POSTER ABSTRACTS

Abstracts from the 7th Canadian Conference on Dementia (CCD) held in Vancouver, October 2013

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POSTER PRESENTATIONS FROM THE 7TH CANADIAN CONFERENCE ON DEMENTIA (CCD) HELD IN VANCOUVER, OCTOBER 2013

The Role of S-Adenosylmethionine in Improving Cognitive Performance in Healthy Mice and Alzheimer's Disease Mice: a Meta Analysis

S. Montgomery, J. Wangsgaard, J. Koenig, Jeremy. Mount Saint Vincent University.

Background/Purpose: As of 2011, approximately 747,000 Canadians suffer from some form of dementia; Alzheimer's disease (AD) is one such form. AD is a neurodegenerative disease characterized by significant neuronal death. Neuronal death has been associated with two pathophysiological features: 1) neurofibrillary tangles within the neurons, and 2) amyloid beta plaque formation between neurons. Excessive production of these two features is manifested by severe cognitive impairment. One of the most extensively researched compounds, associated with these characteristics, is the amino acid, homocysteine, which has been found to be higher in blood plasma concentrations in patients with AD compared to healthy counterparts. Folate, vitamin B12, and vitamin B6 have been effective in reducing plasma homocysteine and this reduction has been associated with a reduction in amyloid beta and tau phosphorylation. However, this reduction in homocysteine has not resulted in improved cognitive performance. More recently, research focus has shifted to the universal methyl donor, S-adenosylmethionine (SAM), as a dietary supplement to treat both the pathophysiological features and cognitive impairment of the disease in mice and has shown promising results in alleviating both domains of the disease.

Methods: Here, a meta-analysis was conducted to evaluate the effect size for Y maze performance between two groups of mice, one receiving a SAM supplemented diet and the other group receiving a non-SAM supplemented diet. A thorough literature review was conducted and all studies that met the inclusion criteria were included in the analysis. For each study, both groups of mice were fed a folate and vitamin E deficient diet for 1 month with or without SAM supplementation.

Results & Conclusion: The results of four mouse studies demonstrated a significant effect of SAM supplementation on cognitive performance as measured by the percent of spontaneous alternations made in the Y maze, thus illustrating the utility of this supplement in research concerning mental health.

Dementia: Knowledge, Practices, and Obstacles to Diagnosis and Management with GP

K. Pathak, A. Jude. Macedonia University.

Objectives: To identify primary care doctors knowledge, practices, and obstacles with regard to the diagnosis and management of dementia.

Methods: Standardized questionnaires covering knowledge, practices, and obstacles were distributed among a random sample of primary care doctors in Kathmandu, Nepal. 380 physicians responded (response rate = 89%).

Results: Knowledge of practitioners with regard to the diagnosis and management of dementia was unsatisfactory. Diagnosis and management barriers are presented with regard to GP factors, patient factors, systemic factors, and carer factors.

Discussion: Specifically, the results address the following issues: time, communicating the diagnosis, negative views of dementia, difficulty diagnosing early stage dementia, acceptability of specialists and responsibility for extra issues, knowledge of dementia and ageing, less awareness of declining abilities and diminished resources to handle care, not specified guidelines, poor awareness of epidemiology, and less confidence to advise.

Conclusions: Demographic changes mean that dementia will represent a significant problem in the future. The following paper outlines the problems and solutions that the Nepalese medical community needs to adopt to deal effectively with its diagnosis, care, and management.

Personhood: the Life Story and an Exploration of 'Simulated Presence' as Strategies for Care in Persons with Dementia

S. Davidson, J. Rice. Baycrest.

Background: As the number of individuals with dementia grows, we are seeing associated caregiving challenges. In one program for persons with dementia, involving caregivers in the creation of an individual's life story is an important step in the development of a person-centred approach to care by identifying important life events and their meaning. This narrative contributes to individualized interventions for care. At the same time, the use of technology and 'simulated presence' is being explored with some caregivers as an additional intervention.

Objective: This poster will demonstrate how 'simulated presence' can be an effective strategy to engage family or other significant caregivers and the interprofessional team in provision of a truly person-centred approach to care.

Methods: Clients and caregivers are involved in creation of a life story when the client is first admitted to the program. Caregivers are also invited to participate in making audiotapes where they provide reassurance or narration of care steps. These audio recordings are played during care, in order to redirect or engage the person with dementia. Elements of the person's life story, as well as how to implement 'simulated presence', are integrated into a behavioural intervention plan. Several of these situations have been videotaped and caregivers have viewed the videos and participated in individual interviews, to learn about their perspectives on the use of 'simulated presence' in the care of their family member.

Results: Videotapes of care when 'simulated presence' is part of the intervention demonstrate engagement of the person and a reduction in unwanted behaviour. The impact on care providers is also evident. With simulated presence, the number of staff required to provide care has been observed to be fewer than without this intervention. Interviews with family reveal a variety of themes. While they may have doubts about their ability to contribute to care, or about the effectiveness of 'simulated presence' for their family member, they are eager to participate in finding solutions to reduce responsive behaviours. Over time, observing changes in their family member's behaviour and feeling like their participation has an impact on client care, can be reassuring and rewarding.

Conclusions: Simulated Presence therapy is an intervention which uses recordings of a client's family members to be played during care or at other times when responsive behaviours occur. This can be a meaningful way to engage caregivers and to enhance care for persons with dementia. Consideration should be given to who may or may not be appropriate for such an approach, and future research is warranted to further explore this unique element of a person-centred approach to care for persons with dementia.

Assessment of Quality of Life in People with Dementia: a Methodological Feasibility Pilot Study in Long-Term Care

K.N. Cytryn[1], O. Lungu[2], P. Voyer[3], M. Wilchesky[4]. [1]Centre for Research in Aging, Donald Berman Maimonides Geriatric Centre; [2]Département de psychiatrie, Université de Montréal, Montreal, PQ; [3]Faculté des Sciences Infirmières, Université Laval; [4]Division of Geriatric Medicine, McGill University.

Background: Assessment of quality of life (QoL) of long-term care (LTC) residents presents significant challenges. People with dementia (PwD) may be unable to comprehend information being sought, lack insight into their own experiences, and be unable to formulate responses that express their perceptions of their own QoL. Yet they have been shown to be able to respond to such questions. Further, the perspectives of people with higher levels of cognition may not be well-served by instruments based predominantly on observation of behaviours and non-verbal indicators. Evaluation of the outcomes of care measures and performance improvement interventions is therefore challenging. A method of reliable and valid assessment of QoL of LTC residents is needed that is responsive to changes in clinical status, clinically feasible, an indicator of quality of care and performance, and a valid research measure.

Objective: To compare and contrast selected measures of QoL of LTC residents in people with cognitive impairment levels ranging from none to severe dementia. This pilot study assessed the feasibility of a proposed protocol.

Method: Instruments validated to assess QoL in PwD were compared and contrasted for validity and feasibility across levels of cognition in LTC settings. Seven instruments were selected for further evaluation. Twelve resident/staff member dyads were randomly selected and stratified based on cognitive status of residents (unimpaired, mild, moderate, severe impairment). All seven tools were administered to staff members. Two instruments were designed to be administered directly to PwD. Mini-Mental State Examinations were administered to residents. Semi-structured interviews were conducted in which resident and staff member participants evaluated the instruments in terms of representativeness of their concepts of QoL, formats of instrument items, relevance, and clinical feasibility. Preliminary qualitative analysis (open coding) was conducted.

Results: Internal instrument consistencies ranged from Cronbach's α = 0.678-0.914 (one outlier 0.039). Further quantitative analysis will be conducted on the subsequent full sample. In interviews, residents and staff members reported that instruments addressed all relevant domains; no omissions were identified. Both residents and staff members asked for clarification of various items within the scales. Preferences were expressed for scales with emphasis on observable behaviours and simplicity. Number of response options was not a determining criterion. Discrepancies were identified between residents' self-evaluations and staff evaluations. Duration of caregiver data collection ranged from 31–66 minutes for testing and 5–23 minutes for interviews. Duration of data collection with residents was 15–33 minutes and 3–12 minutes, respectively. Residents with no, mild, and moderate impairment were able to complete the two instruments administered directly to them; none of the three severely impaired residents was able to complete the instruments. Caregivers commented that they found the data collection process to be long.

Conclusions: Findings validated the feasibility of the proposed methodology. The number of instruments was reduced. Understanding of concepts and use of instruments was problematic. No single instrument was deemed appropriate across the cognitive range. Preliminary findings identify the need for a simple instrument in language easily understood by residents and staff with clearly expressed items based on objective observation of behaviours.

Impact of Socioeconomic Status on Initial Clinical Presentation to a Memory Disorders Clinic

W. Qian, T. Schweizer, C. Fischer. St. Michael's Hospital.

Background/objectives: Low socioeconomic status (SES) has consistently been shown to increase the risk of developing Alzheimer's disease (AD) and other dementias. Not surprisingly, a few studies have also linked low SES with an increased risk of mild cognitive impairment (MCI), a brain syndrome that often precedes dementia. However, it is not known what the relationship of SES is to the initial clinical presentation to a memory disorders clinic. We hypothesized that lower SES can lead to delayed medical attention and disease diagnosis and greater clinical severity at time of diagnosis, and be associated with reduced use of cognitive enhancers.

Methods: Data from 127 AD and 135 MCI patients seen at a memory disorders clinic based in a large urban centre were analyzed retrospectively. We examined the relationship between SES and 1) the diagnosis of either AD or MCI; 2) the age of patients when they present to clinic; 3) objective cognitive tests using the Mini-Mental State Exam (MMSE) and Behavioural Neurology Assessment (BNA) to indicate clinical severity; and 4) the use of cognitive enhancers in patients with AD. SES was measured using the Hollingshead 2-factor index of social position, which is a linear scale from 11 to 77 that incorporates educational and occupational attainments, and is negatively correlated with SES. Upper and middle class (scores of 11–43) were compared with lower class (scores of 44–77) individuals.

Results: AD patients had significantly lower SES than MCI patients ($p < .001$). Low SES was also associated with a greater age at initial time of diagnosis (U = 6006.5, $p = .027$). Among patients with MCI, those with low SES performed worse on the BNA than their higher SES counterparts after correcting for age (high SES: 91.4 ± 10.8; low SES: 82.4 ± 14.1; $p = .005$), although there was no effect of SES on the less comprehensive MMSE. SES did not affect cognitive scores in patients with AD. Lastly, the use of cognitive enhancers among AD patients was associated with higher SES ($p < .001$, $r = 0.842$).

Conclusions: Individuals with lower SES presented more frequently with established dementia, while higher SES individuals presented more frequently with MCI. This, combined with the greater age found among low SES individuals, could indicate that low SES may lead to delayed referral to memory disorders clinics and delayed diagnosis of AD. Furthermore, higher SES is associated with better cognitive functioning in MCI patients and increased use of cognitive enhancers in AD patients, possibly because low SES patients come in too late to benefit from treatment. This has broad health policy implications in terms of developing strategies to engage patients with low SES in the early stages of dementia, perhaps through better identification of patients at the primary care level.

Going Home with Oxygen Therapy in People with Dementia

L. Hung, C. Fernandes. Providence Health Care.

Background: Home oxygen therapy is prescribed to people with various health conditions including lung and heart diseases, such as Chronic Obstructive Pulmonary Disease (COPD) and heart failure. Managing the use of oxygen can be difficult in patients with dementia who have cognitive and functional losses. Hypoxia can exacerbate confusion and worsen behavioural symptoms. Patients with cognitive impairment often have great difficulty to learn and remember how to use unfamiliar oxygen equipment properly. Mortality and readmission rate are high in this group of patients. The burden of symptoms significantly affects quality of life and health status of patients and caregivers. Older people with dementia who have medical co-morbidities require careful attention to minimize behavioural consequences and improve quality of life. Clinical management of these patients differs from the younger population and care professionals must adjust their management strategies to accommodate their special needs.

Aim: Despite the fact that provision of home oxygen therapy is required by some older adults with cognitive impairment or dementia, there is no literature which describes the specific challenges and offers guidance to the provision of oxygen therapy. This study aims to explore the main issues associated with preparing older patients going home with oxygen therapy by inquiring the care providers' perspective.

Method: A total of 10 participants, including Physician, Respiratory Therapist, Physiotherapists, Occupational Therapist, Nursing and Social Work, participated in two focus groups. The participants from one group work in a local community hospital; the others work in the community sector. The focus group discussions were one hour each. The discussions were audio-taped and transcribed verbatim. Thematic analysis was undertaken to identify important themes and subthemes to reveal the challenges and specific areas for improvement.

Results: Three broad themes emerged as main issues associated with preparing patients going home with oxygen. The first theme, 'Education', explored subthemes of Knowledge, Resources, and Barriers. For care providers in hospital, knowledge of equipment available in the community is needed to select appropriate equipment to meet varying needs of patients. The biggest barrier is patient-related factors including decreased cognition, visual and physical deficits, and language barriers that affect the learning ability of patients. Under the second theme, 'Safety', there were subthemes that considered environmental challenges and equipment. Participants reported high risk for falls due to long oxygen tubing in their homes and the manoeuvring of equipment. Other hazards include smoking, fire risks with gas stoves, and inappropriate levels of oxygen. The third theme, 'Discharge Process', discussed the subthemes of team collaboration, time limit, and home oxygen assessment. Participants consistently highlighted the importance of effective communication of information about patient's cognitive, physical, and functional abilities, as well as safety issues to community teams.

Conclusion: This study demonstrates that there is a need to improve current processes in order to provide patient-centred, safe, and efficient home oxygen therapy to geriatric patients, particularly to the group with cognitive impairment/dementia. Careful attention and adaptations are required to meet the special needs of this vulnerable population.

How the Hospital Environment May Impact the Care of Patients with Dementia and Other Mental Health Needs

L. Hung[1], E. Loewen[1], B. Bindley[1], D. McLaren[1], T. Feist[1], A. Phinney[2]. [1]Providence Health Care; [2]University of British Columbia.

Background: Environmental interventions are an untapped source of therapeutic potential. Given the fact that we have a burgeoning older population with dementia in acute hospitals, there can be great patient benefits and potential cost savings of utilizing environmental strategies to promote safe recovery, reduce loss of function, and avoid adverse events. Older adults with dementia have decreased ability to cope with environmental stressors; they are more sensitive to the impacts of environmental features. Research suggests that an environment that is safe, warm, and familiar not only supports cognitive and functional needs of older people with dementia, but may also contribute to improving quality and safety of care in patients of all ages. However, research on effective environmental interventions in the acute setting to support patients with dementia is lacking.

Aim: Our study aims to: 1) provide a review of the literature to identify relevant evidence-based environmental interventions that may contribute to positive experience in older adults in acute hospitals, and 2) investigate the physical environment of a geriatric psychiatry unit in a community hospital to understand how physical environment may play a role in meeting needs of patients with dementia or other mental health needs.

Method: We conducted a focused ethnography method on a 16-bed geriatric psychiatry unit in a community hospital. We began with a review of literature, an environmental scan, and a survey of 18 staff from different disciplines, including nurses, occupational therapists, and care aides. These guided our subsequent focused observations and interviews with patients and families. The sample included 7 patients (four of whom were diagnosed with dementia and three with depression/schizoaffective disorder), and 4 family members. We used purposive sampling to ensure we had a variety of patients with different behavioural symptoms and functional and psychosocial needs. A thematic analysis was conducted.

Results: Our results demonstrate that physical environment plays an important role in impacting the hospitalization experience of older adults with dementia or other mental health needs and their families. The four inter-related themes of environmental qualities central in promoting healing and coping are: therapeutic; supportive in functional independence; facilitative in social connections; and personal safety. Therapeutic means the unit offers pockets of home-like environment and provides quality sensory stimulations. Supportive of functional independence refers to the environmental features that make it easy for older adults to use the bathroom, wash, groom, mobilize, locate places/rooms, and store personal belongings. Facilitative of social connection indicates the provision of safe and comfortable social spaces for patient, family, and staff to interact/engage in meaningful activities. The feeling of personal safety involves having staff in close proximity and minimizing disruptions (e.g., physical or verbal) from confused patients.

