

Running Head: DEVELOPMENT AND EVALUATION OF A RURAL MEMORY CLINIC

**Improving Access to Dementia Care:  
Development and Evaluation of a Rural and Remote Memory Clinic**

Debra G. Morgan, PhD, RN  
Associate Professor & Chair, Rural Health Delivery  
Canadian Centre for Health & Safety in Agriculture<sup>1</sup>

Margaret Crossley, PhD, R. D. Psych.  
Associate Professor and Director of Clinical Training, Department of Psychology  
Director, Aging Research & Memory Clinic<sup>1</sup>

Andrew Kirk, MD, FRCPC  
Professor & Head, Division of Neurology, Department of Medicine<sup>1</sup>

Carl D'Arcy, PhD  
Professor & Director, Applied Research/Psychiatry<sup>1</sup>

Norma J. Stewart, PhD, RN  
Professor & Associate Dean, Graduate Studies & Research  
College of Nursing<sup>1</sup>

Jay Biem, MD, MSc, FRCPC  
General Internist, Department of Medicine<sup>2</sup>

Dorothy Forbes, PhD, RN  
Associate Professor, School of Nursing<sup>3</sup>

Sheri Harder, MD, FRCPC  
Assistant Professor, Department of Medical Imaging<sup>1</sup>

Jenny Basran, MD, FRCPC  
Assistant Professor & Head, Division of Geriatric Medicine<sup>1</sup>

Vanina Dal Bello-Haas, PhD, PT  
Associate Professor, School of Physical Therapy<sup>1</sup>

Lesley McBain, PhD  
Assistant Professor, Indigenous Studies Department (First Nations University of Canada)<sup>4</sup>

<sup>1</sup>University of Saskatchewan, Saskatoon, Saskatchewan, CANADA (Corresponding Author: Wing 3E, Royal University Hospital, 103 Hospital Drive, Saskatoon, SK, CANADA, S7N 0W8, TEL: (306) 966-7905, email: [debra.morgan@usask.ca](mailto:debra.morgan@usask.ca))

<sup>2</sup>Lakeshore General Hospital, Montreal Quebec, CANADA

<sup>3</sup>University of Western Ontario, London, Ontario, CANADA

<sup>4</sup>First Nations University of Canada, CANADA

Running Head: DEVELOPMENT AND EVALUATION OF A RURAL MEMORY CLINIC

**Improving Access to Dementia Care:  
Development and Evaluation of a Rural and Remote Memory Clinic**

The availability, accessibility, and acceptability of services are critical factors in rural health service delivery. In Canada, the aging population and the consequent increase in prevalence of dementia challenge the ability of many rural communities to provide specialized dementia care. This paper describes the development, operation, and evaluation of an interdisciplinary memory clinic designed to improve access to diagnosis and management of early stage dementia for older persons living in rural and remote areas in the Canadian province of Saskatchewan. We describe the clinic structure, processes, and clinical assessment, as well as the evaluation research design and instruments. Finally, we report the demographic characteristics and geographic distribution of individuals referred during the first three years.

**BACKGROUND**

**Rural Aging and Dementia**

According to the 2006 census (Statistics Canada, 2007) rural areas in Canada had a higher proportion of seniors (people aged 65 and over) compared to urban areas, and remote rural areas had a higher proportion of seniors (16.1%) than cities (13.2%) or rural areas close to cities (13.9%). These rural-urban differences are occurring nationally but are especially striking in Saskatchewan, where seniors make up 14.7% of the population of cities vs. 22.4% of towns and 21.7% of villages (Sask Trends Monitor, 2007). The 2006 census also revealed that the proportion of seniors had increased in every province and territory in Canada since 2001 and that Saskatchewan continues to have the highest proportion of seniors at 15.4%, compared to 13.7% nationally (Statistics Canada, 2007). This aging phenomenon is taking place around the world, with wide-ranging implications (Nyce & Schieber, 2005), including the planning of health care

services for individuals with dementia. A national study of the prevalence and risk factors for dementia (Canadian Study of Health & Aging Working Group, 1994) identified that dementia affected approximately 8.0% of all Canadians aged 65 and over and increased to 34.5% of those aged 85 and over. In 2007 an estimated 450,000 Canadians over 65 have dementia, with an estimated 97,000 new cases this year (Alzheimer Society of Canada, 2007). With the increasing prevalence of dementia with age and the expanding population of older adults, management of the growing numbers of individuals with dementia is an emerging health care crisis and a specific challenge for rural communities. In its dementia care strategy report, the Saskatchewan Provincial Advisory Committee of Older Persons (2004) identified seven major issues, including diagnosis and treatment. A quotation from a rural participant that “It was like climbing a mountain to get a diagnosis,” illustrates the challenges in obtaining diagnostic assessment.

The Ministerial Advisory Committee on Rural Health (2002) identified limited diagnostic services and under-servicing of special-needs groups, such as seniors, as areas of concern for rural, remote, northern, and Aboriginal communities in Canada. More than half of Canada’s 1.4 million Aboriginal people reside in rural, remote, or northern regions, yet little is known about assessment and care needs of Aboriginal seniors with dementia. The lack of culturally appropriate services for minority seniors may lead to even greater barriers to care (Hinton, Franz, & Friend, 2004; McKenzie & Bushy, 2004). Although limited in number, existing studies of rural dementia care in Canada report limited availability of formal services and supports, long distance to service, and transportation difficulties (Bédard, Koivuranta, & Stuckey, 2004; Forbes, Morgan, & Janzen, 2006; Morgan, Semchuk, Stewart, & D’Arcy, 2002). Similar issues have been reported in studies conducted in rural areas of the USA (Goins, Williams, Carter, Spencer, & Solovieva, 2005; Starns, Karner, & Montgomery, 2002), Scotland (Innes, Blackstock, Mason, Smith, & Cox, 2005), and Wales (Wenger, Scott, & Seddon, 2002).

## **Early Diagnosis and Treatment**

DeKosky (2003) has argued that diagnosis, treatment, and follow-up of dementia patients from the earliest possible stage will reduce health care costs, increase the quality of life for patients, and reduce caregiver burden. The establishment of a diagnosis of dementia has been described as an important transition from early uncertainty and ambiguity to a phase of learning to live with impairment (Woods et al., 2003). Early diagnosis of dementia is essential for timely effective ongoing care and family support (Turner et al., 2004), yet detection, referral, and management are often inadequate (Downs et al., 2006). Studies of family caregivers' experiences in obtaining a diagnosis of dementia reveal long delays between initial symptom recognition and diagnosis, ranging from two years (Knopman, Donohue, & Guterman, 2000) to 30 months (Boise, Morgan, Kaye, & Camicioli, 1999). The diagnostic workup of dementia is more difficult for rural patients, involving consultations with multiple specialists over extended time periods (Teel & Carson, 2003). Caregivers of rural patients report significantly more barriers to obtaining a dementia diagnosis than urban caregivers (Wackerbarth & Johnson, 2002).

Limited access to specialists means that responsibility for early diagnosis and treatment will fall on primary care physicians (Hinton et al., 2004). Although current Canadian consensus guidelines suggest that most patients with dementia can be assessed and managed adequately by their primary care physicians (Hogan et al., 2007), a number of studies have raised concerns about their confidence in diagnosing dementia, the adequacy of their training, and their access to resources in diagnosis and management of dementia. Turner et al. (2004) found that one-third of general practitioners surveyed expressed limited confidence in their diagnostic skills and two-thirds lacked confidence in management of behavior and other problems in dementia. A survey of rural and urban primary care physicians in the USA (Brown, Mutran, Sloane, & Long, 1998), found that most physicians had made few new diagnoses of Alzheimer's Disease (AD) during

the previous year; rarely used published diagnostic criteria, performed diagnostic procedures related to AD, or recommended approved drug therapies; and did not regularly refer families to AD support groups. A chart review study of rural patients with ICD-9 codes relevant to dementia revealed that few records actually coded dementia, and that formal mental status testing was rarely performed in these patients (Camicioli et al., 2000).

Iliffe and Wilcock (2005) studied barriers to recognition of and response to dementia by primary care physicians and found that the major barrier was complexity of diagnosing and managing early dementia. Participants were concerned about the uneven geographical distribution of support and diagnostic services to assist general practitioners, patients, and families. Teel (2004) found that rural primary care physicians perceived limited access to consultants and limited community support and education resources as major impediments to diagnosis and treatment. Similarly, Williams (2000) found that family physicians wanted specialists to assist them with dementia diagnosis and treatment planning, and in communicating with and educating family members. Other studies (Iliffe & Wilcock, 2005; van Hout, Vernooij-Dassen, Bakker, Blom, & Grol, 2000) report that general practitioners have difficulty providing support to and talking with patients and families about the dementia diagnosis.

