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Evidence-Based Interventions For Community-Dwelling Persons With Dementia

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Background/Objectives: Comprehensive mapping of evidence-based interventions for the health and supportive service needs of individuals with dementia is an important first step in capacity planning. A scoping review was undertaken to generate potential candidates for simulation and scenario modelling. We achieved these aims by identifying the most promising interventions for improving outcomes for persons living with dementia, care partners and the health system.

Methods: We investigated interventions representing eleven topics relating to the care and management of community-dwelling persons living with dementia. Primary outcomes of interest were: timing and rate of long-term care transition, hospitalization, economic evaluation, and quality of life and patient-centred measures. Scholarly articles were identified using electronic databases (e.g. MEDLINE and PsycINFO) and grey literature from relevant websites and expert consultation. Two reviewers independently screened results and abstracted data; a third adjudicated final inclusion. GRADE and Oxford Levels of Evidence were applied to assess strength of the evidence and evaluate recommendations for use.

Results: We screened 468 titles and abstracts and 152 full-text articles. Sixty-one studies published between 1985 and 2016, ranging from meta-analyses, systematic reviews, randomized clinical trials and cohort studies were included for synthesis. Four effective interventions were assigned a strong recommendation for use based on evidence of high-moderate quality and favourable effects in at least two or more outcomes relevant to our scoping review questions. Interventions achieved between 4.5 to 10 months of delayed time to admission to long-term care and approximately 20-40% reduced rate of transition. Positive benefits of interventions were consistently reported for mental health and quality of life of persons living with dementia and care partners, though their economic benefit and impact on hospitalization or emergency room department use were often mixed or unreported.

Conclusion: Our review identified that among the eleven community-based intervention types, only four: adult day programs; caregiver or care partner education programs; comprehensive community-based care; and, dementia case management or care coordination reported sufficient evidence to consider including in scenario modelling for dementia capacity planning.

Peripheral Oxidative Stress Markers Are Related To Vascular Risk Factors And Subcortical Small Vessel Disease

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Background: Oxidative stress and subcortical white matter hyperintensities (WMH) presumed to represent subcortical ischemic vascular disease (SIVD) of the small vessels, are commonly detected in older people with and without Alzheimer's disease (AD), but the relationship between SIVD and peripheral oxidative stress markers has not been assessed in patients with or without AD.

Objective: To study the relationships between serum oxidative stress markers and SIVD and/or AD, and to explore relationships between oxidative stress, vascular risk factors and WMH. **Methods:** Patients with varying degrees of WMH were recruited from memory and stroke prevention clinics into 4 groups: minimal SIVD (n=20), extensive SIVD (n=28), AD with minimal SIVD (n=13), and AD with extensive SIVD (n=12). Volumes of deep and periventricular WMH were delineated using PD/T2 and fluid-attenuated inversion recovery MRI at 3.0 T. Serum was collected and assayed for lipid hydroperoxides (LPH), 8-isoprostane (8-iso) and 4-hydroxynonenal.

Results: In a multivariate model, SIVD was associated with higher peripheral blood 8-iso (F_{1,72}=13.03, p=0.001) and LPH (F_{1,72}=6.08, p=0.016) concentrations while AD was not (8-iso F_{1,72}=0.04, p=0.851; LPH F_{1,72}<0.001, p=0.990). LPH concentrations were related to hypertension (F_{1,72}=7.30, p=0.009), and LPH mediated the effect of hypertension on deep (indirect effect=249.96, 95% bootstrap confidence interval [79.91, 557.69]) but not periventricular WMH

volumes. 4-hydroxynonenal was associated with hyperlipidemia ($F_{1,72}=4.47$, $p=0.038$), but not SIVD or AD.

Conclusions: Peripheral oxidative stress markers were related to subcortical small vessel disease and vascular risk factors but not to Alzheimer's disease. Lipid peroxidation mediated the impact of hypertension on damage to the deep subcortical white matter.

Dementia Talk App - Using Technology To Empower Caregivers In Managing Dementia Care At Home

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Background: Nearly 12% of Canadians are caregivers for a person who has dementia. Up to 90% of people with dementia (PWD) experience significant behavioural and psychological symptoms (BPSD) that challenge and upset caregivers. Currently, there is no easy way for caregivers to manage and track behaviour-related symptoms in the care recipient, making it difficult to improve care and share information across the circle of care.

Objectives: This presentation will discuss the development of a mobile application called the Dementia Talk App, an award winning App, designed to empower caregivers to manage and track behaviours in the person with dementia as well as enhance communication among care providers. The presentation will showcase key features of the App and share highlights from caregiver focus groups to demonstrate the importance of caregiver driven development process in creating meaningful and accessible digital solutions for clients and their caregivers.

Method: The study involves 15-20 participants, who have reviewed and trialed the app for a period of three weeks. The participants attended focus groups to discuss their experience and provide feedback about the app. The feedback was recorded through audio recordings and written notes. The transcripts were analyzed using the "framework analysis" approach, which is a standard method of qualitative data analysis.

Conclusion: This study will provide information that guides the modification and further development of the Dementia Talk App. The goal of the study is to refine the app in order to optimize its effectiveness in helping caregivers to track and manage behaviour-related challenges with the PWD.

Sporadic CJD And Cryptococcal Meningitis Masquerading As "Alzheimer's Dementia"

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We report two patients who were initially diagnosed to have Alzheimer's dementia, which on further investigation turned out to be CJD and chronic cryptococcal meningitis respectively.

Objective: A high index of clinical suspicion for Creutzfeldt-Jakob disease and Cryptococcal meningitis should be entertained in patients with subacute neurocognitive decline, even when imaging studies are unremarkable

Background: Case 1: A 77 year old lady presented to a geriatric psychiatrist with a 3 month history of cognitive decline, poor impulse control, paranoia, asterixis and inability to take care of her ADL. A diagnosis of Alzheimer's dementia with delirium was considered by the psychiatrist. Despite stopping the offending medications, and correcting electrolyte imbalance and insomnia, the symptoms got worse. Patient was seen by a Neurologist and the first EEG showed generalized slowing and the MRI showed minimal white matter disease. A repeat EEG showed BiPLEDS and spinal tap showed no evidence of bacterial, viral, fungal or mycobacterial infections. Patient continued to decline during the 3-week stay in the hospital showing evidence of paranoia, visual hallucinations, aphasia, multiple segmental myoclonus and progressive somnolence. A strong clinical suspicion of Creutzfeldt-Jakob disease was considered but family refused brain biopsy and preferred palliative care for her. Neurologist discussed about getting autopsy to look for pathogenic mutation to rule out familial CJD with family, and they agreed. Patient died 2 week later. The brain autopsy specimen showed spongiform changes in the gray matter, with severe involvement in foci of cortex and striatum. The specimen was analyzed by National Prion Disease Pathology Surveillance Center and reported sporadic CJD MM1. PRNP gene sequence showed 129 polymorphism: 129M/M with no pathogenic mutation.

Case 2: A 68 year old man with background history of Diabetes was diagnosed with Alzheimer's dementia about 1 year ago by a Neurologist elsewhere. Family was concerned about the rapid deterioration in cognition over a 3 month period marked by increasing short term memory loss, aphasia, difficulty recognizing faces, ataxia and falls. He showed short term memory loss, difficulty with working memory, apraxia and impaired executive functioning. In view of the subacute deterioration, a spinal tap was done and it showed Cryptococcus neoformans on PCR and subsequently on CSF culture. Screening for HIV, NMDA receptor and Voltage gated potassium channel antibodies were negative. MRI of the brain showed mild atrophy. Patient was treated with Intravenous Lipo amphotericin and Flucytosine for 4 weeks and subsequently with fluconazole with remarkable improvement

Conclusions: A High index of suspicion should be maintained in subacute dementia, even when it is labelled as Alzheimer's dementia. Such patients should get MRI of the brain and EEG . A spinal tap is indicated to look for cryptococcal meningitis or CJD. Paraneoplastic antibody and vasculitis screening may also be considered. In selected cases brain biopsy may be indicated.

Evaluative Measurements Used To Study Cognition In Persons With Central Nervous System Trauma

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Background/Objectives: Central nervous system (CNS) trauma - including traumatic brain injury (TBI) and traumatic spinal cord injury (SCI) - have been frequently reported as risk factors for cognitive decline and development of various neurodegenerative disorders including Alzheimer's disease. To quantify the risk of cognitive decline post-injury, evaluative measurements able to detect changes in cognition after CNS trauma over time are crucial. We aimed to provide a systematic consideration, description, and in-depth understanding of the strengths and limitations of evaluative measurements that were utilized in the assessment of cognition in patients with CNS trauma.

Methods/Overview: All English language, peer-reviewed studies published in English before March 2017 with prospective or retrospective data collection and a longitudinal design were retrieved through PubMed searches. Using a standardized form developed for a previous systematic review on measurements' properties, details of utilized measurements of cognition were extracted from original studies and manuals and evaluated using the Holmbeck et al. (2008) evidence-based assessment criteria.

Results: The searches yielded 23 measurements, categorized into either (i) global measurements of cognition; (ii) domain-specific measurements of cognition; or (iii) multi-domain measures, which include items (subscales) of cognition among other functions. Of all utilised measurements six were categorised as global measurements of cognition and the rest as domain-specific or multi-domain measurements. Measurements were used to capture patients' 'capacity', 'perceived ability', and/or 'cognitive activity'. There exists limited information on ability of majority of utilized measurements to detect cognitive change over time in patients with CNS trauma. Only 6 of the measures were able to capture overall cognition, majority (10) were focused on only one aspect of cognition.

Conclusions: CNS trauma-related deficits in language, perception, memory reasoning, and attention among other deficits

require a wide range of evaluative measurements to consider. The knowledge of evaluative properties of these measurements would allow researchers and clinicians to accurately compute the rates of cognitive decline in CNS trauma.

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Understanding The Needs Of People With Young Onset Dementia: Process, Products And Partnerships

M. Schulz. Alzheimer Society of Canada.

Background: Young onset dementia (YOD) is defined as dementia diagnosed before the age of 65. YOD accounts for 2-8% of all dementia cases (World Alzheimer Report, 2015). Individuals with YOD face many unique difficulties starting with obtaining an accurate diagnosis, which can cause considerable stress for the individual and their family (Baptista, 2016). In addition, the personal and social consequences of YOD differ from those experienced by individuals diagnosed with dementia later in life. A lack of knowledge about YOD exists among health and social care providers (HCP) which adds to the difficulties and lack of available support. The Alzheimer of Canada (ASC) conducted two projects to get a better understanding of the YOD experience in order to address the gaps in current knowledge and to improve the experience of living with YOD.

Method: ASC conducted a gap analysis regarding available learning and support resources for individuals with YOD. As part of the analysis, advice and feedback was gathered from those with lived experience. ASC also engaged persons with YOD to plan and deliver a webinar for HCP about living with YOD. The goals of the webinar were to raise awareness of YOD and to provide strategies to help HCP support individuals with YOD.

Results: The analysis revealed that there is a lack of available information to serve the needs of this population. Specifically there is a need to: 1) develop resources for youth who support persons with YOD; 2) create support groups specifically for YOD; and 3) investigate web based learning and support resources for persons with YOD, their caregivers and their children. In addition, as a result of persons with YOD planning and delivering the webinar, ASC gained valuable lessons on shared leadership and project logistics.

Conclusion: Results from these projects will inform the development of resources for both HCP supporting individuals with YOD, and for people with YOD and their caregivers. In addition, lessons learned from involving people with YOD

will inform the process that ASC follows in engaging people with YOD throughout the organization.

Bilateral Prefrontal High-Frequency rTMS For Gait Impairment In Seniors With Executive Dysfunction: Preliminary Results

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Background/Objectives: A significant portion of aging disabilities arise from two major syndromes: cognitive and mobility impairments. Cognition and mobility declines have been linked to specific central nervous system changes which can be i) mediated by neurodegeneration, vascular factors, and the genome; and ii) moderated by physical activity, mood, micronutrients, and socialization. Emerging evidence demonstrates that executive dysfunction is an early phenomenon in the pathway to mobility disability and subtle changes in executive function are independently associated with future falls. Repetitive transcranial magnetic stimulation (rTMS) is a safe approach to modulate the excitability of cortical areas and remote areas connected to it. This allows “electrodeless” probing of cortical networks. Repetitive application of the magnetic field to the cortex results in enhancement or inhibition of cortical excitability depending on the frequency or strength of the field applied. Studies have shown the potential for rTMS to enhance motor learning and working memory in healthy controls and patients with neurological and psychiatric disorders. rTMS has been used for the treatment of symptoms in neurodegenerative disorders, and neurocognitive rehabilitation. Also, there is evidence for the neuroplastic effect of rTMS in motor and prefrontal cortex from animal and human studies. However, rTMS has not yet been explored as an intervention to improve prefrontal cortex mediated gait in seniors. This pilot study aims to explore the effect of high-frequency rTMS applied to prefrontal areas bilaterally on prefrontal cortex mediated gait parameters in seniors with executive dysfunction.

Methods: Forty seniors (60 plus) with executive dysfunction (MoCA EIS=8-11) will be recruited from geriatric medicine/psychiatry clinics in London Ontario. Exclusions include severe depression, diagnosed musculoskeletal and neurological disorders or medications affecting gait, diagnosed Alzheimer’s disease, in addition to rTMS exclusions. Baseline clinical, cognitive and gait assessments will be done after successful screening and patients will be randomized to active vs. sham rTMS (45% tilted coil). Patients will receive 5 active or sham consecutive daily sessions of high-frequency (20 Hz, 2000 pulses) rTMS to the right then left prefrontal areas. Only the operator of the TMS machine will be aware of the study assignment. Cognitive and gait measures are

repeated immediately after the last session (day 5) and at day 12 follow-up.

Results: At the time of submitting this abstract we have data on 6 participants in the study (3 active and 3 sham). Preliminary analysis shows a modest but significant improvement in stride-time variability during dual task gait in the active compared to the sham group. Also, we noticed an improvement in delayed recall (RAVLT-20 min) and MMSE at 12 weeks.

Conclusions: Our preliminary results suggest that bilateral prefrontal high-frequency rTMS is a promising tool in improving prefrontal cortex mediated gait impairment in seniors. This pilot study will allow us to measure the effect size of this intervention, which will allow the design of a well-powered study to confirm the utility of rTMS in treating pre-frontal cortex mediated gait impairment in seniors. This has important care implications given the accumulated disability caused by cognitive and mobility impairment in seniors.

Province Wide Implementation Of Behaviour Supports Ontario (BSO): Lessons From Success Of Embedded Teams

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Background: Behaviour Supports Ontario (BSO) was launched by the province in 2011 to enhance the healthcare for Ontario’s seniors, their caregivers and families living and coping with responsive behaviors associated with dementia and other neurological conditions. Program implementation models varied across and within the Local Health Integration Networks (LHINs). Our initial study identified BSO teams embedded in LTC homes as out-performing mobile teams across all key performance measures (Grouchy, et al. 2017).

Methods: The objective of this follow-up study was to assess the sustainability of the performance of embedded teams. Our primary outcomes included a re-assessment of key metrics from provincial administrative databases to determine whether gains in performance would continue to persist in the fourth year of program implementation. This involved significance testing of changes in restraint and inappropriate use of anti-psychotics indicators and of weighted average InterRAI aggressive behaviour scale (ABS) scores for each BSO model for 2015/16, the fourth year of implementation. This paper also assesses factors related to the sustainability of the BSO program related to program itself (e.g., intervention adaptability, effectiveness), the LTC home context (e.g., leadership) and the health system (e.g., provincial funding). Our review of recent literature examined the possible contribution of these factors in managing responsive behaviours and identified areas for further research.

Results and Conclusions: The follow-up study provided evidence of BSO embedded teams continuing to outperform mobile teams in relation to the reduction of restraints only ($p < .005$). Health system factors such as new BSO funding and provincial leadership in reducing the inappropriate use of anti-psychotics were shown to have an impact across all BSO models. Evidence identifying the effectiveness and sustainability of person-centred interventions such as training and skill-development, building psychosocial interventions into routine care, etc. is generally limited in the literature. A more systematic review of the effectiveness of specific interventions at various stages of dementia associated with BSO is required to support sustainable resident outcomes.

Association Of Motoric Cognitive Risk Syndrome With Cardiovascular Diseases And Risk Factors: Results From A Cross-Sectional Study

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Background: Motoric Cognitive Risk (MCR) syndrome is defined as the combination of objective slow gait speed and cognitive complaint, in the absence of dementia. MCR syndrome, which is a pre-dementia syndrome, is a predictor of vascular dementia. The association between CardioVascular Diseases and Risk Factors (CVDRF) and MCR syndrome has not been extensively studied. This study examines the association of CVDRF and MCR syndrome in the European older community-dweller population.

Methods: In this cross-sectional study, a total of 238 older French community-dwellers without dementia (71.4±3.6 years; 37.4% female) were recruited, from the “Gait and Alzheimer Interactions Tracking” (GAIT) study. Cardiovascular diseases and risk factors examined were; coronary heart disease, cerebrovascular disease, peripheral vascular disease, rheumatic and congenital heart disease, deep vein thrombosis and pulmonary embolism, hypertension, diabetes and obesity. Moreover, covariates such as age, sex and number of therapeutic classes taken daily were considered.

Results: The prevalence of MCR syndrome in the current original study was 16.8% (n=40). Participants with MCR syndrome took more medications ($P=0.010$), had a greater mean value of BMI ($P<0.001$) and waist hip ratio ($P=0.006$), which was also more frequently abnormal ($P=0.013$) compared to non-MCR participants. They also had a greater incidence of high blood pressure ($P=0.018$) and diabetes ($P=0.009$) compared to non-MCR participants Multiple

logistic regressions reported that there was an association between MCR syndrome and both abnormal waist hip ratio (Odd ratio (OR) >2.8 with $P<0.020$) as well as high blood pressure (OR >2.5 with $P<0.025$). An association between MCR syndrome and diabetes ($P=0.022$) was also reported in the logistic regression, though this association was not confirmed in the backward regression model.

Conclusion: MCR syndrome was found to be associated with multi morbidities and CVDRF in the European (France) population. These findings suggest that a vascular mechanism may underlie the pathophysiology of MCR syndrome.

Using The Communication Enhancement Model To Communicate With Elderly Patients

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With the increasing complexity of healthcare, older patients are faced with multiple risks associated with hospitalization; these include the loss of function related to physical illness, immobility and cognitive decline. Enhanced communication is key to reducing risks, optimizing patient safety, improving the quality of life and minimizing challenging behaviours. This paper outlines the communication predicament older adults face while in the hospital and proposes the Communication Enhancement Model (CEM) as a framework between care providers and patients to minimize risks and establish positive interactions. Insights from prior research are used to demonstrate what older patients experience and ways to reduce inadequate communication encounters. Before meeting, the health care provider may see the name, age and diagnosis of the patient. Inferences regarding intellect and competence of the patient are made prior to the meeting. Additional inferences are made after seeing the patient and care providers adjust their communication styles accordingly. This may be appropriate accommodation, for example, speaking louder if the patient is hard of hearing. However too often older patients face a communication predicament where care providers tend to use inappropriate accommodation such as patronizing speech. Examples include speaking slower, using an exaggerated tone and simplified vocabulary. This action reduces self-esteem, reinforces negative stereotype behaviours and limits future productive conversations. It is proposed to use the Communication Enhancement Model as a framework in the hospital setting. This model is based on the Health Promotion Framework consisting of three domains: self-care promoting independence, mutual aid which encourages collaboration and healthy environments which implies appropriate resources are accessible. Care providers gain a different perspective as a result of using the CEM. A more responsive communication encounter is based on individual needs, collaboration and resources such as technical aids

and written material to facilitate the interaction. The patient feels respected and is more willing to actively participate which leads to a more thorough health assessment care plan. The CEM leaves both the patient and care provider feeling empowered and with increased satisfaction. The strengths of the patient are not ignored. The patient and care provider emerge from this experience better equipped to deal with the next encounter. The communication enhancement model can be integrated into practice as a framework in hospitals to eliminate negative stereotypes and ineffective communication thereby making patient interactions a more positive experience. This promotes patient safety by optimizing communication encounters, improves quality of life and empowers both patients and staff.

Exploring The Patterns Of Change On The MoCA And Its Subscores In People With Subjective Cognitive Decline

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Memory complaints are common among the elderly population, and the underlying diagnosis can range from subjective cognitive decline (SCD), to mild cognitive impairment (MCI), and to dementia. SCD is diagnosed in people who note a change in their memory, are concerned about it, but score in the normal range on screening neurocognitive tests. People with MCI have subjective and objective changes in their memory shown on screening neurocognitive tests, but their instrumental activities of daily living are intact. At present, we are unable to predict which individuals with SCD will progress to MCI or remain stable at SCD.

The Memory Index Score (MIS), first described in 2012 by Julayanont, Nasreddine et al., is a subscore derived from the MoCA by giving 3-points for free recall, 2-points for category cued recall and 1-point for multiple choice recall to each of the five registered words. As an expansion to the MIS, we scored the Memory Recall Index Score (MRIS), totalling 25-points, by adding 10-points from the Memory Registration Score (MRS), scored by five-word registration done twice, to the 15-points MIS described above. This project explored the patterns of MoCA subscores in the selected participants to look for predictive patterns of progression from SCD to MCI.

In 2009, we began an REB-approved study (Case Finding - CF) which used newspaper advertisements to recruit people who were concerned about their memory. CF-participants were followed at various time-points using neurocognitive tests and other questionnaires. In this study, participants with more than one visit, a 1st visit MoCA score of 26 or greater, and a 1st visit clinical suspicion of SCD by case conference (MB) were selected. Then, selected participants were

categorized as SCD (stable) or MCI (progressed) based on their subsequent MoCA scores, with 26 or above for stable-SCD and 25 or below for MCI. A third group was defined for participants who scored in both ranges and were in the SCD range at the most recent visit. The results from Two-Tailed T-tests assuming unequal variance showed that the scores on the MRIS were significantly different between the SCD and MCI group at the time of progression to MCI (23.6 vs. 18.5, $p < 0.01$), but their scores on the MRIS were not differentiable at the 1st visit (22.2 vs. 21.8, $p = 0.49$). This difference was facilitated primarily by the MIS (13.7 vs. 9.3, $p < 0.01$), not the MRS (9.9 vs. 9.2, $p = 0.01$).

In conclusion, the MoCA subscores did not predict progression from SCD to MCI at 1st visit in our study population, which is limited by the availability of longitudinal data because many participants only attended CF twice. We anticipate that with longitudinal data and larger sample sizes, predictive patterns may become apparent because the scatterplots of the SCD, MCI and fluctuating groups suggest a temporal relationship with a MIS drop preceding a MRS drop on the MoCA subscores as cognitive decline progresses.

The Downstream Role Of Dietetics: Registered Dietitians In Dementia Care In Rural And Urban Long-Term Care Contexts

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Background: Residents of long-term care (LTC) homes who have dementia are at an increased risk for malnutrition and its accompanying poor health outcomes (e.g., impaired immunity, breakdown in skin integrity). Nutrition care, ranging from provision of therapeutically appropriate, high quality menus to individualized resident nutritional care plans, is crucial in addressing malnutrition and enhancing resident quality of life. Registered dietitians (RDs) are recognized experts in nutrition care, and key members of interdisciplinary LTC teams. Less is known, however, about the role of RDs related specifically to dementia care within the LTC context. Given the high prevalence of dementia in LTC, this is a critical area of investigation.

Objectives: We examined the role of RDs in providing care to residents with dementia in rural and urban LTC contexts to gain an understanding of the challenges and opportunities for dietetic practice in dementia.

Methods: An exploratory study was conducted to better understand the role of RDs in providing nutrition care to residents with dementia in the LTC setting. A total of 27 RDs working in urban and rural LTC homes in 9 provincial health regions participated in in-depth interviews. The median age of participants was 40 (23-56), the median number of years as

a RDs was 15 (1-31), and the median number of years worked in LTC was 9 (0.5-31).

Findings: While strong commonalities were demonstrated regarding philosophy of care and practice needs, roles and practice responsibilities varied between regions, and often between each LTC home. Analysis yielded a grounded theory, ‘the downstream role of dietetics’, comprised of 4 interconnected themes: RD practice and expertise, resources, relationships, and ‘siloing’ of care. Participants described challenges experienced, strategies used, and opportunities for improvement experienced by RDs in pursuing high quality nutrition care for persons with dementia in LTC.

Conclusions: From the perspective of RDs, increased expertise and confidence in dementia care is needed. Advocating to be part of the care team in a more upstream manner is required but limited in many ways. Nutrition care for LTC residents with dementia could be enhanced through RD involvement earlier in the trajectory of the disease process.

From Academic Symposia To Local Youth Initiatives: The Spare A Thought For Dementia Campaign

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In what ways can the research community mobilize knowledge and information about dementia to broader public spheres? What roles do youth, educators, and community organizations have in creating more awareness about Dementia.

Extending beyond symposia and academic settings, the Spare a Thought for Dementia campaign seeks to highlight local initiatives and tell stories about youth engagement within the community. The objective is to raise youth awareness of dementia and its broader impacts on society. Spare a Thought for Dementia was a direct result of a two-day symposium, hosted by Dr. Kristine Newman at Ryerson University’s Daphne Cockwell School of Nursing, which brought together scholars, youth, and community organizations to discuss perceptions, efforts, and engagement opportunities. As a result of the symposium, we have formed the Thoughts for Dementia Collaborative, consisting of caregivers, youth, and community leaders invested in engaging the high school student population across Ontario.

Our mission is to promote awareness and advocate for persons with dementia and their youth care partners by:

- Providing resources and information that contributes to a better understanding of dementia;
- Profiling experiences of youth as care partners of persons living with dementia;
- Encouraging youth to engage with local communities and become advocates;

- Supporting local initiatives surrounding dementia care, and;
- Engaging with organizations that contribute towards dementia awareness within the community.

The Spare a Thought for Dementia campaign was developed to build partnerships with communities, schools, and other stakeholders to discuss needs, engagement opportunities, and ways to disseminate knowledge. This campaign is a key example of the potential ideas, collaborations, and initiatives that can stem from academic environments given the right circumstances.

Our presentation seeks to roadmap our journey from symposia into local communities through youth engagement. We will share highlights and challenges in developing the Spare a Thought for Dementia campaign, ranging from consultations, ideation, and design. By sharing our journey, our goal is to solicit feedback for improvement and to gather insights on other successful initiatives that can inform our mission. We will present our progress including our early stage strategies, and future goals and outreach plans in hopes of sparking discussions around youth engagement and knowledge mobilization strategies.

Relearning Of Functional Vocabulary In Primary Progressive Aphasia: Can New Technologies Be An Ally?

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Background/Objectives: Primary progressive aphasia is a neurodegenerative disorder in which a gradual deterioration of communication is observed. Therefore, the impact of the disease on the social life and autonomy of the patients is significant. In the semantic variant (SPA), the core feature is the impairment of semantic knowledge, thus compromising essential language skills, including naming of objects used in everyday life. Currently, long-term services of speech-language therapy are not available for those patients in the province of Quebec. New technologies, including smart tablet, are an innovative way to provide rehabilitation of language impairment, respecting the current logistical and financial constraints of the healthcare system. The aim of this study is to investigate the effectiveness of a therapy self-administered with a smart tablet to improve naming of functional vocabulary in SPA.

Methods/Overview: Two participants with SPA took part in the study. An ABA design with multiple baselines was used to compare naming performances in four equivalent lists: 1) functional words chosen with the participants, 2) words chosen according to the traditional approach, 3) words exposed but not trained and, 4) untrained words.

The treatment was self-administered at home, at a rate of 4 times/week for 4 weeks.

Results: For both participants, the treatment induced significant improvement for trained words. Moreover, this improvement was still observed two months after the end of the treatment. An advantage of functional vocabulary over vocabulary chosen according to the traditional approach was observed.

Conclusions: This study showed that treatment self-administered with a smart tablet helped to improve naming of functional vocabulary in two participants with SPA. More studies are needed to confirm the effectiveness of smart tablets to improve naming, but it is certainly a promising avenue to explore in the future.

Therapeutic Targeting Of Mitochondria With The Anti-Cancer Drug, Nilotinib, In Alzheimer's Disease

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Objectives: Alzheimer's disease (AD) is the most common form of dementia and affects millions of people worldwide. AD is characterized by the development of neurofibrillary tangles (NFTs) and accumulations of amyloid beta (AB) in brain tissue; however, AD is considered a multifactorial disorder and seemingly involves several different etiopathogenic mechanisms that can affect mitochondrial function. The earliest deficits in the pathological progression of AD actually seem to be caused by impaired mitochondrial function - before the robust appearance of AB and NFTs. In this study, we investigated the effect of the FDA-approved anti-cancer drug, Nilotinib, on mitochondrial function and evaluated mitochondrial protein subunits expression.

Methods: Astroglial cells were isolated from cortical tissue of 7 day old C57BL/6 mice (background control) and 3xTg mice, a transgenic model of AD. Further, the oxygen consumption rate (OCR) was measured in control vs. 3xTg cells utilizing the XF24 analyzer after 24 hrs. dose-dependent treatment with Nilotinib (10 nM-1000 nM). Additionally, Western blots were used to detect expression levels of key proteins involved in mitochondrial function: NF- κ B p50/p105/p65/P75 subunits, MnSOD, pCREB, and select OXPHOS complex protein subunits in astroglia cells in the presence and absence of Nilotinib treatment.

Results: Our data shows Nilotinib improves mitochondrial function putatively through the up-regulation of transcription factor nuclear factor kappa B (NF- κ B), also via changes associated with antioxidant manganese superoxide

dismutase (MnSOD), cAMP response element-binding protein (pCREB), and oxidative phosphorylation (OXPHOS) signaling. Both basal and maximal respiration levels were significantly increased ($p < 0.05$) after a 24 hr. treatment with 100 nM Nilotinib in astroglial cells from AD mice, but not in control cells. Additionally, we showed that Nilotinib significantly increased protein expression levels of NF- κ B p50/p105 subunits, and pCREB, and MnSOD in AD cells and NF- κ B p50/p105 subunits and pCREB in control cells. Moreover, Nilotinib increased expression of mitochondrial complex (I-V) protein subunits in 3xTg cells, but not in control cells.

Conclusions: The results of the current study highlights a putative role for Nilotinib in regulating astroglial bioenergetics in early state AD and suggests that energy metabolism may be a critical therapeutic target for preventing or treating AD.

The Impact Of Interprofessional Care On The Management Of A Complex Wound On An Inpatient Geriatric Psychiatry Unit

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Background: Older adults are at risk of skin breakdown due to changes in skin, mobility, nutrition, continence, and medical comorbidities (Wounds Canada, 2017). Management of a pressure injury can be challenging in older adults but more so in persons with advanced dementia presenting with responsive behaviours, impaired communication, ongoing incontinence, poor nutrition, and decreased mobility.

Overview: We would like to present a case study on a patient with advanced dementia who had been on the Geriatric Psychiatry unit for over 2 years. During that time, staff observed increased gait disturbances, impaired executive functioning, decreased oral intake and increasing incontinence associated with the patient's advancing dementia which contributed to his increased risk of skin breakdown. Despite ongoing skin surveillance, he developed a Deep Tissue Injury on his coccyx. Over the following 2 months, an interprofessional team worked to manage the wound and associated contributing factors. Some of the difficulties encountered by nursing staff included the location of the wound and the patient's incontinence patterns which caused the wound dressing to be contaminated and require frequent care. Further complicating the provision of care included the patient's behavioral and pain issues making treatment adherence an ongoing challenge.

Results: The patient was subsequently discharged to LTC with the wound almost healed.

Conclusion: The focus of our poster presentation will be on the management of this patient and his wound by the interprofessional team utilizing best practices according to the needs and preferences of the patient and practice setting (RNAO, 2016). We will present our challenges, what strategies were effective and lessons learned from this case.

