore, this larger project could motivate and train older adult participants directly involved in the study to become volunteer peer educators on the consequences of FOF and they could reach out to other older adults in the community on this important issue combined with other fall prevention initiatives in the community, highlighting how to prevent injuries and/or a decrease in quality of life through lack of participation or activity.

## **Chapter 4.**

### **Theory & Conceptual Model**

The traditional approach to research and interventions in the area of the public health issues of falls and falls prevention have focused mostly on the personal character and motivation of older adults. As a result, the common strategy has been to concentrate on individual success and survival and this approach stands to be the same for fear of falling (Gulwadi and Calkins, 2008). Focusing solely on the individual and the risk factors that he/she may have disregards the contextual, external sources of the manifestation of FOF (Sixsmith, Woolrych, Schonnop, Robinovitch, Chaudhury & Feldman, 2013). Although, the research concerning falls and fear of falling that already exists is relevant and essential it is necessary to also include contextual factors surrounding these public health issues. The ecological model is an optimal approach to the study of FOF because it addresses both the individual and external environmental factors that influence an older adult's life. The systems theory approach is another important perspective to take in account when addressing falls and FOF because it looks at the entire context of these public health issues.

The ecological model and systems theory both consider the influence of the individual, however, they are also greatly focused on external factors that influence the individual, which are out of the individual's control; in this way the ideologies of the ecological model and systems theory are linked. Additionally, the ecological model and systems theory are comprehensive and utilize approaches that are all-encompassing to include all of the components that are pertinent to the topic. They bring forward micro and macro, personal and social, contextual facets. Use of these frameworks helps us to understand FOF in older adults who are part of a highly heterogeneous group and function within a complex neighbourhood setting that is impacted by built and social environment structures and factors that affect their safety and well-being (Zecevic et al.,

2009). Legters (2002) stated that “a multidimensional approach to intervention to decrease FOF, is often recommended throughout the literature” and, therefore, is in support of inclusive theoretical approaches (p. 269). Future research in the area of FOF should include these comprehensive approaches that combine aspects of internal, individual characteristics as well as external, contextual variables to capture a holistic picture. The following two sections will elaborate on the two approaches, ecological model and systems theory, with the final section of this chapter proposing a conceptual model.

## **4.1. Ecological Model**

In contrast to the traditional, individualistic attitude, the ecological perspective is holistic approach and takes into account several levels and settings of interventions (individual, communal, governmental etc...). This ecological model approach has been successfully used in explaining other public health issues such as smoking and diabetes prevention (Richard et al., 2008). The ecological model is also useful in facilitating bridging the gap between the more common individual focused research and the lesser-known holistic studies that take into account environmental factors. Creating a bridge between these two types of research is important because individuals will inevitably be influenced by their surrounding environment and their personalities will also influence this interaction with the environment. In other words, agency and structure will always interact and this interaction will result in the outcome behaviour (Giddens, 1979).

The ecological model has been promoted when studying public health issues because it considers a wide range of socio-environmental factors (Richard, Gauvin, Gosselin, Ducharme, Sapinski & Trudel, 2008). Bronfenbrenner has been at the forefront of research involving the ecological model since the 1970s and he “argues that in order to understand human development, one must consider the entire ecological system in which growth occurs” (Bronfenbrenner, 1994 reprinted in Gauvain and Cole, 1993, p. 37). The ecological model evolved from a body of theories that focused on the life course and how human development changes over time as a result of the environment in which a person lives. Children have been the main group studied using the ecological model as the theoretical form of investigation. This is understandable



considering the number of influential years of development that children have ahead of them. However, social researchers have come to realize the versatility of the ecological model approach and extended its use to other age groups, including older adults. The ecological model is relevant to understanding FOF because it is a health issue that predominantly begins to affect older adults. Understanding the life course of the older adult and his or her socio-spatial health context provides a better idea of falls and FOF. The ecological model can help to explain this 'phase' of development in later life contextualizing it across the life course.

There are various components that comprise the ecological model, which include the following: microsystems, mesosystems, exosystem, macrosystem and chronosystems (Bronfenbrenner, 1994 reprinted in Gauvain and Cole, 1993). One way of visualizing it is that "the ecological environment is conceived as a set of nested structures, each insure the other like a set of Russian dolls" (Bronfenbrenner, 1994 reprinted in Gauvain and Cole, p. 39). The micro- and macrosystems are the two components of the ecological model that have been used to developed the proposed conceptual model (Fig 4.1), which will be presented and discussed later in this chapter. The microsystem level consists of the patterned connections that exist in a person's interpersonal relationships, which include social relationships as well as interactions with the built environment (Sallis et al., 2006). The immediate environment of the microsystem is where proximal processes exist and they promote human development and the success of human development by proximal processes greatly depends on the microsystem's content and structure. Consequently, since the microsystem is dedicated to people's proximate interactions with their physical environmental as well as their social interactions, it will be included in the proposed conceptual model for FOF. The macrosystem is comprised of the central functions of the micro-, meso-, and exosystem features within a culture and focuses on "the belief systems, bodies of knowledge, material resources, customs, life-styles, opportunity structures, hazards, and life course options that are embedded in each of these broader systems" (Bronfenbrenner, 1994 reprinted in Gauvain and Cole, p. 40). The macrosystem is also included as a central component of the proposed conceptual model because it contains all of the influencing structures found within a neighbourhood environment.

As previously mentioned, the majority of health initiatives involving fall prevention interventions have taken a traditional, biomedical approach that focus on individual abilities and weaknesses, such as physical decline or visual degeneration etc. This outlook encourages victim blaming tendencies and evades developing holistic programs that address the many influential socio-environmental factors. Therefore, when studying a public health issue, it is important to include all of the factors that may affect that particular health problem, especially when it involves the aging population because there are a multitude of factors among older adults concerning their health that are susceptible to change. These various factors include personal characteristics, social supports, community services, organizational factors, program interventions by health authorities and public health bodies in the society. Understanding the interplay of these factors can lead to improvements in the contexts within which fear of falling tends to manifest and create a healthier aging environment (Richard et al., 2008).

Nahemow and Lawton (1973) stated that it is “possible for the dynamics of the system to improve the individual’s level of functioning” and the ecological interaction also utilizes this principle and takes into account individual competency and how one interacts with the given environmental press (p. 30). In other words, in the instance of FOF, attaining a low level of FOF will be dependent on older adults’ response and interaction with their surrounding environment, which will, in turn, depend greatly on what the environment provides. Therefore, despite the influence of personal characteristics, it would be difficult for an older adult to overcome environmental press if it was excessively challenging. Thus, altering the environment so that it is safe and supportive of older adults needs can encourage and facilitate the change in their attitudes and behaviour, which could lead to the prevention or reduction of FOF. This will help to ensure that the environment does not negatively impact their quality of life. Regardless of the issue of inquiry, an intervention based on the ecological model asserts that, in order to achieve change within a segment of the population, it must be multifactorial and include creating change among individuals, the built and social environments, and government sectors (Sallis et al., 2006).

One possible limitation of the ecological model approach is that since it encompasses many elements and factors of the environment, some factors may be

overlooked in the analysis process or the impact of one factor may become tangled with that of another. Furthermore, the ecological model approach may come across as overwhelming to professionals or funders who are accustomed to the more singular approach of research that is based on the biomedical model (Sallis et al., 2006). This may be one reason why its practices are not well translated or utilized in public health practices (Richard et al., 2008). However, the variables of the environment are bound to interact with and affect one another. Therefore, in reality, it is impossible and impractical to study them individually. Consequently, using an ecological approach to studying the environment in which people live may be difficult and complex but it is reflective of the complexity that exists in people's lives and it aims to uncover the foundations of these complexities.

## **4.2. Systems Theory**

The systems theory “encourages the development of a global, more unitary consciousness, team work, collaboration, learning for life, and exposure to the universal storehouse of accumulated knowledge and wisdom” (Laszlo & Krippner, 1998, p. 54). In relation to the public health issue of fear of falling, the systems theory attempts to reveal the influencing factors, many of which are outside of the control of the older adult. Past research findings, which focus primarily on individual risk factors, should be utilized alongside future studies, which are increasingly inclusive, because these findings have been established and are valuable. The systems theory stands to supplement these findings that have an individual-based approach and provide a more extensive understanding of falls and FOF that includes the impact of built- and social environment factors.

The systems theory is a critical form of analysis that seeks to explore issues through a trans-disciplinary framework and determine the underlying functions and reasoning behind certain dynamics; it “seeks to understand a situation as a system of interconnected, interdependent, and interacting problems” (Laszlo & Krippner, 1998, p. 65). As is the case with FOF, Sixsmith et al. (2013) determined that “limited conceptualization of a fall as an outcome of the person's impairment and environmental hazards fails to convey the complexity of potential contributory factors typical of most fall

incidents” (p. 160). In other words, failing to acknowledge the complex nature of FOF, including its various interacting factors, results in a restricted understanding of the overall causality and effect of FOF. This limited approach can lead to unsuitable and inadequate intervention initiatives (Sixsmith et al., 2013). The systems theory is meant to uncover all of the potential defaults that could be related to a specific issue that exists within a system, which extends from individual risk factors to community support to government funding. Systems theory defines ‘environment’ as a set of objects that are subject to change and these changes can either positively or negatively affect the system. The elements of the built and social environment that act as barriers and facilitators to older adults’ FOF are the focus of the system approach in this case. The behaviour of the entire system influences changes within its environment and these environmental changes, both built and social, affect people’s behaviours and attitudes.

The systems theory approach, when considering FOF and the built environment, wants to reveal latent or unnoticed hazardous conditions that act as barriers to older adults (Zecevic, Salmoni, Lewko and Vandervoort, 2007). The systems theory also wants to abstract the issue from its usual structure, look beyond the simplified explanation and, instead, discover a deeper, wider-range of explanatory possibilities within the entire scheme of a person’s life. It is a theoretical approach that can be used across various professions and, as a result, increases the opportunity for dissemination and knowledge translation between different professionals, which is a critical component of the proposed study. Methodologies developed from the systems theory have several potential benefits, which are: to better identify barriers related to FOF, utilize current falls and FOF knowledge, help establish standardized FOF measurement tools, move the focus away from the older adult and towards the weaknesses of the environment, and guide effective interventions (Zecevic et al., 2007).

The systems theory is becoming increasingly popular and used to investigate human perceptions because it “does much to render the complex dynamics of human bio-psycho-socio-cultural change comprehensible” (Laszlo & Krippner, 1998, p. 49). Approaching public health issues, such as FOF, through a systems lens that does not concentrate on the individual will foster a safety culture where people will feel self-assured knowing that they are being supported rather than blamed for their limitations

that come naturally with age (Zecevic et al., 2009). In 2004, Reason pointed out, “when a similar set of conditions repeatedly provokes the same kind of error in different people it is clear that we are dealing with an error prone situation rather than with error prone, careless, or incompetent individuals” (in Zecevic et al., 2007). Individuals cannot be liable for a public health issue that impacts such a significant number of people. The systems theory accepts that people are imperfect and are expected to experience human error (Dekker, 2002). In other words, it is unrealistic to try and fix everyone’s individual weaknesses, especially older adults who may have various risk factors or limitations that are irreversible. Rather, interventions should be directed at numerous features of the surrounding environment.

Due to the restrictive nature of quantitative results, being able to provide in-depth explanations about social and psychological phenomena, such as fear of falling, through alternative investigative methods are sought out (Laszlo & Krippner, 1998). The ecological model and systems theory are founded on holistic perspectives that provide this alternative, comprehensive method of investigation. Therefore, the ecological model and systems theory provide ideal approaches for the exploration of FOF in the proposed study and its proposed conceptual model.

