

Locator Device Project

SUMMARY REPORT

November 2015



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Executive Summary

Strategies from Alberta Health and Alberta Health Services recognize the importance of supporting seniors who prefer to remain in their own home as long as possible. Assistive technology has been suggested to play a key role in this issue.

Following the steps of a previous successful pilot project of assistive technologies, the Continuing Care Technology Innovation (CCTI) Pilot, which showed that assistive devices provided clients and their families with a sense of security and reduced stress, the Locator Device Project (LDP) was envisioned. Its purpose was to evaluate uptake, enrollment, technology capability and usability of global positioning system (GPS) technology for Home Care clients with memory impairment and their caregivers. In addition, it also examined the project planning, implementation, maintenance and evaluation process within AHS and its partners.

The LDP evaluated the use of GPS devices worn by patients that had cognitive impairment and demonstrated or perceived risk of wandering. Project participants consisted of the patient and at least one family caregiver forming a dyad. With the use of the GPS, caregivers were linked to use a web-based platform that allowed them to locate their loved ones when they were missing. The project took place from March 2013 until July 2015 in two communities within Alberta: Grande Prairie and Calgary.

Data was obtained through initial and exit interviews, to determine if expectations before the test were met, as well as weekly phone interviews, and focus groups held upon completion of the project. Evaluation of these results indicated that usability was high both for clients and caregivers and that the device met their expectations. It also showed caregivers and patients had a positive attitude and low anxiety regarding the device and indicated that the locator device brought peace of mind to caregivers and independence to patients. With respect to the device itself, several positive qualities were mentioned (such as good performance in remote areas or ease of charge) and some barriers towards use were identified (challenge of introducing the habit to wear the device at all times or false alarms, for example).

With regards to implementation, the project team identified several key factors that enabled the successful implementation of this project: (1) leadership established through the steering committee that championed the project and provided ongoing guidance as well as through the consistency and effort of the Project Lead, who led the day to day planning, preparation, trial

phase, and wrap up, and had no competing priorities and was always accessible to address problems and concerns, (2) autonomy of all members within the project team, (3) knowledge sharing among team members that gave them the opportunity to learn from each other, (4) strong, efficient and sustained communication and (5) collaboration between team members, among different areas within AHS and iteratively with the evaluation team.

Based on the positive results of this project, the project team recommends that the locator device be considered as a standard strategy in home care and supportive living contexts. It also suggests that the device be introduced early in the individual's illness and that it is considered for provincial funding.

Future direction for this project will include the application for further funding to conduct a quantitative study where the effectiveness and cost-effectiveness of the device are studied in conjunction with the barriers and facilitators for its implementation.

For complete project information and outcomes be sure to refer to the project Evaluation Report in Appendix 6.

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1. Background

In December of 2008 Alberta Health (AH), formerly Alberta Health and Wellness released the *Continuing Care Strategy - Aging in the Right Place*¹. This strategy recognizes that seniors and those living with disabilities prefer to remain in their own homes and communities as long as possible.

The *Continuing Care Health Technologies Roadmap*² was developed in 2009 by InnoTraction Solutions under contract to AH, Alberta Health Services (AHS) and Alberta Innovation and Advanced Education (IAE), formerly Advanced Education and Technology. The roadmap identifies the needs of continuing care clients living in the community at risk of institutionalization and links those needs to potential technology solutions that would enable these clients to continue to live in the community.

Assistive technology is a combination of equipment with monitoring and response capabilities that help individuals to manage the risks associated with independent living. Assistive technologies include those that allow for automatic and continuous real-time monitoring of activities or events as well as supporting clients and their caregivers in the activities of daily living and social connectedness. By examining these safety, wellness, and social connectedness risk factors to older and disabled adults living in the community, and addressing the issues with appropriate, simple, inexpensive and reliable technology, it was anticipated that assistive technology would enable individuals to live at home as long as possible while at the same time contribute to a reduction in caregivers' stress.

One of the initiatives identified in the strategy, the *Continuing Care Technology Innovation Pilot* (CCTI), provided dedicated funding to field test a limited number of promising market ready assistive technologies. This pilot project tested and evaluated three assistive technologies with Home Care and Supportive Living clients in two geographic areas of Alberta and took place from November 2009 through June 2012. The tested technologies included two personal emergency response systems, one with environmental alerts including fall detection and one with real time video streaming and medication management capabilities. The third device was a medication reminder system.

¹Alberta Health and Wellness (2008) *Continuing Care Strategy – Aging in the Right Place*. Retrieved from: <http://www.health.alberta.ca/documents/Continuing-Care-Strategy-2008.pdf>

² InnoTraction Solutions (2009) *Continuing Care Health Technologies Roadmap*. Retrieved from: <http://eae.alberta.ca/media/271110/ccht-roadmap-all-chapters.pdf>

The purpose of the project was to determine if assistive devices could improve client safety and quality of life. Evaluation results indicated the devices provided clients and their families with a sense of security and reduced families' stress related to caring for their loved one. Cost avoidance was achieved for the caregiver when they could reduce their travel to personally visit their loved one and when admission to facility based continuing care was avoided³. In light of the success of this project, a new initiative; the *Locator Device Project* (LDP) was envisioned. This project is well aligned with the Healthy Aging and Seniors Care platform of the *Seniors Health Strategic Clinical Network Transformational Roadmap*⁴ which intends to incorporate evidence-informed strategies on optimizing seniors' living conditions. Its key characteristic of incorporating family caregivers into the project is well in line with the platform's vision to engage family and caregivers to minimize the impact of frailty, illness and disability on independence and quality of life. This aspect of the project is all interrelated to Alberta Health's *Continuing Care Health Service Standards*⁵ that supports innovation and creativity to maintain patients' wellbeing while involve clients and their families in the integrated care team to work together in the delivery of the best possible care.

2. Purpose

The Locator Device Project (LDP) tested and evaluated wearable global positioning system (GPS) devices for retrieving the location of clients at risk of wandering with dementia in two geographic areas of Alberta. The purpose of the project was to evaluate uptake, enrollment, technology capability and usability. The project also went beyond the patient-technology focus and examined the project planning, implementation, maintenance and evaluation process within AHS and with project partners.

The following objectives were identified as necessary to achieve this overall purpose:

- Minimize risk to community-living participants who demonstrate wandering when there is an associate risk: Increase participant safety through use of technology by providing a

³Alberta Health Services (2012) *Continuing Care Technology Innovation Pilot Project. Project Team Report*. Edmonton (AB).

⁴Seniors Health Strategic Clinical Network (2014) *2014-2017 Transformation Roadmap*. Retrieved from: <http://www.albertahealthservices.ca/Strategic%20Clinical%20Networks/ahs-scn-srs-roadmap.pdf>

⁵Alberta Health (2008 – amended 2013). *Continuing Care Health Service Standards*. Retrieved from: <http://www.health.alberta.ca/documents/Continuing-Care-Standards-2008.pdf>

means of locating and retrieving participants more quickly.

- Learn about the experience, benefits and limitations of the police and emergency services in responding to locator device alerts.
- Learn about the experience, benefits and limitations for the participant and caregivers using the locator technology.
- Increase participant independence if use of locator device allows for less supervision and increased freedom of movement.
- Learn about the benefits and limitations of locator technology in rural and urban Alberta.
- Learn about the characteristics of the clientele best suited to the locator technology trialed.
- Learn about the ability of the locator technology to prevent or delay a move to alternate level of care or facility.
- Learn about the experience, benefits and limitations for the referral sources for the LDP.
- Learn about the experience, benefits and limitations for the emergency response partners of the LDP.

3. Project Scope

The technology scope was limited to GPS devices available in the Alberta market at the time of the project's commencement. The project target population was limited to individuals in Home Care with a cognitive impairment deemed at high risk of wandering. The project took place from March 2013 until July 2015. For further information, please refer to the Final Evaluation Report which can be found in Appendix 6.

4. Methods Overview

4.1. Project Structure and Evaluation

A steering committee was constructed so that important parties were kept abreast of

developments and had the opportunity to provide advice into the process. It included members of the Alzheimer Society Alberta & Northwest Territories (ASANT), the Alzheimer Society of Calgary (ASC), AH, IAE, and senior leadership from relevant sectors of AHS. In addition to the stakeholders involved through the steering committee, additional collaborations included the RCMP in Grande Prairie and the Calgary Police Service. The Steering Committee informed the development of an evaluation framework for the LDP project based on the intended outcomes of the project (included in Appendix 4). The evaluation was descriptive, testing only one product line without a control group and using a pre-test/post-test design. It was conducted by Dr. Lili Liu (an integral part of the Steering Committee) and her team at the Faculty of Rehabilitation Medicine of the University of Alberta.

The principal investigator (PI), Dr. Don Juzwishin, and the co-PI, Dr. Lili Liu, submitted the evaluation framework to the Research Ethics Board. After approving the framework, they were kept abreast throughout the project.

4.2. Chosen Assistive Technologies

The CCTI project and roadmap were used as guidance. Assisted by Contracting, Procurement & Supply Management and following a Request for Proposals, vendors were invited to come forward with their technologies. Vendors were evaluated and scored according to three main parameters: technical requirements, service and support (including training, maintenance and warranty) and pricing. The three highest scoring vendors were then invited to present their technologies to the Vendor Selection Working Group after which they were re-scored and the better-qualified one was offered a contract⁶.

Three types of devices were used in this study: one is a simplified cell phone and can be worn on a lanyard or belt, another within an insole and a watch. All devices were tracked on a web-based platform that caregivers could access using mobile devices or computers. Caregivers are provided with secure access to the mapping website.

⁶www.safetracksgps.ca



The GPS technology was wearable and included device features that were customizable (volume, vibration), capable of two-way voice communication (not insoles), water resistant, had tamper alerts and was lockable (watch). The customizable technology software was capable of alerting caregivers by text or email notification of the GPS user’s exit/entrance into a geofence (electronic safe zone or no-go zone parameters) and path of travel in addition to more common GPS related features such as location coordinates, direction and speed of travel, and address approximation.

The LDP trial devices ranged in cost as follows:

	ST200/Prime	Watch	Insoles
Purchase Price	225.00	400.00	330.00
Monthly monitoring fee	40.00	35.00	40.00
One-time Shipping fee	25.00	25.00	25.00

In preparation for LDP vendor selection past evaluation experience, clinical experience, and knowledge gleaned from the literature provided guidance in GPS technology specification requirements. Additional technology-related learnings gleaned during the course and evaluation of the LDP are important to highlight.