Conclusion: The evidence indicates that physical environment plays an important role in making hospitals safe and supportive of healing for older adults with dementia and other mental health needs. Patients' and families' perspectives provide us with a better understanding of current challenges of the hospital environment and assist in identifying specific priorities and interventions to make improvement.

The Role of ''Miscommunication'' as a Key Culprit in the Pathogeneses of Depression and Dementia: Synaptic Changes in Primary Hippocampal Neurons after Treatments with Corticosterone and Oligomeric Beta-Amyloid

G. Wong, S. Wuwongse, R. Chang, A. Law. The University of Hong Kong.

Background: Alzheimer's disease (AD) and depression share many common pathological features — for example, decrease in the number of synapses. The synapse forms an important communication unit between neurons to maintain neuronal viability and sustain whole brain functioning. Actin is the main cytoskeleton that forms the architecture of the synapse. Polymerization and depolymerization of actin allow actin filaments to constantly remodel and maintain synaptic plasticity. Furthermore, synaptic vesicle proteins involved in the docking and fusion of the vesicles to the membranes allowing for neurotransmitter release, including synaptophysin and synaptotagmin, are also important in maintaining synaptic function. Abnormalities in synaptic and cytoskeletal proteins have been observed in both depression and AD.

Objectives: To investigate morphological and protein changes in the synapse after treatments with oligomeric beta-amyloid and corticosterone.

Methods: 14-day-old hippocampal primary-cultured neurons were treated with either oligomeric beta-amyloid or corticosterone separately for 24 or 48 hours. Neurons were transfected with beta-actin to observe synaptic morphological changes. Immunocytochemical analysis was used to investigate changes in the vesicle proteins synaptophysin and synaptotagmin in neurons. FM4-64 dye was used to investigate functional changes. All of the above were imaged by multiphoton microscopy.

Results: After treatments with oligomeric beta-amyloid or corticosterone, changes in beta-actin morphology were observed. Rod shaped actin began to form within the cell body, and also along and at the ends of dendrites. Oligomeric beta-amyloid significantly reduced the expressions of synaptic vesicle proteins, whereas corticosterone induced aggregation of these proteins. FM4-64 dye showed that the function of the neurons was compromised; more specifically, exocytosis appeared to be abnormal in the amyloid- or corticosterone-treated synapses.

Conclusions: Our results show that both oligomeric beta-amyloid and corticosterone affect presynaptic vesicle proteins, cytoskeletons, and neuronal functioning. This may help to explain the decrease in dendritic spine number and dendritic regression observed in depression and AD. Moreover, such resulting neurodysfunction likely forms the basis of cognitive impairment seen in depressed and demented individuals.

The Impact of Alzheimer's Disease on Communication: Perceptions of Persons with Alzheimer's Disease and Their Family Care Partners

J. Small[1], C. Jacova[2], L. Butters[1], M. Chan[1], L. Saidmuradova[1], G. Tse[1]. [1]School of Audiology and Speech Sciences, University of British Columbia; [2]Division of Neurology, University of British Columbia.

Background/Objectives: It is well established that persons with Alzheimer's disease and their family care partners may hold differing views on how the disease has impacted various aspects of their lives. For example, previous research has identified discrepancies in care partner/receiver perceptions of depression, diagnosis, pain, values and care preferences, quality of life, and everyday functioning. One domain that has not been closely examined, yet which contributes to all other aspects of daily functioning, is a person's ability to communicate. The present exploratory study investigated family care partner/receiver perceptions of the care receiver's communication abilities in daily life.

Methods: Seven participant dyads (care partner/receiver) were interviewed separately using the CLIMAT interview scale. Questions were asked regarding the care receiver's abilities across four major domains: Social, Everyday Functioning, Cognitive, and Behavioural. The care partner and receiver interview data were transcribed and imported into Atlas-ti for coding. Open coding was undertaken to identify participants' recurring comments and themes related to language and communication abilities, such as word-finding difficulty, repeating oneself, comprehension, initiating conversation, and engaging in social interaction. These themes were further analyzed to determine whether there were discrepancies between the care partner's and receiver's perceptions of functioning in each domain.

Results: The results indicate that discrepancies were most apparent in describing the care receiver's abilities to have meaningful conversations about recent events and to engage in social interaction outside the home. The differing views reflected care receivers' underestimation of the impact of AD on their communication functioning. Possible sources of the diverging care partner/receiver perceptions include awareness and/or protection of self and others, and attitudes about the functional impact of AD.

Conclusions: The differing views of care partners and receivers point to the need for them to have more open and ongoing dialogue about changes in communication ability and their potential impact on interpersonal interactions and quality of social life.

Dementia, Responsive Behaviour, and Falls: a Pilot Project

S. Davidson, J. Rice. Baycrest.

Background: Preventing falls among older adults remains a focus of health professionals. While fall prevention and injury reduction initiatives involve many excellent, evidence-based strategies, these same strategies are not always applicable within a dementia population. Recent trends at a geriatric hospital reveal an increase in falls with critical injury with clients who have dementia and also exhibit responsive behaviours. This relationship between falls and behaviour indicates a need to explore possible interventions aimed at this population specifically. Clients who exhibit responsive behaviour often have underlying neurological conditions which may make traditional falls prevention strategies ineffective, as they are not aimed at the strengths of the client.

Methods: As part of a larger Falls Prevention Initiative, a geriatric hospital implemented a three-month pilot project on two specific units involving strategies that were developed with a focus on the unique characteristics of each population. On one behavioural dementia unit, two falls prevention strategies: consistent, universal provision of hip protectors and a visual tracking of falls and falls with critical injury, were implemented for a three-month period.

Results: Preliminary results from this pilot indicate that there have been zero falls with critical injury during the three-month period, and the average rate of falls is no different from the average falls rate observed during the past year. A visual tracking system, located in a lounge area in front of the care station, has been available for staff, clients, and families to observe and follow. Different team members were required to take on the duty of tracking falls, encouraging interprofessional accountability. Use of hip protectors was offered to all clients; however, many barriers arose to limit family members and staff from continuously implementing wearing of hip protectors over the course of the pilot project. Some examples of barriers include hip protectors limiting clients' abilities to toilet themselves, clients exhibiting behaviours which may limit the effectiveness of hip protectors (e.g., disrobing, fidgeting, etc.), and having hip protectors contribute to responsive behaviours (e.g., restlessness).

Conclusions: The pilot project has so far been successful, in that there have been no falls with critical injury observed on the unit and the number of falls has been regularly below the annual average. Having one universal strategy (hip protectors) has not been sustainable on this unit, due to individual differences within the patient population. The visual management strategy has engaged staff and families. While there is a trend in the number of falls in people who exhibit responsive behaviours, falls strategies need to be individualized as this population is highly heterogeneous. Taking a team approach, including team conferences and implementing collaborative interventions, helps to minimize the risk associated with falls in this population.

Lost in Transition: Communicating Occupational Identities Across Care Settings

J. Rice, G. Gallagher. Baycrest.

Background: Older adults identify themselves by what they do and the activities that structure their lives (Laliberte-Rudman D, *et al. 1997*). People with dementia maintain this need for engagement, but are often unable to communicate their needs. A lack of attention to individual care needs may trigger responsive behaviours. The lack of coordination between care settings may exacerbate client's behaviours when they move between care settings (Coleman EA. 2003).

Methods: A geriatric hospital aimed to identify critical components of a process and develop a prototype to ease care setting transitions of patients with severe cognitive impairment and behavioural issues. A pilot project on the behavioural neurology inpatient unit in collaboration with the hospital's Innovation, Technology, and Design Lab explored use of video communication across care settings. To showcase six clients' engagement to subsequent care providers, videos were created of each client, depicting personhood, behaviour mitigation, and approach to care. A participatory action framework, based on the knowledge to action cycle was utilized (Graham ID. 2006*)*. Focus groups were held with care providers at the discharge destination.

Results: A thematic analysis was completed by the behavioural neurology unit and the Innovation, Technology and Design Lab which revealed three themes: 1) Video communication is valued as a medium for sharing client information; 2) Communication needs to be catered towards the discharge destinations, considering workload, culture, and accessibility; and 3) Staff value preserving client identities, through maintaining daily routines, incorporating their life story, and building connections with clients.

Conclusions: The current process and lack of individualized care plans leave clients with unmet needs and decreases engagement. Care facilities value video, so long as it is tailored to the needs of the care setting and highlights the shared goal of preserving the client's occupational identity. Enhancing communication through video technology is one strategy to help ease care transitions and support continuous meaningful engagement. Next steps include activating a Cloud—a portal that will allow staff in other institutions to access client information securely and enable better communication across settings.

Visual Scanning as a Biomarker for Assessing Symptoms of Apathy and Depression in Alzheimer's Disease

S. Chau[1], N. Herrmann[1], M. Eizenman[2], L. Grupp[3], M. Isen[1], K. Lanctôt[1]. [1]Neuropsychopharmacology Research Group, Sunnybrook Health Sciences Centre; [2]Institute of Biomaterials and Biomedical Engineering, University of Toronto; [3]Department of Pharmacology and Toxicology, University of Toronto.

Background: Apathy and depression, two of the most prevalent behavioural disturbances in Alzheimer's disease (AD), often contribute to decline in quality of life for patients and their caregivers. Symptoms of apathy and depression may be difficult to assess, particularly as cognition deteriorates. Our team developed the Visual Attention Scanning Technology (VAST), an eye-tracker which enables real-time measurements of attention patterns towards competing visual stimuli. Previous results suggest that VAST has the ability to distinguish between depressed patients without dementia and healthy controls. Using VAST in the AD population for the first time, we explored an objective method of assessing symptoms of apathy and depression that does not rely on patient verbal skills or caregiver reports.

Methods: This is a cross-sectional study of patients with mild to moderate AD (NINCDS-ADRDA criteria; Mini-Mental Status Examination, MMSE). Participants were screened for significant depression (DSM-IV-TR; Neuropsychiatric Inventory, NPI depression, and apathy (NPI apathy). On a computer screen, participants were presented a series of 16 slides, containing 4 images of different themes (2 neutral, 1 social, 1 dysphoric), interspersed with filler slides. Patients were allowed 10.5 seconds to view each slide for a total test time of 20 minutes. Interest was measured using the number of fixations within specific images on a slide. Groups were compared using analysis of variance (ANOVA) and associations were determined using Pearson correlation coefficients.

Results: Of the 37 AD patients (19 females, age =77.1±8.7, MMSE = 22.1±3.5) included in this preliminary analysis, 19 had neuropsychiatric symptoms (NPS, 12 significant apathy, 7 significant depression) and 18 had neither of these symptoms (non-NPS). These patients had comparable age, though depressed patients scored lower on MMSE compared with apathetic and non-NPS patients. There was a significant difference in number of fixations on social images between groups ($F_{2,34} = 4.01$, $p = .027$); specifically, apathetic patients were less interested in social images compared with non-NPS. No statistical significance was found between groups for dysphoric images ($F_{2,34} = 0.35$, $p = .707$). Higher apathy scores on the NPI were significantly correlated with decreased number of fixations on social images ($r = 0.42$, $p = .009$, $n = 37$).

Conclusions: These preliminary findings suggest that interest in social stimuli using VAST can distinguish AD patients with different behavioural disturbances and is associated with severity of apathy. The results of this study will begin the development of a non-invasive and novel objective tool for evaluating apathy and depression severity in AD, which might also be a useful biomarker for predicting and monitoring treatment response.

Exploring Predictors of Outcome in a Cholinesterase Inhibitor Discontinuation Trial with Moderate to Severe Alzheimer's Disease Patients

J. O'Regan[1], N. Herrmann[1,3], E. Goran[3,4], S. Black[3,5], E. Williams[3], K. Lanctôt[1,2,3]. [1]Neuropsychopharmacology Research Group, Sunnybrook Health Sciences Centre, [2]Department of Pharmacology and Toxicology, University of Toronto; [3]Faculty of Medicine, University of Toronto; [4]Seniors' Health Centre, North York General Hospital; [5]Cognitive Neurology Research Group, Sunnybrook Health Sciences Centre.

Background: Cholinesterase inhibitors (ChEIs) are considered the first line treatment for symptoms of Alzheimer's disease (AD). Despite their modest efficacy, lack of data regarding long-term use, and potential for side effects, patients with moderate to severe AD on ChEIs tend to remain on these medications for long periods of time and often until death. This warrants the investigation of predictors of response to discontinuation of ChEI therapy to determine if, and for whom, it is appropriate.

Methods: Institutionalized patients with moderate to severe AD (Mini-Mental Status Exam 2 years ChEI use were randomized, double-blind to ChEI continuation or placebo (with 2-week taper) for 8 weeks. Vitals: weight (kg), Clinician's Global Impression (CGI), neuropsychiatric symptoms (Neuropsychiatric Inventory/Nursing Home Version [NPI-NH]), cognition (Severe Impairment Battery [SIB] and the MMSE), and safety (standardized symptom checklist) were monitored biweekly. Demographic and clinical characteristics were investigated at baseline.

Results: To date, 25 patients (72% male, mean age 87.9±3.0, mean MMSE 6.8±5.2, mean NPI 17.6±13.6, mean CGI 3.8±0.7 at baseline) have been enrolled. Based on un-blinded results, patients were classified into two groups to determine whether baseline measures of vitals (blood pressure, pulse rate), weight, cognition (MMSE and SIB), and behaviour (NPI) were objective predictors of change in CGI status. When patients were grouped based on CGI status at study endpoint, a total of 8 (32%) patients worsened, while 16 (64%) showed no change and 1 (4%) had improvement. Preliminary data indicates that vitals (χ^2 (3) = 4.642, R^2 = .169, p =.200), weight (χ^2 (1) = .864, R^2 = .034, p =.343), cognition (χ^2 (2) =.586, R^2 = .023, p =.746), and behaviour (χ^2 (1) =1.239, R^2 = .048, p =.266) were not associated with CGI change in binary logistic regression models. As well, there were no predictors of change in behaviour (NPI) and cognition (MMSE and SIB).

Conclusion: Thus far, there have been no baseline predictors of worsening. Once the recruitment goal of 60 patients is met and study treatment allocation revealed, placebo and ChEI continuation groups will be compared and predictors of response will be determined. Further assessment of predictors of improvement following ChEI discontinuation will provide data for guidelines for ChEI discontinuation.

Is There a Motor Signature in Mild Cognitive Impairment? Results from the Gait and Brain Study

S. Muir-Hunter[1], M. Montero-Odasso[1], K. Gopaul[2], M. Speechley[1]. [1]University of Western Ontario; [2]Parkwood Hospital.

Background: Gait and cognition are interrelated. However, it is still unknown if there is a "motor signature" associated with cognitive dysfunction. Previous studies assessing older people with normal cognition, mild cognitive impairment (MCI), and with dementia have found that executive dysfunction is consistently associated with a slower gait. However, associations between episodic memory dysfunction and gait performance are inconsistent, and it is unknown if memory dysfunction, which is cardinal sign in MCI, is specifically associated with the gait disturbances seen in MCI.

Objective: To determine whether gait performance in older adults with MCI differs based on their cognitive subtyping classification: amnestic type (aMCI) or non- amnestic type (na-MCI).