### **Memory Clinic Design and Operations**

Memory clinics were first established in the USA in the mid-1970s to provide diagnostic and treatment services, and to facilitate research (van Hout et al., 2000). The added value of multidisciplinary assessment is the ability to differentiate among the dementia subtypes (Wolfs, Dirksen, Severens, & Verhey, 2006). Early and accurate differential diagnosis allows for the earliest possible management (Passmore & Craig, 2004). There are few published reports of memory clinics targeting rural residents or evaluations of telecommunications technology to deliver services for assessment and management of dementia. A comparison of an urban memory

clinic and a rural satellite (Wackerbarth, Johnson, Markesbery, & Smith, 2001) found few differences in rural vs. urban patients. Studies examining the use of telehealth videoconferencing suggest that psychometric (Ball & Puffett, 1998; Loh, et al., 2004; Montani et al., 1996; Tyrrell, Couturier, Montani, & Franco, 2001) and neurological examination (Craig, McConville, Patterson, & Wootton, 1999) can be done using this technology.

Evidence on clinics serving rural communities is lacking. One of the most extensive surveys of memory clinics (Lindesay, Marudkar, van Diepen, & Wilcock, 2002) identified 58 clinics in the British Isles, of which 72% were hospital-based. The report did not indicate whether the clinics were located in rural or urban locations. Most of the 58 clinics provided specialist assessment (97%), information to patients and caregivers (93%), initiation and monitoring of treatment (86%), and advice on management (86%). Almost half operated weekly (46%). Most (83%) operated over one half-day session and were staffed by 1 to 9 individuals (mode = 2; mean = 4). Clinic specialists included psychiatrists (79%), nurses (71%), psychologists (60%), physicians/geriatricians (28%), and neurologists (21%). Most clinics (93%) assessed three or fewer new patients per session. Regular follow-up was provided by 33%, with 1 to 10 sessions (mode = 2; mean = 4). Initial assessments were completed in one (46%) or two (46%) sessions, which ranged from one to seven hours (mean = 2.5). Neuroradiological assessment was provided by most clinics (CT = 93%, MRI = 71%) (Lindesay et al., 2002). A well established clinic in Australia (Ames, Flicker, & Helme, 1992; Stratford et al., 2003) operates a half-day per week, seeing two new patients weekly. Assessments are conducted over two visits a few weeks apart, with a family conference at the end of the second visit.

### **RURAL AND REMOTE MEMORY CLINIC**

The current paper reports on a study involving the development and evaluation of a new Rural and Remote Memory Clinic that incorporates telehealth videoconferencing with a one-stop

interdisciplinary assessment in a tertiary care centre. This research is part of a larger 5-year research program *Strategies to Improve the Care of Persons with Dementia in Rural and Remote Areas* underway in the Canadian province of Saskatchewan (Morgan et al., 2005). The research was funded under the New Emerging Team initiative of the Canadian Institutes of Health Research (CIHR), which was designed to support teams of investigators conducting collaborative multidisciplinary research. The objectives of the memory clinic program are to increase the availability and accessibility of dementia care in rural and remote areas, to determine the acceptability of a one-stop clinic and of telehealth versus regular follow-up, and to develop culturally appropriate assessment protocols for assessment of dementia in aboriginal older adults.

The province of Saskatchewan is sparsely populated, with approximately one million people living in an area of 652,000 km<sup>2</sup> or 252,000 mi<sup>2</sup>. (In comparison, England has an area one-fifth that of Saskatchewan, with 50 times the population). The population densities of the 13 regional health authorities (RHAs) in the province range from 0.03 to 9.15 persons per km<sup>2</sup> with a median density of 1.67 people per km<sup>2</sup> (Statistics Canada, 2003). Saskatchewan Health provides publicly funded health care services through the RHAs. In 1999, Saskatchewan Health initiated a provincial telehealth system to help address the challenges of health delivery in remote areas, starting with 10 northern sites. The provincial network has expanded rapidly in the last few years. A trained telehealth coordinator at each site provides technical and clinical support. Partnerships with RHAs and First Nations bands have made additional sites available. At present there are 29 telehealth sites located in rural and remote communities in Saskatchewan with populations that range in size from 622 to 34,291 persons (median = 2,727).

Initially the research team held consultation meetings with care providers in all 13 rural and northern communities with provincial network sites in operation at that time, as well as 2 sites operated by First Nations bands. The purpose was to obtain feedback on plans for the

memory clinic study. There was strong support for the proposed clinic by rural and remote providers, who reported a growing prevalence of dementia in their practices and the need for more information and resources for diagnosing and managing patients and supporting caregivers. As a result of these visits the research team identified feasibility issues related to the study design before implementation. Our appreciation of the costs and limitations of travel to the tertiary care centre from northern sites (McBain & Morgan, 2006) led us to modify our expectations for follow-up of northern residents. Using contact information provided at the consultation meetings we conducted a baseline survey aimed at assessing rural care providers' comfort and confidence in providing dementia care, and exploring their continuing education needs.

### **Sampling and Design**

The demonstration project was approved by the University of Saskatchewan Behavioral Research Ethics Committee. The target population is non-institutionalized individuals in Saskatchewan, age 50 or older, referred to the clinic in Saskatoon because of a concern about a memory disorder. Saskatoon is the tertiary care referral centre for the middle and northern areas of the province. Our intent was to increase access to assessment in rural and remote areas of the province, thus eligibility is limited to this population. Rural is defined as populations living outside 100 kms. (62 miles) of the major cities of Saskatoon and Regina, the other tertiary care centre in the province. Communities within the three northern RHAs are defined as remote.

To evaluate the acceptability of the integrated clinic and to compare telehealth vs. regular follow-up, we planned to conduct a between-group (telehealth vs. in-person) randomized design, where half of the communities would be assigned to in-person (standard) care delivery. This design was modified as a result of the community consultation visits. Local care providers wanted to use their existing telehealth infrastructure. They advised that implementation of a design that did not use telehealth (control condition) or that delayed access in control

communities (staggered entry) would jeopardize stakeholder buy-in. Physicians in remote northern communities stated that they would be unlikely to refer patients because in-person follow-up was not practical due to the cost of travel to Saskatoon and lack of public transportation in many communities. Instead, a single case design (Kazdin, 1982; Shadish, Cook, & Campbell, 2002) was adopted that alternated between telehealth and in-person follow-up with randomly assigned order (i.e., telehealth vs. in-person first). Patients alternate between the two modes for the 6-wk, 12-wk, and 6-month follow-up appointments. Strengths of this repeated measures design include increased power, control for individual differences, and greater ability to assess patient and family satisfaction and acceptability of the two delivery modes because individuals would have experience with both. Increased community buy-in and use of all available telehealth sites were additional benefits. A further design decision was to offer remote northern participants telehealth for all follow-up visits, thus treating northern sites as a separate descriptive study.

### **The Intervention**

The goal of the rural memory clinic was (1) to provide a state of the art interdisciplinary assessment of dementia, and (2) to streamline assessment in order to reduce repeated travel and to shorten the time to diagnosis. Referrals are made by family physicians to the neurologist, but may be initiated by any member of the health team or a family member. Appointments are booked by the clinic nurse by mail and followed up by telephone to confirm attendance.

### **Pre-Clinic Assessment via Telehealth**

We originally planned to use these pre-clinic sessions as a screening process to ensure referrals were appropriate and to inform planning for the full-day assessment in the tertiary care centre (Saskatoon) 4 to 6 weeks later. Once the clinic was operational, however, we found we were reluctant to screen out referrals even though some did not fit our planned target population

of early stage dementia. Of the 137 patients who have attended the full-day clinic to date, 5 had MMSE scores indicating moderately severe dementia (MMSE 13 - 15) and 1 had a score indicating severe dementia (MMSE 6). We did not want to discourage referrals early in the study, and we believed that the referrals reflected a need on the part of family physicians for confirmation of the dementia diagnosis and advice on management. This conclusion was based on review of referral letters and analysis of data from the initial baseline survey. The top-ranked continuing education needs identified by physicians were for information relevant to diagnosis and for guidelines for initiating treatment. During the 30-minute pre-clinic telehealth assessments, the clinic nurse and neuropsychologist interview the patient and family about the referring problem, obtain a brief medical history, and provide information about the clinic visit. A requisition for blood work is faxed so that patients can have the laboratory analysis done immediately. Results are then available on the clinic day. A standardized flow sheet was developed to guide and document the pre-clinic assessment. It is completed by both the nurse and neuropsychologist who use the information to guide clinic planning. Two to three pre-clinic telehealth appointments are conducted on clinic days.

