Usability of locator technology among home care clients at risk for wandering

Evaluation Report

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The evaluation was completed by the University of Alberta in collaboration with Alberta Health Services.

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EXECUTIVE SUMMARY

This project evaluated the usability of Global Positioning System (GPS) or locator devices used by home care clients at risk for wandering, and their caregivers. The evaluation was funded by the Alberta Ministry of Innovation and Advanced Education and took place from April 2013 to June 2015. Data collection occurred in two sites: Calgary (urban) and Grande Prairie (rural).

A total of 45 dyads of client-caregivers participated in the study. Of these, 14 (31.11%) were in Grande Prairie and 31 (68.88%) were in Calgary. All client participants were Home Care clients and met specific inclusion criteria. The 45 dyads used locator devices for an average of 5.8 months.

The selected technology vendor was SafeTracks that provided three GPS devices for evaluation: the ST200/ST200-Prime, iLoc Bracelet and insoles. Evaluation data was collected in the following ways: (1) Initial and exit questionnaires for clients and caregivers to complete. The items developed for this study were based on the Unified Theory of Acceptance and Use of Technology (UTAUT). The caregiver questionnaires were meant to be proxies for the clients because it was not known if all clients could complete the questionnaires. (2) Research assistants documented users' experiences during the time they were using a locator device. These "Use Logs" were completed by phone between a research assistant and a client-caregiver dyad weekly, then bi-weekly as comfort and competency was gained in the technology use. (3) Focus groups were conducted with caregivers and stakeholders at the end of the study in Calgary and in Grande Prairie.

We also collected baseline data of clients from the RAI-HC (e.g., mood and behaviour patterns, social functioning, physical functioning and service utilization; and three measures related to functional spatial orientation, safety and wandering. Baseline data of caregivers included measures of burden, working status and relationship to client.

The results of the usability evaluation were favourable. The acceptance of a locator device by dyads was high as indicated by a high intention to use it in the future. The usability of the device was high as indicated by the following: (1) high perception of

usefulness of the locator device, (2) positive attitude toward the use of the locator device, (3) importance of influence of others in using the locator device, (4) high acceptance of locator device, and (5) low anxiety toward use of a device.

Usability questionnaires and focus groups provided similar feedback from clients and caregivers: (1) Locator devices brought “peace of mind” to caregivers and allowed clients to remain active in their neighbourhoods. (2) Locator devices should be made available to dementia clients earlier, *before* signs of wandering, when they can consent to being monitored, and learn to use a locator device. (3) Although locator devices are consumer products, participants believed that the cost should be shared or subsidized by Alberta Health Services or the government because the devices could save costs in other sectors such as first responders, homecare and allow clients to stay in their homes longer. (4) Support for using the devices, either from the vendor, research team or a third party, was necessary to ensure successful adoption. (5) Stakeholders such as homecare, Alzheimer Society, and the police or first responders do not want to assume the role of monitoring, but they do play an important role as partners who can refer clients to the technology, or use the GPS coordinators to narrow their search when a client is lost.

Based on these evaluation results, we make six recommendations: (1) Provide locator devices to earlier stage dementia clients who can participate in their care plan. (2) Funding for locator devices and associated telecommunications could take into consideration capacity of users to pay and subsidization by public funding. (3) The role of monitoring should remain with caregivers of clients. First responders and other stakeholders could use the GPS data or facilitate access to devices by those who need them. (4) This technology could be used with clients who have other conditions such as autism, developmental disabilities or mental health conditions. (5) Collaborate with police to collect prospective data on numbers of reported missing persons who have dementia. (6) Conduct a longitudinal study on the health economics of the use of locator devices, with outcome measures that examine impact of the technology on use and cost of health care services and first responder services.

1.BACKGROUND

From 2010 to 2012, the Alberta Innovation and Advanced Education, formerly AET, funded the Continuing Care Technology Innovation (CCTI) project[1]. During that time, CCTI had intended to examine Global Positioning System (GPS) technology but such technology was not readily available to consumers. In 2014, a number of GPS technologies became available on the market. Alberta Health Services (AHS) identified a vendor through a vendor evaluation and selection process. An evaluation team, consisting of members from the University of Alberta and AHS, developed an evaluation framework that included a literature review and evaluation proposal[2].

The concept of using GPS devices to help dementia clients remain in their communities had been examined earlier in Canada. Project SOFT (Satellite Option Finding Technology) is a Halifax Regional Police initiative that has been in the works since 2007. After the design phase that included collaboration with the local Alzheimer Society and Victoria Order of Nurses (VON), 10 watch-like devices equipped with GPS were trialed over a 12-month period with dementia patients in the Halifax area. A Project SOFT summary report is not available, but learnings shared by the project principal investigator, Constable Matthew MacGillivray (personal communication, February 6, 2013) of the Nova Scotia Police, suggested positive results for users as well as emergency services, such as police, who were able to decrease time and manpower resources in locating GPS-users reported missing.

The Locator Device Project (LDP) was conducted as an AHS initiative with numerous internal and external stakeholders. The management of risks related to wandering and elopement is a priority for numerous AHS departments at this time. This project fosters stakeholder engagement from Continuing Care, Emergency Medical Services, and Addictions and Mental Health to facilitate knowledge translation around locator technology. Key internal stakeholders included the AHS portfolios of Seniors Health (SH), the Research department of Health Technology Assessment and Innovation

[1] Alberta Health Services (September 19, 2011). The continuing care technology innovation pilot project (CCTI) Evaluation framework (Updated).
[2] Alberta Health Services and University of Alberta (March 12, 2014). The use of locator technology in community settings: Evaluation framework.

(HTAI), Seniors Health Strategic Clinical Network (SCN), Emergency Medical Services (EMS), and Seniors Health Home Care (HC). Key external stakeholders included the Alberta ministries of Health (AH) and Innovation and Advanced Education (IAE), the University of Alberta (UofA), police services, Grande Prairie Primary Care Network (PCN), the Alzheimer Society of Alberta & Northwest Territories (ASANT) and the Calgary Alzheimer Society. Referrals to the LDP were forwarded from several potential sources such as Alzheimer Societies, Primary Care Network, EMS, Home Care, RCMP, and Calgary Police Service (CPS) involved in the project.

2.INTRODUCTION

The rates of cognitive impairment are on the rise worldwide largely due to aging populations. By 2015, nearly 44 million people have Alzheimer or related dementias, and the global cost is estimated to be $605 billion, representing 1% of the entire world's gross domestic product (Alzheimer Disease International, 2014). In the United States, by 2014, an estimated 5.2 million Americans of all ages have Alzheimer disease and related dementias; this includes an estimated 5 million people age 65 and older (Alzheimer Association, 2014). According to the Alzheimer Society of Canada (2010), over the next 30 years, the number of people with Alzheimer disease or related dementias will increase from 500,000 to 1,125,000. As a result, the economic burden will rise from estimates of $15 billion to $152 billion per year (Alzheimer Society of Canada, 2010).

One significant concern for individuals with cognitive impairment is becoming lost when alone and walking in unfamiliar environments because these individuals may have difficulty navigating in indoor or outdoor environments independently (Chang, Chu, Chen, & Wang, 2008). This behavior may be indicative of wandering. "*Wandering is either or both a purposeful or aimless complex behavior with various presentations including repetitive locomotion, hyperactivity, excessive walking, and agitation, manifested by an individual with cognitive impairment which may lead to safety concerns"* (Baptiste, Steggles, Grochowina, & LeBeau, 2006). As many as 40%-60% of individuals with dementia wander from their homes and become lost; about 5% become lost repeatedly (McShane, Gedling, Keene, Fairburn, Jacoby, & Hope, 1998).

The wandering behavior of people with Alzheimer or related dementias impacts their independence, as well as the economic and care burden of family caregivers. For example, more than 40% of family caregivers report that the emotional stress of their role is high or very high (Alzheimer Disease International, 2014). In terms of economic burden in 2014 in the United States, Alzheimer and dementia caregivers incurred $9.7 billion in additional out-of-pocket health care costs (Alzheimer Association, 2014).

A variety of interventions have been used in the management of wandering. Earlier interventions included the use of physical restraints, physical barriers, and medications to manage behaviors (Hermans, Htay, & Cooley, 2009). However, physical interventions are considered restrictive and medications may cause unwanted side-effects. Recently, relatively new wearable, GPS-enabled devices offer options for management of wandering. This technology may be a preferred strategy for some wanderers and caregivers because it enables monitoring of an individual's geographic location while allowing the individual a degree of autonomy (Pot, Willemse, & Horjus, 2012).

In spite of the advantages of the use of GPS technology to monitor and locate people with Alzheimer or related dementias, its use is relatively new. Little is known about how effective and useful the GPS technology is and attitudes and levels of acceptance toward GPS technologies among persons with dementia and their caregivers (Landau & Werner, 2012). Most of the studies are qualitative or case studies conducted with cognitively intact older people, and formal or informal caregivers that provide anecdotal elements about experiences of use of GPS (Landau R. , Werner, Auslander, Shoval, & Heinik, 2010; Zwijsen, Depla, Niemeijer, Francke, & Hertogh, 2012; Chen & Leung, 2012; Werner, Auslander, Shoval, Gitlitz, Landau, & Heinik, 2012). Few studies about attitude and usability toward GPS include participants with dementia. For example, Faucounau et al. (2009) conducted a case study using a dementia client and caregiver dyad to explore the needs, perceptions, acceptance and usability of a tracking device. The researchers found that the dementia patient was unable to give an opinion about the device's functioning, and the caregiver highlighted usage difficulties, which suggested the device did not meet her needs. In another study, researchers used a three-stage participatory design process and involved people with

dementia to develop prototypes for two devices, an armband and an electronic notepad (Robinson, Brittain, Lindsay, Jackson, & Olivier, 2009). Participants with dementia made valuable suggestions for functional improvement such as two-way communication, and "flexibility of function as disease progresses" (p. 494). Robinson et al. (2009) obtained their data through focus groups, but did not incorporate a framework or theory in their evaluation of "acceptable" and "effective" designs. Finally, Dale (2010) interviewed six families who used GPS technology. The interviews focused on perceived user-friendliness and usefulness. According to the study, the GPS was easy to use, and it was viewed as very useful. However, there were a number of usability issues which adversely affected usage, including system stability, secure fastening, and size. All of these studies lacked the use of a theoretical approach to explain the usability and acceptance of GPS technology by users.

A theoretically-driven evaluation on the usability of GPS devices among community-based clients with dementia and their caregivers could be used by community-based health service programs to understand user needs and maximize technology adoption. These programs include Home Care, Mental Health and Addictions, and Continuing Care, in rural and urban settings, within the Alberta context.

3. RESEARCH QUESTION, USABILITY DEFINITION and STUDY DESIGN

Research Question: What is the usability of locator technology for home care clients at risk for wandering?

Usability can be defined as*:*
"Effectiveness, efficiency and satisfaction with which specified users achieve specific goals in particular environments" (ISO-9241, 2010)

In this study, we examined usability of locator devices using three approaches that focused on perceived usability based on experience of dyads of clients and caregivers: (1) Use Logs, (2) Initial and exit questionnaire items based on the Unified Theory of

Acceptance and Use of Technologies, and (3) focus groups with caregivers and stakeholders.

Study design: This study used a pre- and post-test design, with no control group.

4. PARTICIPANTS

Client and caregiver pairs (dyads) were recruited using a convenience consecutive sampling approach. Dyads were referred to the study through Alberta Health Services Home Care based on set inclusion criteria.

4.1 Inclusion Criteria

Dyads met the following inclusion criteria:

(1) Clients demonstrated or were deemed at risk of wandering when walking and with cognitive impairment (e.g., dementia, developmentally delayed, or mental health clients, measured by Mini-Mental State Examination, 2nd Edition™ (MMSE®-2™) (Folstein, Folstein, & McHugh, 1975)) with at least one primary caregiver involvement in the study.

(2) Clients, or caregivers were able to communicate in English.

(3) Clients and caregivers were aged 18 years or older.

(4) Clients could be male or female, and living in the community (including designated supportive living or SL4D), either in Grande Prairie (rural) or Calgary (urban).

4.2 Exclusion Criteria

Clients in acute care facility, psychiatric facility, under age 18 years or residents in long-term care facilities were excluded. As it was not known whether or not wearable GPS technology affected pacemakers, clients with an implanted pacemaker device were also excluded.

4.3 Ethical considerations

This research proposal was approved by the University of Alberta Health Research Ethics Board (HREB) (see Appendix A1 for ethics approval). All clients and caregivers signed an assent or informed consent form (see Appendices A2 to A4 for Assent Form, Consent Form for Clients and Consent Form for Caregivers).

5. DATA COLLECTION APPROACHES

5.1 Demographic data

We collected demographic data on clients and their caregivers using a standard form (see Appendix B for LDP Referral Form). Caregiver data were minimal and included contact information. As caregiver age was deemed a relevant variable, with agreement of the LDP Steering Committee, we collected this data as a last item on the caregiver exit questionnaire. Client data included demographics, living arrangement, mental status, history of wandering behaviour, living arrangement, type of housing, frequency and type of home care services, and levels of independence with activities of daily living.

5.2 Baseline and functional measures

Baseline measures from the RAI-HC were collected at the times of entry and exit from the study. These variables included mood and behaviour patterns, social functioning, physical functioning and service utilization in the last seven days.

We also administered measures with clients to establish baseline description of functions related to wandering; these measures were administered once upon entry into the study. The measures are provided in Appendices C1 to C4: Self- and proxy-rated Functional Spatial Abilities Questionnaire (FSAQ) (Liu, Gauthier, & Gauthier, 1996), Safety Assessment Scale (SAS) (De Courval, et al., 2006), and Revised Algase Wandering Scale: Community Version (RAWS: CV) (Algase, Beattie, Bogue, & Yao, 2009).

Caregivers

In the caregiver group we included the following potential confounding variables: the burden of care (Zarit Burden Scale (Appendix C5) (Zarit, Reever, & Back-Peterson, 1980), primary caregiver age group, gender, working status (retired or not), working hours per week, care giving hours per week, and family relationship between the caregiver and the client (children, spouse, etc.).

Resident Assessment Instrument-Homecare (RAI-HC) indicators

We obtained and compared RAI-HC indicators for selected variables assessed close to the time clients were admitted into the study, and at the time the study terminated. These variables were: (1) Section E: Mood and behaviour patterns, (2) Section F: Social functioning, (3) Section H: Physical functioning, (4) Section P: Service utilization in the last 7 days.

5.3 Use Log

A "Use Log" (see Appendix D), consisting of six questions, was used by research assistants who contacted clients and caregivers by phone to enquire and record users' experiences with a locator device.

5.4 Usability questionnaires

We examined homecare clients' and their caregivers' perception of usability using initial and exit questionnaire items framed by the *Unified Theory of Acceptance and Use of Technology (UTAUT)* (Venkatesh, Morris, Davis, & Davis, 2003). Table 1 provides definitions of the constructs represented by the questionnaire items. In these definitions, "system" refers to the locator device and web-based platform used to locate a client. Figure 1 illustrates the predictive relationships between the independent variables (*Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions*) and "*Intention to use"*, which in turn predicts "*Use"* of a technology, or a locator device, in this study.

Table 1.Constructs of the Unified Theory of Acceptance and Use of Technology

Determinant name[1]	Variable type	Definition
Performance Expectancy	Independent	The degree to which an individual believes that using the system will help him or her to locate a care recipient.
Effort Expectancy	Independent	The degree of ease associated with the use of the system. Also the degree of use free of effort.
Social Influence	Independent	The degree to which an individual perceives that significant others believe he or she should use the system.
Facilitating Conditions	Independent	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.
Use	Dependent	Overt behavior (i.e., actual use of the system)
Behavioural Intention	Dependent	Intention to perform some behaviour (i.e., use the system.

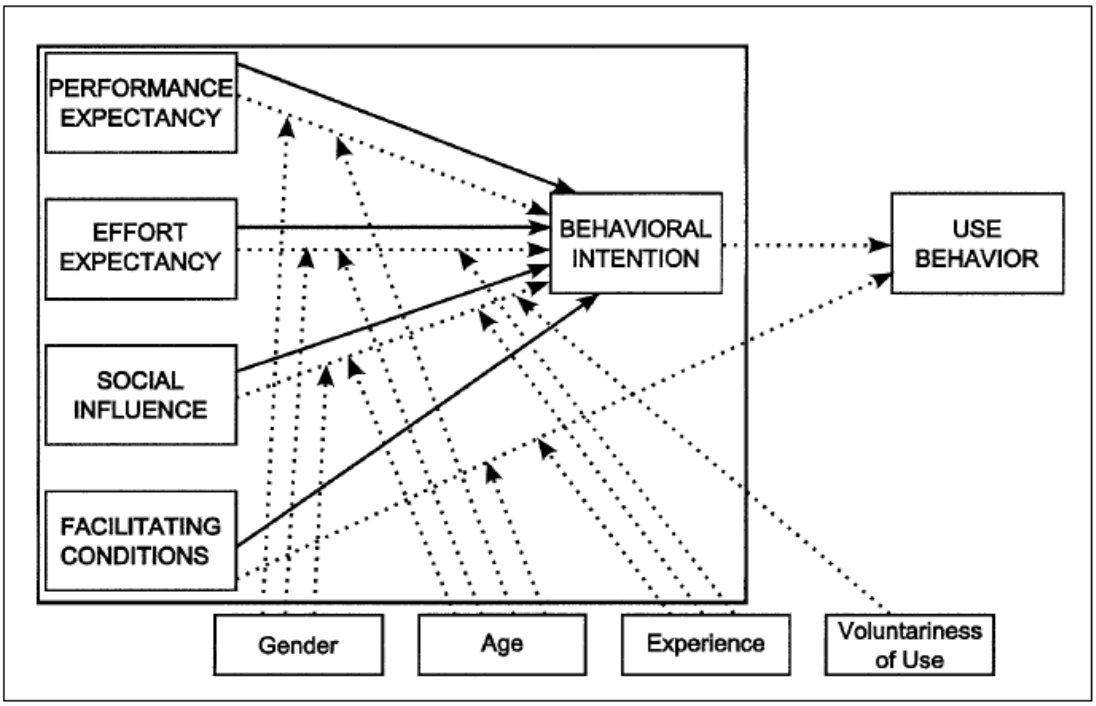

Figure 1. Relationship between independent variables and dependent variables in the UTAUT. Gender, age, experience and voluntariness of use are moderating variables.

We designed and administered paper-based initial and exit questionnaires for clients and caregivers (as proxies for clients) based on the UTAUT. These four

questionnaires are provided in Appendices E1 to E4[3]."Initial" and "exit" corresponded to "pre" and "post" time periods with respect to technology use. The initial questionnaires provided baseline user expectations of device acceptance, and the exit questionnaires provided data on actual use and whether or not the clients' and caregivers' expectations of a device were met.