- Often consumer GPS products had been tried by participants prior to the LDP. However, they are not designed with dementia users in mind. The limitations described include:
 - Device was easily lost (not wearable or securable)
 - Too complicated for the user with dementia (i.e. unable to unlock cell phone in order for it to be useful)
- It is a challenge to match GPS technology and client's unique needs and preferences; several GPS device options are required to improve likelihood of matching a device to user needs and preferences
- Two-way voice communication was a well-regarded technology feature by numerous users. When implementing the ST200 PRIME (without 2-way communication) several participants identified the importance of the feature to their needs.
- Programmability (customizability) of the technology software and device features will allow for technology adaptability to unique user needs and preferences. Some dyads require a device that simply tracks location, whereas others want more functionality in their GPS device.
- Proactive and available customer service support is essential to support GPS users' education, comfort and learning requirements. Even when provided with regular contact and education by research assistants (RAs), the focus group sessions revealed that GPS users lacked knowledge in device features and capabilities. Caregivers benefit from supportive and interactive educational resources and troubleshooting on an ongoing basis.
- Connectivity was hypothesized to be a limitation of the technology worth evaluating; given lack of cellular connectivity in areas of northern Alberta or tall concrete structures or underground transportation in urban centers. Ultimately, connectivity was not a concern. More specifically, the difficulty caused by concrete buildings, cellular signal gaps or "Satellite Drift" resulted in false Geofencing alerts. Satellite Drift can be defined as when there is a miscommunication between how the geofence parameter setting interacts with a location reading to result in a false geofence exit or entrance alert.

Location readings were impacted when the device was indoors, whereas outdoor location readings were very accurate. This is not surprising when one understands that GPS technology relies on a *sky view* / satellites for location accuracy. While false alerts are annoying for caregivers (and initially alarming), with vendor tech support and education the concerns could be minimized. In time, the families accepted the occasional false alarm and felt assured by the “test of the system”. The false alarms were commonly experienced by participants, however, did not result in withdrawal from the project; families trusted the technology to work if/when it was required. Bread crumb trail, or path of travel information, depicted on the software ensured families had the most up to date information, as well as a last known location plot on the map, should the connectivity falter. In response to the technology limitation for indoor use, Bluetooth beacons were trialed within larger facilities to improve location readings and decrease false alarms. This allowed the GPS devices used indoors to communicate with the positioned beacons when indoors rather than struggle for satellite communication.

- Several of the participants were able to travel on vacation within Alberta, into other provinces, or even into the United States with the security of GPS technology. A families’ travel destination did determine whether the technology could be used within the allotted monitoring fee package utilized for the LDP. Quick and easy programming allowed for users to set up new or temporary geofences as required.

4.3. Target Population Groups

Project participants were identified and selected from caseloads of Home Care Case Managers (CM). CM, who were educated about the LDP, discussed the project with clients that matched the inclusion criteria and following an informed consent, connected them to the project team.

Briefly, the inclusion criteria selected clients with cognitive impairment that had demonstrated or perceived risk of wandering. They had to have at least one primary caregiver therefore forming the study dyad.

Site	Total Referrals	Enrolled participants	% enrolled
Calgary	42	31	74
Grande Prairie	15	14	93
TOTAL		45	

Occasionally dyads referred to the LDP were not a good match for project enrollment due to acute illness, poor technology:client match, lack of participant consent, or inability to meet inclusion criteria (non-English speaking).

4.4. Pilot Communities

Two communities in Alberta, Grande Prairie and Calgary, were selected based on the following:

- Geographic representation of both urban (Calgary) and rural (Grande Prairie) populations,
- Population size allowed for recruitment of adequate number of participants,
- Willingness and capacity of the area home care programs to participate,
- Previous experience with implementing Continuing Care Technology Innovation initiatives in Grande Prairie, and
- Availability of project resources (such as research assistants from the Calgary campus of the University of Alberta) in Calgary

4.5. Pilot Project Assistants

The project was carried out with the assistance of the Home Care CM and other stakeholders that identified pilot participants. In addition, the project employed five research assistants (RA) in Calgary and a project lead in Grande Prairie. They conducted face-to-face recruitment interviews and exit interviews to collect data. Additionally, regular phone calls were made to determine the need for further training, troubleshooting and assess overall satisfaction.

The LDP partnered with the Department of Occupational Therapy in the Faculty of Rehabilitation Medicine of the University of Alberta for the LDP evaluation. Led by Dr. Lili Liu, the LDP evaluation team provided expertise in the design of the evaluation, data analysis, and the production of a final evaluation report.

4.6. Ethics

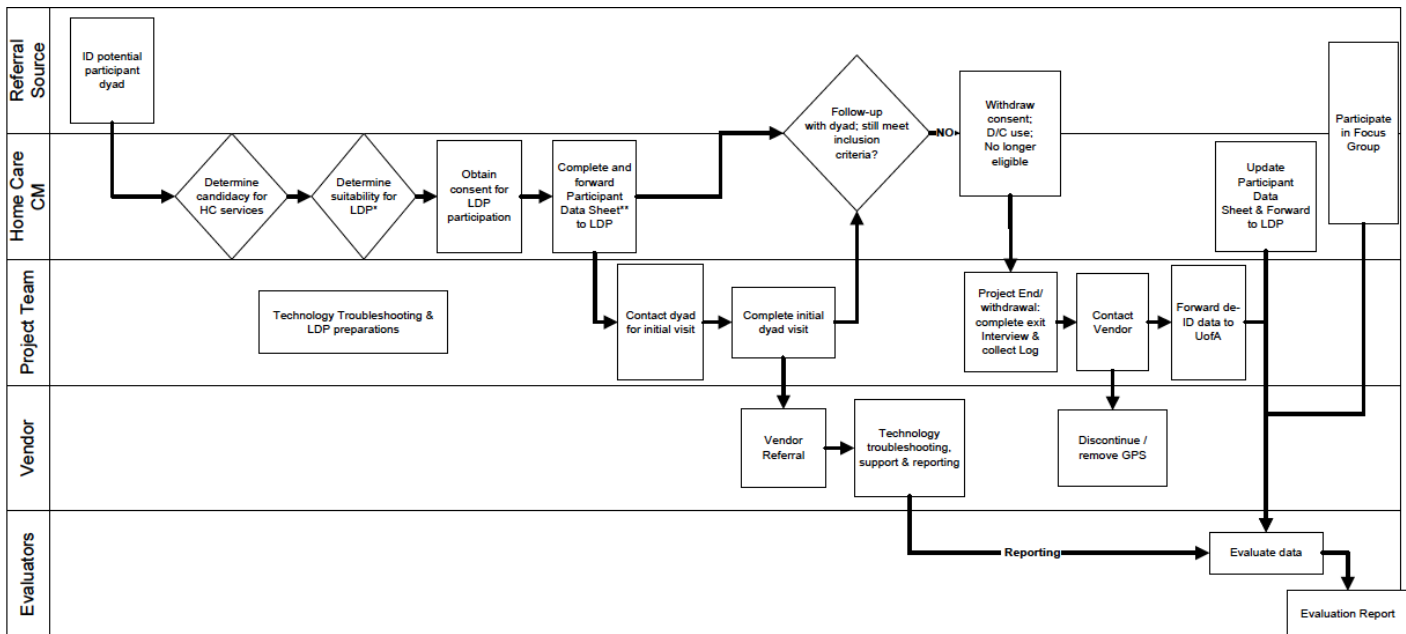
The LDP took place at a time in Alberta when significant reformation was underway to achieve greater provincial ethics board harmonization. Given this, initially the project team was preparing to submit a series of ethics applications to numerous boards given the provincial scope of the multi-site project. The project team submitted the project plan and Evaluation Framework to the University Of Alberta (UA) Health Research Ethics Board (HREB). The Ethics Board required assurance that dyads were to be made aware of the risks of participation and GPS device use. Information Sheets and Consent/Assent forms were prepared for use by all participants in the study. At the time Ethics Approval was granted, ethics harmonization in Alberta deemed the HREB to be the sole and sufficient ethics board approval required to pursue the goals of the GPS research project.

4.7. AHS Research Approvals

Alberta Health Services requires Operational Approvals and a Research Agreement to ensure that the proposed research is of the highest moral, ethical, legal standard. Research approvals involve Information and Privacy departments as well as Legal review. Rigorous research processes such as these ensure important points of attention are not overlooked. AHS Data Integration, Measurement and Reporting (DIMR) was a key ally in fulfilment of the Research Agreement as they are responsible for the due diligence around protection of the public and appropriate sharing of AHS and client data.

5. Conducting the Project

The project started with the selection of participants. Data was collected throughout the project to allow for project evaluation and the preparation of a final evaluation report. Figure 1 shows the various stakeholders' roles within the project implementation and the process.



*LDP Inclusion / Exclusion Criteria
 **Single-page form created by LDP Project Team

Figure 1: Swim Lane Process Map for the Locator Device Project.

Case Managers, educated about the LDP, evaluated their Home Care patients to determine if they met the eligibility criteria and whether they would be good candidates for the LDP. Case managers then spoke with potential participants and their families. After obtaining consent, they referred participant dyads (clients and caregivers) to the LDP team.

Prior to the in-home visit, the Project Lead reviewed the project information and requirements with families and through discussion of the client’s unique needs, also matched the dyad with the most appropriate GPS device. The Project Lead and RAs then contacted the dyads and set up face-to-face interviews. In these visits, they conducted a structured initial interview to collect data related to the client’s health and quality of life as well as their expectations regarding the device (in terms of performance, effort and social influence, among others). They also instructed the dyads on the use of the device.

Throughout the length of the project, the project lead and the research assistants contacted the dyads in a weekly manner to confirm the continued willingness to participate, troubleshoot any potential problems and determine the overall satisfaction with the device. Clients were instructed to use the device at all times and continue their daily activities normally. As shown in Figure 2, caregivers were asked to utilize the technology to locate their loved ones when they were missing and to report the usage of the device to the LDP team.