### **4.3. Proposed Conceptual Model**

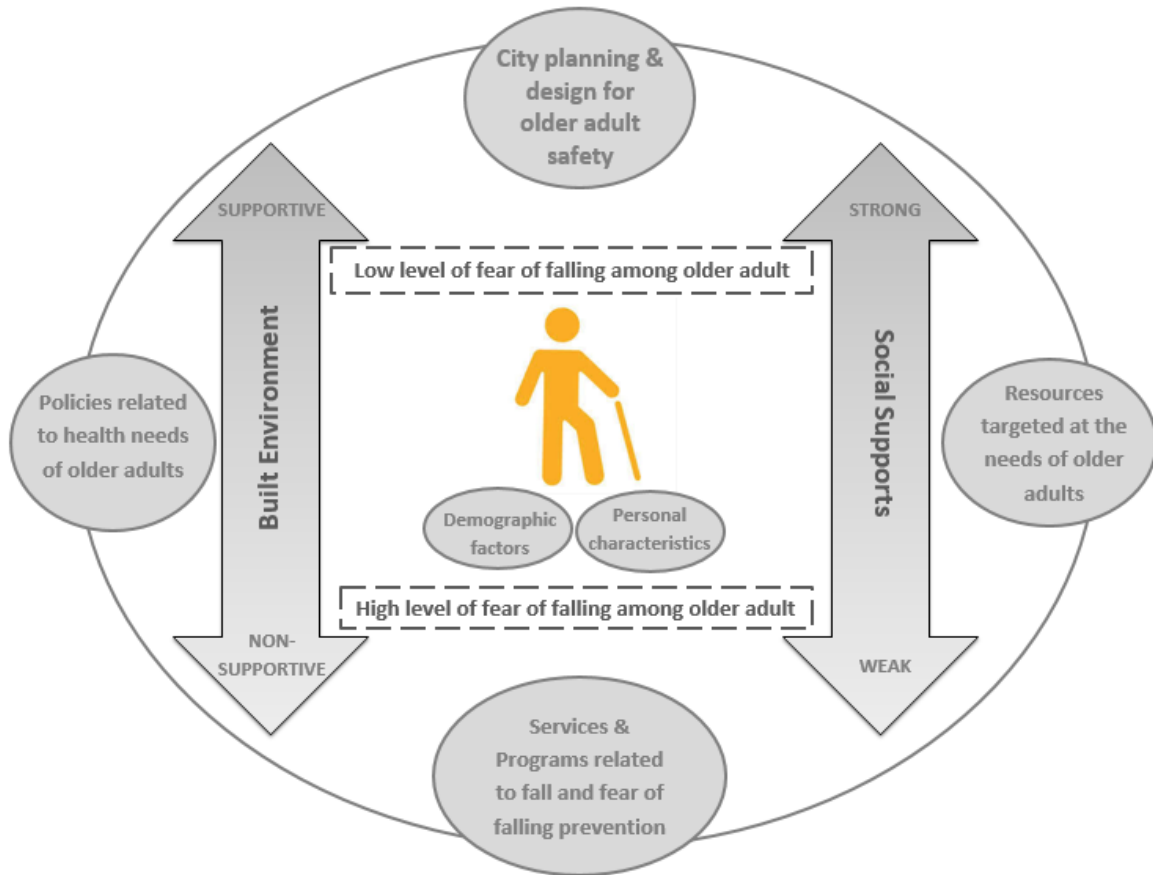
Fear of falling is not a straightforward public health issue; it is the result of many interconnecting factors. For this reason, there is no singular method or investigative tool that can detect or resolve this public health issue. A multifaceted health issue, such as this one, requires a multifaceted approach. Therefore, the proposed conceptual model of this Capstone project integrates both micro and macro levels of the ecological model, which includes various aspects of an individual’s life that should be taken into consideration (figure 4.1). The diagram for the proposed conceptual model and all of its components will be presented and discussed in detail later in this section.

For FOF, the system will be defined “as a person interacting with the physical and social environment within which the person lives” (Zecevic et al., 2009, p. 686). Therefore, the system boundary for FOF in the proposed study is pre-determined as the

neighbourhood is built environment and social supports within that environment. A system's theory approach will analyze FOF among older adults as something that develops as a result of deficiencies that exist in the built environment and poor social support factors (Zecevic et al., 2009). This innovative approach to the analysis of public health issues "is needed to expand the focus from the individual to multilayered organizational and supervisory causes" (Zecevic et al., 2009, p. 685). Identifying built environment and social support barriers and facilitators to FOF, which are independent of individual characteristics, will assist in developing more effective prevention programs that are transferable and can be valuable for a greater portion of the aging population.

The conceptual model is based off of the foundation of the micro- and macro-components of the ecological model. These elements include individual and external factors of the neighbourhood that have a high likelihood of influencing the well-being of the individual that exists within that environment. The ecological approach is broad and takes into account a number of societal factors that may influence an individual's behaviour. Filiatrault, Desrosiers and Trottier (2009) have findings "that suggest that fear of falling may have proximal (social support from spouse or partner) as well as broader (residential area) environmental determinants and point to the need to adopt an ecological perspective for a better understanding of FOF among the elderly population" (p. 893). Using this approach makes it possible to focus in on a specific area without disregarding the other areas of influence that the entire ecological theory is comprised of. For example, in the proposed study, although the study is focused on the built environment and social supports, it does not completely discount the influence of the individual characteristics or the impact of government funding etc. Proximal processes are interactions that occur on a consistent basis over an extended period of time (Bronfenbrenner, 1994 reprinted in Gauvain and Cole). These reflect the relationships that older adults have formed with their surrounding social supports, such as neighbours or community center staff etc., and built environment, which can influence FOF. Bronfenbrenner also assumed that a person's development and their behaviour are determined by their interaction with other people in certain situations, which establishes the significant of social supports to FOF. The comprehensive nature of the ecological model is why it is such a pertinent approach to FOF.

The proposed conceptual model is represented below in Figure 4.1. The focus of this Nested Systems of FOF model is to demonstrate that the state of the built environment and social supports has the potential to influence the manifestation of FOF among older adults.



**Figure 4-1. Nested Systems of Fear of Falling**

The abstract figure at the center of the Nested Systems of Fear of Falling model is representative of a community-dwelling older adult (who may also require an assistive device) who is at risk of developing a FOF. The entire model represents how the level of FOF that the older adult develops is dependent on their surrounding physical environment and social supports. The arrows to the right and left of the central older adult figure symbolise the effect of the built environment and social support factors. The fluctuation of the built environment and social supports that is symbolized by the large vertical arrows reflects the nature of the changing elements within one's microsystem. It is expected that one's microsystem will change and these changes stand to influence

and transform the surrounding older adult existing with this microsystem. As the supportive nature of the built environment or strength of social supports decreases, the probability that an older adult will acquire a high level of FOF increases; and vice versa. A high level of FOF, which is in excess of what is necessary, can correspond with the restriction of activities or social isolation. The rectangles formed by dashes reading “low level of FOF among older adults” and “high level of FOF among older adults” are the possible outcomes influenced by whether or not the older adult has a supportive built environment and strong social supports. As has been discussed, if an older adult has a ‘high’ level of FOF in response to what their built and social environment provides can lead to other negative consequences and decrease an older adult’s quality of life.

The factors in the conceptual model (figure 4.1) found in the circles placed around the larger encompassing circle represent the influential elements of the macrosystem that are subject to change and have the potential to affect the older adults living within the system. *City planning and design for older adults’ safety* refers to the development of a community environment that is structured in such a way that the built environment elements are supportive of the safety needs of older adults. *Services and Programs related to falls and fear of falling prevention* encompasses what efforts are being made and reflected through services being offered in order to prevent the occurrence of falls and manifestation of fear of falling. *Resources targeted at the needs of older adults* includes the money and materials that are provided and available to communities in their efforts to support the well-being of older adults. *Policies related to the health needs of older adults* are concerned with the course of action the government is taking to ensure that older adults are provided with opportunities to create a positive quality of life.

Personal characteristics and demographic factors are included because, no matter the amount of preventative efforts and modifications made, older adults’ individualities and lifelong development can never be fully predicted or controlled. As a result, personal characteristics will always play a role in how someone interacts with and reacts to their surrounding environment. Individual health measures, such as balance efficacy, potential chronic conditions or visual impairments, will inevitably be influential on an older adult's FOF due to the interaction between agency and structure, as



described by Giddens (1979). Individual measures may be so significant that the supportive nature of the physical environment and availability of social supports in an older adult's life may not have a substantial impact. For example, an older adult with a poor balance ability, several chronic conditions and a visual impairment may develop a high level of FOF despite living in an ideal physical and social environment. Although this is noted and acknowledged the focus of the proposed study and conceptual model is on the external physical and social environmental factors that influence FOF among community-dwelling older adults. Furthermore, individual characteristics are also included in the ecological model and systems theory because they understand that people are interactive members of their environments and, therefore, have an influence and their personal preferences and individualities must be taken into consideration. The goal of this proposed conceptual model is to show how the barriers and facilitators of the built environment and social supports can potentially influence older adults' FOF.

## **Chapter 5.**

### **Grant Proposal**

The following section is a grant proposal that follows the guidelines of the CIHR Project Scheme: 2016 1st Live Pilot grant. Each section will meet the character limitations, including words and spaces, which can be found in the Project Scheme grant guidelines in Appendix G. The grant proposal seeks to demonstrate the significance and need for a comprehensive study, which looks beyond personal characteristics, addressing the physical environment and social support factors that influence fear of falling among community-dwelling older adults. This will help to develop more effective and holistic intervention strategies. The Project Scheme: 2016 1st Live Pilot grant "is designed to capture ideas with the greatest potential to advance health-related knowledge, health research, health care, health systems, and/or health outcomes" (Research Net, 2015). The proposed study is in accordance with mission of the CIHR Project Scheme proposals as the study will advance the understanding of fear of falling, a significant public health issue, and maintain or improve the health of older adults living in the community. The proposed study meets the criterion of the Project Scheme proposal by articulating an explicit purpose, providing a thorough timeline and having researchers committed to knowledge translation approaches (Research Net, 2015).

#### **5.1. Summary**

##### **5.1.1. Summary**

The public health issue being addressed in the proposed study is fear of falling (FOF) among community-dwelling older adults and how the physical environment and social support factors affect this FOF. FOF was initially recognized solely as a risk factor or consequence of falls. However, FOF has been recently described as "a potential

health problem of equal importance to a fall and may also affect society as health care utilisation and costs increase" and it is now considered to be its own public health issue (Zilistra et al., 2007, p.304). FOF has the potential to affect older adults who have and have not experienced a fall and can result in the cessation of regular activities, causing older adults to become sedentary, isolated, resulting in a negative impact on their quality of life (Scheffer, Schuurmans, van Dijk, van der Hooft & Rooij, 2008; Lach, 2005).

Current research in this area has focused primarily on individual risk factors and falls and FOF in the home environment while little attention has been paid to uncovering the risk factors that exist within the outdoor environment (Phillips et al., 2013; Curl et al., 2015). The lack of understanding surrounding what external, physical environmental factors may be due to the fact that older adults "represent a subset of the population who are likely to perceive the environment differently" and this has not yet been taken into consideration (Nyman et al., 2013; Curl et al., 2015, p.2). Therefore, the proposed study takes an innovative approach by exploring external physical and social environment factors and aims to determine what features act as potential barriers and facilitators to FOF. This understanding will help guide the development of communities that are more supportive of older adults' needs and that deter the occurrence of falls and FOF and result in an improved quality of life.

### *Core Expertise*

Due to the nature of this Capstone project this section is not completed. This section would be completed for an actual grant proposal.

### *Method*

The physical environment and social support factors related to fear of falling of three urban and three suburban neighbourhoods will be explored in this study. A mixed methods approach is proposed in the study and it includes a quantitative physical environmental audit, a semi-structured survey completed by older adult participants, and a qualitative participatory Photovoice tool. The tool used for the environmental audit is SWEAT-R, which will collect data from the Safety and Comfort and Functionality domains (Chaudhury, Sarte, Michael, Mahmood, Keast, Dogaru and Wister, 2011). The

survey is comprised of both set scales and open-ended questions with sections on a) physical environment b) demographic factors c) social support and d) quality of life. Lastly, Photovoice is a participatory research process that involves study participants contributing directly as co-researchers through photo documentation as well as through a debriefing session where the older adult participants engage in dialogue with research team members about the photographs to generate themes and concepts concerning the physical environment and social supports that are most significant to fear of falling among older adults. These methods will be discussed in further detail in section 5.1.3 – Data Collection.

## **5.2. Concept**

### **5.2.1. Quality of the Idea**

Before the 1990s, fear of falling went relatively unnoticed as a primary public health issue since it was exclusively considered and studied as a risk factor of falls (Filiatrault, Desrosiers & Trottier, 2009). Although there is strong relationship between falls and FOF, in the past 20 years FOF has gained recognition as being a separate public health threat. It is important to study falls and FOF separately because fear of falling is “a common and potentially disabling problem among community-living older persons” (Friedman, Munoz, West, Rubin & Fried, 2002; Murphy, Dubin & Gill, 2003, p.43). In fact, many studies have found that approximately 50% of older adults who suffer from a FOF have, in fact, no history of falls (Filiatrault, Desrosiers & Trottier, 2009; Lach, 2005). As a result, there is a substantial need for a comprehensive study that explores the cause and effect of fear of falling among the aging population.