Methods: Older adults (≥ 65 years) with MCI from the "Gait and Brain Study"□ were included in this analysis. Global cognition was evaluated using the MMSE and the MoCA. Specific cognitive domains were evaluated using a battery of neurocognitive tests: Trail Making Tests A and B, Rey Auditory Verbal Learning Test, Digit Span Test, and Letter Number Sequence Test. Gait performance was evaluated with the GaitRITE mat under usual and dual-task walking conditions (walking while naming animals out loud and walking while doing serials subtractions by 7). Participants were divided in aMCI and naMCI based on their episodic memory assessment performance. The relationship between cognitive group (aMCI vs. na-MCI) and gait variables was evaluated with linear regression modeling.

Results: Sixty-four participants, mean age 77±6 years and 57.6% female were included. Forty-three were aMCI and 21 were na-MCI. Groups were similar in age, co-morbidities, level of physical activity, and history of previous falls. aMCI participants walked slower than na-MCI (98.5 vs. 112.1 cm/sec, p < .001). Multivariable linear regression, adjusted for age, gender, and executive function, demonstrate the aMCI group was significantly associated with gait dysfunction under dual-task testing and had a higher gait variability (p < .001), indicative of a more unstable gait pattern.

Conclusions: Memory dysfunction, specifically episodic memory impairment, was associated with poor gait performance, particularly under dual-task test conditions. Associations were maintained even after adjustments for potential confounders in the multivariate logistic regression. Our findings suggest that there is a motor signature in aMCI characterized by slowing gait under dual-tasking and higher variability, which seems to be independent of executive dysfunction.

Teaching Old Brains New Facts: Incidental Learning of Novel Concepts in Older Adults, Mild Cognitive Impairment, and Alzheimer's Disease

E. Attali, A. Gilboa. Rotman Research Institute at Baycrest,

Background: Extensive research in behavioural neuroscience has established that the hippocampus and the medial temporal lobe (MTL) systems are required to form new long-term declarative memory until slow consolidation processes allow neocortical networks to represent memory independently. Sharon *et al.* (2011; *PNAS*) demonstrated an important exception to this well-established theory by showing that adults with severe MTL amnesia were able to acquire novel arbitrary associations through Fast Mapping (FM). During FM, the meaning of new words and concepts is inferred by exclusion, and durable novel associations are incidentally formed. FM is most apparent during early childhood's exuberant learning phase, but is also available to adults. Age-related changes commonly involve explicit memory decline that is correlated with hippocampal dysfunction. FM has never been tested in older individuals or neurodegenerative disorders.

Objectives: Examine older adults' ability to learn through FM, and the impact of dementia on such learning.

Methods: Healthy older adults (OA), mild cognitive impairment (MCI), and Alzheimer's disease (AD) patients performed an FM task. On each trial, participants saw pictures of two items—an unknown (e.g., umbretta) and a well-known (e.g., duck) item. They had to make a perceptual decision (e.g., "Is the umbretta's beak purple?") that required an inference about the association between novel labels and novel items. Sixteen new items were incidentally encoded in this way. Memory was tested using a 3-alternative-choice associative recognition task after 10 minutes and again after 1 week. A matched Explicit Encoding (EE) task was also used in which participants were simply asked to "remember the Caracara", and testing was the same.

Results: Similar to previous studies with young and middle-aged adults, OA perform better on EE than FM, but in addition they displayed moderate reductions in FM performance. AD and MCI patients demonstrated equivalent performance to OA when tested after 10 minutes following FM encoding, despite significant impairment on the EE task. By contrast, when tested after a week, FM gains were lost in AD, but not in OA or MCI. Brain behaviour correlations in AD and MCI patients showed that EE scores were correlated with hippocampal volumes and with clinical tests of episodic memory. By contrast, FM scores were correlated with neocortical regions such as ATL and specific frontal and parietal regions, and with semantic memory tasks.

Conclusions: Our study concurs with that of Sharon and colleagues, that MCI and AD patients were able to learn new associations through FM despite an impaired episodic memory system. However, AD patients also demonstrated accelerated forgetting over a week. Interestingly, the pattern of correlations with brain volumes suggests FM is less sensitive to hippocampal atrophy and more sensitive to anterior and posterior neocortical degeneration that is also part of AD. These findings are in line with previous patient research that demonstrated learning through FM depends on the ATL probably due to its role in representing semantic associative networks. The data are consistent with the idea that acquisition of semantic information through FM and EE rely on distinct neural systems.

Changes in Physical Activity and Cognitive Function with Transition to Retirement Living

K. Regan[1], B. Intzandt[1], L. Middleton[1], M. Sharratt[2], S. Brown[2], K. Pfisterer[2], E. Roy[1]. [1]University of Waterloo; [2]Schlegel-UW Research Institute for Aging.

Background: Dementia is a major predictor of the need for long-term home care and becomes increasingly common with greater age. Retirement living is an alternative residential option available to seniors that offers some support (e.g., cleaning, cooking, medical support) but is independent of provincial health services. Retirement living may facilitate physical and social activity among older adults by reducing health, social, and environmental barriers. Since regular physical activity is associated with slower cognitive decline, an increase in physical activity in retirement living may slow cognitive decline with age.

Objective: The objective of this study is to (1) quantify changes in physical activity over the transition from community living to retirement living, and (2) describe the association between these changes and cognitive function.

Methods: Older adults living in and on the wait-lists for retirement living were recruited for this study. Physical activity was assessed objectively with a tri-axial actigraph activity monitor and was self-reported using the CHAMPS questionnaire. Cognitive function was assessed using the MoCA and a 30 minute cognitive battery based on the vascular cognitive impairment harmonization standards, which assess cognitive domains including memory, executive function, and attention. Current residents participated in one assessment in which they reported current and past (prior to retirement living) physical activity; current activity was objectively measured. Wait-list participants reported physical activity and had both physical activity and cognitive function measured prior to and after their transition to retirement living.

Discussion: Physical activity in retirement living will be compared to physical activity in the community using paired t-tests. The relationship between physical activity changes and cognitive function will be assessed with correlational analysis. Results: Sixty-seven percent of current residents increased weekly participation in purposeful exercise (e.g., aerobic classes, use of fitness equipment in the facility, and walking groups). Four residents reported beginning purposeful exercise activities only after the transition to retirement living. Conversely, the frequency of physical activity related to activities of daily living decreased among all residents. At this time, 10 wait-list residents have completed pre-transition assessments and will have post-transition assessments completed in the fall. These results will also be presented at the Canadian Dementia Conference.

Conclusion: This study investigates the impact of a residential choice and alternative health care option (retirement living) on physical activity patterns and cognitive function. It is possible that this alternative care model may improve physical activity and thereby decrease cognitive decline and dementia among older Canadians.

Remembering Community Settings: Designing 'Dementia-Friendly' Urban Public Spaces

M. Przydatek. University of Victoria.

Background: In 2038, there will be 257,800 new cases of Alzheimer's disease or a related dementia in Canada, equaling 756 million hours of informal care, and a projected economic burden of $153 billion for that year (*Rising Tide: The Impact of Dementia on Canadian Society*, 2009). The aging of the Canadian population has heightened the potential environmental, social, and economic impacts on those with dementia.

Objectives: This paper focuses on the relationship between individuals with dementia and their environments. Specifically, it concentrates on improving quality of life for those with dementia and increasing the capacity of the existing urban spaces through safety, sense of community, equality of access and opportunity, and enabling independence.

Discussion: The impact of public spaces on those affected by dementia is often overlooked in the academic literature and, more seriously, in public policy formulation. To help address the shortage of material on dementia-friendly public spaces, a review of the literature on dementia-friendly communities is included to produce recommendations for "best practices" addressing dementia, with special emphasis on dementia-friendly public environments. The paper then employs Penny McCourt's 'Dementia Policy Lens Toolkit' to assess the new 'dementia-friendly' approaches in York, England in the context of the identified "best practices". Addressing the questions: "How can we make our urban public spaces more dementia-friendly?'' and ''What are the health implications of 'dementia-friendly' urban spaces?'', the paper concludes with recommendations on implementing these best-practices in Canadian settings.

Aβ Amyloid and Cognitive Change: Decline in Learning and Working Memory Across Preclinical and Prodromal Stages of Alzheimer's Disease

P. Maruff[1], L. Yen Ying[2], K. Ellis[1], V. Villemagne[3], C. Rowe[3], C. Masters[4]. [1]University of Melbourne; [2]Brown University; [3]Austin Health, Dept of Nuclear Medicine and Centre for PET; [4]Mental Health Research Institute of Victoria.

Background: Recent prospective studies have shown that high Aβ amyloid is associated with a faster rate of memory decline in healthy older adults and adults with mild cognitive impairment (MCI). However, because these studies were conducted over shorter durations (i.e., 18 months), longer prospective studies are required to determine if Aβ-related memory decline is unremitting.

Methods: Healthy older adults (n = 177), and adults with MCI (n = 48) underwent positron emission tomography (PET) neuroimaging using Pittsburgh Compound B (PiB) for Aβ amyloid, APOE ε4 genotyping, and cognitive assessment using Cognigram as part of their baseline assessment in the Australian Imaging, Biomarkers, and Lifestyle (AIBL) study. Cognitive function was reassessed 18 and 36 months later.

Results: Compared to healthy older adults with low Aβ amyloid, healthy older adults and adults with MCI with high Aβ amyloid showed a moderate decline across 36 months on the Cognigram learning working memory composite. In contrast, adults with MCI and low Aβ amyloid showed a slight improvement on the Cognigram learning/working memory and psychomotor/attention composites across the 36 months. APOE ε4 carriage did not moderate the relationship between Aβ amyloid and cognitive decline.

Conclusions: The results of this study suggest that in healthy older adults, high Aβ amyloid most likely indicates that AD-related neurodegeneration has begun. They also support the hypothesis that adults with MCI and high Aβ amyloid is indicative of incipient AD, while MCI with low Aβ amyloid may reflect the presence of other neurodegenerative or psychiatric processes. Once commenced, the rate of decline in cognitive function remains constant across the preclinical and prodromal stages of AD. Finally, the results indicate the sensitivity of the Cognigram learning and working memory composite to the effects of Aβ amyloid in non-demented adults.

High Aβ Amyloid and Cognitive Screening: Implications for Early Detection of Alzheimer's Disease

P. Maruff[1], L. Yen Ying[2], K. Ellis[1], V. Villemagne[3], C. Rowe[3], C. Masters[4]. [1]University of Melbourne; [2]Brown University;

[3]Austin Health, Dept of Nuclear Medicine and Centre for PET; [4]Mental Health Research Institute of Victoria.

Background: Prospective studies show that in healthy older adults and adults with mild cognitive impairment (MCI), high levels of Aβ amyloid are associated with cognitive decline and more rapid progression to the next clinical disease stage. However, as yet single cognitive assessments or cognitive screening has not been able to differentiate non-demented individuals with low and high Aβ amyloid.

Methods: Healthy older adults (n = 288) and adults with amnestic MCI (n = 56) enrolled in the Australian Imaging, Biomarkers and Lifestyle (AIBL) study, underwent positron emission tomography (PET) neuroimaging using Pittsburgh Compound B (PiB) for Aβ amyloid, and completed the Cognigram cognitive screen.

Results: In healthy adults, performance on the attention/psychomotor function (d = 0.16) and learning working memory (d = 0.23) composites were equivalent between low and high Aβ amyloid groups. In MCI, performance on the attention/psychomotor function composite was equivalent between low and high Aβ amyloid groups (d = 0.21); however, performance on the learning working memory composite was significantly worse in the MCI high amyloid group compared to the MCI low Aβ amyloid group (d = 0.69).

Conclusions: The data indicate that in MCI high Aβ is associated with more severe impairment in learning and working memory. In MCI, Aβ amyloid levels do not influence attention and psychomotor function. In healthy adults, cognitive screening is not sensitive to elevated amyloid levels. These data suggest that prospective cognitive screening may be necessary to identify high Aβ amyloid in healthy adults. However, in MCI more severe memory impairment can indicate that Aβ amyloid levels are abnormally high.

Brain Disease and Creativity: the Cases of Franz Schubert and Maurice Ravel

A. Mansur1, C. Fischer[1,2], T.A. Schweizer[1,3], L. Fornazzari[1,4]. [1]Keenan Research Centre of the Li Ka Shing Knowledge Institute, Neurosciences Division, St Michael's Hospital, University of Toronto; [2]Department of Psychiatry, University of Toronto; [3]Department of Neurosurgery, University of Toronto; [4]Department of Neurology, University of Toronto.

Introduction: The objective of this study was to determine the role of music in promoting an enhanced brain reserve capacity in Franz Schubert and Maurice Ravel, two professional musicians who suffered from neurological disorders.

Methods: We consulted medical journals, reports, historical reviews, memoirs, and books written in English describing the life of each composer, the progression of their disease, and its effects on their musical faculties.

Results: Schubert suffered from a brain infection, most likely tertiary syphilis. In 1822, he experienced hair loss, skin rashes, ulcers in the mouth and throat, bone pain, and headaches—all characteristics of second stage syphilis. During this time however, Schubert composed numerous pieces, including "Die Schöne Müllerin", which was written while being treated in the hospital. In the final year of his life, Schubert's disease progressed to a tertiary phase where his brain was affected, resulting in chronic headaches, dizziness, paranoia, memory deficits, and eventually delirium. Despite the cognitive and physical deterioration, Schubert's musical composition output remained intact with the completion of his last three piano sonatas just weeks before his death. In fact, Schubert was reported to have made corrections to Part II of his piece "Winterreise" a day before he died. Likewise, Ravel first exhibited symptoms of primary progressive aphasia with underlying corticobasal degeneration as early as 1927, about the same time as he composed his famous work, *Bolero*. His motor and cognitive deterioration accelerated following 1932 due to a car accident. Like Schubert, despite the onset of his cognitive decline, Ravel composed numerous works including his last two piano sonatas from 1929-1931 and "Don Quichotte Ã Dulcinée" a year after his car accident. Although his apraxia restricted him from composing music into the last couple of years of his life, his memoirs explicitly indicate that his musical sensibility was preserved. In describing his opera, "Jeanne d'Arc", he claimed to have had so much music rushing into his head, but no way of physically expressing it. Likewise, Ravel retained the ability to remember his own music and identified errors in the performance of his work by other musicians.

Conclusion: The literature on the preservation of musical competency in famous artists affected by various brain diseases such as frontotemporal dementia and Alzheimer's disease is supported by our review on the musical integrity in Schubert and Ravel. We raise the hypothesis that the neural pathways recruited in composing and understanding music at a professional level are separate from those used in daily activities. These networks are unique in that they are resistant to neurodegenerative diseases. Therefore, music may serve as another basis for enhanced brain reserve capacity in artists.

Relationships Between At-Home Function and Severity of BPSD Across Dementias

B. Ogbiti[1], A. Kirstein[1], M. Freedman[1,2], P. Verhoeff[1], M.U. Wolf[1], T. Chow[1,3]. [1]Rotman Research Institute, Baycrest;

[2]University of Toronto Neurology; [3]University of Toronto Geriatric Psychiatry.

Background: Behavioural and psychiatric symptoms of dementia (BPSD) may disable a patient from performing activities independently; the reverse may be true in that losing independence may affect mood and behaviour. The purpose of this study is to investigate the association between function and severity of neuropsychiatric disturbance in the context of dementia.

Methods: We analyzed data from a longitudinal study of caregiver informants responding to the Functional Rating Scale (FRS), Clinical Dementia Rating Scale modified for frontotemporal dementia (CDR-FTLD), Frontal Behavioural Inventory (FBI), and Neuropsychiatric Inventory (NPI). Participants granted 2–3 telephone sessions separated by at least one year. We performed bivariate correlations for the FRS and CDR-FTLD against the behavioural inventories and compared patterns among 3 subtypes of dementia and Mild Cognitive Impairment (MCI) who converted to Alzheimer's disease (AD).