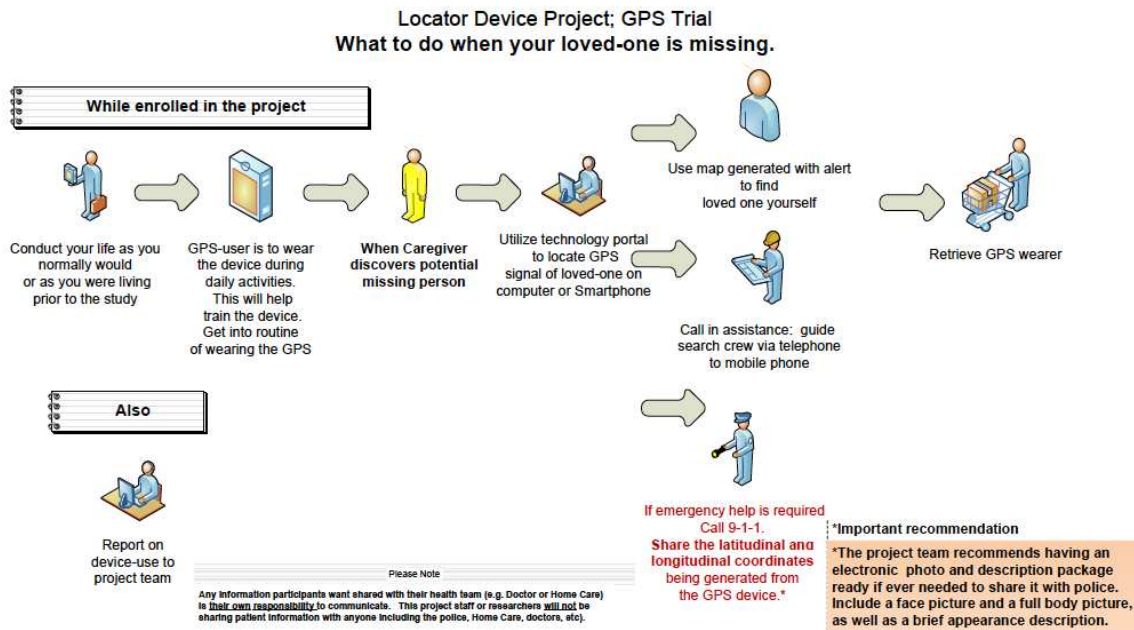


Figure 2: Process map indicating what was expected for participating dyads.

Regular communication between the dyads and research team fostered relationships that allowed for glimpses into how the GPS devices were impacting the day to day lives of project participants. A few case studies are included in Appendix 5 along with a UofA alumni magazine, Rehab Impact, story featuring the LDP. The full magazine can be found at <https://rehabilitation.ualberta.ca/about-us/communications-and-media-relations/rehab-impact-report>. A number of “missing episodes” occurred during the course of the project. Some of the GPS users would go walking or leave the home on multiple occasions each week. With use of the GPS technology, families or care providers were able to locate the GPS wearer in a timely manner and return them safely home without incident.

Near the end of the project, structured focus groups were utilized to obtain stakeholder data regarding uptake, device provider involvement, effect of LDP on health provider hours of service, ethical privacy issues, device usability, emergency response time and overall satisfaction, among others. Upon completion of the project, the LDP team conducted exit interviews to collect additional data. The exit questionnaires provided information regarding actual use and whether the dyad’s expectations for the device had been met.

A total of 45 dyads completed the project, although in some cases, only caregivers completed the exit interviews since some clients were unable to complete it due to institutionalization,

medical condition or death. Thus, analyzable data for clients was restricted to 29 initial and exit interviews.

Interestingly, the locator device project raised interest among the media (Appendix 7), which allowed this project to raise awareness about assistive technologies, its role in improving the quality of life of patients and their caregivers and the importance of enabling individuals to live at home as long as possible.

6. Project Findings

Evaluation of the collected data suggested that the device had high usability and that it was well accepted providing peace of mind to caregivers and independence to patients.

Most of the dyads used the locator device either every day or very often. 78% of the users wore the device to perform activities such as walking, going out, visiting family members, and driving, while 17% used the device within their home.

As the evaluation report shows (Appendix 6), 43% of users expressed no concerns with usage of the device, while the rest reported some barriers towards use, such as occasional false alarms, battery life, delay in updating the client's coordinates, caregivers unable to login to the vendor's website and discomfort when using the device, among others.

Some of the results obtained from the statistical analysis of the initial and exit interviews were:

- The expected usability was high both for clients and caregivers in the beginning and most importantly, that their expectations were met at the end of the project when the usability scores showed no significant difference relative to the entry scores.
- 89% of the users would be willing to pay for the device although 75% of them thought that Alberta Health Services should cover the cost.
- There was a positive attitude and low anxiety toward the use of the locator device.
- The influence of significant others in using the locator device was important, most significantly for caregivers.

Screening Tool Results collected at the Initial Interview provide insights into the characteristics of Home Care clients suitable for GPS device consideration.

Function and wandering	Mean
1. Mini-Mental State Exam (MMSE) Scored out of 30 points where scores <27/30 suggest cognitive impairment.	15.46
2. Safety Assessment Scale (SAS) Totaled out of a potential max score of 47. The higher the score, the higher the associated risk.	21.82
3. Revised Algase Wandering Scale: Community Version (RAWS:CV) 39 items are rated on a 5 point scale: never/unable (1), seldom (2), sometimes (3), usually (4), and always (5). 5 subscales assess 33 items. Subscales are averaged for comparability depending on frequency of behavior patterns	1.99
4. Functional Spatial Abilities Questionnaire (FSAQ) - self-rated Questions consider way-finding in familiar and unfamiliar environments, traveling by foot and by car, and so on. Scored Yes (1), N/A (2), or No (3), for a max possible score of 36 where the higher the score equals higher functional spacial ability	26.76
5. B. Functional Spatial Abilities Questionnaire (FSAQ) - proxy-rated Same as for FSAQ above	19.63

- MMSE scores suggest typical participants with dementia rated as having moderate cognitive impairment.
- Participants were often highly supervised, or families had minimized risks. Wandering was a primary risk. Even with supervision, there were many stories of those with dementia going missing. There are regular stories in the media that too often end tragically.

6.1 Technology Use for Locating Users

Several of the LDP clients referred for GPS technology trial were well known to police services because of regular requests for assistance by the caregivers in locating these individuals. During the course of the GPS trial, police services were not called upon. Families were able to utilize the GPS technology in order to quickly and accurately locate and retrieve their loved one without involving police or emergency services.

The occurrence of wandering episodes, or missing episodes, was isolated to a small number (estimated to be approximately 11-13%) of clients during the course of the project. The majority of the missing episodes occurred with a subset of this group; often same individual would commonly go missing several times per week. On each of these occurrences, the GPS technology was successfully used to locate and retrieve the missing senior within moments of being notified of (by geofence alert), or realizing, their absence.

During one routine follow-up call, a *missing episode* was recalled for an RA. One LDP participant commonly walked unaccompanied in the neighborhood. One day the walker informed their spouse that they were going to walk to the corner store; a routine occurrence for this individual. When the walker did not return in an expected amount of time, the spouse then visited the store to check on and search for the missing loved one. It turned out, upon speaking to the corner store staff, the walker had not arrived at the store. With this information, the spouse then accessed the GPS software on a mobile device. The technology was able to show the walker's path of travel was actually in the opposite direction than the store. Upon seeing the walker's location and information on the smartphone, the spouse was able to find the walker, collect them with the car, and return them safely home. Without the GPS technology at hand, there would not have been a clue as to where to begin a search.

6.2 Focus Groups

A total of three focus groups were held in Grande Prairie and four in Calgary. Focus groups allowed for the participation of 15 caregivers (including spouses, adult children and in-laws) and 9 stakeholders (including representatives from Grande Prairie RCMP, Calgary Police, Home Care, Grande Prairie Primary Care Network, ASANT and ASC). These are some of the conclusions obtained from these sessions:

- The locator device brought peace of mind to caregivers for knowing that their loved ones were easy to locate in case they wandered away. They also explained how that allowed the clients to have more freedom for movement.
- Caregivers also commented on the relief that the SOS button added, knowing that their loved one could rapidly connect with the caregiver with just a push of a button.
- With respect to the device itself, dyads suggested that they were easy to charge, that they worked well on remote areas, that they appreciated the variety of models and that by having a mobile platform, caregivers were not required to be at home.

- On the negative side, caregivers indicated that the major concern came from making sure the client was using the device at all times. In addition, false alarms and the lack of an indicator light to warn about battery charging were mentioned.
- In the future, caregivers and stakeholders thought the device should be made available to dementia clients earlier, before the signs of wandering appeared, so they can consent to being monitored and to create the habit of using the device.
- Calgary policy suggested the program reduced the impact and workload on an already overworked detachment.
- RCMP saw the value for the rapid localization of missing people with cognitive diseases although they were cautious to suggest that they should not be a direct partner, to avoid the perception that RCMP would have the capability to track and monitor people's locations.

6.3 Desire to Continue with Technology at LDP End

Throughout the project, participants were prepared for the project's end at which time they could decide to keep the equipment (paying for the monthly maintenance cost themselves) or return the equipment to AHS. Of 28 participants, 21 chose to continue with the use of their GPS device following the exit interview visit: 15 / 20 of Calgary users and 6 / 8 Grande Prairie users. Participants were permitted use of the devices at no charge until the project conclusion on June 30, 2015. Of the 24 participants who were enrolled until the time of project closure June 30, 2015, 14 (58%) dyads chose to continue with use of the technology following project completion. For this group, continuing with the technology involved a decision to privately pay for the technology monthly monitoring fees to the vendor following June 2015 until the device was no longer required. Three dyads obtained AHS support for hardship in order to continue with use of the technology (AHS/ParticipantTechDecision.6July2015). AHS retained ownership of the devices and collected them from the dyads when no longer in use. Also at the time of project closure, some of the participant dyads considered the amount the device was being used by the Home Care client, other options used to manage risk (such as alternate environments or accompaniment on outings), or the expected time to pending placement, and ultimately decided against private payment and opted to returned the device to end their involvement. The diagram below outlines the various reasons clients had for ending their time on the project.

	Withdrawal Reason						
Of the 46 Enrolled Home Care clients	Placement (or in hospital waiting)	Medical condition (fracture, injury)	Poor client:tech match	Withdrawal (i.e. project end and risk low: "constant supervision" or not used regularly)	Still paying for GPS	Deceased	Unknown
	13	2	4	12	9	1	5

[LDP Close - Participant Tech Decision.27Oct2015]

Additional project information is provided in the Evaluation Report included in Appendix 6.

7. Project Costs

The LDP was supported through grant funding from the Alberta government; the Ministry of Innovation and Advanced Education. Grant funding of over \$433,000 was available for GPS trial as part of the Continuing Care Health Technologies initiative that was initiated in 2009. The funding was utilized for project management resourcing, evaluation services, technology expenditures, knowledge translation, and project administration.