The objectives of this study are to (1) discover the linkages between fear of falling and older adults’ perceptions of the physical environment and social support, and (2) identify how the linkages between FOF and older adults’ perceptions of the physical environment and social support can be measured.

### *Research Questions*

In congruence with the research objectives, the research questions are as follows:

1. What are the objective and subjective physical environment and social support barriers and facilitators related to fear of falling of older adults and how does that impact their quality of life?
  - a) What are the objective physical environment barriers and facilitators in falls or fall prevention of older adults? What are some of the subjective environmental barriers and facilitators that affect fear of falling?
  - b) Are the objective physical environmental barriers and facilitators congruent with older adults' perceptions of environmental barriers and facilitators that generate fear of falling?
  - c) How do older adults' perceptions of these barriers and facilitators of the physical environment affect fear of falling among older adults?
  - d) What are the social support factors (or lack of support) that affect older adults fear of falling?
2. How can we measure the linkage between fear of falling and physical environment and social support facilitators and barriers?

### *Rational*

The aging population is set to double in North America over the next 15-20 years and fear of falling is rated most highly among the aging population when compared to other fears including "criminal violence, financial crisis, or adverse health event" (Deshpande, Metter, Lauretani, Bandinelli & Ferrucci, 2009, p.91). In combination, this makes FOF a significant and noteworthy public health issue that needs to be studied further (Statistics Canada, 2012). Exploring the effect of older adults' physical and social neighbourhood environments on fear of falling is warranted since "the complexity of the environment in terms of hazards and risks increases multifold in community settings" (Desphande, 2009, p.91). The purpose of the proposed study is to explore where the overlap lies between objective and subjective factors of the physical and social environments. Determining what these factors are can guide the development of intervention programs that address FOF more effectively and help create policies that address the environments of communities, in which older adults live, and make them more supportive of their needs.

### **5.2.2. Importance of the Idea**

The consequences of suffering from a high level of fear of falling can be devastating for older adults and can negatively impact many aspects of their life. For example, activity restriction, one of the primary consequences of FOF, can lead to a decline in physical function, which can lead to a decrease in self-efficacy and isolation and this can manifest into depression (Legters, 2002; Lach, 2005). In addition, FOF may also impact others indirectly, such as those who act as social supports to the older adult suffering from a FOF may have to undertake the 'activities', such as grocery shopping. Social services may be an alternative solution, which utilizes tax payers' money (Perez-Jara et al., 2010). These additional consequences highlight the need for preventative interventions.

Fear of falling is complex and multifactorial, making it difficult to develop a single instrument that can analyze all of its influencing factors comprehensively (Legters, 2002). Measurement tools for FOF rely on self-reporting, which can distort the results due to individual interpretation, and many lack standardization due to variation in definitions (Legters, 2002; Scheffer et al., 2008; Perez-Jara et al., 2010). These uncertainties concerning FOF reveal the importance of the proposed study, which includes both objective and subjective components. Furthermore, when addressing public health issues, such as FOF, it is crucial to move the research trend away from individual characteristics and risk factors to avoid victim-blaming tendencies. The proposed study does this by taking a more holistic approach to its investigation and this will encourage the development of more comprehensive and effective prevention initiatives.

## **5.3. Feasibility**

### **5.3.1. Approach**

#### *Fear of Falling*

Older adults aged 55 and older will be recruited for this proposed study because fear of falling predominantly affects the aging population (Scheffer et al., 2008). Having

older adults who are in the young-old category (55- 75) and the old-old category (75+) will allow the research to collect data on older adults who are more active outside of the home (and may not have FOF), as well as, older adults who are at risk for falls or have had previous falls, or have potential fear of falling and may be more homebound (Li et al., 2006; Gulwadi & Calkins, 2008). In the proposed study, FOF is defined as: a serious psychological public health issue that primarily affects older adults, including those who have and have not experienced a fall, and can lead to unnecessary activity restriction resulting in a lower quality of life. To ensure that all FOF aspects are included this definition contains components from definitions developed in studies by the following researchers: Scheffer et al. (2008), Zilistra et al. (2007) and Lach (2005).

The physical environment can be daunting to older adults because it is much more unpredictable and less familiar than the home environment (Deshpande et al., 2009). This deviation from the norm can pose a greater number of challenges to older adults and create more opportunity to develop a fear of falling. Research has also demonstrated that FOF is exacerbated among older adults who have no or little social support and spend the majority of their days alone (Fletcher and Hirdes, 2004). Yardley and Smith (2002) found that a considerable number of older adults were more fearful of losing their social identity than they were of experiencing functional decline. Evidently, both the physical and social support environments can have a substantial influence over the prevalence of FOF among older adults.

*Research Setting*

Six neighbourhoods in Greater Vancouver region were selected as study sites. These neighbourhoods were selected based on a) having more dense aging populations compared to other neighbourhoods and b) being located in two different health authorities (Census 2006, 2011). The three urban neighbourhoods are located in the Vancouver Coastal Health district and the three suburban neighbourhoods in the Fraser Health authority (BC Stats, 2014). Including a diversity of neighbourhoods will help expose a variety of environmental features that can act as barriers or facilitators to FOF in different types of settings. The six neighbourhoods are listed in the table below.

<b>Vancouver Coastal Health</b>	<b>Fraser Health</b>
---------------------------------	----------------------

Urban (*total: 81, 935 older adults)	Suburban (total: 30, 355 older adults)	
Neighbourhood:	Neighbourhood:	Population:
West End Vancouver	White Rock	5, 685
Downtown Eastside Vancouver	Delta	15, 460
South Cambie/Midtown Vancouver	Maple Ridge	9, 210

\*The 2011 Census does not differentiate the population for the smaller neighbourhoods within the central Vancouver district, i.e. the urban neighbourhoods.

For the proposed study, the survey participants will be recruited from within the six neighbourhoods by posting advertisements at local community centres, flyer distribution and random calling using a phone vendor. The participants will reflect the gender ratio of the population, 35-40% male and 60-65% female, as closely as possible in order to gather all different perspectives (Statistics Canada - Census Profile: Vancouver, 2015). Participants involved with Photovoice will be selected from within the group of survey participants. Survey participants must be cognitively capable of understanding and completing the survey independently. (Researchers will be available for assistance if needed, however, this will be on a limited basis due to a minimal number of research assistants, time and availability.) Older adults recruited for the Photovoice sessions must be able to physically navigate their neighbourhood independently. Researchers involved in the proposed study will work with community centers, neighbourhood houses, and seniors' centers to mitigate any difficulty in participant recruitment.

### *Data Collection & Analysis*

The proposed study will use a mixed methods approach to provide data that is both objective and subjective in nature, which can then be compared and contrasted during analysis. First, the three urban and three suburban neighbourhoods will be analyzed using two domains of SWEAT-R, Safety and Comfort and Functionality, to determine what physical environmental factors exist as potential barriers and facilitators to older adults' mobility and falls risk (Michael et al., 2009; Chaudhury et al., 2011). A total of 25% of the neighbourhood area, or a maximum of 60 blocks, will be randomly selected in each neighborhood for the audit. SWEAT-R is a valid and reliable tool that



has been used in a number of studies in the United States and Canada (Michael et al., 2009).

The second instrument in the proposed study is a four part survey that includes aspects of the 1) physical environment, 2) demographic factors, 3) social support and 4) quality of life. The survey will be completed by 40-50 older adult participants from each urban and suburban neighbourhood; a total of 240-300. The goal of the survey is to uncover the insights and perceptions that older adults hold of their neighbourhood's physical and social environments. The survey is comprised of pre-established scales and tools on perception of neighbourhood (NEWS), fear of falling (FFABQ), quality of life (ICECAP-O) and social factors; therefore, the survey is expected to generate rich and reliable data.

NEWS is a scaled questionnaire that provides a detailed evaluation of what one's neighbourhood consists of, such as types of neighbourhoods, streets and pedestrian safety (Cerin et al., 2006). FFABQ is the Fear of Falling Avoidance-Behavior Questionnaire and it is a single page questionnaire that investigates older adults' perspectives specific to activity avoidance, which is relevant to older adult's health and quality of life (Landers et al., 2011). ICECAP-O is used to examine older adults' overall quality of life through the inquiry of five aspects of life; *attachment, security, role, enjoyment and control* (ICECAP-O, 2015). The social support scales inquire about older adults' interactions with their neighbours as well as their perceptions of the overall social cohesion of their neighbourhood (du Toit, Cerin, Leslie & Owen, 2007; Clarke et al., 2008). The demographic section of the survey was compiled from a number of sources, including a Public Safety Survey developed at the University of Fraser Valley and a British Household Panel Survey and it covers basic socio-demographic items (Cohen, Plecas & McCormick, 2009; British Household Panel, n.d.). The last investigative tool, Photovoice, will be used to foster direct participation from the older adults. Through photography, a total of 10 older adult participants from each urban and suburban neighbourhood, for a total of 60, will share their perspectives of their environment, physical and social, which correspond to FOF and will participate in a follow-up debriefing session with the researchers.

The data collected from each tool, at three different phases of the study (see Table 5.1 for the detailed timeline), will be analyzed individually, as well as compared and contrasted against one another. The objective data collected from the environmental audit will be compared and contrasted with the subjective findings collected from the survey and Photovoice sessions in order to determine where the linkages lie between objective data and older adults' perceptions in regards to barriers and facilitators of FOF. These types of analysis of objective and subjective barriers and facilitators of FOF will help reveal what features of the physical and social environment are most significant to FOF in older adults and help to guide program development and interventions related to FOF.

### *Conceptual Framework*

Extant research in the area of fall prevention and fear of falling focuses primarily on personal risk factors of older adults and disregards the influence of external factors found in the physical and social environments (Gulwadi & Calkins, 2008). Consequently, fall prevention initiatives have taken a medical-based stance and focus on the weaknesses of the older adults. These individualistic approaches lack proactive preventative strategies that could mitigate FOF and serve, primarily, to describe a problem after it has already manifested.

To analyze FOF among community-dwelling older adults more comprehensively, a conceptual framework is proposed (figure 5.1), using the micro- (individual factors) and macro (environmental and social factors) components that draw upon the ecological Model (Bronfenbrenner, 1994 reprinted in Gauvain and Cole). The ecological model considers how all of the elements in one's life interact and tries to determine why people choose to behave in certain ways (Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006). The systems theory is another important perspective that recognizes that human error is inevitable and aims to identify the 'errors' that exist within the entire system of the surrounding environment (Zecevic, Salmoni, Lewko, Vandervoort and Speechly, 2009). The ecological model and the systems theory adopt the viewpoint that public health issues are the result of various factors, including personal, social, physical environment, and contextual (Zecevic et al., 2009).