Results: The dataset includes 20 sessions regarding 9 MCI converters, 194 sessions for 94 AD patients, 63 sessions for 28 behavioural variant frontotemporal dementia (bvFTD) patients, and 32 sessions for 14 primary progressive aphasia (PPA). For the total sample, we found positive correlations for FRS and FBI: r from .682 to .870, $p < .01$; CDR-FTLD and FBI: r ranging from .734 to .876, $p < .01$; FRS and NPI: r from .425 to .605, $p < .05$; CDR-FTLD and NPI; r from .442 to .544, $p < .05$. Among diagnostic groups, MCI converters showed the highest r values for all pairings of 4 instruments.

Conclusion: This study indicates links between functional ability and severity of neuropsychiatric symptoms across several types of cognitive impairment. Further study will explore causality in the association, as well as seeking the relative roles of additional covariates, such as educational level or duration of illness.

Neuropsychiatric Symptoms in Patients with Alzheimer's Disease, Vascular Dementia and Mixed Dementia, and Neuroanatomical Correlates

C.J. Anor[1,2], S. O'Connor[3], A. Saund[4], D. Tang-Wai[2], R. Keren[2], M. Tartaglia[2]. [1]University of Toronto, [2]Toronto Western Hospital; [3]University of Pennsylvania; [4]York University.

Background: Neuropsychiatric symptoms (NPS) are common in patients with dementia including Alzheimer's disease (AD), vascular dementia (VaD), and mixed AD and VaD. The most common NPS encountered in dementia are apathy, irritability, agitation, depression, delusions, hallucinations, anxiety, disinhibition, and eating abnormalities (Cummings JL; 1997). These symptoms contribute to patients' distress, caregiver burden and institutionalization. Different neurodegenerative diseases may be associated with certain NPS, thus impacting treatment and care. Moreover, frontal lobe injury is often associated with development of NPS (Damasio A. In: *Clinical Neuropsychology.* 1993; Oxford University Press).

Objectives: The aim of this study was to compare NPS in patients with AD, VaD and mixed AD and VaD, and to evaluate the differences in incidence of NPS in relation to frontal white matter hyperintensities (WMH).

Methods: This was a retrospective chart review of 510 patients who presented to the Toronto Western Hospital Memory Clinic with cognitive complaints. Ninety-three patients with AD (McKhann GM, *et al.*; 2011), 34 patients with VaD, unrelated to stroke (Gorelick PB, *et al.*; 2011), and 54 patients with mixed AD and VaD who had a Neuropsychiatric Inventory (Cummings JL; 1997) score or data on NPS were included in the study. Binary logistic regression was used to determine whether diagnosis was associated with specific NPS. Left and right frontal WMH on the FLAIR images were manually segmented and their volumes calculated. One-way ANOVA tests were used to determine the relationship between NPS and the volumes of frontal WMH.

Results: There were no significant differences in gender, education or MMSE (AD 21.7; VaD 23.8; mixed 23.8) between patients with AD, VaD, and mixed, but there was a significant difference in age with mixed being older (mixed 82.3±6.6, AD 76.6±10.2; VaD 75.3±10.2; $p < .01$). NPS were common in all three diagnoses. Controlling for age, VaD patients had significantly more agitation ($p < .05$; VaD 40%, AD 14%), aberrant motor problems ($p < .05$; VaD 31%, AD 12%), and sleep disturbances ($p < .05$; VaD 57%, AD 17%) than AD patients, but not more than mixed AD and VaD. VaD patients had significantly more depression than patients with mixed AD and VaD ($p < .01$; VaD 48%, mixed AD and VaD 20%). Irrespective of diagnoses, there was significantly more left, right, and total frontal WMH in those with delusions compared with those without ($p < .01$;delusions 1/0 = 519.4 mm^3/181.2 mm^3; 525.0 mm^3/180.6 mm^3; 1044.4 mm^3/362.0 mm^3, respectively). There was also more left, right, and total frontal WMH in those with hallucinations compared with those without ($p < .05$;hallucinations 1/0 = 400.4 mm^3/193.3 mm^3;405.7 mm^3/192.3 mm^3;806.1 mm^3/385.7 mm^3, respectively). No other NPS were associated with WMH.

Conclusions: NPS were prevalent in AD, VaD, and mixed AD and VaD, but their frequencies varied amongst the different dementia causes. Agitation, depression, sleep disturbances, and aberrant motor behaviour were most prevalent in VaD. Volumetric analysis revealed significantly more left, right, and total frontal WMH in patients with delusions and hallucinations versus those without these NPS. These differences are likely related to underlying pathology and warrant further study, as they have implications for treatment.

A Critical Review of the Resiliency, Legal, Privacy, and Security Issues in the Usage of Smart Systems to Track Three Categories of Dementia Patients

J. Nehinbe, J. Benson.   University of Essex, Colchester, UK

Background: The ongoing pilot implementation of remote monitoring devices for dementia patients is facing impending dangers. The government perceives the initiative as an IT-based therapy for complementing pharmaceutical and non-pharmaceutical therapies, while health policy formulators are promoting the initiative because of its usefulness for tracking dementia patients. However, misconceptions are building up by the families of dementia patients and carers who will administer the surveillance therapy whenever it goes live regarding its compliance with best clinical practices in the areas of legal, data sharing, privacy, and security issues. Usually, experience shows that lack of acceptability and design flaws are central to the failures of most health service initiatives at the implementation and post-implementation stages over the years. Therefore, this paper investigates the aforementioned issues from the perspectives of families of dementia patients and carers. The results obtained suggest strategies for improving the success of the remote surveillance initiatives after implementation.

Objectives: This study examined the perspectives of families of dementia patients and carers on resiliency, privacy, legal, and security of smart devices for tracking dementia patients. Tracking of vulnerable patients involves police and ambulance system. Thus, this study further seeks to proffer strategies for reducing the growing cost of managing dementia patients.

Method: Thirty-six mental health and admiral nurses in UK and abroad participated in the survey. We introduce smart devices to them as knowledge-based systems for tracking dementia patients who are vulnerable to self-discharge. The inclusion and exclusion criteria are respondents that have experiences with patients officially diagnosed for early-onset dementia or late-onset dementia and with the following three characteristics: 1) acute dementia patients (ADP) are disorientated and confused patients, vulnerable to wandering, lost or putting family members, friends and carers into distress situations; 2) strong-minded dementia patients (SDP) are aggressive patients who discharge themselves against medical advices without referring to Mental Health Review Tribunal (MHRT) or certified by doctors; 3) isolated dementia patients (ISP) are patients that live alone and take care of themselves without recourse to relatives, friends or carers.

Results: The degree of resiliency of smart devices if they are suddenly compromised by hackers is unanimous affirmed as an important issue to be investigated thoroughly. The results demonstrate that 86.10% of participants agree that some of the information regarding the patients can be adapted to many uses, while 44.40% believe that smart devices may have false positives detection rate. The results reveal correlations between IT-based therapy and continuous training, while 50.40% say patient's health records are indirectly transferred to vendors of smart devices to manage.

Conclusions: Continuous education and development of operational policies to cover privacy and security issues in the administration of smart devices are strategies to improve perceptions of mental health nurse, carers, and families. There is need to strengthen mental health laws to protect carers who will generally administer IT-based therapies. Unlawful accessibility to the devices and alerts they generate must be prevented using suitable Intrusion Detection and Prevention Procedures (IDPP) in accordance with best clinical standards.

Automated Doll Therapy for Managing Dementia Patients

J. Nehinbe, J. Benson. University of Essex, Colchester, UK

Background: The discovery of dementia sickness which often results into sudden declination or deterioration in the memory functionality and social functions of affected persons is a central problem in the social health-care services over the years. Several research findings have supported doll therapy in a recent decade. However, the methodology for applying doll therapy suffers moral criticisms in social care setting across the globe despite the benefits that are associated with the therapy whenever it is compared with pharmaceutical interventions. Firstly, critics are of the view that modelling specially loved personalities in the form of pets are deliberate attempts to reduce the dignity, worth, efforts, and invaluable contributions that the affected patients have done to the society during their active years. Secondly, conventional doll therapy is seen as dehumanizing and harmful to the mind of aspiring and productive youths. Thirdly, doll therapy is applied in fragments to patients without compliance to the best clinical practices. Consequently, this study proposes automated doll therapy for treating dementia patients in order to lessen the above issues. The results show that automated doll therapy has positive effects on society, patients, families, friends, and carers of dementia patients. Further analysis suggests that automated doll therapy is compliance to best clinical practices.

Objective: The study reviews methodology for applying doll therapy against best clinical practices.

Method: Thirty-four mental health practitioners, and 26 friends and family members of dementia patients volunteered to participate in the survey. The sample population were selected based on their experiences in in-patient wards in North, East, West or South of England. Participants were exposed to methods, strengths, and weaknesses of conventional and computer aided devices (CAD) methods for applying dolls to a group of dementia patients in a multimedia room within an in-patient. Thereafter, participants were interviewed on their perceptions on both methods. Their responses transcribed immediately. The perceptions of the respondents were repeated clarifications to improve data reliability and validity, and the results obtained were statistically analyzed.

Results: Analysis of the results underpinned four hypotheses: 1) The perception that automated doll therapy will be better than the conventional method for managing dementia patients is high; 2) Automated doll therapy shows possibility of stabilizing emotions of patients with mild dementia problems to a certain degree; 3) Automated doll therapy suggests potential improvements in the perceptions of families, friends, and carers of dementia patients; 4) Automated doll therapy suggests positive impacts on social interactions among dementia patients in all age range of dementia patients.

Conclusions: This survey suggests strategy for improving the efficacy and perception of families, friends, and carers of dementia patients on doll therapy irrespective of the ages of the patients. More so, 73.33% of the population sample agree that automated doll therapy is indicative of compliance to best clinical practices for treating dementia patients. Approximately 58.33% of the respondents elaborate health and safety issues, maintenance cost, training, and suitable space to set up a media room to implement the therapy as major barriers to the implementation of this framework.

The Neural Correlates Underlying Errors of Selective Attention in the Stroop Task: a Comparison Between Alzheimer's Disease and Healthy Aging

A. Luedke, J. Fernandez-Ruiz, Juan, A. Tam, A. Garcia. Queen's University.

Background: Selective attention, the ability to maintain mental focus, declines across normal aging. This decline is exaggerated in Alzheimer's disease (AD), which is reflected by increased reaction times and error rates on the Stroop task, a classic measure of selective attention. While it has been well established that impairment in selective attention is a common symptom of AD, often occurring early on in the disease, the neural correlates underlying these deficits remain elusive. The default mode network (DMN), a collection of functionally related brain areas, normally exhibits task-induced deactivation. However, this pattern of activation is altered in AD. We hypothesized that less DMN deactivation may contribute to errors in selective attention, especially in the AD group.

Methods: Using an event-related Stroop task in a functional MRI paradigm, we tested 10 patients with mild Alzheimer's disease (mean age 73.9±8.4) and 10 healthy elderly (HC) (mean age 63.6±7.8). To analyze failures of selective attention, we assessed the differences in neural activity preceding an incongruent error between HC and AD.

Results: The AD group had significantly slower reaction time for incongruent stimuli compared to the HC group $t(18) = -3.85$, $p < .05$. The AD group also made significantly more incongruent errors than the HC group $t(18) = -2.98$, $p < .05$. The HC group showed greater activation in the left anterior cingulated cortex (ACC), left precuneus, left superior frontal gyrus, bilateral middle frontal gyrus, and right insula, all of which have been previously implicated in the Stroop task. In contrast, the AD group showed greater activity in more parietal and posterior regions, including the right lingual gyrus, right superior parietal lobule, and right inferior parietal lobule. Interestingly, the AD group also showed significant activity in the ACC and precuneus; however, this activity was lateralized to the right. Furthermore, the ACC activity in the AD group was more inferior compared to the HC group, and the precuneus activity was more superior to the HC group.

Conclusions: While it is not surprising that the ACC was activated in both groups since its involvement in conflict detection, activation of different areas within these relatively large structures suggests that the ACC and precuneus are differentially affected by the disease. Thus the AD group showed more default mode network activity and the HC group showed more frontal activity preceding errors in the Stroop task. This result suggests that the neural correlates underlying errors of selective attention are different in AD than in HC.

FMRI Study of Attentional Lapses Across Aging

A. Tam, J. Fernandez-Ruiz, J. Walsh, Jeremy, A. Luedke, Angela, A. Garcia. Queen's University.

Background: Attentional lapses can occur on a daily basis and disrupt the completion of goal-oriented tasks. While the neural correlates of attentional lapses have been studied in young adults, it is unclear whether the mechanisms behind this phenomenon change with age.

Methods: We scanned healthy young (n = 12) and older (n = 28) adults with functional magnetic resonance imaging while participants performed a trial-by-trial attention task, the Stroop task, where we measured the response time to each stimulus. We defined an attentional lapse as a longer response time relative to the average response time, and a fast reaction as a faster response time relative to the average.

Results: Young and older adults performed equivalently on all behavioural measures, such as reaction time and accuracy (both $p > .05$). We found parietal regions in the default mode network, including the precuneus and inferior and superior parietal lobules, exhibited greater activity as reaction time to stimuli increased. Compared to fast reactions, attentional lapses were preceded by decreased activity in frontal attentional regions, including the anterior cingulate and inferior, middle, medial, and superior frontal gyri (all $p < .05$). These frontal areas also displayed significantly greater post-stimulus activity during attentional lapses compared to faster responses, potentially as a mechanism to recover from the initial lapse of attention. Older adults displayed reaction time-modulated activity in a greater number of frontal cortices and in more dorsal default mode regions, relative to young adults.

Conclusions: Our results support previous research that activity in frontal and parietal regions of the attentional and default mode networks contribute to lapses of attention. Our results also suggest that the neural correlates of attentional lapses change with healthy aging, reinforcing the idea of functional plasticity to maintain high cognitive function throughout the lifespan.

Precuneus Volumes and Cognitive Tests in Older Adults

A. Garcia, A. Luedke, A. Tam, J. Fernandez-Ruiz. Queen's University.

Objective: We investigated the relationship between the precuneus volumes (a component of the Default Mode Network or DMN) and cognitive scores, including scores of verbal memory, in older and younger adults to assess possible functional differences among age groups.

Methods: A high-resolution anatomical scan was acquired with a T1-weighted, 3D MP-RAGE sequence in 30 older adults (21 cognitively normal and 9 patients with mild cognitive impairment or MCI); mean age 71.5 years and in 12 younger adults, mean age 23 years. Full cognitive testing had been administered to all subjects within 1-3 weeks of the MRI. The cognitive testing included the California Verbal Learning Test (CVLT), the Montreal Cognitive Assessment (MoCA), the Mini-Mental State Exam (MMSE), and the Stroop test. Manual precuneus segmentation followed previously described anatomical guidelines, marked in the sagittal plane and then segmented in the coronal plane. Precuneus volumes were normalized by total intracranial volume (ICV). Pearson correlations were used to analyze the relation between precuneus volumes and cognitive scores.

Results: Patients with MCI had significantly lower cognitive scores and precuneus volumes compared to the cognitively normal older control group and to the younger group. Among the 30 older participants there were highly significant correlations between the right precuneus and the CVLT short and long delay free and cued recall scores (SDFR $r = 0.636$, $p < .0001$; SDCR $r = 0.593$, $p < .001$; LDFR $r = 0.551$, $p < .005$; LDCR $r = 0.634$, $p < .0001$), and with the CVLT Learning Slope (LS) ($r = 0.67$, $p < .0001$). The left precuneus correlated only with the CVLT LS ($r = 0.49$, $p < .01$). There were also significant correlations between the Stroop, MoCA, and MMSE scores and the right and left precuneus volumes ($p < .01$ to $p < .0001$) among the older population, but there was no correlation between precuneus volumes and any of the cognitive scores in the younger population.