An Evaluation Of The Efficacy Of Behaviour Therapy On Deferring Emergency Department Visits As A Result Of Behaviour In Dementia Care

N. Feltz. The Royal Ottawa Mental Health Centre.

The Champlain Behavioural Support System received enhanced funding in August 2016 from the Behavioural Supports Ontario (BSO) initiative for BSO staffing resources to long-term care homes (LTCHs) and to other health service providers. With direction from the Champlain Local Health Integrated Network (LHIN) came the development of the Behaviour Therapy program within the Royal Ottawa's Geriatric Psychiatry Program. The Behaviour Therapists (BTs) are now integrated within a collaborative model of service delivery in the Geriatric Psychiatry Outreach and BSO teams in LTCHs across the Champlain LHIN.

Behaviour Therapy aims to provide effective evidence based and non-pharmacological services to maintain and/or improve the quality of life for the populations in which they serve. Therefore, the purpose of the current evaluation is to isolate BSO data recorded by the BTs, in an attempt to identify the efficacy of the BT role at deferring emergency department (ED) visits for behaviour within the collaborative model of service delivery.

New to Dementia care, this discipline is yielding preliminary results in effectively addressing socially significant behaviour as part of a collaborative model of service delivery. Further isolation of the independent variables responsible for deferring ED visits is necessary to hypothesize BT efficacy within the program's collaborative model of service delivery. However, the BTs have been effective thus far in maintaining near zero rates of ED visits while triaging the increasing number of BT referrals. An exhaustive evaluation of this new role and program is ongoing.

Applied Behaviour Analysis (ABA) For Dementia Care: Welcoming Behaviour Therapy Into Geriatric Psychiatry

A. Loncar, N. Feltz. The Royal Ottawa Mental Health Centre.

The Champlain Behavioural Support System received additional BSO funding August 2016, and with direction from Champlain LHIN came the development of the Behaviour Therapy (BT)

program at the Royal. The Behaviour Therapists are integrated within the collaborative model of Geriatric Psychiatry Outreach and BSO teams in long-term care homes (LTCHs) across the Champlain LHIN; a new discipline within this field.

Behaviour Therapy provides evidence based services to improve the quality of life for the populations in which they serve. It relies on the evidence based science of Applied Behaviour Analysis (ABA) and the ethical guidelines of the Behaviour Analyst Certification Board (BACB) to assess, modify, and monitor ongoing behaviour change. The principal interests of Behaviour Therapy services include operationalizing operant behaviour, using objective data to monitor the behaviour of interest, assessing the current environment influencing said behaviour, and creating treatment plans to modify the environment, thus promoting positive behaviour change. This discipline within Geriatric Psychiatry embodies a non-pharmacological and collaborative model approach, while focusing on building capacity within the LTCHs to address socially significant behaviour, and improve the quality of life for residents living with dementia.

New to Dementia care, this discipline is yielding promising results in effectively addressing socially significant behaviour using evidence based non-pharmacological means. An exhaustive ongoing evaluation of this new program is underway.

A Driving Cessation Decision-Making And Coping Framework And Toolkit For People With Dementia

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Background: Decision-making about driving and transitioning to non-driving is a challenge faced by all drivers diagnosed with dementia and their families. Driving cessation programs typically target older drivers broadly, and in doing so neglect important considerations unique to drivers with dementia.

Objectives: To design an evidence-based, multi-component framework and toolkit for interventions that support drivers with dementia and their caregivers in navigating the process of driving cessation.

Methods: We employed a range of knowledge creation and synthesis activities to inform the development of this

framework, including literature reviews, a meta-synthesis and on-going qualitative methods to explore the perspectives of key stakeholders (e.g., healthcare providers, family caregivers). Tools and resources that address driving cessation were also collected, reviewed and organized according to content areas.

Results: A revised framework was designed that organizes driving cessation and corresponding interventions according to different thematic content areas (e.g., awareness-raising, practical planning, mobility and emotional support). Identified tools have been organized into key areas of the framework and will comprise a toolkit aimed at informing health professionals and other stakeholders about how to support drivers and former drivers with dementia and their caregivers with driving cessation decision-making and coping.

Implications: This research provides healthcare providers with an intervention framework and toolkit to support driving cessation in persons with dementia and their caregivers. Next steps include evaluating the implementation process of the intervention framework and toolkit in community settings in Ontario with the aim of informing more widespread implementation and adaptation across Canada.

Developing A Family-Centered Care Model For Alzheimer's Disease: A Scoping Review Of Family-Centered Care Models

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Background/Objectives: Families play an important role in the delivery and quality of care for persons with dementia. The need for family-centered care, for all patient populations, has been greatly advocated in published literature, as family-centered care models have the potential to improve the well-being of patients and family caregivers. To date, no family-centered care model has been recommended for caring for persons with Alzheimer's disease. This study aimed to systematically review existing models of family-centered care to determine the 1) key components of the models/interventions and 2) methods of delivery (including, who delivers the model and where).

Methods/Overview: We used scoping review methodology guided by Arksey & O'Malley (2005) to gather and summarize the existing literature on family-centred care models. A systematic review was conducted of family centered care models for all populations. MEDLINE, PsycINFO, CINAHL and EMBASE were searched from 1990 to May 2017. The final 55 articles were reviewed in detail and a codebook was developed in an attempt to uncover commonalities and

differences amongst the models. Data was presented as a narrative synthesis.

Results: 55 papers were included in this review. No included models were developed specifically for caring for persons with Alzheimer's disease. Most family-centered care models are developed for pediatric patient populations. Model elements were fairly consistent across the pediatric and adult literature. Five themes were determined from the studies: defined outcomes, shared decision making, uniqueness of individual families, delivery of support and policies and procedures.

Conclusions: The systematic review suggests that families should be included at the center of care. In particular, family-centered care models that are adapted for caring for persons with Alzheimer's disease incorporate an interdisciplinary team and empower family members to take on a more active role in care plans through disease-specific education, open communication and flexible care plans. It is our intention that this review enhances the understanding of current family-centered care models in hopes that can be used to help advance care practices for persons with Alzheimer's disease and their family.

Physical Activity Participation In Mild Cognitive Impairment And Alzheimer's Disease

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Background: Alzheimer's disease (AD) is the most common contributing factor to dementia, for which there is no currently approved disease-modifying therapy. In the absence of a cure, strategies for reducing the onset and progression of AD are needed. Physical activity (PA) has the potential to play a role in these strategies, but despite its cognitive health benefits, older adults (aged ≥ 65 years) both with and without cognitive impairment underutilize PA as a health behaviour. Little is known about the perceptions, experiences, and beliefs of older adults with mild cognitive impairment (MCI) or AD influencing their participation in PA. Creating this knowledge is necessary to develop and implement evidence-informed health promotion initiatives using PA for the management of cognitive impairment in older adults.

Research Question: An interpretive phenomenological approach was taken in this study to explore the phenomenon of PA participation in older adults with MCI or AD by asking, "What are the perceptions, experiences, and beliefs of community-dwelling older adults with MCI or AD and their caregivers concerning PA as a health behaviour?"

Methods: Dyads consisting of one community-dwelling adult aged ≥ 65 years diagnosed with MCI or mild-to-moderate AD and one familial caregiver were recruited from a cognitive neurology clinic at an urban teaching hospital. Purposive sampling was used to recruit a convenience sample including individuals with a diversity of cognitive, PA, and motivational profiles. Semi-structured interviews were used to explore the PA perceptions, experiences, and beliefs of dyad members. Interviews with individual dyad members were audio-recorded, transcribed verbatim, and analyzed using qualitative thematic analysis. Data on participant demographics, weekly PA levels, and apathy levels were collected using questionnaires.

Results: 10 care dyads ($n=20$) were recruited over an 8 month period. Thematic analysis of interview transcripts yielded four emergent themes: (1) PA as a meaningful activity, (2) Feeling is more important than thinking, (3) Participation is possible despite dementia, and (4) Caregivers as PA enablers. Theme 1 relates to how older adults with MCI or AD and their caregivers define PA and conceptualize it as a health behaviour. Theme 2 captures the recognition of older adults with MCI or AD that there are cognitive benefits associated with PA, but that these longterm health benefits are less motivating than immediate PA benefits they can personally perceive. Theme 3 speaks to the desire of older adults with MCI or AD to be active and how they are able to do so despite the unique barriers they face related to cognitive impairment. Theme 4 pertains to the influential role of the dyad relationship on PA participation.

Conclusions: Findings from this thesis address a gap in the literature concerning the value and use of PA for health promotion in community-dwelling older adults with cognitive impairment. These findings highlight opportunities for future research and knowledge translation priorities for applying PA as a health promotion strategy in this population.

Fronto-Subcortical Hypoperfusion In Presymptomatic Ftd Is Associated With Behavioral Measures, But Not Cognitive Deficits – The Genfi Study

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Background: Frontotemporal dementia (FTD) is a highly heritable neurodegenerative condition. Genetic mutations in the three genes account for the majority of genetic FTD: Chromosome 9 open reading frame 72 (C9orf72), progranulin (GRN), and microtubule-associated protein tau (MAPT).

We hypothesize that in pre-symptomatic mutation carriers, regional hypoperfusion in frontal regions will associate with behavioral and cognitive measures.

Methods: In the large multi-centre pre-symptomatic genetic FTD study (GENFI), we previously identified “regions of interest (ROIs) of cerebral hypoperfusion” using a voxel-based analysis (VBA) of Arterial Spin Labeling MRI data from presymptomatic mutation carriers ($n=95$; C9orf72=30, GRN=48, MAPT=17) vs. non-carrier controls ($n=100$). These hypoperfusion ROIs were then associated with cognitive and behavioural measures using multiple linear regression. Specifically, in these models, the dependent variables included: global cognition (Mini-Mental State Examination), executive function (Trail making test A and B), language (Boston naming and verbal fluency), logical memory (immediate and delayed recall), working memory (forward and backward digit span), and behavioural measures (Cambridge Behavior Inventory [CBI]). Analyses were repeated after stratifying on mutation, and all models were adjusted for age, sex, and education.

Results: The hypoperfusion ROIs in carriers identified from the VBA included: paracingulate, orbitofrontal/insula, frontal pole (right), putamen, frontal pole (bilateral), and middle frontal gyrus/inferior frontal gyrus/superior frontal gyrus (MFG, IFG, SFG). No associations were observed between ROIs and cognitive domains in carriers or non-carriers. In the ROI-behavior analyses using CBI score, significant interactions were observed between cerebral perfusion and carrier-status across the ROIs. In carriers only, hypoperfusion in the paracingulate region [β 0.16 (95% CI:0.23,0.04) $p < 0.001$, p -interaction < 0.001], frontal pole (right) [β 0.14 (95% CI:0.06,0.22) $p < 0.001$, p -interaction 0.01], putamen [β 0.20 (95% CI:0.06,0.34) $p = 0.006$, p -interaction =0.01], frontal pole (bilateral) [β 0.14 (95% CI:0.06,0.22) $p < 0.001$, p -interaction 0.008], and MFG/IFG/SFG [β 0.13 (95% CI: 0.06,0.21) $p < 0.001$, p -interaction 0.01] was strongly associated with behaviour features. No ROI-behavior associations were observed in non-carriers. In subsequent mutation stratified analyses, we found that observed associations were driven by MAPT carriers.

Conclusion: Cerebral hypoperfusion within frontal-subcortical regions in presymptomatic FTD is associated with early behavioral changes but not with cognitive deficits.

Canadian Dementia Priority Setting Partnership: The Top 10

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Background/Objectives: In health research, scientists typically set the research priorities. However, there is now increasing recognition – including among advocates, researchers and research funding organisations – of the need to incorporate the experiences and insights gained from living with a condition, including in the research priority setting process. The Canadian Dementia Priority Setting Partnership asked Canadians about their research questions related to living with dementia and dementia prevention, treatment and diagnosis. The objective was to create a list of dementia research priorities that address these areas and reflect the views of Canadians with personal or professional experience of dementia.

Methods/Overview: The study used the methods of the James Lind Alliance. The work was overseen by a Steering Group (people with personal and/or professional experience of dementia working with the study team). The process comprised a series of steps: 1) A questionnaire for individuals with dementia, friends, family and caregivers, health and social care providers and others was circulated across Canada, with support from Alzheimer Societies in Canada as well as other partner organizations. 2) The responses were categorized and refined, then checked against existing research evidence. 3) The list of research questions was then prioritized through a two-stage process (an interim prioritization survey and an in-person prioritization workshop) to produce the “top ten” Canadian dementia research priorities. Persons with dementia were engaged in the research process, including in the Steering Group, reviewing and advising on study procedures, recruitment for the questionnaire, data analysis, and dissemination of results.

Results: 1217 individuals and groups submitted over 8200 responses. Responses were distilled into a consolidated list of 79 questions about dementia. 249 individuals and groups then participated in the interim prioritization survey and, from this, a short-list of 23 questions was then discussed at a workshop in Toronto (June 2017) which brought together participants from across Canada: persons with dementia, friends, family and caregivers and health and social care providers. The top 10 research priorities are now being shared with researchers and research funding organisations so that they can incorporate these priorities into their dementia research and research funding agendas.

Conclusions: Dementia research stakeholders have a set of priorities, developed by engaging Canadians with personal or professional experience of dementia, to inform their future and ongoing work.

Creating Dementia Friendly Emergency Departments: Improving Quality And Safety Of Care In Emergency Departments For People Living With Dementia

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Background: People living with dementia typically live with one or more co-morbid health conditions, which makes them frequent users of acute health services. People living with dementia commonly have poor health and well-being related outcomes after hospitalisation and have a higher risk of experiencing a safety issue while in hospital, including risk of delirium, falls, secondary infection, deconditioning, medication errors, and inappropriate intervention. The emergency department (ED) is a particularly challenging environment for people with dementia as the physical environment can be distressing and disorientating, processes are not designed for older people with complex health needs, and cognitive impairments may complicate discharges and transfers. Creating dementia friendly EDs can reduce the risk of avoidable or iatrogenic harm and contribute to improved outcomes by preventing acute deterioration in functional abilities.

Objective: The objective of this research project was to create a model of “Dementia Friendly Emergency Departments” in the context of the UK National Health Service (NHS). Specific project aims were 1) To understand what is important to people living with dementia and carers when they access care in an ED; 2) To explore current experience of healthcare staff caring for people with dementia in ED- In particular, to increase understanding of the facilitators and barriers to the provision of good and safe care for people with dementia in the ED. and, 3) To identify what structural and procedural changes would be required to enable provision of dementia friendly care in ED’s within the NHS.

Methods/Overview: This study explored the current experience of people with dementia, carers, and healthcare professionals who either accessed, or provided, care in ED’s. This was a mixed methods study, initially using quantitative data collected as part of a national survey data (n403 respondents); followed by an observational study and semi-structured qualitative interviews with patients, carers, and staff (n80). This study adapted the Yorkshire Contributory Factors Framework- a patient safety incident investigation tool- as an interview guide. This offered a structured approach enabling exploration of the multiple active, environmental, organisational and external contributory factors that could lead to episodes of ‘poor care’ in the ED. Additionally, the interviews explored ‘positively deviant’ examples of care where unusually good outcomes are achieved to identify practices that could be utilised or expanded to improve care. Using these data, a theoretical model of ‘dementia-friendly emergency rooms’ is proposed.

Results/Conclusions: The holistic needs of people living with dementia and their carers are typically not met in the ED environment. The biomedical focus in the ED environment is misaligned with the priorities of people with dementia and their carers. There are changes in the physical structures, care

process, and administrative systems which can be implemented to improve the quality and safety of care provided to people living with dementia while in ED's. Adopting some or all of these strategies, is likely to assist in aligning the priorities of people living with dementia and carers, as well as improving health and wellbeing outcomes.

Study Of The Efficacy Of Speed-Feedback Therapy For Older Adults With Dementia: A Randomized Controlled Trial

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Background/Objectives: Rehabilitation of older adults with dementia is still in the trial-and-error stage, and establishment of a satisfactory method for rehabilitation remains an urgent task. We investigated the efficacy of a speed-feedback therapy system devised by us incorporating an upper extremity ergometer, in improving the attentiveness, cognition, and activities of daily living (ADL) of older adults with dementia.

Methods/Overview: Design and setting: A randomized controlled trial was conducted with the participation in three daycare facilities in Japan.

Participants: The 100 dementia patients who fulfilled the eligibility criteria were randomly assigned to the intervention group (N = 50) or the control group (N = 50).

Interventions: The intervention in the control group consisted of standard upper extremity ergometer pedaling for 6 consecutive weeks, while that in the intervention group consisted of speed-feedback therapy for 6 consecutive weeks. Subjects in both groups engaged in ergometer pedaling at a frequency of at least once a week, 5 minutes each time. The exercise load was set at a low level.

Main Outcome Measures: Evaluations were performed by the Trail Making Test-Part A (TMT-A), Mini-Mental State Examination (MMSE), and N-type Activities of Daily Living Evaluation Scale for the Elderly (N-ADL), at the following 4 time-points in both groups: at the baseline, immediately after completion of the 6-week intervention, 1 month after completion of the intervention, and 3 months after completion of the intervention.

Analysis: In order to evaluate the differences between the two groups, we performed repeated measures analysis of variance (ANOVA) with the amounts of changes ([score immediately after intervention] – [baseline score], [score 1 month after completion of the intervention – baseline score], and [score 3

months after completion of the intervention – baseline score]) as the dependent variables.

Results: Comparison of the changes in the scores on the evaluation scales between the intervention group and control group from immediately after the intervention to 3 months after completion of the intervention showed significant interactions between the groups in attentiveness (TMT-A; $p < 0.01$), cognitive function (MMSE; $p < 0.01$), and ADL (N-ADL; $p < 0.01$).

Conclusions: The results suggest that speed-feedback therapy is effective for increasing attentiveness and improving cognitive function and ADL in older adults with dementia.

Acknowledgement: This study was funded by the Chudenko Corporation.

A Review Of The Geriatric Psychiatry Behaviour Support Outreach Team Collaborative Practice

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Background: This paper reviews the current inter-collaborative practice model of the Royal Ottawa's Geriatric Psychiatry Outreach (GPO), Behaviour Support Ontario (BSO) Team to long term care homes (LTCH) within the Champlain LHIN, and its impact in the field of geriatrics. This model of service is composed on an inter-professional team consisting of: Geriatric Psychiatrists; Geriatric Psychiatry Outreach/BSO Nurses, Director, Manager, Program Evaluation Coordinator, Behaviour Therapist, Administrative Assistants, Social Workers, Psychogeriatric Resource Consultants (PRC's), and Community and Acute care partners. The Champlain BSO System aims to provide services to older adults (>65 years of age) with cognitive impairments due to dementia, mental illness, or other neurological conditions with associated complex and challenging (responsive) behaviours. Support is also provided to their caregivers. Their aim is to help seniors with challenging behaviours that are living in long-term care homes. By modeling different approaches and techniques for interacting and caring for older residents, the mandate for this team is to collaborate and build capacity with LTCH staff to build behavioural support models. The Geriatric Psychiatrists, Registered Nurses, and Behavioural Therapists are consultants within the LTCHs to provide consultations services to LTC staff, residents, and their families. These specialized psychiatric assessments are delivered for residents living in the facility that have been flagged as having psychiatric symptoms. The goal of this collaborative model is to address the complex mental health needs and assist in the management of responsive behaviours for seniors living in a variety of community LTCHs, to foster a supportive care environment, optimized

quality of life and prevent unnecessary psychiatric admissions and emergency room visits. It provides comprehensive nursing consultation to staff, administrators, residents and their families. This includes direct practice, education, research and ongoing evaluation. Prior to the existence of this model, residents with severe neuropsychiatric symptoms (such as biting, scratching, yelling, hitting, and/or spitting) were often too difficult for LTC staff to manage. This resulted in the transfer of the resident to the emergency department, or admission to the Royal until their behaviours deescalated. Through data collection, Geriatric Outreach & BSO evaluate their services regularly, and work to prevent behaviour/psychiatric related admissions to hospitals.

Methods: The original structure of the team was mapped out, and compared to the current model structure, identifying the program's growth. Furthermore, a quantitative review of program metrics from 2015-2017 will be completed to illustrate program evolution. This review will illustrate how the professionals continue to have a positive impact in building capacity in LTC and how they have addressed the complex mental health needs in Geriatrics. The analysis will identify new admissions to the program, number of clinics, follow-ups, educational sessions, and the number of attendees.

Conclusions: Using the collaborative practice model in LTCHs prevents unnecessary hospitalization, and improved quality of life among residents with complex mental health needs. The data analysis will highlight the increase in capacity, positive impact, and need for this specialized service in geriatric psychiatry. In new admissions to the program, number of clinics, follow-ups, educational sessions, and the number of attendees.

Exploring The Use Of Xbox Kinect As A Group Activity In Adult Day Program Settings For People With Dementia

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Background/Objectives: Participation in enjoyable activities can become increasingly difficult for people with dementia. Digital technologies, such as motion-based technologies (e.g. Wii, Xbox Kinect), are widely available, accessible, and can provide engaging activities. However, to be used most effectively with people with dementia requires a good understanding how to best select and present these activities. In this study, we explore the use of motion-based technology (Xbox Kinect) as a group activity for people living with dementia and other complex needs.

Methods/Overview: This observational study was conducted in a specialized adult day program for people with age-related

challenges, such as dementia that had progressed beyond the mild stage. Participants (n=23) were invited to play a digital bowling game on Xbox Kinect in a group setting, once per week for 20 weeks. Each session was led by members of staff at the day program, with the researcher observing in the background. Data were collected in the form of participant observations, which were transcribed and analyzed to identify emerging themes.

Results: Data analysis revealed three predominant themes which illustrate the potential of motion-based technology as a group activity for people with dementia. These themes include: (a) the importance of having a trained trainer, (b) learning vs. mastery, and (c) playing 'independently together'. These themes describe the critical role day program staff/trainers play in supporting people with dementia to use motion-based technology, the ability of people living with dementia or other complex needs to learn to play games presented on motion-based technology with repeated exposure, and the positive social activity provided by playing games on Xbox Kinect in a group setting.

Conclusions: This study reveals that people with dementia that has progressed beyond the mild stage can learn to play motion-based games. This was evident through reduced prompting, changing aim to hit more bowling pins, and teaching others. The findings revealed the importance of having staff that possess both a general understanding of dementia, as well as a specific understanding of each player's needs (cognitive and/or physical). Training staff to use motion-based technology, plus how to introduce, teach and support people with dementia to use it is also critical. Playing motion-based games in a group setting provided a social activity, with participants engaging through positive encouragement and friendly competition. The findings support the feasibility of implementing motion-based technologies such as Xbox Kinect in adult day programs and potentially other group settings for people with dementia.

Identifying Team-Based Approaches to Primary Health Care for Rural Dementia Patients: A Scoping Review of the Literature

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Background: Diagnosing and managing dementia is a complex and challenging process; yet it is essential in order to ensure patients and their families have access to the necessary services, supports and treatments. Unfortunately, those living in rural and remote areas have more limited access to dementia-specific primary health care (PHC) services (Morgan 2012). To address this gap, the Rural Dementia

Action Research (RaDAR) Team is implementing a 5-year study to identify and develop evidence-based best practices for delivering comprehensive, integrated PHC for dementia that is adaptable and sustainable across diverse rural settings and PHC teams. As part of this work a scoping review of literature associated with team-based care approaches is currently being conducted.

Objective: The primary objective of this study is to search existing literature with the goal of identifying team-based PHC approaches for rural and remote dementia patients and their caregivers.

Methods: A search strategy was employed which included only peer-reviewed journal articles that were published from 1997 to 2017. Four databases (Embase, Medline PsycInfo and CINAHL) were searched from March 2017-May 2017. Both quantitative and qualitative studies were included in the review. Titles, abstracts and full text articles were screened independently by two reviewers; any discrepancies were resolved by a third reviewer when necessary. Data extraction was carried out by one reviewer and checked by a secondary reviewer.

Results: Ten studies (6 mixed methods, 2 qualitative methods and 2 quantitative methods) were included in the review. Approximately 60% reported employing an interdisciplinary team and 40% employed a multidisciplinary team to implement the team-based care approaches among rural dementia patients. Outcomes were reported by key themes (e.g., location of care team, organization and use of electronic medical records, communication strategies, caregiver support and engagement, and barriers/ challenges and recommendations for implementation).

Conclusion: This scoping review identified key strategies for informing the implementation of team-based approaches for primary care for rural dementia patients. Based on applicability, the identified strategies will be incorporated into the PHC dementia model for rural patients and caregivers the RaDAR team is working to develop. These strategies will be tailored to fit the needs of each rural community and PHC team implementing the model. The effectiveness of identified strategies will then be evaluated.

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A Community-Based Participatory Research Approach To Co-Producing Rural Dementia Care Best Practices With Primary Health Care Teams

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Objectives: Improving care for people with dementia living in rural and remote communities is critical because these areas have a larger share of older adults, yet less access to specialists and dementia-specific services. Most of the responsibility for dementia diagnosis and management falls to primary health care (PHC) providers, yet there is a knowledge gap in evidence-based practices to guide PHC for dementia in rural settings. The Rural Dementia Action Research (RaDAR) team is partnering with one Saskatchewan health region to develop, evaluate, and sustain the RaDAR PHC Toolkit to support PHC providers to deliver guideline-based care.

Methods: We used a 5-step development-adaptation framework and a community-based participatory research approach that involves PHC providers as partners throughout the research process. A comprehensive baseline needs assessment was conducted, including 32 telephone interviews with PHC team members, decision-makers, and individuals with dementia and caregivers to explore strengths and gaps in dementia care. A Rural PHC Model was created incorporating seven principles of effective PHC for dementia identified in the literature and classified into three domains: multidisciplinary team-based care, access to decision support tools, and specialist-to-provider support. Our goal was develop feasible and effective approaches for operationalizing these principles, beginning with one PHC team and incrementally scaling up to build a Rural PHC Toolkit with a range of strategies that can adapted to diverse rural/remote contexts.

Results: PHC team members reported a need for improved specialist access, dementia-specific training, and standardized decision support tools. We partnered with an initial PHC team to develop strategies for implementing the Rural PHC Model and creating the first iteration of the toolkit. To address the need for decision support tools, we implemented a guideline-based electronic medical record (EMR) visit flow sheet adapted from the Primary Care Dementia Assessment and Treatment Algorithm developed by Dr. Dallas Seitz. Other model elements including team-based care, care coordination, education/support for caregivers, access to IT resources, and access to dementia specialists and education for PHC providers, have either been strengthened further or developed, and implemented in collaboration with the first PHC team. We have enrolled a second PHC team to further adapt and test the Toolkit's feasibility and usability in a different rural context. In an ongoing process evaluation we are assessing implementation barriers and enablers, guided by the Consolidated Framework for Implementation Research.

Conclusions: The realities of many rural contexts, including poor specialist access, few team members (often not

co-located), and limited community resources, point to the need for adaptable and sustainable rural dementia care best practices that can be tailored to individual PHC teams. Developing these practices in partnership with rural PHC teams is essential for ensuring relevance and fit to the local context and long-term sustainability.

This Canadian Consortium in Neurodegeneration in Aging (CCNA) project is funded by the Saskatchewan Health Research Council, in partnership with CIHR.

Lessons Learnt From A Feasibility Study On Individualized Treatment Plans Using A Digital Self-Management Program For Older Adults Living With Dementia

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Background: Digital technologies are increasingly being used for self-management of chronic health conditions by patients living at home. However, using digital self-health-management programs with people with dementia is not yet widely practiced. Additionally, factors that affect adoption of these types of programs by people with dementia have not been thoroughly explored. Thus, the aim of the present study is to investigate the feasibility of a self-management app (Mozzaz™) for people with dementia and their caregivers.

Methods: Six dyads, composing of a person with dementia and a family caregiver, were trained to use Mozzaz™ before being asked to use the platform at home for three months. To examine the impact of Mozzaz™ app use on well-being and the dyad relationship, two standard tools were administered (pre-post): the Canadian Occupational Performance Measure (COPM) and the Quality of the Carer-Patient Relationship (QCPR). To assess cognitive function, the Montreal Cognitive Assessment (MOCA) was also administered (pre-post). Lastly, the System Usability Scale (SUS) and an in-depth interview were conducted to understand the challenges and barriers related to the adoption of Mozzaz™ app at baseline, at six-week follow-up, and at 3 months.

Results: The dyads were examined as a series of case studies. The dyads (2 and 3) that completed the trial are reported here. Pre-post MOCA administration revealed no change in score over the 3-month study period for participant #3 (pre and post MOCA score = 25/30). However, participant #2, who started off with a lower MOCA score (19) dropped to 14. Pre-post administration of the COPM revealed improved scores in both occupational performance (+0.4) and satisfaction (+1.4) for patient #3. However, both performance (-1.2) and satisfaction (-0.2) COPM scores declined for patient #2. Pre-study QCPR scores (49/70 and 66/70) remained almost the same (48/70 and 67/70) at post-study for both dyads. During the initial Mozzaz™ training session, dyad #2 rated the

platform usability as above average (SUS scores of 75/100 and 85/100). After using the app at home for six weeks, their SUS scores declined to 35 and 40. However, after a re-training session, the dyad's usability ratings of the mobile platform were higher than the 6-week score (70 for both). Dyad #3 initially rated the platform's usability to be below average (SUS scores of 47.5/100 and 50/100). After using the app at home for six weeks, their SUS scores still remained below average (57.5/100 and 37.5/100). After a re-training session, at the end of the 3-months study period, the patient's score remained relatively the same (52.5/100) but the caregiver's SUS rating declined even further (32.5/100).

Conclusions: To improve the usability of Mozzaz™, all users recommended simplification of the scheduling system, as well as more frequent training, a user manual, and options to remove unnecessary functions. Despite the low SUS scores, almost all users found Mozzaz™ helpful in their daily lives, with 67% of users reporting that they would continue to use the Mozzaz™ app after the study.

The Effect Of Curved Path Walking On Gait In Older Adults With Alzheimer's Disease

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Objectives: People with Alzheimer's disease (AD) have impaired gait and cognitive function which increases their risk for falls. Deficiencies in both gait and cognition can be evaluated by increasing the complexity of the walking task. Curved path walking reflects the dynamic stability required in real-life environments, resulting in greater cognitive load and requiring more motor control than straight path walking. As such, curved path walking may be an avenue to assess deficits in both gait speed and motor control for people with AD. However, little research has examined the effects of curved path walking on gait and motor control in AD. Therefore, the purpose of this study was to 1) examine differences in gait performance between healthy older adults and people with AD and, 2) assess their relationship between cognitive function and gait performance on straight and curved path walking tasks.

Methods: Fourteen people with AD (mean age = 73.08 ± 9.22) and 14 age and sex matched controls (mean age = 72.86 ± 9.53) were recruited. Global cognition was assessed with the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment Scale (MoCA). Executive function was assessed using Trail Making A and B (TMTA, TMTB) and the Digit Span Test Forwards and Backwards (DST-F and DST-B). Gait performance was quantified as time in seconds to complete a walk in both a straight path (6m) and a curved condition (Figure of 8). In addition, motor control

was assessed through qualitative ratings of smoothness of walking in the curved path condition. Paired t-tests and Chi Square tests were used to assess group differences. Linear regression modeling was used to assess the relationship between cognition function and time to complete the straight and curved path walking tasks.

Results: Gait speed was significantly slower in both the straight path (AD= 6.05 (1.26), Control = 5.09 (0.76), $p=0.02$) and curved path walking in people with AD (AD = 11.25 (4.87), Control = 8.28 (2.44), $p = 0.05$). Smoothness scores were significantly lower for people with AD (AD = 1.93 (1.26); Control = 3.00 (0.00)) in the curved path walking condition. For the straight path walking condition, measures of global cognition, the MMSE ($p=0.028$) and MoCA ($p=0.026$), significantly predicted walking performance Executive function (TMTB, $\beta=0.37$, $p=0.040$; DST-F $\beta= -0.57$, $p < 0.001$; DST-B, $\beta= -0.42$, $p = 0.018$) was related only to curved path walking, in which lower executive function was associated with longer time to walk.

