Technology to Improve Autonomy and Inform Housing Decisions for Older Adults with Memory Problems Who Live at Home: Protocol for a Multi-Pronged Mixed Methods Study in Canada, Sweden and the Netherlands

Abstract

Background: Understanding the mobility patterns and experiences of older adults with memory problems living at home has the potential to improve autonomy and inform shared decision-making (SDM) about their housing options.

Objective: We aim to: i) assess the mobility patterns and experiences of older adults with memory problems, ii) co-design an e-decision support intervention (e-DSI) that integrates users’ mobility patterns and experiences, iii explore their intention to use an e-DSI to support autonomy at home and iv) inform future SDM processes about housing options.

Methods: Informed by the Good Reporting of a Mixed Methods Study (GRAMMS) reporting guidelines, we will conduct a three-year multipronged mixed-methods study in Canada, Sweden and the Netherlands. For phase one, we will recruit a convenience sample of 20 older adults living at home with memory problems from clinical and community settings in each country for a total of 60 participants. We will ask participants to record their mobility patterns outside their home for 14 days using a Global Positioning System (GPS) and a travel diary plus we will conduct a walking interview and a final debrief interview after 14 days. For phase two, referring to results from the first phase, we will conduct one user-centred co-design process per country with older adults with memory issues, caregivers, healthcare professionals and IT representatives informed by the Double Diamond method. We will ask participants how personalized information about mobility patterns and experiences could be added to an existing e-decision support intervention and how this information could inform SDM about housing options. For the third phase, using online web-based surveys, we will invite 210 older adults with memory problems and/or their caregivers (split equally across the three countries) to use the e-DSI and provide feedback on its strengths and limitations. Finally, we will triangulate and compare data from all phases and countries to inform a stakeholder meeting that will develop an action plan.

Results: The study opened for recruitment in Netherlands in November 2018 and in Canada and Sweden, in December 2019. Data collection will be completed by April 2021.
Conclusion: This project will explore how e-decision tools can integrate the mobility patterns and mobility experiences of older adults with memory problems, in three countries, can improve their autonomy and ultimately inform SDM about housing options.

Trial Registration: ClinicalTrials.gov 118792 (NCT04267484) https://clinicaltrials.gov/ct2/show/NCT04267484

Keywords: Aging-in-place; co-design; cross-country comparison; e-decision support intervention; housing decisions; memory problems; mixed methods; mobility patterns; shared decision-making; technology

2.1 Introduction

Background
Estimates of life expectancy are increasing, yet age-related disability is still not decreasing (Murray et al., 2015; Schön et al., 2016). Cognitive impairment, including memory problems, are increasingly considered a major public health, economic, social and political challenge. Projected estimates are that over 75 million older adults worldwide will experience some form of dementia by 2030 (Prince et al., 2015). Most older adults with dementia want to remain at home, in a familiar environment, as long as possible (Han et al., 2016; Van Der Roest et al., 2007). For those people with dementia who live at home, engaging in activities outside the home can predict vulnerability. For instance, one study found that 43% of people with dementia wander at some point (McShane et al., 1994). Not all people with dementia, especially at the early-stage of the disease, have a formal diagnosis or may feel stigmatized by the word (Novek and Wilkinson, 2019; Whear et al., 2014). Therefore, for the purpose of this research, the term "memory problems" will be used to identify participants rather than dementia. Further, in this protocol we refer to "housing decisions" as decisions about how to remain safely at home as well as decisions about whether to move elsewhere or not. Memory problems, and other dementia-related behaviours, along with a need for more skilled health care services, can be a strong incentive to relocate people with dementia to residential care facilities, even against their will (Buhr et al., 2006; Pot et al., 2012). Whether to stay at home
Technology to Improve Autonomy and Inform Housing Decisions for Older Adults with Memory Problems Who Live at Home: Protocol for a Multi-Pronged Mixed Methods Study in Canada, Sweden and the Netherlands

("age in place") or move to a residential care facility is a frequent, and difficult, decision for older adults with health and memory problems and their informal and formal caregivers (Caron et al., 2006). Moreover, the decision about whether it is time to relocate may have to be faced repeatedly as autonomy diminishes and the current housing situations may not provide enough support. Older adults with memory problems may express the desire to stay at home (Van Der Roest et al., 2007) but they, and their caregivers, are often unaware of options available to them that could support them to remain safely at home. Furthermore, older adults with memory problems are often unaware of their right to be engaged in the decision-making process which undermines the quality of housing decisions for them and their caregivers (Garvelink et al., 2017, 2016; Légaré et al., 2014).