### **The One-Stop Clinic**

The stream-lined, integrated one-day weekly clinic includes assessment by a neurologist, neuropsychology team, geriatrician, neuroradiologist, and physical therapist. Table 1 lists the clinical measures administered via questionnaires at each point of contact with patients and family members. The functions assessed as part of the clinical work-up, and the specific tests and procedures used, are reported in Table 2. A modified version of The Community Screening Interview for Dementia (CSID<sup>®</sup>; Hall, 2000; Hall, Hendrie, Brittain, Norton, Rodgers, & Prince, 1993), a screening instrument developed for cross-cultural dementia research, is used for non-English-speaking patients who prefer to be assessed using a translator. The clinic follows a

family-centred approach and we strongly encourage at least one caregiver to attend to provide information on the patient's history and daily functioning. We also assess the psychological health and caregiver burden experienced by the family or others supporting the patient. Two new patients are evaluated at each weekly clinic, with start times staggered at 8:30 AM and 9:30 AM and ending between 5:00 PM and 5:30 PM. The day starts with the clinic nurse meeting the patient and family at the hospital information desk and taking them to the clinic for the initial assessment. Throughout the day the nurse accompanies patients to the various locations where assessments are conducted, and monitors the in-person and telehealth follow-up appointments that also take place on clinic day.

*Insert Tables 1 and 2 about here*

On arriving at the clinic, the nurse reviews the consent forms for participation in the clinic evaluation research with the patient and family members, and informed written consent is obtained from both parties. Although we have had no refusals for the research, the patient would still be seen in the clinic. The patient and family members are then interviewed jointly by the team neurologist, neuropsychologist, geriatrician and physical therapist. The neurologist then examines the patient while the remaining team members conduct the family interview. A standardized neuropsychological test battery is completed with the patient by the neuropsychology graduate student or team psychometrist, under the supervision of the neuropsychologist. Although all parts of the battery are administered when possible (testing time is approximately 2 hours), for approximately 20% of patients an abbreviated or modified version of the test protocol is administered (e.g., because level of impairment requires some procedures to be discontinued, limitations due to sensory loss, fatigue). Meanwhile, family members complete paper-and-pencil measures of burden, distress, and health, as well as functional and

behavioral ratings of the patient. Patients are then jointly assessed by the geriatrician and physical therapist. All patients undergo a CT brain scan unless they have had recent imaging.

Each patient is discussed during interdisciplinary teaching rounds scheduled at the end of the clinic day and attended by all team members, residents, and graduate students. The referring rural family physicians are encouraged to participate by telephone conference call. Following this meeting patients and family members meet with the neurologist and neuropsychologist who provide information about the probable diagnosis, feedback based on the clinical assessments, and recommendations for management and care. Where appropriate, referrals are made to local support groups or services. Team clinicians prepare individual written reports that are collated and sent to the referring physician, usually within one week of the assessment.

### **Follow-up Assessment**

Follow-up assessments are conducted at 6 weeks, 12 weeks, 6 months, 1 year, and then yearly. Additional appointments are scheduled if needed. Patients from northern locations are offered telehealth appointments in their home communities for all follow-up contacts. Prior to one year, patients see only the clinic neurologist at follow-up appointments, with 20-minute appointments scheduled during clinic days. At one year, patients return to the clinic for more extensive assessment and are seen by the neurologist, physical therapist, and the neuropsychology team for an abbreviated one-hour test battery. Patients with advanced illness who are unable to complete neuropsychological testing at one year are seen via telehealth by the neurologist and neuropsychologist and only the 3MS is administered.

### **Evaluation of Clinic and Follow-up Interventions**

A number of evaluation instruments are used to collect data on patient/caregiver and telehealth coordinator assessments of telehealth and the one-stop clinic. Immediately following each telehealth session patients and their caregivers complete a 15-item *telehealth satisfaction*

*questionnaire*, which is then faxed to Saskatoon by the telehealth coordinator. The instrument was adapted from a questionnaire used in previous Saskatchewan Telehealth Network evaluations (Linassi & Shan, 2005; Miller & Levesque, 2002). Respondents rate 13 aspects of the telehealth appointment on a 4-point scale (poor, fair, good, excellent). Space for comments is also provided. At the same time, coordinators complete and return a brief *telehealth coordinator evaluation* form in which they rate both patient and caregiver comfort on 5-point Likert scales (1 = very uncomfortable; 5 = very comfortable). Open-ended questions are used to solicit comments on strategies used to put patients at ease and patient or caregiver concerns.

At both telehealth and in-person follow-up appointments, patient-caregiver dyads complete a *follow-up evaluation questionnaire* in which they rate their overall satisfaction with the appointment (1 = very dissatisfied, 5 = very satisfied) and its convenience (1 = very inconvenient, 5 = very convenient). They are asked to describe what they liked most and least about the appointment. In Saskatoon, the clinic nurse or a research assistant attending the session complete a *telehealth session form* to document any technical problems.

Within one to two days following the clinic visit, the *1-Stop Clinic Satisfaction Interview* is administered by telephone. Caregivers respond to a series of questions rated on a 4-point Likert scale, that assess communication, treatment by team members, and satisfaction with care. Open-ended comments questions at the end of each section provide an opportunity for caregivers to elaborate on their experiences. The Client Satisfaction Questionnaire (Larson, Attkison, Hargreaves, & Nguyen, 1979) is embedded in the interview. This instrument was modified slightly by removing one question that was not relevant to our clinic. Information regarding travel and costs incurred in attending the clinic are also obtained. Approximately one year after the clinic appointment, an in-depth semi-structured *telehealth satisfaction interview* is conducted

by telephone to explore caregivers' perceptions of telehealth versus in-person appointments and to re-assess their views about the effectiveness of the one-day clinic one year later.

Clinical and evaluation data are centrally managed to enhance data quality and accessibility, and to facilitate interdisciplinary analyses that capitalize on the depth and breadth of data collected. Most data are entered into a single database, with multiple measures for each patient linked by their identification code. Following data cleaning, assessment and handling of missing data, the scoring of embedded scales takes place. Our intent is to periodically release an electronic file containing the full data set for analysis that will be available to all team members and their students. By providing regular data releases over time as the sample size increases, we can ensure consistent sample size across analyses conducted at each stage of the research and increase accessibility of the data by providing the entire range of variables used in the study. The geographic distribution of the first 151 patients seen at pre-clinic assessment or assessed at the memory clinic are shown in Figure 1. This map, created using GIS (Global Information Systems) software to plot the location of clinic patients using their home postal codes, shows that the clinic is serving patients from most rural areas of the province. Of the 151 patients referred and seen via telehealth for a pre-clinic assessment, 136 were from rural areas and 15 from remote northern communities. Of these, 126 rural patients (93%) and 11 remote patients (73%) subsequently attended the full-day clinic.

*Insert Figure 1 and Table 3 about here*

Demographic characteristics of the first 137 patients attending the full day clinic are reported in Table 3. Data are shown for all patients, and for the rural and remote patients separately. The current sample is too small to conduct statistical analyses of differences between rural and remote patients, although it is interesting to note that the mean age of rural patients is 73.4 years vs. 69.6 years for remote patients. One-way travel saved by conducting the

appointment by telehealth was approximately 462 kms. for remote patients and 192 kms. for rural patients. The majority of patients reported that they most often spoke English at home. Five of the 7 Aboriginal patients (First Nations, Métis) resided in remote communities. The Community Screening Interview for Dementia (CSI'D') was used with seven patients who requested assessment in their own language (4 Cree, 1 Dene, 2 German). Translation was provided by family members, except for one remote patient who was not accompanied by family. The taxi driver who brought the patient to the clinic translated. To date 23 of the 137 patients seen in the clinic, all of whom were from rural areas, have requested a change in type of follow-up format prior to the one-year assessment, rather than following the pattern indicated by the initial randomization. Seventeen patients requested a change from in-person to telehealth and six requested a change from telehealth to in-person follow-up appointments. No requests for changes were made by remote patients. Table 3 also reports the number of patients who have discontinued follow-up after the clinic day, and at what stage. Although a greater proportion of remote than rural patients were not seen in the clinic following pre-clinic assessment, remote patients who attended clinic were less likely to discontinue than rural patients.

There are few reports describing other memory clinic populations. Most do not provide details about the proportion of rural vs. urban patients but appear to be serving mainly urban patients. Of the 577 patients seen in an Australian memory clinic over a 9-year period (Stratford et al., 2003), the mean age was 72.9 years, identical to the overall mean age of patients seen in our clinic. English as a first language was spoken by 73% of patients and an interpreter used for 8% of assessments, compared to 94% and 5% of the current clinic population, respectively. In the Australian clinic a diagnosis of AD was made for 40% of patients, similar to the 35% of the rural and remote clinic patients. Lindsay et al. (2002) reported on 58 clinics in the UK, where an average of 20% of patients received a diagnosis of AD. Patient age was not reported.

## **Team Processes and Management**

Staff currently employed with the study include a project manager, research nurse, and a data management team (data manager, research assistant, data analyst, statistical consultant) that meets weekly. Yearly study team retreats are attended by 20-25 study investigators, staff, and students. We hold monthly noon-hour rounds at which team members present on research or clinical topics linked to the study. Study co-investigators meet periodically to discuss major issues related to the research. To reduce demand on team members, streamline decision-making, and provide some separation of evaluation and clinical processes, separate evaluation and clinical teams meet as needed. Due to the challenges of bringing the large co-investigator group together, a small research management team (principal investigator, one senior co-investigator, and the project manager) meets regularly to discuss issues related to financial and data management, publication, and plans for clinic sustainability.