- Financial information provided is for the period of October 1, 2012 to September 30, 2015.
- Financial reporting does not contain in-kind contributions.

Project Revenue		AET Grant Funds Remaining
AET Grant Funds Received	\$ 433,392 from former grant	
Interest Earned on AET Grant Funds	8,406	
(A) Total Project Revenue	441,798	
Project Expenditures		Project Funds Remaining (A-B)
Personnel	254,964	\$ 79,838
Research and Evaluation	72,603	
Operations (Travel and supplies)	10,072	
Equipment (Technology)	24,321	
(B) Total Project Expenditures	361,960	

8. Project Team Lessons

The successful implementation of this project allowed the project team to learn from it to determine which factors enabled its success:

- **Leadership:** One of the primary concerns was the challenging yearlong process prior to participant recruitment where project planning, development, stakeholder engagement, and approvals were required. The process was complicated with the need for numerous, different types of approval within the organization. For example, the LDP encountered numerous research-related redundancies within the organization and/or the province. However, senior leadership in the organization constantly championed them. Early on in the project implementation cycle, the team recognized the importance of gaining leadership support and established a steering committee with directors from within the organization to act in the capacity of an overarching body. The steering committee

ensured the project progressed in the intended direction and provided guidance where needed.

Additionally, the project lead for the LDP was hired as a full time staff solely responsible for this project, and was not a pre-existing position within the organization with other competing priorities. Focused attention on the LDP allowed the project lead to be accessible to other project team members to address problems and concerns in a timely manner. The project lead's dedication to the project also allowed for an efficient use of funds, which together with the funding agency's flexibility, allowed the project to extend past its originally intended date of completion, permitting the recovery of further data and improving the overall quality of results. LDP job duties are listed in Appendix 8.

- **Autonomy:** Since the project lead had experience working with the continuing care technology innovation pilot project, she was afforded considerable autonomy to make decisions and lead the project with her expertise. In addition to the project lead, the evaluation personnel and the research assistants (RAs) also felt they were afforded significant autonomy. With numerous responsibilities that required a considerable time commitment, the RAs reported significant autonomy in creating their own schedules and managing their participants. The evaluation team was highly supported by the Project Lead for efficiency of the project development and trial.
- **Knowledge sharing:** The project management team was readily available to the RAs to provide support as needed. Oftentimes, RAs would resolve issues and share information among each other, which was encouraged by the management team. By promoting these informal networks and the sharing of information, the management team was able to ensure that the large group of RAs would always be informed and have easy access to individuals with information when needed. All members of the project team stressed the importance and utility of the weekly meetings and the opportunity to share obstacles, problems and successes and receive honest feedback. In addition, regular meetings of the Evaluation Working Group and the Stakeholder Working Group ensured ongoing collaboration and communication.
- **Strong, efficient and sustained communication:** The recruitment and referral process were clearly outlined in the LDP procedure framework for RAs and other team members. Good communication was essential given the large, diverse and virtual nature of the team. Additionally, the flow chart format for project team duties, participant duties and home care case managers made for easy to read and understanding of otherwise

complicated, wordy information. By creating clear communication tools, the project team could minimize misunderstandings and the need for constant clarifications of project procedures.

- Collaboration: the LDP leadership leveraged opportunities to respectfully collaborate within the project team, with other organizational departments, and with external stakeholders. An important observation made during team meetings was the strong relationships formed between the individuals and the boundary spanning collaboration between RAs, the project lead and the evaluation team. RAs collaborated with other members of the team in areas they recognized as their weaknesses and other's strengths. Collaboration was also promoted during the vendor RFP process, as alliance with the procurement department was necessary to include external stakeholders when selecting a vendor. There was also ongoing collaboration with the evaluation team that was iteratively linked to the Steering Committee allowing for the refinement of their approach.

8. Project Team Recommendations

1. Locator device technology should be a standard strategy considered in home care and supportive living contexts.
2. Locator device technology should be introduced as a potential health strategy early in the individual's experience of dementia.
3. Funding for the locator device technology should be considered as a provincial benefit for eligible candidates.
4. For future projects, factors enabling the successful implementation of this project should be replicated. That is, projects should have strong and sustained leadership, they should promote the autonomy of its team members, there should be opportunities for knowledge sharing, and they should attempt to have efficient communication tools and it should encourage collaborations.
5. This project had a wide media exposure (Appendix 7). Although the project team worked together with the communications department to determine the message, future projects should prepare a communication package early in the process.

9. Future Directions

1. Based on the success of this project, the Principal Investigator of this research initiative (Dr. Don Juzwishin) recommends that current momentum be maintained and further funding be sought to conduct a quantitative study focusing on clinical effectiveness and cost-effectiveness of this technology as well as identifying the barriers and facilitators for implementation.
2. Although the inclusion criteria allowed for other health conditions, all participants of the project had dementia. In the future, this technology should be tested on other conditions such as autism, developmental disabilities or mental health conditions.
3. Future project should attempt to develop collaborations with the police to collect data on reported missing persons to determine if the locator device reduces the number of reports and/or the response time.

Appendix 1: Steering Committee Terms of Reference

The Use of Locator Technology in Community Settings (Locator Device Project)

Steering Committee Terms of Reference

Purpose and Scope

Alberta Enterprise and Advanced Education (AEAE) grant funds remain unused from the Continuing Care Technology Innovation (CCTI) Project (2010-2012). These funds have been repurposed to conduct a new short-term project that will seek, select, implement, trial, and evaluate GPS locator technology with community-based individuals with cognitive impairment who can benefit from assistance in walking safely to minimize risk.

The literature suggests GPS technology is useful in helping the caregivers of dementia patients. The technology also may improve quality of life for those with cognitive impairment by increasing their independence while assisting safer walking. This technology also has the potential to significantly decrease emergency service time and manpower resulting in cost savings when responding to a call about a loved one who cannot be located in their safe home environment.

Beyond the literature available, this project will consider utilization of locator technology:

- a) available in Alberta
- b) with population groups in addition to dementia who may benefit from assistance with safer walking
- c) for community living individuals
- d) in rural areas of Alberta

This project will also go beyond the patient:technology focus and examine the project planning, implementation, maintenance and evaluation process within AHS and with project partners.

Project Scope:

- Provincial scope; including urban and rural site participation
- Test one patient locator technology or device (GPS that will allow for client location, tracking, and retrieval should they exit an area of safety)
- Small number of participants (e.g. 20: 10 rural and 10 urban). A small population will allow a detailed examination of the stakeholder experience with the technology.
- Adults (>18 years of age)
- rural: Grande Prairie and area
- urban: Calgary
- Participants with cognitive impairment who can benefit from safer walking assistance. Caregivers of those participants.
- Home care clients; i.e. primary care network, Alzheimer society, or police / RCMP referrals

An AHS Steering Committee of internal and external stakeholders is needed to support and guide the *Use of Locator Technology in Community Settings Project (Locator Device Project or LDP)*. The purpose of this committee is to provide a forum where selected representatives can collaborate to provide leadership and support to ensure the evolution of the project.

These Terms of Reference are intended to accompany the Locator Device Project Charter document. Please refer to the project charter for a more comprehensive project overview.

Steering Committee Responsibility:

- Support and advocate for the work of the project team and stakeholders: remove barriers and facilitate the work of the Locator Device Project.
- As a committee member, you will be a conduit of communication between the LDP/team and your colleagues. This communication and information sharing is meant to facilitate the project.
- You are to provide the project team with expertise to the project.
 - Assist the project lead and project team in identifying strategic stakeholders.
 - Act as a resource for linkages to strategic stakeholders.
 - Assist in establishing formal liaison (internal and external) with all appropriate groups
 - Contribute to overall planning and decision-making on project tasks related to stakeholder engagement
 - Become an ambassador for the project and provide the team with strategic knowledge related to the project uptake, implementation and evaluation.
- Take project information back to your teams and organizations: Provide high level project updates to appropriate staff, colleagues and leadership.

Reporting Responsibility

Members of the steering committee will provide high level report to their team, colleagues and leadership. This communication will help ensure the appropriate stakeholder groups and organizations are aware and informed about the project.

D. Juzwishin and C. Knight will communicate project information and updates to their respective leadership and ensure AHS executive are informed.

Principles

The LDP Steering Committee is guided by the AHS organizational values of Respect, Accountability, Transparency, Engagement, Safety, Learning and Performance. The Committee ensures that Quality, Sustainability, Access are key drivers for all activities.

Quorum

A quorum is 50 per cent plus 1 on the appointed members including a committee Chair.

Decision Making Process

Decisions will be made by consensus: general agreement of the group; majority, if necessary.

Communication

Steering Committee meeting materials will be distributed 1 week prior to LDP Steering Committee meetings.

Membership for this committee is provincial in nature and face to face meetings impractical. Meetings will be held via teleconference or Telehealth.

Frequency of Meetings

The Steering Committee will meet every 6-8 weeks initially, aiming for quarterly meetings. Meetings will be 1.0 to 1.5 hours in length. Additional meetings may be called as needed.

Hanna Abouzeenni will provide secretariat support to the LDP Steering Committee.

Committee Term

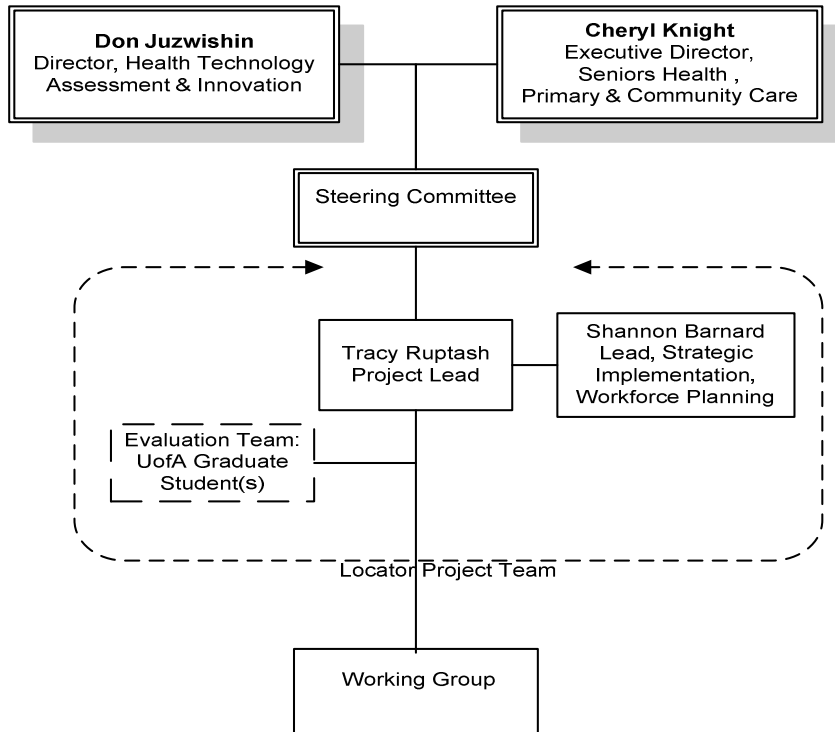
This committee is required to support the Locator Device Project. The Locator Device Project will take place through March 31, 2014. The committee term would extend if the project is extended.