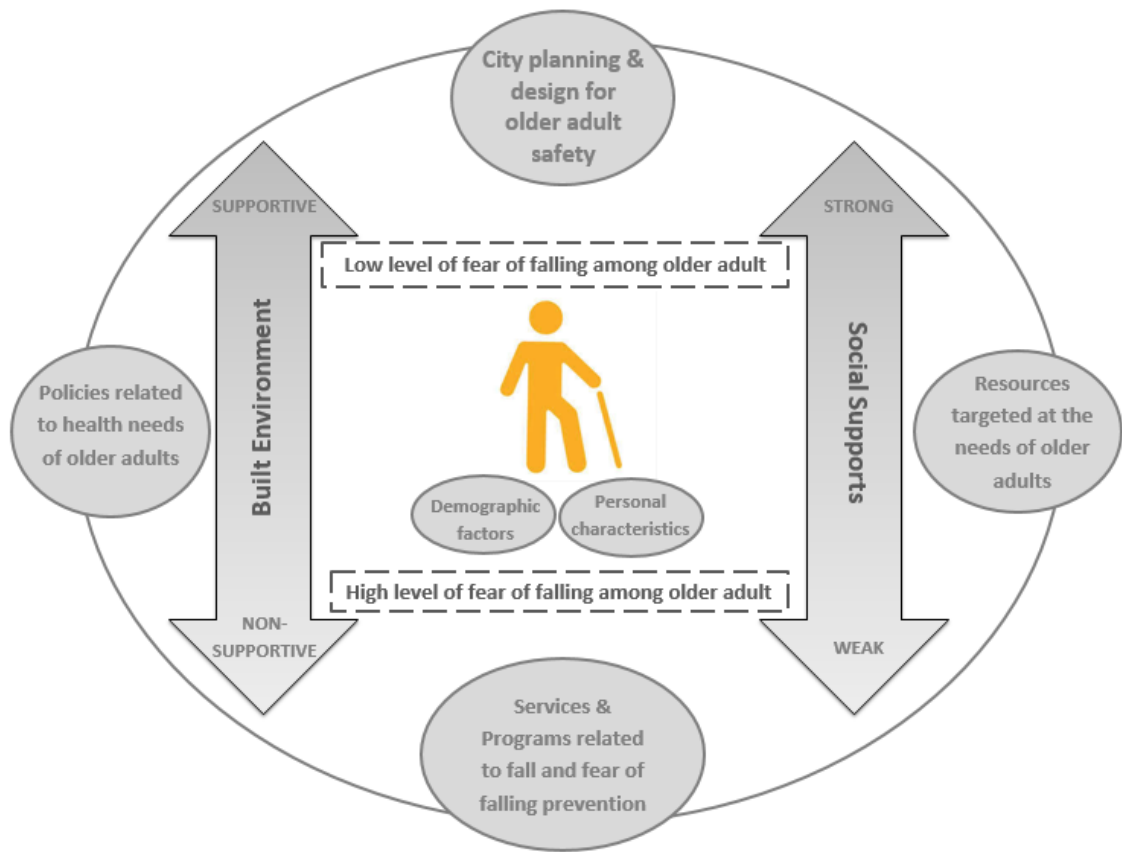


Figure 5.1 - Nested Systems of Fear of Falling

The abstract figure at the center of the model represents a community-dwelling older adult who is at risk of developing a fear of falling. The arrows to the right and left of the abstract figure symbolize the effect of the physical environment and social support factors. As the supportive nature of the built environment or strength of social supports decreases, the probability that an older adult will acquire a high level of FOF increases; and vice versa. The domains found in the circles, on the larger surrounding circle, represent the influential elements of the macrosystem that relate to falls and FOF. Personal characteristics are included at the center of the proposed model because individual health measures, such as balance efficacy, potential chronic conditions or visual impairments, will inevitably be influential on an older adult's FOF due to the interaction between agency and structure, as described by Giddens (1979). However, the focus of the proposed study and conceptual model is on the external physical and social environmental factors that influence FOF among community-dwelling older adults

and, therefore, individual characteristics is not highlighted. The proposed conceptual model guides a holistic exploration of FOF taking into consideration less studied external factors of the physical environment and social supports, while also considering individual factors. The following Timeline (table 5.1) provides the proposed study's schedule along with a brief description of each stage of data collection and analysis.

*Table 5.1 - Timeline*

<b>Date</b>	<b>Action</b>	<b>Description</b>
January 4, 2016 to February 26, 2016	Recruit research team.  Recruit older adult participants.	Undergraduate assistants will be recruited.  Flyers will be distributed and posted throughout the six neighborhoods chosen for the study.
February 29, 2016 to March 25, 2016	Train research team.  Continue recruiting older adult participants.	The research team will be trained on all of the methodologies, instruments and objectives of the study.  Recruiting older adult participants will continue to ensure that there are an adequate number of participants.
March 28, 2016 to April 29, 2016	Complete and analyze SWEAT-R environmental audit.  Distribute surveys to participants.	Research team members will carry-out the SWEAT-R environmental audit and analyze the results.  The survey will be distributed to participants.
May 2, 2016 to May 27, 2016	Completion of surveys.  Continue analyzing SWEAT-R data.	Participants will be informed that the survey will be collected during the first week of June.
May 30, 2016 to June 30, 2016	Collect and analyze surveys.  Recruit Photovoice participants (from those who completed survey).	When surveys are being collected the research team will ask certain participants if they would like to participate in the Photovoice.

July 4, 2016 to July 29, 2016	<p>Train Photovoice participants.</p> <p>Continue analyzing survey data.</p>	Schedule and hold Photovoice training sessions at local community centers. In-home training will also be available in the event a participant cannot make the general training session.
August 1, 2016 to September 2, 2016	<p>Photovoice completion.</p> <p>Compare and contrast SWEAT-R and survey results.</p>	Cameras, used for Photovoice, will be collected by the research team. The pictures will be developed and returned to the participants with further instructions.
September 6, 2016 to September 30, 2016	<p>Hold Photovoice discussion groups.</p> <p>Analyze notes taken from Photovoice; find themes and concepts.</p>	Participants will bring 5 pictures to the discussion group. The research team will guide the discussion and take notes about the main points.
October 3, 2016 to October 31, 2016	<p>Analyze, compare and contrast findings from all methods used.</p> <p>Write and produce study report.</p>	Finish analysis and produce report that can be shared with and used by professionals as well as the public.
November 1, 2016 to December 16, 2016	<p>Complete and distribute report.</p> <p>Present findings.</p>	The report will be distributed to community centers, professionals who work with and for older adults and to older adults themselves. Findings will be presented to willing health districts, community centers, and relevant divisions of the government.

### *Knowledge Translation*

In order to accomplish positive change in relation to fear of falling initiatives, knowledge translation (KT) must be successfully executed. Therefore, sharing and making the results of this proposed study transferable is a primary goal. KT is a crucial component of research that tends to be overlooked and "a large gulf remains between what we know and what we practice" (Davis, Evans, Jadad, Perrier, Rath, Ryan, Sibbald...Zwarenstein, 2003, p.33). The proposed study includes a significant knowledge translation (KT) component that is integrated throughout the study, from beginning to end. Community engagement is crucial to KT, which is why the aging population is directly involved in the study in two capacities, through the survey and Photovoice. Photovoice has the added benefit of creating champions among older adults in the community who can share what they have learned and raise awareness about FOF.

In addition, at the conclusion of the proposed study a report will be written in order to compile the findings in a form that is convenient for review by other researchers, policy makers, professionals that work with and amongst older adults and community-dwelling older adults. Making this information accessible to older adults is essential so that they can be empowered and become advocates and can educate others on what they have learned. Presentations will be made to all relevant professionals in fields that involve the aging population as well as to community centers, neighbourhood houses, and seniors' centres, with different focuses and approaches, in order to raise awareness and educate more people on the topic of FOF. These outreach efforts will help to improve health care practitioners' knowledge base and awareness of FOF and educate communities about FOF. The goal is to have this increased awareness lead to a reduction in the prevalence of FOF and start to positively affect the health and quality of life of older adults.

#### **5.3.2. Expertise, Experience and Resources**

Due to the nature of this Capstone project, the *Expertise and Experience* components will not be completed. This would be completed in the future for an actual

grant proposal. The budget is within the \$50,000 grant requirements, to be used over the period of a year; budget details for the proposed study can be found in Appendix I.

Addressing fear of falling is significant and stands to improve the safety and well-being of the ever increasing aging population. Creating relationships with the older adult participants and developing collaborative partnerships with the community centers involved in the proposed study is crucial for the successful knowledge translation of the findings at the completion of the proposed study and ongoing in the future. The findings of this study will be shared with the communities that were involved with the study as well as other communities in Metro Vancouver. The lead researcher of the proposed study has worked at a seniors centre within Metro Vancouver and she has established relationships with several other seniors' centres, community centers and neighbourhood houses. This experience and connections can assist with the knowledge translation of the results. The findings report, along with subsequent presentations, can be disseminated among these organizations and the information regarding FOF can reach a diverse group of older adults. This will provide an opportunity to have educational sessions in various community facilities regarding an important public health issue that may be affecting the older adults in those communities. This will allow those facilities to better serve and assist their older adult members so that they are able to maintain a healthy lifestyle. The expectation is that these results will also be found useful to communities with similar population demographics in other parts of North America. The results will also be presented to the appropriate departments of each health authority, Vancouver Coastal Health and Fraser Health, which will encourage them to consider FOF as a public health issue and make appropriate modifications to their existing fall prevention interventions and include fear of falling as a significant component that requires attention and action.

This study is limited in scope due to time and financial limitations. A future study, carried out on a larger scale, could include comparisons across different groups of older adults based on their age, ethnicity, gender, assistive device use and/or health issues, and that study could have a more extensive knowledge translation (KT) component. For example, a series of videos could be developed for different groups of knowledge users, such as urban designers, planners and policy makers, health care practitioners and

older adults themselves. Furthermore, older adult participants could be trained to be volunteer peer educators who could deliver information to other older adults in the community about potential consequences of FOF and educate them on what can be done, alongside fall prevention initiatives, to prevent injuries or a decrease in quality of life.

Research assistants with gerontology, sociology and city planning backgrounds will be recruited in order to form a multidisciplinary team. Together, this group will generate a multifaceted understanding of the needs of older adults as well as the environments, physical and social, in which they live. Considering their backgrounds, the research team will be dedicated to the objectives and committed to achieving the goals set-out in the proposed study because they will be dedicated to creating communities that are more conducive to a positive quality of life among the aging population.



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## Appendix A.

### Request for Participation Letter

Date

Dear <Name of Community Center Director>,

I am a Researcher in the Department of Gerontology at Simon Fraser University and my work explores the public health issue of fear of falling among older adults. In my current study I am investigating how certain features of the built and social environment can effect fear of falling among community-dwelling older adults. I am writing to request the use of your facility for meeting space on two occasions as well as for recruitment advertisements because your community center is located in one of the six neighbourhoods that will be included in this study.

My study involves one phase of quantitative data collection in the form of an environmental audit and two phases qualitative data collection that includes a survey and participatory method, called Photovoice, for a total of three phases. We would like to use your facility on two occasions for one of the qualitative components of the study. First, we would be using your facility to provide instructions to the seniors who are participating in the Photovoice phase of the study. Then, the second time we would use your facility would be to hold a discussion group for the seniors to share what they captured through Photovoice. The first instruction session will be an hour long and the second discussion group session will take approximately two hours; both sessions will be single day events.

I hope you decide to support this research study and grant us use of your space. Your support will help us to understand environment and social support factors act as barriers and facilitators to fear of falling among older adults and hopefully influence policies and city plans that are more conducive to the safety of seniors and support their well-being. At the conclusion of the study I would be more than happy to share the results and final report with you and your community center so that you may benefit from the findings.

I would be more than happy to meet with you at your earliest convenience to discuss my research plans and how this work may be able to benefit your organization. For additional information you can reach me by email at xxxxxxxx@sfu.ca or by phone at (xxx) xxx-xxxx. Thank you very much in advance for your consideration of my request.

Sincerely,  
Tasha Lorenzen

Research Associate  
Department of Gerontology  
Simon Fraser University

## Appendix B.

### Informed Consent by Participants

Title of Research Study: An invisible health threat: A Sample Funding Proposal  
An exploration of older adults' perceptions of the barriers and facilitators within their physical and social environment and how that affects their fear of falling  
Investigator Name: Tasha Lorenzen

Investigator Department: Department of Gerontology

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well-being of research participants. Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director, Office of Research Ethics by email at xxxxxxxx@sfu.ca or phone at (xxx) xxx-xxxx.

Your signature on this form will signify that you have received a document which describes the procedures, possible risks, and benefits of this research study, that you have received an adequate opportunity to consider the information in the documents describing the study, and that you voluntarily agree to participate in the study.

Having been asked to participate in the research study named above, I certify that I have read the procedures specified in the Study Information Document describing the study. I understand the procedures to be used in this study and the personal risks to me in taking part in the study as described below:

What is the purpose of this study? The goal of this proposed research is to explore what built environment and social support factors act as barriers and facilitators to the public health issue of fear of falling among older adults:

- (1) Identify how FOF is measured
- (2) Discover the linkages between FOF and older adults' perceptions of the physical environment and social support
- (3) Propose a research project that demonstrates how the linkages between FOF and older adults' perceptions of the physical environment and social support can be measured

What will you be required to do? You will be required to complete an 11 page survey. Topics to be covered in the survey will include questions about the neighbourhood that

you live in, your social life (family, friends and neighbours), your quality of life, and fear of falling specifically.

You may also be asked to participate in the Photovoice portion of the study, which requires you to take pictures of certain features of your neighbourhood and participate in a follow-up discussion group.

What are the risks and benefits of this study? Information collected through the survey will be kept confidential and will only be seen by members of the research team for analysis. If you are asked and choose to participate in the Photovoice portion of the study you will be required to walk around your neighbourhood to take pictures, which includes the usual, unpredictable factors of the environment. Participating in this study will also require a small investment of your time and effort. There are no other risks associated with this study. The benefit of participating in this study is that you will be a contributing factor to knowledge gained on this public health issue and the findings could potentially lead to influencing policy implementation and city development plans that are more conducive to the safety and well-being of older adults.