On the client questionnaires (19 items for initial questionnaire, and 39 items for exit questionnaire), clients used a 3-point Likert scale, each with corresponding depictions of a sad face for (1) or disagree, neutral face for (2) or neutral, or a happy face for (3) or agree. On the caregiver questionnaires (26 items for initial questionnaire, and 39 items for exit questionnaire), caregivers used a 5-point Likert scale ranging from "strongly disagree (1)" to " strongly agree (5)".

The caregiver questionnaires were developed to serve as proxies of client questionnaires as it was not known if clients would have the capacity to complete the questionnaires to the full extent. The low number of response options (e.g., three-point Likert scale) is justified when cognitive capacity of participants is compromised (Alwin, 2007, p. 192) cited in (Marsden & Wright, 2010, p. 426). Questionnaire with different scales is a useful strategy to avoid common method bias[4](Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). These questionnaires included specific questions by adapting scales and items already validated with high levels of internal consistency in previous research for UTAUT constructs(Venkatesh, Morris, Davis, & Davis, 2003).

A summative score was built by adding all questions of UTAUT construct (except for Anxiety). The maximum possible value of summative usability score with three-point Likert scale was 39 points. Therefore, a summative score higher than 30 points and closer to 39 points would indicate that acceptance of GPS was high. In addition to this summative score, behavioral intention and use of GPS were treated as outcome

[3] Appendix E4 is Caregiver Exit Questionnaire which identifies caregiver's age category (item 50)

[4]The *common method variance* is the variance that is attributable to the measurement method rather than to the constructs the measures represent) is. The term *method* refers to the form of measurement at different levels of abstraction, such as the content of specific items, scale type, response format, and the general context (Fiske, 1982, pp. 81-84). At a more abstract level, method effects might be interpreted in terms of response biases such as halo effects, social desirability, acquiescence, leniency effects, or yea- and nay-saying. (Fiske, 1982, p. 426).

measures in the multivariate Partial Least Squares (PLS) model to determine the GPS device acceptance.

Independent variables: In this study performance expectancy, effort expectancy, and social influence were considered as direct determinants of behavioral intention to use the GPS; while behavioral intention to use the GPS and facilitating conditions were considered as direct determinants of actual use of GPS. Anxiety and attitude toward using GPS were not included in the multivariate analysis because it has been reported that these constructs are significant only when performance and effort expectancies are not included in the model (Venkatesh, Morris, Davis, & Davis, 2003, p. 455)

In the client group we included the following potential confounding variables: client's age and gender, self-rated health status, wandering behavior, whether a client has a primary caregiver, whether or not a client has a secondary caregiver, client's living arrangement (e.g., live with a spouse or alone), clients' housing arrangement (e.g., house detached or owned), home care visiting frequency (e.g., one day a week or once a month, or less often), type of home care service (e.g., case management).

5.5 Focus Groups

Focus groups were held in with caregiver and stakeholders in Grande Prairie and Calgary toward the end of the study. Informed consent forms were signed by caregivers and stakeholders (see Appendices F1 & F2). Focus groups were guided by 10 semi-structured questions (Appendix G).

6. PROCEDURES

One research team member (TR) received referrals electronically from Alberta Health Services Homecare. The team member then contacted Homecare to confirm referral receipt, verbally review project information, screen whether or not the participant met the inclusion criteria and to determine and set up the most appropriate GPS device. Next, an eligible client-caregiver dyad was contacted by one of six research team members (TR in Grande Prairie, and five research assistants in Calgary) to further

review and discuss project details and to arrange for a home visit. After a home visit was arranged, an assigned research team member visited the client-caregiver dyad in their home, obtained signed informed consent forms, and provided the appropriate GPS device. During the same visit, an initial interview was conducted and questionnaires completed. After the home visit, the same research assistant consulted the vendor as required for GPS set up and training. Dyads' experience and issues related to use of a GPS was monitored through weekly phone calls by the research assistant who documented in the Use Log (Appendix D) problems and solutions offered to address these concerns. The Evaluation Team held weekly "rounds" by teleconference during which problems, solutions and suggestions were shared. Aside from the provision of a GPS device and telecommunication free of charge, there were no incentives offered to participants of this study.

When a dyad terminated participation, the same research assistant met with the dyad to complete the exit interview, then the GPS device was removed. The only exception was when the study terminated at the end of June 2015. The final enrolment data reported at the last Evaluation Committee meeting on June 17, 2015 was as follows: of the 7 remaining participants in Grande Prairie, as of May 21, 2015, 5 dyads returned the devices, 2 kept the devices and made arrangements with the vendor (SafeTracks) to take over the monthly telecommunication costs. Of the 15 remaining participants in Calgary, as of May 21, 2015, 4 dyads returned the devices, 9 dyads took over monthly payments and 2 dyads obtained financial assistance from Home Care to cover the monthly telecommunication cost (T. Ruptash, personal communication, June 17, 2015).

7. STATISTICAL ANALYSES

We used descriptive statistics to summarize demographic data of clients and caregivers. In order to determine whether use of devices met clients' and caregivers' expectations based on UTAUT constructs (e.g., perception of usefulness (performance expectancy) the items of the exit and initial questionnaires for measuring the technology acceptance of GPS were paired analyzed using nonparametric tests. Wilcoxon paired signed ranks test (2 dependent samples) was used to test

expectations within groups (e.g., initial versus exit in client or caregiver groups), whereas Mann-Whitney U tests were used to test differences in expectations between groups (initial or exit between client and caregiver groups). The alpha level of significance was set at $p \leq 0.05$ (two-sided).

We used a multivariate research model based on PLS regression (PLS regression) to determine what factors contribute to acceptance of a GPS device by clients and caregivers. The alpha level of significance was set at $p \leq 0.05$ (two-side).

Bivariate correlations (i.e., Spearman's rho correlation) were calculated to determine the level of agreement, if any, between client and caregiver questionnaire responses (i.e., performance expectancy, effort expectancy, social influence, etc.). Statistically significant correlations of the coefficients would suggest that caregivers can serve as client proxies in this technology usability and acceptance study. In order to determine whether or not to include mediator and moderator variables in the multivariate model, bivariate correlations (i.e., Spearman's rho correlation) between independent and potential confounding variables[5] were calculated. The alpha level of significance was set at $p \leq 0.05$ (one-sided).

Missing data of continuous variables were replaced with the average values of these variables, and missing data of categorical and ordinal variables were replaced with the medians of these variables.

SPSS® V 22.0 and SmartPLS V 3.2.0 statistics package were used to generate descriptive, univariate and bivariate statistics, and PLS path modeling respectively.

[5] *Potential confounding variables:* As the UTAUT model includes variables, such as gender and age, that moderate the relationship between the four main constructs and the behavioral intention and use behavior, we included in the analysis additional potential confounding variables, such as number of people living with a client, that might affect our multivariate model.

8. RESULTS

8.1 Sample size

A total of 56 dyads were invited to participate. Two dyads were excluded due to language barriers. Of the remaining 54 dyads, 6 declined to participate, and 1 client was hospitalized before the initial interview. Of the47 dyads that met the inclusion criteria, one dyad did not respond to an invitation to schedule an initial interview. The sample size for the initial intake was 46 dyads. One dyad dropped out before the exit interview. Thus, the final sample size with complete initial and exit data was 45 dyads. Of these, 14 (31.11%) were in Grande Prairie and 31 (68.88%) were in Calgary. Caregivers of all 45 dyads completed initial and exit questionnaires. Clients of all 45 dyads completed the initial questionnaire. Sixteen (16) clients were unable to complete the exit questionnaire due to their medical condition (n=5), or institutionalization (n=10) or death (n=1). Thus, a total of 29 clients (64.44%) completed exit questionnaires; this corresponded to response rate of64.44% (29/45) for clients, or dyad units of analysis.

8.2 Description of study participants

The gender and age distributions of clients and caregivers are depicted in Table 2. There were proportionally more males among the clients, and more females among the caregivers. The average age of the clients was 76 years, and 67% of the caregivers were between the ages of 51 and 70.

Table 2. Gender and age distribution

	Client	Caregiver
Gender M/F	27/19	11/35
Percentage M/F	59/41	24/76
Age (years)	mean 76.02 (SD=11.5)	41-50: 11% 51-50: 35% 61-70: 32% 71+: 15%

At the time of referral, 34 (73.9%) of the clients demonstrated *existing wandering behaviour* as indicated on the referral form (Appendix B). Table 3 provides data on clients' baseline function, self-rated health status, living arrangement and home care

services at the initial interview. As a group, the clients had a *moderate* level of wandering behavior as determined by RAWS: CV scale (mean=1.99, SD=0.55), low level of function as indicated by an average MMSE score of 15.46 (SD=6.62), medium level of functional spatial abilities according to the proxy or caregiver rated version of the FSAQ[6] (FSAQ Proxy-rated mean=19.63, SD=5.45), but high level according to the self-rated version (mean=26.76 SD=5.56). The clients had a medium level of risk (SAS scale (mean=21.82, SD=3.69). Of the 46 clients, 28 (60.9%) rated their health as good or very good.

While all clients had one primary caregiver in order to participate in the study, 14 (30.4%) also had a *secondary caregiver*. The frequency and types of home care services are also listed in Table 3.

Table 3. Clients' demographic data at initial interview (n=46)

Function and wandering	**Mean (SD)**
Mini-Mental State Exam (MMSE)	15.46 (6.62)
Safety Assessment Scale (SAS)	21.82 (3.69)
Revised Algase Wandering Scale: Community Version (RAWS:CV)	1.99 (0.55)
Functional Spatial Abilities Questionnaire (FSAQ) - self-rated	26.76 (5.56)
Functional Spatial Abilities Questionnaire (FSAQ) - proxy-rated	19.63 (5.45)
ADLs[7]	24.04 (5.70)
Self-rated health status	**n(%)**
Good	16 (34.8)
Very good	12 (26.1)
Regular	12 (26.1)
Poor	1 (2.2)
Very poor	0 (0)
Missing values	5 (10.9)
Living arrangement	n(%)
With spouse	22 (47.8)
With spouse & children	5 (10.9)

[6]Statistically significant differences in means were found between FSAQ Proxy- and FSAQ Self-rated scales (ANOVA test, F= 36.773 p<0.000, power = 100%)

[7]In the standard referral form, section 12 we asked about client abilities to do activities of daily living (ADL). We created a summative scale called ADL, the higher the number, the less able clients could do activities in their own. The maximum possible score was 39 points.

With children	5 (10.9)
Alone	10 (21.7)
Other	4 (8.7)
Housing arrangement	**n(%)**
House detached	27 (45.0)
Owned	11 (18.3)
Condominium/Apartment	6 (10.0)
Other	3 (5.0)
Senior lodge	4 (6.7)
Supportive living level	5 (8.3)
Rental	1 (1.7)
Private	2 (3.3)
Retirement community	1 (1.7)
Group home	0 (0)
Home care visiting frequency	**n(%)**
Once a day	14 (29.2)
Several times a week	8 (16.7)
One day a week	5 (10.4)
Once a month, or less often	13 (27.1)
Other	3 (6.3)
Several times per day	2 (4.2)
Several times a month	3 (6.3)
Type of service home care	**n(%)**
Case management	40 (41.2)
Respite care	17 (17.5)
Adult day program	22 (22.7)
Personal support services	14 (14.4)
Direct professional care	4 (4.1)

Table 4 provides an overview of demographic data on caregivers at initial interviews. Caregivers consisted of predominantly spouses or adult children. Overall, 25 (54.3%) of caregivers had a paid job, whereas 21 (45.7%) were retired or not working. Among those who had a paid job, caregivers had a mean of 32.4 work hours per week; these caregivers dedicated a mean of 43.8 hours per week to care for their spouse or parent with dementia. In contrast, caregivers who were not working spent almost twice as much time (mean=87 hours) providing care for a relative. Caregivers considered they had mild to moderate levels of burden of care[8] (mean Zarit Burden Scale score of 38.24 at the initial interviews, and 40.05 at the exit interviews.

[8] No statistically significant differences in means were found between initial and exit Zarit burden scale (Wilcoxon Signed Ranks Test Z=-1.364, $p<0.173$

Table 4. Burden, work hours and types of caregiver

Caregiver characteristics	Mean (SD)
Zarit Burden Scale	
Initial interview	38.24 (12.38)
Exit interview	40.05 (16.36)
Primary caregiver	
Work hours per week	32.40 (17.55)
Caregiving hours per week	63.93 (58.03)
Retired	87.0 (60.7)
Employed	43.8 (24)
Type of primary caregiver	
Spouse	29 (63.10)
Children	12 (26.0)
Other (friend, daughter-in-law)	3 (6.5)
Missing data	2 (4.4)

Table 5 provides results of a comparison of RAI-HC indicators obtained at times corresponding to the initial and exit interviews. For each client, RAI-HC data were obtained for three points in time: (1) Latest RAI data collected prior to initial interview, (2) Latest RAI data prior to exit interview, and (3) Earliest RAI after exit interview. If no RAI was done before the initial interview, the second data would be the same as the first.

Three indicators showed changes:

- Transportation (performance) improved
- ADL functioning declined
- Stamina associated with days client went out, declined

Table 5. *RAI-HC indicator changes from initial to exit*

RAI-HC Section and variable	Z value	p-level
Section E: Mood and behaviour patterns		
E1. Depression, anxiety, sad mood	-1.08	NS*
E2. Mood decline	-1.00	NS
E4. Changes in behaviour symptoms	-1.41	NS
Section F: Social functioning		
F1a. Involvement (interaction with others)	-0.00	NS
F1b. Involvement (expression of anger family/friends)	-1.34	NS
2. Change in social activities	-0.53	NS

3a. Isolation (length of time alone)	-0.07	NS
3b. Isolation (feels lonely)	-1.41	NS
Section H: Physical functioning		
1f. Shopping (performance)	-1.74	NS
1g. Transportation (performance)	-2.15	.03
2c. Locomotion in home (performance)	0.00	NS
2d. Locomotion outside home (performance)	-2.38	NS
3. ADL decline	-2.22	.02
6a. Stamina (days went out)	-2.65	.01
6b. Stamina (hours of physical activities)	-1.13	NS
Section P: Service utilization last 7 days		
1A-1J. Formal care (total care or care management in days)	-0.69	NS
1A-1J. Formal care (total care or care management in hours)	-1.62	NS

*NS = not statistically significant at p<.05

8.3 Locator Devices

Three types of devices were used in this study (see Table 6), all were supplied by one vendor, SafeTracks, an Alberta-based company (see Appendix F for pamphlet and pictures of devices). At the beginning of the study, the ST200 was the standard device. It resembles a cell-phone and can be worn on a lanyard, belt or carried. The insoles and ILoc Bracelet were introduced later in the study, along with an updated version of the ST200 called the ST200-Prime. All devices were tracked on a web-based platform that caregivers could access using mobile phones and tablets, or desktop computers.

Table 6. Types of locator devices used by clients

Type of GPS device	n(%)
ILoc Bracelet	22 (47.8)
ST200	16 (34.8)
ST200-Prime	5 (10.9)
Insoles	3 (6.5)

8.4 Use Log

In Calgary, the 31 dyads used the locator devices for an average of 162.3 days (SD=88.1, range=30 to 296 days), or 5.4 months. In Grande Prairie, the 14 dyads used the locator devices for an average of 199.4 days (SD=101.5, range=51 to 323 days), or 6.65 months. Over the last month of the study, 5 dyads were recruited in

Calgary, this short duration could account for a lower average of usage time span in Calgary. The difference in mean days of device use between Calgary and Grande Prairie was not statistically significant (F=1.96, p=0.216). Combined, the 45 dyads in both Calgary and Grande Prairie used the devices for an average of 173.6 days (SD=92.9, range 30 to 323 days), or **5.8 months**.

Figure 2 shows the times that participants used a device *over the past 7 days*. In 62.5% of use logs, clients used the locator device either every day or very often. In 37.54% of cases, clients used the locator either sometimes, rarely or had not used it.

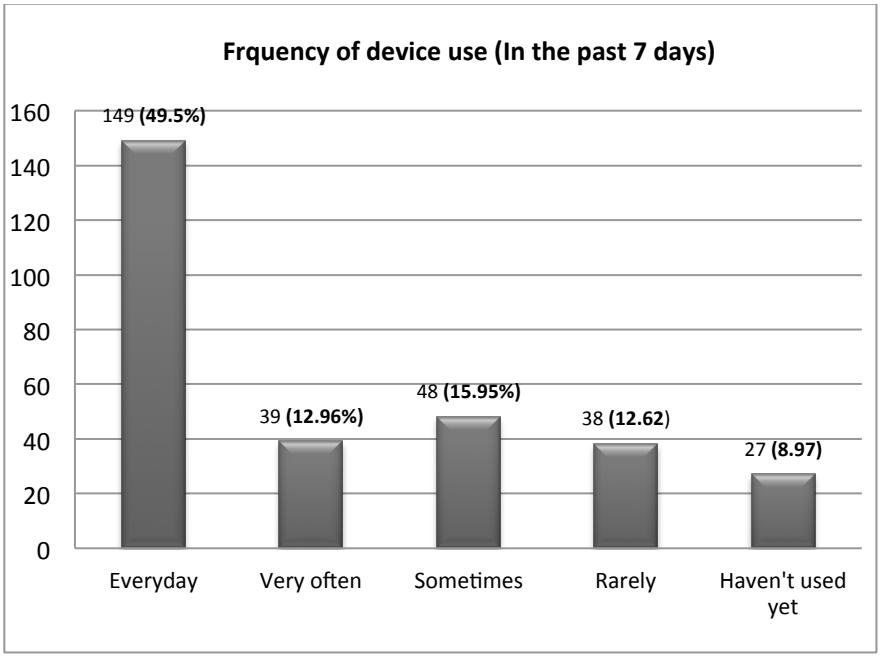

Figure 2.Frequency of device use in the past 7 days

Figure 3 shows the most common activities of clients when using the device. Note that 77.6 % of client activities included walking, going out, visiting family members, and driving. The locator device gave users "*more freedom*" and allowed them opportunities to "*go out more often*", as some stated in the use logs.