This project will have a Hard Stop at the time of completion.

Resources

The Steering Committee membership will not be remunerated. Reimbursement for out-of-pocket expenses may be considered on a case by case basis through request-submission to the committee chairs.

Proposed Project Structure



Appendix 2: Stakeholder Working Group Terms of Reference

The Use of Locator Technology in Community Settings (Locator Device Project) Stakeholder Working Group Terms of Reference

Purpose and Scope

Alberta Enterprise and Advanced Education (AEAE) grant funds remain unused from the Continuing Care Technology Innovation (CCTI) Project (2010-2012). These funds have been repurposed to conduct a new short-term project that will seek, select, implement, trial, and evaluate GPS locator technology with community-based individuals who are at risk due to cognitive impairment and may benefit from assistance in safer walking.

The literature suggests GPS technology is useful in helping caregivers of dementia patients. The technology also may improve participant independence and quality of life through assisting safer walking. This technology also has the potential to significantly decrease emergency service time and manpower resulting in cost savings when responding to a call about a missing loved one who cannot be located within their safe home environment.

Beyond the literature available, this project will consider utilization of locator technology:

- e) available in Alberta
- f) with population groups in addition to dementia who have demonstrated a need for safer walking assistance
- g) for community living individuals
- h) in rural areas of Alberta

This project will also go beyond the patient:technology focus and will examine the introduction of new technologies to AHS: examine the project planning, implementation, maintenance and evaluation processes within AHS and with project partners.

Project Scope:

To test one patient locator technology or device (GPS technology that will allow for client tracking, location, and retrieval should they exit an area of safety) with a small number (20 participants: 10 rural and 10 urban) community participants with cognitive impairment (home care clients, developmentally delayed, or mental health participants, etc.) who are at risk because of demonstrated need for assisted safer walking. A small population will allow a detailed examination of the stakeholder experience with the technology.

- **Provincial scope**; including **urban and rural** site participation
- Test **one** patient locator technology or device (GPS that will allow for client location, tracking, and retrieval should they exit an area of safety)
- **Small** number of participants (20: 10 rural and 10 urban). A small population will allow a detailed examination of the stakeholder experience with the technology.
- **Adults** (>18 years of age)
- rural: Grande Prairie and area

- urban: Calgary
- Participants with cognitive impairment at risk of wandering (who may benefit from support in safer walking). Caregivers of those participants.
- **Home care clients;** i.e. primary care network, Alzheimer society, or police / RCMP referrals

Membership Responsibility:

A working group of key stakeholders has been assembled for the duration of the Locator Device Project (LDP). The purpose of this committee is to provide a forum where key provincial representatives, along with the project team can collaborate to facilitate and ensure the successful planning, implementation and evaluation of the LDP.

These Terms of Reference are intended to accompany the Locator Device Project Charter document. Please refer to the project charter for a more comprehensive project overview.

The responsibilities of this working group are to:

- Work within the scope of the LDP
- Support and advocate for the work of the project and its team
- Work to decrease project barriers and help ensure project success
- Work collaboratively to advance the project planning, implementation and evaluation by sharing your expertise to
 - navigate current policies and procedures in order to advance the project
 - remove barriers and facilitate the work of the LDP team and project as a whole
 - align the day to day organizational operations (RCMP, PCN, CPS, Alzheimer Societies, home care, etc.) with the LDP and its goals.
 - help guide and support the LDP whenever possible and at all stages
- Be an informational conduit between the LDP and your staff and colleagues
 - Take project information back to your teams and organizations: Provide high level project updates to appropriate staff, colleagues and leadership.
 - Provide the LDP with feedback and share contact information as appropriate.
- Identify and help to mitigate project related issues and gaps for the duration of the LDP
 - Ensure any limitations or barriers to the LDP are clearly communicated as early as possible to the project team and mitigation assistance around the issue is provided
- Contribute to development or refinement of methodologies and models to support the success of the LDP
- Work to contribute to the referral population within the project scope
- Provide guidance, support and linkages to facilitate project evaluation

Principles

The LDP Working Group is guided by the AHS organizational values of Respect, Accountability, Transparency, Engagement, Safety, Learning and Performance. The Committee ensures that Quality, Sustainability, Access are key drivers for all activities.

Reporting Responsibility

All members of the working group are expected to provide high level report to their team, colleagues and leadership. This communication will help ensure the appropriate stakeholder groups and organizations are aware and informed about the project and will also provide a means of feedback to the working group.

Communication

Meeting materials will be distributed 1 week prior to LDP Working Group Committee meetings.

Membership for this committee is provincial in nature and face to face meetings impractical. Meetings will be held via teleconference, Lync or Telehealth.

Frequency of Meetings

The Working group will meet every Month and as needed for the duration of the LDP. Meetings will be 1.0 to 1.5 hours in length. Ideally, efforts will be made to book meeting times several months in advance due to busy calendars and difficulty scheduling last minute meetings. Additional meetings may be called or unnecessary meetings cancelled, as deemed necessary.

Hanna Abouzeenni will assist Tracy Ruptash in providing secretariat support to the LDP working group.

Committee Term

This committee is required to support the Locator Device Project. The Locator Device Project will take place through December 31, 2014. The committee term would extend if the project is extended.

This project will have a Hard Stop at the time of completion.

Resources

The Working Group membership will not be remunerated. Reimbursement for out-of-pocket expenses may be considered on a case by case basis through request-submission to the committee chairs. WG committee chairs will present any expense claims submitted to the Steering Committee Co-Chairs for consideration and decision.

Accountability

The LDP Working Group is accountable to the Locator Device Project Steering Committee through the Project Team. Decisions with significant implications for the LDP will be brought to the Steering Committee.

Membership

Locator Device Project Working Group Representation:

- **AHS Addiction & Mental Health**- Kathryn Boyer, RN, Developmental Disabilities Mental Health, (with back-up by James Weller)
- **Primary Care Network** (non physician representative)
 - Grande Prairie –Paul O’Toole, Social Worker
- **Home Care Case Manager**
 - Grande Prairie Home Care - Louise Lyons, Case Manager
 - Calgary Home Care – Lauraine Newton, Care Manager, Calgary North
- **UofA** Faculty of Rehabilitation Medicine
 - Dr. Lili Liu, Professor, Researcher, Department of Occupational Therapy
 - Research Assistants
 - Kristen Rabel
 - Pranshu Arora
 - Peyman Azad Khaneghah
- Grande Prairie **RCMP** – Constable Kenneth Petruik
- **Calgary Police Service**
 - Winnie Chang, Systems Analysts, IT department
 - Sergeant John Hebert, Missing Persons team
- **EMS**
 - Calgary-Ryan Kozicky, B.Sc., EMT-P, MPH(c), Operations Manager, Community Paramedic
 - Grande Prairie EMS- Randy Pohl, Manager, EMS Operations North West
- **Occupational Therapist, Home Care**
 - Calgary- Danielle Jensen, Dementia Care Team
 - Grande Prairie – Amanda Johnson
- **NZ Seniors Consultation Team**– Corinne MacDonald, Nurse Consultant
- **Caregiver representative**- TBD
- **Facility Respite Care**- Marlene Collins, Director, Complex Continuing Care, Carewest
- **Alzheimer Societies**
 - AB & NWT (ASANT)- Christene Gordon
 - Calgary- Ali Cada

AD HOC consultants

- **AHS Communications:** Shelley Rattray, Senior Communications Advisor
- **AHS Legal:** Jill Curtis, Counsel, Legal & Privacy
- **AHS Project Ethics:**
 - Al-Noor Nenshi Nathoo, Executive Director, Clinical Ethics Service, Alberta Health Services
 - Suzanne Vorvis, Director Provincial Research and Privacy Initiatives
- **AHS Information and Privacy** – Linda Teskey and Maura Reeves (IT Security & Compliance)
- **AHS Survey and Evaluation Services**, DIMR- Jeanne Annett, Director, Evaluation Services
- **AHS Project Management** Support Services Team- Brian Draginda

Others may be consulted as needed to support the LDP.

The LDP Working Group will be co-chaired by Tracy Raadik-Ruptash and Shannon Barnard.

Appendix 3: Evaluation Working Group Terms of Reference

Project Evaluation Working Group Terms of Reference

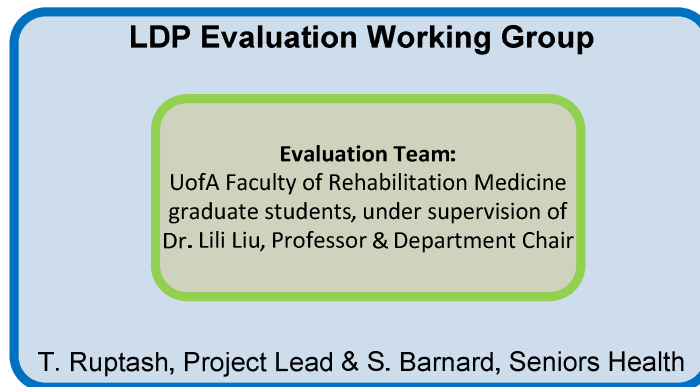
Purpose

Alberta Enterprise and Advanced Education (AEAE) grant funds remain following completion of the Continuing Care Technology Innovation (CCTI) Project (2010-2012). These funds have been repurposed to conduct a new short-term project that will seek, select, implement, trial, and evaluate GPS locator technology with community-based individuals who are at risk due to cognitive impairment and may benefit from assistance in safer walking.

Alberta Health Services will partner and enter into contract with the University of Alberta, Faculty of Rehabilitation Medicine, Department of Occupational Therapy for the evaluation of the Locator Device Project (LDP). An evaluation team has been assembled for the duration of the LDP. The purpose of this committee is to collaborate toward the successful completion of a robust LDP evaluation.