## **Discussion**

This work is still in progress, but after five years of working together (including project development) and operating the clinic for three years, we are able to identify some of the project's challenges and successes. Our team is also looking ahead to future research and is exploring mechanisms for ensuring sustainability of the clinic beyond the research funding.

## **Challenges**

Once challenge has been the management of conflicting demands that can arise when integrating service development with evaluation (Finch, May, Mair, Mort, & Gask, 2003). For example, some patients have declined follow-up unless they can be seen using telehealth, because of the difficulties of traveling. A few have requested in-person appointments because they have family members living in Saskatoon. Although such requests have implications for our research design, our decision has been to consider the clinical need first and to accommodate

their requests. We are also aware that there is a larger need for assessment of cognitive problems in younger individuals or caused by factors other than dementia, but due to the limited resources and the mandate of the funded research, we are not able to meet all of the existing need.

The past decade has seen a growing emphasis on, and requirement for, interdisciplinary research in the health sciences. One of the factors contributing to this development is the increased complexity of health-related issues and the recognition that no single discipline has a monopoly on the search for creative solutions (Armstrong, 2006). Hall et al. (2006) note that interdisciplinary health research requires considerable investment in time, physical space, and financial resources, and that regular and frequent research-team meetings are integral to success. Some of the challenges faced by our research team include the increasing workload and time demands experienced by all team members, in clinical, teaching, administration, and research activities. These demands make it difficult to make time for team-related activities. Some activities and decisions require face-to-face interaction, which can be difficult to arrange. Nevertheless, ongoing commitment to the team is evident in the continued involvement and interest demonstrated by team members.

One study objective which has not been achieved to the degree the team had hoped for is increased referral rates for patients in remote northern communities. Extensive work has been conducted by one of the co-investigators (M.C.) and her doctoral student to develop and refine assessment procedures for Aboriginal seniors. We had hoped that our clinic might improve accessibility of diagnostic services for northern patients, resulting in broader representation of Aboriginal patients in the clinic. During the development meetings we held in northern communities, we learned about the often insurmountable difficulties of travel to Saskatoon. Some northern patients referred for assessment have been unable to attend because they could not afford the cost of transportation. Related research conducted by graduate students associated

with the project have identified other cultural, historical, and system factors that may create barriers to diagnostic assessment for dementia in northern populations (e.g., Cammer, 2006).

Another goal of this research was increased capacity development and knowledge exchange with rural providers, but there appears to be barriers to participation in the end-of-day team conference by referring physicians. When physicians do participate via teleconferencing there are evident benefits for patients, families, referring physicians, and the clinic team. More work is needed to discover other ways of involving physicians in the session or identifying alternative approaches for interaction. This may be a fruitful area for future research, as there is growing interest in identifying barriers to detection and management of dementia in primary care (Iliffe & Wilcock, 2005; van Hout et al., 2000).

### **Successes**

Patient and Family Satisfaction. Although satisfaction surveys have been critiqued because of lack of conceptual and theoretical clarity about the concept of patient satisfaction, research shows that users of health services can provide detailed descriptions of their experiences and attribute a value to them (Williams, Coyle, & Healy, 1998). Providing patients with a voice in the evaluation and continuing development of services requires efforts to access patient experiences, discover what is important to them, and elicit their views on whether the service can be improved (Williams et al.). To avoid some of the limitations of satisfaction studies, we are using multiple methods of evaluating patient and caregiver satisfaction, including qualitative and quantitative approaches, and we are following patients over time. These approaches are helping us to understand what is important to users. One of the main themes emerging from the evaluation is that most patients and families appreciate having a coordinated one-stop approach to assessment and being able to receive a diagnosis at the end of the day. Most patients and caregivers also report high satisfaction and convenience ratings with the use of telehealth.

Future publications are being developed that will report on their experiences with the clinic day and telehealth versus face-to-face follow-up.

Benefits of the team approach. A number of positive outcomes of this project are related to the opportunities for interprofessional practice, research, and training. Foley (1990) has described the evolution in models of health care service delivery, from unidisciplinary, multidisciplinary, interdisciplinary, and most recently, transdisciplinary approaches. Foley provides a useful description of these terms, which are often erroneously used interchangeably. In the multidisciplinary approach, professionals work next to each other but with minimal exchange of information or interaction. Assessments tend to be discipline specific and individual; plans may or may not reflect a group consensus and the family is peripheral. In the interdisciplinary model the patient is also assessed individually, but the professionals meet to exchange information related to diagnosis and treatment. Fragmentation can occur because each piece of the puzzle is obtained from separate samples of behavior. In contrast, the transdisciplinary approach involves a deliberate pooling and exchange of information and knowledge, and crossing of traditional disciplinary boundaries. Patients are assessed simultaneously by multiple professionals and the family is an integral part of the process. Benefits include reduced demand on the patient as a result of joint “arena evaluation,” streamlined case management, and enhanced professional skills (Foley, 1990).

The model of care that has evolved in the Rural and Remote Memory Clinic is a blending of the interdisciplinary and transdisciplinary approaches. For example, the initial interview with the patient and family is conducted jointly by team clinicians, and there are opportunities for cross-disciplinary learning that occur during informal interactions between clinicians on clinic days. The monthly clinical and research rounds also provide opportunities for learning about assessment methods used by other disciplines and for more in-depth case studies of select clinic

patients. The clinic also provides exposure to interprofessional care for students from various disciplines represented on the clinic team.

### **Conclusion**

In this paper we have described the development, operation, and evaluation of an interdisciplinary memory clinic aimed at improving access to diagnosis and management of early stage dementia for individuals living in rural and remote communities. Based on three years of experience in operating and evaluating the clinic, we are confident that the stream-lined one-stop clinic and the use of telehealth videoconferencing for pre- and post-clinic assessment are feasible and acceptable approaches to health care service delivery for rural and remote seniors and their caregivers. Telehealth systems are expanding in all of the Canadian provinces and therefore available for similar clinical and research purposes. The interdisciplinary approach provides an efficient use of patient and provider time because of the coordinated model of care. The initial community consultation process prior to implementation of the clinic was critical to the success of the research and the clinic operations, by identifying potential pitfalls early in the project and using local care provider input in structuring the clinic and its operations, and in influencing the research design for the program evaluation. Demand for the clinic services remains strong, and is expected to continue as the population ages and the proportion of seniors in rural communities increases. The integrated clinic model of care developed here has the potential to be used to provide first-class healthcare for a variety of other chronic health care problems in rural and remote areas.

## References

Alzheimer Society of Canada. (2007). *People with Alzheimer's Disease and related dementias: Canadians affected by Alzheimer's Disease and related dementias*. Available on-line at <http://www.alzheimer.ca/english/disease/stats-people.htm>

Ames, D., Flicker, L., & Helme, R. (1992). A memory clinic at a geriatric hospital: Rationale, routine and results from the first 100 patients. *The Medical Journal of Australia*, 156, 618-622.

Armstrong, P. (2006). Advancing interdisciplinary health research: A synergism not to be denied. *Canadian Medical Association Journal*, 175(7), 761-762.

Attkisson, C., & Zwick, R. (1982). The Client Satisfaction Questionnaire: Psychometric properties and correlations with service utilization and psychotherapy outcome. *Evaluation and Program Planning*, 5, 233-237.

Ball, C., & Puffett, A. (1998). The assessment of cognitive function in the elderly using videoconferencing. *Journal of Telemedicine and Telecare*, 4(Supplement 1), 36-38.

Bédard, M., Koivuranta, A., & Stuckey, A. (2004). Health impact on caregivers of providing informal care to a cognitively impaired older adult: Rural vs. urban settings. *Canadian Journal of Rural Medicine*, 9(1), 15-23.

Bédard, M., Molloy, M., Squire, L., Dubois, S., Lever, J., & O'Donnell, M. (2001). The Zarit Burden Interview: A new short version and screening version. *The Gerontologist*, 41(5), 652-657.

Benton, A.L., Hamsher, K.de S., & Sivan, A.B. (1994). Multilingual Aphasia Examination (3<sup>rd</sup> ed.). Iowa City: IA: AJA Associates.

Berg, K., Wood-Dauphinee, S., Williams, J., Gayton, D. (1989). Measuring balance in the elderly: preliminary development of an instrument. *Physiotherapy Canada*, 41, 304-311.

