TORONTO DEMENTIA RESEARCH ALLIANCE

IMPACT REPORT

DEC 2024

ABOUT TORONTO DEMENTIA RESEARCH ALLIANCE

Established in 2012, the Toronto Dementia Research Alliance (TDRA) is a collaboration among the University of Toronto (U of T), Baycrest, the Centre for Addiction and Mental Health (CAMH), Ontario Shores Centre for Mental Health Sciences (Ontario Shores), Sunnybrook Health Sciences Centre (Sunnybrook), Unity Health Toronto (UHT), and the University Health Network (UHN).

TDRA is working together to better understand, prevent, and treat dementia by creating a stronger link between basic science and clinical research, embedding research into care, improving outreach and education to the community, and increasing the efficiency of collaborative research processes across the city.

TDRA is guided in everything it does through the Lived Experience Advisory Partners (LEAP) Council, which was created to bring together people living with dementia, caregivers/care partners, family members, and representatives from community organizations to help integrate the lived experience voice into TDRA's work.

WE AIM TO ADVANCE RESEARCH AND INNOVATION IN DEMENTIA PREVENTION AND THE STANDARDIZATION OF DEMENTIA CARE.

EXECUTIVE SUMMARY OF THE LAST FOUR YEARS

As the TDRA is going through key transitions, we are reflecting on the past four years since Dr. Tarek Rajji took over the leadership role.

TDRA is all about maximizing impactful collaboration. Under Dr. Rajji's leadership, two organizations, Ontario Shores and UHT, (re)joined TDRA. As well, the relationship with the UofT, especially the Tanz Centre for Research in Neurodegenerative Diseases (the Tanz Centre), was strengthened. Optimizing collaboration resulted in more than 20 new projects and more than $21M in external funding to TDRA scientists and initiatives.

This executive summary focuses on four key areas: Dementia Prevention, Dementia Research Infrastructure, Standardization of Dementia Care, and the development of the TDRA Clinical Table. These accomplishments underscore TDRA's ongoing dedication to advancing dementia research and care.

DEMENTIA PREVENTION

In 2021, TDRA and the Tanz Centre launched the Temerty-Tanz-TDRA Initiative to explore links between dementia and depression with a focus on cross-site collaboration, to date funding 6 seed fund projects, 14 scientists, 3 fellows, and 2 workshops. Building on this work, TDRA launched a seed fund competition for research exploring neurodegenerative diseases more broadly, which has funded 5 projects to-date. TDRA partnered with MITO2i to support a fellowship on mitochondrial dysfunction and photomodulation in mild cognitive impairment, and with the Krembil Foundation on "Improving Prognostic Confidence in Neurodegenerative Diseases Causing Dementia using Peripheral Biomarkers and Integrative Modeling". Additionally, TDRA, the Tanz Centre, and the Department of Physiology at the UofT initiated a Brain Canada-funded project to optimize theta-burst stimulation for better neuroplasticity and cognitive effects in older adults at risk for dementia.

DEMENTIA RESEARCH INFRASTRUCTURE

To help facilitate successful and efficient collaboration, TDRA established a legal working group in 2022, which has saved months and possibly years of time for rollout of TDRA-developed initiatives. TDRA also advanced outreach and dementia study recruitment through a strategic partnership with the Alzheimer Society of Toronto, creating the Toronto Dementia Network (TDN) research page and co-hosting bi-monthly webinars focused on education and recruitment. By December 31, 2024, 259 study participants had signed up, with a 33% enrollment success rate into various research projects.

TDRA further engaged community members through hosting four well-attended and highly rated workshops: the Temerty Tanz-TDRA Inaugural Workshop in 2022, the Neuromodulation for Neurocognitive Disorders Workshop in November 2023, and the Brain Health & Dementia public event followed by the Temerty-Tanz-TDRA Outcomes Workshop in 2024.

STANDARDIZATION OF DEMENTIA CARE

TDRA has made significant strides in standardizing dementia care. The Memory Clinic working group digitized the clinical intake form and Toronto Cognitive Assessment (TorCA), which are now used across TDRA memory clinics, supporting research with nearly 4,000 patients assessed. Additionally, TDRA launched several externally-funded projects, including the Virtual Assessment of Praxis, the Hybrid Virtual Cognitive Program, and an artificial intelligence (AI) tool for dementia prediction and triage. Recently, the Slaight Family Foundation funded the Alzheimer Society of Canada to explore national dissemination of TorCA.

To further standardize dementia care, TDRA developed the TDRA Standardized Clinical Cognition MRI Protocol and held two University of Toronto-accredited courses in 2023 to facilitate its dissemination: one for clinicians on dementia diagnosis and treatment, and another for radiologists on MRI reporting. Today this MRI protocol is used at 15 academic and community sites with 37 MRI units across Ontario and is supported by Slaight Family Foundation funding for national distribution. In long-term care (LTC), TDRA's LTC working group created a standardized intake assessment for neuropsychiatric symptoms in residents living with dementia, which is being implemented in several LTC homes, with further dissemination also supported by Slaight Family Foundation funding.

CLINICAL TABLE

Expanding its collaborative model, TDRA established a Clinical Table in January 2024 with support from the Toronto Academic Health Science Network (TAHSN). The Clinical Table aims to provide timely, effective, evidence-based care, setting a model for coordinated, high-quality care infrastructure in Toronto and beyond.

As Dr. Rajji transitions from his role, TDRA reflects on the significant achievements and collaborative efforts of the past four years, which have set a strong foundation for future advancements in dementia research and care. Dr. Rajji expressed pride in the tangible results achieved, stating, "I'm proud of the many results we've accomplished at TDRA and grateful to everyone who helped make this success possible. We focused on increasing collaborations and outreach and established new funding and educational opportunities that turned ideas into results." He extended his gratitude to the TDRA community, governing committees, and the dedicated TDRA Coordinating Centre team for their tireless efforts.

We thank Dr. David Tang-Wai for his invaluable leadership as Interim Executive Director, guiding TDRA through the end of 2024 and beginning of 2025 with stability and strategic insights. As of February 1, 2025, we welcome Dr. Carmela Tartaglia as the official Executive Director, bringing her vision and leadership to TDRA. Dr. Tartaglia, a respected cognitive neurologist and clinician scientist, has been a longstanding member of the TDRA community and will continue to drive the organization's progress.

Tarek Rajji
Executive Director, TDRA
(Sept 2020-Sept 2024)

David Tang-Wai
Interim Executive Director, TDRA
(Oct 2024-Jan 2025)

Carmela Tartaglia
Executive Director, TDRA
(Feb 2025-Present)

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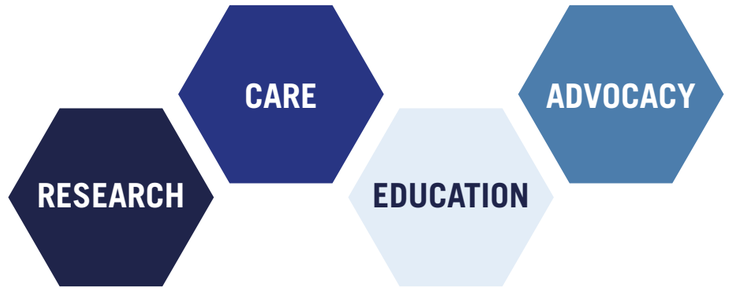
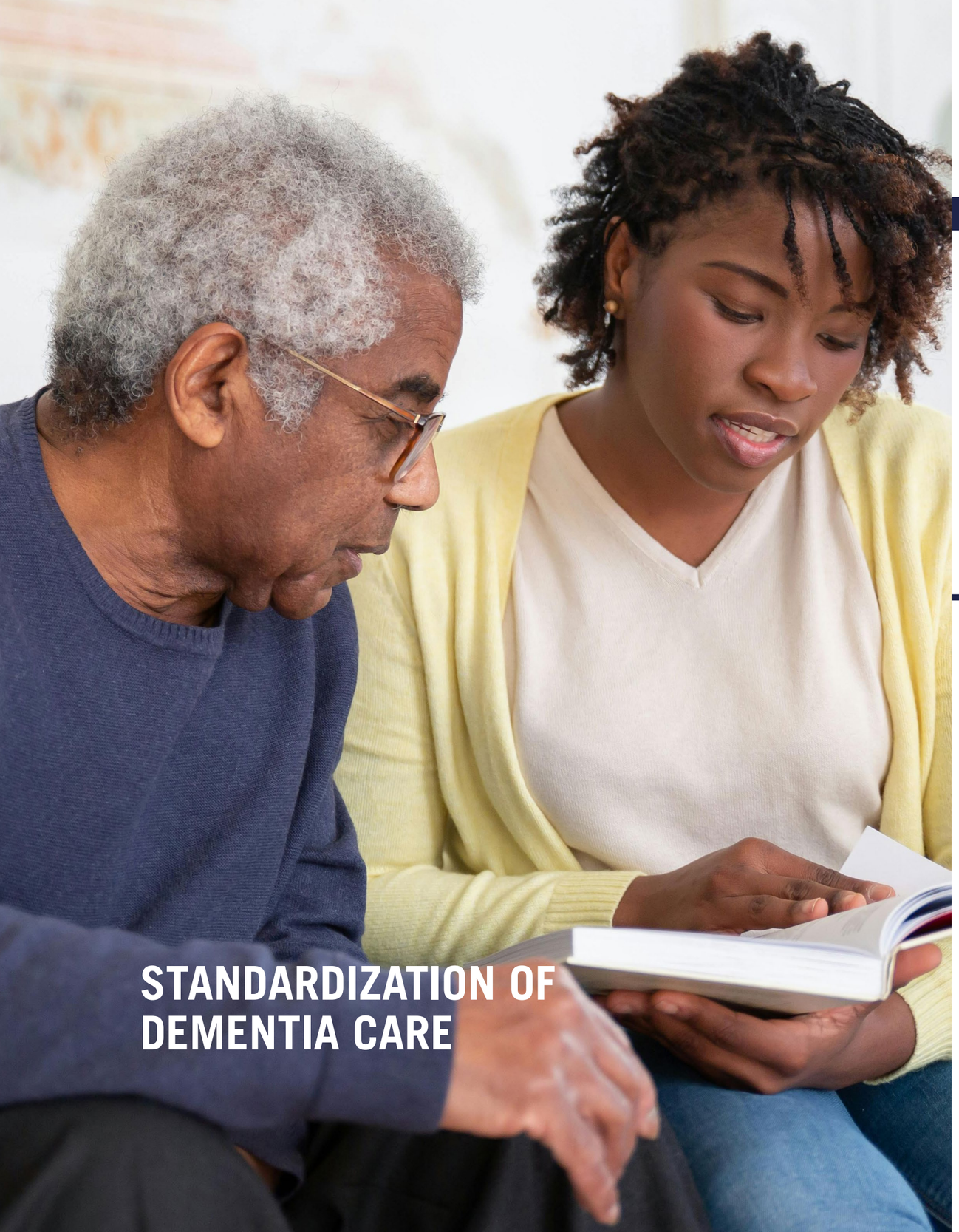
NEW DIRECTIONS 2024-2027

Between 2020 and 2023, TDRA activities were organized around three pillars: Dementia Prevention, Standardization of Dementia Care, and Dementia Research Infrastructure. In 2024, a new direction was launched, centered on a TDRA Clinical Table, and towards a re-organization of TDRA activities going forward under the pillars of Care, Education, Research, and Advocacy. This report contains icons along the left margin at each section to reflect contribution to each new strategic pillar.