Conclusions: Curved path walking may be a more beneficial testing protocol for gait function in those with AD who have difficulty completing secondary cognitive tasks seen in traditional dual-task testing. Ambulation around a curved path provides meaningful information on daily life walking involving the ability to negotiate obstacles, change directions and plan a path. In addition, curved path walking provides unique information into the motor control abilities of individuals that may highlight adverse gait patterns not apparent from gait speed alone.

Early Brain Changes In Progranulin Mutation Carriers

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Background and Objectives: Mutations in the progranulin (GRN) gene were discovered as a major cause of familial Frontotemporal Dementia (FTD) in 2006. All mutation carriers, regardless of type of mutation, symptom status, and age, have reduced progranulin levels through haploinsufficiency. It is likely that brain degenerative changes develop years if not decades prior to FTD onset. We conducted a systematic review of the published evidence to determine 1) the relationship between emerging brain changes and age; 2) the temporal ordering of functional/metabolic and structural brain changes; and 3) the topography of brain changes associated with GRN mutations.

Method: We performed a systematic search for studies that compared GRN mutation carriers to non-carrier controls on at least one imaging modality (structural MRI, fMRI, FDG-PET, DTI). Mutation carriers did not meet FTD diagnostic

criteria. We screened retrieved citations by title, abstract, and full text, and performed data extraction on studies meeting inclusion criteria. We assigned to one of three stages based on the mean age of the mutation carrier group: early (age ≤ 40), middle (age between 41 and 50), and late (age > 50).

Results: Our search produced 11 studies published between 2008 and 2017, with carrier sample size range 5-28, and mean age range 37-54. Most studies were cross-sectional. Brain structural data were presented in all 11 studies (9 MRI, 3 DTI), functional/metabolic data in 8 studies (6 resting state [rs] fMRI, 2 FDG-PET). Six studies evaluated structural and functional/metabolic data concurrently. At the early stage, GRN mutation carriers reveal altered connectivity in medial frontal and fronto-parietal regions, subtle breakdowns in white matter tracts connecting frontal to posterior regions but no gray matter loss. Mid-stage studies indicate medial and inferior frontal as well fronto-parietal connectivity disruptions, and a spreading pattern of glucose hypometabolism in orbitofrontal, inferior/middle temporal, and subcortical regions. The structural evidence has an inconsistent pattern but suggests breakdown of white matter tracts as well as some gray matter loss. At the late stage, a widespread pattern of reduced connectivity is found in medial frontal, fronto-insular, and posterior regions. Hypometabolism is evident in the same frontal but not in posterior regions. No pattern of abnormalities is evident in white matter or gray matter.

Conclusion: The current review is the first to systematically synthesize the imaging evidence on brain abnormalities in predementia GRN mutation carriers. The aggregate evidence suggests that 1) measurable brain changes are detectable in mutation carriers 20 to 25 prior to FTD onset; 2) functional/metabolic brain changes reveal a more consistent pattern of progression over time than structural changes, and may precede these; 3) the topographic pattern has an anterior-to-posterior gradient, but does not appear consistently lateralized to either hemisphere. Emerging functional/metabolic and structural abnormalities map onto the frontally-based salience and the fronto-parietal central executive network. We identified conceptual and methodological challenges that hinder further progress in the field. Despite these challenges, a solid empirical basis exists now for validating neuroimaging markers that track disease progression along the predementia stages of FTD-GRN.

Calgary Brain Bank

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Background/Objectives: Basic research on human neurodegenerative diseases has been based extensively on animal models; however, these models do not fully recapitulate

human pathology. The objective is to develop a human tissue brain bank that includes anatomically specific, pathologically characterized neurodegenerative diseases and normal aging controls.

Methods/Overview: Patients included in the brain bank were adults who either had a clinically diagnosed neurodegenerative disease or were not known to have a significant central nervous system disease. Excluded patients include those suspected of having CJD, brain infections, brain tumours, and patients with major but not neurodegenerative neurologic diseases. In all patients, families consented to have tissue used for research. Anatomically specific regions of brain and spinal cord have been either snap-frozen in liquid nitrogen vapour or formalin-fixed and embedded in paraffin (FFPE). Matching samples were examined for pathologic changes and graded according to standard protocols. Normal control brains are also screened for common neurodegenerative diseases and further characterized, when indicated by the screening.

Results: The Calgary Brain Bank currently has about 81 cases, 35 including frozen tissue and 46 FFPE-only cases. Pathologically-confirmed cases include 14 patients with Alzheimer disease (AD), 11 patients with Lewy body disease (LBD), 5 patients of progressive supranuclear palsy (PSP), and 29 brains from patients with no known neurologic disease. Some of these patients had significant dual pathology (e.g. AD and LBD). Screening of normal brains has revealed an age-dependent increasing frequency of low-to-moderate levels of Alzheimer disease pathology, Lewy body pathology, and microvascular changes. A database is under development that associates individual samples from the bank with specific pathologic changes. Current research initiatives using brain bank material include examination of chaperone expression in normal brain and examination of aggregated protein motifs using fluorescent probes specific for “amyloids”.

Conclusions: The University of Calgary has established a brain bank for the study of neurodegenerative diseases that is available to researchers.

Electroconvulsive Therapy for Behavioural and Psychological Symptoms of Dementia: A Prospective, Open-Label, Observational Study

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Background/Objectives: Agitation and aggression are amongst the most problematic neuropsychiatric symptoms of dementia. They are associated with increased risk of institutionalization,

psychotropic medication use, caregiver burden, and mortality. Safe and effective treatment for these symptoms are lacking. Medications can be useful to some extent but is also associated with considerable risks as well. ECT has been used in this context clinically when options are exhausted. However, to date, only case reports, case series, retrospective studies, and one open label prospective study has been published. We hypothesize that ECT will lead to a reduction in agitation and aggression between baseline and after treatment.

Methods: Patients admitted to the geriatric psychiatry inpatient units at Ontario Shores (Whitby, Ontario) and the tertiary geriatric psychiatry units in Vancouver (British Columbia), with agitation and/or aggression due to dementia who were referred for ECT to treat agitation and/or aggression, were enrolled in the study. These patients also have failed at least 4 different psychotropic medication trials. We conducted the Neuropsychiatric Inventory - Clinician (NPI-C), Pittsburgh Agitation Scale (PAS), Cornell Depression Scale, Cornell-Brown Quality of Life Scale, Columbia ECT subjective side effect schedule, and either the Folstein Mini-Mental Status Exam (MMSE) or Functional Assessment Staging of Alzheimer’s Disease (FAST) at baseline, during and after the completion of the ECT course. The ECT dosage and titration is decided by the treating psychiatrist.

Results: Preliminary results on the 4 patients enrolled at the Vancouver site showed a drop in NPI as well as PAS from baseline on all patients. The change is especially evident when looking at the agitation and aggression sections of the scales. Thus far, no patient has dropped out due to intolerance of ECT.

Conclusions: ECT may be a safe option in treating agitation and aggression secondary to dementia (who have failed conventional non-pharmacological and pharmacological treatments). The improvement in symptoms does not seem to be dependent on a strict ECT electrode placement or titration protocol.

*Please note at the time of this submission Ontario Shores site do have data of 10+ patients but we have not been able to integrate their data yet but it may be integrated by the time the final presentation is produced.

Butyrylcholinesterase: A Diagnostic Target For Neuroimaging In Alzheimer’s Disease

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Background: There are currently no effective means to definitely diagnose Alzheimer’s disease (AD) during life.

Molecular imaging of amyloid (A β) or tau pathology in the AD brain is limited because similar changes are found in ~30% of cognitively normal individuals. In the current work, we show that the enzyme butyrylcholinesterase (BChE) is a highly sensitive and specific biomarker for the disease, has strong predictive value and could therefore provide greater accuracy as an AD diagnostic. To that end, we developed novel chemical entities as radiotracers for brain imaging that target BChE. We present quantitative comparisons of BChE and A β in postmortem human brain tissues and also describe the synthesis and in vivo evaluation of a putative single photon emission computed tomography (SPECT) BChE radiotracer in a mouse model of AD.

Methods: BChE Quantification. 22 postmortem brain tissues were processed using standard histochemical and immunohistochemical techniques from which BChE and A β pathology burden was determined; AD (n=8), cognitively normal with A β (NwA β) (n=6), cognitively normal (n=8). The predictive value of BChE and A β quantification was assessed, via receiver-operating characteristic plots, using sensitivity, specificity, and area under curve (AUC) metrics to evaluate their diagnostic performance. Radiosynthesis N-Methylpiperidin-4-yl-4-[123I]iodobenzoate (TRV6001) was synthesized and injected into 5XFAD mice (n=7) and wild-type (WT) counterparts (n=5) for comparative SPECT/CT/MRI evaluation over 60min. Whole brain and regional retention of TRV6001 was assessed.

Results: BChE Quantification. BChE-associated pathology was greater in AD, particularly in the orbitofrontal cortex. In this region, the largest increase (9.3-fold) was in BChE-associated pathology, observed between NwA β and AD, due to the virtual absence of BChE-associated plaques in NwA β brains. BChE-associated pathology provided better diagnostic performance (AUC = 1.0, sensitivity/specificity = 100%/100%) when compared to A β (AUC = 0.98, 100%/85.7%). Radiosynthesis Cerebral uptake of TRV6001 indicated that this compound penetrates the blood-brain barrier, and was retained longer in 5XFAD vs. WT. Thus, whole brain retention was significantly greater in 5XFAD brain vs. WT (~2.3-fold, p<0.05). Importantly, cortical retention was significantly greater (18-31%, p<0.05) in 5XFAD brain.

Conclusions: BChE Quantification. These findings highlight the predictive value of BChE as a biomarker for AD that could facilitate timely disease diagnosis and management. Radiosynthesis Target engagement of TRV6001 with BChE-associated pathology in the 5XFAD brain was observed. TRV6001 could effectively distinguish 5XFAD from WT.

Summary: This brain imaging method may enhance the accuracy and timely detection of Alzheimer's disease, providing the best opportunity to evaluate emerging Alzheimer's therapies for timely disease treatment.

Mindfulness Interventions For Caregivers Of Patients With Dementia

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Background: Those who work with patients with dementia frequently observe high levels of stress, burden and anxiety in caregivers of these individuals. Often, these caregivers are family members (usually the spouses or adult children) and are living with the individual with dementia. Due to the difficult experience of being a caregiver to someone with dementia, caregivers consistently report high rates of burnout. There exists a great need for programs focussed on supporting caregivers during this time to reduce the likelihood of burnout and to improve the quality of life of those responsible for individuals with dementia. Although different types of group support programs exist, the purpose of this pilot study is to explore the effectiveness of a mindfulness-based intervention program tailored to caregivers of individuals with dementia. The rationale for a mindfulness training programs comes from the use of mindfulness programs as a tool to reduce anxiety and stress, and (as a result) burnout. To our knowledge, no program of this kind currently exists.

Methods: This pilot study consists of three, 8-week (one and a half hour, weekly sessions) mindfulness programs for caregivers of individuals with dementia. While the caregivers participate in the mindfulness program, their loved ones with dementia participate in a cognitive stimulation group. To evaluate the effectiveness of this program, the caregiver participants completed assessments including The Zarit Burden Interview, The Generalized Anxiety Disorder 7-item (GAD-7) scale, and the Cohen Perceived Stress scale. These measures were taken at baseline, post-program, at a 3-month follow-up after the end of the program. Additionally, the caregiver participants completed a general program evaluation at the end of the 8-week program.

Results: The results provide a descriptive summary of the first (of three) 8-week mindfulness program consisting of 8 caregiver participants. There was a noticeable reduction from baseline (50%) to follow-up (12.5%) in the participants categorized as high stress. This reflects a significant decrease in reported perceived stress from baseline to post-program (t(6)=4.49, p=.05). This reduction was maintained at the 3-month follow-up. Participants' perceived burden did not significantly change from baseline to 3-month follow-up. This is unsurprising given the likely progression of dementia over time and the caregivers' perceptions of burden. Similarly, there were no significant changes on the GAD-7 scale reported by the caregiver participants from baseline to post-program, through to the 3-month follow-up.

Conclusion: The limited findings of this pilot study suggest that the greatest utility of this type of program might be in the perceived reduction of stress reported by the caregivers. It is our hope that the experiences gained during the in-clinic program will hopefully fuel the desire to continue on at home with the lessons learned and aid in stress reduction and coping skills and ultimately contribute to a better quality of life.

The Canadian Consortium for Neurodegeneration in Aging (CCNA): Overview Of The Neuropsychology Training For The Comprehensive Assessment Of Neurodegeneration And Aging (COMPASS-ND)

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Background and Objectives: The CCNA is a \$31.5 million research initiative funded by the Canadian Institute of Health Research (CIHR) and partners. COMPASS-ND, with \$8.4 million dollars in funding is the signature clinical study of the COMPASS-ND. It is aimed at understanding the mechanisms of neurodegenerative illness, its prevention, treatment, and improving the quality of life of those with dementia. By the end of 2018, 1600 Canadians between the ages of 50-90 who are living with or at risk for developing dementia will be enrolled at 30 sites across Canada. Neuropsychological assessment is a crucial component of the diagnosis of dementia and the specification of its various etiological subtypes. The purpose of this poster is to outline the training procedures for both the neuropsychology and screening visits for research staff who are testing patients for COMPASS-ND.

Methods: Following a comprehensive background interview and physical examination, 125 participants have been recruited into COMPASS-ND to date. These participants comprise diagnostic groups of subjective cognitive impairment, mild cognitive impairment (MCI), vascular MCI, Alzheimer's disease, vascular dementia, mixed dementia, fronto-temporal lobar dementia, Parkinson's disease/Lewy body dementia). Participants have undergone cognitive testing in the screening visit including Logical Memory, CERAD Word List, MoCA and Benson Figure). Participants have also had imaging of their brain and blood drawn. The neuropsychology battery includes a comprehensive test battery consisting of both clinical and experimental measures that assesses a broad range of cognitive function (e.g., verbal and non-verbal learning and memory, executive function, attention/concentration, language, processing speed, perceptual abilities, etc.). Tests were chosen to overlap with several other large scale dementia studies across

the country to allow for maximal harmonization of data across studies, taking approximately three hours to complete.

Results and Conclusions: In this poster, an overview of the training and data monitoring and quality review for the neuropsychology test battery and screening visit cognitive measures for the COMPASS-ND will be reviewed. We will describe the procedures for staff training in both English and French for the neuropsychology visit. To date nineteen sites have completed or are in the process of completing training and the remaining sites will be beginning training in the fall of 2017. This includes the development of content of the on-line training platform for the neuropsychology session in both English and French. This on-line training runs through the Longitudinal Online Research and Imaging System (LORIS). Procedures for video observation of both "mock" and actual participants at all 30 sites across the country are in place. This overview will include lessons learned that can inform the set up of other small and large scale studies with remote training and data monitoring needs.

Older Adults' Perceptions Of Cognitive Testing: Moving Towards Person-Centeredness

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Background: Detecting cognitive impairment and dementia in primary care settings is based on case finding-- screening is initiated by clinician's suspicion and a diagnosis is made through a full diagnostic assessment. Thirty-eight percent of older primary care patients in one recent study refused diagnostic screening. In another study, 48% of primary care patients who screened positive refused full diagnostic assessment. A person-centered approach may address reasons for refusal to participate in cognitive tests. The aims of this research were to (i) identify older adults' preferences regarding the test experience; (ii) determine the importance of having choices around the test experience; and (iii) examine patients' reported willingness to undergo testing in relation to i) and ii). The Attitudes Around Cognitive Testing (AACT) questionnaire was developed for this study to identify older adults' attitudes regarding cognitive testing in primary care settings.

Methods: Adults 50 years or older completed AACT. Primary care sites around Portland, OR were invited to participate. If sites agreed, study flyers were hung up in waiting rooms to elicit participation. The flyer invited participants to complete the survey via paper-and-pencil, or through an online version. Participants were also recruited through Amazon Mechanical Turk, an online crowdsourcing data site (www.mturk.com).

Results: Our preliminary data included 18 adults who completed paper-and-pencil surveys. Participants' ages ranged

from 50 to 85 (mean=63 years). The majority of participants were female (78%), White (83%), and endorsed subjective cognitive concern (56%). Participants indicated no clear preferences regarding the modality (paper-and-pencil, computer, or mobile device), location (physician's office or home) and who is with them (loved one, physician or healthcare professional, or alone); however, participants reported preferences for how they receive test results. Forty-four percent of participants prefer to receive negative results via mail and 67% of participants prefer to receive positive results via an office visit. Participants attributed importance to having a choice in each of the domains. Percentages of participants who agreed or strongly agreed it is important to have choices in each testing domain is as follows: modality (61%), location (55%), company (72%), and result delivery (89%). Seventy-eight percent of participants agreed that they would be willing to take the test but this did not appear to be related to having choices in the test experience. Both MTurk and paper survey collection is ongoing, with a greater sample size anticipated at the time of presentation of this work.

Conclusions: Our data show older adults attribute importance in having choices with regard to cognitive testing. We did not find a clear relationship with patient compliance, yet personal autonomy and choice are critical constructs in the patient-centered healthcare literature. Our findings support the practice of engaging older adults in the procedures of cognitive testing and the discussion of results. Such engagement has the potential to increase the rates of early detection of cognitive impairment in medical settings. Future examination regarding patients' preferences, their perceived importance of having choices and their willingness to undergo testing are warranted to elucidate the complex relationships between these constructs of person-centeredness.

Presenting the PREvention Program for Alzheimer's Related Delirium (PREPARED) Trial: A Cluster Randomized Trial Targeting Delirium Prevention in Long-Term Care Residents with Dementia

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Background/Objectives: Delirium is a significant cause of morbidity and mortality among older people admitted to both acute and long-term care (LTC). Prevention, founded on a thorough understanding of associated risk factors, is the best approach for dealing with delirium. Several successful multicomponent interventions have been developed

to reduce delirium incidence in the acute care setting (30%-73% reduction). However, little work has focused on using this approach to reduce delirium incidence in LTC. As such, co-investigators within our team employed an integrated knowledge translation strategy to develop a multicomponent delirium prevention program (PREPARED intervention) based on modifiable risk factors for LTC residents. The feasibility and acceptability of this program has been demonstrated using a participatory approach in three Quebec LTC facilities, and the program has received recognition by the scientific community. Given its large expected impact and high knowledge translation potential, a thorough and well-designed large-scale evaluation is urgently needed in order to demonstrate its efficacy. As such, the goal of the PREPARED trial is to assess the efficacy of the PREPARED intervention in reducing delirium (incidence, frequency, severity, episode duration) among cognitively impaired LTC residents.

Methods/Overview: The PREPARED intervention consists of four components: a decision tree, an instruction manual, a training package and a toolkit. This 4-year cluster randomized study will involve nursing staff and residents in 40-50 public and semi-private LTC facilities in Montreal, Canada. Institutions within all five (5) of the Integrated University Health and Social Services networks on the island of Montreal and one private network have agreed to participate. Approximately 900 LTC residents will be enrolled in the study and followed for 18 weeks only if they are at high risk of delirium and are delirium-free at baseline. Primary study outcomes such as delirium incidence (measured by the Confusion Assessment Method), delirium severity (measured by the Delirium Index), and level of adherence to the PREPARED intervention will be assessed weekly. Cognitive impairment, functional autonomy, and social engagement will be assessed at baseline and at end of follow-up. Information pertaining to modifiable delirium risk factors, frailty, medical consultations, falls, and institutional transfers will be assessed retrospectively. For primary analysis, hazard ratios will be modeled using extended Cox models to compare the effect of the PREPARED intervention to that of usual care on the time to first delirium episode. Clustering effects will be taken into account using frailty models, an extension of Cox regression for the addition of random effects.

Results: As the intervention has been shown to be both feasible and acceptable, we expect exposure to the PREPARED intervention to reduce delirium in this frail population.

Conclusions: This large-scale intervention study will contribute significantly to the development of evidence-based clinical guidelines for delirium prevention in this frail elderly population, as it will be the first to evaluate the efficacy of a multicomponent delirium prevention program tailored for LTC on a large scale.

Are Interventions That Include An Advanced Care Planning Component Effective At Reducing Hospital Admissions From Long-Term Care?

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Background: Long-term care (LTC) residents are frequently transferred to acute care. These transfers may lead to important adverse events (i.e. delirium, nosocomial infections, pressure ulcers and functional decline), disruptions in care, and up to 34% of LTC residents visiting emergency rooms subsequently die in hospital. Transfers may also disproportionately affect residents with dementia due to the extreme vulnerability of this population. Up to 2/3 of unplanned hospital admissions (HA) for this population are reported to be “potentially avoidable”, sometimes due to a failure to update advance care directives during the course of resident institutionalization or to consider “do not transfer” orders within said directives. Advance care planning (ACP) best practices, which include providing a range of health care choices, establishing goals of care, and systematically updating ACPs, have been reported to decrease HA rates and the number of residents dying in hospitals. To date, however, there is a lack of systematic evidence regarding the effectiveness of ACP in reducing HA.

Objective: This current systematic review analyzes the effectiveness of interventions aimed at reducing HAs from LTC during episodes of acute or complex health deterioration that include an ACP component, as compared to usual care.

Methods: A systematic review was conducted. MEDLINE, CINAHL, EMBASE, Social Work Abstracts and other relevant scientific literature databases were searched from inception to July 2016. Forward and backward citation tracking techniques were employed, and grey literature reviewed. Original studies that employed quantitative and mixed methods, studied LTC residents aged 65 years and older, and assessed HAs from LTC were eligible. The Mixed Methods Appraisal Tool was used to assess the quality of the included articles. A random-effects model meta-analysis was conducted for rate ratio reduction in HA rates per 100 resident-days.

Results: Our initial search yielded 57 articles, and from among these 25 included an ACP component. From these, only 7 fulfilled the eligibility criteria and were included for analysis. Interventions were usually multi-component, and targeted a variety of transfer-related factors. Frequently adopted ACP strategies included: having established protocols,

using standardized communication tools, and educating LTC stakeholders (e.g., staff, residents, families). The meta-analysis revealed that there was a significant reduction in HA rates from LTC (RR=0.73; 95%CI=0.61-0.86; overall effect Z=3.66, p=0.0003) despite high statistical heterogeneity (I²>95%).

Conclusions: Interventions targeting the improvement of ACP procedures are effective in reducing overall HAs from LTC and have the potential to improve the end-of-life quality for these residents, especially those with dementia. Outcome measurements and data reporting need to be standardized in order to improve our understanding of the benefits of interventions in this area. In addition, more research is needed to determine whether reduction in all-cause HAs can be attributed specifically to reductions in transfers deemed to be “potentially avoidable” or not.

Successful Aging In Place: How Good Are Geriatricians At Predicting The Patient Journey With Dementia?

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Background/Objectives: Dementia is increasingly common among patients living in the community. In order to adequately assist patients to successfully age in place and transition to appropriate levels of care without crisis, geriatricians and healthcare providers must be able to provide accurate prognostic predictions. Clinicians often rely on their clinical impression of patients’ situations instead of using standardized tools for predicting nursing home (NH) placement and death. More accurate predictions would improve advanced care planning and patient-centered care. This study evaluates the accuracy of the overall clinical impression of geriatricians with respect to critical patient outcomes such as admission to hospital with an Alternate Level of Care (ALC) designation, admission to NH, and/or death.

Methods/Overview: Many patients living in the community with a diagnosis of dementia are followed in an Outpatient Memory Clinic at St. Joseph’s Hospital in Saint John, New Brunswick. Patients are seen with a family member approximately every 7-9 months (more frequently as needed) by a nurse and a geriatrician. At each visit, patient characteristics such as cognitive, functional and behaviour status, current living arrangements, and home supports are collected along with the geriatrician’s prediction about the patient’s prognosis (ALC in <1 year; NH or death in <1 year, 1-2 years, 2-5 years, or >5 years). A retrospective chart review was conducted to collect data from patient visits between January 1, 2015 and May 31, 2016. Patient disposition at one year following their visit closest to May 31, 2016 (index visit) was also retrieved

and categorized as ‘at home/assisted living’, ALC, NH, or expired. These outcomes were compared to physician predictions, and descriptive statistics and cross tabulations were calculated.

Results: Of the 361 patients who visited the Memory Clinic during the 18 month period, 63% were female. Alzheimer’s dementia was the most common diagnosis (64.8%), followed by mixed Alzheimer’s/vascular dementia (21.3%). Mean age was 81.4 (SD 7.4), mean Mini Mental Status Exam was 19.7 (SD 5.7), mean Functional Assessment Screening Tool was 4.8 (SD 0.6), and mean Clinical Frailty Scale was 5.8 (SD 0.6). Most (82.5%) were living at home at the time of their index visit. After one year, 54.3% of patients were living at home, 14.7% had an ALC designated stay in hospital (81.1% of which were related to dementia), 12.5% had transitioned to NH without becoming ALC, and 8.9% had died. Sensitivity of physician prediction of death, admission to NH, or admission to hospital with ALC designation within one year ranged from 6.3% to 48.0%. Specificity ranged from 82.0% to 97.5%. Positive predictive value of physician predictions ranged from 20.0% to 31.2%, and negative predictive values ranged from 90.3% to 91.7%.

Conclusions: When informed by overall clinical impression based on knowledge of patient cognition, function, home supports, and mobility, geriatricians’ predictions do not reliably align with actual patient outcome. More research is needed to better understand which patient characteristics contribute to their immediate outcomes, and to enable geriatricians to better facilitate successful aging in place.

Usability And Acceptability Of A Mobile Dementia Observations Application (DObs) On A Dementia Care Unit

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Background: Responsive behaviours in dementia, such as agitation and aggression, are common and distressing for caregivers and patients. A basic principle of assessment of behavioural symptoms is to chart the behavioural patterns over 24 hour cycles, to help establish their frequency, severity, and any patterns to the behaviours. A widely-used tool for this assessment is called the dementia observation system (DOS), which is paper-based. We have developed a web-based mobile Dementia Observation (DObs) application designed for use by front-line staff, with the goal of improving the ease, completeness, and accuracy of behavioural data collection.

Objective: The aim of this study was to evaluate the usability and acceptability of the DObs mobile application with front-line dementia care workers.

Methods: We used a mixed-method design. Participants were clinical staff on the Toronto Rehab Geriatric Psychiatry inpatient dementia unit. They were asked to complete a series of tasks that assessed the administrative and observational functions of the app. Quantitative measures of user interaction errors were recorded. Assessors also completed the system usability scale (SUS), a perceived usefulness scale, and a computer self-efficacy scale (C-SES). Qualitative data was collected via audio-recording of the scenario based tasks and post-test questions related to improvements and clinical implementation.

Results: Seven clinical staff participated in this study, with a mean C-SES score of 8.5/10. Participants completed on average 83% of tasks correctly, required hints 5% of the time, and failed 13% of the time. In addition, the perceived usefulness of the app was given an average rating of 4.3/5. The System Usability Scale (SUS) provides an overview of the user experience and satisfaction with the system. The administrative function had an average SUS score of 80.4/100 and the observational function scored 80.7/100. Other issues identified included were the need for better confirmation for user actions and challenges in incorporating the application into daily workflow.

Conclusions: Mobile technology offers an opportunity to improve the assessment and treatment of responsive behaviours in dementia. Areas of improvement with respect to usability of the DObs mobile application were identified and are being incorporated into the application. Our next study will examine DObs feasibility in the clinical workflow of a dementia care environment, and assess the validity and reliability of the mobile application.

Assessment Of Mobility In Advanced Dementia: A Scoping Review And Feasibility Analysis

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Background/Objectives: Impaired mobility is a significant health, safety and quality of life issue for people with dementia. Many of the factors associated with mobility decline in dementia are progressive in nature, leading to loss of independent mobility over time. Despite the therapeutic challenges that arise from physical, cognitive, and behavioral symptoms in the advanced stages of dementia,

it remains essential to target mobility to prevent excess disability and limit the use of inappropriate interventions such as physical or chemical restraints. To help evaluate individuals' capacity and prescribe appropriate intervention for mobility decline across the course of the disease, clinicians must be able to properly assess, stage, and monitor mobility status. The goals of this study were to identify standardized measures of mobility for older adults with dementia and to determine each tool's feasibility for use in advanced dementia.

Methods: A scoping review was conducted involving electronic searches of Medline, Embase, CINAHL, and PsychInfo databases using key word combinations related to dementia, mobility, assessment, and validation. Searches were limited to studies published in English and conducted in older adults with dementia. Studies examining individuals with mild cognitive impairment were excluded. We also excluded assessments requiring instrumentation not readily available for clinical use and studies that examined indirect factors of mobility (e.g. strength) or non-mobility specific behavioral and psychological symptoms (BPS) of dementia (e.g. agitation). Screening and full text review were conducted independently by two investigators. A standardized template was developed to extract descriptive data and psychometric properties. Feasibility for use in advanced dementia was assessed by scoring tools according to their need for communication, sustained attention, motivation/co-operation, and execution of complex motor skills.

Results: The search yielded 3728 records, of which 32 met criteria for inclusion. From these papers, 38 tools were identified, either developed specifically for a dementia population (n=13) or developed for older adults and validated in dementia. Tool type ranged from staging (n=1) to symptom assessment (n=6), to functional capacity (n=26). Five additional tools evaluated falls efficacy (FES). Excluding FES, 79% of the tools were performance-based. Components of mobility assessed included standing (n=15), walking (n=20), postural transitions (n=16), assisted transfers (n=4), wheeled mobility (n=1), bed mobility (n=2), and mobility-related BPS (n=9). 40% of the tools measured multiple components but none assessed all aspects. Only 38% of the studies included people with severe dementia. Twelve of the tools (32%) scored $\geq 5/9$ for feasibility in advanced dementia. Psychometric analysis of these tools was limited and only three tools showed both good reliability and validity.

Conclusions: This review highlights a critical gap in the area of mobility assessment related to a lack of comprehensive, dementia-appropriate tools and more specifically, a lack of tools appropriate for use in advanced stages of the disease. Future work should extend psychometric analysis of existing tools and develop more comprehensive methods for mobility assessment in this population.

Study Design Of A Phase 2 Randomized Controlled Trial Of Intranasal Oxytocin For Symptomatic Treatment In FTD

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Oxytocin, a neuropeptide, is a mediator of aspects of social cognition and behaviour. The first studies of intranasal oxytocin as a symptomatic treatment in FTD indicate that oxytocin may improve apathy/indifference and related empathic behaviours (Jesso et al. 2011; Finger et al. 2015). Based on these findings, a phase 2 randomized controlled trial of intranasal oxytocin for symptoms of social apathy and empathy deficits in one-hundred patients with FTD across 5 Canadian and 8 US sites will begin enrollment in January 2018. As new evidence suggests the pharmacokinetics of oxytocin may vary with chronic use, an adaptive cross-over design with 6 week treatment intervals will be used to identify the best dose schedule. In the second phase, remaining patients are enrolled at the most promising dose. The primary outcome measure is change on NPI apathy/indifference score. Secondary outcome measures include change in the Interpersonal Reactivity Index (IRI), caregiver distress/burden ratings, facial expression recognition performance, and total NPI scores. Oxytocin levels will be measured in CSF in each treatment period to confirm entry into the CNS. Results of the trial will be used to determine if a phase 3 trial of intranasal oxytocin for symptoms in FTD is warranted.

Patterns Of Cognitive Deficits In Non-Demented Parkinson's Disease Relative To Healthy Controls: A Meta-Analysis

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Background/Objectives: Cognitive symptoms of Parkinson's disease (PD), although widely reported, are poorly characterized and their mechanisms are unclear. This is in part due to methodological inconsistencies across studies in the cognitive tests used to assess specific cognitive domains. Because this literature is inconclusive, a meta-analysis is needed to quantify the degree of impairment across cognitive domains. This meta-analysis will also take into account potential moderating factors to improve our understanding

of disease mechanisms. For example, given the known higher prevalence of men relative to women with PD, it is important to investigate how sex might moderate PD cognitive symptoms. The present meta-analysis will determine if there are cognitive deficits in PD patients relative to healthy controls in frontal executive, visuospatial, and verbal memory domains and the degree to which any deficits are moderated by sex or other patient characteristics.