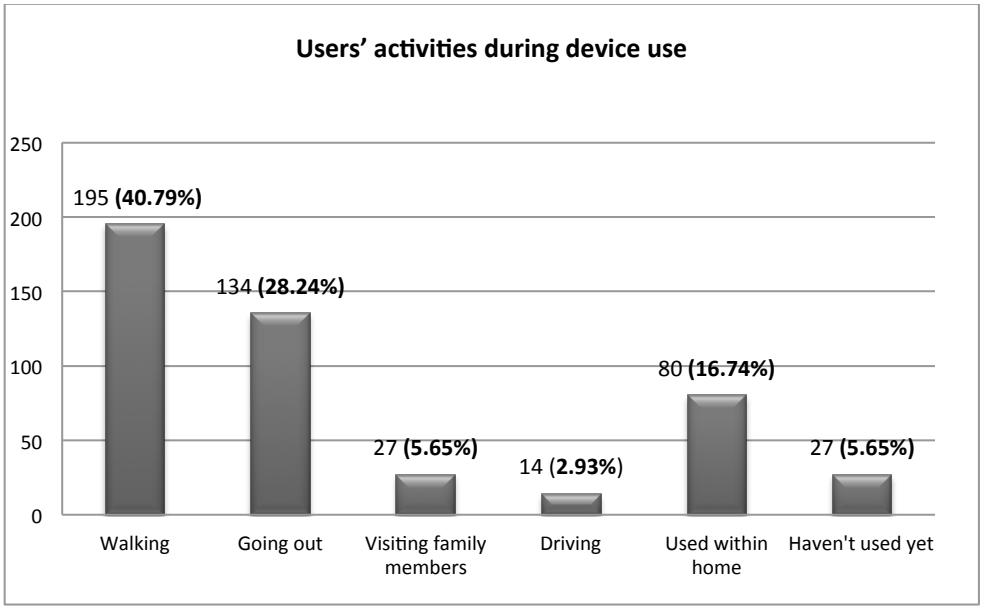

Figure 3.Users' activities during device use

Figure 4shows that, in 74% of use log files analyzed, the most common features used by clients were the automated notifications and web site platform.

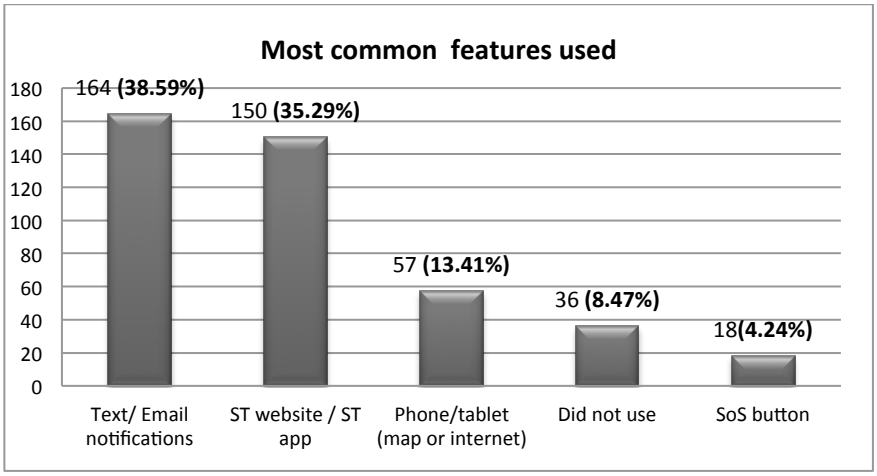

Figure 4.Most common features used

Figure 5 shows experiences, concerns, and barriers to using the GPS devices, although no concerns were expressed in 43% of use log files analyzed. In 57% of the use logs, there were some barriers toward use. These barriers were: charging of device, uncomfortable to wear, false notifications (due to a small geofence area), forget to charge or wear, and false alarm.

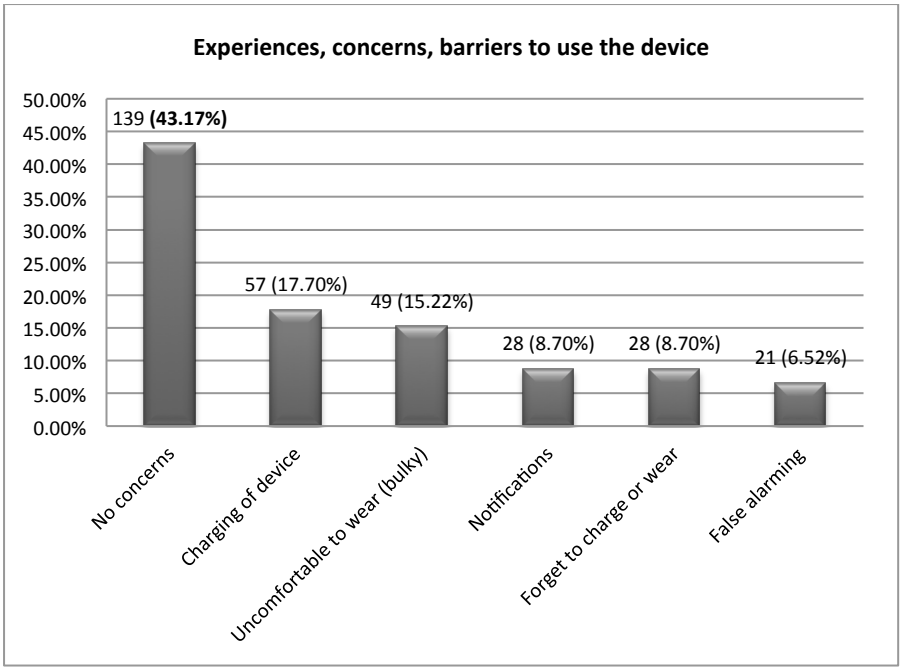

Figure 5. Experiences, concerns, barriers to use the device

8.5 Usability of locator device: UTAUT questionnaires

8.5.1 Expectations versus actual use

The usability questionnaires (see Appendices C1-C4) were administered to clients and caregivers at initial intake and at exit. Caregivers completed a total of 46 initial questionnaires and 45 exit questionnaires. Clients completed a total of 46 initial questionnaires and 29 exit questionnaires (37% attrition rate).

Usability of the locator device was measured using two approaches based on data collected on the usability questionnaires: a summative score, and whether or not dyads were willing to pay for this service.

The summative score was calculated by adding all questions of UTAUT construct (except for Anxiety) (see Appendix A). The maximum possible value of summative usability score based on a 3-point Likert scale (in the case of client questionnaire) was 39 points. The range could be divided into thirds such that the lowest possible score of

13 out of 39 would indicate low usability, *14-26 would indicate some usability* and a score of ***27 to 39 would indicate high usability***. Then, we compared the means of all summative score of baseline expectations, before use the locator device, to actual use of a device among clients and caregivers.

Table 7 shows initial and exit summative usability scores between user type (client or caregiver). Client and caregiver expectations about the usability of the locator devices at the initial interview were high and statistically significantly different (see Table 4). Clients and caregivers continued to think that the usability of the devices was high at the exit interview, after they had used the devices. There was no difference in the exit usability scores between the client and caregiver groups.

Table 7. Initial and exit summative usability scores between type client and caregiver

	Clients Mean (SD) Summative usability score	Caregivers Mean (SD) Summative usability score	Mann-Whitney U Test
Initial	36.21 (3.38) (n=44)	31.04 (4.23) (n=46)	Z=-6.402 p=0.00 (n-44)
Exit	33.17 (5.37) (n=29)	32.24 (5.72) (n=45)	Z=-0.56 p=0.575 (NS) (n=29)

Table 8 shows initial and exit summative usability scores within client and caregiver groups. Overall, during initial interviews, clients and caregivers anticipated the GPS devices to be useful. At the exit interviews, after they used the devices, clients and caregivers continued to perceive the usefulness to be high, i.e., all mean scores were above 27, and there was no difference between the initial and exit usability scores. These results suggest that clients and caregivers would continue to use the locator device in the future.

Table 8. Initial and exit summative usability scores within client and caregiver

	Initial	Exit	Mann-Whitney U Test
Clients (n=29) Mean (SD)	36.21(3.38) (n=44)	33.17 (5.37) (n=29)	Z=-1.552, *p*<0.121 (NS)
Caregivers (n=45) Mean (SD)	31.04 (4.23) (n=46)	32.24 (5.72) (n=45)	Z=-1.503 *p*<0.133 (NS)

Tables 9 and 10 provide client and caregiver summative usability scores at initial and exit interviews, by types of devices. The scores were high (all over 27 out of a maximum of 39) and, with the exception of the insoles for which there was no data. There was no difference in usability scores between the devices among the clients, and among the caregivers.

Table 9. Usability scores at initial interview, by types of devices

Device model	Clients Mean (SD) (n=44)	Caregivers Mean (SD) (n=46)
ST200	35.45 (2.54)	31.25 (3.58)
ST200 Prime	37.25 (1.70)	31.8 (3.63)
iLoc Bracelet	34.24 (4.39)	30.85 (4.19)
Insoles*	-----	-----
χ^2 (df)	5.83 (3)	0.331(3)
p-value**	0.210 (NS)	0.954 (NS)

*No data
**Kruskal-Wallis test

Table 10. Usability scores at exit interview, by types of devices

Device model	Clients Mean (SD) (n=44)	Caregivers Mean (SD) (n=45)
ST200	33.27 (6.84)	33.65 (6.09)
ST200 Prime	31.25 (2.87)	34.00 (5.20)
iLoc Bracelet	33.64 (4.78)	30.67 (6.09)
Insoles*	-----	-----
χ^2 (df)	1.886 (3)	3.974 (3)
p-value**	0.393 (NS)	0.264 (NS)

*no responses for insole users
**Kruskal-Wallis test

8.5.2 Willingness to pay to locator device service

Table 11 presents data on the 45 dyads' willingness to pay for the GPS locator device and service: 89% of the dyads (Figure 6) were willing to pay for the locator device

service at monthly rate of $33.28 (SD=$16.24 CAD, median=$30 CAD, mode $20 CAD). Seventy-five percent (75%) of 44 dyads (Figure 7) thought that the locator device service should be covered by Alberta Health Services or the government, whereas 25% thought that the service should be covered by users (who did not want to "*burden to the government*"). Seventy-one percent (71%) of the dyads thought that another organization should pay for the locator device service.

Table 11. Participants' willingness to pay for GPS device

Questionnaire item	
We would be willing to pay the device service (n=45).	40(89%)
Alberta Health Service or government should pay for the locator device service (n=44)	33 (75%)
Another organization should pay the locator device service (n=44)	31(7%)
What monthly rate (CAD$) would you be willing to pay to use the device? (n=45)	Mean (SD): $33.2 (16.24) Median: $30 Mode: $20

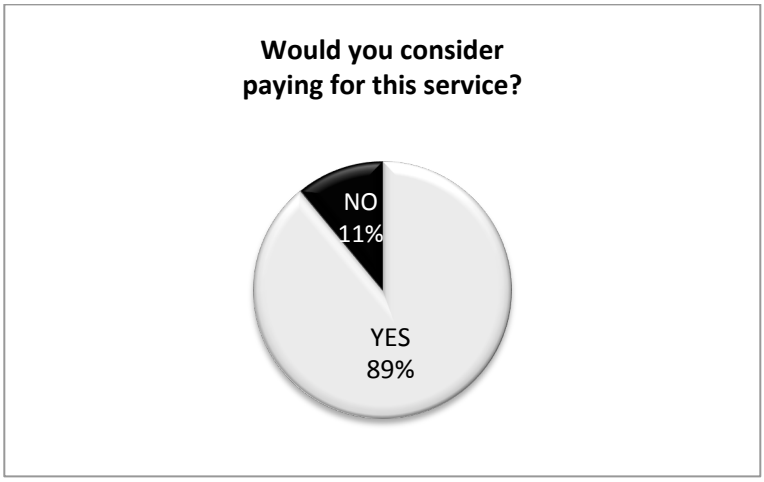

Figure 6.Users' willingness to pay for the locator device service (n=45 dyads)

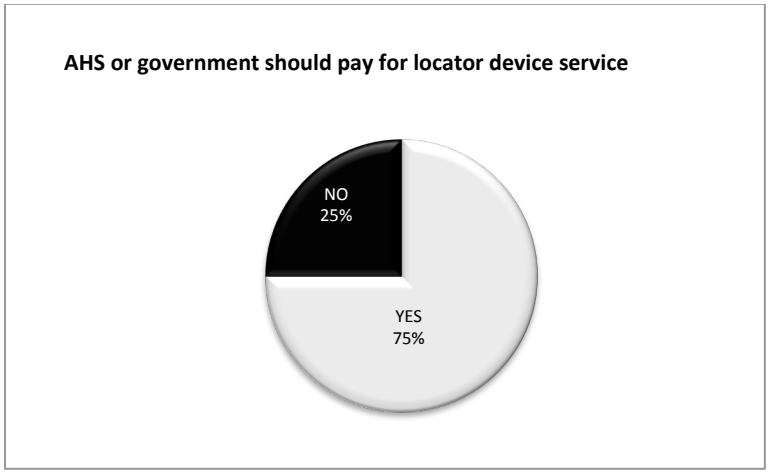

Figure 7. AHS or government should pay for locator device service (n=44 dyads)

8.5.3 Caregivers as proxy for client responses

The data provides support for using caregiver responses as proxy for clients who could not respond to the questionnaire. Responses of 5 of 8 usability determinants at exit interview among caregivers and clients were statistically significantly correlated: performance expectation, social influence, anxiety, behavioural intention, and actual use.

- r_{PE} =+0.157 (p<0.035)
- r_{SI} =+0.478 (*p*<0.000)
- r_{AnX} =+0.232 (p<0.043)
- r_{BI} =+0.347 (p<0.004)
- r_{USE} =+0.57 (p<0.000)

Behavioural intention and actual use of locator device:

Among the clients, social influence was associated with behavioural intention to use the locator device (SI→BI*:* β=+0.696, *p*<0.000). Behavioural intention to use the locator device was associated with actual use behaviour (BI→USE*:* β=+0.724, *p*<0.000).

Among caregivers, there were positive and significant correlations between performance expectancy (PE→BI, β=+0.565, p<0. 000), social influence (SI→BI,

β=+0.265, p<0. 027) and behavioural intention to use the locator device. There was a negative correlation between effort expectancy the intention to use the locator device in the caregiver model (EE→BI*,* β=-0.291, *p*<0.045). There was a positive and statistical significant correlation between facilitating conditions and behavioural intention to use the locator device (FC→USE*:* β=+0.380, *p*<0.006). Finally, behavioural intention to use the locator device and actual use were correlated (BI→USE*:* β=+0.446, *p*<0.002).

8.5.4 Comparisons between clients and caregivers on UTAUT constructs: Intention to use and actual use

We were interested in the expectations and actual believes of clients and caregivers by UTAUT constructs: performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention to use locator device as well as anxiety and attitude toward use of the locator device.

We expected that both clients and caregivers at least met their expectations regarding their belief of usefulness, easy of use, positive influence of others, and facilitating conditions toward use of the locator device. Therefore, clients and caregivers would have a positive attitude and low anxiety toward use the device. This would lead to an intention to use the device in the future.

8.5.4.1. Performance expectancy

- After using a locator device, clients and caregivers perceived that the device was useful (i.e., improved the independence in the activities of daily living (ADL) and the clients' communication with caregivers), and there was no difference in perception between the clients and caregivers (Z=-1.807, p<0.078).
- Expectations about the usefulness of a locator device in caregiver and clients groups were met (no within group difference between initial and exit interviews within the client group (Z=-1.562, *p*<0.12), nor within the caregiver group (Z=-0.841, *p*<0.400).

8.5.4.2. Effort expectancy

- After using the technology, clients thought that the locator devices were free of effort, or easy to use, while caregivers, as proxies, did not. In other words, caregivers thought that their relatives (or the clients) perceived the devices to be "hard to use" (Z= -4.278, p<0.000).
- Expectations about the ease of use of locator devices in caregiver and client groups did not change after participants used the devices. That is, comparing the medians of effort expectancy at initial and exit interviews, clients still believed that locator device was "free of effort" (Z=-0.520, p<0.60) whereas caregivers did not (Z=-0.145, p<0.880).

8.5.4.3. Social influence

- After using the devices, clients and caregivers both thought that the influence of significant others was important in using a locator device (no difference in medians between the two groups was found, Z=-1.272, p<0.203).
- The importance of the influence of significant others in using a locator device in caregivers did not change (Z= -1.272, p<0.203), whereas clients thought it was less important after they had used the devices (Z=-0.213, p<0.003). In other words, caregivers believed that they have an influence on whether or not clients use locator devices. Actually, caregiver (or social) influence was less of an influence for clients after they had used the devices.

8.5.4.4. Facilitating conditions

- At the exit interviews, clients and caregivers both thought that they had all the resources necessary to use the locator devices, and there was no difference between the groups (between group differences: Z=-0.747, p<0.455). That is, technologic support and facilitating conditions met the needs of the clients and caregivers.

- In the caregiver group, beliefs about adequate technologic support and other facilitating conditions among the caregiver group did not change from initial to exit interviews, hence their expectations were met (Z= 0.000, *p*<1.000).
- Although clients thought they had the resources necessary to use the devices, their beliefs about adequate technologic support and other facilitating conditions declined at the exit interview, compared to the initial interview (within client group difference: Z=-1.980, *p*<0.05).

8.5.4.5. Attitude

- At the exit interview, clients and caregivers had similarly positive attitude toward locator device use (between group difference: Z-0.650, *p*<0.515). That is, overall, they thought that using the locator device was a good idea.
- Caregiver and client attitude toward use of the locator device did not change from initial to exit interviews. Therefore, they still believed that using the locator device was a good idea (client within group: Z=-0.386, *p*<0.70; caregiver within group: Z= -0.977, *p*< 0.329).

8.5.4.6. Anxiety

- At the exit interviews, clients and caregivers, similarly did not feel anxiety toward using the locator devices (between group difference: Z=-1.273, *p*<0.09). Clients and caregivers had confidence in the technology and they were not concerned the data would fall in “bad hands.”
- Clients’ low anxiety level toward locator device use was the same at initial and exit interviews (within client group: *Z*=-0.545, *p*< 0.58), whereas caregiver anxiety was significantly lower at the exit interview compared to the initial (within group difference: *Z*=-3.261,*p*< 0.01).

8.5.4.7. Behavioral intention to use locator device

- After the trial, clients and caregivers thought that they would continue to use a locator device in the future. Caregivers showed higher intention to use a device than clients (Z=-2.095, p<0.036).
- Expectations of intention to use a locator device in the client group were met (within client group: Z=-0.449, p<0.65), whereas this was not the case among caregivers(caregiver within group difference: Z=-3.273, p<0.001). In other words, among caregivers, although the intention to use a locator device was high at the exit interview, this intention to use was lower than at the initial interview. Upon further investigation, we learned that the reasons were attributed to the health status of clients, rather than negative experience with a locator device (see Table 12).