STANDARDIZATION OF DEMENTIA CARE

STANDARDIZATION OF DEMENTIA CARE

TDRA actively seeks opportunities to standardize elements of dementia care by making evidence-informed protocols widely available. Taking this approach improves the quality of care, and creates a set of data that are consistent and comparable. Here are some of our standardization initiatives:

CLINICAL TABLE

CARE

The TDRA Clinical Table, established in January 2024, is committed to enhancing dementia care across the Greater Toronto Area (GTA) by improving clinical pathways from diagnosis through end-of-life. Its mission is to strengthen the dementia healthcare system by providing guidance, support, and accountability in clinical practice and care standards. The Table has identified three key focus areas: integrating primary and specialty care pathways, improving regional access to specialized dementia care services, and leveraging TDRA's collaborative role and resources to ensure equitable access to emerging investigations and treatments. The overarching goal is to promote high-quality care through interdisciplinary collaboration within the TDRA network, with the intention to expand these efforts beyond the GTA. To advance these initiatives, the Table is actively forming working groups that will drive progress and innovation in dementia care across the region.

SLAIGHT FAMILY FOUNDATION FUNDING

In June 2024, the Slaight Family Foundation announced a $30-million donation to support seven Canadian organizations in enhancing dementia research, prevention and compassionate care. Two of those organizations - Alzheimer Society of Canada (ASC) and the CAMH – are focused on spreading clinical initiatives and diagnostic tools that were developed by TDRA. Specifically, the donation will be used to help spread the use of the TDRA-developed TorCA, the TDRA Standardized Clinical Cognition MRI Protocol, and Technology-Enabled Integrated Care Pathway for Behavioural Symptoms of Dementia in Long-Term Care (Tech-ICP). More information can be found here.

Leveraging its collaborative structure, TDRA has taken a leadership role in bringing together site leaders from across the Slaight-funded organizations through a dedicated forum. This initiative aims to harness the collective expertise of its network, foster meaningful partnerships, and uncover new opportunities to advance dementia research and care. By creating a dynamic space for knowledge exchange and strategic alignment, TDRA is accelerating the translation of research into impactful clinical practices.

STANDARDIZATION OF DEMENTIA CARE

STANDARDIZED CLINICAL COGNITION MRI PROTOCOL

CARE

The Standardized Clinical Cognition MRI Protocol for dementia implemented in 2021 continues to be in use at 15 academic and community sites that host 37 MRI units across Ontario. Proportionally, this translates to approximately 19% of Ontario MRI sites, and approximately 26% of Ontario MRI units that are reported to be using the TDRA Standardized Clinical Cognition MRI protocol. Since April 2021, more than 5575 clinical scans have utilized this protocol. In February, 2024, Dr. Linda Lee virtually presented information about this protocol at MINT Memory Clinic Educational Sessions, to an audience of approximately 300 MINT Clinic affiliates across Canada. More information about this protocol can be found on the TDRA webpage, here: https://tdra.utoronto.ca/browse-tdra-tools. Additionally, a portion of the Slaight Family Foundation funding allotted to Alzheimer Society of Canada (ASC) will be used for an initiative to increase the uptake and use of this protocol nation-wide.

EDUCATING CLINICIANS ON TDRA'S STANDARD MRI PROTOCOL

EDUCATION

The approach to imaging dementia outside of the academic hospitals varies. In a move toward establishing TDRA's Clinical Cognition Protocol as the standard for imaging in dementia, two courses were developed by TDRA members: the first provided an overview of the various dementias, introduced the standardized protocol, and walked clinicians through some of the scales used by radiologists, linking scores to different pathologies and symptoms. This University of Toronto-accredited course was originally held on May 12th, 2023. The presenters were David Tang-Wai (UHN), Carmela Tartaglia (UHN), and Luca Pisterzi (TDRA). The course, called 'Update on the diagnosis and treatment of dementia', is featured on the RADUCATE platform for future viewers at the following link: https://www.raducate.ca/course/diagnose-any-dementia. As of the end of 2024, 8 users have completed the online course.

Scientific Planning Committee:
Sid Feldman (Baycrest), Alexander Forcina (Primary Care Physician), David Tang-Wai (UHN), Carmela Tartaglia (UHN).

On June 23rd, 2023 TDRA hosted a second accredited course for radiologists led by Paula Alcaide-Leon (UHN) and Carmela Tartaglia (UHN). Once again, a background on the various types of dementia was provided, but with a focus on how the various pathologies manifest in MR images. A number of validated tools that help measure key changes to the brain in dementia were also reviewed. To reinforce the concepts, a simulator that was developed by Eric Bartlett (UHN/JDMI) which guided learners through nine validated cases that provided the opportunity for learners to test the concepts taught in the course. The simulation component of the course provided registrants with Section 3 credits from the Royal College of Physicians and Surgeons of Canada. This course is also featured on the RADUCATE platform for future viewers at the following link: https://www.raducate.ca/course/dementia-mri-report-simulator. As of the end of 2024, 39 users have completed the online course.

Scientific Planning Committee:
Eric Bartlett (UHN/JDMI) Sandra Black (Sunnybrook), Amer Burhan (Ontario Shores) Corinne Fischer (UHT), Martin Ingelsson (UHN), Anish Kapadia (Sunnybrook), Sanjeev Kumar (CAMH), Paula Alcaide Leon (UHN), Walter Montanera (UHT), Alan Moody (Sunnybrook), Andrea Para (UHN), Chris Scott (Sunnybrook), David Tang-Wai (UHN), Carmela Tartaglia (UHN).

STANDARDIZATION OF DEMENTIA CARE

MEMORY CLINIC STANDARDIZATION

RESEARCH

CARE

This working group continues to focus on standardizing assessments for people living with dementia, and improving accessibility for the Toronto Cognitive Assessment (TorCA), which has been downloaded 380 times across 15 countries as of December 31, 2024. A Canadian French version of the TorCA was completed and is currently being validated and normed. Detailed TorCA and BNA-SF training videos were developed in 2024 and are available through links on the TDRA portal, which can be found at the following webpage: https://portal.tdra.utoronto.ca/. A portion of the Slaight Family Foundation funding allotted to Alzheimer Society of Canada (ASC) will be used for an initiative to increase the uptake and use of the TorCA nation-wide.

This group below has remained cohesive since collaborating to develop the TorCA, and continues to be a source of studies that test innovative modes of improving care in dementia.

Investigators: Sandra Black (Sunnybrook), Bradley Buchsbaum (Baycrest), Howard Chertkow (Baycrest), Daniel Felsky (CAMH), Corinne Fischer (Unity Health), Morris Freedman (Baycrest), Sean Hill (CAMH), Sanjeev Kumar (CAMH), Ekaterina Rogaeva (UofT), Stephen Strother (Baycrest), David Tang-Wai (UHN), Carmela Tartaglia (UHN).

ACTIVE STUDIES BY THE GROUP

ARTIFICIAL INTELLIGENCE (AI) IN THE MEMORY CLINIC

A state-of-the-art deep convolutional neural network, trained on 50,000 digital images of clock drawings from the TDRA database and the National Health and Aging Trends Study (NHATS) at Johns Hopkins University, has been developed by Freedman and colleagues to classify clock images (on the "Clock Drawing Test") as indicative of Alzheimer's or not. This model achieves approximately 80% accuracy in identifying dementia using only the clock image and outperforms the current manual scoring methods used during patient diagnosis. A patent has been filed for the model, and the findings are currently undergoing internal review prior to submission to journals, following legal clearance.

Discussions have also taken place with the Ontario Ministry of Transportation (MTO) to explore leveraging this model for assessing risks related to road accidents and traffic violations in the senior population. Lastly, an abstract is being prepared for submission to the 2025 Alzheimer's Association International Conference (AAIC) to present this breakthrough model.

HYBRID-VIRTUAL COGNITIVE PROGRAM (HCP)

Provincial and center-specific approval was received from Baycrest's REB, and the study was officially launched at Baycrest. 103 participants have been recruited, with 47 completing the study. The study remains on track to meet Baycrest's annual recruitment target of 250 participants. A streamlined recruitment plan has also been designed for participating TDRA sites (CAMH, UHN, Sunnybrook). This plan involves collecting intake data from participants' first visit at their respective sites and referring eligible participants to Baycrest for a fast-track Neuropsychology assessment. Referral forms have been created for inter-site recruitment and consent, REB approval has been attained and recruitment flyers have been drafted. The TDRA database will be used to collect Visit 1 data while the database for Visit 2 is currently under development. Electronic data entry will be carried out by 3 summer students in 2025 at Baycrest, adding approximately 300-400 new participants to the TDRA database.

VIRTUAL ASSESSMENT OF PRAXIS AS A PREDICTOR OF BASIC ACTIVITIES OF DAILY LIVING

Funded for $99,932, this study explores whether virtual assessments of praxis are more informative than traditional questionnaires to assess impairments in activities of daily living. Several challenges have impacted progress, including limited availability of Occupational Therapists (OTs), fewer physician referrals, the departure of key study staff, and delays due to COVID-19. Despite these setbacks, the team is implementing a solid recruitment strategy using the TDRA database and actively hiring new staff to support the study. While OT limitations may continue to affect recruitment, the team is optimistic about completing the study by September 2025.

STANDARDIZATION OF DEMENTIA CARE

LONG-TERM CARE (LTC) STANDARDIZATION

CARE

This group has designed a standardized intake assessment for neuropsychiatric symptoms in LTC residents with dementia. This form has been developed in REDCap, and will generate an automated consultation note. The group received feedback regarding this form from stakeholders that included psychiatrists, nurses, and occupational therapists at Ontario Shores, UHT, UHN, and CAMH. The group is now working on logistics of implementing the form in clinical workflow at different sites. The group is also working with PointClickCare to discuss an approach to incorporating the assessment into the electronic medical records at the LTCHs. The group has obtained CTO provincial approval to collect data for research using the intake form. Finally, this group has obtained funding from Slaight foundation ($6.5 million) to implement standardization of care in long term care homes using an integrated care pathway for the next three years.