New technologies could extend the period of time during which older adults with memory problems can remain mobile and autonomous (Meijering, 2021). Alarm bracelets with communication systems, assistive walking devices, support bars and adaptive kitchen equipment are commonly used to support independence in indoor environments (Brummel-Smith and Dangiolo, 2009; Robinson et al., 2013). There is enormous potential for other technological interventions used extensively in other sectors, such as GPS-tracking, indoor-beacon technology, bed sensors, personal activity monitors to measure movement (acceleration, cadence, and steps) (Gebruers et al., 2010; John and Freedson, 2012), detect falls (Spain et al., 2012) and measure activity in- and outside the home or body metrics (e.g. blood pressure, heart rhythm) (Ballinger et al., 2018). These technologies could be enlisted to support mobility and autonomy in the home environment and hold great potential for older adults whose informed value congruent decisions are to stay home (Bet et al., 2019; Kampmeijer et al., 2016; Malwade et al., 2018; Taraldsen et al., 2012). However, few technologies have been applied or tested with older adults in real-life settings outside of residential care facilities. Further, there have been limited attempts to use technologies to assist older adults with memory problems to stay longer at home, nor has data from such devices been used to inform housing decisions. This study builds on our current work (Meijering and Weitkamp, 2016; van den Bemt et al., 2018).

To improve the quality of housing decisions among older adults with memory problems, team members of this current study have performed
systematic reviews (Boland et al., 2017; Garvelink et al., 2016) and created, and evaluated, e-decision support interventions (e-DSI) to inform and foster shared decision-making (SDM) (Garvelink et al., 2016; Légaré et al., 2015). However, little attention has examined the relationship between the dynamics of mobility patterns and mobility experiences outside the home and how an understanding of mobility can inform SDM about housing options. Person-centred care promotes patient autonomy, empowerment, value congruent choice (Edvardsson et al., 2008; Kestens et al., 2018) and is key to the next generation of health reforms (Ministers, 2017). SDM is the cornerstone of person-centred care and a process whereby the people involved in decision-making identifies the decision to be made and discusses risks and benefits of the options, as well as the preferences of all involved (Elwyn et al., 2016; Garvelink et al., 2019; Légaré et al., 2015, 2011a, 2011b). In the case of older adults with memory problems and their caregivers, SDM requires conveying information in a way that will engage them in the decision-making process by helping to clarify what matters most to them. Preferred options need to be assessed and if possible tailored to meet the person’s understanding and needs. Decisions made in this way increase satisfaction, increase adherence to decisions made and decrease decisional regret (Stacey et al., 2017). SDM is especially important in preference-sensitive decisions or in circumstances where decision-making is plagued with uncertainty, such as housing decisions (Boland et al., 2017). Housing decisions for older adults facing loss of autonomy are distinct in that their level of autonomy related to memory problems may be changing and their decisions can quickly be out of date. The decision-making process may thus need to be repeated and requires updated information on a regular basis. We hypothesize that an adapted e-decision support intervention (e-DSI) and the devices connected to it could play an important role in informing and updating this decision.

**Objectives**
The overall aim of this research project is to understand the mobility patterns and experiences of older adults with memory problems living at home and how this data can improve autonomy and inform SDM about housing options. Our multi-disciplinary and international team aims to address the following research questions: i) what are the mobility patterns and mobility experiences of older adults with memory problems?
ii) how can an e-DSI be co-designed and adapted to integrate mobility patterns to improve autonomy? iii) what is the intention among older adults to use the e-DSI for future decision-making about housing and iv) how can this research inform SDM processes about housing decisions?

2.2 Methods

Overview of Study Design
The COORDINATEs project (technology to support Decision making about Aging at Home) is a multi-pronged study that comprises of four phases, each one under the leadership of team members in a different country. Our research questions will be addressed in three countries, with a diversified sample, using a mixed methods approach to provide rich insight into mobility patterns and decision-making. Using an integrated knowledge translation approach, we will use an iterative end-user consultation and feedback to tailor e-DSI technology to end-users in Canada, Sweden and the Netherlands.