Conclusions: The volume of the right precuneus appears to be related to scores of verbal memory in older adults but not in younger adults. Selective attention and scores of general cognitive function are also related to right and left precuneus volumes in older adults but not in younger adults. This may explain lack of deactivation of the precuneus during task performance among older adults.

Musical Faculties Preserved in Musicians with Alzheimer's Disease

A. Mansur[1], C. Fischer[1,2], T.A. Schweizer[1,3], K. Acuna[1], N. Kirwan[4], L. Fornazzari[1,5]. [1]Keenan Research Centre of the Li Ka Shing Knowledge Institute, Neuroscience Division, St Michael's Hospital, University of Toronto; [2]Department of Psychiatry, University of Toronto; [3]Department of Neurosurgery, University of Toronto; [4]St. Michael's Hospital; [5]Department of Neurology, University of Toronto.

Background: We wanted to investigate whether amateur musical training and leisure playing can protect Alzheimer's patients from degenerating their episodic memory for music, and to compare these effects with the deficits produced by Alzheimer's disease (AD) using conventional memory measures.

Methods: We recruited an amateur piano player with a 10-year history of studying music and the DSM IV diagnosis of probable AD. The patient was visited at his home each day for a week to conduct logical memory testing, as well as episodic memory testing specific to music. The logical memory section from the Wechsler Test was conducted at 1 and 15 minutes. Similarly, the patient was first shown the piece “A Winter Scene” and asked to sight-read the first 8 bars and then play the 8 bars with both hands from memory at 1 and 15 minutes.

Results: The patient’s performance on the memory test was very poor at onset and showed no improvement over the course of the study. His ability to sight-read the 8 bars of music on the first day was intact and accurate. His immediate recall of the music on the first day showed accurate performance of the first 3–4 bars of music with notes played in both hands. From the second to the fifth day, the patient demonstrated difficulties remembering the melody line, especially in the left hand. The patient, however, was able to recall the right hand melody for the first 3–4 bars correctly on most days. Despite minimal improvements within the first five days, the patient’s performance on the sixth and seventh days reveals nominal improvements in musical expression. On the sixth day, he was able to recall four full bars of music with no errors in the right hand. On the last day, he accurately performed the four bars with both hands for the first time. Even when playing incorrectly, the patient remained within the music’s A-minor key.

Conclusion: Our case study reveals differences in the way AD affects logical memory and episodic memory for music. The patient had deteriorated in logical memory, but was able to retain musical literacy, memory of music, music sensibility and, most importantly, the ability to learn music after repeated trials. Like our previous work on professional artists, our findings here suggest that exposure to music training and performance at an amateur level can preserve the brain’s memory networks involved in musical expression when faced with neurodegenerative disease.

Characterizing the Prevalence of Behavioural and Psychological Symptoms of Dementia (BPSD) in a Long-Term Care Setting Across the 24-Hour Circadian Cycle: Selected Preliminary Findings

M. Wilchesky[1], O. Lungu[2], E. Kröger[3], M-A. Bruneau[4], P. Voyer[5], J. Desrosiers[6], N. Champoux[7], P. Landreville[8], J. Monette[9], B. Gore[10], R. Verreault[11]. [1]Division of Geriatric Medicine, Department of Medicine, McGill University; [2]Départment de psychiatrie, Université de Montréal; [3]Centre d’excellence sur le vieillissement de Québec; [4]Institut Universitaire de Gériatrie de Montréal; [5]Faculty of Nursing, Laval University; [6]Faculty of Medicine and Health Sciences, Université de Sherbrooke; [7]Institut Universitaire de Gériatrie de Montréal; [8]École de psychologie, Faculté des sciences sociales, Université Laval; [9]Division of Geriatric Medicine, Jewish General Hospital; [10]Donald Berman Maimonides Geriatric Centre; [11]Département de médecine sociale et préventive, Faculté de médecine, Université Laval.

Background: Dementia is a highly prevalent condition among elderly residents in long-term care (LTC) facilities. BPSD can significantly increase both residents’ mortality risk and the burden on the health-care system. A large body of research has identified the importance of BPSD in the management of dementia in LTC. Yet very few studies have assessed the prevalence of BPSD in LTC as a function of the time of day during which symptoms are evaluated (i.e., day vs. evening vs. night). This is an important knowledge gap to be addressed, given that some symptoms may occur more frequently at or after dusk than during daylight hours, and that their emergence at a specific time of day may be associated with different risk factors.

Objectives: To characterize and compare the prevalence of BPSD in a LTC setting as evaluated by front-line staff who work during the day, evening, and night shifts.

Methods: As part of a larger study examining BPSD prevalence and incidence, we assessed neuropsychiatric symptoms of LTC residents over a 3-month period. Frequency and severity of symptoms over a 2-week window were assessed using the Neuropsychiatric Inventory Nursing Home Version (NPI-NH) during the day shift (07:00–15:00), the evening shift (15:00–23:00), and at night (23:00–07:00). The Cohen-Mansfield Agitation Inventory and the Pain Assessment Checklist for Seniors with Limited Ability to Communicate were also administered for all study residents.

Results: A total of 72 residents were evaluated: 56 during the day, 44 during the evening, and 46 at night. Twenty-three residents were evaluated by staff from all three shifts, 24 by staff from two shifts and 25 by staff from one shift only. The prevalence of BPSD was 62.5% during the day, 68.2% during the evening, and 39.1% at night. Among residents who were awake at night, the proportion exhibiting BPSD was 50%. The percentage of residents identified as having more than 4 clinically significant BPSD symptoms increased significantly from 10.7% during the day to 34.1% in the evening ($\chi^2 = 8.12$, df = 1, $p = .004$), a possible indication of sundown syndrome. Agitation/aggression and irritability were the most frequently reported BPSD by all shifts, whereas apathy, anxiety, and sleep dysregulation were more frequently reported during the day, evening, and night, respectively.

Conclusions: Our findings are consistent with data reported in previous studies which found BPSD prevalence in LTC as being above 60%, with agitation/aggression and irritability being the most common symptoms. We found evidence of an increased BSPD symptom load during the evening (sundowning) as compared with daytime, and a decrease in BPSD prevalence at night. Our results highlight the importance of considering the time of day during which BPSD symptoms are evaluated in LTC residents.

Cognitive Remediation Program for Mild Cognitive Impairment (Mci) in Older Adults: Preliminary Analysis

G. Gagnon, A. Potes, C. Brunelle, D. Fontaine, N. Grenier, L. OReilly, V. Nair, D. Dastoor, J. Dubé, R. Desautels, N. Rajah. Douglas Mental Health University Institute - McGill University.

Background: Older adults diagnosed with mild cognitive impairment (MCI) are considered as a high-risk population for progression to Alzheimer's Dementia (AD) (e.g., Gauthier *et al*.; 2006), with a high conversion rate to AD (Chertkow *et al*.; 2008, Defranceso *et al*.; 2010)—up to 80%, within five years (Peterson *et al*.; 2004). Memory clinics in Canada offer clinical research trials to evaluate innovative treatment options, with a hope to ameliorate and/or delay disease progression from MCI to dementia. Multi-component cognitive training studies for MCI have yielded interesting results (e.g., Cipriani *et al*.; 2006, Talassi *et al*.; 2007, Rozzini *et al*.; 2007). One such promising technique was developed and validated by Belleville and colleagues (2006; MEMO program) for improving episodic memory function, subjective memory rating, and self-rating of well-being in amnestic MCI (aMCI) patients.

Objective: Our study aimed to replicate the results of Belleville and colleagues (2006) with some modifications: 1) a bigger sample size, 2) inclusion of a wider range of MCI sub-types (not only aMCI), 3) inclusion of a Lifestyle Training control group to account for placebo effects and the impact of psychosocial interactions on cognition, and 4) the use objective primary outcome variables from CANTAB (Cambridge Neuropsychological Test Automated Battery) and neuropsychological tests.

Methods: We conducted a pseudo-randomized clinical trial in which a treatment group (TR, N = 24, male =9) and a life-style training control group (Control, N = 20, male = 10) underwent a combined Relaxation/Tai Chi Therapy training for 3 weeks and a 6-week training using a modified MEMO method, while the Control group received 6 weeks' health and lifestyle training program (e.g., discussing factors contributing to diabetes, the importance of exercise, how to prevent falls). All participants were older Francophone adults (age = 69.23±8.78 years, education = 15.50±4.34 years) referred to DMHUI Memory Clinic and having a diagnosis of one of the four subtypes of MCI. Significant medical, psychiatric, neurological or cognitive co-morbidities were ruled out. Participants were tested before and after intervention with cognitive screeners, computerized cognitive tasks, neuropsychological testing, and questionnaires about mood and subjective judgment of memory.

Results: Preliminary results on Repeated Measure ANOVA controlling for age and education indicate a significant treatment (pre/post) effect (F(1,40) = 4.22; p =.047) and an age-by-treatment interaction (F(1,40) = 5.55; p =.023) on the CANTAB Short Reaction Time. A tendency towards a reduced number of errors (F(1, 3) = 2.99; p =.093) and improved strategy use (F(1,33) = 2.618; p =.115) was observed in the TR vs. Control group for the CANTAB Spatial Working Memory test. No effects were found on CANTAB Paired Associate Learning first trial memory score, Paired Associate Learning total errors, and Short Reaction Time Accuracy, or on formal neuropsychological testing of attention and memory, MMSE, MoCA, Squire Subjective Memory Questionnaire, mood, and self-esteem scales, when controlling for age and education. Feasibility and clinical implications will be discussed. Final results will inform about the effect of cognitive remediation and help determine best practice in the care of MCI patients.

Reducing and Optimising Medication Use Among Long-Term Care Residents with Advanced Alzheimer's Disease: Results from a Delphi Panel Based on a Scoping Literature Review

M. Wilchesky[1], M. Arcand[2], R. Verrault[3], J. Monette[4], N. Champoux[5], P. Voyer[6], ME. Aubin[7], P.J. Durand[8], E. Kroger[9,10]. [1]Division of Geriatric Medicine, Department of Medicine, McGill University; [2]Département de médecine de famille, Université de Sherbrooke; [3]Département de médecine sociale et préventive, Université Laval; [4]Division of Geriatric Medicine, Jewish General Hospital; [5]Institut Universitaire de Gériatrie de Montréal; [6]Faculté des sciences infirmiÈres, Université Laval; [7]Unité de médecine familiale, Université Laval; [8]Faculté de médecine, Université Laval; [9]Centre d'excellence sur le vieillissement de Québec; [10]Faculté de pharmacie, Université Laval.

Background: Older persons with advanced Alzheimer's disease or related disorders (ADR) receive numerous medications to treat an average of 21 health conditions. This is problematic given that the likelihood of drug–drug interactions and adverse drug events increase with the number of medications prescribed. Emergence of symptoms such as agitation, depression, constipation, and pain may in fact be due to adverse events caused by medications originally prescribed for the purposes of long-term prevention strategies. However, as ADR progresses, the objectives of care should shift from a curative to a palliative approach, and medication regimens should be revised and adjusted to reflect this change. There is limited research providing evidence with regard to the risk-benefit profiles of many medications for this specific patient population. Research evaluating interventions in which medication profiles are reviewed and adjusted in ADR patients is even more lacking, thereby underlining the need for new evidence-based guidance.

Objectives: A scoping review of the literature and an ensuing Delphi panel were conducted to answer the following questions: 1. What criteria exist to determine whether a medication is still appropriate in patients with advanced ADR? 2. Which medications may be considered inappropriate for these patients? 3. Do interventions to optimize medication use in these patients currently exist?

Methods: Phase I consisted of a scoping review (NICE, Cochrane Collaboration, Arksey and Levac). Thirteen scientific databases and websites of scientific and gray literature were searched in order to select articles for inclusion using an iterative process. Identified studies were analyzed by two independent reviewers. Studies were included if they were a guideline, review or a primary study, focusing on patients with ADR, at end-of-life, or the elderly, in either a palliative care, long-term care facility (LTCF), or unspecified setting. Letters, editorials, meeting abstracts or studies taking place in a hospital or ambulatory setting were excluded. In Phase II, a Delphi panel following the RAND approach sought consensus from 15 expert clinicians (family physicians, geriatricians, nurses, pharmacists, social workers, and an ethicist) to identify medications deemed inappropriate within the Quebec clinical care context. Interventions judged as promising and applicable were also identified.

Results: The search strategy identified 6,186 references, of which 356 were retained after double screening. Forty articles were identified as being specifically relevant to the research questions at hand, among which 25 intervention studies provided evidence of small but significant reductions in potentially inappropriate medications, adverse events or medication load without associated consequences to morbidity or mortality. The Delphi panel produced three lists of medications: medications always appropriate, medications mostly appropriate, and medications rarely appropriate in these patients. The panel also identified promising key elements of a complex intervention to optimize medication use in this patient population.

Conclusion: Medications frequently prescribed for patients with advanced ADR in LTCFs were categorized as being either always, mostly or rarely appropriate. Several key elements of multidisciplinary interventions involving patients, families, and care teams appear promising for improving medication use among this vulnerable patient population: a pilot study for such an intervention is under way.

Risk Factors for Development of Psychotic Symptoms in Early Stage Alzheimer's Disease

C. Millikin[1], D. Turnbull[2], L. Lix[3], C. Fischer[4]. [1]Department of Clinical Health Psychology, Faculty of Medicine, University of Manitoba; [2]Department of Psychology, Faculty of Arts, University of Manitoba; [3]Department of Community Health Sciences, Faculty of Medicine, University of Manitoba; [4]Keenan Research Unit of the Li Ka Shing Knowledge Institute, St. Michael's Hospital, University of Toronto.

Background/Objective: Psychotic symptoms in dementia are associated with several negative outcomes, such as earlier institutionalization and increased caregiver stress. Most studies of psychosis in dementia have involved patients with moderate to severe cognitive impairment. Few have examined development of psychotic symptoms in patients who were non-psychotic at baseline. Knowledge of psychosis risk factors at the mild cognitive impairment or early dementia stage is important for understanding the mechanisms underlying psychosis in dementia, and for developing effective prevention and treatment strategies. Our objective was to examine factors associated with the development of delusions and hallucinations in a large sample of patients with an initial diagnosis of amnestic mild cognitive impairment (aMCI, CDR = 0.5) or early stage probable Alzheimer's disease (AD, CDR = 1.0) who were non-psychotic at baseline.

Methods: ADNI data for participants with aMCI (n = 397) or AD (n = 193) at baseline were examined. Individuals with psychosis at baseline were excluded, as were those who developed both delusions and hallucinations as their initial presentation of psychosis, resulting in a sample of 473 never psychotic and 79 who developed delusions (n = 56) or hallucinations (n = 23) as their initial psychotic symptom. The presence of delusions and hallucinations was ascertained from informant ratings on the Neuropsychiatric Inventory Questionnaire (NPI-Q). Patients with/without delusions or hallucinations were compared with respect to demographic, genetic, and vascular risk factors (history of hypertension, baseline smoking) using chi-squared tests and *t*-tests.

Results: A small minority of participants with an initial diagnosis of aMCI developed psychosis. Most of these (55.8%) had progressed to AD by the visit at which symptoms were first reported, with onset of psychosis typically occurring more than 6 months after dementia diagnosis (7.5 months for delusions, 13.2 months for hallucinations). In the combined aMCI/AD sample, more patients developed delusions (10.1%) than hallucinations (4.2%). Age, race (white vs. non-white), gender, baseline smoking status, history of stroke, and presence or number of ApoE-E4 alleles were unrelated to development of psychosis. Having a history of hypertension was associated with development of delusions, while patients who developed hallucinations had a lower level of education and lower baseline MMSE score ($p < .05$).