Investigators: Amer Burhan (Ontario Shores), Peter Derkach (West Park Healthcare), Anuroop Duggal (LEAP), Corinne Fischer (UHT), Morris Freedman (Baycrest), Sean Hill (CAMH), Andrea Iaboni (UHN), Sanjeev Kumar (CAMH), Krista Lanctôt (Sunnybrook), Clement Ma (CAMH), Gillian Strudwick (CAMH).

DEMENTIA CAREGIVERS SKILLS-TRAINING THROUGH VIRTUAL REALITY SIMULATION (VR-SIM CARERS)

RESEARCH

CARE

Funded for $546,218 in 2022 as part of the NRC-CIHR Aging in Place Challenge, this project seeks to build an immersive virtual reality training environment for caregivers/care partners. In June, 2024, a Knowledge Summit was hosted at Ontario Shores and attended by 13 caregivers/care-partners and 15 interested parties, such as knowledge users, researchers, and clinician-scientists. Attendees participated in testing of VR-SIM Carers training platform and provided feedback at focus groups. Use of Virtual Reality and Augmented Reality Technologies to Support Resilience and Skill-Building in Caregivers of Persons With Dementia: A Scoping Review was published in July 2024. Three manuscripts are currently in process which cover some of the background work for this initiative. VR-SIM Carers was showcased by Ontario Tech University collaborator Dr. Bill Kapralos, during a conference presentation in Greece. The initiative was also represented at the AGEWELL conference in October 2024. All updates and events can be accessed on the VR-SIM Carers website, which features the project overview, previous and past events, a blog post, and contact information.

Investigators: Amer Burhan (Ontario Shores), Ron Beleno (AGE-WELL), Mary Chiu (Ontario Shores), Kristina Kokorelias (UHN), Irene Rubenstein (Knowledge User), Joel Sadavoy (Mount Sinai), Adriana Schnall (Baycrest), Michael Smith (NRC), Jeanie Zabukovec (Ontario Shores), Lynn Zhu (Ontario Shores).

STANDARDIZATION OF DEMENTIA CARE

TDRA DEMENTIA CLINICAL RESEARCH DATABASE

RESEARCH

Funded for $2,774,955 from Brain Canada, this project established a clinical research platform that provided a consistent and efficient approach to managing research and clinical care in patients with neurodegenerative conditions. The platform provides epidemiological data, tracks disease burden, fills gaps in medical evidence such as therapeutic effectiveness, and enables evaluation of “real world” effectiveness of medical therapies in practice outside the highly controlled conditions of clinical trials. As of December 2024, significant progress has been made in terms of new data entry and recruitment for a total of ~5000 records. Active recruitment continues at Baycrest, UHN, and Sunnybrook and new records are added to the database on a regular basis. The database is supporting multiple research studies. It continues to gain traction with three new data access requests for three new research studies in the last year.

Principal Investigator:
Morris Freedman (Baycrest)

Investigators: Sandra Black (Sunnybrook), Sanjeev Kumar (CAMH), Tarek Rajji (CAMH/UTSW), Stephen Strother (Baycrest), David Tang-Wai (UHN), Carmela Tartaglia (UHN).

DEMENTIA PREVENTION

DEMENTIA PREVENTION

14 modifiable factors have been identified that contribute to the risk of dementia. TDRA's efforts to advance work in this area focus largely on building capacity in translational research, and on supporting the development of promising ideas through small, targeted grants.

TEMERTY-TANZ-TDRA INITIATIVE

In partnership with the Temerty Faculty of Medicine and the Tanz Centre for Research in Neurodegenerative Diseases, TDRA launched a 3-year and $1.05 million initiative focused on exploring the link between dementia and depression. Depression has been identified as a key modifiable risk factor for dementia, and modifiable risk factors account for 40% of dementia cases. There were three elements to this initiative: Temerty-Tanz-TDRA Research Fellowships, Temerty-Tanz-TDRA Seed Funding, and Temerty-Tanz-TDRA Workshops.

RESEARCH

EDUCATION

TEMERTY-TANZ-TDRA RESEARCH FELLOWSHIPS

The three Temerty-Tanz-TDRA funded fellows listed below, or their designates, presented updates on their research at the Temerty-Tanz-TDRA Outcomes Workshop on November 5, 2024. More information about these Fellows can be found on the TDRA website at: https://tdra.utoronto.ca/temerty-tanz-tdra-research-fellowships.

RESEARCH FELLOWSHIP #1: TEMERTY-TANZ-TDRA BRAIN MEDICINE

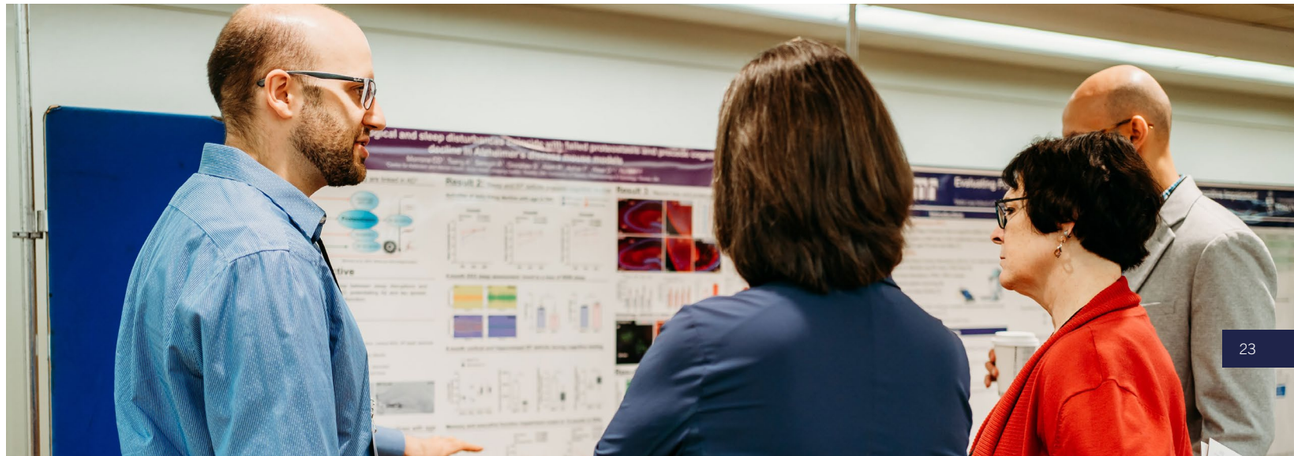
Eleven applications were received, and reviewed by a Selection Committee with representatives from Baycrest, CAMH, Sunnybrook, UHN, and U of T. The Committee selected Iryna Palamarchuk, who began her work in March 2022 on a collaborative project between CAMH and Sunnybrook. The original study plan aimed to use two types of brain stimulation - transcranial Alternating Current Stimulation (tACS) and Focused Ultrasound (FUS) - on 40 people with mild cognitive impairment (MCI). Dr. Iryna Palamarchuk worked on this project, focusing on how the treatments affect neuroinflammation and stress. Following completion of her fellowship, Dr. Mina Mirjalili, another fellow, is now leading a revised version of the study, which focuses only on tACS. While Dr. Mirjalili is not funded by the Temerty-Tanz-TDRA Initiative, she is benefiting from the foundation the project created. The goal is to see if tACS can help slow cognitive decline in people living with MCI and be used in future treatments.

RESEARCH FELLOWSHIP #2: TEMERTY-TANZ-TDRA BRAIN MEDICINE

Seven applications were received, and the Committee selected Adrian Espiritu in 2022. Adrian is conducting a collaborative project between Ontario Shores and Sunnybrook. The goal of this research is to see if accelerated theta burst stimulation (absTBS) is safe and helpful compared to a control treatment ('sham') in improving walking, thinking, mood, and other outcomes such as anxiety, quality of life, and daily activities in older adults with treatment-resistant depression (TRD). This study is the first to explore how absTBS might change the way walking and thinking are affected together (called dual-task cost), which could help identify early signs of dementia in older adults with TRD. Recently, the protocol was updated to include an open-label arm, which will reduce barriers to participation since it requires fewer follow-up assessments. The study is still accepting participants, and results are not yet available.

RESEARCH FELLOWSHIP #3: TEMERTY-TANZ-TDRA POST-DOC

Thirty-four applications were received and reviewed by a Selection Committee with representation from all TDRA sites. The Committee selected Samar Elsheikh in 2022, who led a collaborative project between CAMH and UHT. This study looked at how genetic risk factors contribute to cognitive problems in older adults with depression and how these factors interact with their environment to affect how they respond to treatment. The results suggest that genetic differences play a role in depressive symptoms in older adults, especially when cognitive problems are present. Some areas of thinking, like memory and attention, were more strongly affected by age, which influenced how well antidepressants worked. These findings (once confirmed with larger samples) could help improve personalized treatments for managing depression and cognitive decline in older adults. One study paper has been accepted for publication, and the team is working on two more.



DEMENTIA PREVENTION

RESEARCH

TEMERTY-TANZ-TDRA SEED FUNDING

Awards valued at $70,000 to seed innovative research at the intersection of depression and dementia were launched in June of 2021. Submissions were to be multi-site, or collaborative among basic and clinical sciences. In the first year's competition, nine applications were reviewed by a panel of five external reviewers and a member of TDRA's Lived Experience Advisory Partners (LEAP) Council. Funded projects and their updates are as follows:

IMPACT OF LIPOPOLYSACCHARIDE ON IMMUNE RESPONSE AND CEREBRAL AMYLOID DEPOSITION IN OLDER ADULTS WITH A HISTORY OF MAJOR DEPRESSIVE DISORDER

This study has been completed and the manuscript has been published in the American Journal of Geriatric Psychiatry (doi: 10.1016/j.jagp.2023.04.014).

Investigators: Damien Gallagher (Sunnybrook) and Ariel Graff-Guerrero (CAMH).

THE CONTRIBUTION OF CEREBROVASCULAR DISEASE TO DEPRESSION IN PATIENTS WITH AND WITHOUT ALZHEIMER'S DISEASE

This project has concluded, and the results suggest that a past history of depression did not predict Alzheimer's disease (AD) biomarker status or cerebrovascular injury. This study has been completed and the manuscript has been published in the Journal of Alzheimer's Disease (doi: 10.1007/s11357-023-01030-x). A replication study has been completed in a larger cohort of the Alzheimer's Disease Neuroimaging Initiative (ADNI), and is soon to be submitted for publication.