- Blessed, G., Tomlinson, B., & Roth, M. (1988). Blessed-Roth Dementia Scale (DS). *Psychopharmacology Bulletin*, 24(4), 705-708.
- Boise, L., Morgan, D., Kaye, J., & Camicioli, R. (1999). Delays in the diagnosis of dementia : Perspectives of family caregivers. *American Journal of Alzheimer's Disease*, 14(1), 20-26.
- Brown, C., Mutran, E., Sloane, P., & Long, K. (1998). Primary care physicians' knowledge and behavior related to Alzheimer's disease. *The Journal of Applied Gerontology*, 17(4), 462-479.
- Bucks, R., Ashworth, D., Wilcock, G., & Siegfried, K. (1996). Assessment of activities of daily living in dementia: Development of the Bristol Activities of Daily Living Scale. *Age and Aging*, 25, 113-120.
- Buschke, H. (1984). Cued recall and amnesia. *Journal of Clinical Neuropsychology*, 6, 433-440.
- Byrne, L., Wilson, P., Bucks, R., Hughes, A., & Wilcock, G. (2000). The sensitivity to change over time of the Bristol Activities of Daily Living Scale in Alzheimer's Disease. *International Journal of Geriatric Psychiatry*, 15(7), 656-661.
- Camicioli, R., Willert, P., Lear, J., Grossman, S., Kaye, J., & Butterfield, P. (2000). Dementia in rural primary care practices in Lake County, Oregon. *Journal of Geriatric Psychiatry & Neurology*, 13, 87-92.
- Cammer, A. (2006). *Negotiating culturally incongruent healthcare systems: The processing of accessing dementia care in Northern Saskatchewan*. Available on-line at <http://library2.usask.ca/theses/available/etd-12192006-160831/>

Canadian Study of Health & Aging Working Group. (1994). Canadian Study of Health and Aging: Study methods and prevalence of dementia. *Canadian Medical Association Journal*, *150*(6), 899-913.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385-396.

Craig, J., McConville, J., Patterson, V., & Wootton, R. (1999). Neurological examination is possible using telemedicine. *Journal of Telemedicine and Telecare*, *5*, 177-181.

Crossley, M., & Lanting, S. (2007). *Grasshoppers and Geese Test*. Unpublished: Rural and Remote Memory Clinic, University of Saskatchewan, Saskatoon, SK.

Cummings, J., Mega, M., Gray, K., Rosengerg-Thompson, S., Carusi, D., & Gornbien, J. (1994). The Neuropsychiatric Inventory: Comprehensive assessment of psychopathology in dementia. *Neurology*, *44*, 2308-2314.

DeKosky, S. (2003). Early intervention is key to successful management of Alzheimer Disease. *Alzheimer Disease and Associated Disorders*, *17*, S99-S104.

Derogatis, L. (1975). *Brief Symptom Inventory*. Baltimore: Clinical Psychometric Research.

Derogatis, L., & Melisaratos, N. (1983). The Brief Symptom Inventory: An Introductory Reprint. *Psychological Medicine*, *13*(3), 595-605.

Downs, M., Turner, S., Byrans, M., Wilcock, J., Keady, J., Levin, E., O'Carroll, Howie, K., & Iliffe, S. (2006). Effectiveness of educational interventions in improving detection and management of dementia in primary care: Cluster randomized controlled study. *British Medical Journal*, *332*, 692-696.

Duff, K, Patton, D., Schoenberg, M.R., Mold, J., Scott, J.G., & Adams, R. (2003). Age- and education-corrected independent normative data for the RBANS in a community-dwelling elderly sample. *The Clinical Neuropsychologist*, 17 (3), 351-366.

Ewing, J. (1984). Detecting alcoholism: The CAGE Questionnaire. *Journal of the American Medical Association*, 252, 1905-1907.

Finch, T., May, C., Mair, F., Mort, M., & Gask, L. (2003). Integrating service development with evaluation in telehealthcare: An ethnographic study. *British Medical Journal (BMJ)*, 327, 1205-1208.

Foley, G. (1990). Portrait of the arena evaluation: Assessment in the transdisciplinary approach. In E. Gibbs & D. Teti (Eds.), *Interdisciplinary assessment of infants: A guide for early intervention professionals* (pp. 271-286. Baltimore, MD: Paul Brooks.

Forbes, D., Morgan, D., & Janzen, B. (2006). Rural and urban Canadians with dementia: Use of health care services. *Canadian Journal on Aging*, 25(3), 321-330.

Goins, T., Williams, K., Carter, M., Spencer, S., & Solovieva, T. (2005). Perceived barriers to health care access among rural older adults: A qualitative study. *The Journal of Rural Health*, 21(3), 206-213.

Goodglass, H., & Kaplan, E. (1983). The Assessment of Aphasia and Related Disorders (2<sup>nd</sup> Ed.). Philadelphia: Lea & Febiger.

Hall, K.S. (2000). Community Screening Interview for dementia (CSI 'D'); Performance for dementia in five disparate study sites. *International Journal of Geriatric Psychiatry*, 15, 521-531.

Hall, J., Bainbridge, L., Buchan, A., Cribb, A., Drummond, J., Gyles, C., Hicks, T., McWilliam, C., Paterson, B., Ratner, P., Skarakis-Doyle, E., & Solomon, P. (2006). A meeting

of the minds: Interdisciplinary research in the health sciences in Canada. *Canadian Medical Association Journal*, 175(7), 763-771.

Hall, K.S., Hendrie, H.C., Brittain, H.M., Norton, J., Rodgers, D.D., & Prince, C. (1993). Development of a dementia screening interview in two distinct languages. *International Journal of Methods in Psychiatric Research*, 3, 1-28.

Heaton, R.K., Grant, I., & Matthews, C.G. (1991). *Comprehensive norms for an expanded Halstead-Reitan battery: Demographic corrections, research findings, and clinical applications*. Odessa, FL: Psychological Assessment Resources.

Hinton, L., Franz, C., & Friend, J. (2004). Pathways to dementia diagnosis: Evidence for cross-ethnic differences. *Alzheimer Disease and Related Disorders*, 18(3), 134-144.

Hogan, D., Bailey, P., Carswell, A., Clarke, B., Cohen, C., Forbes, D., Man-Son-Hing, M., Lanctôt, K., Morgan, D., & Thorpe, L. (2007). Management of mild to moderate Alzheimer's disease and dementia. *Alzheimer's & Dementia*, 3, 355-384.

Iiffe, S., & Wilcock, J. (2005). The identification of barriers to the recognition of, and response to, dementia in primary care using a modified focus group approach. *Dementia*, 4(1), 73-85.

Innes, A., Blackstock, K., Mason, A., Smith, A., & Cox, S. (2005). Dementia care provision in rural Scotland: Services users' and carers' experiences. *Health and Social Care in the Community*, 13(4), 354-365.

Kazdin, A. (1982). *Single-case research designs: Methods for clinical and applied settings*. Oxford: Oxford University Press.

Knopman, D., Donohue, J., & Guterman, E. (2000). Patterns of care in the early stages of Alzheimer's disease: Impediments to timely diagnosis. *Journal of the American Geriatrics Society*, 48, 300-304.

Larsen, D., Attkisson, C., Hargreaves, W., & Nguyen, T. (1979). Assessment of client/patient satisfaction: Development of a general scale. *Evaluation and Program Planning*, 2, 197-207.

Lawton, M., Moss, M., Fulcomer, M., & Kleban, H. (1982). A research and service oriented multilevel assessment instrument. *Journal of Gerontology*, 37(1), 91-99.

Lewinsohn, P., Seeley, J., Roberts, R., & Allen, N. (1997). Centre for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology of Aging*, 12(2), 277-287.

Linassi, A., & Shan, R. (2005). User satisfaction with a telemedicine amputee clinic in Saskatchewan. *Journal of Telemedicine and Telecare*, 11, 414-418.

Lindesay, J., Marudkar, M., Diepen, E., & Wilcock. (2002). The second Leicester survey of memory clinics in the British Isles. *International Journal of Geriatrics Psychiatry*, 17, 41-47.

Logsdon, R., Gibbons, L., McCurry, S., & Teri, L. (1999). Quality of life in Alzheimer's Disease: Patient and caregiver reports. *Journal of Mental Health & Aging*, 5(1), 21-32.

Logsdon, R., Gibbons, L., McCurry, S., & Teri, L.(2000). Assessing quality of life in older adults with cognitive impairment. *Psychosomatic Medicine*, 64(3), 510-519.

Logsdon, R., & Teri, L. (1997). The Pleasant Events Schedule- AD: Psychometric properties and relationship to depression and cognition in Alzheimer's Disease patients. *The Gerontologist*, 37(1), 40-45.

Loh, P., Ramesh, P., Maher, S., Saligari, J., Flicker, L., & Goldswain, P. (2004). Can patients with dementia be assessed at a distance? The use of telehealth and standardized assessments. *Internal Medicine Journal*, 34, 239-242.

McBain, L., & Morgan, D. (2006). Telehealth, geography, and jurisdiction: Issues of healthcare delivery in Northern Saskatchewan. *Canadian Woman Studies*, 24(4), 123-129.

McKenzie, R., & Bushy, A. (2004). Rural minority and multicultural preventive care: Primary care, and mental health issues: Challenges and opportunities. *The Journal of Rural Health, 20*(3), 191-192.

Miller, G., & Levesque, K. (2002). Telehealth provides effective pediatric surgery care to remote locations. *Journal of Pediatric Surgery, 37*(5), 752-754.