Methods: Systematic searches were performed in March 2017 using MEDLINE, EMBASE and PsycINFO and evaluated by two independent raters. Random effects models will be used to compute pooled effect sizes (using Hedge's g and 95% confidence intervals) of differences between PD patients and healthy controls for neuropsychological test performance within each of the three cognitive domains. Meta-regressions will determine whether patient sample characteristics (i.e., motor symptom severity, disease duration, age at testing, PD medication status, presence of depressed patients in PD sample, years of education) moderate effect sizes. Subgroup analyses will be conducted on sex-segregated PD patient data to determine whether effect sizes differ between men and women.

Results: We retrieved 7985 records, reviewed 1089 full text articles, and included 164 articles for data extraction. Neuropsychological test data were available for 120 articles (109 providing information on frontal executive abilities, 52 providing information on verbal memory, and 58 providing information on visuospatial abilities), comprising 5682 PD patients, and 5375 healthy controls. Because only one study provided sex-segregated data, we obtained sex-segregated neuropsychological test data from the authors for 47 articles. Extraction of moderator variables and quality assessment of included articles is currently underway. Meta-analysis of effect sizes for each of the three cognitive domains, as well as meta-regressions, and subgroup analysis by sex will be completed prior to the conference date.

Conclusions: Findings from the present meta-analysis is expected to improve understanding of the cognitive profile of PD, and provide insight into potential sex-related and other factors that might moderate disease expression. Ultimately, this information could improve clinical and therapeutic PD management.

AMBIENT Fall Risk Monitoring in Dementia – a Feasibility Study

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Background/Objectives: Falls are a leading cause of injury, loss of independence, reduced quality of life, and mortality in older adults with dementia. An accurate assessment of fall

risk would allow for individuals at risk to receive appropriate preventative interventions. We are working towards the development of a falls risk monitoring system which relies on the frequent assessment gait using ambient mobility, balance, and gait evaluation and monitoring technologies (AMBIENT). AMBIENT allows for the frequent, accurate, unobtrusive, and cost-effective measurement of gait and balance parameters. Through our research, we have validated spatiotemporal characteristics of walking from AMBIENT against instrumented walkways, thereby verifying that it accurately and reliably captures spatiotemporal gait parameters. This study aims to investigate the feasibility of using AMBIENT to monitor gait in individuals with dementia residing in a dementia care unit.

Methods/Overview: We conducted a pilot longitudinal study with 20 participants (age: 78.1 ± 7.4 years, female: 31%) in the geriatric psychiatry unit at the Toronto Rehabilitation Institute, an eighteen-bed inpatient dementia care unit for older adults with behavioral symptoms. The setup includes radio frequency identification (RFID) to identify study participants and a Microsoft Kinect sensor to track body posture over time. The system automatically monitors participants' gait as they walk within the view of the sensor during their daily routine and computes the spatiotemporal parameters of gait. Demographic and baseline descriptive measures were also collected, which include the Katz Index of Independence in Activities of Daily Living (Katz), the Severe Impairment Battery scale (SIB), and the Tinetti Performance Oriented Mobility Assessment Score (POMA). We also tracked falls history and use of any psychotropic medications.

Results: On average, 71 walking sequences per person were collected over an average length of stay of 46 ± 28 days. During this period, there were 12 falls among study participants. The range of reported falls was 0–4, where 13 participants (68.4%) did not fall during their length of stay, 3 (15.9%) fell once, 1 fell twice, 1 fell 3 times, and 1 fell 4 times (multiple falls: 15.9%). Mean quantitative measures of gait assessed included stride length (0.8 ± 0.1 m), stride time (1.4 ± 0.2 s), cadence (89.3 ± 18.3 steps/min), velocity (0.6 ± 0.1 m/s), step length asymmetry (1.3 ± 0.4) and step time asymmetry (1.2 ± 0.5).

Discussion: This pilot study demonstrates the feasibility of using AMBIENT in a dementia care unit to unobtrusively track quantitative measures of gait over time. Our goal is now to collect longitudinal data and to use state-of-the-art machine learning techniques to build a robust, multivariate predictive model capable of detecting changes in mobility and falls risk.

Seeing Through The Veil: Experiences Of Caring For Persons Living With Dementia At The End Of Their Lives From Healthcare Professionals Perspectives

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Background/Objectives: This arts-based presentation presents research findings through paintings and creative works that healthcare professionals created about what it is like to care for persons living with dementia who are receiving end-of-life care.

Methods/Overview: Through focus groups and creative expression we explored healthcare professionals' experiences of caring for persons living with dementia at the end of their lives and the values, beliefs and assumptions that support and/or act as a barrier to providing quality care. To date, literature that explores barriers to quality palliative care for persons living with dementia focuses on: the educational needs of staff and families; the biomedical challenges that arise, such as, pain, treatment of pneumonia; and lastly the system barriers to quality care. Seven healthcare professionals, primarily nurses with one occupational therapist and one therapeutic recreationist participated in this study. Healthcare professionals described what it was like to care for persons living with dementia at the end-of-life in different settings: critical care, long term care, rehabilitation and an acute medical unit. Utilizing an arts-based research approach researchers generated new insights about what it is like to care for persons on their final journey with dementia.

Results/Conclusions: The findings that emerged from the focus groups and creative expressions will be presented artistically. While several themes emerged, the overarching theme reflects that both darkness and light coexist on the journey. This research contributes to the national conversation about end-of-life care and understanding the barriers and opportunities for providing quality palliative care for persons living with dementia.

By the Numbers: The Impact of the Ontario Shores Geriatric Outreach Team on Management of Patients Identified as Posing a Risk or Threat of Harm to Others

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Background/Objectives: The Geriatric and Neuropsychiatry Outpatient Service (GNOS) at Ontario Shores provides specialized services to meet the mental health needs of individuals 65 years of age and older and those under 65 with suspected age-related cognitive impairment. A report by the Geriatric and Long-Term Care Review Committee in 2016 found "The issue of resident-on-resident violence in [long-term care] homes is an

urgent and persistent issue." Anecdotally, the team perceives an increase in aggression in the patient referrals to GNOS which we surmise may be attributed to the growing trend toward minimizing use of chemical and physical restraints to address this risk. The purpose of this investigation is to clearly identify the current state with respect to prevalence of violence in current service requests, with the intent to use this information to bolster funding for more resources / training and specialized care for these individuals.

Methods/Overview: The researchers investigated the prevalence of violence in referrals to Geriatric Service at Ontario Shores by completing a comprehensive retrospective review and analysis of referral and admission data to the GNOS program for 2016. Inclusionary criteria included referrals for individuals to GNOS, the Geriatric Dementia Unit (GDU) or the Geriatric Psychiatry Unit (GPU) with "risk of harm or danger to others" identified by the referring source. The service pathways for these individuals were traced.

Results: In 2016 there were 522 referrals to the GNOS program at Ontario Shores. There were 77 admissions to GDU and GPU. Of those 77, thirty-six had contact with the GNOS program. We continue to investigate the number of referrals which had indicated "risk of harm to others".

Conclusions: Ontario Shores' GNOS program provides a valuable service in that the majority of individuals referred for risk of harm to others. Many of the inpatient referrals appear to be for LTC residents who are admitted directly from schedule one (acute care) hospitals, and without having had opportunities for community outreach based interventions, suggesting that there may be an even greater role for our program to play.

InTouch: Introducing Touchscreen Applications To People With Advanced Dementia Through Staff-Client Co-Play

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Background: Recent research has demonstrated that touchscreen technology provides an accessible and engaging source of leisure for people in the earlier stages of dementia who can play games independently. The potential of touchscreen technology as engagement at more advanced stages of dementia is underexplored.

Objectives: To evaluate the application of touchscreen games for enhancing staff-client engagement for individuals with advanced dementia.

Methods: Eight individuals with advanced dementia and four nursing staff members were recruited from a specialized

geriatric dementia unit. Four games were selected for staff to offer to the clients. Staff selected 2 clients to play with and co-played on 3 occasions. Staff engagement, client engagement, enjoyment and social interaction, including turn-taking were measured. We examined staff and client engagement, enjoyment, and social interaction by analyzing face-view and screen-view videos using ObserverTM. All participants showed signs of engagement and enjoyment in the majority of sessions. Various forms of social interaction were exhibited during gameplay, including eye contact and the use of social touch by both staff and clients. Additionally, turn-taking behaviour was exhibited in 50% of the sessions.

Discussion: Touchscreen games can facilitate an opportunity for meaningful staff-client engagement in advanced dementia care, and can provide an opportunity for social interaction between clients and staff.

Let's Connect – Training People With Dementia To Play Touchscreen Tablet Games

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Background/Objectives: Participation in enjoyable activities can become difficult for people with dementia to achieve independently. While past research has shown that people with mild to moderate dementia can learn to independently play games presented on touchscreen tablets (Astell et al., 2016), the application of this type of technology with people living with greater levels of cognitive decline has not been as thoroughly explored. The overarching aim of this study was to explore whether people with dementia that had progressed beyond the mild stage could play games presented on touchscreen tablets, either independently or with support.

Methods/Overview: The study was conducted in a specialized adult day program for people with complex age-related challenges, such as dementia that had progressed beyond the mild stage. Over a 6-month period, student volunteers (n=13) coached participants with dementia (n=21) to play a selection of commercially-available games on touchscreen tablets. Methods of data collection included log sheets (to track what games were played, how often, and for how long), and a post-study interview with clients, their families and volunteers.

Results: Participants completed a total of 272 sessions with student volunteers. Clients with dementia were able to play pre-selected games presented on touchscreen tablets, with 9/21 (43%) participants learning to play independently with minimal assistance. Over time, participants began to express their preferences for different apps and games based on their

own individual interests, highlighting the diverse preferences of people with dementia. Additionally, 18/21 (86%) participants or their families purchased their own touchscreen device, highlighting the transfer of skills from the day program to the home environment. Post-study interviews with clients revealed that 20/21 (95%) participants enjoyed learning to play touchscreen tablet games, highlighting their enjoyment and willingness to continue with the activity. Post-study interviews with caregivers revealed a decrease in perceived levels of stress due to their family member having a source of independent and meaningful engagement. Additionally, post-study interviews with student volunteers revealed an improvement in their perceptions of the abilities of people with dementia.

Conclusions: The findings extend knowledge about the ability of people with dementia to learn new skills with appropriate training and support as the participants in this study were living with dementia that had progressed beyond the mild stage. Additionally, the findings support the potential of games presented on touchscreen tablets to provide engaging, independent activities to people with dementia, both at the day program and at home. The findings also emphasize the feasibility of implementing touchscreen tablet programs in day centre settings as a regular-scheduled activity for people with dementia.

Help Me Understand: A Unit's Journey to Improve Day-to-Day Management of Responsive Behaviours

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Background: In 2011, there were 747,000 Canadians living with Alzheimer's disease and other dementias; the projected number by year 2031 would be 1.4 million Canadians. Progressive degeneration of brain cells affect a person's ability to understand, remember, and perform simple day-to-day tasks. These changes also affect a person's ability to communicate a specific need which can result in responsive behaviours, such as hitting, screaming, cursing, or wandering. In a busy acute care unit at a downtown teaching hospital, there has been an increase in admission of patients with dementia. Coupled with extended length of stays associated with waiting for long-term care placements, there is an immediate need to enhance the approach to care for this population. Historically, chemical and physical restraints have been used to manage responsive behaviours; however, these approaches often lead to several side effects and safety concerns. As the philosophy of care moved towards least restraints, staff was challenged with managing "combative, aggressive behaviours." This resulted in an increase in falls, workplace violence reports, and poor staff morale. While the nurses had knowledge of the acute medical disease of dementia, there were gaps in relating that knowledge into practice when faced in situations when patients displayed responsive behaviours. This

case study shares the journey of an internal medicine unit to improve day-to-day management of responsive behaviours by acknowledging and understanding the behavior and creating a safe environment.

Methods: Debriefs occurred with a focus of understanding why the incidents took place. Staff was encouraged to reflect on the situation, understand the behaviour and identify triggers. The focus was not on the action but in finding the meaning. This information was then used to drive care planning. In addition, falls prevention strategies were put in place and a safety culture was developed through the implementation of a “Do-No-Harm” board. A doll intervention was trialed to meet the patient’s need to nurture and form attachments.

Results: Three of six patients developed a therapeutic relationship with the dolls, resulting in a decrease in workplace violence incidents, anxiety, crying, and wandering. Staff also began to take initiative in identifying and communicating triggers, early implementation of care strategies, and thinking outside the box to come up with interventions that relate to the patient’s personal story.

Conclusion: To promote patient-centered-care of our patients with dementia, the focus of incident debriefs was not on the behaviour but the person. By trying to understand the meaning behind responsive behaviours, there has been a positive change in our management of behavioural and psychological symptoms of dementia. Staff are actively listening to the patient’s story and seeing the patient as a human being who is challenged with expressing their needs. Engagement continues to be high as our staff continue to look for strategies that meet the specific needs of this population. As we continue our journey to change dementia care in the acute setting, two RN-led quality improvement projects are currently taking place looking at non-pharmacological interventions for the management of responsive behaviours.

Adapting Mainstream Dementia Tools For Use In Indigenous Communities In Canada

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Background: Dementia is a growing concern in Canadian Indigenous populations. Recent research suggests equitable access to dementia services requires that care strategies for Indigenous peoples be culturally grounded. Current dementia care strategies have shown varying degrees of cultural,

educational, and language bias, impairing application in Indigenous communities. A partnership between North East Behavioural Supports Ontario (NE BSO) and Canadian Consortium on Neurodegeneration in Aging (CCNA) Team 20 (Ontario) was established to address this need.

Methods: Using community-based participatory methods and a “two-eyed seeing approach,” researchers worked closely with NE BSO staff, and the Ontario CCNA Team 20 project team and advisors to adapt “P.I.E.C.E.S. of my Personhood” for use with Indigenous populations in Northeastern Ontario, Canada. This tool is used by NE BSO staff in the care of older adults with memory loss to identify information relevant to their care, and is applicable to both home care and institutional settings.

Results: Our findings indicate that many questions in the original tool were not appropriate for use with older Indigenous adults. Changes that needed to be made addressed the directness of questions, removed questions that could trigger posttraumatic stress responses and removed those related to material wealth. The tool was also changed to focus on relationships rather than individual accomplishments to respect the cultural value of humility practiced in this region. The resulting tool, P.I.E.C.E.S. of my Relationships, has been received well by community members. Additional findings include the need for supporting Indigenous approaches to older adult care, relationship building, the importance of language preferences, and attention to non-verbal communication.

Conclusions: Results indicate that the approach to a culturally appropriate P.I.E.C.E.S. tool is two-pronged, requiring changes to the nature of questions as well as addressing structural barriers in care settings such as provider training in culturally safe care. We conclude with some insights into the time and attention needed to adapt tools for use with Indigenous communities.

Care Financing, Evaluation Of A Direct Fund Respite Program For Family Caregivers Of People With Dementia

Kristy McKay. Alzheimer Society Toronto.

Background: The financial cost of caring for Canadians living with dementia is huge, estimated at \$10.4 billion in 2016 this amount is projected to double by 2031[i]. While our public healthcare system carries about two thirds of the cost, families incur significant out of pocket, indirect, and missed opportunity costs that climb as high as \$15, 200 per year[ii]. Since 2011, The Alzheimer Society of Toronto (AST) Caregiver Project has worked to lessen this impact by providing small grants to over 2000 family caregivers in Toronto, Ontario. Caregivers complete applications with designated

care coordinators, or AST Social Workers. Problem Solving Therapy is used to create a self directed care plan that includes access to grants. Caregivers use grants to purchase support services like in home care, medical supplies, social activities, or other caregiving related expenses. Caregivers are supported through AST services such as counselling, support groups, and education sessions.

Objectives: To evaluate the program's impact on caregivers' self reported stress (SRS), financial compromise, self care and sense of support.

Methods: Caregivers were surveyed over a 6 month period; questionnaires were mailed at care plan implementation and three months post.

Results: The response rate was 30% (91 Caregivers), and 43% (128 caregivers) for pre and post questionnaires respectively. Caregivers were asked to estimate their monthly out of pocket expenses related to caregiving, the mean amount reported was \$765 per month. Three months post care plan implementation SRS levels were maintained, time spent on caregiving related tasks increased, and need for financial compromise increased substantially. Positive impact was seen; caregivers reported that funds enabled them to spend more time on their own health (53%), family or personal commitments (46%), other (33%) and work or school (5%). Additionally 99% of caregivers felt that participating in the program made them feel more supported in their caregiver role, and 71% felt that funds and support received allowed the care recipient to live at home longer. Themes that emerge from qualitative data collection include thanks, gratitude for the funding that enable the access to essential supplies like food, medication, and incontinence products. Other themes include need for increased funding amounts and supports.

Conclusion: Questionnaire results do not indicate a decrease in caregiver SRS, financial compromise or time spent on caregiving tasks. This could be due to the large discrepancy between reported out of pocket expenses and grant amount, and it is recommended that grant amounts increase substantially. Results do indicate benefits such as increased time for self care, increased sense of support in their caregiving role and the belief that the program has enabled the care recipient to stay living in their own home longer. Additionally qualitative results from open ended questions indicate that the program provides access to vital care and support that would otherwise be inaccessible.

[i] Prevalence and monetary cost of dementia in Canada. Alzheimer Society of Canada, 2016.

[ii] Assessing the socioeconomic impact of Alzheimer's in Western Europe and Canada. The Economist, 2016.

Patterns Of Performance On Sentence Repetition In The 3 Variants Of Primary Progressive Aphasia

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Background: Current diagnostic criteria specify that the logopenic variant (lvPPA) of primary progressive aphasia (PPA) is characterized by impairment in sentence repetition and word retrieval. The diagnostic criteria do not, however, specify whether sentence repetition will be impaired in either the semantic (svPPA) or the nonfluent (nvPPA) variants and the implication is that performance on this task will distinguish patients with the logopenic variant from the other variants. We aimed to determine if patients with any variant of PPA show impairment on sentence repetition.

Method: We administered the sentence repetition task from the Boston Diagnostic Aphasia Examination to 52 participants with PPA (9 lvPPA, 20 svPPA, 23 nvPPA), and 20 controls. The patient groups were matched on aphasia severity based on the Western Aphasia Battery. The task consists of 16 sentences/phrases, half of which are high probability and half of which are low probability (e.g., "Go ahead and do it if possible" vs. "The Chinese fan had a rare emerald"); the two conditions are matched on length and syntactic complexity.

Results: Analysis of variance showed that on the high probability sentences, the lvPPA and nvPPA groups were impaired relative to controls, while the svPPA group performed normally. On the low probability sentences, all of the PPA groups were impaired.

Discussion: As expected, the lvPPA patients were impaired on sentence repetition and performance was not affected by the probability of the sentence. Impairment in sentence repetition was also documented in both of the other variants, which was unexpected based on diagnostic criteria. The nvPPA patients were impaired on both high and low probability sentences, which is the same pattern seen in the lvPPA group. In contrast, the svPPA group was impaired on repetition of low probability sentences only; this is consistent with previous findings demonstrating difficulty with repetition of strings of words which patients no longer comprehend (due to semantic impairment).

Conclusion: Sentence repetition is impaired in all 3 variants of PPA. This is in contrast with current diagnostic criteria, which specify that this impairment will be a distinguishing feature between the logopenic variant and the other two variants.

Cholinesterase Inhibitor Use And Impact Of Frailty Status Among Older Adults With Dementia Prior To And After Admission To Long-Term Care

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Background: Cholinesterase inhibitors (ChEIs) are prescribed for symptomatic treatment of mild to severe Alzheimer's disease. Among those receiving treatment, the decision to discontinue treatment is complex, requiring consideration of patient-specific benefits and risks, severity of impairment and expected rate of cognitive decline, tolerability, coexisting chronic conditions, and family and caregiver preferences. Studies of ChEI use have generally lacked the detailed clinical information required to understand the range of factors associated with discontinuation or persistence such as frailty, degree of cognitive impairment, and the presence of challenging behaviours. Little is known about the pattern and determinants of ChEI use among older persons transitioning to long-term care (LTC), an important period during which decisions must be made regarding which medications to continue.

Objectives: Our objectives were to describe patterns of ChEI use prior to and following admission to LTC among older adults with dementia or significant cognitive impairment; and, to determine whether frailty and other resident characteristics were associated with the risk of discontinuation.

Methods: We used linked clinical and administrative health databases to conduct a retrospective cohort study of 56,722 older adults (aged 66+) with dementia and/or significant cognitive impairment who were newly admitted to LTC in Ontario between April 2011-March 2015. We analyzed whether residents were prescribed ChEIs concurrently at the time of admission and during the following year. Frailty was calculated using a validated 72-item index (FI) derived from items included in the Resident Assessment Instrument (RAI-MDS 2.0). Discontinuation was defined as a 30-day gap in which no new dispensations occurred and no supply of any ChEI was available from previous dispensations. Cox proportional hazards models were used to estimate the association between resident characteristics (including sociodemographic information, cognitive function, behaviours, comorbidity and frailty), and time to discontinuation.

Results: Almost one-third (31.3%, n=17,749) of LTC residents with dementia or significant cognitive impairment were on a

ChEI at admission. In the year following, 82.3% continued to use ChEIs and 17.7% discontinued. After accounting for resident characteristics, ChEI type and history of use, the rate of discontinuation was 26% higher in frail residents compared to non-frail residents (HR=1.26, 95% CI [1.11,1.43]). Residents with aggressive behaviours (HR=1.83, 95% CI [1.60, 2.08]), end stage disease (HR=1.97, 95% CI [1.47, 2.63]), and higher levels of cognitive impairment (HR=1.31, 95% CI [1.12, 1.54]) were also more likely to discontinue a ChEI.

Conclusions: Most LTC residents who entered on a ChEI continued treatment during the 1-year follow-up. Resident characteristics such as frailty, severity of cognitive impairment and aggressive behaviours were associated with ChEI discontinuation, which is arguably consistent with a number of recommended guidelines for ChEI discontinuation. Future work should examine the long-term outcomes associated with cholinesterase inhibitor discontinuation in this population.

Demographic influences on consecutive Addenbrooke Cognitive Examination 3rd edition (ACE-III) scores collected in a Specialized Seniors Health Clinic

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The Addenbrooke Cognitive Examination (ACE) was originally developed to improve on the diagnostic utility and accuracy of the Mini-Mental State Examination (MMSE). The ACE and its subsequent iteration, the ACE-R, were recently replaced with the ACE-III. The ACE-III continues to have a total score out of 100 as well as sub-scores for Attention/Orientation, Memory, Fluency, Language, and Visuospatial abilities; however, significant changes were made to the language and visuospatial sections. The ACE-III was validated for use in a sample of 53 healthy older adults who were 50 years or older (average age 68.7 ± 7.0 and average education 14.1y ± 2.8). Two cut-offs scores for dementia have been set at 88 and 82. However, little is known about the demographic influences on the ACE or ACE-R and even less is known about demographic influences on ACE-III scores, especially for adults over 70 years. The purpose of this study was to exam demographic influences (i.e., age, education, sex, and English as a second language) on ACE-III scores in a consecutive population of seniors (age 65 years and older) who were referred for neuropsychological assessment due to cognitive concerns. There were 130 referrals from a Specialized Seniors Health Clinic over a period of 2 years. Of these, 104 individuals agreed to participate in the study. The average age was 74.6 ± 6.8 years, the average education was 13.2 ± 3.2 years, 63% were male, and 85% had English as their first language. All spoke adequate English to complete neuropsychological testing. The average score on the

ACE-III was 75.1 out of 100. In considering standard cut-offs, 14 individuals scored above 88, 16 individuals scored between 82 and 88, and 74 scored below 82 (suggesting dementia). Statistically significant correlations with small to moderate effect sizes were found for age ($r=-0.22$) and education ($r=0.39$) with the Total ACE-III score. In addition, age was uniquely correlated with the Memory sub-score ($r=-0.23$). Education was correlated with all sub-scores (Attention/Orientation: $r=0.22$, Memory: $r=0.20$, Fluency: $r=0.26$, Language: $r=0.43$, and Visuospatial: $r=0.26$). Sex was not correlated with any of the ACE-III sub-scores. English as a second language was correlated with the Language sub-score ($r=-0.39$). These results indicate that older age is associated with lower scores on the ACE-III, especially for the Memory sub-score. In addition, higher education is associated with higher scores for the Total score and for all sub-scores of the ACE-III. Lastly, English as a second language was associated with lower scores on the language sub-score. These results indicate that further investigation of demographic influences on ACE-III performance is warranted. Total scores and sub-scores may need to be adjusted for education and memory performance may need to be adjusted for age. As well, English as a second language should be considered when interpreting ACE-III scores, especially for the Language sub-score.

Determining The Impact Of Passive Music Exposure On Brain Activation And Functional Connectivity Using fMRI In Patients With Early Alzheimer's Disease

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Background: Although Alzheimer's disease (AD) affects almost one million Canadians and that this number is estimated to increase significantly in the next 10 years, existing pharmacological treatments have shown only modest benefits to the patient. Music has been demonstrated to improve behavior and cognition in AD. Additionally, music has proven to have a powerful effect on cognitive reserve, or the brain's ability to compensate for damage and protect against the development of AD. No study has used neuroimaging to visualize brain changes pre- and post- a passive music listening intervention (MI) with AD persons. We sought to determine whether exposure to familiar music can alter functional brain connectivity and cognitive outcomes in early AD, and whether musicianship confers an advantage in MIs.

Methods: We recruited N=4 musicians (AD+M) and N=5 non-musicians (AD-M) with early AD (other dementias excluded) with no other neurological/psychiatric illness who speak English, are aged 65+, have an MMSE score >18,

have a reliable informant/caregiver, and able to undergo MRI. AD+M must have played music professionally and/or received formal musical training. Musical preferences were obtained from participants and songs were loaded onto an MP3 player. Participants were asked to complete a three-week MI (music listening 60 min/day), validated by an informant. Participants visited St. Michael's Hospital twice, once before MI initiation and at MI completion. At each session, participants underwent cognitive testing and an MRI, including a structural scan as well as resting state and task-based fMRI. During the task, participants listened to familiar (obtained from musical preferences) and unfamiliar (newly composed) music. We generated activation maps of familiar and unfamiliar music in AD+M and AD-M then found regions of significant overlap to establish a common Music Network (MN). We then utilized our resting state data and calculated the change in activation (post-pre intervention) at each voxel and fit a group-level GLM to measure the mean effect of intervention and interactions with patient group. We measured mean connectivity values between nodes of the MN and compared them between AD+M and AD-M and pre- and post-treatment.

Results: Familiar music activated areas involving the putamen, cerebellum and frontal regions relative to unfamiliar music. In the MN, AD+M group showed higher average functional connectivity pre-MI. However, the AD-M group showed a significant increase in mean connectivity from pre- to post-MI. Although not significant, AD-M saw an increase in cognitive scores ($p = 0.2$) while AD+M did not ($p=1.0$).

Conclusions: Familiar music activated emotion and frontal areas extensively compared to unfamiliar music. These results give preliminary insight into the compensatory mechanisms by which music may modulate emotional and executive networks to improve cognition in individuals with AD. Our resting state and cognitive findings suggest enhanced benefits of MI, particularly for AD-M, suggesting that novelty of exposure is critical in music-based intervention studies. Increased understanding of how music can affect the brain in AD will lay the empirical foundation for the development of new, inexpensive, and enjoyable therapeutic interventions that target specific brain networks to improve clinical care and reduce neuropsychiatric symptoms.

A Quality Improvement Project – Development Of An Electronic Medical Record (EMR) Template For Dementia Follow Up Visits

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Background/Objectives: Dementia follow up visits are time consuming. There are certain themes that need to be

addressed and documented at each follow up visit. These include cognitive and functional status, safety concerns, comorbidities, medication management, responsive behaviours and caregiver stress. Documentation of all these issues can be time consuming. To minimize the time spent on documentation and to ensure all the issues are addressed, an EMR template was created.

Methods: A literature search conducted on EMR templates for dementia follow up visits revealed no publications. Informal discussion with colleagues also confirmed that there are no existing electronic medical templates for dementia follow up visits. A template was created after review of quality indicators for dementia care and best practices, using common themes addressed during follow up visits. The first iteration of the template appeared as a flow sheet on the progress notes, only captured the issues were discussed or not, and did not capture the discussions or recommendations. It was cosmetically unappealing. Second version was created in Feb 2017. An Excel spreadsheet was created with all the themes addressed on dementia follow up visits except for comorbidities. Each major topic is divided into sub-topics and further subdivided if required. Major heading include the following: diagnosis, living arrangement, visited with, changes since last visit, medication management, cognition, function, safety concerns, behaviours, cognitive test score, treatment options, support systems and care. Each major topics had several subtopics; e.g. Behaviours subtopics include: psychosis, aggression, agitation, mood, apathy disinhibition, motor, night time and eating. Psychosis was subdivided into hallucinations and delusions, further categorized as distressing or non-distressing. The template includes tick boxes and free text options. The Excel spreadsheet was then converted into an EMR template for the OSCAR EMR. Once saved, the form appears on the EMR as a follow up visit progress note.

Results: This is second iteration of the EMR dementia follow up visit template was used in the office for dementia specific follow up visits. Use of this EMR template saved time by diminishing the need to review previous visit notes and by reducing the time required to document the visit. By using the template, any issues that were not addressed on the previous visit were easily identified and addressed on subsequent visits.

Conclusion: EMR template was developed to facilitate documentation and to ensure quality care was provided for patients with dementia during follow up visits. It is currently available for implementation with the OSCAR EMR system, but can be adopted for use on any EMR system and personalized.

In Vivo MRI Metrics As A Tool For Early Identification And Gradation Of Alzheimer's Disease Key Neuropathological Lesions

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Background/Objective: Given the heterogeneity in dementia aetiologies and clinical presentations, a definitive diagnosis of Alzheimer's disease (AD) can only be established following postmortem examination, which has long been and remains the gold standard. A current accepted assessment method is the "ABC staging", which requires the neuropathological gradation of diffuse amyloid plaques, neurofibrillary tangles (NFT), and neuritic plaques. Among all pathological features of AD and frequent comorbidities, the strongest correlate of atrophy on magnetic resonance imaging (MRI) appears to be NFT pathology. We aimed to provide more extensive regional analysis to define the best predictive model for post-mortem neurofibrillary degeneration associated with AD using in vivo MRI measurements.

Method: Participants were selected from three databases (ADNI, NACC and Rush Memory and Aging Project) providing MRI scans and postmortem neuropathological data. After initial quality control, 194 subjects were retained. Surfaces, thicknesses and volumes from cortical and subcortical structures were segmented bilaterally from last MRI before death using FreeSurfer and transformed to normed metrics adjusted for sex, age, intracranial volume, manufacturer and magnetic field strength. In total, 234 radiological variables were examined. Both nonparametric and machine learning analyses were performed to provide the best predictive model of neurofibrillary staging as assessed by Braak score.

Results: We created three different models using anatomical areas respectively involved in Braak transentorhinal (I-II), limbic (III-IV) and isocortical (V-VI) stages. The best models included age at death, time interval between last MRI and death, gender, cognitive performance and the normed scores of metrics from eight structures that are routinely inspected during neuropathological examination of patients with suspected AD. The first model included entorhinal cortex and hippocampus measurements and provided an accuracy of only 27.9% for the prediction of Braak transentorhinal stage. The second model included metrics from fusiform gyrus, inferior temporal and middle temporal cortices and provided an accuracy of 68.5% for the prediction of Braak limbic stage. The third model included surfaces, thicknesses and volumes from superior temporal, inferior parietal and pericalcarine cortices and provided an accuracy of 61.3% for the prediction of Braak isocortical stage. We therefore obtained a global accuracy of 56.5% for the prediction of the severity and distribution of AD-associated neurofibrillary degeneration.

Conclusion: Regional brain atrophy reflects underlying neurofibrillary degeneration and may be detectable using in

vivo neuroimaging. MRI metrics may therefore be an avenue for prediction of AD pathological staging in the living brain.