Investigators: Angela Golas (CAMH) and Carmela Tartaglia (UHN).

ASSESSMENT OF HEART RATE VARIABILITY IN OLDER ADULTS WITH LIFETIME HISTORY OF DEPRESSION OR MILD COGNITIVE IMPAIRMENT

This pilot study looked at heart rate variability (HRV) to understand how the autonomic nervous system works in older adults with a history of depression, mild memory problems, or both. The study found that HRV was lower in those with mild memory problems, but not in those with a history of depression or subjective memory concerns. A potential change in how breathing affects heart rate was seen in the mild cognitive impairment group. Surprisingly, HRV was linked to memory performance in people without noticeable cognitive issues, but not in the expected way. The researchers are now conducting a larger study to confirm and better understand these results.

Investigators: Jean Chen (U of T), Linda Mah (Baycrest).

The second round of the Temerty-Tanz-TDRA Seed Fund competition closed for submissions on June 30th, 2022. Seven LOIs were invited to submit full applications. After careful review and scoring by a panel of five external reviewers and two members of LEAP, two projects were selected for seed funding. These projects, launched in 2023, are:

COGNITIVE AND NEUROIMAGING PATTERNS IN INDIVIDUALS WITH ALZHEIMER'S DISEASE AND DEPRESSION: A MACHINE LEARNING STUDY

This study evaluates the utility of machine learning in classifying whether patients have Alzheimer's disease, active depression, or both, based on easily accessible data such as cognitive test results and brain tissue measurements from MRI scans. The project has received data from six cohorts (Alzheimer's Disease Neuroimaging Initiative; Harvard Aging Brain Study; Wisconsin Registry for Alzheimer's Prevention; Prevent-AD and RUSH). Several preliminary analyses have been conducted to train and assess different machine learning models. Analyses of results are ongoing.

Investigators: Jennifer Rabin (Sunnybrook), Mary-Pat McAndrews (UHN).

TARGETING A-SYNUCLEIN WITH A NOVEL PEPTIDE INHIBITOR TO TREAT COGNITIVE IMPAIRMENT AND DEPRESSION IN PARKINSON'S DISEASE DEPRESSION IN PARKINSON'S DISEASE

This project examined the relationship between alpha-synuclein accumulation (a protein linked to Parkinson's disease), brain cell death, depression, and memory problems in an animal model. The model first used rotenone, a pesticide associated with an increased risk of Parkinson's disease in humans, and then an a-synuclein-mediated neurodegeneration model. The results suggest that injecting a novel AAV-peptide into the ventricles of a rat brain will not be effective in evaluating the effects on depression and cognition. This is due to a limited signal detected in the cerebral cortex and deeper brain structures like the substantia nigra.

Investigators: Lorraine Kalia (Tanz, UofT), Philip Kim (Donnelly Centre, UofT), Suneil Kalia (UHN), Clement Hamani (Sunnybrook).

The third round of the Seed Fund competition closed for submissions on June 1, 2023, with twenty-three submissions received. Three seed funds were available, each up to $70,000. One seed fund was reserved for projects that examine the link between depression and dementia, funded by Temerty-Tanz-TDRA Initiative. Two seed funds were reserved for projects focusing more generally on dementia, funded solely by TDRA. Twenty full applications were received, and evaluated by a committee consisting of nine external reviewers and two LEAP members. The three projects selected for seed funding, beginning in January 2024 are:

HARNESSING VAGAL NERVE FUNCTION TO CURB DEPRESSION AND DEMENTIA (DEPRESSION & DEMENTIA STREAM)

Stimulating the vagus nerve, a key cranial nerve that controls heart rate and is involved in epilepsy, has been suggested as a way to reduce inflammation. It may also be a potential treatment for dementia and depression. This study aims to explore the role of vagal function in preclinical models of dementia and depression. A deeper understanding of the molecular mechanisms that regulate vagal function could enhance the use of vagus nerve stimulation, which is already approved for treating refractory depression. The study launched in November 2024.

Investigators: Minna Woo (UHN), Thomas Prevot (CAMH).

USING FUNCTIONAL IMAGING TO EVALUATE THE EFFECT OF PHOTOBIOMODULATION IN PATIENTS WITH MILD COGNITIVE IMPAIRMENT (DEMENTIA STREAM)

This study focuses on investigating the efficacy and underlying mechanisms of photobiomodulation (PBM), a novel non-invasive candidate treatment that delivers infrared light to the brain and that has shown promise in preclinical studies and case series. This experimental protocol presents a unique opportunity to gain a deeper understanding of the PBM's mechanisms of action on brain health and function, and to assess the potential of the collected data to provide biomarkers of PBM utility. Pilot study results show significant improvement and biomarker changes in the active group compared to the sham group. A manuscript detailing these findings is currently under review by the co-authors.

Investigators: Corinne Fischer (UHT), Simon Graham (Sunnybrook), Tom Schweizer (UHT).

ON THE ROAD TO ACCEPTANCE: OPTIMIZING NATURALISTIC DRIVING MONITORING SYSTEMS FOR INDIVIDUALS WITH DEMENTIA (DEMENTIA STREAM)

A major challenge in dementia care is determining the point at which driving safety becomes significantly compromised for drivers with dementia. While a diagnosis of dementia directly impacts driving abilities, it is insufficient for revoking one's driving privileges. This study aims to investigate the acceptability and usability of naturalistic driving monitoring systems to enhance driving-related decision-making in individuals with dementia. When fully developed, driving monitoring technologies could serve as early indicators of declining driving performance. This would enable a more evidence-based approach to decision-making regarding driving in dementia.

The present study will allow researchers to anticipate how this technology can be implemented in practice. To date, two participants with mild cognitive impairment have completed the study.

Investigators: Mark Rapoport (Sunnybrook), Gary Naglie (Baycrest), Sayeh Bayat (University of Calgary)

TDRA SEED FUND COMPETITION

RESEARCH

In 2024, TDRA launched the inaugural TDRA Seed Fund Competition, which builds on the Temerty-Tanz-TDRA Initiative outlined above, by providing ongoing support for innovative new projects focused on dementia and related neurodegenerative diseases.

TDRA's Seed Fund Competition gave researchers in our community the opportunity to apply for up to $70,000 CAD to help with the early stages of their studies. To qualify, projects had to be collaborative across at least two TDRA partner sites, or, combine lab-based and clinical science. Three projects were funded, descriptions are below.

DOES CPAP IMPROVE COGNITION IN VASCULAR COGNITIVE IMPAIRMENT AND ALZHEIMER'S DISEASE?

The study team is currently conducting a study comparing two methods for diagnosing obstructive Sleep Apnea (OSA) in patients with cognitive impairment: in-laboratory polysomnography (iPSG) and home sleep apnea testing (HSAT). With the TDRA Seed Fund, the project will expand to include a sub-study that will track cognitive changes in patients using Continuous Positive AIr Pressure (CPAP) after six months. This sub-study will help determine if treating OSA with CPAP can improve cognitive outcomes in patients with Vascular Cognitive Impairment (VCI)/Alzheimer's Disease (AD). It will also explore whether CPAP affects sleep quality, mood, daily functioning, and caregiver burden—key factors that impact quality of life.

Investigators: Mark Boulos (Sunnybrook), Paul Verhoeff (Baycrest).

DIGITAL PHENOTYPING OF CIRCADIAN RHYTHM USING LOCATION DATA IN LONG-TERM CARE

This study will use data from existing safety systems in LTC homes to monitor for circadian rhythm disruptions and improve diagnosis and care. These safety systems track residents' movements with real-time location technology, which gathers valuable information about residents' rest and activity patterns. The study team has shown this data is effective for tracking rest-activity rhythms in people living with dementia. The next step is to analyze these patterns in a larger group of LTC residents over the course of a year, using machine learning to identify common disruptions, and leveraging this data to enhance care and sleep management strategies moving forward.

Investigators: Andrea Iaboni (UHN), Andrew Lim (Sunnybrook).

PREFRONTAL CORTICAL PLASTICITY IN MILD COGNITIVE IMPAIRMENT: IMPLICATIONS FOR EYE MOVEMENT AND LANGUAGE PROCESSING

Alzheimer's Disease (AD) and Mild Cognitive Impairment (MCI) can affect eye movement and language processing, both of which are controlled by the Dorsolateral Prefrontal Cortex (DLPFC). This study will explore how changes in the DLPFC impact these abilities in older adults.

Researchers will use two types of tasks to evaluate language processing, while recording brain activity using Electroencephalography (EEG). The study will compare how well older adults with MCI perform these tasks against healthy adults. The goal is to identify brain activity patterns to better detect and track eye movement, memory, and language issues in MCI, ultimately improving early diagnosis of conditions like Alzheimer's.

Investigators: Hamed Azami (CAMH), Jennifer Ryan (Baycrest).

DEMENTIA PREVENTION

RESEARCH

EDUCATION

TEMERTY-TANZ-TDRA (TTT) WORKSHOPS

The Inaugural Temerty-Tanz-TDRA (TTT) Workshop was hosted on November 30th, 2022, titled “Discovering the Links between Depression and Dementia’. This Workshop provided an opportunity for all fellows and seed funding awardees to present on their progress, and to learn from their peers. The Workshop also featured two international keynote speakers- Dr. Olusola Ajilore and Dr. Stafford Lightman- who are experts in the field of depression and dementia research. The Workshop was accredited by the Royal College of Physicians and Surgeons, which allowed eligible clinicians to earn Continuing Medical Education credits for their participation.

The Temerty-Tanz-TDRA (TTT) Outcomes Workshop, held on November 5, 2024, at CAMH’s Arrell Family Foundation Auditorium, showcased research outcomes and next steps from Seed Fund Awardees and Research Fellows funded by the Initiative. The event also featured two internationally renowned keynote speakers from the USA (Dr. Shawn McClintock and Dr. Lisa Monteggia) and a person with lived experience. Accredited for Continuing Medical Education credits, the workshop attracted 77 attendees, including researchers, clinicians, trainees, students, community and funding representatives, and individuals with lived experience. Interactive Q&A sessions followed each presentation, and two knowledge translation sessions focused on actionable outcomes. Attendees were seated at pre-assigned tables to encourage cross-stakeholder interaction.