Table 12. Caregivers' reasons for low intention to use the locator device

Comments about experience with locator device	Reason for low intention to use
1. *"Provided a sense of security when leaving him alone at home as he had a tendency to wander. This allowed everyone to know he had left the geozone we had setup"*	Client passed away
2. *"Potential of finding people"*	Client moved to a special care centre
3. *"I could trace her movement"*	Client's Medical condition declined
4. *"I like the idea of the GPS but because my Pop has Alzheimer we are worried that he cannot be alone regardless of GPS"*	Client's medical condition declined
5. *"I wish to have this device earlier. Knowing we could track him gave us a lot of confidence and independence. This an excellent device"*	Client moved to a special care centre
6. *"Love the concept. We did not use it too much as we should have". Due to eye injury we were house bound. "C31"[1] rarely left the house without me so at times we forgot to take the device with us"*	Client eye injury
7. *"Would be a godsend if I did have it a year before. Specially if client was in home and caregiver at work"*	Client moved to a special care centre

About 36% of clients (16 cases) were unable to fill out the exit surveys due to either the progress of their medical condition (5/16, 31.25%), death (1/16, 6.25%) or a move to a care facility (10/16, 62.5%).

There was a negative correlation between the intention to use the locator device and whether or not there was a decline in a client's medical condition (YES=1) (r_{xy}= -0.593, p<0.010). From the open-ended questions in the exit questionnaires we can see why intention to use a locator device decreased among these caregivers. Although these caregivers indicated they did not have the intention to use a device in the future, their comments about the usefulness of a locator device can be viewed as positive. Some caregivers whose relatives' medical conditions declined, passed away, or moved to a care facility, commented "*Would be good if I did have it a year before*" or "*I wish to had this device earlier*".

8.5.4.8. Actual use of locator device

- At the exit interview, caregivers and clients had used the locator device on a regular basis, especially when clients walked outside (see Table 13). (Mean (SD)= 2.49 (0.80)).
- As expected, devices were least used when a client was home alone (Mean (SD)=2.07 (0.94)).
- At the exit interview, caregivers showed they had used the locator device features more frequently than the clients (Client Mean (SD)= 2.37(0.84); Caregiver Mean (SD)=2.56(0.77) (Z=-2.095, p<0.036)).

Table 13. Actual use of the locator device (Clients versus caregivers)

Type of uses	Clients (n= 29) Median	Caregivers (n=45) Median
The device was worn on regular basis	3	3
The device was used when walked outside	3	3
The device was used frequently	3	3
The device was used when client was home alone	2	3

8.5.5. Level of agreement between client and caregiver responses

After the trial, responses of clients and caregivers for Behavioral Intention to Use and Use of a locator device were statistically significantly correlated, indicating that caregivers were able to predict the acceptance and usability behaviors of locator devices of their relatives who were the clients in this study (see Table 14).

Table 14. Spearman rho correlations between client and caregiver responses on UTAUT constructs

Construct name	Initial Interview (n=44)		Exit Interview (n=29)	
	r_{xy}	*p*-value	r_{xy}	*p*-value
Performance expectancy	0.15	0.090	0.157	0.035*
Effort expectancy	0.207	0.024*	0.138	0.150
Social influence	0.088	0.202	0.478	0.000*
Facilitating conditions	0.090	0.200	0.096	0,238
Anxiety	0.146	0.82	0.232	0.043*
Attitude	0.181	0.008*	0.165	0.119
Behavioural intention	0.100	0.171	0.347	0.004*
Use	NA	NA	0.57	0.000*

*Statistically significant

Low correlations between client and caregiver responses could be due to two reasons. First, during the initial interview, caregivers and clients were asked for their beliefs and intention to use the locator technology. As the dyads did not have a complete understanding about the locator device, they may not have formulated a valid assessment about the usefulness a locator device (Sheppard, Hartwick, & Warshaw, 1988). Therefore, there were few correlations between clients and caregivers at the initial interview. However, at the exit interviews, clients and caregivers had used the technology, thus, they had adequate information about the locator device. Therefore, their responses were more informed regarding the usefulness of the technology and there were more correlations between clients and caregivers.

Second, the correlation of the responses between clients and caregivers at the exit interviews, especially *Intention to Use* and *Use* of the locator device can be explained by the *Folks Concept of the Intentionality Theory* (Malle, 1999). This theory states that an external agent or observer classifies behaviors as intentional or non-intentional. An

external observer classifies a behavior as intentional when: (a) there exists a strong system of beliefs (or reasons[9]) about the overt behavior leading to a specific outcome, (b) a resulting intention to perform that behavior, (c) the skill to perform the behavior, (d) and the awareness of fulfilling the intention while performing the overt behavior. The same theory states that intentional behaviors are highly predictable for an external observer, especially when it presents a strong belief system (called reasons) leading a specific outcome. Essentially, performance expectancy, effort expectancy, social influence, and facilitating conditions are a client's belief (or reasons) and the intention to use and use of the locator device are intentional behaviors under volitional control of the clients, these behaviors were highly predicted by the caregivers. Thus, it can be justified that caregivers are valid representatives of clients when completing the questionnaires on clients' behalf, particularly when a client is unable to complete the questionnaire.

8.5.6. Level of importance of UTAUT constructs by type of user (client and caregiver)

Figures8 and 9show the mean values of UTAUT constructs by clients and caregivers respectively at the initial and exit interviews. These figures show that of the four main constructs (Performance Expectancy, Effort Expectancy, Facilitating Condition and Social Influence), Social Influence had the highest ratings, and was the most salient construct for intention to use a device among clients and caregivers.

[9] According to the Folks Concept of the Intentionality Theory *reasons, "are agents `mental states of whose content they considered and in the light of which they formed an intention to act* "(Malle, 1999, p. 27). Therefore, *reason explanations* are "*those behaviours explanations that cite external observer`s reasons for intending to act or for acting intentionally"*

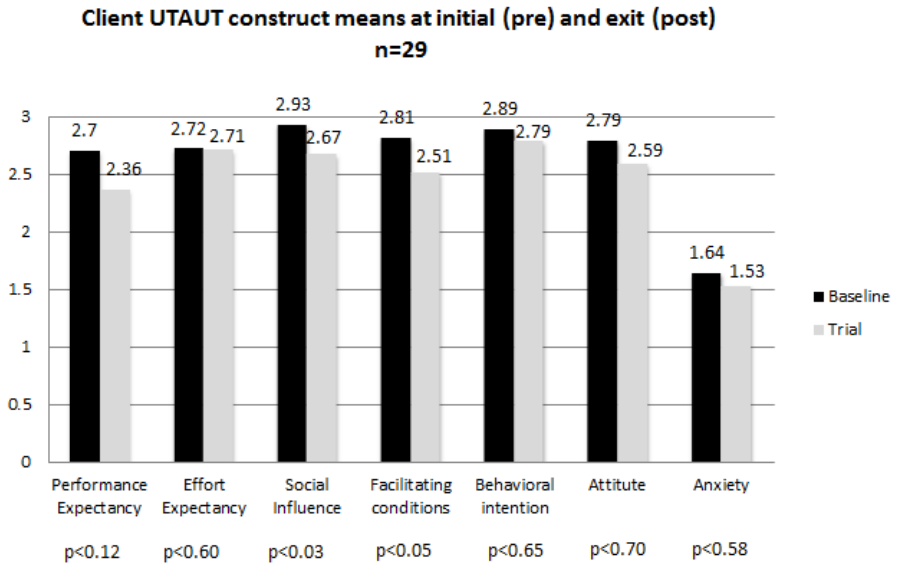

Figure 8. Clients' mean scores[10] of UTAUT constructs at initial (baseline) and exit (trial) interviews

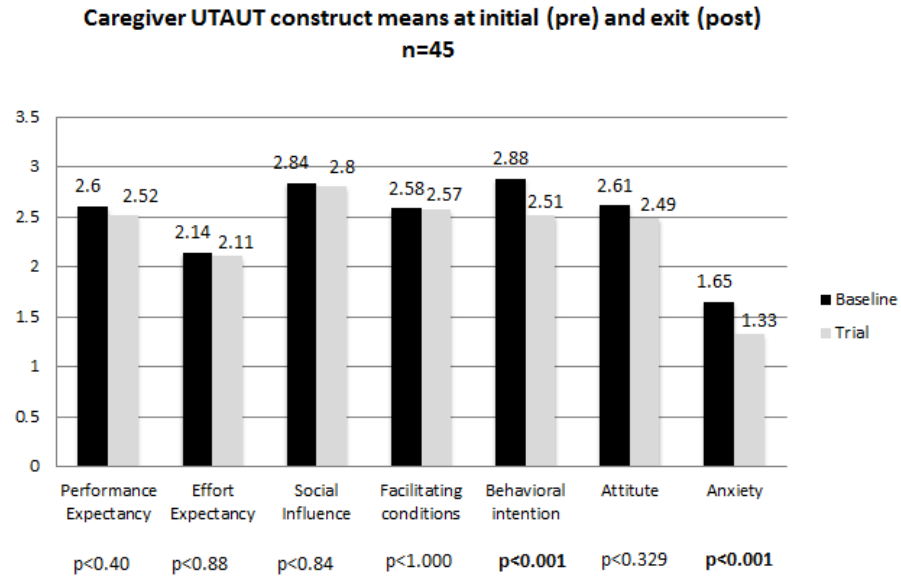

Figure 9. Clients' mean scores[11] of UTAUT constructs at initial (baseline) and exit (trial) interviews

[10]Mean of 3 indicates that users believe: device is useful, the device is easy to use, the influence of other is important in using the device, facilitating conditions are created to use the device, users have good attitude toward use of the device, user are anxious toward use the device, and they have the intention to use the device.
[11]Mean of 3 indicates that users believe: device is useful, the device is easy to use, the influence of other is important in using the device, facilitating conditions are created to use the device, users have good attitude toward use of the device, user are anxious toward use the device, and they have the intention to use the device.

One explanation for Social Influence to be the most important construct influencing intention to use the locator device is that caregivers and clients encouraged each other to use to device in order to address the burden of care for caregivers and the worries of clients about getting lost. They may encourage each other to use the device in order to have more freedom to conduct their daily activities, or to be able to continue to live in the community. Therefore, this "*positive feedback*" (Social influence) enhances or amplifies the effect of a higher intention to use or positive expectation toward use of the device.

Table 15 provides comparison data on medians between client and caregiver user groups per UTAUT construct at initial and exit interviews. Table 16 shows data of medians within client and caregiver user groups per UTAUT construct at initial and exit interviews.

Table 15.Comparison of medians between client and caregiver user groups per UTAUT construct at initial and exit interviews

	Initial Interview			Exit Interview		
Construct	Clients Median	Caregivers Median	Z (p value)*	Clients	Caregivers	Z (p value)*
Performance expectancy	3.0	3.0	-.74 (.46)	3.0	3.0	-1.81 (.08)
Effort expectancy	3.0	2.0	-4.78 (.00)**	3.0	2.0	-4.28 (.00)**
Social influence	3.0	3.0	-1.64 (.11)	3.0	3.0	-.27 (.23)
Facilitating conditions	3.0	3.0	-2.07 (.04)**	3.0	3.0	-.75 (.46)
Anxiety	1.0	2.0	-.070 (.95)	1.0	1.0	-1.27 (.09)
Attitude	3.0	3.0	-2.18 (.03)**	3.0	3.0	-.65 (.52)
Behavioural intention	3.0	3.0	-.07 (.51)	3.0	3.0	-2.30 (.04)**
Use	NA	NA	NA	3.0	3.0	-2.10 (.04)**

*Mann-Whitney U Test
**Statistically significant

Table 16. Comparison of medians within client and caregivers user groups per UTAUT construct at initial and exit interviews

	Clients (n=29)			Caregivers (n=45)		
Construct	Initial Median	Exit Median	Z (*p*-value)*	Initial Median	Exit Median	Z (*p*-value)*
Performance expectancy	3.0	3.0	-1.56(.12)	3.0	3.0	-.84 (0.40)
Effort expectancy	3.0	3.0	-.52(.60)	2.0	2.0	-.15, (.88)
Social influence	3.0	3.0	-.21 (.03)**	3.0	3.0	-.25 (.80)
Facilitating conditions	3.0	3.0	-1.98 (.05)**	3.0	3.0	.00 (1.00)
Anxiety	1.0	1.0	-.55(.58)	1.0	1.0	-3.26 (.00)**
Attitude	3.0	3.0	-.39(.70)	3.0	3.0	-.977 (.33)
Behavioural intention	3.0	3.0	-.45(.65)	3.0	3.0	-3.27 (.00)**

*Mann-Whitney U test
**Statistically significant

8.5.7. Moderators of UTAUT constructs

We conducted bivariate analysis which showed that participant responses for performance expectancy, effort expectancy, social influence, behavioural intention, and use constructs were *independent* of age, number of persons living with a client, MMSE, SAS, RAWS-CV, FASQ self-rated, FASQ caregiver or proxy-rated, ADL and client gender. Also, these main UTAUT constructs were *independent* of Living, Housing arrangement, Homecare visit frequency and Type of home care service received. As these variables were independent of UTAUT constructs, we did not include it in the PLS model.

8.6 Focus groups

Focus groups of 1.5 hours duration were conducted in February 2015: 3 in Grande Prairie and 4 in Calgary. The focus group information letters and consent forms are provided in Appendix G. The ten focus group questions are provided in Appendix H. Table 17 lists the numbers of focus groups and participants. A total of three focus

groups were held in Grande Prairie, ranging from 2 to 5 participants in each. In Calgary, there were a total of four focus groups with participants ranging from 2 to 6. In one Calgary-based focus group session with caregivers, a client also attended with her spouse. The dyad expressed interest in attending together. The client's presence was welcomed by the caregivers. In all, 15 caregivers and 9 stakeholders participated in the focus groups. Caregivers included spouses and adult children and included in-laws. Stakeholders included representatives of the Grande Prairie RCMP, the Calgary Police Service, Home Care Case Management, Rehabilitation, and PCN/Social Work.

Table 17. Focus group participants in Grande Prairie and Calgary

Location	Caregiver	Stakeholder
Grande Prairie n=12 participants	Session A: n=4 Session B: n=2	Session C: n=5
Calgary n=13 participants	Session D: n=3 Session E: n=6*	Session F: n=2 Session G: n=2
	15 caregivers	9 stakeholders

*Does not include one client attendee.

All focus groups were audio recorded and transcribed verbatim. They were analyzed for common words or phrases that appeared with each of the nine focus group questions. Below are themes corresponding to the respective questions, among caregiver and stakeholder groups.

Focus group question and summary of responses

1. Describe your experience in living with (or working with) persons at risk for getting lost or wandering.

Caregivers

- Caregivers were looking after care recipients who all had Alzheimer disease or related dementia: 2 wives, 5 husbands, 3 father, 1 stepmother, 2 mother, 1 mother-in-law.
- All but one caregiver used one of the GPS devices throughout the study.

- One caregiver described why his father exited the study: *"Unfortunately in January my father had sort of the last big wander when he went outside in the very cold weather improperly dressed and that triggered it. So, he's now in the hospital awaiting long-term care. So, unfortunately we had to exit from the program at the beginning of January".*
- Another caregiver explained why his dad could not participate in the study: "*The timing for us was a little unfortunate, dad got lost a week before we got the device. He was out till 1:00; we live near --- Shopping Centre. He made it all the way over --- to --- till 1:00 in the morning. The police were out looking for him. There must have been 10 guys looking for him for 6 hours. They were ready to call out a helicopter to find him except it was down for repairs. If we had had that device we could have found him within half an hour. We would have known exactly where he was. He went for a walk on the hill. The savings, if you want to put it in very crude sort of money terms, to save a group of police and the helicopter being called out probably would have paid for a year or more of use of that [device]."*

Stakeholders

- The participants were care manager with dementia care team, home care case manager, occupational therapists, PCN/social worker, representatives from the Alzheimer Society of Alberta and Northwest Territories, Grande Prairie RCMP and Calgary Police Service.
- Grande Prairie RCMP:
    - In 2014, there were approximately 15 occurrences of missing persons related to somebody who might just be "lost because of a medical condition like dementia or Alzheimer's". The RCMP does not collect separate data on why individuals are missing.
    - *"I do recall one incident … where a lady left a care facility and she was found in the spring. She had died. It might be something to look at in terms of, could you keep a bank of them [GPS devices] at the nursing station and if you want to leave you sign out watch number four or lanyard number four and then you can keep track of where they're going."*
    - "*The RCMP has to be very, very careful when associating ourselves to*

tracking and monitoring programs. We're not in the business of tracking and monitoring people. And it actually could have a very negative impact on the program if you said the RCMP are our direct partner… Some people will look at this as Big Brother and it's not. And [the] reason why we're a stakeholder."

Calgary Police Service

- *"We've had a number of instances where seniors, typically, leave their normal place of residence and then are found close by or at great distances, but it takes an extraordinary amount of resources sometimes to try and locate those people. And – but for the grace of God in some instances they are located safe and sound in the vast majority of cases, but we've also had those instances where, you know, technology such as this would have assisted us."*
- The participant described a time when there was a couple who were missing. The man had vision issues, the woman could see and guide him where to go, but she had dementia. They drove to a forest service road, tried to walk out, but they didn't survive. "*It's beneficial technology, … there certainly are some instances where it could be helpful".*

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2. Describe your experience using a locator device like the ones used in this study.

Caregivers

- Caregivers described 7 clients who used the device on a lanyard (two kept it in their pockets because the lanyard was short, another put it in an old cell phone case clipped to his belt), 3 clients who used the watch, and one used the insoles inside her slippers.
- One caregiver used both the locked and unlocked features of the watch.
- One person chose the lanyard over the watch which was considered to be too big.
- One person used both the device on a lanyard and the watch.

Stakeholders

- Staff in homecare facilitated the research project by serving as contact person

between management and potential clients. This person was "*part of the regular working group as well as the selection committee for the devices [vendor*]".

- Health care staff member "*negotiated, got [a client] onto the project [so that] he can go and play pool at one of the neighbouring facilities, he can go out, go for a walk and it was through a managed risk agreement … the family did want to be able to give him more independence."*
- Alzheimer Society involved indirectly. "*Regional offices get a lot of questions about technology, what works, what doesn't."* Offices give recommendations, provide education to caregivers. They have received "*a lot of positive feedback"*. *"However, there are a few people who have wanted to be part of the project but the person was too far advanced"*. "*Caregivers are concerned about transition, that is when they need the technology support, it can reduce caregiver anxiety when, in that period of time, a person hadn't got used to living in their new home, and we all know how adept people can be in exiting [going out]."*
- For first responders, it would be helpful for a family member to provide the last GPS coordinates of a lost person, "*we can easily enter the GPS coordinates that are provided to us and it will pop up on our maps and we can go directly from there*."