The LDP Evaluation Team (as part of the Evaluation Working Group) will work closely with the Project Lead and Project Consultant as well as with other key stakeholders of the LDP. The role of the evaluation team is to develop an evaluation plan, execute an evaluation approach, compile and evaluate project data and produce an evaluation report. The plan should consider the health system utilization, stakeholder experience and client experience perspective. The evaluation team will examine AHS data sources available and also develop means to collect data as required (such as focus groups, surveys or questionnaires, interviews and other tools from the literature). The project evaluation team will be responsible to outline data collection processes and methodology necessary to achieve a high quality analysis and final report.

UofA Faculty of Rehabilitation Medicine graduate students, under supervision of Dr. Lili Liu, Professor & Department Chair, compose the Evaluation Team. The evaluation team will contribute a robust literature search and project evaluation. The graduate students' role, as research assistants and as part of achieving their own educational goals, is to support and contribute to the project through collaboration with other team members and leadership in accomplishing the goals of the project in a timely manner.



In addition to the University of Alberta, Faculty of Rehabilitation Medicine, Department of Occupational Therapy (UofA), who was engaged early in the project design process AHS Survey and Evaluation Support [Survey and Evaluation Services (SES), Data Integration, Measurement & Reporting (DIMR)] have also been engaged and informed of this project’s work. Evaluation Services (ES) are pleased to provide consultative support on an Ad Hoc basis.

Membership Responsibility:

The responsibilities of this working group are to work within the scope of the LDP to develop and implement a high quality and thorough evaluation plan including, but not limited to

- Evaluation framework⁷
- Data collection / Outcome measurement tool identification
- Data repository creation and management, as required
- Data analysis
- Evaluation report

The evaluation team is required to work collaboratively to advance the project evaluation to meet key timelines while also providing guidance, support and linkages to facilitate all LDP evaluation processes.

In addition to these Terms of Reference, the LDP Charter document is an important foundational document that will also inform the project’s evaluation. In addition, the Charter, as the umbrella document, outlines a framework for the various stakeholders’ roles during the course of the LDP. The evaluation team should be familiar with the LDP charter and the goals of the project as identified by the LDP steering committee.

Research Question:

What is the usability of locator technology (safe walking technology) in managing risk for community-based individuals who wander?

The evaluation team will create, identify and utilize the necessary outcome measurement tools (including tools in the literature) and develop criteria for use:

⁷ The Evaluation Framework is a comprehensive plan for the complete evaluation of all aspects of the LDP

- i. Questionnaires, Inventories, etc.
- ii. surveys
- iii. focus groups
- iv. interviews (intro and exit)
- v. response time to alert
- vi. RAI-HC: health service provision (direct care provision, risk of ALC placement, etc.)
- vii. other tools or methods as to be determined

In seeking to answer the research Question, the LDP evaluation will focus on the following prioritized outcomes:

- 1. Technology impact on safer walking
 - a. impact on community tenancy
 - b. Impact on safety-risk
- 2. Technology impact on caregiver stress / coping

From past experience with the Continuing Care Technology Innovation (CCTI) Project and in order to best inform decisions following the completion of the LDP attempt will be made to describe any traits or themes that emerge during the LDP related to:

- 1. Technology
 - a. Usability - the degree to which a technology is easy to use, learnable, acceptable, efficient, safe, satisfying, or prone to error. The technology must be operated easily and intuitively to be useable (as defined in the LDP Charter). Examine usability from the perspective of all user groups (i.e. service provider involvement, hours of service, and cost of care provision, emergency response to an event, healthcare provider relationship with the care recipient)
 - b. uptake - identify any factors that contribute or detract from uptake by the user groups
 - c. Costs associated with technology use
- 2. User experience
 - a. ethical considerations – such as concerns related to monitoring and privacy
 - b. discuss the traits of those most likely to benefit from the chosen technology and in doing so provide inclusion and exclusion criteria, thus creating a client:technology match profile that may be used by stakeholder agencies in the future

Principles

The LDP Working Group is guided by the AHS organizational values of Respect, Accountability, Transparency, Engagement, Safety, Learning and Performance. The Committee ensures that Quality, Sustainability, Access are key drivers for all activities.

Reporting Responsibility

University of Alberta Graduate Students, as members of the evaluation team are responsible to report to Dr. Lili Liu. The LDP Evaluation Working Group will be chaired by Tracy Ruptash. The evaluation working group reports to the LDP Steering Committee chaired by Don Juzwishin

(Director, Health Technology Assessment & Innovation) and Cheryl Knight, (Executive Director, Seniors Health) followed by Denise Holman, (Director, Home Care Development). Decisions with significant implications for the LDP will be brought to the Steering Committee.

Communication

Membership for this committee is provincial in nature and face-to-face meetings not always feasible due to geographical distance. Most meetings will be held via teleconference or videoconference. Those members residing in one community (such as Edmonton or Calgary) who wish to congregate for meetings are encouraged to do so. A regular Evaluation Working Group meeting series will be arranged to facilitate open dialogue by all parties during the course of the LDP and its evaluation. Meetings will be 1 hour in length and will occur every 2 weeks. Additional meetings may be called or unnecessary meetings cancelled, as deemed appropriate.

Committee Term

This committee is required to conduct all aspects of evaluation for the Locator Device Project. The Locator Device Project will take place through December 31, 2014. The committee term would extend if the project is extended.

Resources

UofA is participating in the LDP under a collaborative partnership as well as under contract. AHS will contract UofA evaluation support in the form of

- hired graduate student research assistantship to advance the project evaluation work
- project evaluation administrative support (transcription of recorded interviews and focus groups)
- office and paper supplies
- travel and accommodation costs
- computer programs (site licensed software)

In-kind contributions include

- lab/working space including computers for evaluation team
- access to university research services support (ethics, etc.) for evaluation working group
- Dr. Lili Liu's contributions of time and expertise

Hanna Abouzeenni (Health Technology Assessment & Innovation, AHS) and Karmet Wall (UofA) will assist in providing support to the LDP evaluation working group. Karmet Wall will assist Dr. Liu with scheduling meetings with students and the LDP team.

Membership

Locator Device Evaluation Working Group Representation:

- ✓ **University of Alberta** (Evaluation Team)
 - **Dr. Lili Liu**, Chair, Department of Occupational Therapy, Faculty of Rehabilitation Medicine

- graduate students
 - **Kristen Rabel** (MScOT, UofA) – Capstone; Calgary satellite
 - **Pranshu Arora** (MSc Rehabilitation Science); Edmonton
 - **Peyman Azad Khaneghah** (PhD Rehabilitation Science); Edmonton
 - **Karen Nabuurs** (MScOT, UofA); Calgary satellite
 - **Julia Mills** (MScOT, UofA); Calgary satellite
 - **Teanna Matchett** (MScOT, UofA); Calgary satellite
 - **Cassandra Greenhough** (MScOT, UofA); Calgary satellite
- **Dr. Antonio Miguel-Cruz**, Department of Occupational Therapy, Faculty of Rehabilitation Medicine
- ✓ **Alberta Health Services**
 - **Shannon Barnard**, Lead, Strategic Implementation, Workforce Planning, Seniors Health, Calgary
 - **Tracy Ruptash**, Project Lead, Locator Device Project, Grande Prairie
- ✓ **Ad Hoc**
 - **Jeanne Annett**, Director, Evaluation Services, AHS Survey and Evaluation Services, DIMR

Appendix 4: Evaluation Framework



LDP Evaluation
Framework.25March2

Appendix 5: Case Studies

GPS SUPPORTS AGING IN PLACE: A LOOK INTO GPS USE FOR HOME CARE CLIENTS WITH DEMENTIA

Adapted from a presentation by Tracy Raadik-Ruptash, BScOT, OT (C), Project Lead, Alberta Health Services, provided on November 4, 2014 at the 2014 Canadian Home Care Association Summit held in Banff, Alberta.

Dementia symptoms can be a challenge for people as well as their caregivers. The risks are real and can be devastating. The Locator Device Project (LDP) is a research project grant funded by Alberta Innovation and Advanced Education (IAE) being conducted by Alberta Health Services (AHS) in partnership with key Alberta stakeholders. AHS continues to be client-focused and trial new ways to support our continuing care clients to age in place and stay in their community-based homes. The LDP is looking to see if using wearable GPS-enabled devices will help people with dementia who are at risk for wandering live safely in their community.

The LDP is lead by a steering committee of multiple provincial stakeholders including the funder, care providers, and researchers who meet to govern and deliberate on all stages of the project. Project sites include Calgary and Grande Prairie. Project Evaluation is lead by Dr. Lili Liu, Department of Occupational Therapy, Faculty of Rehabilitation Medicine, at the University of Alberta. Graduate and post graduate Research Assistants are critical to the day to day data collection for this project as well as for data analysis.

The number of people with cognitive impairment is growing quickly in Canada. This fast growth is due, in large part, to our aging population. People with cognitive impairment can have many symptoms, one of which may be wandering (impaired way-finding). Because wandering behaviours can happen for many reasons they can be difficult to manage. No matter what the reason for the behaviour, when someone wanders away from a safe environment and can't find their way back on their own, their safety is compromised. Because of the huge safety risk and the trouble managing these wandering behaviours, the person with the cognitive impairment often loses his or her independence, often increasing the burden on the caregiver. Locator technologies—such as global position system (GPS) technology—may be an effective strategy to decrease risk associated with becoming lost. This is because the person's geographic location can be monitored while at the same time maintaining the person's autonomy.

The Alzheimer Society of Canada estimates that about 747,000 Canadians have dementia. In 2010, the Canadian Institutes of Health Research (CIHR) reported that 1 in 4 Canadians over the age of 65 had an age-related cognitive impairment due to Alzheimer's disease and related dementias. Up to 63% of seniors with dementia who are still living in the community have had issues with wandering (Hogan, 2004).

Ethical considerations are of foremost concern during project planning, approval and device trial. The LDP is ethics board approved and utilizes participant consent and assent. Participant dyads (Home Care clients and their family caregiver) are recruited to take part

in the technology trial: The GPS technology is programmed to maintain confidentiality by reporting to family caregivers(s).

GPS Technology

The wearable GPS technologies include features that can be programmed for the user. Some of these features include:

- ✓ Two-way voice communication
- ✓ Panic button for direct family contact
- ✓ Geofencing
- ✓ Single button push dialing
- ✓ Automated notifications by text and email
- ✓ Breadcrumb trail
- ✓ Real time location



Four wearable GPS-enabled devices are being trialed. These include cell phone like hand-held devices, that can be worn in a lanyard, carried in a pocket or purse, a watch, and insoles that can be placed within walking shoes.