Ministerial Advisory Committee on Rural Health (2002). *Rural health in rural hands: Strategic directions for rural, remote, northern, and aboriginal communities*. Ottawa: Health Canada. Available on-line at [http://www.phac-aspc.gc.ca/rh-sr/pdf/rural\\_hands.pdf](http://www.phac-aspc.gc.ca/rh-sr/pdf/rural_hands.pdf).

Montani, C., Billaud, N., Couturier, P., Fluchaire, I., Lemaire, R., Malterre, Ch, Lauvernay, N., Piquard, J., Frossard, M., & Franco, A. (1996). Telepsychometry: A remote psychometry consultation in clinical gerontology: Preliminary study. *Telemedicine Journal, 2*(2), 145-150.

Morgan, D., Semchuk, K., Stewart, N., & D'Arcy, C. (2002). Rural families caring for a relative with dementia: Barriers to use of formal services. *Social Sciences & Medicine, 55*, 1129-1142.

Morgan, D., Stewart, N., Crossley, M., D'Arcy, C., Biem, J., Kirk, A., & Forbes, D. (2005). Dementia care in rural and remote areas: The first year of a CIHR New Emerging Team. *Canadian Journal of Nursing Research, 37*(1), 177-182.

Mountjoy, C. (1988). Dementia and the Hachinski Scale. *British Journal of Hospital Medicine, 39*(3), 254.

Nyce, S., & Schieber, S. (2005). *The economic implications of aging societies: The costs of living happily ever after*. Cambridge: Cambridge University Press.

O'Rourke, N. & Tuokko, H. (2003). Psychometric properties of an abridged version of the Zarit Burden Interview within a representative Canadian caregiver sample. *The Gerontologist*, 43(1), 121-127.

Passmore, A., & Craig, D. (2004). The future of memory clinics. *Psychiatric Bulletin*, 28, 375-377.

Pfeffer, R., Kurosaki, T., Harrah, C., Chance, J., Filos, S. (1982). Measurement of functional activities in older adults in the community. *Journal of Gerontology*, 37(3), 323-329.

Powell, L., & Myers, A. (1995). The Activities-specific Balance Confidence (ABC) scale. *Journals of Gerontology Series A*, 50, M28-34.

Podsiadlo, D., & Richardson, S. (1991). The timed "Up & Go": A test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society*, 9, 142-148.

Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.

Randolph, C. (1998). Repeatable Battery for the Assessment of Neuropsychological Status Manual. San Antonio, TX: Psychological Corporation.

Reitan, R.M. (1969). Manual for the administration of neuropsychological test batteries for adults and children. Indianapolis.

Reitan, R.M. (1992). Trail Making Test: Manual for administration and scoring. Arizona: Reitan Neuropsychological Laboratory.

Rose, D. (2003). *FallProof. A comprehensive balance and mobility program*. Champaign, IL: Human Kinetics.

Roth, M., Tym, E., Mountjoy, C., Huppert, F., Hendrie, H., Verma, S., & Goddard, R. (1986). CAMDEX: A standardized instrument for the diagnosis of mental disorder in the elderly

with special reference to the detection of early dementia. *British Journal of Psychiatry*, 149, 698-709.

Sask Trends Monitor. (July 2007). *Tracking economic, social, and demographic trends from a Saskatchewan perspective*. XXIV(7).

Saskatchewan Provincial Advisory Committee of Older Persons. (2004). *A strategy for Alzheimer disease and related dementias in Saskatchewan*. Report commissioned by the Minister of Health, Saskatchewan Health. Available on-line at <http://www.gov.sk.ca/news-archive/2005/1/27-046-attachment.pdf>

Shadish, W., Cook, T., & Campbell, D. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. New York: Houghton Mifflin Company.

Shumway-Cook, A., Horak, F. (1986). Assessing the influence of sensory interaction on balance: Suggestion from the field. *Physical Therapy*, 66, 1548-1550.

Spreen, O., & Benton, A.L. (1977). Neurosensory Centre Comprehensive Examination for Aphasia (NCCEA). Victoria: University of Victoria Neuropsychological Laboratory.

Spreen, O., & Strauss, E. (1998). A compendium of neuropsychological tests (2<sup>nd</sup> Ed.). Administration, norms, and commentary. New York: Oxford University Press.

Starns, M., Karner, T., & Montgomery, R. (2002). Exemplars of successful Alzheimer's demonstration projects. *Home Health Care Services Quarterly*, 21(3/4), 141-175.

Statistics Canada. (2003). *Health Indicators, November 2003*. Catalogue no. 82-221-XIE. Ottawa, ON: Statistics Canada. Available on-line at [http://www.statcan.ca/english/freepub/82-221-XIE/2006001/tables/42\\_01.pdf](http://www.statcan.ca/english/freepub/82-221-XIE/2006001/tables/42_01.pdf)

Statistics Canada. (2007). *Portrait of the Canadian population in 2006, by age and sex, 2006 census*. Catalogue no. 97-551-XIE. Ottawa, ON: Statistics Canada. Available on-line at <http://www12.statcan.ca/english/census06/analysis/agesex/index.cfm>

Stratford, J., LoGiudice, D., Flicker, L., Cook, R., Waltrowicz, & Ames, D. (2003). A memory clinic at a geriatric hospital: A report on 577 patients assessed with the Camdex over 9 years. *Australian and New Zealand Journal of Psychiatry, 37*, 319-326.

Squire, L., & Zouzonis, J. (1988). Self-ratings of memory dysfunction: Different findings in depression and amnesia. *Journal of Clinical and Experimental Neuropsychology, 10*(6), 727-738.

Teel, C. (2004). Rural practitioners' experiences in dementia diagnosis and treatment. *Aging and Mental Health, 8*(5), 422-429.

Teel, C., & Carson, P. (2003). Family experiences in the journey through dementia diagnosis and care. *Journal of Family Nursing, 9*(1), 38-58.

Teng, E.L., & Chui, H.C. (1987). The modified Mini-Mental State (3MS) Examination. *Journal of Clinical Psychiatry, 48*, 314-318.

Thorgrimsen, L., Selwood, A., Spector, A., Royan, L., de Madariaga Lopez, M., Woods, T., & Orrell, M. (2003). Whose quality of life is it anyway? The validity and reliability of the Quality of Life – Alzheimer's Disease (QoL-AD) Scale. *Alzheimer's Disease and Associated Disorders, 17*, 201-208.

Tinetti, M. (1986). Performance-oriented assessment of mobility problems in elderly patients. *Journal of the American Geriatrics Society, 34*, 119-126.

Trennery, M.R., Crosson, B., DeBoe, J., & Leber, W.R. (1989). Stroop Neuropsychological Screening Test. Florida: Psychological Assessment Resources.

Tuokko, H., & Hadjistavropoulos, T., Miller, J.A., Horton, A., & Beattie, B.L. (1995). The Clock Test: Administration and scoring manual. Toronto: Multihealth Systems.

Turner, S., Iliffe, S., Downs, M., Wilcock, J., Bryans, M., Levin, E., Keady, J., & O'Carroll, M. (2004). General practitioners' knowledge, confidence and attitudes in the diagnosis and management of dementia. *Age and Aging*, 33(5), 461-467.

Tyrrell, J., Couturier, P., Montani, C., & Franco, A. (2001). Teleconsultation in psychology : The use of vidolinks for interviewing and assessing elderly patients. *Age and Aging*, 30, 191-195.

van Hout, H., Vernooij-Dassen, M., Bakker, K., Blom, M., & Grol, R. (2000). General practioners on dementia: Tasks, practices and obstacles. *Patient Education and Counseling*, 39, 219-225.

Ware, J., Kosinski, M., & Keller, S. (1996). A 12-item Short-Form Health Survey. *Medical Care*, 34(3), 220-233.

Wackerbarth, S., & Johnson, M. (2002). The carrot and the stick: Benefits and barriers in getting a diagnosis. *Alzheimer Disease and Associated Disorders*, 16(4), 213-220.

Wackerbarth, S., Johnson, M., Markesbery, W., & Smith, C. (2001). Urban-rural differences in a memory clinic population. *Journal of the American Geriatrics Society*, 49, 647-650.

Washburn, R., Smith, K., Jette, A., & Janney, C. (1993). The Physical Activity Scale for the Elderly (PASE): Development and evaluation. *Journal of Clinical Epidemiology*, 46, 153-162.

Wechsler, D. (1997<sup>a</sup>). Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) Manual. San Antonio, TX: Psychological Corporation.

Wechsler, D. (1997<sup>b</sup>). Wechsler Memory Scale (WMS-III) Manual. San Antonio: Psychological Corporation.

Wenger, G., Scott, A., & Seddon, D. (2002). The experience of caring for older people with dementia in rural areas: Using services. *Aging & Mental Health*, 6(1), 30-38.

Wilkinson, G. S. (1993). WRAT3 Administration Manual. Wilmington: Wide Range.