The Role Of Endogenous Cellular Prion Protein In Brain Synaptic Function

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Dr. Taghibiglou has found that the cellular prion protein (PrPC) interacts with the GluA2 subunit of AMPA type of glutamate receptors (AMPA). In the brain, AMPARs are the major neurotransmitter receptors that are involved in glutamate-based neuronal communication. Increases and decreases in AMPAR number, distribution, and efficacy represent some of the mechanisms that neurons employ to modulate their communication strength; such changes occur at synapses, and this process is known as synaptic plasticity. Defects in synaptic plasticity are responsible for many brain disorders such as Alzheimer's disease, however the role of PrPC in this process is not known.

Here we show that loss of PrPC causes AMPAR-mediated modifications in synaptic plasticity. I use wild-type B6 mice and PrPC knockouts to explore the function of PrPC at brain synapses. The work focuses on the hippocampus, as it is critical for learning and memory; it is also the brain structure that is preferentially affected in Alzheimer's disease (AD) patients in terms of structure, plaque pathology, and function.

Modulating Neocortical Spatiotemporal Potassium Dynamics: Effects On Spreading Depression And Focal Seizures

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Background: The regulation of brain extracellular potassium (Ke) and spread is disrupted in many conditions, including epilepsy, brain trauma, migraine and stroke. We utilize novel K measuring systems to elucidate the effects of modulating neocortical Ke, tracking its spatiotemporal redistribution. Focally increased Ke causes a transient spreading depolarization, which, when sufficiently large, depresses local metabolism and neuronal activity, becoming a spreading depression (SD), which can be benign or malignant. In the murine neocortex in vivo, we have demonstrated rapid (msec) K redistribution via glia to the perivascular region, followed by a slow K (min) redistribution, partly mediated by glial gap junctions. However, the mechanisms of both rapid and prolonged K redistribution remain enigmatic. With novel techniques and insights, we are investigating Ke regulation in normal and focally epileptic cortex.

Methods: We study mouse cerebral neocortex in vivo, using state-of-the-art technology including: i) double-barreled K⁺ recording electrodes, 4mm apart, with local field potential recordings ii) optogenetic hyperpolarization of the glial membrane potential. We will study K redistribution mechanisms applying pharmacological tools to connexon and pannexon channels, and acute and chronic focal models of epilepsy. K will be increased by focal application, local and somatosensory stimulation, and from seizures.

Results: 1) Elucidated the mechanisms underlying the initial rapid (msec) K redistribution following focal K application or a focal seizure: The initial rapid redistribution of raised Ke occurs via local astrocytes mediated mainly by Kir channels and redistribution occurring electrogenically in the astrocyte to the perivascular astrocytic end-feet, extracellular space and into the local vasculature. 2) Elucidated the mechanisms underlying the slower K redistribution following focal K increase: The slower spread and redistribution of K is partly due to K ions passing via inter-astrocytic gap junctions, and partly due to local diffusion from the area of initial higher Ke to more distal neocortical regions. Following neocortical chronic seizures, K redistribution will be impaired due to altered interastrocytic gap junctional communication. Hyperpolarizing glia optogenetically will depress resting Ke and diminish spreading depolarizations and the larger SD events.

Conclusions: Spatial buffering of raised extracellular K⁺ is mediated through gap junctional communication, most likely via astrocytes. This study will further our understanding of the mechanisms and modulation of rapid and slow K redistribution in the neocortex, advancing brain therapeutics, particularly for focal epilepsy.

The Effect Of Aerobic Exercise On White Matter Hyperintensity Progression May Vary By Sex

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Background: Subcortical ischemic vascular cognitive impairment (SIVCI) is the second most common cause of cognitive impairment and dementia. It is associated with vascular risk factors and people with SIVCI commonly exhibit white matter hyperintensities (WMH). Epidemiological data indicate that WMH are progressive in nature and the progression of WMH are associated with subsequent declines in cognitive function. Aerobic training may be a promising strategy to reduce vascular risk factors, and thus has the potential to mitigate WMH progression in people with SIVCI. Of note, biological sex may moderate the efficacy of aerobic training on brain health, including WMH progression.

Objective: The goal of this exploratory analysis of data acquired from a randomized controlled trial was to investigate the effect of a 6-month aerobic training program on WMH progression and determine whether these changes are sex dependent.

Methods: This is an exploratory analysis of a randomized controlled trial assessing the effect of aerobic training in SIVCI (NCT01027858). Participants were randomized into a 6-month aerobic training or control group. A subset completed magnetic resonance imaging at baseline and 6-months to quantify WMH volume. An analysis of covariance with Bonferroni corrected planned comparisons was conducted to determine the effect of aerobic training and sex on change in WMH volume at 6-months controlling for baseline WMH volume, age, and ApoE ε4 status.

Results: Twenty-nine participants were included in this sub-analysis; 16 were randomized to the aerobic training group and 13 to the control group. We found a significant sex×group interaction ($p = 0.03$). At 6-months, females in the aerobic training group showed significantly greater WMH volume compared with females in the control group ($p = 0.05$). Among males, there was no significant between-group difference ($p = 0.31$). In the aerobic training group, males demonstrated significantly less WMH volume at 6-months compared with females ($p = 0.01$). In the control group, there were no sex differences in WMH volume ($p = 0.69$).

Conclusions: The results of our exploratory analysis suggest that the effects of aerobic training on WMH progression may vary by sex. This may stem from sex-specific hemodynamic responses to exercise, such that the physiological effects of aerobic training may be more potent in males compared with females. Additionally, sex differences in aerobic training may be related to hormonal differences. Specifically, greater pituitary-adrenal axis reactivity and reduced estrogen levels in women may increase the susceptibility for ischemic damage. More studies with larger samples are needed to affirm the efficacy of aerobic training on WMH progression and to fully elucidate the effect of aerobic training future studies should consider potential sex differences.

The Initial Development of iGeriCare: An Online Geriatrics Education Tool

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Background: Receiving a diagnosis of dementia is a stressful experience for patients and their caregivers. Patients and

caregivers are provided with a large amount of information during this difficult time which can be overwhelming. Long wait times between physician appointments makes asking clarifying questions or obtaining new high quality, evidence-informed educational material difficult. Therefore, iGeriCare has aimed to, with the input of geriatricians, clinical staff, patients and families, create online information and educational modules (lessons) on relevant topics to patients with dementia and their families to complete at their own pace.

Methods: Eight lessons were developed through an agile framework, ultimately informed by health care professionals (geriatricians, case managers) and informal caregivers from the community. Topics addressed included but were not limited to: What is Dementia?; What is Mild Cognitive Impairment?; and How to Promote Brain Health. Informal caregivers evaluated the usability of the lessons through telephone interviews ($n=3$). The Quality in Use Integrated Measurement (QUIM) Framework informed usability (Seffah et al., 2006). QUIM consists of usability factors (i.e. efficiency) and subsequent criteria (i.e. efficiency= minimal action, operability) (Seffah et al., 2006). Each participant ($n=3$) had a total of nine bi-monthly interviews, one to introduce the topic and gather demographic information, and one for each lesson. Additionally, qualitative feedback was collected online via 360 Articulate as the lessons were developed, allowing constant improvement through iteration. Caregivers, geriatricians, case managers and community members (total $n=12$) all evaluated online. Data collected from the phone interviews (QUIM) and online feedback (360 Articulate) was thematically analyzed into words, phrases and attitudes.

Results: Overall feedback was positive. The most emergent themes include: relevance of information; slide design; ease of navigation and; forward learning. Participants found the information included to be relevant and in comprehensible 'bite-sized bits'; health care professionals approved the accuracy and deliverance, and community members/caregivers appreciated the lexicon. Participants valued the colour and design of the slides, the size grading of images, as well as the clarity of the words. All participants expressed ease-of-use on the lessons; participants improved as they practiced through additional lessons. Last, participants expressed how they found the lessons helpful, and encourage the development of additional lessons.

Conclusions: The thematic data illustrates positive attitudes towards the lessons from both healthcare professionals and caregivers. As the study data displays the design and presentation of the lessons are well perceived, a second phase of the project will begin in January 2018. Two additional lessons will be developed to make a full set of ten lessons. Additionally, a pilot study of the iGeriCare intervention will test pre- and post-caregiver wellbeing, caregiver self-efficacy and quality of life.

Dementia Population Risk Tool (DemPoRT): Predictive Algorithm For Assessing Dementia Risk In The Community Setting

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Objectives: The burden of disease from dementia is a growing global concern as incidence increases dramatically with age and average life expectancy has been increasing around the world. Planning for an aging population requires reliable projections of dementia prevalence; however, existing population projections are simple and have poor predictive accuracy. The Dementia Population Risk Tool (DemPoRT) will predict incidence of dementia in the population setting using multivariable modeling techniques, and will be used to project dementia prevalence.

Methods and Analysis: The derivation cohort consists of elderly Ontario respondents of the Canadian Community Health Survey (CCHS) (2001, 2003, 2005, 2007; 18 764 males and 25 288 females). Pre-specified predictors include sociodemographic, general health, behavioral, functional and health condition variables. Incident dementia was identified through individual linkage of survey respondents to population-level administrative health care databases (1 797 and 3 281 events, and 117 795 and 166 573 person-years of follow-up, for males and females, respectively until March 31, 2014). Using time of first dementia capture as the primary outcome and death as a competing risk, sex-specific proportional hazards regression models were estimated. The 2008/2009 CCHS survey will be used for validation (approximately 4 600 males and 6 300 females). Overall calibration and discrimination will be assessed as well as calibration within predefined subgroups of importance to clinicians and policy makers.

Results: The derivation cohort consists of 47,776 survey respondents, of which 4,867 (10%) were identified as having incident dementia. The pre-specified model includes 32 predictors (63 degrees of freedom) capturing information on sociodemographics, general and chronic health conditions, health behaviors and physical function. Preliminary results suggest that the model is well-calibrated and has good discrimination. Diabetes, stroke and diet are strong predictors of dementia for males and females. Body mass index and needing help managing finances are also predictive in females, while self-rated health is predictive in males. After model reduction, the contribution of health behaviors to dementia incidence will be assessed and future prevalence of dementia in Ontario will be projected. DemPoRT will be validated using the 2008/09 CCHS in Ontario.

Conclusion: Health system planning in anticipation of growing dementia prevalence requires reliable projection estimates. DemPoRT will be the first and most comprehensive population-based algorithm for predicting dementia incidence, with the potential to improve the ability to answer key policy questions with respect to the future burden of dementia in Canada.

Digital Storytelling And Dementia In Edmonton, Alberta

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Background: Currently, 564,000 Canadians live with dementia. According to the Alzheimer Society of Canada (2016), it is estimated that this number will increase to 937,000 by 2031. Digital storytelling has been used therapeutically with people with dementia, in a variety of ways from using reminiscence to stimulate memory to videos for facilitating communication. Here, we defined digital storytelling as using media technology including photos, sound, music, and videos to create a meaningful life story or stories.

Objectives: The purpose of this research is to explore and understand the benefits and challenges of creating and sharing digital stories as experienced by the storytellers - people with dementia. We are implementing a similar protocol across three Canadian sites- Edmonton, Vancouver, and Toronto.

Methods: Focusing on the project in Edmonton, the researcher met weekly with seven participants (4 men, 3 women) over 8 weeks. The weekly sessions were designed to facilitate participants to develop and create a digital story. During the last session, they discussed the experience of using digital media to create stories, and the seven digital stories were shared with loved ones and the public. Themes included family, personal accounts of war, travel, and sports that bridged generations. Each session was audio recorded. Transcripts and field notes were analyzed to determine the benefits and challenges of going through the digital storytelling process for the participants and their care-partners.

Results: Participants talked about feeling a sense of accomplishment and satisfaction, enjoying the individual sessions and having the digital story as a legacy to pass on. Thinking about life stories triggered memories from the past and participants were surprised at what they were able to remember. Some challenges they faced included having difficulty articulating or expressing thoughts, and having difficulty remembering specific details of past events during certain sessions. Interestingly, the benefits expressed by participants were a result of the process of the workshop as well as the outcome. In other words, the video that was created by the participant received a unanimous positive response; however,

the participants also focused on the importance of interactions with the facilitator and actively participating in creating the digital stories. Although the participants seemed to know that they would not remember the details of the workshop, they expressed enjoyment and satisfaction with the process, emphasizing the significance of the relationship with the facilitator. They looked forward to meeting, talking about their lives, and recalling memories they had not thought about for years. The experience for persons with dementia was in enjoying the ‘present moments’ in the digital storytelling process.

Jazzercise As An Intervention For Subjective Cognitive Decline In Postmenopausal Women: Pilot Study Rationale And Methodology

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People who are concerned about memory and score in the normal range on clinical cognition tests are now identified as having subjective cognitive decline (SCD) (Jessen et al., 2014). The combination of physical activity and cognitive training may have a greater effect on cognitive performance than either alone (Eggenberger et al., 2015). Participants training in group versus individual settings are more likely to self-report memory improvement (Eggenberger et al., 2015). Physical exercise when combined with music has been demonstrated to have more positive effects on cognitive function in elderly people than exercise alone (Sato et al., 2014). It has been recommended that future trials use validated objective measures that cover 24 hours per day to ensure that all sedentary and physical activity behaviours are measured (Voss et al., 2014). Jazzercise is the world’s leading group dance fitness program lead by certified instructors. New dance routines to music are created every 8 weeks and this learning represents a form of cognitive training during exercise. Cognitive vitality (CV) is a rich concept which expands beyond measured cognitive function by embracing additional variable resources including social support, physical and functional status, physical activity, mental health and nutrition. We will explore the parameters that contribute to CV and explore individualizing them using a Goal Attainment Scaling approach in a cohort of females with SCD.

Research Question: “Does 6 months of jazzercise improve physical fitness, elements of CV and stabilize brain structural/functional decline in sedentary post-menopausal women with SCD?”

Hypotheses: Compared to baseline assessments, jazzercise over 6 months will;

- a. Improve physical fitness, mood and exploratory parameters of cognitive vitality.

- b. Improve cognitive function, gait and balance.
- c. Stabilize anterior hippocampal volume, (MRI), stabilize metabolite levels in the posterior cingulate and motor cortex (MRS), improve cerebral blood flow (ASL), and increase functional/structural connectivity (resting state fMRI/DTI).
- d. Provide effect size measurements for sample size calculation for a larger future randomized controlled trial.

Methodology: Ten well-characterized, sedentary, postmenopausal women over the age of 55 years are being recruited from the Aging Brain and Memory Clinics, the cognitive neurology clinics, and the geriatric psychiatry clinics. Participants are being oriented to jazzercise and then asked to choose two classes per week and encouraged to increase participation to up to 3-5 classes per week by the end of 3 months and continue to 6 months. Participants will answer clinical questionnaires and complete a cardiovascular, neurological, and musculoskeletal examination. They will undergo a 6 minute walk test, gait and balance measures, neuropsychological tests and MRI at baseline, and 6 months. Blood will be drawn at baseline and at 6 months for future analysis. Fitbit measurements of pulse rate, steps per day and sleep quality will be completed for a 1 week period at baseline, 1, 2, 4, 5 and 6 months.

Preliminary Results: 7 of the 10 participants have initiated the study. Study design and preliminary results will be discussed.

The Canadian Collaboration on Neurodegeneration and Aging - Platform 1 - COMPASS-ND Study

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Background: The Canadian Collaboration on Neurodegeneration and Aging (CCNA) is a national research study of people with cognitive impairment or dementia funded by CIHR and study partners engaging over 360 dementia researchers. Across the 3 themes of prevention, treatment, and quality of life are 20 teams with specific research questions. The 8 platforms supporting the teams include the Clinical Cohorts Platform; COMPASS-ND study.

Objectives:

1. To create a pan Canadian set of cohorts of participants with various cognitive disorders
2. Integrate a wide range of experimental, clinical, imaging and genetic expertise
3. Address the causes, identification, management, treatment and prevention of cognitive conditions in the aging population.

4. Collect biospecimens, imaging, genetics, and brain donation to support the research of 20 national research teams.

Methodology: In July 2014 a clinical cohort working group was struck and met monthly by teleconference to design a comprehensive clinical protocol. Membership was drawn from Montreal representing CCNA central office, CCNA database team from Longitudinal Online Research and Imaging System (LORIS), the Cognitive Clinical Research Group in London, Ontario representing the Consortium of Canadian Centres for Cognitive Clinical Research (C5R) and stroke and Parkinson's Disease sites as well as experts from neuropsychology, cognitive neurology and neuroimaging. The protocol included clinical questionnaires, neurologic examination, detailed neuropsychology testing, blood and CSF biomarkers and MRI brain imaging. Definition of the seven different cognitive disorders were defined and agreed upon. Clinical cohorts included subjective cognitive decline (244 for intervention trials in Toronto and Montreal and 56 from the rest of the country) MCI (400), MCI with subcortical vascular lesions (200), mild dementia of mixed etiology (150), mild Alzheimer's Disease (150), Parkinson's Disease dementia spectrum (Lewy Body disease, Parkinson's dementia, MCI in Parkinson's disease) (200), frontotemporal (FTD) spectrum (behavioural variant FTD, primary progressive aphasia, progressive subnuclear palsy and cortical basal syndrome) (200) for a total of 1600 participants. The choice of neuropsychological tests included the intent to have overlap between the neuropsychological tests in COMPASS ND with the neuropsychological tests being performed in the Ontario Neurodegeneration Research Initiative (ONDRI) and the The Consortium pour l'identification précoce de la maladie d'Alzheimer - Quebec (CIMA-Q) being conducted in Quebec. A further consideration was the need to have tests that were validated in both English and French as well as permission to use and retain on LORIS. By July 2015 a platform implementation team (PIT) had been hired and weekly teleconference meetings began. Ethics submissions were submitted to central research ethics boards in Ontario, Quebec, Alberta, New Brunswick and BC. For private sites, the REB submission was submitted to a central private REB.

Results: June 9, 2016 was the enrollment of the first participant to COMPASS-ND followed by refinement of the screening of the 3 clinical visits for consenting participants. To date 18 sites have completed signed agreements and contracts, and staff and have been initiated with a total of 30 sites anticipated. Over 100 participants have been recruited.

β -Amyloid Burden And Vascular Risk Interact To Predict Neocortical Tau PET Signal In Clinically Normal Older Individuals

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Background: Vascular risk factors, such as hypertension, high cholesterol, and diabetes, are risk factors for the development of late-life cognitive impairment. Neuropathological studies indicate that vascular brain injury frequently coexists with Alzheimer's disease (AD) pathology in late-onset dementia, and that vascular brain injury may lower the threshold for cognitive impairment. With the advent of β -amyloid and tau positron emission tomography (PET), we can now explore the relationships between vascular risk factors and AD pathology in vivo and in regionally specific ways.

Objective: We examined the impact of a well-validated measure of systemic vascular risk on regional tau deposition in clinically normal older adults with known amyloid burden. Tau was measured in neocortical and limbic regions of interest (ROIs) in order to investigate regionally specific associations with amyloid and vascular risk.

Methods: The sample consisted of 160 older adults (mean age at baseline = 73.6 \pm 6.2 years) from the Harvard Aging Brain Study, an ongoing longitudinal study. Participants were clinically normal at the time of study entry. Participants underwent β -amyloid (11C Pittsburgh Compound B) and tau (18F Flortaucipir) PET imaging, and assessment of systemic vascular risk using the office-based Framingham Heart Study cardiovascular disease risk score (FHS-CVD). β -amyloid PET imaging and assessment of FHS-CVD occurred at baseline; tau PET imaging was introduced mid-study, and scans were acquired on average 3.3 years from baseline (SD = 1.1). A composite measure of β -amyloid within frontal, lateral and retrosplenial regions was used as a continuous, summary measure of amyloid burden. Tau was measured in four pre-specified, FreeSurfer segmented ROIs, including two limbic regions (entorhinal and parahippocampal cortices) and two neocortical regions known to show neurofibrillary tangle pathology in AD (inferior temporal cortex and posterior cingulate/precuneus). β -amyloid and FHS-CVD were examined as independent and interactive predictors of regional tau PET in separate linear regression models, controlling for age and sex.

Results: Higher β -amyloid was associated with elevated entorhinal, parahippocampal, and inferior temporal tau PET signal (all $p < 0.001$). There was no relationship with tau PET signal in posterior cingulate/precuneus ($p = 0.17$). Higher FHS-CVD was associated with higher tau PET signal in inferior temporal cortex ($p = 0.02$). No relationships were observed between FHS-CVD and other regional measures of tau (entorhinal: $p = 0.22$, parahippocampal: $p = 0.06$, posterior cingulate/precuneus: $p = 0.81$). In separate models, β -amyloid and

FHS-CVD significantly interacted to predict tau PET signal in the parahippocampal cortex ($p = 0.03$) and the two neocortical ROIs examined (inferior temporal cortex: $p = 0.005$; posterior cingulate/precuneus: $p = 0.03$). There was no association with tau PET signal in the entorhinal cortex ($p = 0.49$).

Conclusions: These results suggest that higher β -amyloid and FHS-CVD may synergistically promote tau deposition in the neocortex. Together, with a rich neuropathological literature demonstrating that vascular brain injury may further exacerbate cognitive impairment in AD, the results here provide further rationale for vascular risk reduction (either alone or in combination with anti-amyloid treatments) as a potential approach to delaying AD-related cognitive decline.

Factors Associated With Discordant Clinical And Pathological Diagnoses In Frontotemporal Lobar Degeneration

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Background: Frontotemporal lobar degeneration (FTLD) encompasses several neurodegenerative disorders presenting with a wide range of cognitive, neuropsychiatric, and motor manifestations. Despite improved current diagnostic criteria and recent advances in investigational tools, FTLD disorders are frequently misdiagnosed clinically and final neuropathological diagnoses are often discordant with the initial clinical impression. We aimed to identify potential factors associated with inaccurate clinical diagnoses in pathologically proven cases of FTLD.

Methods: In a prospective case series, subjects were identified through the Sunnybrook Dementia Study (SDS), which is an ongoing longitudinal dementia study conducted at Sunnybrook Health Sciences Centre. Subjects received comprehensive clinical evaluations, including standardized neuropsychological and neuropsychiatric batteries, and brain imaging. Pathologically proven FTLD cases were selected for retrospective analysis. These included neuropathological diagnoses of corticobasal degeneration (CBD), progressive supranuclear palsy (PSP), and frontotemporal dementia (FTD) secondary to TDP-43 proteinopathy or tauopathy. Identified cases were dichotomized into whether the initial clinical diagnosis was concordant or discordant with autopsy results. Data analysis included exploration of potential factors contributing to erroneous diagnosis, such as demographic, clinical, and neuropsychological variables, as well as brain imaging and autopsy findings.

Results: A total of 53 cases of pathologically proven FTLD were identified: 11 CBD, 15 PSP, and 27 FTD (17 cases of

TDP-43 proteinopathy and 10 cases of tauopathy). Discordant clinico-pathological diagnosis occurred in 29 subjects (55%): 7 with CBD (64%), 11 with PSP (73%), and 11 with FTD (41%). Misdiagnosed subjects were commonly mistaken for other FTLD disorders (15 cases, 52%) or with Alzheimer's disease (9 cases, 31%). Factors for discordant clinico-pathological diagnoses included age of onset ≥ 70 years (OR: 5.35, 95%CI: 1.31 – 21.90), age at assessment ≥ 70 years (OR: 7.22, 95%CI: 2.07 – 25.14), and presence of concomitant neurodegenerative pathologies or vascular findings at autopsy (OR: 3.45, 95%CI: 1.16 – 10.29). In FTD, misdiagnosed subjects had onset of their disease at an older age (71.6 ± 7.5 years vs. 57.2 ± 7.5 years, $p < 0.0001$), were less educated (12.2 ± 2.8 years of education vs. 16.5 ± 3.0 years, $p = 0.0009$), and were initially assessed at an older age (74.5 ± 6.9 years vs. 61.0 ± 6.1 years, $p < 0.0001$). Clinically, they had lower scores on the Neuropsychiatric Inventory (NPI) for the euphoria item (0.4 ± 0.7 points vs. 4.0 ± 4.1 points, $p = 0.0281$) and higher scores for the depression item (3.5 ± 3.9 points vs. 0.4 ± 1.1 points, $p = 0.0483$). In PSP, misdiagnosed subjects had lower total scores on the NPI, although not statistically significant (11.4 ± 14.3 points vs. 23.7 ± 16.1 points, $p = 0.2483$). In CBD, misdiagnosed subjects progressed slower until death (8.8 ± 3.0 years vs. 4.7 ± 2.2 years, $p = 0.0419$) and performed better on the Rey-Osterrieth complex figure test (27.1 ± 12.0 points vs. 4.67 ± 3.4 points, $p = 0.0072$).

Conclusions: Initial misdiagnosis of patients with FTLD disorders was frequent in our case series. Older age at onset and at initial assessment, and presence of concomitant central nervous system disease were all significant causes for clinical misdiagnosis.

White Matter Changes Contribute To Neuropsychiatric Manifestations Of Alzheimer's Disease And Frontotemporal Lobar Degeneration: An Autopsy Cohort

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Background: Regional grey matter atrophy in Alzheimer's disease (AD) and frontotemporal lobar degeneration (FTLD) has been associated with cognitive and behavioural symptoms. While white matter hyperintensities (WMH) seen on T2-weighted MRI have recently gained recognition in AD as contributing to cognitive deficits, their association with neuropsychiatric symptoms (NPS) in AD and FTLD has been less well studied. The objective of this study was to investigate the possible associations between regional WMH volumes with NPS in pathologically proven AD and FTLD.

Methods: Pathologically proven cases of AD and FTLD were identified from the Sunnybrook Dementia Study, which is

an ongoing longitudinal dementia study where participants received comprehensive clinical evaluations, including standardized neuropsychological and neuropsychiatric batteries, and brain imaging. Brain imaging data were obtained on a 1.5 Tesla GE Signa system in compliance with consensus recommendations. MR imaging processing included segmentation and parcellation procedures with regionalized and whole-brain volumetrics for grey matter (GM), white matter (WM), as well as WMH. Volumetric data were adjusted for total intracranial volume (TIV). Data analysis included linear regressions with items of the Neuropsychiatric Inventory (NPI) as the dependent variables, regional WMH volumes as predictors, and age, sex, level of education, and corresponding regional GM volumes as covariates.

Results: Fifty-three pathologically proven cases of FTL D (17 TDP-43 proteinopathy, 10 Pick's disease, 11 corticobasal degeneration (CBD), and 15 progressive supranuclear palsy (PSP)) and 15 cases of AD were identified, along with 35 healthy controls for comparison purposes. There were no statistically significant differences between groups in regards to age, sex, and education. The NPI total score differed significantly between groups (ANOVA $p = 0.0043$), with the TDP-43 and Pick's disease subgroups having higher scores. Anxiety was associated with increased volumes of WMH in right medial frontal region in TDP-43 cases (standardized coefficient $\beta = +0.704$, $p = 0.031$) and in left lateral frontal region in PSP cases (standardized coefficient $\beta = +0.720$, $p = 0.004$). Similarly, anxiety was associated with increased volumes of WMH in right lateral frontal region in AD (standardized coefficient $\beta = +1.315$, $p = 0.012$). Euphoria and appetite/eating changes were associated with increased volumes of WMH in left frontal regions for both TDP-43 and PSP pathologies. In TDP-43, increased WMH in the left medial frontal region was associated with euphoria (standardized coefficient $\beta = +0.901$, $p = 0.015$), while in the left lateral frontal region, increased WMH was associated with appetite/eating changes (standardized coefficient $\beta = +0.439$, $p = 0.023$). In PSP, increased WMH in left lateral frontal region was associated with euphoria (standardized coefficient $\beta = +0.680$, $p = 0.04$) and with appetite/eating changes (standardized coefficient $\beta = +0.720$, $p = 0.04$).

Conclusions: Our findings suggest that increased volumes of WMH in distinct frontal regions in AD and FTL D, more specifically in TDP-43 and PSP pathologies, are associated with neuropsychiatric manifestations, mainly anxiety, euphoria, and appetite/eating habit changes.

Continuous, Objective, And Home-Based Assessment Of Activity And Effort Related To Caregiving

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Background: The majority of caregiver instruments use questionnaires that assess subjective aspects related to caregiving, which can be subject to bias and inaccuracies in self-reporting. There is a need for tools that can objectively measure and quantify aspects related to caregiving. Home-based, remote-sensing computer systems provide the ability to capture outcome measures related to cognition and everyday functioning. These systems could also be used to provide more accurate and unbiased measures of daily activities related to caregiving and time spent on caregiving. The goals of this study are to determine the feasibility of collecting objective measure related to caregiving, to assess how they compare to conventional caregiver tools and to develop a set of digital biomarkers that predict effort and time related to caring for an individual with Alzheimer's disease.

Methods: Data is derived from EVALUATE-AD (Ecologically Valid, Ambient, Longitudinal and Unbiased Assessment of Treatment Efficacy in Alzheimer's Disease), a pragmatic proof-of-concept clinical trial to detect standard dementia treatment transitions. Participants are MCI or early-stage AD patients living with a care partner identified through the NIA-Oregon Aging & Alzheimer's Center. A pervasive sensing and computing system is deployed in each couple's home continuously providing data on measures related to caregiver engagement (e.g. time together, sleep disruption related to partner activity). Each caregiver is administered self-report assessment scales, Zarit Burden Interview (ZBI) and the Neuropsychiatric Inventory (NPI-Q), at baseline and every three months throughout the year-long trial. Convergent validity is assessed by examining the correlation between novel outcome measures and the ZBI and NPI-Q.

Results: Five homes with 10 participants are currently enrolled. Caregivers have a mean age of 69 years old and baseline mean ZBI score of 8.7 (range 3-18). The mean baseline NPI-Q and Functional Assessment Scale score for the participant with cognitive impairment are 5.7 (range 2-9) and 6.3 (range 0-14), respectively. Data from passive wall-mounted infrared (IR) sensors are able to determine the time participants spend together in the same room, time apart in different rooms and time when both participants are out of their home. Outcome measures related to nighttime behaviors, including total time in bed and number of awakenings per night, are being derived from actigraph wristwatch and IR sensor data. The home-based computing system is well accepted by study participants and provides continuous data on objective measures related to caregiving.

Conclusions: Home-based remote-sensing systems provide a novel method to objectively measure outcomes related to effort and time spent on caregiving. These outcomes could be used to assess for quantifiable changes in activities related to

caregiving in future intervention trials. Continuous, longitudinally acquired measures could also examine the evolution of caregiver engagement as a patient's condition advances.

Experiences, Perceptions, And Needs Of Community Exercise Providers Concerning Persons With Mild Cognitive Impairment Or Dementia

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Background: The prevalence of dementia in Canada is expected to exceed 1 million people by 2038. Dementia is accompanied by worsening cognitive decline that can compromise one's social, occupational, and functional abilities. Exercise is associated with reduced likelihood of dementia and may help persons with mild cognitive impairment (MCI) and dementia maintain their functional abilities. Despite these benefits, adults with MCI/dementia are frequently inactive, due to poor support for and accommodation of dementia in exercise programs. Community exercise providers (EPs) who deliver programming to adults with MCI/dementia can help mitigate these barriers through providing inclusive, "dementia-friendly" exercise programs.

Research Question: What are the experiences of, perceived barriers and facilitators, and supports needed for EPs to deliver exercise to people with MCI/dementia?

Study Sample: This study included 21 EPs with experience working with middle-aged to older adults (≥ 55 years) from the Kitchener-Waterloo region. Participants included certified exercise physiologists, personal trainers, and community volunteers from commercial and community organizations.

Methods: The EPs discussed their experiences, perceptions of dementia and related barriers, and supports needed for exercise in people with dementia in 1 of 4 focus groups. Focus groups were facilitated by a research assistant and notetaker, and followed a semi-structured format. Focus groups were audio-recorded and transcribed verbatim. Transcripts were analyzed using thematic analysis.

Results: Initial analysis has yielded several findings about the experiences, perceived barriers and facilitators, and supports needed among EPs regarding exercise in people with MCI/dementia.