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3. Describe your experience responding to a call initiated or triggered using a locator device.

Caregivers

- Tracking and communication: When asked if she could locate her husband, a caregiver responded, "*Absolutely, yeah. Well, the only button he can push is the SOS button and he pushes that, it contacts my cell phone and then that's all." "No, he can't really hear me, but I know where he is. Sometimes I just let him walk, because it calms him, and then I go get him and then we go for a drive*."
- Vendor support: one caregiver commented that he sought help from Bob at SafeTracks (vendor) and, *"he said just make your [geofence] zone a little bit wider and a bit deeper – it goes out and it will bounce off the neighbour's house and it will pick it up. As soon as changed that, it's been terrific; you just have to make it a little*

bigger".

- Facility living and false alarms: The technology was used by a caregiver to monitor a client living in a facility. The caregiver was receiving "*wrong readings*" (false alarms) which she attributed to sun dog in December. When she received a notification that her mother was "*out of bounds*", she treated it as a true reading, she called the facility to "*make sure her mum was there. It took her [staff] over twenty minutes to find her [mum], because she was in an area of the [facility] where she doesn't normally go."*
- In another case, a caregiver did get a false alarm reading. When she called, the LPN went to check on her husband and said, "Oh, no, he's sleeping in his bed", "Oh, that's good," and then I got another call about 10 minutes later saying yes, he was back and within the geo fence.
- Managing agitation: One caregiver described an incident when she was in a meeting when she received a text message on her cell phone to alert her that her husband was "*out of bounds*". She didn't have internet so she rushed home to use her laptop to locate her husband. "I went in and the house is empty, the doors are wide open, and the girl's (health care aide) gone too. "He asked her to leave, you can go now, I don't need you anymore, and she said no, I'm not going, and he said, well, then I am, and away he went out the door". He had gone to the hospital, the health care aide followed him, stopping traffic along the way. The caregiver arrived and was able to calm her husband because she was familiar to him.

Stakeholders

- In the previous incident where the caregiver found her agitated husband and his healthcare aide in the hospital, the caregiver was meeting at the Alzheimer Society when she received the alert message on her cell phone.
- Aside from sharing information about the study with potential clients and caregivers, other stakeholders did not experience a call being initiated or triggered.

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4. What do you like BEST about the locator device used in this study (specify device).

Caregivers

- You can find the person very quickly
- It shows the exact address
- It works well in remote areas
- It gives us peace of mind over everything
    - "*The device doesn't mean a thing to her, it really doesn't, not a darn thing. She's a bit annoyed and she has to carry it and she will once in a awhile say, "I'm carrying it. But then she forgets of course. For us, it's a big deal cause it gives us piece of mind over everything".*
    - *"What I like best is, it is such a peach of mind, just to know that if he does go wandering off that I can track him … there are so many times I've wished I would have had it prior to this, that it would have been so helpful and saved us a lot of stress".*
    - *Absolutely … the peace of mind. I work a lot, so I was gone half the time and --- was there, spent a lot time home alone. I had 10 hours of homecare, so it was a constant worry. And if I came home and he wasn't there, in a panic, and so yes, it works wonderful.*
- There is comfort in knowing: "Once she had it on she carried it with her and it was really good. It was great that I had that comfort knowing I could track it if I had to… about November this year and then my mom had a fall and ended up breaking her pelvis and in the hospital. So, now she's just gone into long-term care. And we are using this anymore. But it was well worth it while we had it [GPS device].
- Allows client to engage in activities: *" it's been such a relief to us to be able to have it, and for him to be able to go out and about. He goes down to another part of the building to play pool with his friend, and he would not be able to do that otherwise, because he's in a locked unit."*

Stakeholders

- The vendor and technology is flexible enough to take into consideration older adults' needs, e.g., for an elderly couple, the caregiver may not be comfortable with technology and prefer that the notification contact be her adult son who lives in another province.

- *Device didn't require caregivers to be at [home] (platform is mobile)*
- *It was easy to use globally*
- *Technology was really easy to charge*
- *The program reduces the impact and workload on an already overworked detachment (police)*
- *Up to 60% with dementia will wander. And since we've had people involved in the project we've had no reports of anyone needing to call the police.*
- *It's nice to have the variety. Some clients would really benefit from having a [SOS] but others would not take it with them, would leave it, the insole is more appropriate.*

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5. What do you like LEAST about the locator device used in this study?

Caregivers

- A caregiver was frustrated because her husband was not aware of the SOS button which he can use to contact her.
- One caregiver had difficult opening the platform on Safari. She was able to use it on Firefox.
- A caregiver stated that she "found it so technical". When she returned from a weekend, she was denied access.
- For another caregiver, the system was "a little bit slow".
- A common concern was that the client doesn't wear or take the device.
    - *"He didn't have it on that night: he got out the door without it, so I was out looking for him for an hour."*
    - She would take the device, unless it "*was attached to an emotion*". The caregiver was firm and said that if she didn't take the device, it would be taken away from her. From then on, the client would carry the device.
    - "*My biggest problem, is keeping it on him".*
- The device does not allow user to call back after it is activated. Call back would be a real benefit.
- There is no indicator light on it to let user know that battery charge is low. This is

important, because when the battery is dead, the device does not function and caregiver cannot track user.

- One user didn't like that the device was all grey.
- *"What I like least is that the program is ending and we have to give it up. We are already worried, cause the wandering is increasing incrementally so we are keeping more and more an eye on her and we're worried about that."*
- Another dislike with certain devices was that the client could hear the caregiver, but the caregiver couldn't hear the client. Occasionally, the watches had two-way communication difficulties. Several watches were replaced for this reason but it would repeatedly occur.
- *I didn't like the false alarms.*
- *We were offered a man's insole and we had to go shopping and find a slipper that she would wear, and that the insole would fit in.*
- One client did not like the lanyard, he would take it off and carry it in his pocket.

Stakeholders

- Technology may be too advanced for users who do not have immediate family to help. This could be a service that a vendor or provider could pick up, e.g., CBI, WeCare.
- A call centre is missing and should be the next step (this participant was not aware that the devices were linked to a call centre)
- Insoles not always fitting shoes despite that they could be trimmed.
- The watch should have two-way communication (this device does have two-way communication, but the participant was not aware)
- The devices should be introduced to clients earlier in the disease process. This would increase their chances of taking it with them (habit).
- Battery life, keeping the devices charged, clients don't always remember or know how to charge the devices, they require caregiver assistance.
- Lanyards are easy to remove. A watch is good only if a person is used to wearing a watch.

6. Comment on the web interface platform (i.e., mobile phone, laptop, desktop) associated with the device used in this study.

Caregivers

- Some caregivers used the platform just on their computers, others on their mobile phones, tablets (iPad). The interface on a laptop or desktop was well accepted. But the interface on mobile devices was difficult to navigate.
- About the interface on mobile devices: "*The buttons I found very difficult to use", "the functionality from the main website was not on the mobile site*".

Stakeholders

- Some caregivers expressed "*initial alarm around the satellite drift piece*" (referring to the false alarms), "[*they would] rather get extra alerts rather than not the alerts [they] need*".
- Dyads may not have used all of the features of the devices: "*the families that I've had any information from, they've set it up on a very basic kind of a sense. I think that a lot of families weren't using it to the full extent that it could potentially be used."*

7. In your opinion, what would be a reasonable cost for the device and service?

Caregivers

- In general, caregivers expressed that the technology and service should be available to anyone who needs it, "*If you can afford $100 a month, great; if you can only afford $20 a month, great."*
- The following quotes suggest a range of costs and options from purchase to rent or lease in order to access these devices.
    - *"I would say something under $100 would be reasonable".*
    - *"I think at the most it should be about $30 to $40 a month".*
    - *"You can pay for emergency phones $17 a year or $18 a year".*
    - *"You buy the device outright, or you could rent it, or if it was used previously,*

there was a different charge".

- *"A moderate user fee, $15 a month comes to mind because it's not just the device, there are some smarts behind it that are monitoring it and improving it and that would have to be recognize."*
- *"At $40 a month roughly for monitoring – because I think that's feasible for everyone to do."*

- Comparison with homecare service: "*I figure $400 for Alberta Health versus 10 hours of homecare a week. I think that if you've got a device, and they take it, it'd sure be cheaper for government than homecare. And it will reduce homecare costs*."
- Some caregivers expressed they would not be able to afford a device:
  - *"It would be difficult for me to pay for it at this point. If the device was given, was paid for, then yes, perhaps to look after the monthly fee or what not could be arranged. I don't think anybody should be denied.*
  - *"If a person can afford it, it would be a great thing, but the question comes down to who can afford it and is there help for them to be able to afford it. Myself, I'm struggling financially…"*
- The value of a GPS device is captured in this quote, "*Well, you can't really put a price on it, that's the trouble"*.

Stakeholders

- Is subsidy an option, and how much: *"Sliding scale that takes into account the household income." "We look at having vendor care go in to provide medications to clients and we charge different services based on the income you have, and if your income is below a certain amount there is no cost to you because you're truly deemed".* This individual stated that a client should not have to choose whether they pay for medications or for the service to give medications if they can only afford one.
- Cost savings in other areas: "*If we're not having police go out or we're not having EMS go out [to look for someone who has] been out there for 10 hours and it's minus 30, certainly it saves [costs]…"*
- What is reasonable cost: *"[Cost] is out of reach for some people, like anything is, but the majority of people not unreasonable. "Some would do it for that peach of mind".*
- Generational differences: "*I'll use my dad who is 89 … he would be fine with the $35*

a month cost, but the cost of the initial piece, he would think that was dreadfully expensive, but that's his generation. I'm used to paying $100 a month for my service with internet on my smartphone."

- Give people a choice: "*People [should] have a choice whether they want to use it or not. I can have a $100 [device], or this one for $200. I think as long as there's a choice. You used to rent your telephone and then it was a monthly charge*.
- Another perspective on reasonable cost: *"If the study says people will use this device for six months on average, well is it wise investment to outlay $400 for the acquisition? So $35 a month [comes out to less than] $350 for that time frame."*

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8. Who should pay for this device (specify) and service?

Caregivers

- Alberta Health Services should pay:
    - *"AHS should have this for people with Alzheimer's, is going to possibly reduce the expense in other areas, like a police department."*
    - *"AHS should largely pay for it cause I think it would be a net savings from hospitalization. How about prescribe-able by a doctor."*
    - *"I'd like the government to pay for it."*
    - *"The cost of the device, the monitoring of the device should be paid for by AHS because we, as individuals, have to buy a phone to make it work".*
- Health insurance should pay: "*Blue Cross … [but] not everybody [has]. As far as I'm concerned, this is a necessity for my husband to continue living … to stay safe. It's a medical device, like a wheelchair. So, why wouldn't they help out with that cost?"*
- Cost share:
    - "It should be available to everybody and I think that Alberta Health *Services should be sharing the cost of it. It's just like Alberta Aids for Daily Living, this is an aid for daily living, a very important one."*
    - *"I think that the device should be paid for by the government and the access and monthly fee should be paid for by the individuals so there's a shared cost."*

- Users pay:
    - "*Am I willing to pay for it? Absolutely."*
    - *" I haven't said it to mum, but I believe that we need to buy one and just carry on. It gives us some peace of mind and gives dad the freedom that he needs."*

Stakeholders

- Alberta Health Services:
    - *"low income families …those families were so successful because … they didn't already have the financial ability to already explore some of these [options]. We do have some more affluent families that using this technology and loving it and those would probably not be the clients we would worry as much, they would find the means to purchase."*
    - *"A lot of our seniors are on a very fixed budget and a lot of them are considered to be very low income and that is a big concern for a lot of our families".*
    - *"A lot of our seniors who didn't pay into Blue Cross rely on Seniors Benefit. This population is growing because they were forced into early retirement or quitting their jobs as a result of their disease. [There] has to be funding to bridge that age change".*
- Subsidies:
    - "I think that AHS is going to see a benefit in terms of longer term stays in the community, and there should be some subsidies.
- Special needs funding: "Maybe there is special needs funding".
- Substitute with funding from homecare services:
    - "*Respite cost of four hours a week compared to $40 a month, there's no comparison".*
    - "*Client might not want someone to be [in his home], yet they're not safe to be on their own. So there's huge benefits, there are huge cost benefits."*
- *Issue with linking access to being a homecare client: "There are people eligible for this [device], for example, those living in group homes, but they are not eligible for homecare.*
- Rental program:

- "[Can it] become another device like a bathing device, does it fall under AHS.
- "Aids for Supportive Living"

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9. Would you recommend this device to people at risk for wandering, and their families?

Caregivers

- "*Absolutely, I think that as soon as you get a diagnosis of Alzheimer's, you should be handed one of these things."*
- *"Not everyone wanders, but I just think that they should be available to everybody."*
- *"Alzheimer's is so unpredictable; tomorrow it could be totally different than today. Like the only time I've seen my husband totally get lost was in a mall we go to all the time, he was literally frozen and absolutely fearful. I just want to make sure that he's never going to feel alone or desperate."*

Stakeholders

- *"I would probably recommend it in the vast majority of cases".*
- *"We did have a few caregivers who I feel were experiencing far too much caregiver burnout, and they were saying this is too much, like just the slight learning curve of doing it was more than they could manage."*
- Clients with other conditions or in other environments: *"The Autism Society … should be aware of the [technology]."*

9.SUMMARY OF EVALUATION RESULTS

- The locator device was used by clients and caregivers on a regular basis, for an average of 5.8 months, especially when clients walked outside. It provided independence to clients during activities of daily living (ADL), and "peace of mind" to caregivers by facilitating communication between caregivers and clients.
- The acceptance of a locator device by dyads was high as indicated by a high intention to use it in the near future.

- The usability of the device was high as indicated by the following: (1) high perception of usefulness of the locator device, (2) positive attitude toward the use of the locator device, (3) importance of influence of others in using the locator device, (4) high acceptance of locator device, and (5) low anxiety toward use of a device.
- Usability questionnaires and focus groups provided similar feedback from clients and caregivers:
    - The locator device brought peace of mind to caregivers and allowed clients to remain active in their neighbourhoods. At the end of the project, several dyads continued to use their devices.
    - The locator device should be made available to dementia clients earlier, *before* signs of wandering, when they can consent to being monitored, and learn to use a locator device.
    - Although the locator devices are consumer products, participants believed that the cost should be shared or assumed by Alberta Health Services or the government because the devices could save costs in other sectors such as first responders, homecare and allow clients to stay in their homes longer.
    - Support for using the devices, either from the vendor, research team or a third party, was necessary to ensure successful adoption.
    - Stakeholders such as homecare, Alzheimer Society, and the police or first responders do not want to assume the role of monitoring, but they do play an important role as partners who can refer clients to the technology, or use the GPS coordinators to narrow their search when a client is lost.

10. RECOMMENDATIONS

Based on the results of this evaluation, we propose the following six recommendations:

1. When deploying locator devices, consider providing them to earlier stage dementia clients who can participate in their care plan and while they have the capacity to

determine whether or not they agree to be monitored when their disease progresses.

2. Funding for locator devices and associated telecommunications could take into consideration capacity of users to pay and subsidization by public funding.
3. The role of monitoring would remain with caregivers of clients. First responders such as EMS, police, RCMP could use the GPS data when contacted about a missing person to locate the person. Stakeholders, such as the Alzheimer Society and health service providers, could provide information about the technology to raise awareness among potential users who wish to access it.
4. In this evaluation, all client participants were dementia clients, although the inclusion criteria allowed for clients with other conditions. Future deployment of this technology could be used with clients who have other conditions such as autism, developmental disabilities or mental health conditions.
5. Collaborate with police to collect prospective data on numbers of reported missing persons who have dementia. Currently, this data is not collected by police services. In Grande Prairie, a total of 247 missing persons were reported in 2013. Of the 257 persons reported missing in 2014, it was estimated that 7 to 15 were persons who had dementia (Wendy Hunt, Grande Prairie RCMP, personal communication, May 20, 2015). In Calgary, annual statistics are made public on the numbers of missing persons since 1995[12] (see Appendix G). This number for seniors aged 75 years or older has increased from 13 males and 6 females in 1995 to 68 males and 41 females in 2014. Therefore, it is estimated that in Grande Prairie, the numbers of persons with dementia who were reported missing consisted of 2.7% to 5.8% of the total number of persons reported missing. In Calgary, it is estimated the missing persons over aged 75 years or older increased from .7% of the total number of missing persons in 1995 to 3.6% in 2014.
6. Conduct a longitudinal study on the health economics of the use of locator devices, with outcome measures that examine impact of the technology on use and cost of health care services and first responder services.

[12] http://www.calgary.ca/cps/SiteAssets/Pages/Statistics/Calgary-Police-statistical-reports/Missing%20Persons%201995-2014%20-%20Age%20and%20Gender.pdf

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Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Toward a Unified View. *Mis Quarterly, 27*(3), 425-478.

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Project Title: Locator Device Project

Principal Investigators:

- Don Juzwishin, PhD, FCCHL, Director Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, University of Alberta, Edmonton. Phone: (780) 492-5108

What is a research study?

A research study is a way to find out new information about something. You do not need to be in a research study if you do not want to.

Why are you being asked to be a part of this research study?

We want to know if a global positioning system (GPS) device that looks like a cell phone can help people with memory problems be safe when they are walking alone outside their home. We invite you to use it and then tell us if you think this technology is useful to you. About 20 people will be in this study.

If you join the study what will happen to you?

- If you are not already a Home Care client, you will be admitted to Home Care and assigned a Home Care case manager.
- Your Home Care case manager will collect information from you at the start and end of this project, and do a short memory test with you.
- Your family member will also fill out some forms.
- You will be given a GPS device to use from January 2014 to September 2014. Once the study is completed you will return the GPS device to Alberta Health Services.
- The police will keep a file with your basic information including name, address, family representative name and contact information as well as two photographs so that they can help find you if are missing.
- You and your family member will also be invited to participate in an exit interview when you leave the study.

Will the study help you?

- This study will not stop you from getting lost but will help others to find you quicker if you do become lost.
- Being found sooner may help prevent injuries that could occur if you are lost. This may also help your family or caregiver worry less.

Will the study help others?

- The information you provide during this study will help us to make improvements to this device and provide others with access to this device.
- This device can support personal freedom, lessen the need for constant supervision, improve safety, and decrease stress related to wandering. The device can enhance

independence and safety for those wanting to stay living at home in community or supportive living settings (such as a lodge).

Does your decision maker know about this study?

- This study is being explained to your family member. You can talk this over with them before you decide.

Who will see the information collected about you?