Williams, I. (2000). What help do GPs want from specialist services in managing patients with dementia? *International Journal of Geriatric Psychiatry*, 15, 758-761.

Williams, B., Coyle, J., & Healy, D. (1998). The meaning of patient satisfaction: An explanation of high reported levels. *Social Science & Medicine*, 47(9), 1351-1359.

Wolfs, C., Dirksen, C., Severens, J., & Verhey, F. (2006). The added value of a multidisciplinary approach in diagnosing dementia: A review. *International Journal of Geriatric Psychiatry*, 21, 223-232.

Woods, R., Moniz-Cook, E., Iliffe, S., Champion, P., Vernooij-Dassen, M., Zanetti, O., & Franco, M. (2003). Dementia: Issues in early recognition and intervention in primary care. *Journal of the Royal Society of Medicine*, 96, 320-324.

Table 1. Clinical Measures Data Administered via Questionnaires at Pre-Clinic Assessment, One-Stop Clinic, and Follow-up Assessments.

	Pre-Clinic	Clinic Day	6 wk.	12-wk	6 mo.	1 yr.	Yearly
<i>Patient:</i>							
Demographics, Health, & Lifestyle		X					
Instrumental ADL <sup>1</sup>		X				X	X
Self-Rating of Memory Scale <sup>2</sup>		X				X	X
Perceived Stress Scale <sup>3</sup>		X				X	X
Quality of Life-AD (Self-Rating) <sup>4</sup>		X				X	X
Depression Scale (CES-D) <sup>5</sup>		X				X	X
Pleasant Events – AD <sup>6</sup>		X				X	X
Functional Assessment (FAQ) <sup>7</sup>		X				X	X
QoL - AD (Caregiver Rating) <sup>4</sup>		X				X	X
Neuropsychiatric Inventory (NPI) <sup>8</sup>		X				X	X
Bristol ADL <sup>9</sup>		X					
CAGE Alcohol Use <sup>10</sup>		X					
Camdex <sup>11</sup>		X					
<i>Caregiver:</i>							
Zarit Burden Interview (12-item) <sup>12</sup>		X	X	X	X	X	X
Brief Symptom Inventory (BSI) <sup>13</sup>		X	X	X	X	X	X
SF-12 <sup>14</sup>		X	X	X	X	X	X

<sup>1</sup>Lawton, Moss, Fulcomer, & Kleban (1982)

<sup>2</sup>Squire & Zouzounis (1988)

<sup>3</sup>Cohen, Kamarck, & Mermelstein (1983)

<sup>4</sup>Logsdon, Gibbons, McCurry, & Teri (1999)

<sup>4</sup>Logsdon, Gibbons, McCurry, & Teri (2000)

<sup>4</sup>Thorgrimsen et al. (2003)

<sup>5</sup>Radloff (1977)

<sup>5</sup>Lewinsohn, Seeley, Roberts, & Allen (1997)

<sup>6</sup>Logsdon & Teri (1997)

<sup>7</sup>Pfeffer, Kurosaki, Harrah, Chance, & Filos (1982)

<sup>8</sup>Cummings et al. (1994)

<sup>9</sup>Bucks, Ashworth, Wilcock, & Siegfried (1996)

<sup>9</sup>Byrne, Wilson, Bucks, Hughes, & Wilcock (2000)

<sup>10</sup>Ewing (1984)

<sup>11</sup>Roth et al. (1986)

<sup>11</sup>Blessed, Tomlinson, & Roth (1988)

<sup>11</sup>Mountjoy (1988).

<sup>12</sup>Bédard et al. (2001)

<sup>12</sup>O'Rourke & Tuokko (2003)

<sup>13</sup>Derogatis (1975)

<sup>13</sup>Derogatis & Melisaratos (1983)

<sup>14</sup>Ware, Kosinski, & Keller (1996)

Table 2. Components of the Rural and Remote Memory Clinic Interprofessional Assessment.

---

Component and Specific Measures

---



---

Neurology and Geriatric Medicine

1. Neurologic history and physical examination
2. Comprehensive geriatric assessment

## Physical Therapy

1. Physical therapy screening examination and evaluation (e.g., history, systems review, fall history, activities of daily living, functional status, mobility, home environment, et cetera)
2. Tests and measures to identify existing/potential impairments and functional limitations:
  - Range of motion, flexibility, muscle strength and sensation testing
  - Vision screen (acuity, contrast sensitivity)
  - Timed-Up-and-Go<sup>1</sup>
  - Berg Balance Scale<sup>2</sup>
  - Nudge Test<sup>3</sup>
  - Modified Clinical Test of Sensory Interaction in Balance<sup>4,5</sup>
  - Gait Assessment
  - Physical Activity Scale for the Elderly<sup>6</sup>
  - Activities-specific Balance Confidence Scale<sup>7</sup>

## Neuroradiology

Evaluate CT images for pattern and degree of atrophy, hydrocephalus, evidence of ischemic disease, hemorrhage or tumor.

## Neuropsychology

1. Screening Instruments
  - Modified Mini-Mental State Examination (3MS)<sup>8</sup>
  - Clock Test (CT)<sup>9</sup>
2. Estimates of Premorbid Intellectual Ability
  - Wide Range Achievement Test (WRAT-III) Reading subtest<sup>10</sup>
  - Subtests from the Wechsler Adult Intelligence Scale (WAIS-III)<sup>11</sup>
    - Similarities
    - Block Design
    - Letter-Number Sequencing
    - Symbol Search
3. Learning and Memory
  - Prairie Buschke (modification of Buschke Cued Recall Test)<sup>12</sup>
  - Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)<sup>13,14</sup>
    - Immediate Memory
    - Delayed Memory
  - Grasshoppers and Geese Test<sup>15</sup>
    - Semantic Memory
    - Episodic Memory

## Prospective Memory

4. Attention and Executive Functions
  - RBANS<sup>13</sup> – Attention Index
  - Digit Span Forward and Backwards (Wechsler Memory Scale-III)<sup>16</sup>
  - Stroop Test (The Stroop Neuropsychological Screening Test, SNST)<sup>17</sup>
  - Trail Making Test (TMT)<sup>18</sup>
5. Visuoperceptual and Constructional Skills
  - RBANS<sup>13</sup> - Visuospatial/Constructional Index
  - Clock Test<sup>9</sup>
  - Block Design<sup>16</sup>
  - Symbol Search<sup>16</sup>
6. Language
  - WRAT-III – Reading subtest<sup>10</sup>
  - RBANS<sup>13</sup> – Language Index
  - Token Test<sup>20</sup>
  - Controlled Oral Word Association Test (FAS)<sup>20</sup>
  - Animal Naming (AN)<sup>21</sup>
  - Grasshoppers and Geese Confrontational Naming<sup>15</sup>
7. Manual Strength and Dexterity
  - Grooved Pegboard<sup>22</sup>
  - Grip Strength<sup>23</sup>
  - Finger Tapping Test<sup>24</sup>

<sup>1</sup>Podsiadlo & Richardson (1991)

<sup>2</sup>Berg, Wood-Dauphinee, Williams, & Gayton D (1989)

<sup>3</sup>Tinetti (1986)

<sup>4</sup>Shumway-Cook & Horak (1986)

<sup>5</sup>Rose (2003)

<sup>6</sup>Washburn, Smith, Jette, & Janney (1993)

<sup>7</sup>Powell & Myers (1995)

<sup>8</sup>Teng & Chui (1987)

<sup>9</sup>Tuokko, Hadjistavropoulos, Miller, Horton, & Beattie (1995)

<sup>10</sup>Wilkinson (1993)

<sup>11</sup>Wechsler (1997<sup>a</sup>)

<sup>12</sup>Buschke (1984)

<sup>13</sup>Randolph (1998)

<sup>14</sup>Duff, Patton, Schoenberg, Mold, Scott, & Adams (2003)

<sup>15</sup>Crossley & Lanting (unpublished)

<sup>16</sup>Wechsler (1997<sup>b</sup>)

<sup>17</sup>Trennery, Crosson, DeBoe, & Leber (1989)

<sup>18</sup>Reitan (1992)

<sup>19</sup>Benton, Hamsher, & Sivan (1994)

<sup>20</sup>Spreeen & Benton (1977)

<sup>21</sup>Goodglass & Kaplan (1983)

<sup>22</sup>Heaton, Grant, & Matthews (1991)

<sup>23</sup>Spreeen & Strauss (1998)

<sup>24</sup>Reitan (1969)

Table 3. Demographic Characteristics of the First 137<sup>a</sup> Patients Attending Full-Day Clinic