Experiences: Our participants reported a variety of experiences with people with MCI/dementia, both personally and professionally. Their personal experience informed both their perception of dementia as well as the strategies they used in delivering exercise to people with dementia. Across the focus groups, EPs

had worked with people with MCI/dementia who had diverse needs, including the number and severity of symptoms and the size and strength of their caregiving network, which influenced their participation in exercise programs. Perceived Barriers and Facilitators - EPs perceived dementia symptoms (e.g. memory loss, reduced mobility) as barriers to participation in current exercise programs. However, most EPs had developed their own strategies for program design and delivery to meet the unique abilities and preferences of their clients with MCI/dementia. Educational needs - EPs reported encountering few to no dementia-specific educational resources but identified a need for more education regarding delivering exercise to people with dementia, especially as dementia-symptoms progress.

Conclusions: EPs support the creation of inclusive community spaces for health promotion for adults with MCI/dementia. EPs in this study had developed their own strategies to accommodate the needs of people with MCI/dementia through experience. However, they identified a need and desire for dementia education and the design of appropriate exercise programs. Standardized education could reduce the need to rely on experience and trial and error in programming. Developing structured educational resources and training opportunities for EPs may be a way to broaden their scope of knowledge and increase accessibility of exercise programs to adults with MCI/dementia.

Dancing For Cognition And Exercise (DANCE)

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Background: As our population ages, it is imperative to find strategies which effectively reduce frailty and improve mobility, cognition, and independence. Dancing may be superior to traditional exercise programs given that it's an inherently complex sensorimotor activity that combines both physical and cognitive training as a single entity. Although dancing has been examined in healthy community-dwelling seniors, the feasibility of implementing a dance program with frail older adults with cognitive and physical challenges has not been explored. In this presentation, we will outline the development and design of the Dancing for Cognition and Exercise (DANCE) program using activity analysis and consider intervention fidelity and implementation barriers/facilitators.

Methods: The DANCE program is an ongoing pilot study examining feasibility, acceptability and preliminary clinical effectiveness of a structured, dance program for older adults (aged 60+) with cognitive (MoCA total score = 21.77 ± 4.00) and physical (FRIED Frailty Phenotype: 24 of 25 participants were pre-frail/frail) impairments but able to

follow basic instructions and move independently. The program is a partnership between the Geriatric Education and Research in Aging Sciences (GERAS) Centre at Hamilton Health Sciences and the YMCA of Hamilton. An activity analysis, a systematic evaluation utilized by occupational therapists, was conducted to identify required grading (duration; sequence; instructions), performance skills (motor complexity of rhythm and coordination; balance demands), and therapeutic benefits of dance.

Design: The DANCE program was developed to be delivered over a duration of 15-weeks (1-hr class; twice weekly). Each class follows the same sequence of activities (introduction [10-mins]; warm-up [5-mins]; structured dance [25-mins]; freestyle dance [5-mins]; cool-down [5-mins]; social time [10-mins]). All dance instructions are provided in a graded approach: (1) watching new dance step with no music with verbal cues, (2) trying new dance step with no music with verbal cues, and (3) trying new dance step with music with verbal cues. The structured dance component involves progressive increases in motor complexity (i.e., tapping right foot only to the beat [beginner stages] to coordinating body movement and rhythm between right and left feet [advanced stages]) and balance demands (i.e., seated; standing holding onto with chair; standing without holding onto chair). It is anticipated the therapeutic benefits of dance with additional social time will enhance health and well-being older adults with cognitive impairments who are at risk of functional mobility limitations.

Fidelity: Intervention fidelity and implementation barriers/facilitators will be collected via participant and instructor written feed-back, video recordings and observation. Modifications to the program, rate of progression according to participant capabilities, participant engagement, and relevant contextual factors including intragroup dynamics and contextual variations will be explored.

Conclusions: To our knowledge, the GERAS DANCE program is the first progressive dance program designed for older adults with cognitive and physical impairments who are at risk of declining functional mobility. Our partnership with the YMCA provides infrastructure to access both physical space and instructors already equipped for the needs of older adults, and will ensure seamless implementation of “knowledge into action” and future sustainability of the GERAS DANCE program.

Delusions in Alzheimer’s Disease are Associated with Decreased Default Mode Network Functional Connectivity

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Background/Objectives: Delusions are common in patients with Alzheimer’s disease (AD), affecting an estimated one in three patients. Delusions have been associated with poor outcomes, including greater cognitive and functional decline, a more rapid disease progression, increased caregiver burden, and higher mortality rates. Neuroimaging studies typically focused on regional structural and functional alterations associated with delusions. However, there is increasing evidence that complex cognitive functions involve large-scale intrinsic functional networks, comprised of distinct brain regions that work in synchrony. In our previous study, we found that AD patients who developed delusions exhibited atrophy in areas of the default mode network (DMN) following the onset of delusions. In contrast, AD subjects who did not develop delusions did not show atrophy in these regions over a similar time frame. Building on these findings, we aimed to investigate the resting-state functional connectivity changes associated with delusions in AD. We hypothesized that delusions are associated with decreased DMN connectivity.

Methods/Overview: Using resting-state functional magnetic resonance imaging (fMRI), network connectivity was explored in 15 delusional and 15 comparable non-delusional AD patients. The Neuropsychiatric Inventory Questionnaire (NPI-Q) was used to identify patients with delusions, and the Montreal Cognitive Assessment (MoCA) was used to measure global cognitive status. A dual-regression principal component analysis (PCA) was run across the 30 subjects, which created data-driven spatial maps of networks that accounted for the greatest variability. The PCA component that depicted the DMN was identified and selected for post-hoc analysis. A two-samples t-test with False Discovery Rate (FDR) correction was run to identify significant differences between the two cohorts.

Results: There were no significant demographic or cognitive differences between the delusional and non-delusional groups. The component that was consistent with the regions of the DMN consisted of activation of the bilateral precuneus, medial prefrontal cortex, bilateral medial temporal lobes, and bilateral inferior parietal lobules. Post-hoc analysis of this component showed that the delusional AD group had significantly weaker coherence between the left inferior parietal lobule with the overall DMN.

Conclusion: Delusions in AD may be mediated through impaired connectivity of the DMN, specifically through decreased integration of the inferior parietal lobule. DMN and the inferior parietal lobule play a role in self-monitoring, autobiographical memory retrieval, mind-wandering, concept of self, envisioning the future, Theory of Mind, and empathy. Therefore, breakdown in these cognitive functions may contribute to delusions. Poor self-monitoring and autobiographical memory retrieval may cause misjudgment of events as

memories; mind-wandering can increase suspiciousness; and impaired ability to infer the mental state of others can lead to delusions of persecution. A better understanding of network alterations associated with delusions in AD could potentially lead to interventions to target these networks, leading to improved treatment outcomes.

Prevalence And Topography Of Cerebral Microbleeds In Neurodegenerative Disorders

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Background: The prevalence and topography of cerebral microbleeds (CMBs) in Alzheimer's disease (AD) have been extensively studied. CMBs have been linked to amyloid deposits, but hypertension may also predispose to them. Some authors have suggested that the topography, and risk factors of CMBs vary depending on the dementia diagnosis and reflect the inherent underlying pathology. However, the relationship between CMBs and other types of dementia such as frontotemporal dementia (FTD) and dementia with Lewy bodies (DLB) is not well established.

Methods: We performed a cross-sectional analysis of consecutive patients from the Sunnybrook Dementia Study who underwent T2* Gradient-Recall-Echo MRI (GRE). Images were assessed by two independent raters and CMBs were classified according to the Microbleed Anatomical Rating Scale.

Results: The study population consisted of 207 patients with mild to moderate dementia (Dementia Rating Scale 11.4 ± 17.8), 111 (53%) women, age 72.2 ± 9.5 and 13.8 ± 3.8 years of education. 155 patients with AD, 21 with FTD, and 31 with DLB. Fifty-three normal controls (NC) were included for comparison, 23 (43.4%) women, age 69.5 ± 7.8, years of education 15.7 ± 3.2. At least one definite CMB identified on GRE in 38 (18.3%) patients and 6 (11.3%) normal controls. Definite CMBs were found in 32 (20.6%) of the patients with AD, 1 (4.7%) with FTD, and 5 (16.1%) with DLB. CMBs were distributed more frequently in lobar regions across the entire cohort. In patients with AD, CMBs were found more frequently in the parieto-occipital regions. In the one patient with FTD and CMB, the localization was infratentorial, and in the patients with DLB CMBs were more cortical than subcortical with no lobar predominance.

Conclusions: The prevalence of CMBs in our sample was similar to previous studies of CMBs in AD. CMBs were

found in only one patient with FTD, which is consistent with other reports showing a very low frequency of CMBs in FTD. The prevalence of CMBs in DLB was lower than previously reported, which could be related to the size of our sample, the slightly younger population, and the degree of mixed pathology found in our patients. The distribution of CMBs was similar to what has been shown in other reports with less involvement of the occipital lobe in DLB versus AD. These results expand the knowledge of vascular biomarkers, including amyloid, in different neurodegenerative disorders.

How A Small But Mighty Team Is Effecting Change On Soaring Rates Of Dementia Related ALC

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Background/Objective: On July 1st 2009, the Canadian health care system adopted the term "alternate levels of care" (ALC) to refer to patients occupying inpatient beds but no longer requiring the intensity and volume of care provided within acute care. Since its introduction, Ontario has had, and continues to have, some of the highest rates of ALC in the country and the numbers are steadily increasing. Geriatric clients diagnosed with dementia remain in hospital for twice as long as their counterparts without the diagnosis. Having a dementia diagnosis is linked to approximately two thirds of the "social admissions" into acute care. Patients diagnosed with dementia who display biological and psychological symptoms of dementia (BPSD) and who are awaiting Long Term Care Home (LTCH) or alternative placement, make up the highest combined numbers of ALC days and may remain in hospital for years. This specific cohort has a significant impact which is reverberated across all silos of the health care system. As our population ages and the numbers of individuals diagnosed with a dementia rises we anticipate the trend of rising ALC rates will continue unless action is taken. The strain that high ALC numbers place on the system is well documented and The Ontario Ministry of Health and associated Local Health Integration Networks (LHINs) have been tasked with the challenge of addressing this need. Four years ago, the Toronto Central LHIN funded a small program to address this very issue using a behaviour management model. This research study assesses how well the LHIN funded Behavioural Support Specialist (BSS) Program addresses rising ALC rates within this population by reviewing both quantitative and qualitative data. The research highlights both the programs successes and how these can be increased, and its challenges and how they can be surmounted.

Method/Overview: The effect of the BSS program will be outlined by reviewing: 1) its ability to align with the six transformational pillars of care identified as necessary to decrease ALC as outlined by Dr. David Walker, Provincial ALC Lead

in a report submitted to the Minister of Health and LTCH in 2011, 2) A quantitative review of the outcomes around successful transitions out of ALC and 3) a qualitative review of the impact the program has had on the culture and climate of behavioural management within acute care.

Results: Over the past year, the BSS program facilitated successful transitions and subsequently lessened ALC days for over 50% of its client population. The research suggests that within acute care setting where the BSS are most embedded there has been a demonstrable increase in capacity to manage BPSDs effectively.

Conclusions: This small but mighty team has made a worthwhile impact in reducing ALC days within the TCLHIN hospitals. The BSS program provides a model for what works while also highlighting the urgent need for systems coordination, expansion and enhancement as we prepare to meet the demands of our aging population.

Epilepsy In Patients With Dementia: A Review Of Cases

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Objective: The aim of this study was to describe the features of epileptic seizures in patients with dementia, the possible etiopathogenic mechanisms involved and the electroencephalogram (EEG) findings.

Background: The prevalence of epilepsy in demented patients is higher than in the general population, although the true prevalence of seizures is difficult to determine due to methodological problems detecting these events in a cognitively impaired population. In clinical settings, patients with dementia and epilepsy might be underdiagnosed and therefore undertreated. On the other hand, clinical manifestations suggestive of epileptic etiology in these patients might actually be related to other causes, such as behavioral, autonomic and motor changes in relation to the progression of the neurodegenerative disease. Furthermore, there is a lack of trials addressing the use of antiepileptic drugs (AEDs) in dementia populations, so the use of these drugs is typically based on clinical experience and small case series.

Methods: We reviewed the Sunnybrook Dementia Study (SDS), a CIHR funded longitudinal study using standardized imaging and cognitive testing in a tertiary memory clinic, to identify patients with mild-moderate dementia and concomitant epilepsy. The search was carried out identifying patients who had a concomitant diagnosis of seizures or epilepsy.

Results: 1084 patients with dementia in SDS were reviewed. The mean age of the population was 73 (40 - 90) years old with 14 ± 3.7 years of education and an average of 5 years of dementia duration. The mean score of the Dementia Rating Scale (DRS) was 108.48 ± 21.17 indicating mild-moderate dementia. Twenty-nine patients (2.7%) had a history of seizures. Six of them were diagnosed with epilepsy in childhood and 5 had epilepsy secondary to another neurological disorder (e.g. traumatic brain injury). In 17 patients no other cause of epilepsy was identified. The seizure semiology varied across the patients (focal onset with impaired awareness, focal motor, focal to bilateral generalized tonic-clonic, and non-motor with unknown onset). Some of the EEG recordings showed findings compatible with epileptiform activity. The antiepileptic drugs used were phenytoin, levetiracetam, lamotrigine and valproic acid. We describe the semiology of the epileptic seizures, EEG findings, and management of 4 illustrative cases with Alzheimer's disease (AD), Dementia with Lewy bodies (DLB), mixed dementia (Alzheimer's and vascular dementia) and Cerebral Amyloid Angiopathy (CAA).

Conclusions: There is a need for better methodological studies addressing the role of EEG in the diagnosis and characterization of seizures in patients suffering from dementia. Subclinical epileptiform activity may lead to a faster decline in cognition and can occur more often during sleep stages. With the use of home EEG monitoring and sleep studies, we may in the future be able to diagnose and therefore manage patients with dementia and concomitant epilepsy more readily and at lower cost.

Normal Appearing White Matter Microstructural Changes and Neuropsychiatric Symptoms in Alzheimer's Disease

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Background/Objectives: Neuropsychiatric symptoms (NPS) are common in Alzheimer's Disease (AD). Evidence suggests that as AD progresses, there is an increase in frequency and severity of NPS, leading to lower functional outcome. The purpose of the study was to examine the relationship between NPS and white matter microstructural changes in a sample of AD patients while accounting for concomitant small vessel disease.

Methods/Overview: Thirty-eight dementia patients diagnosed with AD with a mean age of 69.4(11.0), mean years of education of 13.9(3.7), and mean Dementia Rating Scale total (DRS) of 116.6(16.3), were selected from the Sunnybrook Dementia

Study. Caregivers completed the Behavioural Pathology in Alzheimer's Disease (BEHAVE-AD) and the Neuropsychiatric Inventory (NPI). Patients completed extensive cognitive testing. MRI imaging was acquired on a 1.5T GE scanner. The sequences acquired included: 12 direction diffusion tensor imaging (DTI), T1-weighted, proton density and T2-weighted. Lesions and tissue were segmented using a previously validated semi-automated brain region extraction method. Tools from the FMRIB Software Library (FSL) were used for DTI processing. To account for small vessel disease, white matter hyperintensities (WMH) were extracted to allow measurement of DTI metrics of fractional anisotropy (FA) and mean diffusivity (MD) within the normal appearing white matter (NAWM). All statistical analyses controlled for age, sex, years of education, and disease severity using the DRS total score. A Spearman's rho correlation was conducted to examine the relationships with DTI metrics for NAWM and NPS.

Results: Median WMH was 2.6cc with an interquartile range of 7.8cc. The BEHAVE-AD Activity Disturbance subscale was significantly negatively correlated with NAWM mean FA ($\rho = -.332, p = .042$) and positively correlated with mean MD ($\rho = .338, p = .038$). The Overall Global Rating of the BEHAVE-AD was also significantly negatively correlated with NAWM mean FA ($\rho = -.414, p = .01$). Additionally, NPI Aberrant Motor Behavior was significantly negatively correlated with NAWM mean FA ($\rho = -.332, p = .041$) and positively correlated with mean MD ($\rho = .350, p = .031$).

Conclusions: While controlling for small vessel disease in patients with AD, higher ratings on the aberrant motor behavior and activity disturbance subscales of the NPI and BEHAVE-AD were associated with lower FA and higher MD in NAWM. Previous studies have found that small vessel disease burden is associated with deficits in executive and motor function. Our study found moderate correlations between normal appearing white matter microstructural integrity, aberrant motor behavior and activity disturbance, suggesting that degradation of the brain's white matter tracts result in decreased overall connectivity, potentially disrupting normal motor behavior and activity in AD patients. Additionally, since a higher overall global rating in NPS was significantly correlated with poorer white matter integrity, future studies examining region-specific white matter tracts may reveal additional relationships with other NPS in AD patients with small vessel disease. Our findings may yield potential therapeutic targets to improve the functional outcomes and reduce the various NPS that are common in Alzheimer's.

Prescribing Virtual Reality (VRx): Can Exposure To Simulated Natural Environments Using Virtual Reality (VR) Offer An Alternative Therapy For Those Living With Dementia/Cognitive Impairment Who Are Limited From Being Outside?

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Background: Depression and anxiety are common mental health problems in older adults, particularly those with dementia/cognitive impairment (D/CI). Wandering is frequent among people living with dementia, and presents safety risks to patients and challenges to caregivers both at home and within institutions. As the disease progresses, more and more patients become confined indoors and isolated. Furthermore, there is a negative cycle where feelings of isolation and loneliness trigger depression and cognitive decline in older adults, which exacerbates the problems faced by those living with dementia. At the same time, exposure to nature, such as seeing greenery and hearing a babbling brook, has been shown to reduce depression, anxiety, aggression, and bio-physiological distress. Likewise, social interaction is consistently identified as key to improving seniors' quality of life. So while this population may greatly benefit from being in nature or social settings, they are increasingly restricted from experiencing these beneficial contexts and conditions. VR presents a unique opportunity to transport people to a world outside of their confined spaces and into calming settings like a peaceful lake, cozy coffee shop, or cheerful children's playground. VR head-mounted displays (HMD) are wearable devices that make you feel as though you are truly present in the virtual world, seamlessly replacing the real world around you. As this technology becomes more accessible and affordable, there is a unique opportunity for therapy using VR, which may prove to be a more ethically desirable, less expensive means of relaxing, engaging, and distracting patients, without the negative side effects of current approaches (e.g. sedatives, physical restraining, and tracking devices).

Objectives: Determine the usability and safety of VR based therapy for people with D/CI, optimal characteristics of VR experiences for this population (e.g. volume/ light, multi-modality, length, content) and evaluate the potential for VR to decrease depression and anxiety, and increase relaxation.

Methods: In a prospective, non-randomized intervention pilot study, fifty seniors with D/CI were recruited from three healthcare sites. The study included a pre-intervention survey, standardized observation session, post-intervention interview, and obtaining cognitive scoring information (MoCA/MMSE). The intervention consisted of 360° footage from various natural settings displayed using commercially available HMDs. Participants sitting in a swivel chair were assisted to use the HMD and experienced 5-15 min. of VR.

Results: Preliminary results (n=40) indicate that it is feasible to provide dementia patients with VR as a novel therapy. Most participants had positive feedback and reported feeling more relaxed and adventurous, and less lonely post-intervention. Participants tolerated well the headset, none reported feeling dizzy

or disoriented, but the image focus was critiqued. Increasing the stimuli (e.g. presence of people) or narrative content would improve experiences.

Conclusion: Immersive VR technology is increasingly present in healthcare, but its use as therapy for dementia is a novel solution for an old problem, where innovation, including breakthrough discoveries and new approaches to improve quality of life, is sorely needed. Given the positive findings of the feasibility study, we will conduct a Randomized Controlled Trial with updated VR experiences and collecting bio-physiological outcome measures.

Cognitive Resilience And Occupation Moderate Neuroimaging Biomarkers: Sex Differences In Dementia Rating Scale Performance And Change

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Background: A spectrum of neurodegenerative pathologies in the aging brain in combination with cardiovascular risk have led to an increased prevalence and diagnosis of mixed neurodegenerative diseases in late life. Interindividual differences in cognitive resilience and lifestyle factors are associated with complex and dynamic neurocognitive phenotypes in dementia patients. The goal of this study is to examine whether cognitive resilience and occupation act as moderating factors between baseline ventricular size and Dementia Rating Scale (DRS) performance and 3-year change as stratified by sex.

Method: We examined a longitudinal model using dementia patients (N=723; mean age=70.77years (range=38-90years); n females=374) from the Sunnybrook Dementia Study. The recruited patients represented Alzheimer's disease (n=439), mild cognitive impairment (n=77), vascular cognitive impairment (n=52), Lewy body disease (n=30), and frontotemporal lobar degeneration (n=125). We tested the following research questions: (1) Does baseline ventricular size predict poorer DRS performance and steeper 3-year decline and (2) whether cognitive resilience and occupation are moderating factors? (3) Whether combined cognitive resilience +occupation magnifies any moderation effects between baseline ventricular size and DRS performance and change and (4) differentially by sex? We used latent growth modeling to determine how DRS performance changes over 3 years (random intercept and random slope), established a latent cognitive resilience factor (using Wechsler Adult Intelligence Scale (WAIS) vocabulary, WAIS digit symbol, North American Adult Reading Test, education) and path analysis. For occupation, we used the Hollingshead Index of Social Position (occupation scale). To examine moderation effects, cognitive resilience and occupation were dichotomized (low versus high) and additive

effect of cognitive resilience +occupation were computed to represent low, intermediate, and high groups. Age at baseline and APOE ($\epsilon 4/\epsilon 4+$) status were included as covariates.

Results: (1) Larger baseline ventricular size correlated with poorer baseline DRS performance ($\beta=-0.202, SE=0.033, p<0.001$) and predicted steeper 3-year decline ($\beta=-0.085, SE=0.026, p=0.001$). (2) Occupation moderated the relationship between ventricular size and DRS performance. Specifically, larger baseline ventricular size correlated with poorer baseline DRS performance ($\beta=-0.307, SE=0.050, p<0.001$) in the low occupation group but did not significantly predict decline. (3) Larger baseline ventricular size correlated with (a) poorer baseline DRS performance in the low ($\beta=-0.316, SE=0.060, p<0.001$) and intermediate ($\beta=-0.262, SE=0.058, p<0.001$) cognitive resilience +occupation groups and (b) predicted steeper 3-year DRS decline ($\beta=-0.108, SE=0.033, p=0.001$) only for patients in the high group. (4) In men, larger baseline ventricular size correlated with poorer baseline DRS performance ($\beta=-0.231, SE=0.074, p=0.002$) in the low cognitive resilience +occupation group but did not significantly predict decline. Men in the intermediate and high groups appeared protected despite larger baseline ventricular size. However, in women larger baseline ventricular size (a) correlated with poorer baseline DRS performance in the low ($\beta=-0.457, SE=0.099, p<0.001$) and intermediate ($\beta=-0.344, SE=0.070, p<0.001$) groups and (b) predicted steeper 3-year decline in the low ($\beta=-0.201, SE=0.092, p=0.030$) and high ($\beta=-0.153, SE=0.063, p=0.015$) groups.

Conclusions: Cognitive resilience +occupation may moderate the relationship of neuroimaging biomarkers on clinical phenotypes. This moderation effect may differ by sex where women with either low or high cognitive resilience +occupation have accelerated cognitive decline with larger baseline ventricular size compared to men who appeared protected. In dementia, complex interactions between cognitive resilience +occupation and neuroimaging biomarkers may be selective and differentially represented by sex.

Ventricular Enlargement As An Outcome Measure For Clinical Trials Examining Alzheimer's Disease

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Background/Objectives: Alzheimer's disease (AD) is the most common irreversible cause of dementia. In 2016, it has been estimated that over half a million Canadians live with this debilitating ("Dementia numbers in Canada," 2016). In addition to standard cognitive testing, such as the Mini-Mental State Examination (MMSE), previous studies suggest that ventricular size (Nestor et al., 2008) and small

vessel disease burden (Lee et al., 2016) may have potential utility as MRI-based outcome measures for clinical trials in AD. Our study examined changes in ventricular volume and small vessel disease burden as they relate to cognitive changes in AD patients relative healthy elderly controls.

Methods/Overview: We examined 133 AD patients with varying degrees of small vessel disease, and 47 cognitively normal elderly controls from the Sunnybrook Dementia Study. All participants had undergone baseline and follow up structural MRI (1.5T) and cognitive testing (MMSE), with a mean interscan interval (ISI) of 1.7 years. Participant's ventricular cerebral spinal fluid (vCSF) and white matter hyperintensity (WMH) volumes were measured at both time points using a previously validated MRI-based volumetric progression method (Ramirez et al., 2016). An analysis of covariance (ANCOVA) was used for group comparisons of the dynamic progression metrics and partial Pearson r correlations were used to examine the relationship between changes in atrophy, small vessel disease, and cognition. All analyses accounted for age at baseline, sex, and years of education.

Results: Dynamic progression analyses revealed that in just under 2 years, AD patients exhibited significant increases in vCSF volume compared to normal elderly ($p < 0.0001$). Pearson r analyses revealed vCSF volume growth was significantly correlated with periventricular ($r = 0.4$, $p < 0.0001$) but not deep WMH (n.s.). Additionally, vCSF volume growth exhibited a moderate correlation with change in MMSE score ($r = 0.372$, $p < 0.0001$) over the same time period.

Conclusions: As expected, patients with AD showed a greater progression of ventricular atrophy compared to cognitively normal elderly (Nestor et al., 2008). Additionally, vCSF expansion in AD patients from their baseline to follow up scans was consistent with their small vessel disease burden and decline in cognition. The findings from our study suggest that changes in ventricular expansion is a promising biomarker that may be used as viable outcome measure for clinical trials exploring novel treatments aimed at halting progression and restoring cognitive function in AD. In addition to standard cognitive testing, novel treatment strategies such as the use of anti-hypertensives (Edwards et al., 2017), may use our MRI-based progression results as a useful tool to assess treatment outcomes.

Left Temporal Polar Atrophy Distinguishes Semantic Dementia From Alzheimer's Disease

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Background: Alzheimer's Disease (AD) and Semantic Dementia (SD) are late-onset cognitive presentations with overlapping clinical features that can make distinguishing them difficult, particularly early in the course of illness. Studies have indicated that one feature of SD is anterior temporal atrophy, particularly on the left side. The aim of this study was to determine whether left anterior temporal pole (LATP) atrophy can be used as an in vivo imaging biomarker to distinguish between the clinical phenotype of SD and AD in a sample reflective of the tertiary care setting. We first compared LATP volumes between a group of individuals with AD versus those with SD. We then examined whether LATP atrophy was associated with objective language impairment as measured by the Boston Naming Test (BNT), and Semantic Fluency (SeFlu).

Methods: We analyzed data from 425 participants from the Sunnybrook Dementia Study (clinicaltrials.gov NCT01800214), who had a clinical diagnosis of AD ($n = 378$) or SD ($n = 47$). Participants had undergone neuropsychological testing and structural MRI (1.5T), the latter of which was processed using a previously validated volumetric pipeline. To avoid circular reasoning, BNT and SeFlu scores were not used in establishing the clinical diagnosis. Comparison of imaging and language test scores between AD and SD was done using the Mann-Whitney U. Association between LATP, expressed as brain parenchymal fraction (BPF), and BNT, SeFlu, and the MMSE (as a global comparator of cognition) was done using Spearman's Rho. Partial correlations were used, controlling for age, years of education, and the MMSE (for BNT and SeFlu correlations) as cofactors.

Results: SD participants were younger and more educated, but were no different on MMSE compared to AD participants. As expected, SD participants had smaller raw LATP volumes (16.1 cc vs. 18.3 cc, $p = 0.002$), and smaller LATP brain parenchymal fraction (i.e. brain volumes controlled for intracranial capacity, LATP-BPF; 0.61 vs. 0.71, $p < 0.001$; Cohen's $d = 1.7$). Further, SD participants scored lower on BNT (12.6 vs. 20.6, $p < 0.001$) and SeFlu (7.3 vs. 10.1, $p = 0.001$). When combining AD and SD participants, LATP-BPF strongly correlated with BNT ($\rho = 0.75$, $p = 0.02$), and with SeFlu ($\rho = 0.72$, $p = 0.03$), but not with MMSE ($\rho = 0.58$, $p = 0.10$). Separately, among SD participants, LATP-BPF moderately correlated with BNT ($\rho = 0.45$, $p = 0.001$) and with SeFlu ($\rho = 0.36$, $p = 0.01$), but not with MMSE ($\rho = 0.20$, $p = 0.18$). Among AD participants, LATP-BPF moderately correlated with BNT ($\rho = 0.43$, $p < 0.001$) and with SeFlu ($\rho = 0.40$, $p < 0.0001$), and MMSE ($\rho = 0.36$, $p < 0.001$).

Conclusions: LATP volume distinguishes between SD and AD. Furthermore, it specifically correlates with language

function, but not global cognition when considering all AD and SD participants. When considered separately, a correlation was found between LATP-BPF and language function in AD and SD. However, a correlation was not found between LATP-BPF and global cognition in SD participants, while there was a correlation between the two in AD participants, suggesting MMSE may be a sufficient screening tool for SD but is for AD.

Caregiver Mood and Burden are Associated with Patients' Emotion Detection Ability in Alzheimer's and Parkinson's Disease

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Background: Caring for individuals with dementia poses several challenges for caregivers and is associated with increased burden and depression. Moreover, social cognition changes in individuals with dementia have been reported. Alteration in social behavior in dementia can be caused by several factors, including emotion detection deficits. However, the relationship between patients' emotion detection ability and caregivers' mood and burden has not been examined as extensively. The aim of the current study is to investigate changes in emotion detection and empathy in patients with Alzheimer's disease (AD) and Parkinson's disease (PD), and its relationship to caregivers' depression and burden. Furthermore, we assess the caregivers' perceived ability in recognizing emotion detection deficits in patients with AD and PD.

Method: Patients diagnosed with probable AD (N=25, 73.2±11 years) and PD (N=17, 69.4±8 years), along with their caregivers (AD-CG = 62.1 ±13 years; PD-CG = 67.4 ± 9 years), participated in the current study. All patients underwent the Behavioral Neurology Assessment (BNA). All subjects (patients and caregivers) performed an Emotion Evaluation Test (TASIT-EET). In addition, all caregivers completed the Interpersonal Reactivity Index (IRI – measures empathy), Neuropsychiatric Inventory (NPI), Geriatric Depression Scale (GDS), Zarit Burden Interview (ZBI) and were interviewed on the Clinical Dementia Rating Scale (CDR). A one-way ANCOVA, while adjusting for age, gender and CDR, was performed to examine TASIT-EET performance differences in the AD and the PD group. We conducted one-tailed Pearson correlation between TASIT accuracy score (caregiver's ability to accurately predict patient's TASIT-EET response), and ZBI and GDS. Pearson one-tailed correlation was also carried out to determine the relationship between patients' TASIT-EET performance, and ZBI, GDS, empathic concern (IRI-EC sub-score), perspective taking (IRI-PT sub-score) and NPI total score.

Results: There was no significant difference on TASIT-EET performance between the AD and the PD group. A significant negative association was found between the TASIT-EET accuracy score, and ZBI ($r = -.331, p < .05$) and GDS ($r = -.387, p < .05$). There was also a significant association between patients' TASIT-EET score, and ZBI ($r = -.325, p < .05$), GDS ($r = -.291, p < .05$), IRI-EC ($r = .287, p < .05$) and IRI-PT ($r = .361, p < .05$).

Conclusion: The results of the current study suggest that caregivers' inability to accurately predict patients' emotion detection ability is associated with caregiver burden and depression. The patients' decreased ability to detect emotion is related to their decreased capacity to empathise and to understand others' point of view. Furthermore, this decreased ability is also associated with caregiver burden and depression. Changes in emotion detection and empathy in individuals with AD and PD has implications for caregivers and may be amenable to interventions with both patients and caregivers.