Do you have a choice to be in this study? Participation in this research study is on a strictly voluntary basis. You can discontinue at any time for any reasons, or chose not to answer questions asked of you in the survey or during the discussion group (if you are participating in Photovoice). There will be no negative consequences or repercussions if you choose to withdrawal from the study. Should you chose to withdraw after the study ends the investigators may keep the information collected from you and may include it in the study reports.

Statement of confidentiality Data collected through this study will remain completely confidential and your name and contributions you have made will be protected to the extent allowed by law unless you explicitly volunteer to have your data (responses and comments) included the final report and any materials published, relating to the findings, at the conclusion of the study.

Please be aware that by consenting to participate in this study you confirm that any information you encounter will be kept confidential and any person information about other participants will not be revealed to anyone outside of the research team. By signing the consent form you are also granting permission for the Photovoice discussion to be audio taped and subsequently transcribed in full. Any personal information that is obtained during this study will be kept confidential to the full extent of the law.

Inclusion of names of participants in reports of this study will only be done when permission is given by the participant. Your confidentiality and anonymity will be strictly adhered to. Knowledge of your or other participant's identify will not be disclosed, nor will any other identifying information that is provided on research methods (name, home address, etc.). All materials will be maintained in a secure location. Any report or publication based on this study will not include the real/full names of participants, their friends and or their family.

Contact of participants at a future time or use of the data in other studies The information you contribute to the study may be used in future studies that may be similar and may

require future contact with you. Do you agree to future contact? If so, please initial here:

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I understand that I may withdraw my participation at any time. I also understand that I may register any complaint with the researcher named above or the Director of the Office of Research Ethics, Dr. Jeff Toward, at xxx-xxx-xxxx.

Office of Research Ethics

Simon Fraser University

8900 Nelson Way, Burnaby BC V5A 4W9

██████████

If I have questions about this research study or if I wish to obtain copies of the results of this study, upon its completion I understand I can contact:

Tasha Lorenzen

Research Associate

Department of Gerontology

Simon Fraser University

2800-515 West Hastings Street Vancouver, BC V6B 5K3

██████████

The participant and witness shall fill in this area. Please print legibly.

I understand the risks and contributions of my participation in this study and agree to participate.

Participant Name (First and Last): \_\_\_\_\_

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Participant Contact Information: \_\_\_\_\_

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Participant Signature:

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Witness Signature:

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Date (use format MM/DD/YYYY):

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## Appendix C.

### Recruitment Flyer

# Help make your neighbourhood a more supportive place to live



## *Why? Because you deserve it!*

- Are you 65 or older?
- Are you interested in learning about falls and fear of falling?
- Would you like to help improve the safety and structure of the neighbourhood environment in which you live?

### Study details:

A research team based out of Simon Fraser University is exploring what physical and social features of neighbourhood environments potentially influence fear of falling among older adults. The goal is to try and determine how neighbourhoods can best support a positive quality of life for their aging community members.

### What you could do to help with the study:

- (1) Complete a survey (11 pages delivered and collected from your home or local community center).
- (2) Explore your neighbourhood through photography and participate in a discussion group. (A disposable camera and instructions will be provided).

**If you are interested in participating in this study and/or would like more information please call (xxx) xxx-xxxx.**

***Please tell your friends and neighbours who might be interested!***

## **Appendix D.**

### **Survey**

#### **Study Details & Survey Information**

##### Study Details:

A research team based out of Simon Fraser University is exploring what physical and social features of an environment potentially contribute to the fear of falling among older adults. This is being done to try and determine how neighbourhoods can best support the quality of life of their aging community members.

##### Survey Information:

There are four sections in this survey: I) Built Environment II) Demographic Factors III) Social Supports and IV) Quality of Life. The survey will consist of questionnaires with predetermined answers for you to select from but there are also sections with open-ended questions that allow you to answer freely and provide your opinion. There are a total of 11 pages.

If you are in need of any additional assistance in filling out the survey or have any questions, regarding the content or how to complete the survey, please do not hesitate to contact the research team. Telephone: (xxx) xxx-xxxx. Email: xxxxxxxx@sfu.ca.

## I. Physical Environment

### Neighbourhood Environment Walkability Survey (NEWS)



#### C. Access to services

Please circle the answer that best applies to you and your neighborhood. Both local and within walking distance mean within a 10-15 minute walk from your home.

1. Stores are within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. Parking is difficult in local shopping areas.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many places to go within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. It is easy to walk to a transit stop (bus, train) from my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. The streets in my neighborhood are hilly, making my neighborhood difficult to walk in.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

6. There are major barriers to walking in my local area that make it hard to get from place to place (for example, freeways, railway lines, rivers).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree



### D. Streets in my neighborhood

Please circle the answer that best applies to you and your neighborhood.

1. The streets in my neighborhood do not have many cul-de-sacs (dead-end streets).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. The distance between intersections in my neighborhood is usually short (100 yards or less; the length of a football field or less).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many alternative routes for getting from place to place in my neighborhood. (I don't have to go the same way every time.)

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree



### G. Neighborhood safety

Please circle the answer that best applies to you and your neighborhood.

1. There is so much traffic along nearby streets that it makes it difficult or unpleasant to walk in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. The speed of traffic on most <u>nearby</u> streets is usually slow (30 mph or less).	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
3. Most drivers exceed the posted speed limits while driving in my neighborhood.	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
4. My neighborhood streets are well lit at night.	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
5. Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
6. There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood.	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
7. There is a high crime rate in my neighborhood.	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
8. The crime rate in my neighborhood makes it unsafe to go on walks <u>during the day</u> .	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree
9. The crime rate in my neighborhood makes it unsafe to go on walks <u>at night</u> .	1 strongly disagree	2 somewhat disagree	3 somewhat agree	4 strongly agree

(Saelens & Sallis, 2002)

Please provide any additional comments or that pertain to the accessibility and structure of your neighbourhood:

For example:

What elements would you like added to your neighbourhood that would make you feel more secure and confident venturing out of your home and walking around your neighbourhood?

What elements currently exist in the outdoor physical environment of your neighbourhood that support your ability and desire to go outside and decrease your fear of falling?

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## II. Demographic factors

Age: \_\_\_\_\_

Sex: \_\_\_\_\_

1. What is your current living arrangement? I live:

- |                          |                 |                          |                         |
|--------------------------|-----------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Alone           | <input type="checkbox"/> | with my a Family Member |
| <input type="checkbox"/> | with my Spouse  | <input type="checkbox"/> | with a Friend           |
| <input type="checkbox"/> | with my Partner | <input type="checkbox"/> | Other: _____            |

2. How long have you been living in your current neighbourhood? \_\_\_\_\_

3. Do you like living in this neighbourhood? Yes \_\_\_\_\_. No\_\_\_\_\_.

4. Are you planning on remaining in this neighbourhood? Yes \_\_\_\_\_. No\_\_\_\_\_.

Why or why not? \_\_\_\_\_

5. What is the highest level of education you have completed?

- |                          |                           |                          |                                    |
|--------------------------|---------------------------|--------------------------|------------------------------------|
| <input type="checkbox"/> | Grammar school            | <input type="checkbox"/> | Bachelor's degree                  |
| <input type="checkbox"/> | High school or equivalent | <input type="checkbox"/> | Master's degree                    |
| <input type="checkbox"/> | Technical school (2 year) | <input type="checkbox"/> | Doctoral degree                    |
| <input type="checkbox"/> | Some college              | <input type="checkbox"/> | Professional degree (MD, JD, etc.) |

6. Have you experienced a fall in the past year? Yes \_\_\_\_\_. No\_\_\_\_\_.

7. If so, how many times have you fallen in the past year? Yes \_\_\_\_\_. No\_\_\_\_\_.

8. Did you sustain an injury as a result of your fall? Ex. sprain, deep bruising, broken bones etc. Please describe:

\_\_\_\_\_.

(Cohen, Plecas & McCormick, 2009; Eastside Village, n.d.; British Household Panel Survey 2007-2008)

### III. Social Supports

#### Social Interaction with Neighbours

Please place an **X** in the column that best represents your response to the statements about the social interaction with your neighbours listed below.

	Never	Less than 1 time per month	1-3 times per month	1 time per week	2-4 times per week	5 or more times per week
Waved to a neighbour						
Said hello to a neighbour						
Stopped and talked with a neighbour						
Gone to a neighbor's house to socialize						
Had a neighbor at your house to socialize						
Gone somewhere (restaurant, shopping) with a neighbor						
Asked a neighbor for help						
Sought advice from a neighbor						
Borrowed things or exchanged favors with a neighbor						

(du Toit, Cerin, Leslie and Owen, 2007)



### Social Cohesion of Neighbourhood

Please place an **X** in the column that best represents your response to the statements about the social cohesion of your neighbourhood listed below.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I really feel part of this area					
Vandalism and graffiti are a big problem in this area					
Most people in this area can be trusted					
People would be afraid to walk alone in this area after dark					
Most people in this area are friendly					
This area is kept very clean					
If you were in trouble, there are lots of people in this area who would help you					
There are many vacant or deserted houses or storefronts in this area					

(Clarke, Fisher, House, Smith & Weir, 2008)

#### IV. Quality of Life

By placing an **X** in ONE box in EACH group below, please indicate which statement best describes your quality of life at the moment.

1. Love and Friendship	
I can have all of the love and friendship that I want	<input type="checkbox"/> 4
I can have a lot of the love and friendship that I want	<input type="checkbox"/> 3
I can have a little of the love and friendship that I want	<input type="checkbox"/> 2
I cannot have any of the love and friendship that I want	<input type="checkbox"/> 1

2. Thinking about the future	
I can think about the future without any concern	<input type="checkbox"/> 4
I can think about the future with only a little concern	<input type="checkbox"/> 3
I can only think about the future with some concern	<input type="checkbox"/> 2
I can only think about the future with a lot of concern	<input type="checkbox"/> 1

3. Doing things that make you feel valued	
I am able to do all of the things that make me feel valued	<input type="checkbox"/> 4
I am able to do many of the things that make me feel valued	<input type="checkbox"/> 3
I am able to do a few of the things that make me feel valued	<input type="checkbox"/> 2
I am unable to do any of the things that make me feel valued	<input type="checkbox"/> 1

4. Enjoyment and pleasure

- I can have all of the enjoyment and pleasure that I want
- I can have a lot of the enjoyment and pleasure that I want
- I can have a little of the enjoyment and pleasure that I want
- I cannot have any of the enjoyment and pleasure that I want

<input type="checkbox"/>	4
<input type="checkbox"/>	3
<input type="checkbox"/>	2
<input type="checkbox"/>	1

5. Independence

- I am able to be completely independent
- I am able to be independent in many things
- I am able to be independent in a few things
- I am unable to be at all independent

<input type="checkbox"/>	4
<input type="checkbox"/>	3
<input type="checkbox"/>	2
<input type="checkbox"/>	1

Please provide additional comments or explanations that pertain to your quality of life in the space provided below:

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(ICECAP-O, 2015)

## Fear of Falling Activity Restriction Questionnaire (FFABQ)

Please answer the following questions that are related to your balance. For each statement, please check one box to say how the fear of falling has or has not affected you. If you do not currently do the activities in question, try and imagine how your fear of falling would affect your participation in these activities. If you normally use a walking aid to do these activities or hold on to someone, rate how your fear of falling would affect you as if you were not using these supports. If you have questions about answering any of these statements, please ask the questionnaire administrator.

Due to my fear of falling, I avoid . . .	Please check <u>one box</u> for each question				
	Completely disagree (0)	Disagree (1)	Unsure (2)	Agree (3)	Completely agree (4)
1. Walking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Lifting and carrying objects (eg, cup, child)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Going up and downstairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Walking on different surfaces (eg, grass, uneven ground)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Walking in crowded places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Walking in dimly lit, unfamiliar places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Leaving home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Getting in and out of a chair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Showering or bathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Preparing meals (eg, planning, cooking, serving)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Doing housework (eg, cleaning, washing clothes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Work or volunteer work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Recreational and leisure activities (eg, play, sports, arts and culture, crafts, hobbies, socializing, traveling)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please make sure you have checked one box for each question. Thank you!

\*Written permission from the authors will be acquired before data is collected using the Fear of Falling Avoidance-Behavior Questionnaire.