Conclusions: Psychotic symptoms affect a significant minority of patients with early-stage AD. Hypertension was identified as a potentially modifiable risk factor for delusions in dementia. Participants who developed hallucinations had less education than those who were never psychotic, although the average person in both groups had some post-secondary schooling. Lower education is well-recognized as a risk factor for dementia in general, but the possibility of a relationship to hallucinations requires further evaluation. The finding of differing risk factors for delusions and hallucinations suggests that dementia with psychosis is not a unitary construct, and future studies should examine these symptoms separately.

The Zombies in Alzheimer's Disease: Perceptions, Stigma, and Care

M. Przydatek. University of Victoria.

Background: The treatment and care methods used for Alzheimer's disease (AD) operate within the perceptions of our culture; thus, developing care models for AD individuals is influenced by popular language and attitudes. Critical reflection of our culture and its influences unveils how it impacts beliefs and behaviours; from a health perspective, cultural biases could translate into certain diagnoses and treatment options prescribed by practitioners. Negative misconceptions about people with AD cause unhelpful behaviours that focus on the symptoms of dementia rather than the remaining abilities of the people affected. These misconceptions are reflected in the language associated with AD, which is consistent with the terminology used for "zombies" in media, reflecting our society's negative views of aging with memory loss. This association is important since 81% of adult Canadians felt they would be treated and viewed differently if others knew they had received an AD diagnosis (Werner & Davidson; 2004).

Objectives: This paper explores how references to zombies may limit care in North America by framing an individual as 'dead' rather than building upon treatments involving social approaches. This paper does not intend to imply causality, rather to associate the perception of AD individuals as zombified with the dominant care approach in North America. In contrast, Danish perceptions driving care are documented to highlight differing perspectives.

Methods: Conducting a review of the zombie trope, its impact on stigma, identity, and care of those with AD, it was it was found that the 'living-dead' language was thematic throughout both lay and academic literature. Some examples that illustrate this theme include 'living dead,' 'undead,' and 'death in slow motion'. Using this zombie language is not conducive to improving quality of life for those with AD.

Results: Though attention for AD is increasing, it often propels a negative view through terms such as 'living-death'. The presentation of AD in this way focuses on the fear of falling ill, rather than on the way persons with dementia are making the best of their abilities. The 'living-death' stigma correlates with the inhibition of developing social care approaches to AD treatment. Unfamiliarity and lack of knowledge incite fear about the illness, and if AD is continuously pushed away with negative stereotyping, we may never truly hear the voices of those with AD. The 'living-dead' perception of AD requires scrutiny because this popularised assumption shapes views, and continues to burden current AD practices despite the changes that we see occurring; discrimination and dehumanisation still need to be challenged.

Conclusions: Treatment of dementia varies around the world, and through this exploration I propose that being reflective of our perceptions can lead to better quality of care for those with AD. All individuals exist within a dynamic web of relationships that form who we are and how we behave in the world; awareness of this interconnection reveals how our culture impacts AD.

A Prospective Study of Cholinesterase Inhibitor Response in Lewy Body Spectrum Disorders Using Perfusion SPECT

K. Sherborn[1], J. Li[1], M. Messner[1], K. Meradje[1], M. Freedman[2], G. Kleiner-Fisman[2], J. Lee[3], J. Kennedy[4], R. Chen[5], D. Tang-Wai[5], A. Lang[5], N. Herrmann[1], S. Black[1], M. Masellis[1]. [1]Sunnybrook Health Sciences Centre; [2]Baycrest Centre for Geriatric Care; [3]North York General Hospital; [4]Centre for Addiction and Mental Health; [5]Toronto Western Hospital, University Health Network.

Background: The cognitive and neuropsychiatric symptoms associated with Parkinson's disease dementia (PDD) and dementia with Lewy bodies (DLB), collectively known as Lewy Body Disease (LBD), are primarily treated with cholinesterase inhibitors (ChEIs). However, there is significant variability in adverse effects and response among LBD patients taking ChEIs.

Objectives: To examine the efficacy of ChEIs in treating cognitive and neuropsychiatric symptoms of LBD longitudinally using brain perfusion SPECT.

Methods: 53 patients diagnosed with PDD or DLB according to standard criteria were initiated on ChEI therapy and prospectively assessed for efficacy and adverse effects. A standardized neuropsychological battery, the Neuropsychiatric Inventory (NPI), and brain ECD-SPECT were ascertained at baseline (no treatment) and at 24 weeks. A repeated measures ANOVA design was used to determine change over time in these measures.

Results: LBD patients treated with ChEIs showed significant improvements in visuospatial, attention, and phonemic fluency tasks ($p < .05$). They also showed significant reductions in the frequency and severity of visual hallucinations as assessed by the NPI-hallucinations subscale (NPI-HS; $p < .05$). Furthermore, as visual hallucinations diminished, perfusion in the right occipital lobe increased ($r = -0.460$, $p < .05$). Preliminary genetic analysis of the butyrylcholinesterase K-variant was not associated with response.

Conclusions: Treatment with ChEIs was found to be effective in reducing visual hallucinations and improving cognitive function. The negative correlation found above suggests that perfusion in the occipital region could be developed as a biomarker for use in distinguishing between LBD responders and non-responders to ChEIs in terms of visual hallucinations.

Is Dementia Underrecognized and Undertreated in Retirement/Residential Homes?

B. Dalziel[1], G. Lemay[2], S. Bhatti[3], B. Murphy[3], S. Ballester[4], M. Meikle[4]. [1]University of Ottawa; [2]Ottawa Hospital; [3]Desjardins Pharmacy; [4]Prince 0f Wales Manor.

Background: Retirement/residential homes (RHs) are a generally underappreciated component of the health-care system. A prevalence of > 70% dementia is recognized in long-term care homes, but the prevalence in RHs has not been established. The average age in both types of homes is approximately 86, and chronic geriatric conditions are common in both. In Ottawa, Ontario there are far more RH places (8,500) than long-term care beds (5,500). A previous study in an Ottawa RH showed recognized dementia in 40% and dementia screening was positive in an additional 32%. This study in the Prince of Wales Manor (POW) goes one step further in that specially trained nurses did a comprehensive cognitive assessment and, with geriatrician review, a diagnosis of normal cognition, mild cognitive impairment (MCI) or dementia was established.

Methods: After resident/family consent,73 POW residents underwent: 1) chart review to establish residents with a diagnosis of MCI or dementia; 2) screening (Cognitive Quickscreen:CGS) of all residents without a diagnosis of MCI or dementia (the CQS was three-item: recall, clock drawing, and animal fluency); 3) cognitive assessment for those failing the CGS by trained nurse assessors (see assessment guide); and 4) diagnostic review by a geriatrician and resident attending physician to establish a cognitive diagnosis.

Results: Chart review showed 30 residents with dementia (41%), 2 residents with MCI (3%), and 41 residents with neither (56%). The CQS results in the 41 remaining residents revealed 73% failure, 12% pass in all 3 items, and 15% refusal. The 30 residents failing the CQS and the 2 residents with MCI had comprehensive cognitive assessment, and provisional diagnoses were that 15 residents had dementia (22% of the original sample of 73 residents minus the 6 refusers). Additionally, 8 residents were felt to have MCI. Overall 45 of 67 residents (67%) were felt to have dementia, 8 (12%) had MCI, and only 14 (21%) were felt to be cognitively normal.

Conclusions: Retirement/residential homes have a very high prevalence of dementia (67% in this study) with approximately 1 out of every 3 cases of dementia being unrecognized (15 out of 45 total). A cognitive screening and assessment program using a structured dementia assessment guide can be utilized in a time- and resource-efficient manner to address this important health-care issue. RH residents without a diagnosis of dementia or MCI should be screened for dementia at admission and regularly after admission.

Automatic "Smart" Specialist Assessment Reports Can Reduce Production Time, and Improve Accuracy and Timeliness

J. Lindsay[1,2], A. Hamou[1,3], J. O'Brien[1], M. Borrie[1,4,5], F. Gwadry-Sridhar[1,3]. [1]Lawson Health Research Institute; [2]University of Victoria; [3]Western University; [4]Schulich School of Medicine and Dentistry; [5]St. Joseph's Health Care London.

Background: The time required to complete a comprehensive geriatric assessment is significant, and the demand for specialized geriatric services is increasing through the current demographic shift in the Canadian population. Within a specialized memory clinic, more time is required to dictate detailed comprehensive geriatric assessment clinic visit reports. A timely report to the hospital electronic record is an essential element of good specialist care. To reduce report production time, an innovative solution was designed and implemented in the clinic's new longitudinal research registry and documentation system. A novel approach to the automatic generation of a smart narrated synoptic report was developed allowing for reports to be autopopulated with the required patient data.

Methods: Using computer-programming semantics, a report template was created for the initial assessment. The smart report template employed the use of algorithms to determine: 1) what clinical information will be reported; 2) whether the report will be in short or long form; 3) the specific places in the report where information from the clinical database would be injected; and 4) how the information is visually presented in the report. The wording generated in the smart report is determined through the logical analysis of the patient data collected. For example, depending on the context of the pronoun use, the gender (male/female) stored in the database indicates which version of the pronoun should be used.

Results: These reporting algorithms can potentially have various steps of decision-making, or nodes, each with increasing complexity. When using a smart report template to generate a clinic report, each algorithm in the report is automatically evaluated by the system. The generated report shows the cumulative results from the algorithms as a complete, finished report. The user is presented with an automatically generated report that can then be modified and customized to meet any special needs for that particular report. The user may edit the final report by traditional keyboard, via dictation, or by inserting a report snippet. A report snippet is a predetermined piece of code which can represent a standard report element (e.g., a standard page letterhead), a data element extracted from the system (e.g., the patient's birth date or referring physician's name, etc.), or an automatically evaluated logic statement (as in the example of pronoun use above). Once inserted into the report, the report snippet is fully rendered, displaying the final report content which can be manually edited by the user.

Conclusions: The use of the customized smart synoptic reporting solution has anticipated benefits on geriatric clinical practice. Since most of the report is automatically generated from a customized template, the amount of dictation time required is reduced. The use of this solution can improve report accuracy through the use of a standardized template, which can then be customized and sent to multiple recipients in short or long form. Smart reports can increase the timeliness of new reports, as reports can be generated at the end of the visit in short form with recommendations and instructions for patients and caregivers.

Platform for a Longitudinal Clinical Research Registry System for the Care of Outpatients Referred with Cognitive Impairment/Dementia

A. Hamou[1,2], J. Lindsay[1,3], M. Borrie[1,4,5], F. Gwadry-Sridhar[1,2]. [1]Lawson Health Research Institute; [2]Western University; [3]University of Victoria; [4]Schulich School of Medicine and Dentistry; [5]St. Joseph's Health Care London.

Background: Current registries, information systems, and family practice electronic medical record systems are generic in nature and are not tailored to a specialist's workflow or clinic needs. The use of an efficient data collection system, along with the application of an effective workflow model, can lead to significant improvements in the quality of health care provided to patients. We have developed a unique longitudinal web-based tracking system for patient treatment, outcome management, clinical reporting, and research.

Methods: The system's design was informed by health-care providers, a review of existing systems, and published literature. Several modules have been established to address the concerns of the adopting clinic, including: patient demographics, course of symptoms, co-morbid illnesses, medications, cognitive testing, physical and neurological examination, diagnoses, synoptic and detailed reporting, and data analysis for both clinical and research purposes. Conditional patient access provides an interactive model of care to the clinic and allows for future expansion with a patient portal. In a traditional system, baseline information is typically collected manually by a health-care provider using a paper-based form. These forms are transcribed or coded into an electronic database of patient record. This method of retrospective data entry leads to various quality control issues. To address this challenge, our platform was designed to be used not only with web-capable desktop and tablet devices, but with kiosk systems, as well. Various techniques were established to improve quality control and to ensure the accuracy of patient records. Demographic data can be imported or entered directly into the database by the patient, registration clerk or clinician. Furthermore, field validation is used to ensure that no data are missing or incorrectly filled. All data collection forms are clinical workflow oriented, with built-in secondary form validation, autocomplete, autosave, and dropdowns to facilitate fewer entry mistakes.

Results: The resulting increase in quality control ensures accurate patient record entry—the more accurate the data, the more accurate the statistical analysis. The platform has been customized to provide the following system-wide features: side-by-side comparison of past and current information; real-time data entry collaboration between interdisciplinary team members; forms are modular in design to allow for easy expansion; look-up lists (e.g., national medication repository, clinic staff, past occupations, hobbies, standardized diagnostic codes from the US National Alzheimer's Coordinating Centre); digital capture of cognitive tests; synoptic reporting; interactive progress notes and comments; simplified web-based modelling and statistical analysis tools.

Conclusions: The benefits of utilizing such a registry platform can significantly increase both the quality of care provided to patients and the efficiency of clinical practice. Our registry can allow for the measurement of the quality of care indicators, reduce clinical and data-entry errors, and facilitate research since all clinical data can be analyzed statistically in real time.

Enhancing Training in Dementia and Other Brain Disorders Through the Creation of a New Royal College Diploma Program

A. Henri-Bhargava[1], D.B. Hogan[2], T. Chow[3], S.E. Black[3], K.I. Shulman[3], on behalf of the "Royal College 'Brain Medicine' Diploma Proposal" meeting attendees. [1]University of British Columbia; [2]University of Calgary; 3University of Toronto.

Background: Brain disorders that lead to aberrations of affect, cognition, and behaviour (ABC) constitute a growing and resource-demanding health crisis in Canadian society. The number of individuals with dementia, which is an important disorder of ABC, is rapidly increasing. Specialist input is often sought in the diagnosis and treatment of dementia. However, several specialties and subspecialties manage dementia, including geriatric medicine, neurology, geriatric psychiatry, and Care of the Elderly family practice. Other specialists, including neurosurgeons, are becoming involved in the management of dementia. Many of these specialists have either "learned on the job" or taken informal additional training to acquire special competency in the area, without standardization or formal recognition of that training. Creating a standardized training program for physicians wanting to acquire additional competency in disorders of ABC would assure quality of care and attract more physicians to this area, which will be needed to cope with the increased burden that will be posed by ABC disorders. Such training would gather specialists into a more harmonized community of practice in disorders of ABC, and could lead to the emergence of transdisciplinary knowledge and competencies that will allow trained physicians to better cope with these conditions, especially dementia.

Methods: The Department of Psychiatry at the University of Toronto recently sponsored a meeting for a "grass-roots" group of specialists from across Canada, who all deal with disorders of ABC to a substantial degree in their practice. They explored the creation of a Royal College of Physicians and Surgeons of Canada (RCPSC) Diploma program in disorders of ABC. This presentation highlights the results of that meeting and forthcoming efforts.

Results: There was broad consensus that such a Diploma program would be useful. The precise name of this field of training is still being debated, although the preliminary frontrunner is "Integrative Brain Medicine". A consensus definition for this field of study was agreed upon. A "core" training program for the Diploma was proposed, to be accompanied by additional specific "streams" that trainees could choose to focus on, including one in dementia.

Conclusions: A transdisciplinary team of medical educators, with the support of RCPSC, is developing a new Diploma training program to formally recognize training in disorders of ABC, including dementia, and to boost the number of physicians undertaking this training. This is a meaningful step to stem the "rising tide" of these disorders. The Diploma program proposed at the Toronto meeting is being refined with further input from interested stakeholders being sought and warmly welcomed, with the goal of presenting a full proposal to the RCPSC in the spring of 2014. Please contact the first author, Dr. Alex Henri-Bhargava, at alexhb@uvic.ca to participate.

Progression from Subjective Cognitive Impairment to Mild Cognitive Impairment and Those Responding to Advertisements with Memory Concerns

S. Woolmore-Goodwin[1], P. Sargeant[1], B. Lloyd[1], M. Borrie[2]. [1]Cognitive Clinical Trials, St. Joseph's Health Care, Parkwood Hospital; [2]Division of Geriatric Medicine, Schulich School of Medicine and Dentistry, University of Western Ontario.