Relationship Between Cerebral Perfusion, Cognition, And Butyrylcholinesterase (BCHE) Genotype In Patients With Dementia With Lewy Bodies (DLB) And Parkinson's Disease Dementia (PDD)

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Background: Butyrylcholinesterase (gene: BCHE; protein: BuChe) is a key enzyme involved in the metabolism of brain acetylcholine and is a major target of the cholinesterase inhibitor, rivastigmine, used to treat Alzheimer's disease (AD), DLB and PDD. The K and atypical variants of BCHE are naturally occurring genetic variation of BCHE that are associated with a 30% reduction of serum BuChe activity due to lower expression of the enzyme. As a result of these variants, basal levels of acetylcholine in the brain are thought to be higher. Indeed it has been shown that individuals with dementia possessing the K and/or the atypical variants of BCHE have preserved attentional performance and a slower rate of cognitive decline than those with the wild-type variant. The objective of this study was to identify regions of altered cerebral perfusion associated with the K-variant in individuals suffering from DLB/PDD and to relate these regions of altered perfusion to cognitive performance.

Methods: Baseline neuropsychological and brain SPECT data from 57 participants with DLB/PDD were obtained from a prospective, observational study conducted at Sunnybrook

Health Sciences Centre, University of Toronto (Genetic and Perfusion Study of Response to Cognitive Enhancers in Lewy Body Disease [ClinicalTrials.gov: NCT 01944436]). Subjects were also genotyped for the BCHE K variant. Z-scores were calculated from neuropsychological data to derive an attention/working memory measure (forward and backward digit span), and a general cognition measure (MMSE, Dementia Rating Scale, Clock total score). In two separate analytic models, we used statistical parametric mapping (SPM) to identify voxels of altered perfusion within the grey matter that were associated with dose of BCHE K variant (0, 1, or 2 K alleles) and the attentional measure or general cognition measure. These analyses included covariates of age, years of education, and sex.

Results: We found that higher dosage of the K variant, and better general cognitive performance was associated with higher perfusion within the right primary sensory area and Brodmann area 39, part of the parietal cortex that encompasses the angular gyrus ($p < 0.001$, uncorrected). Similarly, we observed that higher dosage of the K variant, and better performance on the attentional/working memory measure was associated with increased perfusion within the right primary sensory area.

Conclusion: We have identified a strong correlation between K variant dosage and both higher general cognitive and attention/working memory performance that associates with higher perfusion within the right parietal region in DLB/PDD patients. This study extends on previous findings by identifying the brain regions potentially involved in protective cognitive effects of the K variant in patients with DLB and PDD.

Beta-Amyloid Burden And White Matter Lesions Could Explain Age-Related Cognitive Decline In Normal Aging

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Introduction: Beta-amyloid (β A) burden and white matter hyperintensities (WMH) are commonly observed in the brains of otherwise healthy older adults, making them key biomarkers for investigating the preclinical stage of dementia. Thus, it is of clinical significance to study how β A burden and WMH effect cognitive functioning across a wide range of cognitive abilities in the healthy elderly.

Objective: Our study aims at better understanding the relationship between β A burden, WMH, cognition and age in a cohort of cognitively normal older adults. To that end, we

examined whether β A burden and WMH yield distinct, additive or synergistic effects on cognition across several cognitive domains. Another objective was to assess the value of β A burden and WMH as potential mediators of the relationship between age and cognition.

Participants and Methods: One hundred and four healthy older adults completed a detailed neuropsychological battery along with a Magnetic resonance imaging (MRI) and a Positron emission tomography (PET) scan. Global levels of A β deposition were measured using PET with the amyloid tracer [11C] Pittsburgh compound B. A neurologist assessed WMH burden for each participant with the ARWMC visual rating scale on FLAIR MRI.

Data Analysis And Results: A composite score was calculated for each cognitive domain: episodic memory, working memory, processing speed, language, executive functioning and visuo-perceptual abilities. Age, β A burden and WMH were entered as predictors of cognitive performance in a stepwise regression model. This procedure was repeated for each cognitive domain. Regression models identified A β burden as the only predictor for verbal episodic memory, while WMH were found to be the main predictor for language, including measures of verbal abstraction, vocabulary, verbal fluency and lexical access. The regression analysis also indicated that A β and WMH exert additive effects on working memory and several aspects of executive functioning, such as attention and mental flexibility. Furthermore, a mediation analysis suggested that β A burden and WMH together effectively mediate the impact of age on working memory and executive functioning. However, age was found to be the only significant predictor for processing speed and visuo-perceptual abilities.

Conclusion: Our results suggest that β A burden and WMH have subtle but real effects on cognition, and that they have both independent and interactive effects in different cognitive domains in a sample of cognitively normal older adults. More research is needed to identify a specific profile of cognitive decline associated with the presence of β A burden and/or WMH in the healthy elderly. Such a cognitive profile could be a useful tool in the early detection and prevention of MCI and dementia.

Can A Simple Computer Game Help Monitor Cognitive Change In Persons With Advancing Cognitive Impairment

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Background: Standard clinical practice requires physicians to use pen-and-paper tools, such as the Mini Mental State Examination (MMSE), to measure cognitive decline. However, such tools are typically used intermittently at appointments, often cause stress to patients and they become less reliable as cognitive impairment progresses.

Objective: A “whack-a-mole” computer software game was designed to monitor changes in processing speed and game play accuracy more routinely among patients with moderate dementia over a 1-year period.

Method: We recruited 13 older adults with moderate dementia from an Ottawa Day Program across two sites. MMSE, Trails A and Ramparts testing was completed to assess dementia severity at baseline. The game required participants to “whack a mole” but “ignore a bunny” as a proxy for processing speed and accuracy. Fifteen rounds were played per session. As performance improved, game difficulty increased. Level reached, accuracy and reaction time were monitored biweekly. We present data from the first week.

Results: Participants’ (9 men) average age was 78.1 years (69-88) and average MMSE score was 19 (range between 11 and 25). Their Trails A times ranged from 38 seconds to over 5 minutes. Game play in the first week revealed a range of Level 1 to Level 9 and the average reaction times was 0.68 seconds (range = .58 to .84 seconds). Preliminary results suggest that participants enjoy the game. However, we have not determined any clear relationship between speed of processing as measured on the Trails A and reaction time on the game at baseline. Similarly there was no relationship found between global cognitive score as measured by the MMSE and level of game attained.

Conclusions: This pilot study shows that game play may be an alternative measure to formal cognitive testing in older adults with advancing dementia. Data from the first week of play shows a variety of scores which would allow separation of “high” and “low” performers, but unfortunately there was not good correlation with established clinical tests. Some of the challenges that have been encountered to date include the large range of cognitive scores in this group (in some cases the diagnosis of dementia could be questioned) and the known floor effects of the MMSE and Trails A. Data collection will continue to be collected over 1 year and analyzed to determine if game play outcomes correlate with standard clinical tests like the MMSE.

Predicting Emergent Aggression In Schizophrenia Monitoring Cognitive Worsening

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Background: Previous research on patients with neuropsychiatric symptoms has suggested an inverse relationship between mental state and aggression. However, the literature has been limited to patients with dementia, and the findings thus far have been equivocal.

Methods: Here, consenting adults (n = 123) with a diagnosis of schizophrenia, schizoaffective disorder, or other psychotic disorder not due to substance abuse or a medical condition were assessed using the Mini Mental State Examination (MMSE) and Modified Overt Aggression Scale (MOAS) over a 12-month period. The MMSE is a brief mental status exam, and the MOAS probes for aggressive behaviour manifested verbally, physically, toward oneself, or against property over the past week.

Results: Pearson correlation analysis revealed a weak inverse relation ($r = -0.16$) between MMSE and MOAS scores rated cross-sectionally.

Discussion: We conclude that that the inverse relationship between mental state and aggressive behaviour observed in patients with dementia neither generalize to patients with schizophrenia nor change over time within this population.

Primary Progressive Apraxia Of Speech: Case Series

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Background: Progressive apraxia of speech is defined as a progressive disorder affecting articulatory planning or programming. When it is the only or predominant neurological deficit, some authors suggest the use of the term primary progressive apraxia of speech (PPAOS). Three profiles of speech deficits could exist in PPAOS: 1) a predominance of articulatory errors; 2) a predominance of prosodic errors; 3) a mixed profile (similar proportion of articulatory and prosodic errors). Despite growing recognition of this neurodegenerative disease, its differential diagnosis is still challenging and late diagnoses are not rare. Recently, a few studies revealed some acoustic measures that could help distinguish PPAOS speakers from healthy speakers and from speakers with neurodegenerative communication disorders without apraxia of speech. However, most of these are not applicable to Quebec French or may possibly be influenced by other cognitive deficits.

Objectives: The aims of the present study are to describe the communication profile of a case series of PPAOS subjects and to identify potential markers that could facilitate differential diagnosis of PPAOS in Quebec French.

Methods: 4 subjects with PPAOS and 11 healthy controls participated in this study. PPAOS subjects were 71 to 81

years old and were 1.5 to 4 years post-onset. Healthy controls were matched for sex, age and education level. Assessment of speech, language and cognition were performed for each subject. Language assessment included word and sentence comprehension and production. Cognition assessment included general cognitive screening, non-verbal memory, lexical fluency, and praxis. Speech assessment included articulation, voice, resonance, and phonation. An acoustical analysis was conducted using the speech analysis software Praat. The results of each PPAOS subjects were compared with those of a subgroup of five matched healthy control subjects. Performance patterns were then subjectively compared between PPAOS subjects.

Results: Speech, language, and cognitive evaluations confirmed the presence of speech deficits without language impairment in PPAOS subjects and the absence of any speech, language or cognitive impairment in control subjects. Speech evaluation revealed a slower articulation rate and a greater percentage of articulation errors for PPAOS subjects when compared to control subjects. PPAOS also showed different patterns of performance in some speech tasks, when compared to control subjects. Out of four PPAOS subjects, two had a prosodic profile and two had a mixed profile.

Conclusions: As expected, articulation rate and precision of articulation were greater for control subjects than for PPAOS subjects. Interestingly, a difference in the performance patterns was found between PPAOS and control subjects in a few speech tasks. Therefore, those tasks performance patterns seem distinctive in PPAOS in Quebec French and could provide a clinically easy and fast way to identify these speakers, regardless of post-onset time.

How To Design An Inclusive Care, Based On Individuals' Social Cognition Capacities To Improve Quality Of Life For People With Dementia?

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Background: Social isolation is one of the consequences of dementia. By progression of dementia the ability to talk, remember, and orient oneself in space gradually reduces and the need for assistance with daily tasks increases. These physical and mental abatement causes decline in social, behavioural, and emotional capabilities.

Objectives: Aim of this study is to focus on individuals, who are dealing with dementia, their passion and physical and cognitive abilities to motivate and encourage them to participate in social activities based on their own interests and background.

Overview: World Health Organization (WHO) estimated the number of people living with dementia at 47 million in 2015 and predicted to increase to 75 million by 2030. Dementia is known to be more common in older adults. As a result, people with dementia either live in long-term care (LTC) facilities, or have to relocate to LTC to reduce the responsibility of care from their families and loved ones. Social cognition decline is one of the challenges of this population. Based on Susan Fiske and Shelley Taylor "Social cognition is the study of how people make sense of other people and themselves" (Social Cognition: From Brains to Culture, 2017). Once this sense declines, isolation and loneliness substitute sociable life of people with dementia. Jutta Treviranus, director of the Inclusive Design Research Centre, (Nicol et al., 2016) describes older adults as the most diverse population while they all have different skills, experiences, and different physical capability and health incidents. Typical care systems are normally based on one solution for all patients, considered as an average patient. As Deborah Estrin suggests we might "begin to leverage our small data to bring more vigilance and insight to everyday care. We can think of this as new kind of medical evidence, evidence where n=me" (Estrin, 2014).

Results: The above overview shows that finding/designing an activity for all members of any LTC facility, is not the right answer for keeping older adults socially active. Instead of focusing on a system of care that tries to provide a universal care approach for average patients, we need to define variety of solutions based on individuals to reflect patients' needs and preferences. Instead of looking at big data to focus on average population and "norm" we may use small data.

Conclusions: By focusing on small data, we will bring more careful approach into healthcare especially for this specific population with diverse needs, and increase the social inclusion of people with dementia rather than socially isolating them.

Assessing The Effects Of A Personalized Music Therapy With Headphones On Agitation In Patients With Dementia

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Background/Objectives: Agitation is frequent in patients with dementia living in nursing homes and care facilities, 48%–82% show symptoms of agitation (Zuidema et al., 2007). Agitation contributes significantly to patient distress and caregiver burden (Brown et al., 2012). Agitation is defined as 'inappropriate verbal, vocal or motor activity that is not judged by an outside

observer to result directly from the need or confusion of the individual (Cohen-Mansfield, 1991). Often agitation is treated with antipsychotic drugs (Ballard et al., 2012) that have serious adverse effects (e.g. decreased quality of life, accelerated cognitive decline, even possible stroke and death) (Ballard et al., 2009). There is evidence that music reduces agitation (Casby & Holm, 1994) and leads to a higher degree of compliance in a person with dementia (Clark et al., 1998) but not much is known about the effects in patients with severe behavioral issues in the context of dementia (Hulme et al., 2010). The goal of this study is to investigate the effect of personalized music therapy with headphones on the agitation level of inpatients in a Geriatric Psychiatry Service.

Methods/Overview: Twenty-one in-patients with moderate–severe dementia (mean age=81±6.3, 47.6% female) experiencing agitation participated in our study to-date. Patients were randomized to personalized music therapy with headphones (5 days) vs. non-personalized or no music (5 days) over the course of two weeks (10 days). Music intervention was administered during morning/evening care and patients were given an iPod with headphones (with and without preferred music genres). Agitation during hygiene care was measured by nurses using the Pittsburgh Agitation Scale (PAS) and “as needed” psychotropic medications (PRNs) required for patients. Wilcoxon Signed Rank Test is used to compare the total number of PRNs in the personalized music and non-personalized or no music conditions in the patients. We will also compare the average and total sub-domain scores on the PAS between personalized music and non-personalized or no music conditions in the patients.

Results: There was no statistical difference in the total number of PRNs between those that listened to personalized music and non-personalized/no music. With regards to the sub-total domain scores on the PAS, though it did not reach statistical significance, total and average scores for motor agitation was lower in the personalized music vs. non-personalized/no music conditions.

Conclusions: Our preliminary results, although not statistically significant, suggest that personalized music may be associated with lower motor agitation. These pilot study results are still being collected and analyzed, but will offer insight into the effects of a personalized music intervention on agitation in an in-patient Geriatric Psychiatry Clinic setting. Further additional studies are needed to explore this finding, as non-pharmacological interventions for agitation are appealing given the adverse events associated with some psychotropic medications.

Can Dual-Task Gait Assessment Differentiate Cognitive Impairment Subtypes In A Clinical Setting?

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Background: Gait velocity has been shown to decline along with cognitive function. Recently, dual-task gait (walking while performing a cognitive demanding task) has been linked to increased risk for progression to dementia in older adults with MCI. Dual-task cost, a measure of the effect of the added cognitive task on gait velocity, has also been shown to inversely relate to cognitive abilities and predict further cognitive decline. However, most of these findings come from research environments using highly specialized equipment and many clinics do not currently use gait testing as a complement to cognitive assessments.

Objective: We aimed to examine whether patients from a memory clinic show differences in dual-task gait velocity and dual-task cost based on their cognitive diagnosis (SCI, MCI, and patients with dementia) when tested using only a stopwatch and a six meter path marked on the floor.

Methods: Patients in the Aging Brain and Memory clinic performed a usual gait walk and three dual-task walks: counting backwards by ones, counting backwards by seven (serial sevens), and naming animals. Patients were excluded if they were unable to ambulate the marked path without assistance. One-way ANOVA and General Linear Models were performed to evaluate gait velocity and dual-task cost (DTC, %) across groups.

Results: 178 patients were assessed with cognitive diagnosis of SCI (n=41), MCI (n=72), or dementia (n=65). Performance in single and dual-task gait declined across the cognitive spectrum showing that as the cognitive impairment increased, gait performance showed slower gait velocity (single gait, p=0.001; counting gait, p<0.001; naming animals, p<0.001; serial sevens, p=0.016) and higher dual-task cost (naming animals, p=0.045; counting gait, p=0.050).

Conclusion: Our results show that gait velocity can be a powerful identifier of cognitive decline. These results align with previous research that has shown a decline in dual-task gait velocity with declining cognitive function. Further studies may determine if incorporating dual-task gait testing in clinics can help predict cognitive decline.

Neurocognitive Deficits Affecting Suicidal Behaviour In Schizophrenia: A Secondary Analysis Of The Clinical Antipsychotic Trials Of Intervention Effectiveness (CATIE) Schizophrenia Dataset

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Background/Objectives: About 5% of patients with schizophrenia (SCZ) commit suicide, and patients with SCZ are overall more likely to engage in suicidal behaviours compared to the general population. Suicidal behaviours have previously been linked to neurocognitive deficits such as deficits in memory and attention, which are common in patients with SCZ. However, there is a lack of large-scale analyses of the association between suicidal behaviours and neurocognition in SCZ. The Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE)-SCZ study was a National Institute of Mental Health (NIMH)-funded study of 1460 SCZ patients which documented clinical, functional, and neurocognitive outcomes over a few years. The CATIE study data provides the unique advantage of a large collection of data from a validated SCZ sample. Thus, we aimed to analyze the CATIE data to determine any association between cognition scores and suicidal behaviour observed during the trial. The hypothesis was that higher average scores for cognition across the neurocognitive measures would be associated with suicidal behaviour.

Methods/Overview: We obtained the neurocognitive battery and suicidal behaviour files from the NIMH database. Specifically, we extracted all available standardized neurocognitive scores from the “neurobatt01” file. We obtained data for neurocognitive measures including the Continuous performance test (CPT) and the Hopkins Verbal Learning Test. We extracted suicidal behaviour scores from the “clgry01” file. This file provided scores for the Calgary Depression Rating Scale (CDRS) item 8, coding for suicidal behaviour severity, from 1 (absent) to 4 (severe). We then ran linear regression analyses to determine the association of each of the average neurocognitive scores with suicidal behaviour severity scores. We also coded a binary suicidal behaviour outcome, with absence of suicidal behaviour coded by a 0 and presence of mild, moderate or severe suicidal behaviour coded by 1. We then ran a logistic regression analysis to determine the ability of neurocognitive measures to predict the presence or absence of suicidal behaviour.

Results: The linear regression analysis revealed that the standardized responses for the Hopkins Verbal Learning Test: Number of items recalled on trial 3 ($p=0.049$), the CPT d-prime score: two digit ($p=0.001$), and the CPT d-prime score: three digit ($p=0.008$) were significantly associated with suicidal behaviour. The logistic regression revealed that the CPT d-prime score: two digit was associated with the presence of suicidal behaviour, although the association was not significant (OR=1.365; 95% CI = 0.990-1.882; $p=0.057$).

Conclusions: Suicidal behaviour is a complex problem, and it is strongly affected by neurocognition. Our analysis of the CATIE trial data suggests that altered cognitive abilities may strongly affect suicidal behaviour in SCZ. Further detailed analyses on memory and attention-based neurocognitive

tests may help decide on future pathways of genetic and antipsychotic research.

Cortical Microinfarcts On 3T MRI: Higher Frequency In Patients With Severe Periventricular White Matter Hyperintensities

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Background/Objectives: Recent neuropathological and neuroimaging studies have suggested that cortical microinfarcts (CMIs) may play an important role in vascular cognitive impairment and dementia. Although previously identified on 7T MRI, these elusive lesions can also be visualized in vivo on 3T MRI. The primary aim of our study was to examine the frequency of CMIs on 3T MRI in patients with severe periventricular white matter hyperintensities (pWMH). The secondary aim was to assess the association of CMIs with cognitive dysfunction as well as other imaging markers, including total WMH volumes (deep plus periventricular), deep and periventricular lacune volumes, and lobar and deep microbleeds.

Methods/Overview: We studied a sample of 114 participants (mean age, 72.5; range, 41-88) consisting of normal controls ($n=34$), “pure” Alzheimer’s Disease (AD; $n=29$), AD + severe pWMH ($n=19$), and severe pWMH in the absence of AD features ($n=32$). CMIs were defined as hypointense on T1-weighted images in at least 2 out of 3 views (axial, coronal, sagittal), <5mm in diameter, distinct from perivascular spaces, restricted to the cortex, and perpendicular to the cortical surface. The lesions were first identified on T1-weighted images and then subsequently confirmed as hyperintensities on FLAIR when visible. The frequency of CMIs, lobar and deep microbleeds, deep and periventricular lacune volumes, and total WMH volumes were quantified using Lesion Explorer (Ramirez, 2011).

Results: Among 114 participants, 17 (14.9%) had ≥ 1 CMIs. Specifically, CMIs were identified in 4 (11.8%) of the normal controls, 3 (10.3%) of the participants with pure AD, 5 (26.3%) of the participants with AD + severe pWMH, and 5 (15.6%) of the participants with severe pWMH only. Cognition, as measured by MMSE scores, did not differ significantly between those with and without CMIs. The frequency of microbleeds in those with CMIs (30 lobar and 3 deep microbleeds) did not differ significantly from those without CMIs (91 lobar and 30 deep microbleeds). Participants with CMIs had a mean deep lacune volume of 0.026 cc and periventricular lacune

volume of 0.15 cc compared to a mean deep lacune volume of 0.092 cc and periventricular lacune volume of 0.81 cc in those without CMIs (deep, $p = 0.4$; periventricular, $p = 0.3$). Participants with CMIs had a mean total WMH volume of 15 cc compared to a mean volume of 19 cc in those without CMIs ($p = 0.4$).

Conclusions: The frequency of CMIs on 3T MRI demonstrated by our results is consistent with the findings of other 3T MRI studies, which have reported rates ranging from 6% to 32% in various populations. Although individuals with CMIs did not differ from those without CMIs in terms of total WMH volumes, CMIs were more frequent in participants with severe pWMH (i.e. those with AD + severe pWMH and severe pWMH only). This therefore suggests that further studies using larger sample sizes are worthwhile and needed to evaluate (1) the possible interplay of CMIs and Small Vessel Disease and (2) any correlations that CMIs may have with cognitive functioning as well as other imaging markers.

Norms Generated From Local Samples Are More Sensitive To Early Dementia Than Are Published Norms

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Introduction: There is currently no consensus regarding the optimal normative reference samples that should be used to interpret cognitive performance in older adults undergoing assessment for dementia. Although it is common practice to use available published normative data to standardize raw scores, some authors have argued that norms generated from locally-recruited healthy samples may be more stringent than published norms (e.g., Arsenault-Lapierre et al., 2011). This study aims to determine whether published norms (P-norms) or sample-based norms (S-norms) are most sensitive, specific and accurate for detecting early signs of dementia.

Methods: The Uniform Data Set (UDS) was administered to 580 participants from the Alzheimer's Disease Neuroimaging Initiative (ADNI). All were non-demented upon admission and had at least one available follow-up visit. The UDS assesses episodic memory (Logical memory story A, Rey auditory verbal learning test), language (category fluency, Boston naming test) and executive functioning (Trails A and B). Raw UDS scores were standardized to age-, sex- and education-adjusted Z-scores based on published UDS norms (P-norms), and again using regression-based norms derived from control participants within ADNI (S-norms). Subjects obtaining 2 scores < -1 SD within a cognitive domain were coded 'at risk for future dementia' based on our previous research (Callahan et al., 2015), and this was determined separately using P-norms and S-norms. The accuracy, sensitivity and specificity of each method to predict later dementia were compared, and receiver

operating characteristic (ROC) analyses were used to compare areas under the curve (AUC) for both types of norms. This procedure was repeated in a second sample of 578 initially non-demented participants from the National Alzheimer's Coordinating Center database, who also completed the UDS.

Results: A total of 168 (30%) ADNI participants eventually developed dementia. Z-scores generated from P-norms had 79.9% sensitivity, 68.6% specificity and 71.9% accuracy in predicting dementia (AUC=.742). In comparison, scores generated from S-norms were more sensitive (85.2%), less specific (57.4%) and less accurate (65.5%; AUC=.715). In the NACC sample, 206 (36%) participants developed dementia. Z-scores generated from P-norms had 66.0% sensitivity, 76.6% specificity and 72.8% accuracy in predicting dementia (AUC=.713). In comparison, scores generated from S-norms were more sensitive (68.9%) equally specific (76.6%) and about as accurate (73.9%; AUC=.728).

Conclusions: Published norms generally appear at least as accurate as sample-based norms to detect early signs of dementia from neuropsychological test performance. However, consistent with prior research (Arsenault-Lapierre et al., 2011), sample-based norms are more sensitive for detecting early signs of dementia. This may be explicable by the fact that locally-recruited healthy samples may be a more representative benchmark for normal performance. In other words, individuals recruited from similar contexts (e.g., same community; same research study) are arguably more similar to each other than to samples recruited from elsewhere, and that deviations from normal within this context may be more indicative of early neurodegeneration. This should be an important consideration for clinicians and researchers alike when interpreting raw scores on neuropsychological testing.

Early Signs Of Dementia In Bipolar Disorder

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Background: Epidemiologic work suggests adults with bipolar disorder (BD) may have increased dementia risk (e.g., Da Silva, 2013), yet studies investigating dementia prodromes systematically exclude subjects with psychiatric conditions. Thus, little is known about early signs of neurodegeneration in older BD patients. In an attempt to distinguish the cognitive features that are inherent to BD relative to those that may signal early neurodegeneration, this study documents the longitudinal cognitive profile of adults with BD who develop dementia, compared to those who do not.

Methods: Participants were 114 adults with BD from the National Alzheimer's Coordinating Center. All were non-demented on admission, and underwent annual assessment

of memory, language and executive abilities (mean 4.4 visits). Raw scores were Z-transformed. Twenty-six participants (22.8%) eventually developed dementia as per DSM criteria (“incipient cases”). Longitudinal cognitive features associated with dementia were determined with linear mixed-effects models. Yearly differences between incipient and no-dementia cases were examined using ANCOVA, covarying for differences in sex ($\chi^2=15.0$, $p<.001$) and lithium use ($\chi^2=4.1$, $p=.044$). Groups were matched on age ($t=-1.6$, $p=.108$), education ($t=1.9$, $p=.054$) and vascular risk factors ($\chi^2=0.3$, $p=.603$).

Results: Performance on all measures was associated with incipient dementia (all models $p<.007$). Backwards digit span ($F=5.0$, $p=.029$), semantic fluency ($F=4.6$, $p=.036$), Trails A ($F=6.3$, $p=.014$) and confrontation naming ($F=12.6$, $p=.001$) were reduced in incipient cases up to 2 years before diagnosis. Recall of a short story differed between groups up to 4 years before diagnosis ($F=4.8$, $p=.035$). Digit symbol substitution (DSS) showed the earliest between-group differences, up to 5 years before diagnosis ($F=4.5$, $p=.046$). A DSS Z score <-1.5 SD at any time was associated with 96.6% sensitivity and 46.2% specificity of future dementia.

Conclusions: Longitudinal investigation of older adults with bipolar disorder indicates that a subset is indeed at risk for neurodegeneration, consistent with prior reports. Cognitive testing can detect signs of dementia these patients up to 5 years before diagnosis. In this study, DSS was especially sensitive to early decline, and may potentially be a cost-effective clinical screening tool.

Executive Abilities in Older Adults with ADHD or Prodromal Dementia

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Background: Attention-deficit hyperactivity disorder (ADHD) persists into adulthood in up to 60% of individuals. The dysexecutive symptoms that characterize ADHD (inability to provide sustained attention or mental effort, difficulty organizing or multitasking) may be difficult to distinguish from those of prodromal dementia (i.e., mild cognitive impairment: MCI) in older patients, particularly when they manifest alongside subjective cognitive complaints. We aimed to compare neuropsychological performance between ADHD and MCI, specifically with regard to executive functions.

Methods: Participants were 27 adults aged 40-89 with subjective cognitive complaints who screened positive for

ADHD on the Adult ADHD Self-Report Scale. ADHD was corroborated using the Conners’ Adult ADHD Rating Scale and the Barkley Adult ADHD Rating Scale. Forty-two participants with MCI were selected from a large cohort of individuals with varying severity of cognitive impairment due to dementia. They were well-matched to ADHD participants on global cognitive functioning (Mini Mental State Examination) and depressive symptoms (Geriatric Depression Scale). Executive functions were assessed using phonemic/semantic fluency, forward/backward digit span, Trails A/B, Stroop, and Wisconsin Card-Sorting Task (WCST). Raw scores were standardized to Z-scores using published normative data. Scores were compared between groups using ANCOVA, controlling for age, sex and education.

Results: Relative to MCI ($M=14.00$, $SD=4.53$), ADHD participants generated more semantic fluency words ($M=18.26$, $SD=5.54$; $F=14.706$, $p=.001$). The groups did not differ in terms of phonemic fluency ($F=0.404$, $p=.843$), forward digit span ($F=2.630$, $p=.120$), backward digit span ($F=3.061$, $p=.095$), Trails A time ($F=0.879$, $p=.359$), Trails B time ($F=0.672$, $p=.722$), Stroop interference time ($F=0.111$, $p=.742$), or WCST categories ($F=3.986$, $p=.059$).

Discussion: These results suggest that semantic fluency is significantly different between older adults with ADHD and MCI. Semantic fluency, which takes 2-3 minutes to administer, may be a cost-effective screening measure to assist in the differential diagnosis between ADHD from MCI. Semantic fluency is thought to rely relatively more on temporal lobe than frontal lobe functions, and may be most sensitive to the earliest stages of Alzheimer’s disease (in which the hallmark feature is temporal lobe degeneration). This preliminary study is the first to directly compare executive abilities between these syndromes, and is an important initial step towards characterizing the neuropsychological profile of ADHD in relation to MCI.

Systemic Autoimmunity: A Sex-Specific Factor In Alzheimer’s-Like Disease

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Background: The 3xTg-AD mouse strain is a valuable model of Alzheimer’s disease (AD) because it develops both amyloid-beta (A β) and tau brain pathology. Our lab recently reported that 3xTg-AD males no longer exhibit AD-like plaque/tangle pathology at 1 year of age, but display anxiety-like behavior, learning/memory deficits, and signs of systemic autoimmunity within the first 6 months. This study was designed to compare immune status in both sexes and to determine whether autoimmunity is damaging or protective.

Methods: 3xTg-AD and non-transgenic mice were administered the immunosuppressant cyclophosphamide from 4 weeks to 6 months of age. Mice underwent behavioral testing and were euthanized for assessment of immune status, molecular markers of AD pathology and epigenetic markers of neurodegenerative disease.

Results: Immunosuppression abolished autoimmunity, reduced soluble A β and modulated histone H2 variant expression, but failed to normalize brain mass, brain-derived neurotrophic factor expression and spatial learning in 3xTg-AD mice. Interestingly, it worsened their performance in anxiety-related tasks and produced distinct patterns of fur graying between sexes. Signs of systemic autoimmunity were more profound in untreated 3xTg-AD males than females, suggesting sex is a factor in determining the magnitude of immunological perturbations.

Conclusions: This study points to early, sex-dependent autoimmunity that is associated with increased A β load and epigenetic changes and is protective against anxiety-like behavior in 3xTg-AD mice. Consistent with evidence implicating the immune system in AD, our results suggest a complex role for autoimmunity in modulating brain and body physiology in an endpoint-dependent manner. These findings may shed light on the increased prevalence of AD in women and provide a novel framework to understand, diagnose, and treat AD.

Exploring The Influence Of A Communication Tool On Patient And Family Satisfaction, Understanding And Recall Following An Initial Physician Outreach Visit

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Background: Patients are referred to the Seniors Mental Health Outreach Services by primary care requesting consultation related to diagnosis, management and/or treatment of age related, neurodegenerative mental health problems or chronic mental health and addiction illness in context of aging processes and chronic disease. Visits can be emotion-filled; there are a range of new people to engage with, many questions to respond to and much information to receive which can be overwhelming and confusing for the patient and family. It is well documented that patient understanding, satisfaction and recall all contribute to treatment/ intervention adherence and ultimately patient outcomes. As such, a communication tool titled the "Summary of Visit Form" (SoV) was created to help address aforementioned problems. Research supports the positive, direct influence patient communication tools have on patient outcomes; however, there is little written with respect to use of patient communication tools in seniors mental health outreach settings.