(Landers, Durand, Powell, Dibble & Young, 2011)

**Fear of Falling**

Please indicate your answers to the following questions with an **X**.

Do you know of anyone who experiences a fear of falling? Yes \_\_\_\_ No \_\_\_\_.

Did hearing about this person's fear of falling influence your feelings towards falling? Yes \_\_\_\_ No \_\_\_\_.

If 'yes', how so:

\_\_\_\_\_

\_\_\_\_\_.

Please place an **X** under the column that best represents your response to the following question: What level of fear of falling do you have?

<p><b>None at all</b> "I have never considered falling and am not fearful of it"</p>	<p><b>Low/Minimal</b> "I have thought about falling but it has not changed my daily routine"</p>	<p><b>Moderate</b> "I am slightly fearful of falling and I am more cautious because of it during my daily activities"</p>	<p><b>High</b> "I am very fearful of falling and think about it before most of my activities"</p>	<p><b>Very High</b> "I am very fearful of falling and it prevents me from doing regular activities that I enjoy"</p>

Please provide any additional comments, general or personal, that pertain to fear of falling:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_.

## **Appendix E.**

### **Photovoice Information and Instruction Sheet**

#### ***What is Photovoice?***

Photovoice is a research tool that allows you, the participant, to become directly involved in the research process. In this study, Photovoice involves the use of disposable cameras to take pictures of anything that represents aspects of your daily lives, including the physical and social environments, that you believe may influence fear of falling either negatively or positively. The pictures that you take will allow the researchers to have a unique and first account view of your perspectives, which is extremely beneficial. Also, Photovoice involves a follow-up debriefing session to further discuss the meaning behind the pictures that were taken.

#### ***What are you expected to do?***

The purpose of this component of the study is to discover what social and built environmental factors neighbourhood act as barriers and facilitators to fear of falling. In other words, we want to know what elements in your surrounding neighbourhood are positive and prevent the manifestation of fear of falling or are negative and contribute to the development of fear of falling. We would like you to take pictures of these positive and negative aspects of your neighbourhood, as they relate to fear of falling. For negative elements these could include slippery wet leaves or a crack on the sidewalk, overgrown shrubs, dark streets etc. and positive factors could be visible neighbours, shorter crosswalks with ample time to cross the street etc... Be creative! There are no restrictions to what you are allowed to capture in these pictures as long as they reflect an aspect of your neighbourhood that in some way may influence your fear of falling, good or bad.

### ***How to use the disposable camera?***

Please see the instructions located directly on the cover of the disposable camera.

Here are a few more tips:

There are a total of 27 pictures that can be taken with a single disposable camera.

Before each picture, the disk with a perforated edge at the top right-hand side on the back of the camera must be twisted/pulled-to the right until it stops. Once all 27 pictures have been taken the disk with the perforated edge will not stop spinning.

Place your eye up to the eyepiece and focus on what you want to take a picture of and then press down on the button located on the top left-hand side of the camera

If the day is gloomy and/or the lighting is poor in the spot where you are taking the picture then press and hold the button on the front of the camera on the right-hand side (when facing the front of the camera) for a 3-4 seconds before taking the picture. This will activate the flash function on the camera.

### ***Timeline:***

You will have between 2-4 weeks, from mid- or late-July to mid-August, to take pictures; the amount of time you have to take pictures will depend on when the Photovoice training session is held at your local community centre. You do not need to use/take all 27 pictures if you do not need or want to. The research team will collect the disposable camera after the 2-4 week period (you will be called and informed of the pick-up date beforehand), they will get the pictures developed and return them to you within 1 to 2 weeks of having picked up the camera. Upon receiving the developed pictures you will select the 5 pictures that best represent aspects of your neighbourhood that either positively or negatively affect fear of falling, whether or not you experience it. You will bring these 5 pictures to the follow-up discussion group that will also be held at a local community center in or near your neighbourhood. The number of pictures per participant is 5 so that everyone at the follow-up discussion group has time to share their most significant pictures and perspectives. (If you would like more than 5 of your pictures to be considered for analysis by the research team you are more than welcome to make notes on the back of the pictures additional pictures, other than you selected 5, and bring them to the follow-up discussion group and give them to any member of the research team).

If you would like more information or need assistance please contact Tasha Lorenzen, the Research Associate, at xxx-xxx-xxxx or xxxxx@sfu.ca.

# Appendix F.

## SWEAT-R Environmental Audit Tool

1	2	3	4	5		
						Observer ID
						Date (mm/dd/yy)
						Neighborhood ID
						Segment ID
						Start time
						Temperature (°F or °C)
					yes = 1; no = 2	Is it raining?
						Answer questions 1-5 at the NW corner of the segment
						<b>NW Corner of Segment</b>
					yes = 1; no = 2	1 1a Is there an <b>intended</b> NW crossing area for pedestrians?
					yes = 1; no = 2; N/A (no intended crossing) = 99	2 1b Is the crossing area marked? (ie, painted lines, zebra striping, and different road surfaces/paving)
						2 Determine whether any of these <b>traffic/pedestrian signals and systems</b> are provided. Mark all that apply.
					yes = 1; no = 2; N/A (no intended crossing) = 99	3 Traffic signal
					yes = 1; no = 2; N/A (no intended crossing) = 99	4 Stop sign
					yes = 1; no = 2; N/A (no intended crossing) = 99	5 Yield sign
					yes = 1; no = 2; N/A (no intended crossing) = 99	6 Pedestrian crossing sign
					yes = 1; no = 2; N/A (no intended crossing) = 99	7 Pedestrian <u>activated</u> signal
					yes = 1; no = 2; N/A (no intended crossing) = 99	8 Pedestrian signal ( <u>not</u> activated by pedestrian)
					yes = 1; no = 2; N/A (no intended crossing) = 99	9 Pedestrian overpass/underpass/bridge
					seconds; NA (no signal) = 9898; N/A (no intended crossing) = 9999	10 3 Time <b>traffic signal</b> (Green) or <b>pedestrian signal</b> (Walk).
					One side = 1; Both sides = 2; None = 3; NA (no sidewalk/curb) = 98	11 4a Does this end of the segment have <b>ramps or curb cuts</b> ?
						4b Determine whether the following <b>curb cut features</b> are present.
					yes = 1; no = 2; NA (no curb cuts) = 98	12 Grooves or bumps
					yes = 1; no = 2; NA (no curb cuts) = 98	13 Color contrast with ground surface
					yes = 1; no = 2; NA (no curb cuts) = 98	14 Material contrast with ground surface
					yes = 1; no = 2; NA (no curb cuts) = 98	15 Broad apron curb cuts
					inches; NA (curb cuts/no sidewalk) = 98	16 5 Measured <u>maximum curb height</u> at this segment end.



1	2	3	4	5		
						Answer questions 6-10 at mid-segment crossing area.
						<b>Mid-Block Crossing Area</b>
				yes = 1; no = 2 N/A (no intended crossing) = 99	17	6a Is there an <b>intended</b> mid-block crossing area for pedestrians?
				yes = 1; no = 2; N/A (no intended crossing) = 99	18	6b Is the crossing area marked? (ie, painted lines, zebra striping, and different road surfaces/paving)
						7 What type of <b>traffic/pedestrian signal(s)/system(s)</b> is/are provided? Mark all that apply.
				yes = 1; no = 2; N/A (no intended crossing) = 99	19	Traffic signal
				yes = 1; no = 2; N/A (no intended crossing) = 99	20	Stop sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	21	Yield sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	22	Pedestrian crossing sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	23	Pedestrian <u>activated</u> signal
				yes = 1; no = 2; N/A (no intended crossing) = 99	24	Pedestrian signal (not activated by pedestrian)
				yes = 1; no = 2; N/A (no intended crossing) = 99	25	Pedestrian overpass/underpass/bridge
				seconds; NA (no signal) = 9898; N/A (no intended crossing) = 9999	26	8 Time <b>traffic signal</b> (Green) or <b>pedestrian signal</b> (Walk).
				One side = 1; Both sides = 2; None = 3; NA (no sidewalk/curb) = 98	27	9a Does the crossing area have <b>ramps or curb cuts</b> ?
						9b Determine whether the following <b>curb cut features</b> are present.
				yes = 1; no = 2; NA (no curb cuts) = 98	28	Grooves or bumps
				yes = 1; no = 2; NA (no curb cuts) = 98	29	Color contrast with ground surface
				yes = 1; no = 2; NA (no curb cuts) = 98	30	Material contrast with ground surface
				yes = 1; no = 2; NA (no curb cuts) = 98	31	Broad apron curb cuts
				inches; NA (curb cuts/no sidewalk) = 98	32	10 Measured <u>maximum</u> <b>curb height</b> .

1	2	3	4	5		
						Answer questions 11-15 at the SE corner of the segment.
						<b>SE Corner of Segment</b>
				yes = 1; no = 2	33	11a Is there an <b>intended</b> SE crossing area for pedestrians?
				yes = 1; no = 2; N/A (no intended crossing) = 99	34	11b Is the crossing area marked? (ie, painted lines, zebra striping, and different road surfaces/paving)
						12 What type of <b>traffic/pedestrian signal(s)/system(s)</b> is/are provided? Mark all that apply.
				yes = 1; no = 2; N/A (no intended crossing) = 99	35	Traffic signal
				yes = 1; no = 2; N/A (no intended crossing) = 99	36	Stop sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	37	Yield sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	38	Pedestrian crossing sign
				yes = 1; no = 2; N/A (no intended crossing) = 99	39	Pedestrian <u>activated</u> signal
				yes = 1; no = 2; N/A (no intended crossing) = 99	40	Pedestrian signal (not activated by pedestrian)
				yes = 1; no = 2; N/A (no intended crossing) = 99	41	Pedestrian overpass/underpass/bridge
				seconds; NA (no signal) = 9898; N/A (no intended crossing) = 9999	42	13 Time <b>traffic signal</b> (Green) or <b>pedestrian signal</b> (Walk).
				One side = 1; Both sides = 2; None = 3; NA (no sidewalk/curb) = 98	43	14a Does this end of the segment have <b>ramps or curb cuts</b> ?
						14b Determine whether the following <b>curb cut features</b> are present.
				yes = 1; no = 2; NA (no curb cuts) = 98	44	Grooves or bumps
				yes = 1; no = 2; NA (no curb cuts) = 98	45	Color contrast with ground surface
				yes = 1; no = 2; NA (no curb cuts) = 98	46	Material contrast with ground surface
				yes = 1; no = 2; NA (no curb cuts) = 98	47	Broad apron curb cuts
				inches; NA (curb cuts/no sidewalk) = 98	48	15 Measured <u>maximum</u> <b>curb height</b> at this segment end.