- The information collected about you during this study will be kept safely locked up. Nobody will know it except the people doing the research. Your name and other identifying information will not be collected.

Do you have to be in the study?

- You do not have to be in the study. No one will be upset if you do not want to do this study. If you don't want to be in this study, you just have to tell us. It is up to you.
- You can also take more time to think about being in the study.

What if you have any questions?

- If you have a question later that you did not think of now, you can call or have your family member contact the project lead, Tracy Raadik-Ruptash at (780) 830-5063. You can also email her at: tracy.ruptash@albertahealthservices.ca
- You can also take more time to think about being in the study and talk some more with your family member about being in the study.

Other information about the study.

- You can change your mind and stop being part of it at any time. All you have to do is tell the person in charge. It is okay. The researchers and your family representative will not be upset.
- You will be given a copy of this paper to keep.

☐ Yes, I will be in this research study. No, ☐ I do not want to do this.

If you decide you want to be in this study, please sign your name.

I, _____, want to be in this research study.

_____ _____

Sign your name here Date

_____ _____ _____

Person obtaining Assent Signature Date

STUDY INFORMATION SHEET
(CLIENTS)

Title
What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators
- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)
- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

Background:
Safety of individuals is a priority for Alberta Health Services. It is good for our health to stay active within our homes and communities. Individuals often become confined to their homes for fear of becoming lost, distressed or injured. In addition, more care and supervision may be required. The Locator Device Project wants to help those with cognitive impairment such as memory loss. This project wants to reduce the risks of walking. Some of the risks are of becoming lost, distressed or injured. Locater technology that uses GPS can help manage the risks of getting lost or distressed. By wearing a GPS device, a walker who is lost or distressed can be located more quickly. This may help to ensure your safety. The GPS can help reduce stress and anxiety when you cannot be found and family are trying to find you. GPS can allow for more personal freedom. GPS may help you to be more independent and safer when out walking. It may also decrease your stress and your family's (caregiver's) stress if you go walking alone. The GPS device can help you stay as independent and safe as possible. The more independent and safe you are, the longer you can be supported to stay living at home in community or supportive living settings (such as a lodge). The use of locator technology may also assist first responders in helping to find you quickly and with fewer people if you become lost.

Purpose:
This project will test a GPS device to help individuals who may be at risk when walking alone away from their home. This project will study the GPS device and how easy it is to use.

Procedure

We are looking for participants between January and September 2014. You are invited to enter this project for as long as you wish, within this time period. To be a part of the project you must be living at home and be a Home Care client. If you are not a Home Care client, you will be admitted to Home Care. Each Home Care client is assigned a case manager. The case manager will complete an intake assessment with you and your family. This paperwork will take about 1.5 hours. The occupational therapist may also visit you at home.

As a part of this study, a researcher will get some information about you during a visit to your home at time agreed by you. This information includes your name, initials, postal code, telephone number, gender, type of residence (lodge), and basic health information such as major diagnoses. We will also obtain information from your medical records about the type of home you live in, whether or not you have been lost, your ability to do self care activities, your health condition and ability to get around.

You will be asked to do the following with a researcher:

- A short (10 minutes) cognitive screening test
- A short (5 minutes) questionnaire about your ability to get around

Your caregiver (family member) will be asked to:

- Complete a survey on caregiver burden (or stress) at beginning and end of the project
- A questionnaire about your ability to get around
- A questionnaire about whether or not you wander
- A questionnaire about your safety in your home and outside

You and your caregiver (family member) will be asked to participate in:

- One interview at the start of the project to understand your ability to get around and your expectations of the technology (1 hour)
- Keeping a log on your use of the locator device (5-10 minutes each entry)
- One interview at the end of the project to understand your experience using the technology (1 hour). A researcher will visit your home to do this interview.

We will also conduct one-on-one or group interviews with responders (EMS, police, RCMP, Emergency, health professionals) who may or may not have been contacted by the GPS technology in the event that you get lost or may need help when walking. All information collected by Home Care and the researchers will be used to evaluate the GPS technology.

You will be asked to wear a GPS device when you are walking outside, while enrolled in the project. A GPS device signals your location whenever you are carrying the device and it is turned on and charged. If you are missing and presumed lost, the GPS device

will allow you to be found by your family or emergency staff such as police. You can also use this device to contact your caregivers, like a mobile phone. If you need emergency help you can press a button and within 5 seconds you will hear someone from the call centre talk to you. If you need, the person will contact 911 for you to send an ambulance or police to your location.

Your caregiver(s) phone number and email address will be entered into the device. If you press SOS, the device will automatically send a message to your caregiver. The call centre will ask you for a “password” to verify you are the user. If you require emergency assistance, your GPS location will be shared with emergency medical services or the police.

The police may request to have pictures of you to help them know who you are. Any information that the police have will be kept in a separate file (name, address, family representative name and contact information, and two pictures -face and full-body). This information will be used with the GPS information to identify you and assist you should you be missing from home. Your information will not be put into the police database. It will be kept separate and private, and will be destroyed when you leave the project.

What are the benefits in taking part in this project?
The GPS device will not stop you from walking outside your home. It is meant to allow you freedom to walk with a backup plan in place. The GPS will help others find you if you go missing. The GPS will not prevent you from becoming lost, but it can help people find you sooner. The GPS can help you and your caregiver or family worry less. It can help prevent injury or death.

Possible Risks
There are risks when you walk outside of the home; you may become lost or injured. This device cannot prevent that. The GPS will however, allow for your family to find out where you are and get to you as quickly as possible. If you need help immediately, your caregiver or Home Care staff can call on the police or EMS to help them find you. You can also tell the device to contact 911 immediately. The device does not guarantee your safety. If you do not wear the device, or if it is not charged or if there is no cellular coverage, the device cannot transmit your location.

Voluntary Participation
Participation is voluntary and you can stop anytime. Your data can be withdrawn at any time before data analysis begins. Your relationship with your health provider (Home Care, family doctor) will not be affected if you choose not to participate or withdraw from the project.

Confidentiality
The research team will make every effort to keep your information private. All information you share follows Alberta Health Services and University of Alberta policies as well as the laws of Alberta and Canada. By participating, you give permission for the researchers to access identifiable health information needed for the research. The information collected will be kept confidential. As much as possible the information we keep will be anonymous; it will not have your name on it. We will guard your privacy as much as possible and your information will be used only for this project. Any electronic information will be stored at secure AHS or University of Alberta locations. The information will be password protected. None of this electronic information will include your name or medical information. Only the members of the research team will have access to this data. All records will be destroyed after five years.

Contact Names and Telephone Numbers
If you have concerns or questions about your rights as a participant, you may contact:

- University of Alberta Research Ethics Office at (780) 492-2615. This office is not connected with the study.
- Tammy Hopper, Associate Dean, Graduate Studies and Research, Faculty of Rehabilitation Medicine, University of Alberta; Phone: (780) 492-0836
- Tracy Raadik-Ruptash, Project Lead, Health Technology Assessment & Innovation, Alberta Health Services; Phone (780) 830-5063

CLIENT CONSENT FORM

PART 1

What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators

- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)

- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

PART 2

	YES	NO
Do you understand that you have been asked to be in a research study?	□	□
Have you read and received a copy of the attached Information Sheet?	□	□
Do you understand the benefits and risks involved in taking part in this research study?	□	□
Do you understand who will have access to the information you provide, including personally identifiable health information?	□	□
Have you had an opportunity to ask questions and discuss this study?	□	□
Do you understand that you are free to withdraw from the study at any time without having to give a reason.	□	□
Has the issues of confidentiality been explained to you?	□	□

Who explained this study to you? _____

I agree to take part in two interviews: YES □ NO □

Signature of research participant: _____

(Printed Name): _____

Date (D/M/Y): _____

Signature of Witness: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee _____

Date (D/M/Y): _____

STUDY INFORMATION SHEET
(CAREGIVERS)

Title
What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators
- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)
- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

Background:
Safety of individuals is a priority for Alberta Health Services. It is important to stay active and mobile within our homes and communities. Individuals often become confined to their homes for fear of becoming lost, distressed or injured. In addition, enhanced care and supervision may be required. The Locator Device Project is intended to support those experiencing cognitive impairment such as memory loss. Those with cognitive impairment can benefit from support to *walk safely*. *Walking safely* means minimizing the risks that may be encountered when walking. Some of the risks are of becoming lost, distressed or injured. Locater technology that uses GPS can help manage the risks of walking for those with cognitive impairment. By wearing a GPS device, a walker who is lost or distressed can be located more quickly, better ensuring their safety. There can be reduced stress and anxiety when an individual may have wandered and needs to be located. Locator technology can support personal freedom, lessen the need for constant supervision, improve safety, and decrease a client's and caregiver's stress related to wandering. The device can enhance independence and safety for those wanting to stay living at home in community or supportive living settings (such as a lodge). The use of locator technology may also assist first responders in helping to reduce the time and manpower required to locate an individual who may be lost.

Purpose:
This project will seek out and test a GPS device to help individuals who may be at risk when walking alone away from their home. This project will examine the device and explore the user's experience with it.

Procedure
We are accepting participants between January and September 2014. Your family member is invited to enter this project for as long as he or she wishes, within this time period, but he or she has to be living at home and be a Home Care client. If he or she is not a Home Care client, he or she will be admitted to Home Care. Your family member will be assigned a case manager and an intake assessment will be completed. This paperwork will take about 1.5 hours. The occupational therapist may also visit your family member at home.

A researcher will get some information about your family member during a visit to your family member's home at an agreed time. This information includes his or her name, initials, postal code, telephone number, sex, type of residence (lodge), and basic health information such as major diagnoses.

Your family member will be asked to do the following with a researcher:

- A short (10 minutes) cognitive screening test
- A short (5 minutes) questionnaire about his or her ability to get around

You will be asked to:

- Complete a survey on caregiver burden (or stress) at beginning and end of the project (10 minutes)
- A questionnaire about your family member's ability to get around (5 minutes)
- A questionnaire about your family member's wandering behavior (10 minutes)
- A questionnaire about your family member's safety at home and outside (10 minutes)

You and your family member will be asked to participate in:

- One interview at the start of the project to understand your family member's ability to get around and your expectations of the technology (1 hour)
- Keeping a log on your use of the locator device (5-10 minutes for each entry)
- One interview at the end of the project to understand your experience using the technology (1 hour). A researcher will visit your family member's home do this interview.

We will also conduct one-on-one or group interviews with responders (EMS, police, RCMP, Emergency, health professionals) who may or may not have been contacted by the GPS technology in the event that your family member gets lost or needs help when walking. All information collected by Home Care and the researchers will be used to evaluate the GPS technology.

Your family member will be asked to wear or carry a GPS device when he or she is walking outside. A GPS device signals his or her location whenever he or she is carrying the device and it is turned on and charged. If he or she is missing and

presumed lost, the GPS device will allow him or her to be found by you or emergency staff such as police. He or she can also use this device to contact you, like using a mobile phone with your number in speed dial. If your family member needs emergency help he or she can press a button and within 5 seconds will hear someone from the call centre talk. If he or she needs, the call centre will contact 911 send an ambulance or police to your location.

Your phone number and email address will be entered into the device. If your family member presses SOS, the device will automatically send a message to caregiver. The call centre will ask your family member for a "password" to verify he or she is the user. If he or she requires emergency assistance, the GPS location will be shared with emergency medical services or the police.

The police may request to have pictures of your family member. Any information that the police have will be kept in a separate file (name, address, family representative name and contact information, and two pictures - face and full-body). This information will be used with the GPS information to identify your family member and assist him or her. His or her information will not be put into the police database. It will be kept separate and private, and will be destroyed when you and your family member leave the project.

What are the benefits in taking part in this project?
The GPS device will not stop your family member from walking outside his or her home. It is meant to allow him or her freedom to walk with a backup plan in place. The GPS will help others find him or her if he or she is missing. The GPS will not prevent your family member from becoming lost, but it can help people find him or her sooner. The GPS can help you and your family member worry less. It can help prevent injury or death.

Possible Risks
There are risks when your family member walks outside of the home; he or she may become lost or injured. This device cannot prevent that. The GPS will however, allow you to find and get to your family member as quickly as possible. If your family member needs help immediately, you or Home Care staff can call on the police or EMS for help. Your family member can also tell the device to contact 911 immediately. The device does not guarantee your safety. If you do not wear the device, or if it is not charged or if there is no cellular coverage, the device cannot transmit your location.

Voluntary Participation
Participation is voluntary and you and your family member can stop anytime. Your data can be withdrawn at any time before data analysis begins. Your family member's relationship with his or her health provider (Home Care, family doctor) will not be affected if you both choose not to participate or withdraw from the project.

Confidentiality
The research team will make every effort to keep your information private. All information you share follows Alberta Health Services and University of Alberta policies as well as the laws of Alberta and Canada. By participating, you give permission for the researchers to access identifiable health information needed for the research. The information collected will be kept confidential. As much as possible the information we keep will be anonymous; it will not have your name on it. We will guard your privacy as much as possible and your information will be used only for this project. Any electronic information will be stored at secure AHS or University of Alberta locations. The information will be password protected. None of this electronic information will include your name or medical information. Only the members of the research team will have access to this data. All records will be destroyed after five years.

Contact Names and Telephone Numbers
If you have concerns or questions about your rights as a participant, you may contact:

- University of Alberta Research Ethics Office at (780) 492-2615. This office is not connected with the study.
- Tammy Hopper, Associate Dean, Graduate Studies and Research, Faculty of Rehabilitation Medicine, University of Alberta; Phone: (780) 492-0836
- Tracy Raadik-Ruptash, Project Lead, Health Technology Assessment & Innovation, Alberta Health Services; Phone (780) 830-5063

CAREGIVER CONSENT FORM

PART 1

What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators

- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)

- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

PART 2

	YES	NO
Do you understand that you have been asked to be in a research study?	□	□
Have you read and received a copy of the attached Information Sheet?	□	□
Do you understand the benefits and risks involved in taking part in this research study?	□	□
Do you understand who will have access to the information you provide, including your loved one's personally identifiable health information?	□	□
Have you had an opportunity to ask questions and discuss this study?	□	□
Do you understand that you are free to withdraw from the study at any time without having to give a reason.	□	□
Has the issues of confidentiality been explained to you?	□	□

Who explained this study to you? _____

I agree to take part in an interview: YES □ NO □

Signature of research participant: _____

(Printed Name): _____

Date (D/M/Y): _____

Signature of Witness: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee _____

Date (D/M/Y): _____

UNIVERSITY OF ALBERTA

Alberta Health Services

LDP Referral Form

Client Study Code:

Client (GPS User) Name:		PHN:
Address:		
Postal Code:	Phone number: (Area Code)	
Diagnoses (related to cognition or wandering):		
Informal Caregiver Name:		
Relationship to client:		
Address:		
Postal Code:	Phone Number: (Area Code)	
E-mail address:		
Highest level of education:		
CLIENT INFORMATION		
1. Client year of birth:		
2. Client Gender (Mark ONE box):	☐ Female	☐ Male
3. Client Most recent MMSE score (if available and completed within 30 days):		
4. What is your current living arrangement? (Mark ONE box):		
☐ Live with spouse	☐ Live with spouse and child(ren)	☐ Live with child(ren) and no spouse
☐ Live alone	☐ Other (Specify)	
5. Number of members in client household?		
6. Client demonstrating existing Wandering behaviour?	*Circle* ***Yes***	***No***
7. Describe how wandering behavior (or risk) is addressed in the client care plan.		
8. List additional caregivers (friends, family, neighbours, etc.) who support the client and how.		
9. Describe your housing (check all that apply)		
☐ House detached	☐ Seniors lodge	
☐ Condominium/Apartment	☐ Group home	
☐ Rental	☐ Supportive Living (level_____)	
☐ Owned	☐ Private	
☐ Retirement community	☐ Other (describe):	

GPS devices in close proximity to implanted health devices may cause interference. Does the client have an implanted device (such as a defibrillator or pacemaker)? Circle **Yes** **No**

Once completed, scan and email to Tracy.Ruptash@albertahealthservices.ca.

Client study code:

10. How often does Home Care visit the client home? *(Mark only ONE box)*	
☐ Every day (seven days a week)	
☐ Several times a week	
☐ One day a week	
☐ Several times a month	
☐ Once a month, or less often	
☐ Several times per day - how many times?	
☐ Other (specify here)	
11. What type of service(s) does Home Care provide?	
☐ Case management	☐ Direct professional care
☐ Personal support services	☐ Respite care
☐ Adult day program	

12. Indicate to what extent the client can do the activities below. Mark only ONE box per item.

Client ability to do these activities	With no help	With some help	Unable to do	Describe type of help provided
a. Walking outside the home				
b. Toileting				
c. Dress & undress self				
d. Grooming (comb hair, brush teeth)				
e. Manage medications				
f. Use the telephone				
g. Shopping				
h. Make meals				
i. Housekeeping				
j. Do laundry				
k. Driving or Use of transportation*				
l. Manage money (banking)				
m. Bathing				
n. **				
o. **				

*transportation: can you get to places out of walking distance with a car or other means (e.g., bus, train)?
**add any additional IADLs that you think should be included.

Print Name of Case Manager who completed form
Cell number:
GPS device recommended:

DATE (DD /MM/ YYYY)

LDP Office Use Only
Date of receipt:
Date of Response to HC CM (within 72 hours):
Notes:

UNIVERSITY OF ALBERTA

Alberta Health Services

Client (GPS User) Initial Questionnaire			
This questionnaire helps us understand what factors affect your use of GPS in daily life. Please rate items 1 to 18 using the scale to show your level of agreement. Mark only one X in a box per item.			
Item	 **Disagree**	 **Neutral**	 **Agree**
1. The GPS would increase my independence.			
2. Using the GPS would help me with my daily activities (e.g., activities outside of the home; shopping, transportation).			
3. I would find the GPS useful to inform my caregiver where I am.			
4. Learning to use the GPS would be easy for me.			
5. Even with the GPS, I worry about getting lost when I walk outside.			
6. The GPS will help me feel more confident walking outside			

PE: 1, 2, 3; EE: 4. 7; SI: 9, 10; FC: 11, 12; BI: 16, 17; ATT: 6, 8, 13, 14; ANX: 5, 15, 18

Client Initial Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
7. I would find the GPS understandable to use.			
8. I am happy to use the GPS so I do not get lost when walking outside.			
9. People who are important to me think that I should use the GPS.			
10. My caregiver should support the use of the GPS.			
11. Using the GPS is well matched to my health needs.			
12. Given the resources that I have, it would be easy for me to use the GPS.			
13. I think it is important for me to wear the GPS.			