Canada, Sweden and the Netherlands all are advanced economies with welfare states with ageing populations. However, each country has a different health and welfare system which influences policies and services dedicated to ageing at home versus in institutions (Böhm et al., 2013; Esping-Andersen, 2003). Canada’s regime is liberal with a National Health Insurance System while Sweden has a social-democratic welfare regime. The Netherlands has characteristics of both conservative and social-democratic regimes and an Etatist Social Health Insurance System. We will take into account the intra- and inter-country differences between older adults and between urban and rural environments. Data collection for each phase will be carried out simultaneously and in collaboration with all country teams. The target population and recruitment strategy will vary for the three data collection phases (Table 2.1). Phase one will be under the leadership of Dutch team members and will assess mobility patterns and experiences of older adults with memory problems in all three countries. Phase two will be under the leadership of a Swedish team and will support the co-design of an e-DSI that integrates mobility patterns and experiences generated from phase one and end-users views and preferences for improving the usability and adaptability of technology (Sumner et al., 2020). Phase three will
be under the leadership of Canadian team members who will oversee web-surveys (one in each country) on the end-user’s intention to use personalized e-DSIs to improve autonomy and inform housing decisions. Lastly, for phase four, the leadership in all three countries will triangulate and compare results to develop an action plan for scaling up e-DSI development to improve autonomy among older adults with memory problems who live at home and inform their SDM processes about housing options. Informed by the Good Reporting of A Mixed Methods Study (GRAMMS) reporting guidelines (O’Cathain et al., 2008), and applying an integrated Knowledge Translation (iKT) approach (Gagliardi et al., 2016), we will to explore synergies between the data, inform the design of the sequential phases and link the findings.

### Coordination and management

An executive committee will oversee the operationalisation of the project. The committee consists of the nominated principal investigator (n-PI) (FL), all co-principal investigators (co-PI) in each country (AJ, 

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**Table 2.1: Target population and recruitment strategy, project phases 1–3**

<table>
<thead>
<tr>
<th>Target Population</th>
<th>Recruitment strategy</th>
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<tr>
<td><strong>Phase 1</strong></td>
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<tr>
<td>Older adults with self-reported memory problems who live at home</td>
<td>Referrals from nurses and physicians</td>
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<tr>
<td>Caregivers</td>
<td>Referrals from home health care teams</td>
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<tr>
<td>Individuals with experience providing care to a person with memory issues</td>
<td>Self-referrals from flyers in public space</td>
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<tr>
<td>Healthcare professionals</td>
<td>Self-referrals from media</td>
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<tr>
<td>Policy makers</td>
<td></td>
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<tr>
<td>IT representatives</td>
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<tr>
<td><strong>Phase 2</strong></td>
<td></td>
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<tr>
<td>Older adults with self-reported memory problems</td>
<td>Network of the research team</td>
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<tr>
<td>Caregivers</td>
<td>Reference group representing older people</td>
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<tr>
<td>Individuals with experience providing care to a person with memory issues</td>
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<td>Policy makers</td>
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<td>IT representatives</td>
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<tr>
<td><strong>Phase 3</strong></td>
<td></td>
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<tr>
<td>Older adults with self-reported memory problems</td>
<td>A survey firm in each country will recruit participants through web panels</td>
</tr>
<tr>
<td>Caregivers</td>
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<td>Healthcare professionals</td>
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LM, ME), two representatives of older adults and caregivers (to be determined), one trainee (JS) and one research coordinator (DC). A steering committee consisting of team members and partners, will oversee the development and implementation of all phases of the study and will meet annually in-person or virtually. In accordance with the funding agencies, our research team will attend the annual meetings of the project's funding agency, the More Years, Better Lives consortium (JPI, 2019).

**Phase 1: Mobility Patterns and Experiences**

**Participants**

In each country, convenience samples of 20 older adults living at home with memory problems will be recruited using several methods including distribution of flyers in the community and health service sites, referrals from community physicians, home health care teams, flyers and media. The research teams will also provide a project overview presentation to local dementia case management teams as a way to elicit suitable referrals. Inclusion criteria for this phase of the study are: i) being over the age of 65, ii) living at home independently with a partner, family member or alone iii) and experiencing memory problems. Participants will be asked to self-identify as experiencing memory problems and the severity of the problems will not be assessed by the research team. Our population target is older adults who live at home independently with a partner, family member, or alone. Thus, it is not an obligation have a caregiver for participating in this study. Although caregivers are not the target population for this phase of the research, if the research participant requests it, the caregiver will be asked to share their own personal experiences and to liaise between researchers and older adults if necessary. In situations where caregivers participate in the research, they will be asked to sign a consent form. We aim for a diverse group of participants (e.g. sex, health status, geographic region). Our mixed-methods approach is well-suited to gain in-depth insight into the mobility patterns and experiences of older adults experiencing memory problems.