DEMENTIA PREVENTION

IMPROVING PROGNOSTIC CONFIDENCE IN NEURODEGENERATIVE DISEASES CAUSING DEMENTIA USING PERIPHERAL BIOMARKERS AND INTEGRATIVE MODELING

RESEARCH

CARE

This collaborative project funded in 2021 for $600,000, brings together a team of scientists from across CAMH Krembil Centre for Neuroinformatics (KCNI), the Tanz Centre for Research in Neurodegenerative Diseases, and the TDRA to develop non-invasive diagnostic and prognostic algorithms – based on biomarkers and supported by AI – in older individuals presenting with cognitive complaints. The aim of this project is to better diagnose neurodegenerative diseases and ultimately enable targeted treatment in people with specific underlying disease pathologies. This project has enrolled 117 participants as of December 2024 (82 at UHN; 35 at Sunnybrook) with Baycrest and CAMH initiating enrollments.

Investigators: Daniel Felsky (CAMH/KCNI), Morris Freedman (Baycrest/TDRA), Ekaterina Rogaeva (UHN/Tanz), David Tang-Wai (UHN/TDRA), Carmela Tartaglia (UHN/Tanz/TDRA)

OPTIMIZATION OF PREFRONTAL THETA-BURST STIMULATION TO TREAT DEPRESSION: A BENCH TO FIRST-IN-HUMAN STUDY

RESEARCH

This project, funded by Brain Canada-Bell Let's Talk ($950,000), is truly translational in nature, as it seeks to optimize the parameters of theta-beta stimulation (TBS) – a novel treatment for depression – to induce neuroplasticity in animal models of depression, and then apply those optimized protocols in persons living with depression. Enhancing neuroplasticity in depression, a high-risk condition for dementia, could not only improve depression outcomes but also reduce dementia risk. Work measuring the strength of connections between the neurons in the prefrontal cortex has so far shown that the levels of long-term potentiation (i.e. the increase in signaling between neurons) that is induced is sex- and protocol dependent. Now experiments are underway to determine the optimum protocol to induce long-term potentiation in male and female mice. An integrated Knowledge Translation (iKT) lived experience advisory committee is in place and has already had its first meeting. Preparation has begun on two manuscripts, the first will discuss translational neuroscience approach as a model to advance brain stimulation, and the second is a review paper on the TMS and electrophysiology concepts.

Investigators: Tarek Rajji (CAMH/UTSW), Graham Collingridge (Tanz), Evelyn Lambe (U of T), Sanjeev Sockalingam (CAMH)

FOCUSED ULTRASOUND (FUS) – TRANSCRANIAL ALTERNATING CURRENT STIMULATION (TACS) PROJECT

RESEARCH

This externally-funded ($500,000) collaborative project between Sunnybrook and CAMH will test the effects of two non-invasive stimulation methods – focused ultrasound (FUS) and transcranial alternating current stimulation – on enhancing working memory in older adults. It will assess whether the combined stimulation results in synergistic effects. The Investigational Testing Authorization for the tACS machine has recently been approved. The study has received REB approval at CAMH and Health Canada approval, and recruitment will start in January 2025.

Investigators: Kullervo Hynynen (Sunnybrook), Tarek Rajji (CAMH/UTSW), Abhishek Datta (Soterix Medical), Iryna Palamarchuk (CAMH)

IDENTIFYING PRE-AGITATION BIOMETRIC SIGNATURE IN DEMENTIA PATIENTS: PRELIMINARY FEASIBILITY STUDY

RESEARCH

This study aims to integrate the use of wearable multisensory devices in dementia care. These devices collect physiological parameters that will be used to create a biometric signature that can predict episodes of emotional distress, allowing early introduction of interventions and treatments preventing critical incidents in this population. The funding ($40,000) was from Team 11 of the Canadian Consortium on Neurodegeneration in Aging (CCNA). This project, along with the ALEVIATE study, resulted in the creation of a large network of collaboration that will carry this work further to meaningful implementation in care settings including LTC and home, through the Slaight Family Foundation funding initiative.

Investigators: Amer Burhan (Ontario Shores), Sarah Elmi (Ontario Shores), Krista Lanctôt (Sunnybrook), Tarek Rajji (CAMH/UTSW), Arany Shanmugalingam (Ontario Shores), Robin Waxman (Ontario Shores)

DEMENTIA PREVENTION

LEVETIRACETAM TO MODULATE HIPPOCAMPAL HYPERACTIVITY IN A POPULATION AT RISK (ALEVIATE)

RESEARCH

This study, funded for $1.4 million by the Weston Brain Institute in 2021, aims to explore what could be a promising biomarker present in the prodromal stages of dementia, and test a possible treatment. Excess activation of the hippocampus in persons with normal cognition carrying an ApoE4 gene – compared to the level of activation in non-ApoE4 carriers – is thought to contribute to progression of disease. ALEVIATE aims to characterize and describe this excess activation, and test levetiracetam's ability to quell elevated activation, and potentially preserve the hippocampus. In the first phase of this study, the baseline level of activation in non-ApoE4 carriers will be measured, and in the second phase levetiracetam will be tested in ApoE4 carriers for its ability to quell excess activation.

Investigators: Sandra Black (lead applicant, Sunnybrook), Arnold Bakker (Johns Hopkins University), Howard Chertkow (Baycrest), Morris Freedman (Baycrest), Maged Goubran (Sunnybrook), Nathan Herrmann (Sunnybrook), Alex Kiss (Sunnybrook), Sanjeev Kumar (CAMH), Ben Lam (Sunnybrook), Krista Lanctôt (Sunnybrook), Mario Masellis (Sunnybrook), Mary Pat McAndrews (UHN), Sara Mitchell (Sunnybrook), Luca Pisterzi (CAMH), Jennifer Rabin (Sunnybrook), Tarek Rajji (CAMH/UTSW), Joel Ramirez (Sunnybrook), Pedro Rosa Neto (Douglas Hospital Research Centre), Antonia Strafella (UHN), David Tang-Wai (UHN), Carmela Tartaglia (UHN), Kamil Uludag (UHN), Neil Vasdev (CAMH), Don Weaver (UHN), Richard Wennberg (UHN), Katherine Zukotynski (McMaster University).

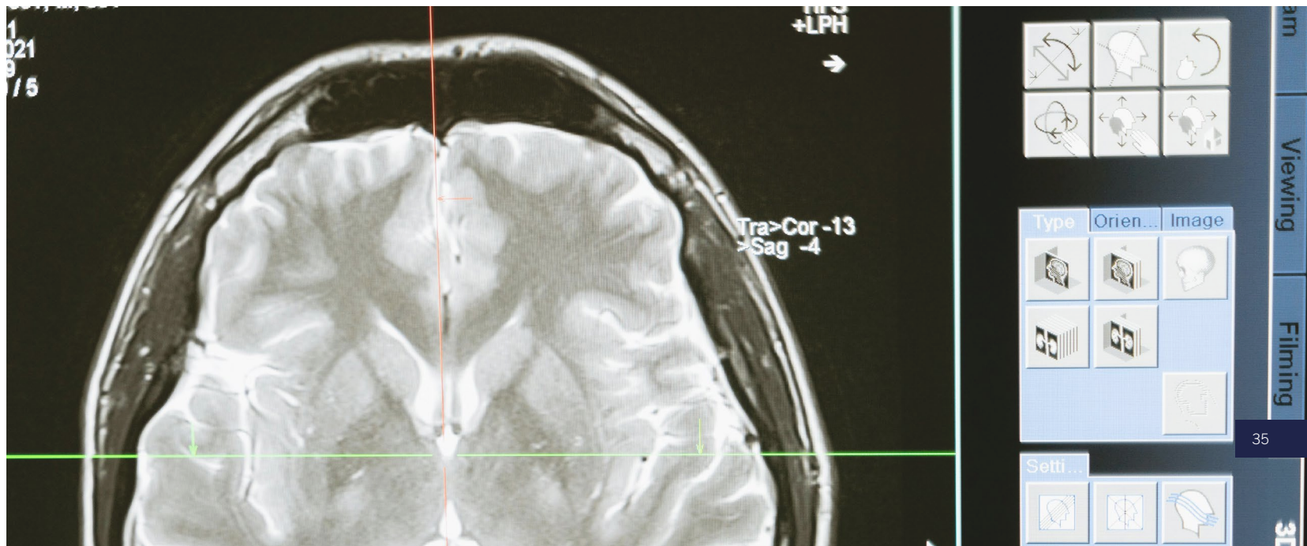
LEVERAGING ARTIFICIAL INTELLIGENCE TO DETECT BEHAVIORAL AND PSYCHOLOGICAL SYMPTOMS OF DEMENTIA ON A CLINICAL DEMONSTRATION UNIT – A VALIDATION STUDY

RESEARCH

This study aims to integrate wearable multisensory devices in dementia care. The device collects physiological parameters that will be used to create a biometric signature that can predict episodes of emotional distress, allowing for early introduction of interventions and treatments to prevent critical incidents in this population. The study also uses cameras that are being trained with AI to be able to identify episodes of agitation.

The project is funded by the Ontario Shores Foundation ($14,000). This validation study will allow the researchers to expand the implementation of the work to a larger network of LTCs, partly supported through the Slaight Family Foundation Funding initiative.

Investigators: Amer Burhan (Ontario Shores), Khalid Elgazzar (Ontario Tech University)



INVESTING IN LEARNERS

TDRA aims to build capacity in dementia research and care by facilitating training opportunities for the next generation of leaders through our network of world-leading clinicians and researchers. The programs and learners funded include:

COMPREHENSIVE RESEARCH EXPERIENCE FOR MEDICAL STUDENTS (CREMS) SUMMER STUDENTS

EDUCATION

RESEARCH

This program provides medical students the opportunity to lead a Summer research project. In 2023, TDRA co-funded Pooja Sankar, who is working with Amer Burhan at Ontario Shores on a study that examines the effects on cognition and gait of rTMS in older persons with depression. Data collection for a systematic review is complete and a manuscript is being drafted.

In 2022, TDRA co-funded Elizabeth Boyd, who worked with Krista Lanctôt at Sunnybrook. Elizabeth examined MRI data from the COMPASS-ND study to determine the association between grey matter atrophy and neuropsychiatric symptoms underlying neurodegenerative processes. This study has concluded, and it was found that neuropsychiatric symptoms may develop early in the presence of vascular brain periventricular regions. Decreased drive and motivation may be an early indicator of vascular mild cognitive impairment (vMCI). A manuscript is in preparation.

In 2024, TDRA did not co-fund a student for this program, as the CREMS Summer Project Catalog did not include a dementia-related project.