PE: 1, 2, 3; EE: 4. 7; SI: 9, 10; FC: 11, 12; BI: 16, 17; ATT: 6, 8, 13, 14; ANX: 5, 15, 18

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Client Initial Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
14. I have confidence in the GPS technology.			
15. Using the GPS causes me concern about people I don't know finding information about me.			
16. I am willing to use the GPS.			
17. I plan to use the GPS in the in the near future.			
18. I feel apprehensive about using the GPS.			
19. How do you expect your life to change by using the GPS?			

PE: 1, 2, 3; EE: 4. 7; SI: 9, 10; FC: 11, 12; BI: 16, 17; ATT: 6, 8, 13, 14; ANX: 5, 15, 18

Revised Sept 22, 2014(2)

Client (GPS User) Exit Questionnaire			
This questionnaire helps us understand what factors affect your use of GPS in daily life. Please rate items 1 to 32 using the scale to show your level of agreement. Mark only one X in a box per item. Provide comments for items 33-39.			
Item	 **Disagree**	 **Neutral**	 **Agree**
1. By using the GPS, I had increased independence.			
2. Using the GPS helped me with daily activities outside of the house (e.g., shopping, transportation)			
3. The GPS was useful to inform my caregiver where I am.			
4. When I was lost, the GPS helped me contact my caregiver. Check if Not Applicable ☐			
5. Learning to use the GPS was easy for me.			
6. I found the system flexible to use.			

PE: 1, 2, 3, 4; EE: 5, 6, 7; SI: 8, 9, 32; FC: 10, 11, 16; FC-C: 12, 13, 14, 15; BI: 17, 18, 19; U: 20, 21, 22, 23, 24, 25; ATT: 27, 28, 29; ANX: 26, 30, 31

Client Exit Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
7. Overall, the GPS was easy to use.			
8. People who are important to me thought that I should use the GPS.			
9. In general, my caregiver should support the use of the GPS.			
10. Given the resources that I had, it was easy for me to use the GPS.			
11. Given the support I had, it was easy for me to use the GPS.			
12. The GPS was water resistant when it dropped in water (toilet, tub or sink) Check if Not Applicable ☐			

Client Exit Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
13. The GPS was comfortable to use (e.g., it was not heavy, the size was right).			
14. The GPS is break resistant when it drops (e.g., does not break easily). Check if Not Applicable ☐			
15. The device assisted me with getting emergency help (e.g., police). Check if Not Applicable ☐			
16. Using the GPS was well matched to my health needs.			
17. If possible I would use the GPS in the future.			
18. I plan to use the GPS in the future if I am able to do so.			
19. I would intend to use the GPS in the future if I am able to do so			

Client Exit Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
20. I used the GPS when I was lost. Check if Not Applicable ☐			
21. I used the GPS two-way calling system. Check if Not Applicable ☐			
22. I wore the GPS on a regular basis.			
23. I used the GPS when I walked outside.			
24. I used the GPS frequently.			
25. I used the GPS when I stayed in the house alone.			
26. I felt nervous about using the GPS.			

Client Exit Questionnaire (continued)			
Item	 **Disagree**	 **Neutral**	 **Agree**
27. I think it was important for me to wear the GPS.			
28. I trusted the GPS technology.			
29. In general, using the GPS was a good idea for my health needs.			
30. Using the GPS, caused me concern about people I didn't know finding information about me.			
31. I hesitated to use the GPS for fear of others having access to my health information.			
32. My friends think I should use the GPS.			
33. What did you like BEST about the GPS?			

Section C (Client Exit Questionnaire - continued)
34. What did you like LEAST about the GPS?
35. Comments on the GPS
36. Would you consider paying for this service? (Circle one) YES NO
37. How much would be an appropriate monthly fee to pay for this service?
38. Do you think that another organization should pay for this service? (Circle one) YES NO
39. If yes, which organization should pay for this?

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Caregiver Initial questionnaire					
This questionnaire helps us understand what factors affect your relative's or care recipient's (replace "_____" with name) use of GPS in daily life. Please rate items 1 to 25 using the scale to indicate your level of agreement. Mark X in one box per item. Provide your comments for item 26.					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1. In general, _____ thinks I should support the use of the GPS.					
2. The GPS would increase _____'s independence.					
3. Using the GPS would help _____ with daily activities (e.g., activities outside of the home; shopping, transportation)					
4. _____ would find the GPS useful to inform me about his (or her) location.					
5. In general the GPS would assist _____ in daily activities outside of the home.					
6. GPS use would increase the quantity and quality of _____'s daily activities (e.g., shopping, transportation).					
7. GPS use would make it easier for _____ to do daily activities outside of the home (e.g., shopping, transportation)					

PE: 2, 3, 4, 5, 6, 7; EE: 8. 9, 10; SI: 1, 11, 12, 13; FC: 14, 15, 16; BI: 22, 23, 24; Att: 17, 18, 19; Anx: 20, 21, 25

Caregiver Initial Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
8. Learning to operate the GPS would be easy for _____.					
9. _____ would find the GPS easy to use and to understand.					
10. _____ would find the system to be understandable to interact with.					
11. People who are important to _____ think that _____ should use the GPS					
12. _____ friends think that he (she) should use the GPS.					
13. People that _____ trusts think that _____ should use the GPS.					

PE: 2, 3, 4, 5, 6, 7; EE: 8. 9, 10; SI: 1, 11, 12, 13; FC: 14, 15, 16; BI: 22, 23, 24; Att: 17, 18, 19; Anx: 20, 21, 25

Caregiver Initial Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
14. From what _____ knows of the GPS, it would be easy for _____ to use the GPS.					
15. Using the GPS is well matched to _____'s health needs.					
16. Given the resources that _____ has, it would be easy for _____ to use the GPS.					
17 _____ thinks it is important for him (her) to wear the GPS.					
18. _____ has confidence in the GPS technology.					
19. In general, _____ thinks that using the GPS is a good idea for his (her) medical condition.					
20. Using the GPS causes my relative concern about people he (she) doesn't know finding information about _____.					

Caregiver Initial Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
21. _____ hesitates to use GPS for fear of others having access to his (her) medical data.					
22. _____ is willing to use the GPS.					
23. I predict that _____ would use the GPS in the in the near future.					
24. _____ plans to use the GPS in the in the near future.					
25. _____ feels apprehensive about using the GPS.					
26. How do you expect _____'s life to change by using the GPS?					

Revised Sept 22, 2014 (2)

Caregiver or Proxy Exit Questionnaire					
This questionnaire helps us understand what factors affect your relative's or care recipient's (replace "_____" with name) use of GPS in daily life. Please rate items 1 to 42 using the scale to indicate your level of agreement. Mark X in one box per item. Provide your comments for items 43-50.					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1. By using the GPS, _____ had increased independence.					
2. Using the GPS helped _____ with daily activities (e.g., shopping, transportation).					
3. The GPS was useful to inform me where my relative was.					
4. In general the GPS assisted in the all daily activities _____ did outside of the home.					
5. Use of the GPS increased the quantity and quality of _____'s daily activities (e.g., shopping, transportation).					
6. When _____ was lost, the GPS helped him or her contact me as a caregiver. Check if Not Applicable ☐					

Caregiver Exit Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
7. Learning to operate the GPS was easy for _____.					
8. _____ found the GPS easy to understand.					
9. _____ believed that it is easy to get the GPS to do what he(she) wanted it to do.					
10. _____ found the system flexible to interact with.					
11. Overall, the GPS was easy to use for _____.					
12. People who are important to _____ thought that _____ should use the GPS.					
13. _____'s friends thought that _____ should use the GPS.					

Caregiver Exit Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
14. People that _____ trusted thought that _____ should use the GPS.					
15. In general, _____ thought that I, the caregiver, should support the use of the GPS.					
16. The GPS was worn on a regular basis.					
17. The GPS was used when _____ walked outside.					
18. The GPS was used frequently.					
19. The GPS was used when _____ was at home alone.					
20. I found the web site easy to use.					

Caregiver Exit Questionnaire – (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
21. I found the website fast to get into.					
22. Given the resources that _____ had, it was easy for _____ to use the GPS.					
23. From what _____ knows of the GPS, it was easy for him (her) to use the GPS.					
24. In general, the responsiveness from the GPS vendor (Safetracks) was good.					
25. The GPS was water resistant when it dropped in water (toilet, tub or sink). Check if Not Applicable ☐					
26. _____ thought that the GPS was comfortable to use (e.g., it was not heavy, the size was right).					
27. The GPS was break resistant when it dropped (e.g., did not break easily) Check if Not Applicable ☐					
28. The responsiveness of emergency response was good (e.g., police) Check if Not Applicable ☐					

Caregiver Exit Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
29. Using the GPS was well matched to _____'s health needs.					
30. I think that _____ intends to use the GPS in the near future.					
31. I predict that _____ will use the GPS in the future if he/she is able to do so.					
32. _____ plans to use the GPS in the future if he/she is able to do so.					
33. _____ would intend to use the GPS in the future if he/she is able to do so.					
34. _____ used the GPS when he (she) was lost. Check if Not Applicable ☐					
35. _____ used the GPS two-way calling system. Check if Not Applicable ☐					
36. Most days, _____used the GPS device.					

Caregiver Exit Questionnaire (continued)					
Item	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
37. _____ felt nervous about using the GPS.					
38. _____ thought it was important for him (her) to wear the GPS.					
39. _____ trusted the GPS technology.					
40. In general, using the GPS was a good idea for _____'s medical condition.					
41. Using the GPS, caused_____ concern about people he(she) doesn't know finding information about him (her).					
42. _____ hesitated to use GPS for fear of others having access to his (her) health information.					
43. What did you like BEST about the GPS?					
Caregiver Exit Interview (continued)					

44. What did you like LEAST about the GPS?
45. Additional comments on the GPS
46. Would you consider paying for this service? YES NO
47. How much would be an appropriate monthly fee to pay for this service?
48. Do you think that another organization should pay for this service? YES NO
49. If yes, which organization should pay for this?
50. What is your age? <30 ( ) 30-35 ( ) 36-40 ( ) 41-45 ( ) 46-50 ( ) 51-55 ( ) 56-60 ( ) 61-65 ( ) 66-70 ( ) 71 + ( )

Appendix D

LDP GPS Use Log

A member of the research team contacts Client or Caregiver by phone on a weekly basis or within two days after the GPS is used. Following the following script and pose the following questions. Record respondent's answers immediately on this form.

Date: _____ Client study code: _____

Interviewer (researcher) Name: _____

Client's Name: _____ respondent? Yes No

Caregiver's Name: _____ respondent? Yes No

Hello Mr. _____ (or Mrs. _____). My name is _____ and I am calling to ask how you are doing with the GPS device. Can I ask you some questions?

Guiding Questions	Notes
1. In the past 7 days, how many times did you use the GPS device? OR, I see that you used the GPS device X yesterday (2 days ago).	
2. When you were using the GPS, what activity were you doing? (walking, driving, taking the LRT, going to the library, etc.)	
3. Please tell me about your experience using the GPS. (Charge the device, drop in water, misplace device, etc.)	
4. What features did you use (how did you use the device)? (Call centre, web site, phone)	
5. Did you require assistance from SafeTracks or the Research Team? What type of assistance did you receive? Were you happy with the result?	
6. Do you have other comments?	

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Functional Spatial Abilities Questionnaire (Self-Rated)

Please answer these questions by circling 1, 2 or 3.

	Yes	N/A*	No
1. I get lost in new or nonfamiliar environments when walking or driving.	1	2	3
2. I require supervision when travelling to a new environment.	1	2	3
3. I have difficulty following a map (ex. Subway map, city map).	1	2	3
4. I am uncomfortable when travelling alone.	1	2	3
5. I have difficulty remembering the destination when I travel.	1	2	3
6. I have difficulty returning home after an outing (ex. Take longer than required, get off at wrong bus/subway/ make a wrong turn).	1	2	3
7. My sense of direction has changed over time.	1	2	3
8. I get lost in previously familiar environments (homes of relatives/friends, shopping centre).	1	2	3
9. I require supervision when I travel in the neighbourhood.	1	2	3
10. I get lost in the home.	1	2	3
11. I am uncomfortable when I am alone at home.	1	2	3
12. I place objects in inappropriate locations in the home (ex. Put kitchen item in bathroom).	1	2	3

*N/A = Not Applicable, or client not put in situation due to fear of client getting lost.

Total: _____ (Max)

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Functional Spatial Abilities Questionnaire (Proxy-Rated)

Please answer these questions regarding _____ by circling 1, 2 or 3.

	Yes	N/A*	No
1. This person gets lost in new or nonfamiliar environments when walking or driving.	1	2	3
2. This person requires supervision when travelling to a new environment.	1	2	3
3. This person has difficulty following a map (ex. Subway map, city map).	1	2	3
4. This person is uncomfortable when travelling alone.	1	2	3
5. This person has difficulty remembering the destination when he or she travels.	1	2	3
6. This person has difficulty returning home after an outing (ex. Takes longer than required, gets off at wrong bus/subway/ make a wrong turn).	1	2	3
7. This person's sense of direction has changed over time.	1	2	3
8. This person gets lost in previously familiar environments (homes of relatives/friends, shopping centre).	1	2	3
9. This person requires supervision when I travel in the neighbourhood.	1	2	3
10. This person gets lost in the home.	1	2	3
11. This person is uncomfortable when he (she) is alone at home.	1	2	3
12. This person places objects in inappropriate locations in the home (ex. Put kitchen item in bathroom).	1	2	3

*N/A = Not Applicable, or client not put in situation due to fear of client getting lost.

Total: _____ (Max)

CLSC CÔTE-DES-NEIGES

Name _____

S.A.S. SAFETY ASSESSMENT SCALE

CAREGIVER AND LIVING ENVIRONMENT 1

a) This person lives on her own. Yes [1] No [0] _____

b) This person is alone at home.
Always [4] Most of the time [3] Occasionally [2] Never [1] _____

SMOKING 2

This person leaves cigarette burn marks on the floor, furniture or clothing.
Yes [1] No [0] _____

FIRE AND BURNS 3

a) The stove on/off buttons are located...
on the front of the stove [1] on the top of the stove [2]
behind the hotplates [3] _____

b) This person is capable of turning on the stove him/herself.
Yes [1] No [0] Doesn't know [1] _____

c) This person cooks his/her own food.
Always [4] Most of the time [3] Occasionally [2] Never [1] _____

d) This person forgets a pan on the stove.
Very often [4] Often [3] Sometimes [2] Never [1] _____

e) The heating system uses...
electricity [1] natural gas [2] wood [3] _____

NUTRITION 4

a) This person receives meals-on-wheels or other prepared meals.
More than once a day [1] Once a day [2]
A few times a week (2 to 6 times a week) [3] Once a week or less [4] _____

b) This person's meals contain foods from different food groups
(dairy products, meat or fish, cereals, fruit and vegetables).
Always [1] Most of the time [2] Occasionally [3] Never [4] _____

FOOD POISONING AND TOXIC SUBSTANCES 5

This person can tell the difference between food that is fresh and food that is spoiled. Yes [0] No [1] _____

MEDICATION AND HEALTH PROBLEMS 6

a) This person takes, on a regular basis...*
1 to 3 medications [2] 4 to 6 medications [3]
7 medications or more [4] Does not take any medication [1]
*prescribed medication only _____

b) This person takes medication to help him/her sleep or relax.
Yes [1] No [0] _____

c) Does this person suffer from any physical health problem?
None [1] Minor [2] Moderate [3] Severe [4] _____

d) This person accepts treatment for his/her physical health problems.
Yes [0] No [1] Does not apply [0] _____

WANDERING AND ADAPTATION TO CHANGING TEMPERATURE 7

a) This person gets lost in familiar surroundings.
Very often [4] Often [3] Sometimes [2] Never [1] _____

b) Has this person ever gotten lost? Yes [1] No [0] _____

c) Can this person find his/her way home? Yes [0] No [1] _____

d) Does this person dress appropriately according
to the changing temperature, both indoors and outdoors?
Yes [0] No [1] _____

An Affiliated University Centre
Affiliated with McGill University

Assessed by _____

SCORE _____ 47

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REVISED ALGASE WANDERING SCALE: COMMUNITY VERSION (RAWS: CV)

	Items	1 never/ unable	2 seldom	3 sometimes	4 usually	5 always
1	He/she does a lot of spontaneous walking.	1	2	3	4	5
2	He/she walks intensely between two places.	1	2	3	4	5
3	He/she paces up and down.	1	2	3	4	5
4	He/she walks off during meals.	1	2	3	4	5
5	He/she goes to many different places while walking.	1	2	3	4	5
6	He/she gets up and walks during the night.	1	2	3	4	5
7	He/she walks around restlessly.	1	2	3	4	5
8	He/she runs off.	1	2	3	4	5
9	He/she walks around between awakening and breakfast.	1	2	3	4	5
10	He/she walks back and forth between two places in a repetitive way.	1	2	3	4	5
11	While walking alone, he/she has fallen down.	1	2	3	4	5
12	He/she walks in one continuous direction.	1	2	3	4	5
13	He/she walks about aimlessly.	1	2	3	4	5
14	While walking alone, he/she walks beyond intended destination.	1	2	3	4	5
15	During meals, he/she tries to leave the table or walks away.	1	2	3	4	5

	Items	1 never/ unable	2 seldom	3 sometimes	4 usually	5 always
16	He/she attempts to get outside.	1	2	3	4	5
17	He/she goes repeatedly to the same location(s) while walking.	1	2	3	4	5
18	He/she cannot locate own room without help.	1	2	3	4	5
19	He/she has been found with some major injury.	1	2	3	4	5
20	He/she repeatedly travels the same route while walking.	1	2	3	4	5
21	He/she has been found with some minor injury.	1	2	3	4	5
22	He/she cannot locate bathroom without help.	1	2	3	4	5
23	He/she travels many different routes while walking.	1	2	3	4	5
24	He/she gets lost inside the house.	1	2	3	4	5
25	He/she walks around between lunch and dinner.	1	2	3	4	5
26	He/she often changes direction or course while walking.	1	2	3	4	5
27	He/she stands at the outdoor wanting to go out.	1	2	3	4	5
28	He/she walks around between breakfast and lunch.	1	2	3	4	5
29	He/she walks for an odd or inappropriate reason.	1	2	3	4	5
30	He/she attempts to find or go to familiar locations, even unrealistic ones.	1	2	3	4	5
31	While walking alone, he/she bumps into obstacles or other people.	1	2	3	4	5
32	He/she walks around between dinner and bedtime.	1	2	3	4	5

	Items	1 never/ unable	2 seldom	3 sometimes	4 usually	5 always
33	He/she walks without an apparent destination.	1	2	3	4	5
34	He/she walks during inappropriate times.	1	2	3	4	5
35	He/she cannot locate dining room without help.	1	2	3	4	5
36	He/she attempts to leave his/her own area.	1	2	3	4	5
37	He/she walks in a continuous route, as if on a track.	1	2	3	4	5
38	He/she gets lost outside the house.	1	2	3	4	5
39	He/she enters private or unauthorized areas.	1	2	3	4	5

Appendix E5

THE ZARIT BURDEN INTERVIEW

Please circle the response the best describes how you feel.