**Data collection**

Data will be collected by using i) a socio-demographic survey, ii) a walking interview iii) GPS tracking, iv) travel diary entries, v) and an in-depth
interview (Table 2.2). Each method provides unique data and in combination the data provides a comprehensive overview to mobility. For instance, the quantitative data collected through the survey will analyzed to describe the sample. The qualitative data from the walking and debrief interviews provides context to mobility experiences and the GPS data will provide insight into the spatial mobility patterns. While there may be gaps in the GPS data related to poor connectivity or if the participant forgets to take the GPS tracker with them to an activity, as seen in other studies with older adults and GPS data (Meijering and Weitkamp, 2016), the travel diary will be used to provide insight into the missing data.

The research team will carefully explain the data collection and storage process through oral and written information. Once this information is carefully explained, the participants will be asked to sign a consent form before the data collection begins. A research assistant (RA) will conduct

<table>
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<tr>
<th>Method</th>
<th>Description</th>
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<tbody>
<tr>
<td>Socio-demographic survey</td>
<td>A 21-item questionnaire that includes questions on socio-demographics, living environment, social activities and standardized self-rated health questions based on a Likert scale.</td>
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<tr>
<td>Walking interview</td>
<td>Participants will be asked to take the researcher on a walk, of a typical route, they do near their home. Throughout this participant-led interview, the researcher will ask questions about the participants’ typical experiences they have when taking the route.</td>
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<tr>
<td>GPS tracking</td>
<td>We will provide participants with a GPS tracking device (e.g., QStarz BT-1000X) to track the routes and location of activities for a period of 14 days. GPS-trackers collect spatial data, consisting of latitude, longitude, date and time (five second epochs).</td>
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<tr>
<td>Travel diary</td>
<td>To complement the GPS data, the participants will be asked to record daily activity information in a formatted travel diary. Activity information includes: date, day of the week, time of departure and arrival time, location, purpose of the activity, mode of transportation, with whom they traveled with and did the activity with, the use of a mobility aid and if the activity was planned.</td>
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<tr>
<td>Debrief interview</td>
<td>After two-weeks of data collection an audio-recorded debrief interview will be scheduled to review the participant’s activities and mobility experiences.</td>
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the walking interviews with the participants to generate insight into the participants’ movements in their neighbourhoods (Jungers, 2010). The RA will walk along with the older adult and ask questions along the way, thereby capturing rich data on attitudes and feelings when “in place”, and environmental perceptions, special practices, social architecture and biographies (Carpiano, 2009; Lager et al., 2016). After two weeks of data collection, we will conduct debrief interviews to discuss participants’ mobility patterns and experiences in relation to their self-reported well-being (Meijering, 2021; Meijering and Weitkamp, 2016). This last interview will more generally explore the participants’ mobility experiences and motives for staying at home in their neighbourhood.

**Data Analysis**

In line with other studies using similar methods, the sample size of 20 participating older adults per country is based on the expectation that it should reach data saturation (see, for example, (Bell et al., 2017; Franke et al., 2019; Meijering and Weitkamp, 2016). A database from quantitative data from travel diaries will be created in ACCESS, data cleaned, analysed descriptively, and linked to the GPS data based on unique identifiers. All data, aside from the GPS data, will be anonymized and pseudonymized. The GPS data is extremely privacy sensitive as it provides location information and will be securely stored in a Virtual Research Workspace (VRW) created by the CIT department at the University of Groningen. Only project staff can access this environment via a two-factor authentication (password and text message). When analysing the GPS data, we will work with the real location data within the VRW. The real locations are needed as the location and movement data needs to be connected to other layers of information such as roads, shops, healthcare services. GPS data will be analysed using GIS software V-analytics and ArcMap 10.5.1 to create maps with visited places and trajectories including speed, duration and length of time at an activity. The qualitative data generated through the walking interviews and debrief interviews will be transcribed verbatim, open content coded using a grounded theory method (Glaser and Strauss, 2017), and analysed thematically using the software package ATLAS.ti 8.4. All data sources will be compared and combined to check for incongruences between the data source to obtain a comprehensive overview of the participants’ mobility in association with their respective environments. Furthermore,
we will summarize the themes from the in-depth interviews, translate them into English and triangulate data from the three countries and further compare differences between healthcare systems, geography, and regulations.