To best protect the privacy and wishes of the people in our study, the technology trial is designed to report to family only. The software and website can only be accessed by password by family caregivers(s).

Using GPS-enabled devices the users carry on with their usual routine: However, if the person travels off-path, wanders, or becomes lost, the GPS-enabled devices allow for

additional support by alerting a family caregiver. The family caregiver can access the secure website to find out where the user is so they can respond accordingly. Real time map access is available through a Smartphone App, or mobile website for mobile devices in addition to website access from any Internet connected PC or laptop. Using these tools, the family caregiver can track or find the device user and help them as needed. The devices also provide a breadcrumb trail of the path the person is on. This can be helpful if the device enters a large structure where the signal may be blocked or if the device loses battery power. If this happens, the last known location of the device is always recorded.

How can GPS help support client independence?

Fern's Story

Fern is 90 years of age and lives alone with the support of her son and daughter-in-law. She still manages many of her own Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs) such as simple meal preparation, taking her medications, and even some grocery shopping. Fern is an avid walker in the area around her home; she regularly visiting the neighborhood pharmacy and grocery store. Fern can become confused and disoriented when she is unwell, exacerbating her dementia diagnosis. Given her age, family were concerned about how receptive Fern might feel about wearing a GPS device. It was surprising to see how accepting of the device she was. She accepted it without hesitation and she wears it regularly; every day on a lanyard around her neck. Fern has even learned to charge the device herself. She has established a routine of charging the device every night and wearing it every day. Having use of the GPS device brings feelings of extra safety and security to Fern to know she has the device to easily link her to her family. She trusts that should anything go wrong, they will be there for her. Fern has a geofence is set up around the perimeter of her neighborhood and includes her home, typical walking routes, and the shops that she typically visits. Sometimes, Fern also likes to visit the shopping mall which is a greater distance from her home and is located outside of the geofence perimeter. To get to the mall, Fern uses public transportation. When Fern travels to the mall on the bus and exits the home-geofence perimeter, her son, Dan, is sent an automatic alert notification by email and /or text. When Dan receives this automatic notification information, it includes a map plotting Fern's location and he can see from this information that Fern is on route to the mall. If he gets a second alert later in the day that tells him Fern has entered her geofence, he can see that she has used the bus to return home again. But, if he does not receive a later alert, or decides to check on Fern, he can see where she is on the software map. If this occurs, usually he will find that she is still at the mall, and when his workday is done, Dan will swing by the food court to pick her up and take her home.

Sue's Story

Sue wants to maintain her mobility and independence as long as possible in light of her dementia diagnosis. She loves to walk her dogs around the neighborhood she has lived in for 20 years, but memory impairment threatens her independence. There have been times

when Sue has become disoriented on a routine walk and had trouble finding her way home again.

For Sue's spouse, Ken, it is challenging to honor Sue's wishes and also manage the threat posed by her memory impairment. Should Sue encounter difficulty in finding her way home, not knowing specifically where she had traveled to or what direction she had chosen to go, it was very stressful for Ken, and trying to find her when she had been missing was an experience he would never want to repeat.

Like many resourceful families we know, this couple has tried common commercial solutions like having Sue carry a cell phone on walks. Limitations to this were that the cell phone became too complicated for Sue to use and eventually it went missing. After that, they purchased a GPS device, but it was lost in time as well.

What appealed to them about the LDP was that the GPS device could be secured and may therefore be less likely to go missing.

Now, Sue does not go out for a walk without her GPS watch and she is pleased to wear it. With the watch on, she can enjoy walking her dogs with the security of knowing that she has a *safety net*: if she is gone too long the means are in place to allow Ken to find her through the associated software. If she recognizes that she has gone off path, she can contact Ken by using the panic button.

Back home, Ken can observe her walking route by using his Smartphone, and if necessary, he can take it with him to easily find her and assist her in returning home. The technology brings Ken great peace of mind, especially with the winter weather, there is less risk of Sue being missing and stranded outside for long periods of time should she get off path.

How can GPS help manage caregiver stress?

Mr. Smith's Story

Before trialing the GPS device, Mr. Smith had been missing several times. Police services were often called in for assistance in finding him. Mr. Smith is easily over stimulated or upset and will seek to escape the situation: He will leave the house. Mr. Smith does not live too far from the family farm where he grew up. So when he becomes upset, typically, he will walk his way toward the old homestead. This can happen as frequently as 3 or 4 times per week.

With use of the GPS device, the software sends an alert to Mrs. Smith's Smartphone each time he leaves the geofence. So, even if she is unaware that he has gone walking toward the farm, the notification finds her. She then has the ability to check his path of travel. If he is on his way to the farm, she will often give him time to walk; this calms him.

Mrs. Smith can use her Smartphone to check his current location, locate him with ease and return him safely home when it is time to assist him in returning home.

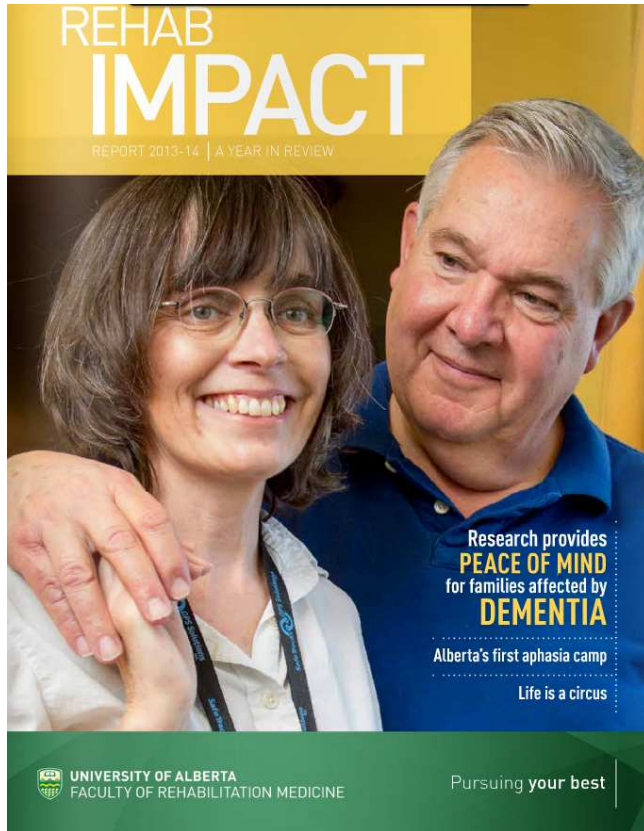
There are often times when Mr. Smith has not been on path to the farm and will go walking in a random direction or alternate route than usual. These occurrences are no longer as stressful as they used to be, because Mrs. Smith can locate him wherever he may be and assist him safely home.

There are many considerations for users in determining whether locating technology is a match to user needs. For information on considering GPS device use

for those with dementia diagnoses, visit the Alzheimer Society of Canada and search Locating Devices. <http://www.alzheimer.ca/en/Living-with-dementia/Day-to-day-living/Safety/Locating-devices>

University of Alberta, Rehab Impact magazine; Spring 2015

(<https://rehabilitation.ualberta.ca/about-us/communications-and-media-relations/rehab-impact-report>)



GPS technology provides peace of mind for families coping with dementia

Partnership with Alberta Health Services uses GPS devices to mitigate risk of wandering or getting lost.

Bryan Alary

It was a phone call that changed everything. Two years ago, while Allison Warman was driving from Edmonton to her house in Calgary, she became confused and disoriented to the point that she couldn't remember the way home.

She pulled over at the halfway point, in Red Deer, and called her husband Tim, who dropped everything to pick her up. It was the first warning sign something was wrong cognitively, a diagnosis that was later confirmed as dementia.

At just 53 years old, Allison—an active, vibrant mother of three and accomplished costume designer whose creations have been worn by figure skating champions Kurt Browning and Kristi Yamaguchi, and the Alberta Ballet—is increasingly housebound, unable to work, drive or even read anything longer than a headline.

"It's been devastating to watch this happen to such an energetic and talented and creative person—she's always been an active person, doing things for people she loves—to have all that taken away from you is brutal," Tim says.

Not everything has been taken. Walking remains one of Allison's true passions, keeping her body and mind refreshed. But the risk of wandering or getting lost is a real concern for people with dementia.

Locator Device Project

Fortunately for Allison, Tim and the couple's teenaged children, she can continue going on her daily outings without fear, thanks to SafeTracks GPS technology in a phone-like device she wears around her neck. The device, and others like it worn in a shoe or as a watch, provide real-time location information viewable on Google Maps and can send text messages or emails to family if Allison veers outside a designated safe zone.

The device was given to Allison when she joined the Locator Device Project, a 12-month trial to evaluate GPS technology in preventing people with cognitive impairments from getting lost or wandering. The project is a partnership between the University of Alberta's Faculty of Rehabilitation Medicine and Alberta Health Services, with 40 participants from Calgary and Grande Prairie.

"The technology provides peace of mind for families," says Lili Liu, lead researcher, professor and chair of the Department of Occupational



The best thing that's happened to her is being able to go out on her own and still be safe.

Tim Warman, husband

Therapy. "Even if there is an accident or an incident, knowing that their loved one has a GPS device helps family members feel more at peace."

More than 40,000 Albertans have dementia of some form, and about three out of every five seniors with dementia living in the community experience wandering. The number of Alberta seniors with dementia is expected to exceed 100,000 by 2038.

"We have a responsibility to provide Albertans who are at risk with supports that will enable them to enjoy their independence without coming to harm," says Don Juzwinski, director of health technology assessment and innovation for AHS. "And we believe the locator project, which uses sophisticated GPS technology, will also support family caregivers and emergency responders to assist dementia clients who have wandered or become lost."

Liu's team, which includes several graduate students based in the Department of Occupational Therapy's satellite site in Calgary, has visited the homes of fam-

ilies participating in the project, answering questions and offering support. The data they're collecting are still being analyzed, but could be used to inform technology options for home-care clients and families.

To her knowledge, this is the first study of its kind in Canada, says Liu, and one she wants to eventually expand to a national level.

For the Warman family, participating in the study and using the technology has afforded Allison a precious sense of dignity.

"The best thing that has happened to her is being able to go out on her own and still be safe," says Tim, who believes the technology could benefit other individuals and families coping with dementia. "It contributes to her emotional well-being, just knowing that she is safe. It's empowering. It's just a wonderful thing."