	Never	Rarely	Sometimes	Quite Frequently	Nearly Always	Score
1. Do you feel that your relative asks for more help than he/she needs?	0	1	2	3	4	
2. Do you feel that because of the time you spend with your relative that you don't have enough time for yourself?	0	1	2	3	4	
3. Do you feel stressed between caring for your relative and trying to meet other responsibilities for your family or work?	0	1	2	3	4	
4. Do you feel embarrassed over your relative's behaviour?	0	1	2	3	4	
5. Do you feel angry when you are around your relative?	0	1	2	3	4	
6. Do you feel that your relative currently affects our relationships with other family members or friends in a negative way?	0	1	2	3	4	
7. Are you afraid what the future holds for your relative?	0	1	2	3	4	
8. Do you feel your relative is dependent on you?	0	1	2	3	4	
9. Do you feel strained when you are around your relative?	0	1	2	3	4	
10. Do you feel your health has suffered because of your involvement with your relative?	0	1	2	3	4	
11. Do you feel that you don't have as much privacy as you would like because of your relative?	0	1	2	3	4	
12. Do you feel that your social life has suffered because you are caring for your relative?	0	1	2	3	4	
13. Do you feel uncomfortable about having friends over because of your relative?	0	1	2	3	4	

14. Do you feel that your relative seems to expect you to take care of him/her as if you were the only one he/she could depend on?	0	1	2	3	4	
15. Do you feel that you don't have enough money to take care of your relative in addition to the rest of your expenses?	0	1	2	3	4	
16. Do you feel that you will be unable to take care of your relative much longer?	0	1	2	3	4	
17. Do you feel you have lost control of your life since your relative's illness?	0	1	2	3	4	
18. Do you wish you could leave the care of your relative to someone else?	0	1	2	3	4	
19. Do you feel uncertain about what to do about your relative?	0	1	2	3	4	
20. Do you feel you should be doing more for your relative?	0	1	2	3	4	
21. Do you feel you could do a better job in caring for your relative?	0	1	2	3	4	
22. Overall, how burdened do you feel in caring for your relative?	0	1	2	3	4	
Total Score (out of 88)						

Interpretation of Score:	
0 – 21	little or no burden
21 – 40	mild to moderate burden
41 – 60	moderate to severe burden
61 – 88	severe burden

Score values and interpretation are guidelines only, as discussed in:
Hebert R, Bravo G, and Preville M (2000). *Canadian J Aging* 19: 494-507.

STUDY INFORMATION SHEET
CAREGIVER

Title: Locator Device Project

Question: What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators

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Project Lead (Contact)

- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

Background:

Safety of individuals is a priority for Alberta Health Services. It is important to stay active and mobile within our homes and communities. Individuals often become confined to their homes for fear of becoming lost, distressed or injured. In addition, enhanced care and supervision may be required. The Locator Device Project is intended to support those experiencing cognitive impairment such as memory loss. Those with cognitive impairment can benefit from support to *walk safely*. *Walking safely* means minimizing the risks that may be encountered when walking. Some of the risks are of becoming lost, distressed or injured. Locater technology that uses GPS can help manage the risks of walking for those with cognitive impairment. By wearing a GPS device, a walker who is lost or distressed can be located more quickly, better ensuring their safety. There can be reduced stress and anxiety when an individual may have wandered and needs to be located. Locator technology can support personal freedom, lessen the need for constant supervision, improve safety, and decrease a client's and caregiver's stress related to wandering. The device can enhance independence and safety for those wanting to stay living at home in community or supportive living settings (such as a lodge). The use of locator technology may also assist first responders in helping to reduce the time and manpower required to locate an individual who may be lost.

Purpose:

This project will seek out and test a GPS device to help individuals who may be at risk when walking alone away from their home. This project will examine the device and explore the user's experience with it.

Procedure
We are accepting participants between April 1, 2014 and March 31, 2015. Participants have to be living at home and be a Home Care client. Those who are not a Home Care client will need to be admitted to Home Care.

This project will be evaluated by researchers who will examine the device and explore the user's experience with it.This project seeks the opinions and experiences of caregivers or family members.

Caregivers are invited to participate in a focus group.This will require approximately 90 minutes of your time.A maximum of $15 will be reimbursed to you for parking and upon submission of a receipt.

Focus groups will take place in Calgary (North Glenmore Park Community Association Centre) and in Grande Prairie (Grande Prairie Public Library. Each focus group will consist of approximately 7 participants. Each session will be audio-recorded, transcribed by a professional transcription service. The transcriptions will be analyzed for themes.

What are the benefits and risks of taking part in this project?
The use of GPS technology in healthcare provision is new. This project will add to this body of knowledge and will inform AHS and project stakeholders about the experience of using GPS technology for community-based adults with cognitive impairment who wander. This device may empower families and informal caregivers to better cope with wandering episodes of project participants. Offering the opportunity for families to use this technology offers potential to support their loved one with dementia; improve client safety and support client independence. Use of GPS may decrease the number of calls placed to services (Home Care, EMS, police and RCMP) and relieve caregiving stress.

Voluntary Participation
Participation is voluntary.
You do not have to answer questions or participate if you feel uncomfortable and you can stop taking part at anytime. You can withdraw from the study prior to the focus group. After the focus group, it would be difficult to remove your comments from the discussion and transcription.

Confidentiality
The research team will make every effort to keep your information private. All information you share follows Alberta Health Services and University of Alberta policies as well as the laws of Alberta and Canada. The information collected will be kept confidential. As much as possible the information we keep will be anonymous; it will not have your name on it. We will guard your privacy as much as possible and your information will be used only for this project. We cannot guarantee that others in the focus group will maintain the confidentiality of what is said. Any electronic information will be stored at secure AHS or University of Alberta locations. The information will be password protected. None of this electronic information will include your name or personal information. Only the members of the research team will have access to this data. All records will be destroyed after five years.

Contact Names and Telephone Numbers
If you have concerns or questions about your rights as a participant, you may contact:

- University of Alberta ResearchEthics Office at (780) 492-2615. This office is not connected with the study.
- Tammy Hopper, Associate Dean, Graduate Studies and Research, Faculty of Rehabilitation Medicine, University of Alberta; Phone: (780) 492-0836
- Tracy Raadik-Ruptash, Project Lead, Health Technology Assessment & Innovation, Alberta Health Services; Phone (780) 830-5063

CAREGIVER CONSENT FORM

PART 1

What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators

- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)

- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

PART 2

	YES	NO
Do you understand that you have been asked to be in a research study?	□	□
Have you read and received a copy of the attached Information Sheet?	□	□
Do you understand the benefits and risks involved in taking part in this research study?	□	□
Do you understand who will have access to the information you provide?	□	□
Have you had an opportunity to ask questions and discuss this study?	□	□
Do you understand that you are free to withdraw from the study at any time without having to give a reason?	□	□
Has the issues of confidentiality been explained to you?	□	□

Who explained this study to you? _____

I agree to take part in a focus group: YES □ NO □

Signature of research participant: _____

(Printed Name): _____

Date (D/M/Y): _____

Signature of Witness: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee _____

Date (D/M/Y): _____

STUDY INFORMATION SHEET
(STAKEHOLDER)

Title: Locator Device Project

Question: What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators
- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
- Lili Liu, PhD, Professor and Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton. Phone: (780) 492-5108

Project Lead (Contact)
- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

Background:

Safety of individuals is a priority for Alberta Health Services. It is important to stay active and mobile within our homes and communities. Individuals often become confined to their homes for fear of becoming lost, distressed or injured. In addition, enhanced care and supervision may be required. The Locator Device Project is intended to support those experiencing cognitive impairment such as memory loss. Those with cognitive impairment can benefit from support to *walk safely*. *Walking safely* means minimizing the risks that may be encountered when walking. Some of the risks are of becoming lost, distressed or injured. Locater technology that uses GPS can help manage the risks of walking for those with cognitive impairment. By wearing a GPS device, a walker who is lost or distressed can be located more quickly, better ensuring their safety. There can be reduced stress and anxiety when an individual may have wandered and needs to be located. Locator technology can support personal freedom, lessen the need for constant supervision, improve safety, and decrease a client's and caregiver's stress related to wandering. The device can enhance independence and safety for those wanting to stay living at home in community or supportive living settings (such as a lodge). The use of locator technology may also assist first responders in helping to reduce the time and manpower required to locate an individual who may be lost.

Purpose:

This project will seek out and test a GPS device to help individuals who may be at risk when walking alone away from their home. This project will examine the device and explore the user's experience with it.

Procedure
We are accepting participants between April 1, 2014 and March 31, 2015. Participants have to be living at home and be a Home Care client. Those who are not a Home Care clientwill need to be admitted to Home Care.

Stakeholder groups will be invited to receive education about the GPS technology being used in this project.

This project will be evaluated by researchers who will examine the device and explore the user's experience with it.This project seeks the opinions and experiences of stakeholders such as EMS, police, RCMP, Emergency, and health professionals.

Stakeholders (EMS, police, RCMP, Emergency, health professionals) are invited to participate in a focus group. Participants may or may not have been contacted by the GPS technology. The researchers will want to hear from representatives of each of the stakeholder groups mentioned above.This will require approximately 90 minutes of your time. A maximum of $15 will be reimbursed to you for parking and upon submission of a receipt.

Focus groups will take place in Calgary in Grande Prairie at locations convenient for the participants. Each focus group will consist of approximately 7 participants. Each session will be audio-recorded, transcribed by a professional transcription service. The transcriptions will be analyzed for themes.

What are the benefits and risks of taking part in this project?
The use of GPS technology in healthcare provision is new. This project will add to this body of knowledge and will inform AHS and project stakeholders about the experience of using GPS technology for community-based adults with cognitive impairment who wander. This device may empower families and informal caregivers to better cope with wandering episodes of project participants. Offering the opportunity for families to use this technology has potential to decrease the number of calls placed to stakeholders (Home Care, EMS, police and RCMP) thereby freeing up manpower and time. Family and caregivers are no more likely to call on stakeholder services as part of this project than they would be otherwise.

Voluntary Participation
Participation is voluntary. You do not have to answer questions or participate if you feel uncomfortable and you can stop taking part at anytime. You can withdraw from the study prior to the focus group. After the focus group, it would be difficult to remove your comments from the discussion and transcription.

Confidentiality
The research team will make every effort to keep your information private. All information you share follows Alberta Health Services and University of Alberta policies as well as the laws of Alberta and Canada. The information collected will be kept confidential. As much as possible the information we keep will be anonymous; it will not have your name on it. We will guard your privacy as much as possible and your information will be used only for this project. We cannot guarantee that others in the focus group will maintain the confidentiality of what is said. Any electronic information will be stored at secure AHS or University of Alberta locations. The information will be password protected. None of this electronic information will include your name or personal information. Only the members of the research team will have access to this data. All records will be destroyed after five years.

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STAKEHOLDER CONSENT FORM

PART 1

What is the usability of locator technology for community-based individuals at risk for wandering behaviour?

Principle Investigators

- Don Juzwishin, PhD, FCCHL, Director, Health Technology Assessment & Innovation, Alberta Health Services, Edmonton. Phone: (780) 735-0741
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Project Lead (Contact)

- Tracy Raadik-Ruptash, Project Lead, Locator-Device Project, Health Technology Assessment & Innovation, Alberta Health Services, Grande Prairie. Phone: (780) 830-5063

PART 2

	YES	NO
Do you understand that you have been asked to be in a research study?	□	□
Have you read and received a copy of the attached Information Sheet?	□	□
Do you understand the benefits and risks involved in taking part in this research study?	□	□
Do you understand who will have access to the information you provide?	□	□
Have you had an opportunity to ask questions and discuss this study?	□	□
Do you understand that you are free to withdraw from the study at any time without having to give a reason?	□	□
Has the issues of confidentiality been explained to you?	□	□

Who explained this study to you? _____

I agree to take part in a focus group: YES □ NO □

Signature of research participant: _____

(Printed Name): _____

Date (D/M/Y): _____

Signature of Witness: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee _____

Date (D/M/Y): _____

Alberta Health Services

UNIVERSITY OF ALBERTA

Locator Device Project

Focus Group Questions

1. Describe your experience in living with (or working with) persons at risk for getting lost or wandering.

2. Describe your experience using a locator device like the ones used in this study.

3. Describe your experience responding to a call initiated or triggered using a locator device?

4. What do you like BEST about the locator device used in this study (specify device)?

5. What do you like LEAST about the locator device used in this study?

6. Common on the web interface (specify platform, i.e., mobile phone, laptop, desktop) associated with the device used in this study.

7. In your opinion, what would be a reasonable cost for the device and service?

8. Who should pay for this device (specify) and service?

9. Would you recommend this device to people at risk for wandering, and their families?

10. Additional comments:

Appendix H

PERSONAL ELECTRONIC MONITORING APPLICATIONS

KNOWING YOUR OPTIONS FOR KEEPING YOURSELF, YOUR FAMILY & CO-WORKERS SAFE

- Alzheimer's / Dementia
- Seniors
- Special Needs
- Children / Teens
- Real Estate Agents
- Mobile Nurses
- Social Workers
- Probation Officers
- Group Home Workers
- City Employees
- Victims of Domestic Violence
- Utility Employees
- House Cleaners
- Security Guards
- Public Transportation Employees
- Taxi/Limo & Delivery Drivers
- Insurance Claim Adjusters
- On-Road Sales Personnel
- Lone Workers
- Global Workers, Out-of-Country

APPLICATIONS

THE SAFETRACKS MISSION

To provide Pro-Active Electronic Solutions to improve and empower our communities with the confidence to take back independence and freedom.

SafeTracks
GPS Canada Inc.

www.safetracksgps.ca
Toll Free 1.877.761.4477
info@safetracksgps.ca

Being Pro-active
TODAY
Not Re-active
TOMORROW

PERSONAL ELECTRONIC MONITORING

SafeTracks
GPS Canada Inc.

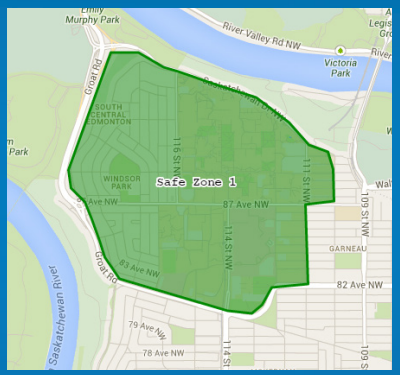
SafeTracks GPS Personal Safety Product Line

Leading GPS Technology for our vulnerable loved ones or for personal protection.

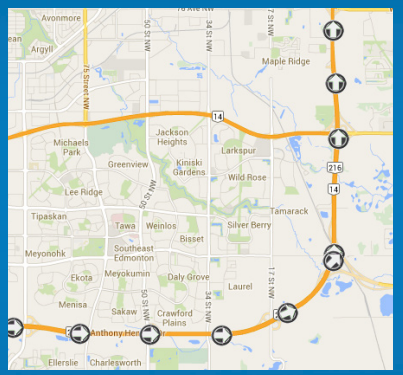
Keeping You Connected to Those Who Matter Most

SAFE ZONE
SafeTracks will notify you when a device user enters or exits the Safe Zone.

BREADCRUMB TRACKING
Breadcrumb Tracking can be viewed on the SafeTracks GPS Software for up to the minute GPS locations.



SAFE ZONE


BREADCRUMB TRACKING

Top-of-the-Line Security... When it Matters Most

TRILOC™ GPS Locator

The most advanced, secure Personal GPS Tracking Solution.

The TRiLOC™ GPS Locator comes with locking wristband and tamper notification. Once installed, if the lock is opened, the device will send notification to emergency contacts.

Engineered to send locations by time intervals to ensure you can find the user when it matters most.

Includes an integrated SOS button that notifies emergency contacts if the user is in danger, as well as Voice capability, make this a clear choice for high security applications.

Combining these technologies with a Safe Zone allows emergency contacts to be notified when a user exits, or enters the Safe Zone area. Ideal for later stages of Alzheimer's, Dementia, Autism or other high risk applications.

- Fall Detection
- Up to 5 Minute Location Updates
- Variable Reporting Parameters
- 2-way Hands-free Voice
- SOS Button
- Waterproof
- ILOC Technologies Software Login
- Electronic Safe Zones
- Email and SMS Notification
- Rechargeable Battery Pack
- Up to 48 Hours of Battery Life (Based on Usage)

Piece of Mind in the Palm of Your Hand

ST 200 PRIME Tracker

The ST 200 PRIME combines the value of GPS technology, 2-way hands-free cellular voice and an integrated SOS button, all in one easy to use package.

With the push of the SOS button, emergency contacts are notified via SMS or email, with the additional option to automatically call the SafeTracks Emergency Center through 2-way, hands free voice technology. Our operators will assess the situation and respond accordingly with Police, Fire or Ambulance. Operators also have access to your GPS Location and specific notes to the user of the device.

Combining these technologies with a Safe Zone allows emergency contacts to be notified when a user exits, or enters the Safe Zone area. Ideal for active seniors, work alone applications, victims of violence or anyone that wants to add an extra layer of security to their life.

- Up to 1 Minute GPS Location Updates
- 2-way Hands-free Voice
- SOS Button
- SafeTracks GPS Software Login
- Electronic Safe Zones
- Email and SMS Notification
- Rechargeable Battery Pack
- Up to 72 Hours of Battery Life (Based on Usage)

SmartSole™

Today's Smartest GPS Tracking Technology

The GPS SmartSoles™ are extremely easy to use and reliable.

Simply charge the SmartSoles™ with the wireless charging pad, insert the sole into the user's shoes and the system is ready to go.

Never has it been so easy to keep track of loved ones.

These rugged GPS insoles are also comfortable and water resistant.

Combining these technologies with a **Safe Zone** allows emergency contacts to be notified when a user exits, or enters the **Safe Zone** Area. Ideal for later stages of Alzheimer's, Dementia, Autism or other high risk applications.

- Up to 2 Minute GPS Location Updates
- Wireless Charging Pad
- Water Resistant
- SafeTracks GPS Software Login
- Electronic Safe Zones
- Email and SMS Notification
- Rechargeable Battery Pack
- Up to 72 Hours of Battery Life (Based on Usage)

In adequate cellular/GPS coverage