**Phase 2: Co-Design of an e-Decision Support Intervention**

**Participants in the Co-design Process**
Using the research team members’ extensive networks, we will recruit a group of a convenience sample of five to eight end-users per country: i) older adults; ii) caregivers; iii) professionals with experience caring for people with memory issues; iv) technology developers. The group size and configuration is based on other co-design studies (Smeenk et al., 2018). We will strive to have an equal proportion of each type of end-user with a size of the group of eight persons. The inclusion criteria for the older adults will be individuals over the age of 65 with memory problems, who receive support at home from health services and who have access to a computer and the internet at home.

**Data collection**
Based on data from phase one, we will conduct user-centred co-design workshops with older adults with memory problems and stakeholders. The aim is to co-design an adapted version of an existing e-DSI that could be used to improve autonomy and inform shared decision-making for older people in frail health living at home, and to evaluate the co-design process. We will use the Double Diamond Method (West et al., 2018) as a guide for the workshop facilitation. The Double Diamond method includes a three step process; i) idea generation, ii) modeling a prototype, iii) testing/consensus discussions. Each country will facilitate their own workshops due to the co-design approach.

**Data Analysis**
The size of the groups is adequate for a user-centred process (Witteeman et al., 2015), ensuring optimal participation of the end-users in the co-design group. The qualitative data generated through the group discussion will be transcribed verbatim, open content coded and analysed thematically using the software package ATLAS.ti 8.4. We will compare data from the three working groups and try to find common ground with
regard to solutions mentioned. Based on the findings we will develop recommendations as to how to integrate mobility patterns to an e-DSI as well as uploading interactive video-based material developed in a previous study (Garvelink et al., 2020) with information about further options for staying independent at home.

**Phase 3: Exploring the Intention to Use a e-DSI**

**Participants**
We will hire a survey firm in each country that will recruit 70 older adults and/or caregivers. A total of 210 participants will be recruited from the survey firm’s web panels and via end-user organizations such as senior and caregiver associations. Inclusion criteria will be if an older adult: i) is 65 years old or older or the caregiver of an older adult who would be eligible; ii) self-identifies as having memory problem; and iii) has access to a computer with internet access. Facing a housing decision will not be an inclusion criterion but participants will be asked if this is a current decision-making process they face. We have determined our sample size based on the mean behavioral intention taken from Delanoë et al. (2016). With power of 80% and an alpha set at 0.05, our survey will be able to detect a mean of $5.6 \pm 0.14$, 19 times out of 20 times (margin of error equal to 0.14) within each country.

**Data collection**
For each country, based on socio cognitive behavioural change theories, such as the theory of planned behaviour (Godin et al., 2008), we will assess participants’ opinions regarding factors (Adekpedjou et al., 2018) that could influence their adoption and intention to use an e-DSI to improve autonomy and making decisions about housing (Garvelink et al., 2017). Participants will be invited to complete a self-administered web-based survey with closed ended questions. The survey questions will be based on the integrative model of behavior (Frosch et al., 2009) to assess participants’ intention to use the e-DSI in the future in the case of facing housing decisions (Garvelink et al., 2017). Additionally, we will measure the psycho-social determinants of this behavioral intention (Garvelink et al., 2016), explore the preferred role in decision-making (Degner and Sloan, 1992), experience using technology (Garvelink et al., 2017) and sociodemographic variables (e.g. age, sex, social economic
status, relation between senior/caregiver) (Adekpedjou et al., 2018; Haesebaert et al., 2019).

**Data Analysis**
Our primary outcome variable is the behavioral intention of participant to use the e-DSI and will be measured on Likert scale (1 to 7). We will assess the psycho-social determinants of this behavioral intention and participants’ opinions regarding factors that could influence their use of an e-DSI by referring to questions in the domains of the NASSS framework (Greenhalgh et al., 2017). We will compare data from people with and without experience using an e-DSI to explore how experience influences willingness to use it. Secondly, we will compare the data obtained in the three countries to identify any differences between healthcare systems, geography, and regulations.