1	2	3	4	5		
						Answer questions 16-53 while walking along segment
						<b>Buffer Area</b>
				1 side = 1; 2 sides = 2; No sides = 3 NA (no sidewalk) = 98	49	16a Is there a <b>buffer zone</b> between sidewalk and street ? (e.g., landscaped strip, trees, benches, etc.)
				inches; NA (no buffer zone) = 9898	50	16b Measured <u>maximum</u> <b>buffer zone width</b> on segment.
				count	51	17a Count <b>mature trees</b> in the buffer zone and/or on median (if present).
				yes = 1; no = 2; NA (no trees) = 98	52	17b Are all <b>mature trees</b> on <b>one side</b> of the segment?
						<b>Land Uses/Buildings</b>
						18 Mark the types of <b>land uses</b> present on this segment.
						<b>Residential</b>
				yes = 1; no = 2	53	Single family home - detached
				yes = 1; no = 2	54	Single family home/duplex - attached (2 or more units)
				yes = 1; no = 2	55	Low-rise multi-family housing (less than 5 stories)
				yes = 1; no = 2	56	High-rise multi-family housing (5 or more stories)
				yes = 1; no = 2	57	Mobile homes
				yes = 1; no = 2	58	Residential, other
						<b>Recreational/Leisure/Fitness</b>
				yes = 1; no = 2	59	Gym/fitness center (also includes yoga/pilates studios, etc.)
				yes = 1; no = 2	60	Movie theater/rental
				yes = 1; no = 2	61	Recreational, other
						<b>Public/Civic Building</b>
				yes = 1; no = 2	62	School, college, or university
				yes = 1; no = 2	63	Community center or library
				yes = 1; no = 2	64	Museum, auditorium, concert hall, theater
				yes = 1; no = 2	65	Post office
				yes = 1; no = 2	66	Police station, courthouse, Department of Motor Vehicles
				yes = 1; no = 2	67	Public building, other
						<b>Institutional</b>
				yes = 1; no = 2	68	Religious institution (church, temple, mosque, etc.)
				yes = 1; no = 2	69	Hospital
				yes = 1; no = 2	70	Institutional, other
						<b>Commercial</b>
				yes = 1; no = 2	71	Restaurants
				yes = 1; no = 2	72	Grocery store / Convenience store
				yes = 1; no = 2	73	Retail stores
				yes = 1; no = 2	74	Bank/financial service
				yes = 1; no = 2	75	Pharmacy/Drug Store
				yes = 1; no = 2	76	Hotel/hospitality
				yes = 1; no = 2	77	Car dealership
				yes = 1; no = 2	78	Gas/service station
				yes = 1; no = 2	79	Commercial, other

1	2	3	4	5		
						<b>Office/Service</b>
					yes = 1; no = 2	80 Offices
					yes = 1; no = 2	81 Health clinics, Medical facilities, Medical offices (not hospitals)
					yes = 1; no = 2	82 Beauty/Barber Shop, Nail Salon
					yes = 1; no = 2	83 Service facilities (ie, insurance offices, funeral homes, dry cleaners, laundromats)
					yes = 1; no = 2	84 Office/service, other
					yes = 1; no = 2	<b>85 Industrial/Manufacturing</b>
						<b>Other</b>
					yes = 1; no = 2	86 Harbor/marina/boat launch
					yes = 1; no = 2	87 Undeveloped land
					yes = 1; no = 2	88 Agricultural land, ranch, farming
					yes = 1; no = 2	89 Nature feature (ie, beach, river, lake, forest)
					yes = 1; no = 2	90 Parking lot
					yes = 1; no = 2	91 Other
					no predominant height = 1; 1-2 stories = 2; 3-4 stories = 3; 5 or more = 4; NA (no buildings) = 98	92 19 What is the predominant <b>building height</b> ?
					yes = 1; no = 2; NA (no buildings > 1 story) = 98	93 20 Do the buildings in this segment contain <b>vertical-mixed use</b> ?
						21 Are there signs signifying that buildings on this segment are <b>senior oriented</b> ?
					yes = 1; no = 2; NA (no buildings) = 98	94 Senior housing (e.g. independent living, assisted living, retirement home)
					yes = 1; no = 2; NA (no buildings) = 98	95 Senior activities (e.g. senior centers, adult day care)
						22 Determine whether any of the following <b>gathering places</b> are on this segment
					yes = 1; no = 2	96 Restaurants
					yes = 1; no = 2	97 Coffee shops
					yes = 1; no = 2	98 Bar/brewery
					yes = 1; no = 2	99 Libraries/bookstores
					yes = 1; no = 2	100 "Corner" store
					yes = 1; no = 2	101 Art galleries, museums, theatres
					yes = 1; no = 2	102 Farmers market
						23 Determine whether any of these <b>distinctive retail types</b> are present (focusing on the form of the building).
					yes = 1; no = 2	102 Big box shops (includes super stores or warehouse stores)
					yes = 1; no = 2	103 Shopping mall
					yes = 1; no = 2	104 Outdoor mall
					yes = 1; no = 2	105 Strip mall/row of shops
					yes = 1; no = 2	106 Drive-thru

1	2	3	4	5		
						<b>Public Space</b>
						24 Mark the types of <b>public space</b> present on this segment.
				yes = 1; no = 2	107	Plaza /square /courtyard
				yes = 1; no = 2	108	Public garden
				yes = 1; no = 2	109	Park/playground
				yes = 1; no = 2	110	Outdoor fitness/recreation area (ie, playing field, walking trails)
				yes = 1; no = 2	111	Public Space, other (not benches)
				count	112	25a How many <b>benches</b> (ie., public and/or transit benches) are present for the public to rest on?
						25b Do any of the benches on this segment have the following <b>features</b> ?
				yes = 1; no = 2; NA (no benches) = 98	113	Back support
				yes = 1; no = 2; NA (no benches) = 98	114	Armrest
				yes = 1; no = 2; NA (no benches) = 98	115	Covered seating
				yes = 1; no = 2; NA (no benches) = 98	116	Color contrast with ground surface
				yes = 1; no = 2; NA (no benches) = 98	117	Clean
				yes = 1; no = 2; NA (no benches) = 98	118	Undamaged
				low quality = 1; neutral = 2; high quality = 3; N/A (no public space) = 98	119	26 Determine the quality of <b>public spaces</b> on this segment
						<b>Sidewalks</b>
				1 side = 1; 2 sides = 2; No sides = 3	120	27 Are sidewalks <b>present</b> ?
				1 side = 1; 2 sides = 2; No sides = 3; NA (no sidewalks) = 98	121	28 Are sidewalks <b>continuous</b> ?
						29 Sidewalk <b>material</b> (check all that are present)
				yes = 1; no = 2; NA (no sidewalks) = 98	122	Concrete/Asphalt
				yes = 1; no = 2; NA (no sidewalks) = 98	123	Brick/Tile
				yes = 1; no = 2; NA (no sidewalks) = 98	124	Dirt/Gravel/Grass/Lawn
				yes = 1; no = 2; NA (no sidewalks) = 98	125	Other

1	2	3	4	5		
					poor = 1; moderate = 2; good = 3; NA (no sidewalks) = 98	126 30a What is the <b>condition</b> of the sidewalk?
					yes = 1; no = 2; NA (no sidewalks) = 98	127 30b Is any portion of the sidewalk <b>under repair</b> ?
					yes = 1; no = 2; NA (no sidewalks) = 98	128 31 Are there sidewalk <b>obstructions</b> blocking pedestrian pathways?
						32 Determine how much of the sidewalk is covered by these features that provide protection from sun, rain, and/or snow.
					some/most covered = 1; no/little covered = 2; NA (no sidewalk) = 98	129 Arcades
					some/most covered = 1; no/little covered = 2; NA (no sidewalk) = 98	130 Awnings
					some/most covered = 1; no/little covered = 2; NA (no sidewalk) = 98	131 Other
					< 4 feet = 1; 4 - 6 feet = 2; > 6 feet = 3; NA (no sidewalks) = 98	132 33 Measured <u>minimum sidewalk width</u> on segment.
					flat/gentle = 1; moderate = 2; steep = 3	133 34 What is the <b>slope</b> of this segment?
						<b>Street Characteristics</b>
					1 lane = 1; 2 lanes = 2; 3 lanes = 3; 4 or more lanes = 4	134 35 How many <b>lanes</b> of traffic are on this segment?
					one-way = 1; two-way = 2	135 36 Is this a <b>one-way</b> or two-way street?
						37 Street <b>material</b> (check all that are present)
					yes = 1; no = 2	136 Concrete/Asphalt
					yes = 1; no = 2	137 Brick/Tile
					yes = 1; no = 2	138 Dirt/Gravel/Grass/Lawn
					yes = 1; no = 2	139 Other
					poor = 1; moderate = 2; good = 3	140 38a What is the <b>condition</b> of the street?
					yes = 1; no = 2	141 38b Is any portion of the street <b>under repair</b> ?
					yes = 1; no = 2	142 39 Is there a designated <b>bike lane</b> in the street?

1	2	3	4	5		
						40 Are any of these <b>traffic-calming devices</b> on the segment?
					yes = 1; no = 2	143 Traffic circle
					yes = 1; no = 2	144 Median
					yes = 1; no = 2	145 Speed bumps/humps
					yes = 1; no = 2	146 Marked crosswalk
					yes = 1; no = 2	147 Sidewalk extensions
					yes = 1; no = 2	148 Signs for pedestrians/children/etc (e.g., Pedestrian crossing sign, playground sign)
					yes = 1; no = 2	149 Signs for school speed zone (e.g., School Speed 20 When Children Present)
					yes = 1; no = 2	150 Signs for traffic activity (e.g., Stop Ahead, bikes on roadway)
					yes = 1; no = 2	151 Other
					No = 1; Yes, without pedestrain thruway = 2; Yes, with pedestrian thruway = 3	152 41 Does this segment end in a <b>cul-de-sac</b> or <b>dead end</b> ?
						<b>Street Life</b>
					count	153 42 Count <b>streetlights</b> on the segment.
					yes = 1; no = 2	154 43 Is there a <b>transit stop</b> present on the segment?
					yes = 1; no = 2; NA (no transit stop) = 98	155 44 Does the <b>transit stop</b> have a <b>light</b> ?
					few/none = 1; some = 2; all/most = 3; NA (no residential buildings) = 98	156 45 How many residential buildings on this segment have <b>front porches</b> ? (porches you can sit on)
					yes = 1; no = 2	157 46 Are there <b>outdoor dining areas</b> (e.g. cafes, outdoor tables at coffee shops or plazas, etc.) located on or open to the
					yes = 1; no = 2	158 47 Are there publicly accessible <b>restrooms/washrooms</b> on the segment?
					yes = 1; no = 2	159 48 Is there <b>parking</b> for the general public anywhere on the segment?

1	2	3	4	5		
						<b>Maintenance</b>
					few/none = 1; some = 2; all/most = 3; NA (no buildings) = 98	160 49 How many <b>buildings</b> on this segment are in <b>good condition</b> ?
					few/none = 1; some = 2; all/most = 3; NA (no buildings) = 98	161 50 How many buildings on this segment have <b>windows with bars</b> ?
					few/none = 1; some = 2; all/most = 3; NA (no buildings) = 98	162 51 How many <b>yards</b> on this segment are <b>well-maintained</b> ?
					Yes, dominant feature = 1; Yes, but not dominant feature = 2; None or almost none = 3	163 52 Is there <b>litter, graffiti, broken glass</b> , etc. on the segment?
					none = 1; few = 2; some/a lot = 3	164 53 Are there <b>abandoned buildings or lots</b> on this segment?
						<b>End time</b>
					very easy = 1; easy = 2; average = 3; difficult = 4; very difficult = 5	<b>Difficulty</b>
<b>Notes</b>						

(Chaudhury, Sarte, Michael, Mahmood, McGregor & Wister, 2011)



### Assessment of the local Outdoor Environment for falling over

This assessment tool has been developed based on research undertaken with older people who have fallen to understand aspects of the outdoor environment which have caused them to fall or fear falling.

It is designed as a starting point for assessing potential risks near to the homes. Assessments should be undertaken on a case by case basis.

<b>Date:</b>			
<b>Assessor</b>			
	✓	<b>Notes (e.g. location)</b>	<b>Recommendations</b>
<b>Weather</b>			
Wet			
Windy			
Icy			
<b>Type of path</b>			
Pavement			
No path			
Path forms useful and direct route			
Path is disjointed			
<b>Slope</b>			
Mostly level			
Slight gradient			
Steep (difficult to walk)			
<b>Path condition and smoothness</b>			
Poor (a lot of bumps, cracks, holes, weeds)			
Moderate (some of the above)			
Good (very few of the above)			
Under repair			
<b>Path material</b>			
Tarmac / black surfacing			
Paving blocks (small)			
Paving slabs (large)			
Tactile Paving			
Setts (Cobbles)			

Hoggin (Smooth but not paved)			
Loose gravel			
Mud / earth / unpaved			
Grass			
<b>Usable width of pavement</b>			
Suitable for only 1 person			
Suitable for 2 people			
Suitable for > 2 people			
<b>Permanent path obstructions</b>			
Poles			
Signs			
Table & chairs			
Utilities covers/manhole cover			
Overhanging Trees			

Tree roots			
<b>Steps</b>			
Height of step			
Number of steps			
Handrail			
Depth of step (consistent?)			
<b>Road Crossing</b>			
Kerb Height			
Able to cross directly using dropped crossing points			
Road width (lanes)			
Controlled by lights			
<b>Temporary Obstructions</b>			
Leaves			
Sitting water/Puddles			
Dustbins			
Litter			
Scaffolding/Construction			
Other			
<b>Street Lighting</b>			
Streetlights present			
Path is well lit			
<b>Social Environment</b> (e.g. crowded streets)			

(Curl, Ward Thompson, Aspinall & Ormerod, 2015)

## **Appendix G.**

### **SWEAT-R Environmental Audit: Domains and Variables**

#### **FUNCTIONALITY (Buildings, Sidewalks & Street Life)**

##### Buildings

Single Family Homes (52-57)

Recreational Uses (58-60)

Public building (61-66)

Institutional (67-69)

Commercial Uses (70-78)

Office/service (79-83)

Industrial (84)

Other (85-90)

Vertical Mixed Use (91)

Sidewalks (120-133)

Street Features (135-141)

Street Life (153, 156-158)

Benches (112-116)

Buffer (48-51)

Public space (107-111, 117, 118)

#### **DESTINATIONS (Facilities)**

Gathering places (95-101)

Senior-oriented (93-94)

Retail (102-106)

Transit stop (154)

Public washroom (158)

Public parking (159)

Cul-de-sac (152)

**AESTHETICS (Views & Maintenance) (119, 160-164)**

**SAFETY & COMFORT (Personal & Traffic Safety)**

Intended crossing (1, , 17, 32)

Marked crossing (2, 18, 33)

Traffic/pedestrian signals and systems (3-9; 19-25; 34-40)

Traffic signal or pedestrian signal (10, 26, 41)

Light at transit stop (155)

Street features (134, 142-151)

Ramps or cut cuts (11, 27, 42)

Curb cut features (12-15; 28-31; 43-46)

Curb cut ht. (16, 42)

**DATA COLLECTION CONDITIONS**

Level of Difficulty

Mean Time (in mins)

Mean Temperature (°F)

Raining

## Appendix H.

### Project Scheme: 2016 1st Live Pilot

#### Application Requirements

##### Project Scheme: 2016 1st Live Pilot

##### Application Requirements

This document provides a summary of the application requirements for the first Project Scheme live pilot competition in advance of the posting of the application form and full application instructions. Please note there will be a registration requirement for this competition.