INVESTING IN LEARNERS

GDIPHR PROGRAM

EDUCATION
RESEARCH

Over 20 months, medical students in the GDipHR program take graduate-level courses and lead a research project. For the 2024-2025 cycle, TDRA funded Ariana Petrazzini, who will also be supervised by Dr. Sanjeev Kumar. Ariana's research will focus on developing novel biomarkers and treatment interventions for neuropsychiatric symptoms of dementia using both non-pharmacological (e.g., Virtual Reality and music therapy) and pharmacological interventions. Secondly, she will analyze multimodal data—including clinical assessments, physiological measures, and brain imaging (MRI)—to identify biomarkers of neuropsychiatric symptoms in Alzheimer's disease. For the 2023-2024 cycle, TDRA co-funded Jessica Hira who is working with Dr. Sanjeev Kumar at CAMH. The project uses TMS-EEG to assess cortical excitability through single and paired pulse TMS paradigms, and MRI data to evaluate cortical structures in patients with dementia.

MITO2I-TDRA FELLOWSHIP

EDUCATION
RESEARCH

The Mitochondrial Innovation Initiative (MITO2i) and TDRA have partnered to co-fund a fellowship focusing on the role of the mitochondria in dementia. Neda Rashidi-Ranjbar – under the supervision of Tom Schweizer and Corinne Fischer at Unity Health Toronto – is leading a study that investigates the efficacy of photobiomodulation, a form of light therapy, in the treatment of mild cognitive impairment. The study is currently recruiting participants.

SANDRA E. BLACK AWARD IN CLINICAL DEMENTIA RESEARCH

EDUCATION
RESEARCH

The Sandra E. Black Award in Clinical Dementia Research is awarded annually to a trainee in the University of Toronto Temerty Faculty of Medicine conducting clinical dementia research at a TDRA site. The award is to recognize the trainee's contributions to an innovative research project.

Maurice Pasternak, PhD candidate at the Institute of Medical Science, University of Toronto, was the 2024 recipient. Maurice, under the supervision of Dr. Mario Masellis at Sunnybrook Health Sciences Centre, is studying how genetic factors impact brain blood flow and connectivity in people living with genetic frontotemporal dementia (FTD). The project focuses on a gene called TMEM106B, which might protect against brain decline in FTD. Using advanced brain scans (i.e., BOLD-fMRI, ASL MRI, etc.), the team will noninvasively measure brain blood flow and brain connections in people at the early stages of FTD and compare them to healthy family members. This research could help detect brain changes prior to the onset of major symptoms and lead to better ways to track and treat FTD in the future.

The recipient of the 2023 Sandra E. Black Award was Madeline Wood Alexander, who is a PhD candidate under the supervision of Jennifer Rabin at Sunnybrook. Her work centred on investigating the combined contributions of vascular risk and menopause history to Alzheimer's disease in Canadian women.

The recipient of the 2022 Sandra E. Black Award was Durjoy Lahiri, who is under the supervision of Howard Chertkow at Baycrest. Durjoy's research focused on amyloid negative and positive individuals and their clinical trajectory, neuroimaging features, and novel blood-based biomarkers. He is also working on neuromodulation therapy in people living with degenerative aphasias.

INVESTING IN LEARNERS

SUPPORTING BLACK AND INDIGENOUS LEARNERS

EDUCATION

RESEARCH

In 2023, TDRA launched the Scholarship for Graduate Dementia Research by Black Students, providing funding at the graduate (i.e., MSc or PhD) level. As a part of this scholarship, TDRA assembled community-specific mentorship networks to engage the successful applicants, including Notisha Massaquoi from the U of T. Past mentorship was also provided by Mireille Norris from Sunnybrook.

Two exceptional candidates were selected as recipients: Tristin Best and Chinaza Dibia. Tristin Best, a PhD candidate, is collaborating with Dr. Howard Chertkow at Baycrest. His research involves exploring olfactory dysfunction as a potential predictor of AD in individuals experiencing subjective cognitive decline. Tristin's work has been presented at conferences and a manuscript is in preparation. In parallel, Chinaza Dibia, another PhD candidate, is working with Dr. Isabelle Aubert at Sunnybrook investigating innovative non-invasive gene delivery methods to treat AD-affected brain regions.

Also in 2023, TDRA launched the Scholarship for Graduate Dementia Research by First Nations, Inuit, and Métis Students. Working with Dr. Pamela Roach and Dr. Jennifer Walker, a partnership proposal has been drafted between TDRA and the Community-based Indigenous Cognitive Health Network (CICHN). The proposed collaboration would create opportunities for Indigenous dementia research scientists, trainees, and the communities they work with, to define their research priorities for Indigenous-focused dementia research, beginning with engagement activities in the Toronto area, and connect and catalyze partnerships in a network-to-network relationship.

BUILDING RESEARCH INFRASTRUCTURE

Administrative and operational hurdles in clinical and multi-site research initiatives can cause significant delays and they are often not unique. TDRA is working across sites to develop harmonized solutions to pressing issues and build infrastructure to fill gaps that impact progress.

LEGAL RESEARCH WORKING GROUP

RESEARCH

A Legal Research Working Group was established in 2022 with representation from all TDRA sites and the U of T. The group meets biweekly to work towards building solutions that add efficiency to the review of legal agreements. One significant achievement of the working group has been expediting the agreement outlining shared ownership for the Toronto Cognitive Assessment (TorCA), and an inter-institutional agreement (IIA) for a collaborative TDRA study. This agreement was between UHN and three other institutions; typically it would be negotiated separately between UHN and each of the parties. Through the working group, the agreement was able to be executed in two months. In 2024 this group has been working through the terms of reference to support the TDRA industry consortium, licensing support for the LTC project, copyright issues for TDRA products, such as the new intake form, and other initiatives. Through the collective efforts of the Legal Research Working Group, the TDRA has made significant strides in promoting efficient and effective legal frameworks, fostering valuable partnerships, and advancing research initiatives in the field of dementia. See appendix 12 for a comparison between the previous model of legal processes and the approach undertaken by the Legal Research Working Group.

BUILDING RESEARCH INFRASTRUCTURE

SUPPORTING RECRUITMENT TO RESEARCH STUDIES

TDRA continues to partner with the Alzheimer Society of Toronto (AST) to help connect the public with research through two initiatives:

RESEARCH

LISTING RESEARCH ON THE TORONTO DEMENTIA NETWORK

The Toronto Dementia Network (TDN) is a site operated by the AST that lists services such as respite care, nursing, transportation and other forms of support. On July 29, 2021, a section was added that lists plain-language descriptions of research studies led by members of the TDRA partner organizations. Individuals can indicate their interest in a specific study and be connected to the research team. If they cannot find a study, they can choose to be triaged to a study based on screening information they enter (ex., preferred location, interventional vs observational, age, etc.). A process to equitably triage these potential participants was developed with input from all TDRA sites.

Sixty cumulative studies have been listed on the TDN website over time; twenty-seven of these studies are now inactive or closed. To date, the mechanism has yielded 361 referrals to studies in the TDRA network, including 118 that are enrolled or have completed a study, i.e. with an exceptional successful enrolment rate of 33%. See appendix 2 for details. In one case, the TDN was the source of 50% of a study's participants, recruited in 1 month.

Efforts to spread awareness of the TDN and increase recruitment continue, including engaging community organizations, being part of newsletters, arranging presentations, and distributing printed brochures. Additionally, the TDN is featured in various outreach initiatives.

EDUCATION

RESEARCH

WEBINAR SERIES: ADVANCES IN DEMENTIA RESEARCH

Hosted in partnership with AST, this series features bi-monthly, plain-language webinars delivered by TDRA-affiliated researchers. Researchers are encouraged to provide an overview of a research topic in dementia, and to discuss a related study that is actively recruiting and listed on the TDN. The webinars are open to anyone, allowing members of the public to engage directly with researchers. Eighteen webinars have been hosted, with 792 attendees and 16 referrals to studies to date. Please see appendix 3 for details. Webinar recordings are posted on both AST and TDRA's YouTube channels.

BUILDING RESEARCH INFRASTRUCTURE

WORKING WITH THE ALZHEIMER SOCIETY OF ONTARIO

ADVOCACY

TDRA has engaged in a strategic partnership with the Alzheimer Society of Ontario (ASO) to advance opportunities to scale and spread some of our initiatives related to the standardization of dementia care. One key area of collaboration is the recently formed Ontario Dementia Care Alliance (ODCA), which aims to serve as an independent expert advisory body to the Government of Ontario. The ODCA will deliver actionable recommendations that would meaningfully improve dementia care for both care recipients and providers.

TDRA members serve a prominent role on the ODCA, with Sandra Black (Sunnybrook), Tarek Rajji (CAMH/UTSW), and Carmela Tartaglia (UHN) all serving on this important group.

ASO and TDRA will also cross-promote and amplify relevant initiatives and messaging (on social media and otherwise). The research section of the ASO website now features information on TDRA and links to our website, the TDN, and the Advance in Dementia Research webinar series.

INDUSTRY CONSORTIUM

RESEARCH
EDUCATION
CARE

Recognizing the potential for advancements in dementia treatments, TDRA wanted to collaborate with companies (Eisai, Biogen, Eli-Lilly, Roche) to establish a consortium that will collectively drive initiatives of mutual interest, ultimately maximizing the positive impact on patients and clinicians in light of these developments.

TDRA met with these companies and discussed 3 initiatives; all seem to be interested.

1. CME courses to train physicians on the use of these medications/diagnostics
2. Fellowships
3. Registry to track outcomes and understand how well these drugs work.

As of August 2024, the terms of reference for the consortium have been created and vetted through the legal working group, and the management of potential conflicts of interest have been discussed with the UofT. An update meeting is planned for Spring 2025.

KNOWLEDGE TRANSLATION

TDRA aims to inform its broad range of stakeholders (i.e., people with lived experience, researchers, learners, decision-makers, and donors) of ongoing progress through several knowledge products, as well as opportunities to share information. They include:

TDRA WEBSITE

EDUCATION

TDRA's website is its main knowledge product, hosting information about research and tools, plain language dementia-related resources, news items, events and a link to past newsletters. TDRA also hosts three blogs (having added one in 2024), featuring TDRA researchers and people with lived experience. The Scientist Explains Series, offers plain-language summaries of key topics in dementia, the TDRA Spotlight Series, provides plain-language overviews of the work led by a TDRA researcher, and the Living with Dementia series, features people living with dementia and carers telling their stories. All blogs are published either as videos or written posts. Together, the eighteen b/vlogs produced by August 15, 2024 have acquired >1673 views and ~550 page reads. The video format that was adopted in 2023 is associated with positive trends in TDRA's YouTube channel. See appendix 8 for updated YouTube analytics.

The password-protected TDRA Portal is where TDRA-developed tools, resources and videos for researchers, clinicians and other scientists are housed. These tools are evidence-based, standardized, and are broadly available to improve diagnosis and care for people living with dementia. The tools include the TorCA, the BNA-SF, the standardized clinical cognition MRI protocol, SOPs for processing bio samples, and others. Videos include presentations from workshops and other educational events, along with instructional material. As of December 31, 2024, there were 855 registered user accounts on the portal.