Background: Traditionally physicians have viewed mild memory complaints in older people to be benign. However, subjective memory complaints in people who have "normal" cognition on testing is termed Subjective Cognitive Impairment (SCI), a pre-MCI stage, and may last up to 15 years. Memory loss as a self-observed complaint is more easily identified than changes in executive function. Identifying people with MCI who are at increased risk for dementia/Alzheimer's disease, and arranging for follow-up is the current best practice recommendation from the Third Canadian Consensus Conference on the Diagnosis and Treatment of Dementia (CCCDTD3). For the last five years, we have advertised during Alzheimer Awareness Month (January) and Senior's Awareness Month (June) for people 55 years and over who have memory concerns, who are interested in research, and who have not had a stroke.

Objectives: 1) To classify the clinical suspicion of memory complaints in respondents and offer follow-up. 2) To complete clinical assessments in those with a clinical suspicion of MCI or dementia on case finding, confirm a clinical diagnosis, and offer research studies for which they may be eligible.

Methods: Over the last 5 years a total of 166 people 55 years and over responded to newspaper advertisements with self-reported memory concerns. Participants received cognitive screening tests using the standardized MMSE, the MoCA, the 15-point GDS, the AD8, the Cornell Scale for Depression in Dementia, and the Lawton Brody Activities of Daily Living Scale. The test results were case-conferenced with a geriatrician and a clinical suspicion of SCI, MCI, depressive symptoms, mixed picture, possible dementia or other was given. All participants agreed for their test results to be sent to their family physician. Fifty-eight individuals have repeat measures on these tests from 2009 to 2013.

Results: Of the 58 follow-up subjects, 45 returned for follow-up after one year and 29 returned for follow-up after two years. In 2013, of those 58 follow-up participants, 54% (31) had no change on their cognitive tests. However 33% (21) had declined over the 5 years and 10% (6) had improved. Of those who were given the clinical suspicion of SCI in 2009 or 2010, 39% had progressed to amnestic MCI or multiple-domain MCI. Those individuals who reported depressive symptoms in 2009 (32%) tended to have lower scores on the GDS and Cornell on follow-up visits. Individuals who declined follow-up appointments maintained that their memory was 'fine' and no longer wished to be followed.

Conclusions: Of those who returned for follow-up, 33% progressed to MCI within 5 years; however, they only represent 35% of the total sample. Therefore a conservative estimate would be 12% of the participants progressed to MCI. It is uncertain whether those who declined follow-up represent individuals who have reverted to 'normal.' Limitations: 1) The participants are drawn from those who have insight to changes in their memory, therefore it may understate the total number; 2) 65% to date have elected not to return for follow-up.

ADHD as a Mimic of Mild Cognitive Impairment? A Protocol Design to Compare Inhibitory Control, Response Variability, Error Monitoring, and Working Memory in Adult Attention Deficit/Hyperactivity Disorder and Mild Cognitive Impairment

D. Bierstone[1], B. Lam[1,2], J. Ramirez[1], S. Ferber[3], R. Schachar[4], S. Black[1,2]. [1]L.C. Campbell Cognitive Neurology Research Unit, Brain Sciences Research, Sunnybrook Research Institute; [2]Dept of Medicine (Neurology); [3]Deptartment of Psychology, University of Toronto; [4]Department of Psychiatry, Neurosciences and Mental Health, The Hospital for Sick Children.

Background: A growing number of middle-aged individuals presenting with concerns of memory loss and decreased mental efficiency are being diagnosed with previously unrecognized attention deficit/hyperactivity disorder (ADHD). However, specific neuropsychological tools to differentiate adult ADHD from prodromal Alzheimer's disease or mild cognitive impairment (MCI) are lacking. One of the core deficits that have been consistently associated with both childhood and adult ADHD is impairment in inhibitory control, as commonly measured using the Stop Signal Task (SST). One study has found mild differences in inhibitory control between MCI and normal controls (NC), but this is still being investigated. Deficits in visual working memory (VWM) have also been reported in both ADHD and MCI. These deficits can be examined using a task that specifically distinguishes random errors from errors due to the inability to divert attention from non-target objects to target objects during visual encoding. No previous studies have yet examined performance on these specific measures in adult ADHD and MCI.

Objectives: The aim of the present study is to compare performance on both the SST and this VWM task between individuals with ADHD and MCI and examine potential correlations with regional grey matter volumes. We hypothesize that deficits in inhibitory control and VWM errors due to non-target responses will discriminate ADHD from MCI. Our second hypothesis is that ADHD subjects will show increased medial and lateral prefrontal cortical thinning and lower putamen and caudate volumes than both MCI and NC.

Methods: 25 ADHD and 25 single and multi-domain amnestic MCI participants will be recruited from the memory clinic at Sunnybrook Health Sciences Centre. All participants will be assessed using the Adult ADHD Self-Report Scale-V1.1 and Connors' Adult ADHD Rating Scale-S:L. The Albert and Peterson Criteria will be used to diagnose MCI. The SST will be administered to obtain measures of inhibitory control, response latency and variability, and error monitoring. Intra-individual variability will be studied using ex-Gaussian fitting, and error monitoring will be assessed based on the extent to which participants slow their response following inhibition failures. A previously described VWM task will be administered in which multiple items are presented in the visual field and the subject must recall the colour of a probed item. The proportions of target responses, non-target responses, and random errors will be calculated for each participant.

Discussion: Results will be compared between groups using Analysis of Covariance (ANCOVA), correcting for age and education. Assessments of memory, attention, and executive function will be obtained through standard neuropsychological testing. Cortical thickness and grey matter volumes of targeted structures will be measured from structural 3D T1 MRI using a previously published semi-automatic pipeline. Partial correlations, controlling for age and education, will be used to assess the relationship between neuropsychological measures and brain volumetrics.

Significance: This study will explore the utility of neuropsychological tools to differentiate ADHD among middle-aged patients presenting with memory complaints from MCI. This study will also provide the foundation for a larger project aimed at examining the relationship between ADHD and Alzheimer's disease in the baby boomer population.

Vitamin D Levels Are Linearly Associated with Verbal Fluency Scores in Healthy Adults

J. Pettersen. Northern Medical Program, University of British Columbia.

Background: Vitamin D (25OHD) insufficiency has been associated with cognitive decline and dementia. In addition to comparatively worse global cognitive performance, individuals with deficient or insufficient vitamin D levels (less than 75 nmol/L) tend to perform worse on tasks of executive functioning. It remains unclear if "supratherapeutic" levels (100 nmol/L or greater) are associated with even better cognitive performance than sufficient levels. The present study sought to address this question, hypothesizing that executive functioning tasks would be most associated with vitamin D insufficiency (less than 75 nmol/L) and that cognitive performance would not differ significantly between those with sufficient and supratherapeutic levels.

Methods: Healthy adults, at least 20 yrs of age participated in the winter phases of the D-COG (Nov. 2010–March 2011) and D-COG2 (Nov. 2011–March 2012) studies. Cognitive testing consisted of the Symbol Digit Modalities Test, Verbal (phonemic) Fluency, Digit Span, and CANTAB computerized battery. Body mass index (BMI) and mood (i.e., Beck Depression Inventory-II) were also assessed. Participants were also asked about vascular risk factors and physical activity. Serum vitamin D (25OHD) levels were analyzed via liquid chromatography/mass spectrometry. PTH, phosphorous, and ionized calcium levels were also obtained.

Results: Data from the D-COG (n = 43) and D-COG2 (n = 99) were pooled due to identical study protocols. The 142 participants were 56.3±14 yrs old with 14.9±4 yrs of education and 71.8% female. They were categorized into the following three groups depending on vitamin D levels: Insufficient (less than 75 nmol/L; n = 73); Sufficient (75–99.9 nmol/L; n = 36), and Supratherapeutic (> 100 nmol/L; n = 33). Vitamin D levels were significantly correlated with performance on Verbal Fluency (partial correlation corrected for age, education, r = .23, p = .01), and the mean scores differed between groups: Insufficient 12.9±4.2, Sufficient 13.2±4.2, Supratherapeutic 16.7±6.6, ANCOVA(covariates: age, yrs of education), F(4, 140) = 6.30, p = .0001. Post hoc Scheffe analyses indicated significant differences between the Supratherapeutic and both the Insufficient (p = .002) and Sufficient (p = .01) groups. Vitamin D sufficiency status remained an independent predictor of Verbal Fluency performance, even after correction for multiple potential confounders including age, education, sex, BMI, amount of physical activity, vascular risk factors, and depression (linear regression, p = .001).

Conclusions: Vitamin D levels were positively and linearly associated with performance on verbal fluency, a task that assesses executive functioning and language. Surprisingly, Supratherapeutic levels were associated with even better performance than sufficient levels on this task. Importantly, however, these sufficiency categories are based on bone health guidelines and the optimal level of vitamin D for cognition is not known. This study suggests that levels exceeding 100 nmol/L may be optimal for at least some aspects of cognition, including executive functioning and perhaps language. What effects vitamin D supplementation has on these and other cognitive domains is not known, but is currently being tested in a randomized supplementation study.

Using Visual Attention as a Biomarker for Working Memory in Patients with Alzheimer's Disease

A. Li[1], S.A. Chau[2], N. Herrmann[1], M. Eizenman[2], L. Grupp[2], M. Isen[1], K.L. Lanctôt[1]. [1]Sunnybrook Research Institute; [2]University of Toronto.

Background/Objective: Impaired memory is a core component of Alzheimer's disease (AD), and patients with AD have been shown to have increased impairments in working memory. Along with this loss in memory, patients also often experience difficulties in attention and, in fact, studies have posited that it is the attentional impairments that underlie many of the deficits in cognition and function seen in patients with AD. Our team has developed the Visual Attention Scanning Tool (VAST), an eye-tracker which enables real-time measurements of attention patterns towards competing visual stimuli. The objective of the present analysis is to observe the spontaneous visual scanning patterns of AD patients in the presence of novel and repeated stimuli using a modified n-back paradigm in order to explore working memory in a naturalistic setting.

Methods: This is cross-sectional study of patients with mild to moderate Alzheimer's disease (probable AD by NINCDS-ARDRA criteria, with a Mini-Mental State Examination score > 10). Visual attention was assessed using the VAST system. Patients were presented with 48 slides, each containing four images simultaneously presented. All four images have similar complexity, valance, and arousal. Two images on each slide were novel and two were repeats of images that were shown previously—repeats of one slide back (n = 1) and 2 slides back (n = 2). Images on each slide were arranged 2 by 2, with the position of the novel stimuli and previously shown stimuli randomly intermixed. Comparisons between and within groups were conducted using two way ANOVA.

Results: 61 patients have been recruited to date (37 AD, 24 controls). Overall, the average age was 74.6±9.2 years, with patients with AD being older than controls (77.1 vs. 70.7 years). The average Mini-Mental State Examination score was 24.4±4.2, with AD patients having a lower score (22.1 vs. 28.0). There was a significant main effects of disease (F1,118 = 23.5, $p < .0005$) and image type (F1,118 = 79.3, $p < .0005$), as well as an interaction between factors (F1,118 = 9.6, $p = .002$) for relative fixation time in the 1-back condition. Similar results were found in the 2-back condition: disease (F1,118 = 10.6, $p = .001$) and image type (F1,118 = 5.2, $p = .024$) main effect, in addition to a significant interaction (F1,118 = 5.7, $p = .018$).

Discussion: These preliminary data for our n-back paradigm of working memory suggest that the orientation towards novel stimuli observed in cognitively intact subjects was not observed in AD patients. These findings suggest that working memory deficits can be detected in AD patients without requiring verbal communication.

Correlates of Neuropsychiatric Symptoms Among Older Women and Men with Dementia Across Continuing Care Settings

C. Maxwell[1,2], M. Vu[1], D. Hogan[3], S. Patten[4], N. Jette[5], S. Bronskill[6], M-J. Kergoat[7], G. Heckman[2], J. Hirdes[2]. [1]University of Waterloo, School of Pharmacy; [2]University of Waterloo School of Public Health/Health Systems; [3]University of Calgary, Geriatric Medicine; [4]University of Calgary, Community Health Sciences; [5]University of Calgary, Neurology; [6]ICES, University of Toronto; [7]University of Montreal.

Background: Neuropsychiatric symptoms associated with dementia present significant challenges to family caregivers and health providers, yet data illustrating variation in the prevalence and correlates of symptoms across care settings or by sex are scarce. We sought to estimate the prevalence and associated correlates of neuropsychiatric symptoms across home care (HC), long-term care (LTC), and complex continuing care (CCC) settings and by sex.

Methods: Cross-sectional study of all HC clients (n = 470,183), LTC residents (n = 127,285), and CCC residents (n = 93,206) aged 50+ years assessed with the Resident Assessment Instrument (RAI-HC or RAI 2.0) in Ontario, Canada from 2004 to 2010. Multivariable logistic regression models were used to identify correlates of neuropsychiatric symptoms across care settings, for total samples and stratified by sex.

Results: There were 100,500 (21.4%, 95% CI 21.3–21.5%) HC clients, 72,732 (57.1%, 95% CI 56.9-–57.4%) LTC residents, and 23,459 (25.2%, 95% CI 24.9–25.4%) CCC residents with a diagnosis of dementia. The severity of impairment associated with dementia generally increased from HC to LTC to CCC; however, there were important differences across care settings. LTC residents with dementia were significantly older, more likely to be women, to exhibit depression and aggressive behaviours, and to be receiving 1+ antipsychotics and/or antidepressants, whereas those with dementia in CCC (despite showing comparable levels of cognitive impairment to LTC residents with dementia) were more likely to be functionally dependent, to have significant health instability, and to have a recent decline in mood, apathy, anxiety (and use of 1+ anxiolytics), and loss of appetite. The proportion of persons with dementia exhibiting 1+ neuropsychiatric symptom(s) was higher in LTC and CCC (~ 98%) than in HC (~ 61%). Adjusting for age, cognitive and functional status, women with dementia were significantly more likely to exhibit depression and anxiety, appetite/eating issues, delusions (HC & LTC), and night-time behaviours (LTC). Conversely, men with dementia were significantly more likely to exhibit agitation/aggression/disinhibition, apathy (LTC & CCC), irritability, motor disturbance (CCC), and hallucinations (HC). The percentage of HC clients with a distressed caregiver was higher among males with dementia and for both men and women, increased with number of neuropsychiatric symptoms. The associations between age, functional and cognitive impairment levels, and selected neuropsychiatric symptoms were generally similar for females and males with dementia, although there were some notable differences. For example, female HC clients with dementia showed stronger associations between increasing cognitive impairment and agitation/aggression/disinhibition and irritability, whereas male HC clients with dementia showed stronger associations between increasing cognitive impairment and anxiety.

Conclusions: We observed significant differences in the profile of neuropsychiatric symptoms among persons with dementia across care settings and by sex. These differences suggest the need for more targeted care planning and interventions to better prevent and manage select neuropsychiatric symptoms across the care continuum.

Communication Between Formal Caregivers and Residents with Alzheimer's Disease (AD): Examining Communication Breakdown and Repair During an Activity of Daily Living

R. Wilson[1], E. Rochon[2], A. Mihailidis[1], C. Leonard[3], J. Small[1]. [1]University of British Columbia; [2]University of Toronto; [3]University of Ottawa.

Background/Objectives: Alzheimer's disease (AD) leads to cognitive declines in language, memory, and executive function, affecting an individual's ability to complete activities of daily living (ADLs) independently. At the moderate and severe stages of AD, there is a need for formal caregivers (e.g., a nurse, personal support worker) to assist residents with AD during the completion of self-care tasks (e.g., grooming and washing). Unfortunately, breakdowns in communication commonly occur between formal caregivers and residents with AD during ADLs, leading to strained communication interactions and task completion difficulties. The systematic examination of which verbal and nonverbal task-focused communication strategies caregivers' use to support residents with AD during task completion has been done. However, there is a need for the systematic examination of (1) which communication strategies contribute to fewer communication breakdowns during daily tasks, and (2) which communication strategies effectively repair communication breakdowns when they do occur. This systematic observational comparison study aims to examine which task-focused communication strategies formal caregivers' use to repair communication breakdowns that occur while assisting residents with moderate and severe AD during the completion of a basic ADL: teeth-brushing.