Please note that the information in this document might change based on the analysis of the results from ongoing pilots. All changes will be highlighted within the document as they are made and no significant changes are expected to be made after December 15, 2015.

Also note that the application for this competition will be completed on-line, and may therefore look different.

##### Administrative, Peer Review and Consent Information

As with other CIHR programs, applicants will be required to provide specific application, peer review and consent information.

1. **Application Information:** The applicant(s) will include information about participants such as name, CIHR PIN, and institution. The Nominated Principal Applicant and all Principal Applicants will attach the Project Biosketch CV (completed through the Canadian Common CV (CCV)). Requirements can be found in the CIHR Project Biosketch CV – Quick Reference Guide. Co-Applicants will attach the Project Scheme Co-Applicant CV (completed through the Canadian Common CV (CCV)). Requirements can be found in the Project Scheme Co-Applicant CV – Quick Reference Guide. Collaborators do not require a CV and the CIHR PIN is optional. The applicants will provide basic information such as project title, administrative details, and descriptors.
2. **Peer Review Administration:** The applicant(s) will provide information that will be used for the purpose of peer review administration, such as suggested reviewers, and reviewers to exclude, for the submitted application.
3. **Preview and Consent:** The applicant(s) will be able to preview the various sections of their application as they are completed, and once complete, the full Stage 1 application and CV(s) can also be previewed. Applicants(s) will be required to agree to the conditions of funding and consent to information sharing prior to submitting the application. Applications must be approved by the applicant's institution prior to submission.

## Overview – General Instructions

The Project Scheme is supported by a two-stage competition and review process that focuses reviewer attention on specific structured review criteria. There are two components being considered within Stage 1 of the Project Scheme: Concept and Feasibility.

Concept focuses on the Quality of the Idea and Importance of the Idea being proposed.

Feasibility focuses on the applicant's/applicants' Approach; the quality of the proposed research project's design and plan, and also on the Expertise, Experience and Resources of the research team to deliver on the proposed project.

The application will be assessed against the above components by peer reviewers with expertise in the application's subject matter. Peer reviewers will be instructed to take the applicant's/applicants' career stage and field of research into consideration.

The substantive content for the application will be divided into three sections.

### Section 1 – Summary

The first section will include a summary of the application. The specific requirements are outlined below.

#### 1. Summary

3,500 characters (including spaces) / approximately 1 page

Applicants will be asked to highlight all key facets of their research proposal by summarizing the following information:

The question or issue to be addressed;

The nature of the core expertise being brought together to address the question or issue;

Any relevant approaches, methodologies, and/or techniques to be used; and

How the expected results of the proposal advance knowledge, health research and/or the application of knowledge in the short term and in the long term, as appropriate.

### Section 2: Concept (50%)

The second section will include information required to assess the concept of the proposed research. In alignment with Criterion 1 of the Project Scheme adjudication criteria, this section is divided into two subsections (a) Quality of the idea, and (b) Importance of the idea. The specific requirements for each subsection are outlined below.

#### 2A. Quality of the Idea (25%)

3,500 characters (including spaces) / approximately 1 page

In this section, reviewers will be asked to assess the quality of what is being proposed. The applicants will be asked to define the overall goal and objectives of the project.

Applicants are encouraged to reflect upon the question being asked of reviewers when completing this subsection. These include:

Are the overall goal and objectives of the project well-defined and clear; with distinct expected outputs that support advances in health-related knowledge, health research, health care, health systems, and/or health outcomes?

Is the rationale of the project idea sound, logical, evidence informed and valid?

### 2B. Importance of the Idea (25%)

1,750 characters (including spaces) / approximately ½ page

In this section, reviewers will be asked to assess the significance of the proposed idea (assuming success) and the contributions to potential advances to health-related knowledge, health research, health care, health systems, and/or health outcomes.

The applicants will be asked to highlight the importance of their research idea. This should include a clear description of the potential impact of their research, and how the described project could lead to advances in health-related knowledge, health research, health care, health systems, and/or health outcomes.

Applicants are encouraged to reflect upon the questions being asked of reviewers when completing this subsection. These include:

Are the anticipated outputs and outcomes clearly described?

Is the potential impact of the research project significant in that it could lead to advances in health-related knowledge, health research, health care, health systems, and/or health outcomes?

### Section 3 – Feasibility

The third section will include information required to assess the Feasibility of the research proposal, in alignment with Criterion 2 of the Project Scheme adjudication criteria.

The CIHR Project Biosketch CV and Project Scheme Co-Applicant CV will also be used as part of this assessment.

Through their Biosketch(es) and CV(s), applicant(s) will highlight their recognitions, funding histories, activities and contributions that best demonstrate their expertise and experience to deliver on the proposed project.

### 3A. Approach (25%)

15,750 characters (including spaces) / approximately 4 1/2 pages

In this section, reviewers will be asked to assess the quality of the proposed research project's design and plan, including how the project will be completed, and timelines that indicate when the project is expected to be completed.

The applicants will be asked to articulate their research methodology. The description of the methodology should also include a brief description of potential challenges to the approach, any mitigation strategies that will be employed to overcome those challenges, and how progress and success will be measured.

Applicants are encouraged to reflect upon the questions being asked of reviewers when completing this section. These include:

Are the methods appropriate to deliver the proposed output(s) and achieve the proposed contribution(s)?

Are the timelines and related deliverables of the project realistic?

Does the proposal identify potential challenges and appropriate mitigation strategies?

### 3B. Expertise, Experience, and Resources (25%)

3,500 characters (including spaces) / approximately 1 page

In this section, reviewers will be asked to assess the appropriateness of the complement of expertise, experience, and resources among the applicants and their institutions/organizations, as it relates to the ability to collectively deliver on the objectives of the project. It is the responsibility of the applicants to ensure the proposed project is poised for success.

The applicants will be asked to outline the collective expertise and experience (disciplinary, professional, or methodological) being assembled, and how it is appropriate to ensure the delivery of the objectives of the proposed research project. This includes the expertise and experience of the proposed Principal Applicants, as well as Co-Applicants and Collaborators (e.g. researchers, technicians, knowledge-users, partners, patients, trainees, etc.).

The applicants will also be asked to indicate the specific environments necessary for the completion of the proposed project, and how they will ensure access to those specific environments.

Applicants are encouraged to reflect upon the questions being asked of reviewers when completing this section. These include:

Do the applicants bring the appropriate expertise and experience to lead and deliver on the proposed outputs, and to achieve the proposed contributions?

Is there an appropriate level of engagement and/or commitment from the applicants?

Is the environment (academic institution and/or other organization) appropriate to enable the conduct and success of the project?



## Appendix I. Project Budget

The following is a proposed budget (based on \$50,000 of funding over a research timeline of one year) and justification for requested expenditures, followed by a breakdown of costs per category.

### **BUDGET JUSTIFICATION AND PROJECTED COSTS PER CATEGORY**

#### **PERSONNEL:**

**Project Coordinator** **\$20,736.00**  
**(\$24/hour + 8% benefits @ 20 hours/week for 10 months)**

The successful applicant will require experience having conducted and/or managed qualitative research and will provide administrative support for the study. He/she will be responsible for subject recruitment and retention activities (eg. seeking new participants, screening, providing information to potential participants, maintaining regular contact with those already enrolled, etc.). This person will also be responsible for: (1) coordinating data collection activities; (2) managing data as it comes in and helping prepare data for analysis; (3) managing communication between team members, including attending team meetings; (4) coordinating dissemination activities; and (5) providing assistance with preparation of manuscripts and presentations.

**3 Undergrad Research Assistants** **\$ 22,550.40**  
**(\$14.50/hour + 8% benefits @ 15 hours/week for 8 months)**

The successful applicants will require experience working with older adults and experience with qualitative methods. He/she will be involved in: (1) data collection (observations and interviews) (2) assisting with analysis, including regular meetings with investigative team to discuss early analytic findings and to discuss implications of this for ongoing recruitment and data collection efforts; (3) assisting with preparation of manuscripts and presentations.

#### **EQUIPMENT:**

**Toshiba Satellite Laptop (S50-CBT2G22 Laptop)** **\$750.00**

A laptop will be used by all members of the research team for (1) storing and analyzing data and (2) producing project documents including the report and presentations. This particular model is necessary because it is compatible with the lead investigator's personal computer.

**Seagate 3TB Expansion Desktop External Drive - USB 3.0** **\$135.00**

An external hard drive is necessary to back up all essential project documents, data, manuscripts, etc., as one is not currently available to the research team.

**Fujifilm Disposable 35mm Cameras with Flash** **\$216.00**

Disposable cameras are necessary for Photovoice, the participatory investigative method being used in the study. Easy to use, disposable cameras are required in order for the older adult to take pictures of their neighbourhoods. There will be a total of 60 participants so 60 disposable cameras are needed. The Fujifilm disposable cameras come in packages of two

#### **SERVICES:**

**Transcription (\$35/hr - 48hrs transcribing discussion groups) \$1,680.00**

Based on an estimated 12 hours of discussion groups: 2 hours per discussion group, 6 discussion groups (over 6 research sites) = 12 hours of discussion group sessions. Transcription takes 4 hours for 1 hour of tape = 12 hours of discussion groups x 4 hours to transcribe each hour = 48 hours.

**Other Services \$600.00**

Miscellaneous costs for things such as photocopies, batteries, binders, file folders, paper, printer cartridge, mailing and courier costs, developing pictures are covered in this category.

**Dissemination Costs \$500.00**

Manuscript publication (preparation costs, publication charges).

#### **SUPPLIES:**

**Laptop Software \$600.00**

Microsoft Office Professional (word, excel, PowerPoint, etc.)

**Dissemination Costs \$150.00**

For conference presentations; paper; poster preparation

#### **TRAVEL:**

**Data Collection \$400.00**

Travel to and from participants' houses to distribute and collect surveys and then Photovoice cameras and pictures.

**Conference Travel \$1,600.00**

One team member to Canadian Association of Gerontology Annual Meeting (Registration \$400, flight \$600, hotel + meals x 3 days = \$600)

## **BUDGET BREAKDOWN BY CATEGORY**

<b>Total Personnel Budget</b>	<b>\$43,286.40</b>
Project Coordinator	\$20,736.00
Undergraduate Research Assistant	\$ 7516.80
Undergraduate Research Assistant	\$ 7516.80
Undergraduate Research Assistant	\$ 7516.80
<b>Total Equipment Budget</b>	<b>\$1,101.00</b>
Toshiba Laptop	\$750.00
External Hard Drive	\$135.00
Disposable cameras	\$216.00
<b>Total Services Budget</b>	<b>\$2,780.00</b>
Transcription	\$1,680.00
Other Services	\$600.00
Dissemination Costs	\$500.00
<b>Total Supplies Budget</b>	<b>\$750.00</b>
Laptop Software (Microsoft Office Pro)	\$600.00
Dissemination Costs	\$150.00
<b>Total Travel Budget</b>	<b>\$2,000.00</b>

Data Collection	\$400.00
Conference Travel	\$1,600.00
<b>TOTAL PROJECT BUDGET</b>	<b>\$49,917.40</b>