Since late 2021, when TDRA's two websites were relaunched, the main site had 243,880 visits, and the portal has had 2,000 visits. See appendix 4 and appendix 5 for website and portal analytics respectively.

KNOWLEDGE TRANSLATION

SOCIAL MEDIA

ADVOCACY

TDRA operates X and LinkedIn accounts that aim to extend the reach of knowledge products to broader audiences, provide platforms to promote upcoming opportunities/events, and drive traffic to our websites. Over time, TDRA's social media presence has been steadily growing in terms of followers, particularly LinkedIn over the past year. X activity and engagement has generally slowed down over the last 18 months, and the team is considering a move to another platform. See appendices 6 and 7 for updated social media analytics.

E-NEWSLETTER

EDUCATION

TDRA launched a monthly e-newsletter for our community in February 2022. The newsletter features a researcher spotlight, announcements, information about upcoming events and current training opportunities, and a plain language summary of a recently published study that features TDRA authors. TDRA published its 35th issue in December 2024 and ended the year with 1378 total subscribers, which is a year-over-year growth of 85% (since December 2023). This was achieved through actively adding subscribers who had interacted with TDRA through its various activities and initiatives, along with increased outreach events, where sign up was offered. In 2024, theming was added to the newsletter, along with matching iconography, for a visual improvement. See appendix 9 for newsletter analytics.

LIVED EXPERIENCE ADVISORY PARTNERS (LEAP) COUNCIL

RESEARCH

ADVOCACY

TDRA is pleased and fortunate to have a very engaged LEAP council, which maintains the lived experience perspective across all initiatives. There are currently 18 LEAP members and three co-chairs. To ensure they have the opportunity to contribute, efforts are being made to have a LEAP member join each of the Research Working Groups (RWGs); there is currently a member on the Scientific Advisory Committee and the Research Operations Committee. See appendix 10 for notable LEAP contributions throughout 2024.

KNOWLEDGE TRANSLATION

COMMUNITY EVENT - BRAIN HEALTH & DEMENTIA

EDUCATION

TDRA's Brain Health & Dementia event took place on May 2, 2024 at CAMH, from 10:00 AM-2:00 PM. The event was for people living with dementia, care partners, and anyone interested in brain health. It featured eight highly interactive, expert speakers, presenting in plain language. Topics focused on dementia and keeping your brain healthy, including modifiable dementia risk factors and associated lifestyle and behaviour tips and featured speakers from every TDRA institution. With a lively question and answer period following each presentation, this event was attended by over 105 members of the public. Over lunch, attendees were able to interact with clinical, research or educational representatives from all TDRA member hospitals and the Alzheimer Society of Toronto, who each hosted an exhibit table.

Feedback from attendees was overwhelmingly positive. Many found the talks to be not only informative but also inspirational. A significant number of participants expressed interest in volunteering for dementia research and contacted TDRA with feedback and inquiries post-event. This level of engagement underscores the event's success in motivating, educating and empowering individuals regarding brain health and dementia, fostering a sense of community and support among participants. Summary survey information can be found in appendix 13.

COMMUNITY OUTREACH

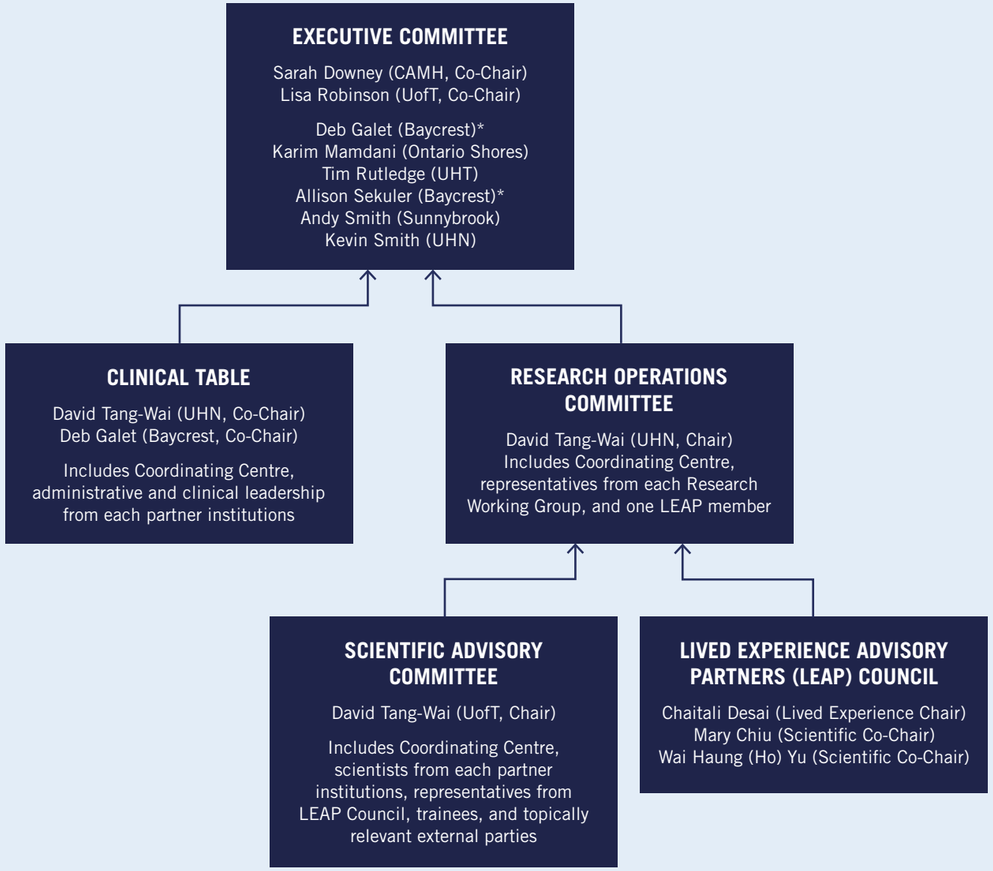
EDUCATION

RESEARCH

1. **TRENT UNIVERSITY AGING SYMPOSIUM (FEBRUARY 2024)**
   TDRA participated as an exhibitor at Trent University Durham Region's Aging Symposium event. From the 57 attendees, TDRA gained 3 newsletter subscribers and 1 TDN sign-up.
2. **CABHI SUMMIT (MARCH 2024)**
   TDRA exhibited virtually at the Centre for Aging and Brain Health Innovation (CABHI) 2024 Summit, where posters, videos, and other communications materials were shared. There were 63 visitors to the virtual booth, leading to 9 'likes' and 4 email leads from individuals interested in connecting further with TDRA.
3. **DEFY DEMENTIA (MARCH 2024)**
   TDRA exhibited at the in-person Defy Dementia event hosted by Baycrest at Hamilton Public Library. There were 112 attendees, leading to 3 newsletter subscribers.
4. **CAREGIVER CELEBRATION AND RESOURCE FAIR (APRIL 2024)**
   TDRA exhibited at the in-person Caregiver Celebration and Resource Fair at Ontario Shores. This event had approximately 80 visitors, leading to 1 newsletter subscriber and 1 TDN sign-up.
5. **CAFE SCIENTIFIQUE (MAY 2024)**
   TDRA exhibited in-person at the hybrid event at Toronto Reference Library, hosted by Baycrest. There were 74 in-person and 35 virtual attendees, leading to 3 newsletter subscribers
6. **WALK FOR ALZHEIMER'S (MAY 2024)**
   TDRA sponsored the 2024 Walk for Alzheimer's event organized by the Alzheimer Society of Toronto at Fort York. As part of the sponsorship, TDRA exhibited in-person at the outdoor event. There were 1131 participating walkers, and TDRA gained 2 newsletter subscribers and 1 TDN sign-up.
7. **AAIC (JULY 2024)**
   TDRA was pleased to exhibit at this year's Alzheimer's Association International Conference (AAIC) in Philadelphia, as part of the Canadian Pavilion. We shared many beneficial interactions with attendees and supported a networking event for Canadian researchers and international partners.
8. **PIPER RESEARCH DAY (OCTOBER 2024)**
   TDRA attended the University Health Network's (UHN) Pride in Patient Engagement in Research (PiPER) 2024 Research Day. Organizational members of our Lived Experience Advisory Partners (LEAP) Council presented two sessions based on their work in patient and family engagement in research at the Centre for Addiction and Mental Health.

APPENDICES

APPENDIX 1: TDRA GOVERNANCE STRUCTURE



**These individuals collectively share one vote*

APPENDIX 2: TDN REFERRAL AND ENROLLMENT INFORMATION SINCE MAY 22, 2021

PARTICIPATING SITES	# OF STUDIES	# OF STUDIES: LEAD SITE	# OF REFERRALS	# OF ENROLLMENTS & COMPLETIONS	% OF REFERRALS ENROLLED OR COMPLETED
BYC	20	14	68	26	38%
CAMH	13	9	31	10	32%
OSH	3	1	10	1	10%
SUNNYBROOK	25	20	205	78	38%
UHT (SMH)	4	1	10	2	20%
UHN	19	14	102	28	27%
UOFT	4	4	7	3	43%
TOTAL	**88**	**63**	**433**	**148**	**34%**

APPENDICES

APPENDIX 3: METRICS FOR TDRA'S ADVANCES IN DEMENTIA RESEARCH WEBINARS

DATE	TOPIC	SPEAKER(S)	ATTENDEES	REFERRALS
14-Sep-21	Driving & Dementia	Mark Rapoport & Gary Naglie	45	-
17-Nov-21	Agitation in Dementia	Sanjeev Kumar	70	1
11-Jan-22	Diagnosis & Self-Care	Richard Swartz	50	3
24-Mar-22	Diversity in Risk & Protective Factors	Ho Yu	55	-
24-May-22	Non-Invasive Brain Stimulation	Dr. Tarek Rajji	43	-
12-Jul-22	Sleep, Cognitive Impairment & Stroke	Mark Boulos	36	-
27-Sep-22	Novel Drug Treatments for Agitation in Dementia	Krista Lanctôt	68	-
17-Nov-22	Complexity of Aging & Dementia	Sandra Black	67	3
23-Feb-23	Light Therapy & MCI	Neda Rashidi-Ranjbar	50	2
19-Apr-23	Frontotemporal Syndromes	Carmela Tartaglia	38	2
15-Jun-23	Risk & Protective Factors	Jennifer Rabin	25	1
22-Aug-23	A New Trial for Frontotemporal Dementia	Andres Lozano	29	1
27-Oct-23	Innovative Research on Driving & Dementia	Mark Rapoport, Gary Naglie & Sayeh Bayat	32	-
23-Jan-24	Connecting Heart Rhythms with Physical, Cognitive and Mental Health	Dr. Linda Mah	39	1
20-Mar-24	What is the Role of Virtual Reality in Supporting Dementia Caregivers?	Dr. Mary Chiu	29	-
21-May-24	Genetics in Dementia Diagnosis – Current and Future Perspectives	Dr. Mario Masellis	40	1
18-Jul-24	Rehabilitation in Mild Cognitive Impairment & Dementia	Dr. Arlene Astell	32	-
10-Oct-24	Measuring Visual Abilities & Electrical Signals in the Brain for Early Detection of Alzheimer's	Dr. Eugenie Roudaia	44	1
		TOTAL	**792**	**16**