**Phase 4: Inform Future SDM Processes**
For the final phase of the project we will synthesize, triangulate and compare data from all project phases and collaboratively explore privacy issues. Validation and interpretation of data will be accomplished with consensus meetings between researchers and end-users (Yin, 2009). Data from the three countries (Canada, Sweden and the Netherlands) will be triangulated and compared to assess differences in contextual factors (healthcare system, policy, geography, culture), and make recommendations for technology implementation to improve autonomy and inform SDM about housing in three countries. At the end of phase 4, end-users in each country will participate in a workshop where project results are presented and discussed. As an output, we will acquire knowledge about differences and similarities in mobility patterns and experiences with using GPS and e-decision support technology among older adults with memory problems and caregivers, their respective assessments of its contribution to improving autonomy and emerging housing decisions, their willingness to continue using it and factors that influence usage. After evaluating the impact of an e-DSI for continuing to age at home and for ongoing housing decisions among older adults and their caregivers, we will propose country-specific action plans to scale up e-DSIs and evaluate its implementation by home care services. We will explore opportunities to continue the consortium and form an infrastructure for continuous collaboration between the three countries.
Ethical Considerations

Review for Human Subjects issues has been obtained from four research ethics committees. Ethics approval has been obtained by the Research Ethics Committee, Faculty of Spatial Sciences (University of Groningen), Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale (L’Université Laval), the Swedish Ethical Review Authority and the Health Research Ethics Board (University of Alberta). For all phases of data collection, participants will be asked to sign an informed consent form. Where appropriate, we will ask informal caregivers to sign a consent form.

2.3 Results

The study opened for recruitment in the Netherlands in November 2018 and in Canada and Sweden, in December 2019. Data collection will be completed by April 2021. Given the COVID-19 pandemic, and the different lockdown approaches taken by each country, data collection may be adapted using virtual methods.

2.4 Discussion

We have described the methods for exploring, among older adults living at home with memory problems and their caregivers as well as with a diversified group of stakeholders, how adding data about personal mobility patterns of older adults to an e-DSI have the potential to improve their autonomy and inform future SDM processes about housing options. This study will contribute to the mobility literature of older adults with memory problems and inform the development of technology that augments self-management among older adults impacted by memory loss, their caregivers, healthcare professionals and policymakers (Garvelink et al., 2017, 2016; Haesebaert et al., 2019; Légaré et al., 2015; Meijering, 2021).

The proposed study is a highly original approach to the potential of technology use with older people with memory problems. First, this is an interdisciplinary, inter-professional, inter-sectorial and international study. This question is often addressed in single contexts, without the
mutually enriching possibilities of working together with other disciplines, professions, technological traditions and cultures. Second, while personalized medical care is becoming the norm in specific contexts, such as gene testing or drug treatment selection, personalized data has rarely been used to empower older people with memory loss. The results not only have the potential to keep older people safely at home for longer but will provide deep insights into their physical and emotional relationship with their surroundings and the consequences of displacing them into a new environment. Third, one of the persistent problems we have seen with decision-making about housing among older adults is that their autonomy or mobility needs change from day-to-day. Thus, the information needed for decision-making also changes from day to day. This technology could relieve the deep distress experienced by older people and their families facing this decision by providing reliable and relevant ongoing data that indicates the individual’s changing needs for on-the-spot decision-making.

Finally, new technologies such as GPS-tracking can infringe on people’s privacy, an issue that is highly relevant today. For example, more people are using apps that provide contact tracing for people infected with COVID-19. In our cross-country comparisons, we will investigate the ethical issues involved in working with tracking technologies with older adults in the three countries. There is little research on the ethical implications of these technologies with older adults and their caregivers (Landau et al., 2010; Landau and Werner, 2012; Werner and Landau, 2011). Notably missing are discussions about translating general ethics and privacy principles into concrete guidelines in different national settings. Therefore, in accordance with our four ethics board’s guidance, we will advance the current state of the art in this domain by developing country-specific ethical guidelines for practice. There are some anticipated challenges and limitations of this research project. Although most of the data collection in each phase will take place in the language of each country (with Canada having two official languages), the overarching research process will be undertaken in English and this may impact the capacity of team members, including older adults and caregivers, to fully participate. Communicating among different countries and time zones can be a challenge. Therefore, it is critical for this international team to have established solid lines of communication and formal institutional consortium agreements to ensure the success
of the project. Second, despite the increasing computer literacy among older adults (Arcury et al., 2020; Hargittai et al., 2019) some, especially those who are socio-economically disadvantaged, do not have access to a computer with internet access and, therefore, not eligible to participate in phase 2 of this project.

This protocol outlines an original approach to integrating mobility patterns and mobility experiences of older adults with memory problems to improve their autonomy and ultimately inform SDM about housing options. The results will contribute to the development of technology that supports older adults’ autonomy and housing decisions in general. Furthermore, the international collaboration with end-users can provide valuable insights into the intention and barriers to use technology for housing decisions.

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