Methods: Fifteen (15) formal caregivers (personal support worker = 14; nurse = 1) and thirteen (13) residents with a confirmed diagnosis of AD (moderate = 6; severe = 7) participated in this study. Participating caregivers and residents with AD were recruited from two different community-based, long-term care facilities. Established caregiver–resident dyads were observed during the completion of six separate teeth-brushing sessions (78 teeth-brushing sessions in total). Each teeth-brushing session was transcribed verbatim into the Systematic Analysis of Language Transcripts (SALT), a language analysis software program. Next, utilizing conversation analysis (CA) method and the trouble source-repair (TSR) sequence paradigm, communication breakdowns were identified. In addition to the identification of communication breakdown and repairs, instances of no trouble source-repair (NTSR) sequences were identified. Finally, the TSR sequences (i.e., trouble source, repair signal, repair type, and resolution) and the NTSR sequences will be coded. Descriptive statistics will be used to analyze the relative frequency of task focused communication strategies occurring during TSR sequences and NTSR sequences as a function of disease severity. Correlation analysis will be used to examine the relationships between the resolution of repair strategy (outcome) and the relative frequency of communication strategies as a function of disease severity.

Results: Across 78 observed teeth-brushing sessions, 215 TSR sequences and 150 NTSR sequences were identified. Agreement analysis was performed on 20% of the transcripts using occurrence percent agreement. Two raters showed 92% agreement for the identification of TSR sequences and 92.4% agreement for the identification of NTSRs. The complete analysis of the TSR sequences and the NTSR sequences is currently underway.

Conclusion: We will present results and conclusions at the 7th CCD. Findings from this study will help to understand further which communication strategies are most effective when assisting residents with AD during daily activities. Moreover, findings from this study will be used to help inform the development of evidence-based communication guidelines for caregivers assisting individuals with AD.

Which Scales Can Detect Depression of Alzheimer Disease According to The NIMH-Provisional Diagnostic Criteria?

A. Sepehry[1], P. Lee[2], D. Foti[1], G-Y. Hsiung[1], C. Vadeanu[1], M. Genge[3], H. Feldman[1], B.L. Beattie[3], C. Jacova[1]. [1]The University of British Columbia (UBC), Division of Neurology; [2]UBC Division of Geriatric Medicine; [3]UBC, Hospital Clinic for Alzheimer Disease and Related Disorders.

Background: The NIMH-Provisional Diagnostic Criteria for depression of Alzheimer's Disease (PDC-dAD) have been proposed over a decade ago. However only few studies examined the validity of depression scales, including the Cornell Scale for Depression in Dementia (CSDD) and the Montgomery-Ãsberg Depression Rating Scale (MADRS), for this novel diagnostic approach to depression of AD (dAD). The validity of brief self-report scales with a parallel version for informant to provide collateral input for assessment of depression of AD has not been examined.

Objectives: To study the validity of the Geriatric Depression Scale (GDS-30) developed for older adults and validated for the DSM [Major Depressive Disorder (MDD)] in detecting dAD, and to compare the subject (GDS-30) to the informant scale (GDS-IF-30).

Methods: Subjects with AD and their informants, recruited at the UBCH-CARD (Clinic for Alzheimer Disease and Related Disorders) completed the GDS-30 and GDSIF-30, Neuropsychiatric Inventory (NPI) (informants), Quality of Life in AD (QoL-AD), and Montreal Cognitive Assessment (MoCA) (subjects). Subjects were assessed by a UBCH-CARD clinician for dAD according to the NIMH-PDC. Inclusion criteria were: a) subject meets possible or probable AD criteria (Mini Mental State Examination (MMSE) = 10 to 26); b) is able to communicate in English; c) has a knowledgeable informant who has contact at least 3–4 times/week. To examine concurrent validity, we performed ROC analyses on the accuracy of GDS scores in detecting a dAD diagnosis. To examine convergent validity, we computed correlations between GDS, NPI depression item scores, and QOL-AD. To examine discriminant validity, we performed correlations between GDS and MoCA scores.

Results: The sample consisted of 21 subject/informant dyads (subject mean age = 71.33; mean education = 14.67; mean MMSE score = 22.2; 11/21 (53%) were men). Six subjects were found to have dAD (mean age = 69.33; mean education = 14; mean MMSE = 23.5; 50% were men) and 15 were non-dAD (mean age = 72.13; mean education = 14.93; mean MMSE = 21.6 (n = 14); 53% were men). The AUC for GDS-30 was 0.79 (*p* value = .027) with the optimal cut-off score of 8 (sensitivity = 67%, specificity = 80%, positive Likelihood Ratio of 3.33). For GDSIF-30, AUC was 0.83 (*p* value = .048) with the best cut-off score of 15 (sensitivity = 83%, specificity = 93%, positive Likelihood Ratio of 12.50). GDS-30 and GDSIF-30 were positively correlated (r = 0.635; *p* value = .05). GDS-30 and GDSIF-30 were inversely correlated with QOL-AD (r = -0.552, and -0.524, respectively). GDS-30 and GDSIF-30 were not correlated with MoCA (r = -0.043, and 0.047, respectively).

Conclusions: The Geriatric Depression Scale based on subject and informant showed good accuracy in detecting dAD. The cut-off scores for dAD were lower than those reported for DSM-MDD. The correlation between GDS-30, GDSIF-30, NPI-depression item, and QOL-AD support the depression scales convergent validity. The lack of correlation between GDS-30 and GDSIF-30 and MoCA supports the depression scales discriminant validity. Overall, the study provides validity of inference for GDS-30 and GDSIF-30 with a limited sample of 21 dAD and non-dAD.

Posterior Cortical Atrophy and Occupational Therapy—Visual Dysfunction in Dementia

A. Lake. University Health Network—Toronto Western Hospital.

Background: "Poster cortical atrophy (PCA) is a neurodegenerative syndrome that is characterized by progressive decline in visuospatial, visuoperceptual, literacy, and praxic skills. The progressive neurodegeneration affecting parietal, occipital, and occipitotemporal cortices that underlies PCA is attributable to Alzheimer's disease in most patients."(Crutch *et al*., 2012; pg. 170.) The role of occupational therapy (OT) in Alzheimer's disease (AD) is widely recognized, particularly related to memory. However, in some AD variants, such as PCA, the initial core clinical manifestation is progressive visual dysfunction and not memory. There is growing recognition for the importance of the OT role in the management of PCA, though few resources exist to inform practice in this area.

Overview: A brief review of the clinical features and subsequent safety concerns of PCA will be provided, as well as the limited options for pharmacotherapy and non-pharmacologic therapy management. The OT role and general intervention strategies for patients with PCA will be presented, including a recently developed set of recommendations for OT intervention for use with patients experiencing AD-related visual dysfunction. The process of developing an OT specific resource for clinicians providing direct and consultative services for patients with AD-related visual dysfunction will be discussed. The interprofessional context of the tool and the tool itself will be reviewed with recommendations for its use, including practical visual aid interventions and adaptations that address 7 main areas of concern in relation to visual dysfunction in dementia. A brief description of an early stage, international systematic study looking at the effectiveness of visual compensatory strategies for this population will be discussed.

Conclusion: While prevalence and incidence of PCA are currently unknown, with the rapidly expanding older population and forecasted increase in dementia in the coming decades, it is evident that the incidence of PCA will expand and subsequently the demand for OT services to optimize the independence and safety of this population at home. Occupational therapists who are experts in the analysis of function that are aware of the issues regarding PCA play a vital role in the management of this patient population for which no other management currently exists. While there is considerable research demonstrating the impact of visual impairment on ADL and IADL performance in the older adult population and the research examining the effect of OT in this area is growing, further research is required to measure the unique contributions of OT, especially for people with PCA, for which no research current exists.

A Novel PS1 Mutation Presenting as Right- and Left-Predominant Corticobasal Syndrome in Two Siblings: Examples of Phenotypic Heterogeneity and Phenotypic Mimicry

B. Lam[1,2], M. Masellis[2], J. Keith[3], P. St. George-Hyslop[4], K. Rogavega[4], S.E. Black[1,2]. [1]L.C. Campbell Cognitive Neurology Research Unit; [2]Department of Medicine (Neurology), Sunnybrook Health Sciences Centre, University of Toronto; [3]Department of Anatomical Pathology, Sunnybrook Health Sciences Centre; [4]Tanz Centre for Neurodegenerative Research, University of Toronto.

Introduction: Corticobasal syndrome (CBS) is a progressive, neurodegenerative condition typified by asymmetric motor symptoms (dystonia, rigidity, akinesia, myoclonus) in the setting of cortical sensory impairment, apraxia, and in prototypic cases, alien limb phenomenon. A diversity of pathologies including Alzheimer's disease (AD), Lewy body disease (LBD), and cerebrovascular disease have been associated with CBS. Similarly, AD is itself associated with significant phenotypic variation and may result from an array of genetic mutations, in particular in presenilin-1 (PS1), presenilin-2, and amyloid precursor protein, all producing a highly aggressive, early-onset phenotype. PS1 in particular has been described in association with a heterogeneous phenotypic array, although not as CBS. Here we describe the first known association between a novel PS1 mutation and CBS in two brothers, one with right-predominant CBS, and the other with left-predominant CBS. These cases illustrate not only remarkable phenotypic mimicry, with an AD gene resulting in CBS, but also the phenotypic heterogeneity that may result even when the same causative mutation is present.

Methods: Two brothers were assessed at the Sunnybrook Health Sciences Centre, Toronto, Canada between October 2008 and June 2010 (Brother RP: follow-up 11 months with 3 visits; Brother LP: 19 months with 4 visits). Both underwent detailed neurologic assessment including physical examination, screening blood work, detailed conventional neuropsychological testing, MRI (1.5 T), and SPECT (T99 ECD). Both brothers consented to and underwent post-mortem pathologic assessment, as well as genetic analysis by deep gene sequencing for PSEN1 mutations.

Case Descriptions— Case 1: Right Predominant (Brother RP). RP was a 55 y.o. dentist with right arm myoclonus, dystonia, and mild rigidity for about 1 year prior to initial presentation. His wife also noticed word-finding difficulties, poor comprehension, and empty speech for 2 years, with significant apathy and depression emerging more recently. On initial examination he had impaired stereognosis and graphesthesia, subsequently developing significant apraxia. Based on these findings RP met criteria for probable CBS2. Post-mortem confirmed Braak stage VI/VI Alzheimer's pathology. Genetic analysis demonstrated a PSEN1 mutation of phenylalanine to leucine at codon 283 (F283L). Case 2: Left Predominant (LP). LP was a 56 y.o. urban planner with left arm myoclonus and apraxia at initial presentation and left predominant akinesia and rigidity emerging 1 year later. Initial examination demonstrated impaired stereognosis and graphesthesia on the left. At last follow-up, he additionally had left arm and leg weakness, left facial droop, and left tongue fasciculations. Mood or behaviour was normal. LP's speech was slowed at onset, eventually becoming nonsensical. Based on these findings, RP met criteria for probable CBS2. Post-mortem confirmed Braak stage VI/VI Alzheimer's pathology. As with PR, LP demonstrated the same F283L mutation of PSEN1. Position-specific independent counts (PSIC) analysis yielded a score of 2.5, suggesting good likelihood of protein dysfunction resulting from this mutation.

Conclusions: This is, to our knowledge, the first description of an autosomal dominant case of AD resulting in the CBS phenotype, caused by a novel F283L mutation in PSEN1. Further, these cases, presenting on opposite sides of the body, illustrate how phenotypic heterogeneity can occur despite identical genotype.

Prescribing Practices in End-Stage Dementia

A. Baillod[1], L. Thorpe[2], S. Whiting[3], J. Richardson[3], A. Cribb[4,5], M. Davidson[6]. [1]University of Ottawa; [2]Psychiatry and Community Health and Epidemiology, University of Saskatchewan; [3]College of Pharmacy and Nutrition, University of Saskatchewan; [4]Saskatoon Health Region, Geriatric Services; [5]University of Saskatchewan; [6]Department of Psychiatry, University of Saskatchewan.

Background: Elderly nursing home residents often have multiple medical co-morbidities and are prescribed numerous medications. With the use of more medications comes the risk of adverse drug reactions due to pharmacokinetic and pharmacodynamic changes, as well as drug interactions. Previous studies have found a relation between polypharmacy and a higher number of care problems (falls, pain, or constipation). There are various criteria regarding medications that are potentially inappropriate in the geriatric population, such as the Beers criteria; however, there seems to be less known about the use of medications and nutritional supplements which are generally not considered harmful, but may no longer be providing benefit, and which may be worsening quality of life, particularly in late dementia.

Method: After appropriate ethics approval, we conducted a chart review on nursing home residents with advanced dementia (Fast Stage 7) living on dementia units at 4 nursing homes. De-identified data were sent to a clinical advisory team consisting of a pharmacist, a specialist in the use of nutrient supplements, a family physician with expertise in the care of the elderly, and a geriatric psychiatrist. The advisory team members completed standardized questionnaires regarding the appropriateness and potential problems with each medication and nutritional supplement, taking into consideration a clinical summary (prepared by the first author) on each study participant. A follow-up meeting with the advisory team reviewed and debated the results of the questionnaires and attempted to come to consensus decisions about the use of each medication based on the clinical context of each patient. Results were summarized by the first author.

Results: Consensus was achieved on many, but not all, of the individual medications prescribed, with differences related to the clinical experiences and specialty of the advisory team member. Many vitamins were prescribed at excessive doses, while other recommended vitamins were not prescribed at adequate doses, or frequency. Reasons for administration of

PRN medications were often not specified, contributing to the risk of prescribing of those medications for inappropriate reasons (such as using antihistamines for sleep or behavioural problems). Medications with a long time to benefit and significant adverse effects (such as statins) were prescribed in some patients, even those with short anticipated life expectancy and challenges with oral medication administration.

Conclusions: In end-stage dementia there are many factors to consider when determining which medications may or may not be appropriate. Determining medication appropriateness is simpler when a particular medication is known to have significant adverse effects with little benefit. Choosing appropriate medications is more complicated when the medication has few or mild side effects, but a long time to benefit. Many of these patients have swallowing difficulties and medications can contribute to overall burden of illness.

Factors Predicting Reaction to Diagnosis of Dementia: a Literature Review

A. Srivastava[1], M. Papadopoulos[2]. [1]St. Joseph's Hospital, Toronto; [2]Ontario Shores Centre for Mental Health Sciences.

Background: Reaction to a diagnosis of dementia among patients and caregivers varies. Factors predicting reaction to such a diagnosis in a clinical setting are, however, not well characterized. Understanding of the contribution of such factors, possibly including psychiatric and other co-morbidities, knowledge of dementia, and degree of social support, may help guide individualized approach to disclosure.

Methods: A comprehensive search of articles investigating reaction to a diagnosis of dementia was conducted.

Results: The majority of research is largely qualitative consisting of semi-structured interview and limited to small numbers of patients. Many earlier studies revolved around the decision to disclose a diagnosis of dementia. Only one study, of absent or mild dementia, used a validated scale administered prospectively.

Conclusions: Evidence outlining the factors contributing to reaction to a diagnosis of dementia is lacking. Only one study administered a validated scale, an unlikely component of routine interview and an uncertain outcome measure of reaction to diagnosis. There is a need to quantitatively explore the contribution of variables, (e.g., co-morbidity and educational level), including those gleaned on interview such as life reflection and strength of social support.