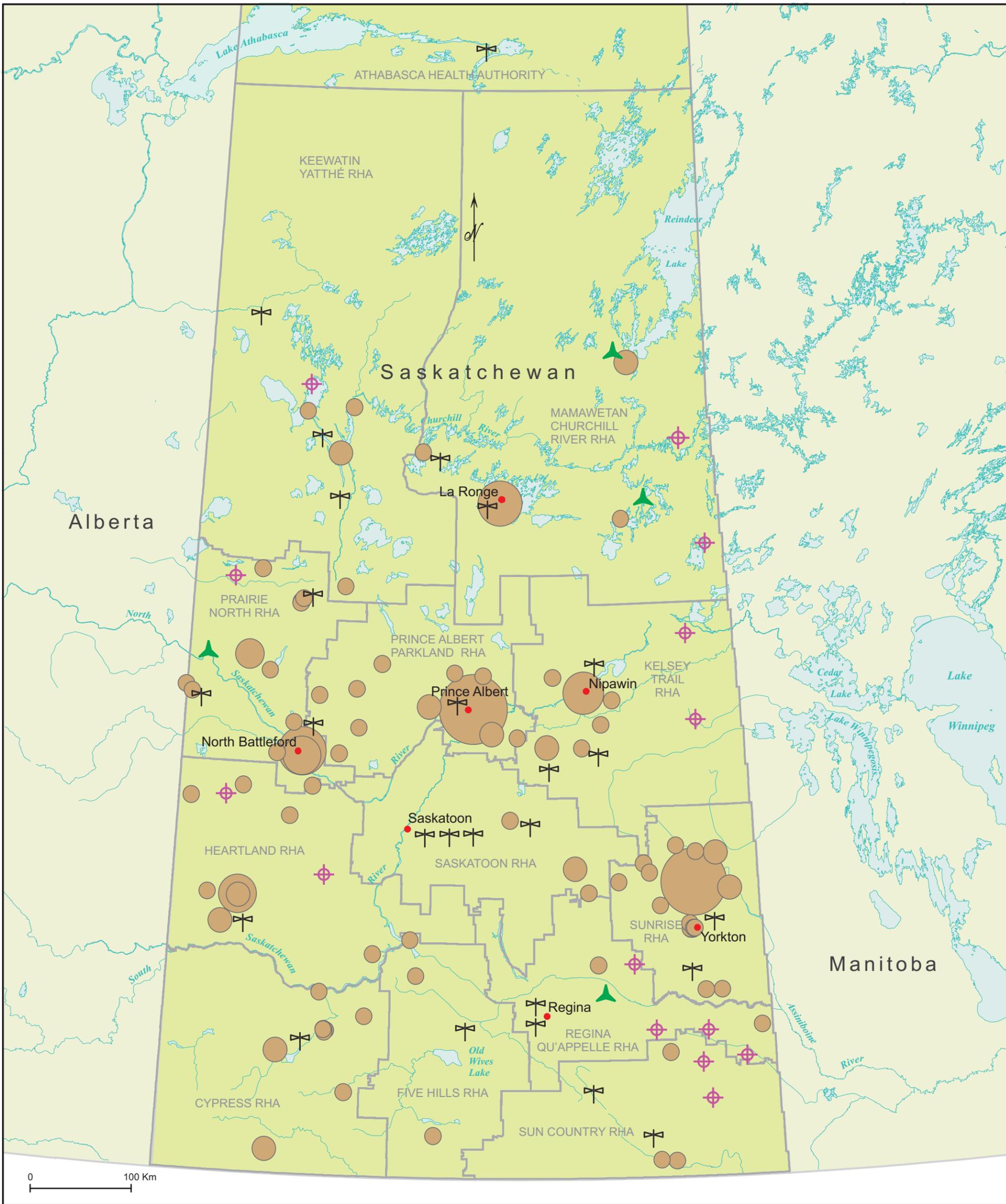
	All Patients (N = 137)		Rural (N = 126)	Remote <sup>b</sup> (N = 11)
	Mean (SD)	Range	Mean (SD)	Mean (SD)
Age	72.9 (10.9)	42 - 91	73.4 (10.6)	69.6 (13.4)
Years of formal education	10.6 (2.9)	3 - 19	10.6 (2.9)	11.5 (3.5)
Distance to telehealth (1 way) (kms.)	39.0 (49.1)	1 - 206	41.0 (49.9)	15.3 (31.0)
Distance to memory clinic (1 way) (kms.)	252.7 (115.1)	103 - 595	233.2 (94.9)	476.8 (85.7)
Distance saved by telehealth vs. in-person appointment (1 way) (kms.)	213.8 (116.6)	-49 - 594.0	192.1 (91.5)	461.6 (81.8)
	Frequency	(Percent)	F (%)	F (%)
Sex (N=137)				
Male	55	(40.1)	51 (40.5)	4 (36.4)
Female	82	(59.9)	75 (59.5)	7 (63.6)
Country of birth (N = 128)				
Canada	119	(93.0)	112 (93.3)	7 (87.5)
Other	9	(7.0)	8 (6.7)	1 (12.5)
Ancestry (N=113)				
First Nations	5	(4.4)	1 (.9)	4 (57.1)
Métis	2	(1.8)	1 (.9)	1 (14.3)
European	79	(69.9)	78 (73.6)	1 (14.3)
Other	27	(23.9)	26 (24.5)	1 (14.3)
Language most often spoken at home (N=113)				
English	106	(93.8)	103 (97.2)	3 (42.9)
Cree	4	(3.5)	1 (0.9)	3 (42.9)
Other	3	(2.7)	2 (1.9)	1 (14.3)
Marital status (N=129)				
Married/common law	94	(72.9)	88 (72.8)	6 (75.0)
Single (never married)	5	(3.9)	5 (4.2)	0
Separated/divorced	3	(2.4)	3 (2.5)	0
Widowed	27	(20.9)	24 (20.7)	2 (25.0)

Living arrangement (N=129)				
With spouse/partner only	84	(65.1)	83 (68.6)	1 (12.5)
Alone	25	(19.4)	24 (19.8)	1 (12.5)
With spouse and other family	17	(13.2)	11 (9.1)	6 (75.0)
Other	3	(2.4)	3 (2.5)	0
Current housing (N=129)				
Family-owned home	106	(82.2)	101 (83.5)	5 (62.5)
Rented home/apartment	9	(7.0)	7 (5.8)	2 (25.0)
Seniors complex	6	(4.7)	6 (5.0)	0
Other	8	(6.2)	7 (5.8)	1 (12.5)
Clinic Day Diagnosis (N=134)				
Alzheimer's Disease	47	(35.1)	45 (36.6)	2 (18.2)
Mild Cognitive Impairment	19	(14.2)	18 (14.6)	1 (9.1)
Dementia d/t Multiple Etiologies	15	(11.2)	13 (10.6)	2 (18.2)
No dementia (normal)	13	(9.7)	10 (8.1)	3 (27.3)
Dementia with Lewy Bodies	8	(6.0)	7 (5.7)	1 (9.1)
Frontotemporal (semantic)	5	(3.7)	5 (4.1)	0
Vascular Cognitive Impairment	4	(3.0)	3 (2.4)	1 (9.1)
Vascular Dementia	4	(3.0)	4 (3.3)	0
Dementia d/t Medical Condition	4	(3.0)	4 (3.3)	0
Dementia not otherwise specified	4	(3.0)	3 (2.4)	1 (9.1)
Frontotemporal (frontal variant)	3	(2.2)	3 (2.4)	0
Frontotemporal (prog. non-fluent)	3	(2.2)	3 (2.4)	0
Normal Pressure Hydrocephalus	2	(1.5)	2 (1.6)	0
Parkinson's Dementia	1	(0.7)	1 (0.8)	0
Huntington's Disease	1	(0.7)	1 (0.8)	0
Alcohol Induced Amnesic Disorder	1	(0.7)	1 (0.8)	0
Requested change in type of follow-up	23	(16.8)	25 (19.8)	0
Type of change requested (N = 137)				
From in-person to telehealth	17	(12.4)	17 (13.5)	0
From telehealth to in-person	6	(4.4)	6 (4.8)	0
Discontinued follow-up (N = 137)				
After clinic visit	7	(5.1)	7 (5.5)	0
After 6-week follow-up	14	(10.2)	14 (11.1)	0
After 12-week follow-up	9	(6.6)	9 (7.1)	0
After 6-month follow-up	15	(10.9)	14 (11.1)	1 (9.1)
After 1-year follow-up	7	(5.1)	7 (5.6)	0
After 2-year follow-up	1	(0.7)	1 (0.8)	0

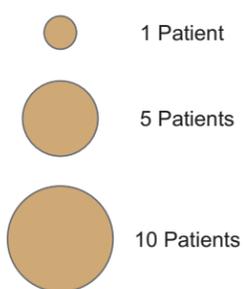
<sup>a</sup>Sample size may be less for some variables due to missing data.

<sup>b</sup>Patients living in the three most northern regional health authorities (see Figure 1).

# Home Communities of Rural and Remote Memory Clinic Patients



## Home Community of Reference Patients



- City/Town
- ✕ Telehealth Saskatchewan (TS)
- ⊕ Regional Health Authority (RHA)
- ▲ First Nations Partnership (FNP)
- Regional Health Authorities Boundaries
- Built-up Area (Insets)