Objective: We were interested in exploring the patient/family perception of value, and whether and how the SoV tool used by the SJHH seniors mental health outreach teams influenced patient and/or family understanding, satisfaction, experience and recall. In addition, we wanted to know if there were specific communication processes that the patient and/or family highlighted as important.

Methodologies: This was an exploratory study using a cross-sectional design. The sample group targeted included active patients/family of the SJHH Senior's Mental Health Outreach Programs from the Halton or Niagara based programs that lived in the community, who were receiving their initial geriatric psychiatry visit and were able to be approached to participate in the study. Initial seniors' mental health outreach visits were carried out as normal and a SoV form was completed and shared with patients/family. Approximately two-four weeks after the initial psychiatry visit, those interested in the study were contacted to be informed and hopefully recruited into the study via telephone. With verbal consent, patients or family then proceeded to participate in a telephone questionnaire consisting of a combination of ten open/closed ended questions. The questionnaire assessed primary and secondary outcomes which are patient/family satisfaction and understanding/recall respectively.

Results: 12 telephone surveys were completed amongst patients, spouses and children. All interviews were transcribed and qualitative data was analyzed using thematic and content analysis. Quantitative data, mean, mode and standard deviation were tabulated. The acceptability and extent of usage of the summary of our visit form was determined by completing a broad analysis of all responses to open and closed ended questions on the telephone survey acknowledging the limitations of this study design.

Impact: This study provided a patient/family perspective of the value and impact of a simple, written patient communication tool at a key clinical touch point e.g. initial geriatric psychiatry visit. It was hoped that this study would add to the conversation as to how current and future healthcare providers could strengthen their current processes to enhance communication recognizing the critical relationship written communication tools have with recall, understanding, satisfaction and thus adherence and ultimately, patient outcomes.

GerimedRisk: Preliminary Data From A New Technology-Based Geriatric Clinical Pharmacology Consult Service

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Background/Objectives: Medications are one of the leading causes of mortality and disability in Ontario. Multiple diseases and polypharmacy in addition to age-related changes to drug elimination put older adults at increased risk of adverse drug events and their complications. There is a paucity of clinicians with expertise in geriatric medicine, clinical pharmacology, geriatric psychiatry and geriatric pharmacy in Canada, particularly in rural areas. There is therefore a need for a scalable, cost-effective solution. Guided by a needs assessment for the existing capacity and demand for geriatric pharmacotherapy in Waterloo-Wellington region, GeriMedRisk was launched April 2017. As the first of its kind in Canada, GeriMedRisk is an independent, not-for-profit interdisciplinary geriatric pharmacology technology-based consultation service that supports physicians, pharmacists and nurse practitioners to optimize their older adult patients' medications, cognition, mobility and function. Utilizing telemedicine (e-consult) over the Ontario Telemedicine Network (OTN) and telephone technology, GeriMedRisk supports referring clinicians from long-term care, primary care and, on a case-by-case basis, acute care.

Methods/Overview: Consult requests from clinicians are sent over OTN e-consult or over the telephone. General drug information questions that do not apply to a specific patient can additionally be sent over e-mail. Telephone consults operate between Monday and Friday, during business hours. On most consults, the geriatric pharmacist performs the initial intake, gathers additional information through online health information portals and the patient's community pharmacist, and provides preliminary recommendations. The consult is then triaged to the appropriate specialist physician(s) who would provide additional recommendations or information. If more than one area of expertise from geriatric medicine, clinical pharmacology, or geriatric psychiatry is required, a coordinated consult is provided. At completion, the consult is sent back to the consulting clinician electronically or over fax in a secure fashion. We performed a descriptive analysis on our consult data for quality improvement purposes.

Results: Since inauguration, we have received 49 consults. The median time to completion for consults is 5 business days (IQR= 3.25). Most clinicians utilize the telephone (59.2%) compared to OTN e-consult (40.8%). Most consults originated from long term care (46.9%) compared to primary care (32.7%), acute care (14.3%), and outpatient specialist care (6.1%). Consults originated mostly from physicians (65.3%) compared to pharmacists (32.7%) and nurse practitioners (2.0%). Geriatric medicine and clinical pharmacology specialists were co-consulted 20.4% of the consults, while geriatric psychiatry was involved in 40.8%. Geriatric pharmacy was involved in 75.5% of the consults. Approximately 40% of patients had cognitive impairment, including delirium and dementia. The most prevalent reason for consult was behavioural and psychological symptoms of

dementia (20.4%). Other common topics of consults included potential or actual adverse drug effects (8.2%), deprescribing (12.2%) and polypharmacy (10.2%).

Conclusions: GeriMedRisk is a new interdisciplinary geriatric clinical pharmacology consult service that supports clinicians using telemedicine. It is a scalable and potentially cost-effective solution to address the need for additional geriatric pharmacotherapy expertise and improve the care of seniors in Ontario.

Association Of Reserve With Cognition Across The Cerebral Atrophy Spectrum Related To Alzheimer's Disease

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Background: Several abnormalities associated with Alzheimer's disease (AD) appears gradually in individuals at risk (Mouih & Duchesne, 2012; Jack et al., 2013). However, these biological factors do not explain by themselves the evolution towards AD since age-related normal and pathological cerebral changes vary between individuals. A concept underlying this individuality is the cognitive reserve (CR; e.g., more educated, complexity in midlife occupation, intellectual leisure). Studies have demonstrated that CR could delay the onset of clinical manifestations of AD (e.g., Stern, 2012). For instance, participation in cognitively stimulating activities during life, identified as a CR proxy, would slow the rate of hippocampal atrophy in normal aging (Valenzuela et al., 2008). The aim of the present study is to examine the relationship of CR with global cognitive function in individuals with similar levels of cerebral atrophy.

Methods: We selected from the CIMA-Q cohort 30 cognitively healthy older adults (CON), 59 individuals with subjective cognitive decline, 28 with mild cognitive impairment, and 13 with clinically probable AD. We assessed CR using an adapted version of the Bartrés-Faz and Solé-Padullés' questionnaire; and global cognitive function using the Montreal Cognitive Assessment (MoCA). We analyzed 3T T1-weighted structural MRIs using Freesurfer 5.3.0, extracted hippocampal (HV) and total cortical volumes (CV), and converted these volumes into age, sex, scanner, and intra-cranial adjusted z-scores according to normative data (Potvin et al., 2016). We then sorted all participants into three z-scores groups ($z \leq -2$; $-2 < z \leq 0$; $z > 0$) for each cerebral region and tested relationships with Pearson's correlations.

Results: There were statistically significant correlations between CR and MoCA in the Left-HV $z > 0$ sorted-group (moderate; $r = .432$, $p < .05$), in the Right-HV $z > 0$ (moderate; $r = .538$, $p < .01$) and $-2 < z \leq 0$ (weak; $r = .373$, $p < .05$), and in the Right-CV $z > 0$ (weak; $r = .313$, $p < .05$).

Conclusion: CR correlation with MoCA is more pronounced in HV $z > 0$ sorted-groups, who are mostly composed of CON subjects. This positive association in healthier brains, and lack of association with atrophy, would suggest an effect of CR in the early phase of progression towards AD. However, further analyses of longitudinal data are required.

The Effects Of Exergaming Interventions On Cognition And Physical Activity Of Institutionalized Older Adults: A Systematic Review

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Objective: Physical activity has a powerful protective effect on older adults' cognition and emotional well-being. For older adults living in long-term care, however, there are limited opportunities for engaging in physical activities, and therefore they are at high-risk of experiencing the consequences of continuous physical inactivity. Older adults with mild cognitive impairments (CI) or dementia experience more inactivity, are more socially withdrawn, and are at a significantly higher risk of decline. Exergames have been posed as a promising way to improve motivation to exercise for institutionalized older adults with dementia, with associated benefits to their cognition, well-being, social engagement, and physical capabilities, however the effects of exergaming on this vulnerable and complex population is unclear. This review aims to explore the current evidence and research gaps in these effects of exergaming interventions for this population.

Method: Four databases (MEDLINE, CINAHL, PsycINFO, and Compendex), were systematically searched. Quantitative studies examining cognitive, emotional, motivational, social and physical effects of exergaming interventions for older adults with dementia or CI living in long-term care were eligible for inclusion. The search included exergaming interventions and all institutionalized older adults. Thorough screening identified studies that had institutionalized older adults with mild CI or dementia.

Result: The search yielded 206 citations; of those, 3 met inclusion criteria. The study designs, outcome measures and interventions varied greatly. Two studies looked at physical effects of exergaming suggested balance and motor function could be improved. Two of the three studies reported a significant pre/post-test improvement to motor function but gait did not improve in both these studies. When looking at cognitive benefits of exergames, studies provided indication that participants improved their alertness, concentration and

memory capabilities. In one of the three studies though, there were no increase in memory capabilities. The studies were of very low to low quality. Furthermore, the studies showed that playing these games did not result in any adverse events, or exacerbate responsive behaviours while the participants were playing. There was no subgroup analysis done in any of the three studies.

Conclusion: There is insufficient evidence that currently available exergames benefit cognition and motor capabilities of institutionalized older adults with mild cognitive impairment or dementia. More robust research looking at the effects of exergames on cognition and motor function is needed. Additional development of exergames tailored to the needs and interests of this population is also required.

Living Well with Dementia: The role of Community-Based Programs in Promoting Social Connectedness for Persons with Dementia and Their Caregivers

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Persons with dementia (PWD) and their caregivers experience chronic social isolation as a result of the effects of disease and the demands of caregiving. Older adults with dementia are often excluded from mainstream recreational and social programs due to cognitive deficits, and the potential need for personal support and programs are not meeting their unique needs. The purpose of this study is to evaluate the project entitled, 'Living Well with Dementia,' designed by the Alzheimer Society of Durham Region (ASDR) to reduce social isolation for persons with dementia and their caregivers through the development of social/recreational programming; an intervention that is being co-facilitated by community volunteers.

This research uses qualitative methodology through individual in-depth interviews using a series of open-ended questions to explore the older adults with dementia, caregivers and volunteers' experiences of the ASDR programs. Preliminary findings revealed the enablers and challenges associated with the programs in relation to providing opportunities for social connections, as well as the impact of the volunteer programs in reducing social isolations for PWD and caregivers.

The findings from this study will help inform further development of ASDR programs in meeting the unique needs of PWD and caregivers in relation to social engagement. These results may be applicable to other community agencies, service clubs, churches and local businesses in order to better understand the needs of PWD and caregivers, as well as identifying the educational training that is necessary for

their volunteers to address the challenges of social isolation among older adults with dementia.

Optimizing Resident Care And Quality Of Life In Long-Term Care With Environmental Enhancements

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Background/Objectives: Approximately 62% of Ontario's long-term care home (LTCH) residents have dementia(1) and 78% of those with dementia experience behavioural and psychological symptoms(2). In November 2014, all LTCHs in the South West LHIN (n=78) were invited to apply for \$5,000 in one-time funding for evidence-based environmental enhancements to help prevent or decrease resident responsive behaviours. Following a peer-review process, the 74 successful applicants were notified in January 2015. Projects were completed by March 31, 2015.

The majority of homes chose one of four approaches to reduce the frequency of responsive behaviours:

- more than half (56.8%) used the funding for multi-sensory equipment, such as Snoezelen™;
- 21.6% purchased expressive therapy equipment, such as iPods™ and iPads™;
- 21.6% created more home-like settings by purchasing new carpeting, tables, and chairs; and
- 17.6% camouflaged doors and other exit points in an effort to reduce elopement attempts.

Methods/Overview: In August 2015, five months after the enhancements had been put in place, the 74 participating LTCHs homes were surveyed and asked to: describe lessons learned;

- share any feedback from residents and family members;
- indicate if they would recommend this project to other homes, and
- describe what factors would be likely ensure success elsewhere.

Results: Fifty-two homes responded to the survey (70.3% response rate). All homes thought that the projects were valuable and had a positive impact on both residents and staff. The enhancements resulted in: decreased responsive behaviours; increased staff and resident engagement and quality of life; reduced depression; and enhanced communication among residents, their family members and staff. A number of homes reported that communication with residents, their family members, and staff about why projects were chosen and their expected impacts was key to success. Respondents also noted

that making changes in a short time period can be challenging, but provided some advice on how to make such projects easier in the future, recommending that homes look at factors such as vendor support, policy development, and existing protocols.

Conclusions: This project shows that even with a relatively small amount of money, LTCHs can successfully implement evidence-informed environmental changes that decrease responsive behaviours and improve both resident and staff quality of life. Although staff members were aware of what needed to be changed, they lacked the funds to do so. This one-time funding allowed homes to implement changes that positively affected residents and staff alike, within a short period of time.

References:

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Differential Association Between Hippocampal Volume and Cognitive Performances in MCI and LLD

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Background: Older adults with Mild cognitive impairment (MCI) or late-life depression (LLD) are at high risk for Alzheimer's disease (AD). Few studies have studied the shared and specific cognitive and cerebral characteristics associated with these conditions. Yet, a great proportion of persons with MCI present depressive symptoms (MCI/D+), on one hand, and LLD is often associated with cognitive deficits, on the other hand. Recent studies have otherwise shown that hippocampal atrophy, which is often observed in both MCI and LLD, is associated with cognitive decline and progression to AD. This study aims to compare and define the anatomical and cognitive differences between MCI without depressive symptoms (MCI/D-), MCI/D+ and LLD.

Methods: This study includes older adults with MCI (Albert et al., 2011 criteria) with (MCI/D+; n=32) or without (MCI/D-; n=35) depressive symptoms as well as patients with LLD (DSM-IV major depressive disorder; n=35). Participants underwent a cognitive evaluation including memory (Buschke, 1984) and executive functioning (D-KEFS, 2001) measures. 3D T1-weighted magnetic resonance images were acquired on a 3.0-Tesla Phillips using a standardized ADNI protocol and were analyzed using Freesurfer (5.3.0). Volumes were then converted into Z scores adjusted for age, sex, scanner

and intra-cranial volume according to normative data (Potvin et al., 2016). Analyses investigated hippocampal volume and performances on verbal memory and executive functioning tasks. A multifactorial analysis of variance was used to compare groups of participants on these measures. Furthermore, multiple linear regressions were used to examine the relationships between cerebral and cognitive measures for each group.

Results: There was no statistically significant difference between groups for hippocampal volume ($p > .05$). On the other hand, MCI/D+ ($p < .001$) and MCI/D- ($p < .001$) participants had significantly poorer memory performances compared to LLD participants. Groups didn't otherwise differ on executive functioning performances ($p > .05$). A significant regression equation was found for MCI/D+ ($p < .01$) and MCI/D- ($p < .001$) with an R^2 of .36 and .26 respectively, according to which hippocampal volume predicted delayed recall in the memory task. That association was not found for LLD ($p > .05$). However, a significant regression equation was found for LLD ($p = .008$) with an R^2 of .19, according to which hippocampal volume predicted inhibition in the executive functioning task, an association which was in this case not found for MCI/D+ and MCI/D- ($p > .05$).

Conclusions: These findings suggest that although MCI/D+, MCI/D- and LLD do not differ purely on volumetric measures of the hippocampus, these anatomical measures are associated with different functions for each condition. Indeed, hippocampal volume underlies memory performance in MCI whereas in LLD it is related to executive functioning. Further research should study the incidence of such differences on the risk of conversion to AD and investigate other potential differences amongst at-risk groups.

Self-Report Of Frequency Of Forgetting Predicts Delayed Verbal Recall In Cognitively Normal Older Adults

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Background: Subjective cognitive decline (SCD), defined by subjective report of cognitive change without objective impairment, is conceptualized as a preclinical stage of AD, but operational criteria for SCD remain unclear. Further, screening for SCD by querying "do you feel like your memory is becoming worse? Yes, this worries me"[1] may not yield adequate specificity. We examined the validity of probing perception of memory decline and memory concern as screening questions for SCD by assessing associations between responses to SCD-screen questions and delayed recall

on the California Verbal Learning Test (CVLT-DR), a robust neuropsychological predictor of future cognitive decline. We also sought to identify other screening questions for SCD by correlating CVLT-DR with responses on the Memory Functioning Questionnaire (MFQ), a self-report measure associated with cerebral amyloid burden in cognitively-normal (CN) older adults.

Methods: Twenty-two older adults [15 females, mean age 75 (SD=6.4); Montreal Cognitive Assessment test (MoCA)=26.2 (SD=1.9)] with normal neuropsychological test performance and no neuropsychiatric conditions as established by medical examination participated. Participants screened positive for SCD (SCD-screen+ve) if they endorsed both memory change ("Do you feel like your memory is becoming worse?") and memory concern ("If so, are you concerned or worried about these memory changes?") Otherwise, they were classified as SCD-screen-ve. Measures included the MFQ, a validated scale of subjective memory ability that probes retrospective functioning (RF), frequency of forgetting (FF), seriousness of forgetting (SF) and use of mnemonics (MU). The Geriatric Depression Scale (GDS), and NEO Five-Factor Inventory were administered to determine whether depression or neuroticism moderated associations between MFQ and CVLT-DR. Linear regression modeling of CVLT-DR was performed using backward elimination and SCD-screen status, age, sex and MoCA as explanatory variables. The MFQ item that most strongly correlated with CVLT-DR was then added to the model. A single MFQ item was chosen to avoid overfitting the model.

Results: SCD-screen status was predictive of CVLT-DR in univariable and multivariable analyses ($\beta = -.54$, $p = .04$, $R^2 = .23$). Only MFQ-FF subscale items were correlated with CVLT-DR: frequency of memory problems related to beginning tasks and forgetting what the task was (Q4e; $r = .63$, $p = .004$), frequency of forgetting to complete household chores (Q3e; $r = .62$, $p = .005$) and frequency of problems recalling personal dates (Q4a; $r = .51$, $p = .03$). Q4e was predictive of CVLT-DR ($\beta = .76$, $p = .003$, $R^2 = .54$) in univariable analyses and was retained, along with age, in multivariable modeling with SCD-screen status, age, sex, and MoCA entered. The final model with age and Q4e as predictors explained 80% of the variability in CVLT-DR and remained unchanged when challenged by entering GDS or NEO-neuroticism.

Conclusions: The associations between frequency of forgetting and delayed verbal recall, a robust predictor of cognitive decline, suggest that screening for SCD by probing perception of current frequency of memory problems, rather than change in memory, may have greater specificity. Notwithstanding the limitations of small sample size and disproportionate male:female ratio, these findings extend previous observations of an association between MFQ-FF and cerebral amyloid burden in CN older adults.

1. Jessen 2014, Alzheimer's & Dementia, 10:76.

A Brief Mindfulness Protocol for Burnout in Front-line LTC Workers

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Background: Given the increased number of Long Term Care (LTC) residents, particularly those with complex care needs, frontline workers are at a high risk of experiencing negative health implications, including burnout and stress. Frontline care workers include but are not limited to nurses, personal support workers, nutrition services, and recreational therapy staff. Phase one, of a multi-phase study, used a cross-sectional design and found significantly higher perceived stress and burnout in frontline workers in LTC within the Mississauga and Halton area, compared to established norms. Phase two identified three types of interventions to reduce work-related burnout in LTC workers including: Mindfulness-Based Intervention (MBI), peer support groups, and cognitive behavioural therapy (CBT). Phase two also developed/piloted a cross-sectional, mixed methods study design for determining the most preferred, feasible, and applicable intervention. Part one of phase three, involved six focus groups where participants rated the three interventions: mindfulness, peer support, and CBT, for each separate criterion: most preferred, applicable, and feasible. Survey data was collected and focus groups themed.

Objectives (part two of phase three): (a): To determine the most preferred, applicable, and feasible group-based intervention for decreasing burnout in frontline LTC workers. (b): To develop a multi-session, evidence-based group protocol for the chosen intervention with one session to be trialed in LTC.

Methods: Frequency percentages and mode values were calculated from ranked survey data using Microsoft Excel and data was transfigured into bar graphs and tables. Qualitative analysis was completed by an outside student who coded and themed the data. A literature review concluded that there is a lack of research pertaining to MBIs implemented specifically with frontline LTC workers and a lack of detail of the protocols used in the research. However, preliminary research suggests that a MBI may be effective for healthcare providers overall for reducing stress and burnout, particularly Mindfulness Based Stress Reduction (MBSR)-based programs. A 4-week brief mindfulness-based group protocol was developed, with weekly themes, informal and formal mindfulness practices, educational handouts, and homework activities.

Results: A mindfulness-based intervention (MBI) was ranked highest by participants over CBT and peer support groups as the most preferred and feasible intervention from the quantitative analysis. This result was confirmed with

themes from the qualitative data. The first session of the group protocol was piloted at Wyndham Manor LTC in Oakville. Preliminary feedback suggested the pilot session was clear and easy to follow, and that participants would be willing to participate in a 4-week mindfulness program.

Conclusion: Results from this project will help inform the next phase of the research study which will implement and evaluate the group protocol. This will also inform others' understanding of the feasibility and effectiveness of a brief-mindfulness based group program at reducing burnout in LTC settings for use in practice or further research.

Mental Health Of Older Female Adults: Hotspots And The Singled-Out Association With Income Inequality At The Neighborhood Level In Toronto

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Background: Toronto and elsewhere have an increasing aging demographic with a growing concern in mental health. Older female adults with dementia and other cognitive impairments are not uncommon. Using Geographical Information Systems (GIS) and spatial statistical analysis, this study identifies hotspots in Toronto with respect to mental health visits for females aged 65 and older (FMH_65+) and the associated sociodemographic and environmental risk factors. Our goal is to provide evidence to policy makers for identifying risk factors and targeting specific neighborhoods for intervention to improve mental health.

Methods: Data of the 140 neighborhoods in Toronto for the study were retrieved from the Toronto Community Health Profiles. ArcGIS and GeoDa were used for mapping and spatial statistical analysis, respectively. For all statistical analyses in this study, a p-value of 0.05 was used to assess significance. To evaluate geographic pattern of FMH_60+, we used Global Moran's I that ranges between -1 and +1 to measure its extent and significance of spatial autocorrelation (i.e., similarity of neighboring values). A value of +1 represents the strongest spatial autocorrelation. We then used local Moran's I that produced a cluster map and a significance (p-values) map to identify the locations of hotspots of FMH_65+. To identify an individual factor that was associated with FMH_65+, we used simple spatial error regression (SSR). Multiple spatial error regression (MSR) could then be used to include all the significant factors from SSR for a multivariate analysis. The factors that were studied include Unemployment Rate, Low Income Rate, % Knowledge of English/French, % of Population in Private Households that are Living Alone, % Recent Immigrant Population, Income Inequality, Meeting Places, Tree Cover, Health Providers, Food Stores, and Walk Score.

Results: The global Moran's I value was 0.495211 and significant. This indicates that overall, neighboring values of FMH_65+ were strongly autocorrelated at the 5% significance level. Results of local Moran's I showed statistically significant hotspots in five neighborhoods (p-values all less than 0.001): Downsview-Roding-CFB, High Park North, Roncesvalles, Dufferin Grove, and Dovercourt-Wallace Emerson-Junction. The only factor that was significantly associated with FMR_60+ was income inequality (regression coefficient = 5.059, p-value = 0.02064). Thus, no MSR was needed.

Conclusions: Out of the 11 sociodemographic and environmental factors analyzed, the only factor that was associated with FMH_60+ at the 5% significance level was income inequality. Income equality is a measure of how different the incomes of the richest in relation to the poorest are. The measure was based on the Gini coefficient that ranges from 0 and 1. Our result indicates that income inequality increased rates of FMH_60+. The five significant neighborhoods are where efforts should be targeted geographically to help women over 60 with their mental health. Further research should investigate the association of income inequality with specific outcome of dementia and other cognitive impairments. The newly released Canadian longitudinal Study on Aging is a good source of data at the forward sortation area level for conducting similar geographic studies that enable targeting of specific neighborhoods and sociodemographic groups for intervention.

Gait Parameters And Characteristics Associated With Increased Risk Of Falls In People With Cognitive Impairment: A Systematic Review

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Background: Gait impairment is common in people with cognitive impairment (CI) and this places them at an increased risk for falls. Gait is a complex activity that can be measured and quantified in many ways. To facilitate knowledge translation to clinical practice and better guide the development of effective fall prevention strategies, a review of the current literature on the specific gait parameters associated with an increased falls risk in people with CI is needed.

Purpose: To clarify and summarize gait parameters and features that are associated with future falls in people with CI.

Methods: The following electronic databases were used: CINAHL, EMBASE, MedLine, PsycINFO, and PubMed. In addition, the reference lists of relevant articles and review papers were manually searched. Study selection: The following

inclusion criteria were used to select studies: 1) prospective cohort studies, 2) study samples with 100% of participants having confirmed CI or having sub-group analysis for people with CI, 3) studies that investigated gait as a risk factor for falls, 4) studies that explicitly detailed the gait assessment protocol, 5) studies that reported falls as an outcome measure, 6) studies that reported adjusted risk estimates or psychometric properties of the gait assessment tests, and 7) studies with explicit inclusion and exclusion criteria and demographic information. Data Extraction: The following information was extracted from the included articles: authors, date of publication, country, setting, type of CI, method for diagnosing or confirming CI, inclusion and exclusion criteria, sample size (% female), mean age, follow-up duration, type of fall evaluated, method of fall ascertainment, percentage of participants that fell during the study, gait assessment protocols, results of gait and falls associations, and adjusted risk estimates for future falls or reported psychometric properties of tests.

Results: Eleven studies met the inclusion criteria, with a mean value of 22 (± 1.7) out of 33 (moderate rating) for their quality of reporting. Increased double support time (DST) variability, use of mobility aids, participation in out-door walks, higher scores on the Unified Parkinson's Disease Rating Scale, and lower average duration of walking sessions were found to be significant predictors of any falls. Increased DST and step length variability were associated with recurrent falls.

Limitations: The following impacted the review: a lack of reporting full results in the reviewed articles, a paucity of prospective studies investigating spatiotemporal gait parameters and falls in community-dwelling people with CI, a lack of studies evaluating gait and falls in younger people with CI and in people with frontotemporal dementia.

Conclusion: The only spatiotemporal gait impairment in people with dementia that can be used to predict any fall is increased DST variability, and for recurrent falls are increased DST and step length variability. There was no consensus among the reviewed articles regarding other spatiotemporal gait parameters. Additionally, the use of standard performance tests and dual-task gait assessments are not recommended to predict future falls in people with CI due to poor psychometric properties. Future research is recommended to focus on developing specialized treatment methods for these specific gait impairments.

The Geriatric Resource Nurse: A New Model Of Care In Toronto, Canada

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Introduction: There is staggering evidence that shows 50% of hospitalized older adults experience some form of functional decline. An intersecting reality is that there are currently 56 000 Canadians with dementia that are being cared for in hospitals. With the growing population of seniors within Canada, it is evident that there is a need to implement strategies that improve patient outcomes and prevent functional decline. Nurses Improving Care for Healthsystem Elders (NICHE) provides a framework known as the Geriatric Resource Nurse (GRN) Model, that offers tools and resources to empower bedside nurses to disseminate knowledge and address geriatric syndromes. Although this model of care has been implemented before, it is the first of its kind within Toronto, the largest populated city within Canada. The University Health Network (UHN), one of Toronto's largest academic institutions has been a NICHE facility member since 2012. UHN has recently taken initiative to implement the GRN model on medicine units to meet the imminent need of improving geriatric care.

Methods: Led by Advanced Practice Nurses, GRNs will enhance their expertise through a variety of modalities: NICHE e-modules, lectures, case studies and interactive stimulations. All these modalities include discussion and education of dementia in older adults. In addition, the GRN will follow patients who have been identified as high-risk, using the modified Identification of Seniors at Risk (ISAR) tool, and develop care plans which will be communicated to the interdisciplinary team. The GRN team will also continually review patient charts to identify common geriatric syndromes and conduct educational in-services for nursing staff, on a monthly basis.

Results: We present a working model as this initiative is new to UHN. With increased geriatric expertise, we anticipate similar outcomes to previously implemented GRN models in similar facilities. This includes a reduction in functional decline and other geriatric syndromes, such as delirium and falls. Overall, we expect the following outcomes: improved geriatric care, reduced organizational costs, and prevention of iatrogenic complications.

Discussion: Knowledge gained from this initiative has the opportunity to expand to other high risk geriatric units throughout UHN. Similarly, we hope that UHN can be leaders in geriatric care and can pave the way to implement GRN models to other facilities in Canada.

Neuropsychological Correlates Of Household Equipment Use Among Older Adults With Subjective Cognitive Impairments, Mild Cognitive Impairment, And Dementia

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Objective: Decreased ability to use household technology such as remote controls, computers, and phones is a common functional outcome of neurodegenerative diseases. Decline in these skills, due to cognitive impairment, is important to establish when diagnosing dementia. The aim of this study was to examine which cognitive abilities are associated with decreased independence in household equipment use (HEU).

Participants and Methods: We examined the reports of 23 older adults seen at an outpatient geriatric clinic for multi-disciplinary assessment of suspected dementia. Of those there were 10 patients who were independent in HEU and 13 patients who were unable to use of one or more household technology. We used point-biserial correlations to examine the association between inability to use household equipment and various neuropsychological measures in the domains of memory, attention, executive function, processing speed, visual-spatial abilities, language, and estimated premorbid intelligence. We also examined the effects of gender, age, and education.

Results: Our findings indicated that the inability to use common household equipment was associated with age ($r = 0.51$, $p < .05$); and negatively associated with neuropsychological tests measuring executive functioning ($r = -0.77$, $p < .01$), object naming ($r = -0.71$, $p < .01$), and semantic fluency ($r = -0.60$, $p < .01$). It was not associated with gender ($r = 0.02$), years of formal education ($r = 0.05$), or estimated verbal intelligence ($r = 0.17$).

Conclusion: The relationship between decreased independence in HEU and performance on neuropsychological testing has received little attention in the literature to date. The results of this study suggest that cognitive contributors to this ability include difficulties with executive function (which is presumably required to determine and carry out the steps needed to operate the technology); as well diminished conceptual knowledge of particular equipment.

Managing Money Matters: Financial Management Is Associated With Increased "Functional Reserve" In Mild Cognitive Impairment

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Background/Objectives: Our previous research suggests that overall experience participating in instrumental activities of daily living (IADLs) is associated with reduced IADL impairment in individuals with mild cognitive impairment (MCI). As a result of this finding, we hypothesize that IADL experience may result in an increased functional reserve. However, it was unclear in our previous work whether this relationship

was explained by a true reserve or simply through practice effects. Given that difficulties managing finances tend to occur with MCI, this study explores whether experience managing one's finances is associated with independence across various other IADLs. We argue that a significant relationship between experience managing finances and independence across other IADLs would provide support for our functional reserve hypothesis.

Methods: Participants with a screen or baseline diagnosis of mild cognitive impairment (n=862) were taken from the Alzheimer's Disease Neuroimaging Initiative study. Functional dependence and experience were quantified from the Functional Activities Questionnaire (FAQ). Individuals with and without financial management experience were compared on age, sex, years of education, and global cognitive functioning. Chi-square analyses were used to compare ratings of financial experience and functional impairment.

Results: No group differences between those with and without financial management experience existed in Mini-Mental State Examination (MMSE) scores, age, and years

of education, although women were more likely to have experience managing finances ($p < .001$). Final chi-square analyses suggest that financial management experience is significantly associated with greater independence in the ability to follow TV, books, or magazines ($p = .009$) and remember appointments and important dates ($p = .002$). Experience managing finances was also associated with impairment assembling important forms ($p < .001$); however, a follow-up analysis suggests that this is explained by the fact that those with financial management experience also tended to have experience assembling forms.

Conclusions: Individuals with MCI who are rated as having experience managing their finances were also rated as being less dependent on their ability to follow and understand TV and books and in their ability to remember appointments and important dates. Neither causation or the mechanisms underlying this relationship can be discerned from these analyses. Therefore, further research is needed to investigate whether engaging in financial tasks protects against early financial impairment, potentially through an increased functional reserve.