Partners in the Locator Device Project include the Grande Prairie RCMP, Emergency Medical Services, and AHS Seniors Health.

Appendix 6: Evaluation Report



Evaluation
Report_Oct 23, 2015

Appendix 7: Media Coverage of the LDP

Media Outlet	Title	Date	URL
Apple	Check this Tech. Devices and apps to keep you healthier as you age	Winter 2014 – Issue 12	http://www.applemag-digital.com/applemag/winter_2014?pg=46&search_term=locator%20device%20project#pg46
The Calgary Sun	'Precious' protection - AHS to launch project that will outfit at-risk patients with GPS tracking	June 10, 2014	http://www.calgarysun.com/2014/06/10/precious-protection--ahs-to-launch-project-that-will-outfit-at-risk-patients-with-gps-tracking
The Grande Prairie Herald Tribune	GPS technology pilot for dementia patients	June 11, 2014	http://www.dailyheraldtribune.com/2014/06/11/gps-technology-pilot-for-dementia-patients
CTV Calgary	Technology used to keep tabs on patients with memory impairment	June 11, 2014	http://calgary.ctvnews.ca/technology-used-to-keep-tabs-on-patients-with-memory-impairment-1.1864065
Newstalk 770	GPS to aid in locating dementia patients	June 11, 2014	http://www.newstalk770.com/2014/06/11/gps-to-aid-in-locating-dementia-patients/
AM 660 News	Alberta Health Services outlines plan for dealing with dementia	Jun 11, 2014	http://www.660news.com/2014/06/11/alberta-health-services-outlines-plan-for-dealing-with-dementia/
Yahoo News	Alberta launches program to track dementia patients with GPS devices	June 11, 2014	https://ca.news.yahoo.com/blogs/dailybrew/alberta-launches-program-track-dementia-patients-gps-devices-190528772.html
La Crete Online	New GPS technology helps support independence	June 11, 2014	http://lacreteonline.com/new-gps-technology-helps-support-independence/
CBC Radio Eye Opener	Locator Device Project	June 12, 2014	http://www.cbc.ca/player/AudioMobile/Calgary%2BEyeopener/ID/2464383533/
AHS News and Advisories	GPS supports seniors with dementia, their caregivers	June 17, 2014	http://www.albertahealthservices.ca/10067.asp
CTVNew.ca	Can GPS technology help dementia sufferers stay independent longer	January 18, 2015	http://www.ctvnews.ca/health/health-headlines/can-gps-technology-help-dementia-sufferers-stay-independent-longer-1.2194777
Rehab and Community Care Medicine	GPS Supports Aging A look into GPS use for home care clients with dementia	February 18, 2015	http://www.rehabmagazine.ca/innovators/gps-supports-aging-in-place-a-look-into-gps-use-for-home-care-clients-with-dementia/
Edmonton Examiner	University of Alberta helps seniors track peace of mind	March 18, 2015	http://www.edmontonexaminer.com/2015/03/18/university-of-alberta-helps-seniors-track-peace-of-mind
Red Deer Advocate	GPS technology used to keep tabs on dementia patients	March 25, 2015	http://www.safetracksgps.ca/site/news_updates
CBC News	AHS using ankle bracelet technology to track dementia patients	March 27, 2015	http://www.cbc.ca/news/canada/edmonton/ahs-using-ankle-bracelet-technology-to-track-dementia-patients-1.3013158

Appendix 8: LDP Lead Job Responsibilities

The Locator Device Project (LDP) Lead position is responsible to provide direction and leadership to the specific provincial strategic initiative related to technology, support the provision of a long-term service delivery perspective and explore the development of an alternate provincial health care approach through the use of technology. More specifically, the LDP Lead position provides direct leadership in the planning, development, implementation, monitoring, maintenance, evaluation and closure of the project.

- Advance strategic plans, alliances and partnerships to move integration of care-provision initiatives forward and promote long-term change for a sustainable health system.
- Align health service strategies and delivery models within the parameters of Alberta Health Services frameworks, policies, business plans, and standards/best practices that enable operational areas to deliver high quality, patient centered services.
- Using appropriate research methods and techniques to determine the value of technology in the care of specific community patient population groups.

The Project Lead employs expertise in numerous leadership areas including, but not limited to:

Project Management:

- Administer the project's planning, development, implementation, monitoring, maintenance, evaluation and conclusion provincially
- Support the preparation for and effective business of the LDP Steering Committee
 - Prepare meeting materials, documentation, presentations, support and inform membership, and deliver on action items.
- Lead, support and record the work of various LDP Working Groups
 - Stakeholder Working Group
 - Evaluation Working Group
 - Vendor Selection Working Group (Short term)
 - Vendor meetings
- Establish and maintain collaborative working relationships with internal and external stakeholders
 - Work closely with the LDP Steering Committee co-chairs, Working Group stakeholders, Vendor, Evaluation Team and Project Team
 - Modify project implementation, maintenance, and evaluation plans as required.
 - Champion the initiative with practitioners and program leaders in the project zones, other zones and provincially
 - obtain and facilitate AHS consultation and ensure project due diligence from Legal department, Research department, Contracting and Procurement Department, Ethics department, Evaluation Services,

Seniors Health, Project management, IT, DIMR, Knowledge Translation, and others as needed

- Ensure project deliverables, milestones and deadlines are met
- Work with Home Care to develop education, implementation and maintenance plans, as required
 - Establishes and maintain collaborative working relationship with home care case managers, home care managers, and Seniors Health
- Work with Communications Department to create and implement a communication plan
 - develop information provided to patients, their families and other care providers/stakeholders
 - Participate in media communication preparation and events
 - Liaise with media
- Monitoring and Assessment:
 - determine client eligibility for the LDP program and educate stakeholders
 - assess the dyad's ability to use the LDP equipment in their home environment
 - manage and report on project budget and management
 - monitor and create risk mitigation plan(s) and deal with unanticipated risks
- Care plan implementation:
 - Participate in individualized plan of client care development, in collaboration with the client, home care case manager and interprofessional health care team and other providers of care ensuring continuity of care across the continuum
- Information Management :
 - Ensure accurate and complete documentation of the LDP Initiative
 - coordinate and complete all reporting activities of the project; monthly Seniors Health status reports, Quarterly IAE status reports, and others as required
 - Recognize and report concerns regarding the development of the project to the LDP Steering Committee
 - Record complete and accurate relevant data for every client

Project Planning:

- Develop Project Charter
 - determine project resource requirements
 - define project team roles and responsibilities
 - outline project timeline, deliverables and milestones
- Develop a Project Proposal / plan
- Identify and Assemble project stakeholders
 - Assemble, lead, support and record the work of various LDP Working Groups
 - Stakeholder Working Group
 - Evaluation Working Group
 - Vendor Selection Working Group
- Lead and Compile Evaluation Framework

- Lead and Compile Ethics Board submission
- Obtain Operational Approvals for Research
- Lead and Compile Research Agreement
- Ensure project / research compliance with applicable privacy and legal legislation
- Coordinate project implementation requirements
 - Ethics Board approval, evaluation services acquisition

Technology Trial Implementation

- Support technology function
 - Liaise with vendor, stakeholders, project participants, and research assistant staff
 - troubleshoot issues as they arise
 - communicate swiftly and thoroughly with all team members
- Oversee participant use of technology in rural project location
 - home visit, client information letter review and signed consent, intake assessment, technology education and set up, technology monitoring / call logs
 - consult with the case manager, interprofessional team and other providers of care, as appropriate, for those clients living in supportive living environments or designated environments
- Lead, support, document and store the work of LDP team meetings:
 - Vendor meetings
 - liaise to develop and improve project processes and/or technology
 - LDP Rounds meetings
 - establish routine project practice and procedures for both project sites
 - educate and orientate research assistants to their role
 - triage dyad enrollment, liaise to improve and standardize project processes and procedures, troubleshoot case by case challenges,
- Provide education, support and guidance to Home Care staff and other stakeholders in integrating assistive technology into their professional practice
- Facilitate and participate in referral stakeholder (including Home Care Case Manager) training sessions.
- Develop and support implementation plans and procedures
- establish routine processes, policies and/or procedures needed for successful implementation
- Identify risks and impact of new initiative and provide recommendations

Administrative Support of the LDP

- Chair Monthly Stakeholder Working Group
 - mediate LDP implementation and the business processes necessary
 - record, monitor, and distribute meeting notes
- Chair Monthly Evaluation Working Group
 - mediate LDP implementation and the business processes necessary
 - record, monitor, and distribute meeting notes
- Lead weekly LDP Rounds

- establish, develop and adjust LDP team processes related to dyad enrollment and support
- troubleshoot and liaise technology implementation with dyads and vendor
- record, monitor, and share meeting notes
- Develop LDP guidelines and procedures needed to ensure success
- Identify and assist in the resolution of LDP guideline and procedure issues

Evaluation:

- Create, validate and implement an evaluation logic model with performance measures and outcome indicators
- Collaborate with Evaluator to ensure required data is collected for project evaluation
 - Identify a minimum data set
 - determine and/or develop data collection tools
 - develop minimum database to register participants, collect and store evaluation data
 - Initiate AHS data request and liaise with AHS data holder for evaluators
- Prepare project proposal and ethics application
 - Patient information letters and consent forms
- Ensure all regulations and legal requirements are met concerning patient data
 - Remove identifiable information from shared data
- Collect data from participants and stakeholders for evaluation
- Evaluate progress toward achievement of expected outcomes, modifying interventions and/or outcomes as appropriate.

Education:

- Develop, schedule, facilitate and evaluate user training on the LDP equipment.
- Share knowledge with other members of the health team for the benefit of clients
- Demonstrate knowledge and ability to utilize teaching strategies which facilitate cooperative and group learning;

Professional responsibilities

- Serve as an advocate to represent client concerns and to ensure client concerns and needs are addressed
- Participate in research, staff development projects, in service education classes and other activities as appropriate
- Maintain continuing competencies through ongoing professional development including participation in education programs, educational in-services, research, continuous quality improvement and risk management activities
- Demonstrate ethical practice and professionalism in working with clients, peers, and other healthcare providers and the public
- Demonstrate knowledge of and application of policies and procedures and applicable federal, provincial legislation. Such legislation includes, but is not

limited to: Health Information Act, Occupational Health and Safety Act, Home Care Regulations, Protection of Persons In Care Act, Personal Directives Act

- Assume responsibility for his/her actions which have a direct impact on the quality of client care, health, and safety
- Demonstrate knowledge and ability to facilitate professional growth of students and colleagues by modeling professional conduct