APPENDIX 4: NEW AND RETURNING USERS TO THE TDRA WEBSITE

Comparing Q4 FY 2022/23 to Q4 FY 2023/24

GENERAL ANALYTICS	Q4 2022/23 JUN 1 - AUG 31	Q4 2023/24 JUN 1 - AUG 31	PERCENT CHANGE (%)
Users who have initiated at least one session	4,891	5,094	4
Returning users	804	616	-23
New users	4,703	4,855	3
Total sessions	7,159	7,014	-2
Pageviews	9,953	12,000	21

Metric Glossary:

1. Returning users: Users who have visited the website before.
2. New users: Users visiting the website for the first time on a specific device (e.g., if you visit from your desktop and then again from mobile, you are recorded as two users).
3. Session: A group of user interactions with your website that occur within a given time frame, typically lasting 30 minutes of inactivity, encompassing all actions like pageviews, events, and transactions.
4. Pageviews: A page view occurs when a page on the website is loaded or reloaded, whether the user was already on your page or came from an external page.

APPENDICES

APPENDIX 5: KEY METRICS FOR TDRA'S PORTAL WEBSITE

Comparing Q4 FY 2022/23 to Q4 FY 2023/24

GENERAL ANALYTICS	Q4 2022/23 JUN 1 - AUG 31	Q4 2023/24 JUN 1 - AUG 31	PERCENT CHANGE (%)
Users who have initiated at least one session	166	239	44
Returning users	35	54	54
New users	148	224	51
Total sessions	286	399	40
Pageviews	641	873	36

Metric Glossary:

1. New users: Users visiting the website for the first time on a specific device (e.g., if you visit from your desktop and then again from mobile, you are recorded as two users).
2. Pageviews: A page view occurs when a page on the website is loaded or reloaded, whether the user was already on your page or came from an external page.

Top Portal Downloads (Q4 FY 2021/22 to Q4/ 2023/24)

	TORCA MANUAL	TORCA TESTING MATERIAL	BNA-SF	MRI PROTOCOL SUMMARY
Q4 21/22	13	10	6	0
Q1 22/23	13	22	7	2
Q2 22/23	10	14	2	1
Q3 22/23	14	16	7	1
Q4 22/23	28	37	12	0
Q1 23/24	19	25	15	0
Q2 23/24	19	25	15	0
Q3 23/24	26	30	15	0
Q4 23/24	16	22	14	0
TOTAL	**158**	**201**	**93**	**4**

APPENDICES

APPENDIX 6: KEY METRICS FOR TDRA'S X PROFILE

Comparison of X Metrics for Q4 FY 2022/23 and Q4 FY 2023/24

GENERAL ANALYTICS	Q4 2022/23 JUN 1 - AUG 31	Q4 2023/24 JUN 1 - AUG 31	PERCENT CHANGE (%)
Total followers	849	948	12
Total posts	54	47	-13
Total impressions	16,858	15,811	-6
Total engagements	699	915	31

Metric Glossary:

1. Total followers: Total number of X user accounts that follow the TDRA account.
2. Total posts: Number of times the TDRA has posted an original post on the TDRA X account (i.e., excluding re-posts).
3. Total impressions: The number of times a post has been seen on X.
4. Total engagements: Total number of times that X user accounts interacted with TDRA posts. This includes clicks anywhere on the post (e.g., Reposts, replies, follows, likes, links, cards, hashtags, embedded media, username, profile photo, post expansion).

APPENDIX 7: KEY METRICS FOR TDRA'S LINKEDIN PROFILE

Comparison of LinkedIn Metrics for Q4 FY 2022/23 and Q4 FY 2023/24

GENERAL ANALYTICS	Q4 2022/23 JUN 1 - AUG 31	Q4 2023/24 JUN 1 - AUG 31	PERCENT CHANGE (%)
Total followers	619	960	55
Total posts	46	38	-17
Total post likes/reactions	181	275	52

Metric Glossary:

1. Total followers: Total number of LinkedIn user accounts that follow the TDRA account.
2. Total posts: Number of times the TDRA made an original post on the TDRA LinkedIn page (i.e., excluding shares).
3. Total post likes/reactions: Total number of times LinkedIn user accounts liked or used an available LinkedIn reaction on TRDA posts.

APPENDICES

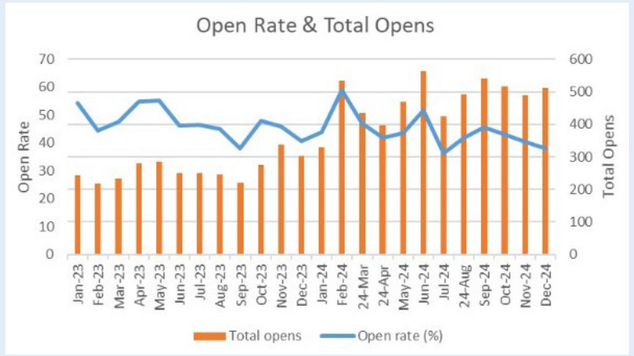
APPENDIX 8: KEY METRICS FOR TDRA'S YOUTUBE CHANNEL

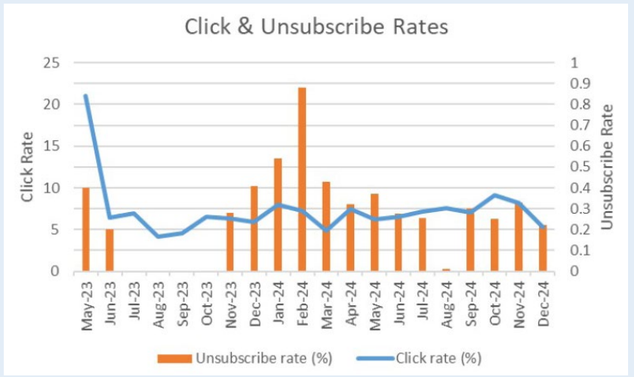
Comparison of YouTube metrics for Q4 FY 2022/23 and Q4 FY 2023/24

METRIC	Q4 2022/23 JUN 1 - AUG 31	Q4 2023/24 JUN 1 - AUG 31	PERCENT CHANGE (%)
Views	5,400	7,020	30
Watch time (hrs)	168	890	429.76
New subscribers	27	17	-37.04
Total subscribers (end of period)	54	182	237.04

APPENDIX 9: KEY METRICS FOR TDRA'S NEWSLETTER

Trend of newsletter metrics since January 2023





Metric Glossary:

1. Open Rate: The number of emails opened by your audience divided by the total number of emails sent out, given they were successfully delivered.
2. Click Rate: Percentage that tells you how many successfully delivered campaigns registered at least one click (on any link).
3. Unsubscribe Rate: The number of people who opted out of your emails divided by the number of people who got the email.

APPENDICES

APPENDIX 10: 2024 ACTIVITY FOR TDRA'S LIVED EXPERIENCE ADVISORY PARTNERS (LEAP) COUNCIL

- Added one new lived experience member
- Lived experience member contributed a quote on TDRA and CAMH for CAMH's Strategic Plan
- TDRA input received on design of new TDRA "Living with Dementia" blog post logo
- LEAP members/affiliated persons featured in three "Living with Dementia" vlog posts
- LEAP actively contributed to planning the Brain Health & Dementia event
- Four LEAP members were featured at Brain Health & Dementia event, and one volunteered on the day of the event
- LEAP member and care partner volunteered for virtual-reality based study study being designed by TDRA-affiliated researcher Dr. Harmehr Sekhon
- Two LEAP members volunteered for an intervention trial for apathy in those with Alzheimer's dementia being designed by Dr. Krista Lanctot of Sunnybrook
- Two LEAP members reviewed and scored 15 applications for the Temerty-Tanz-TDRA (TTT) Seed Funding Competition. They also attended and provided input at the reviewers meeting
- LEAP member volunteered on the Scientific Planning Committee for TTT Workshop
- Three LEAP members volunteered at the TTT Workshop
- LEAP members helped design a handout for registration packages for TTT event
- A LEAP member reviewed a proposal from Sunnybrook's Reactivation Care Centre, providing feedback on potential barriers and the trauma-informed educational framework for managing responsive behaviors in patients with cognitive impairment

LEAP PARTNERS ON TDRA-AFFILIATED STUDIES:

- **INSPiRE-D Study**: A LEAP member is actively engaged as a lived experience partner on the integrated knowledge translation (iKT) piece of the INSPiRE-D study. They co-chair meetings, participate in an advisory capacity, and will help with reporting in the KT stage.
- **VR SIM CARERS**: LEAP members participated in a caregiver/care partner consultation session for a project that aims to adopt the CARERS program into virtual reality (VR).
- **Mechanisms of Cognitive Reserve in Late-Life Depression**: A LEAP member acted as a Lived Experience Advisor for a Canadian Institutes of Health Research (CIHR) grant application examining the links between depression and cognitive impairment. They will have the opportunity to continue in their advisor role should the grant be awarded.

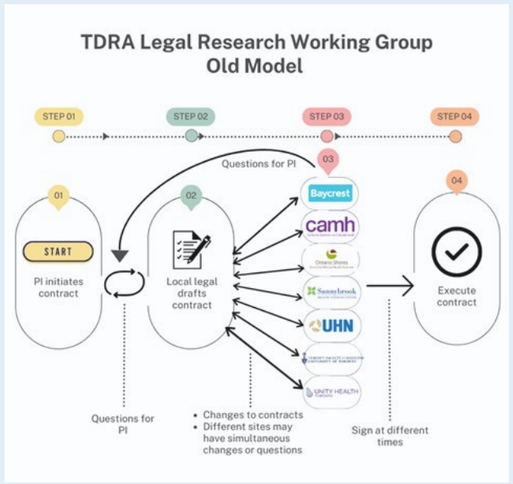
APPENDIX 11: RESEARCH WORKING GROUPS

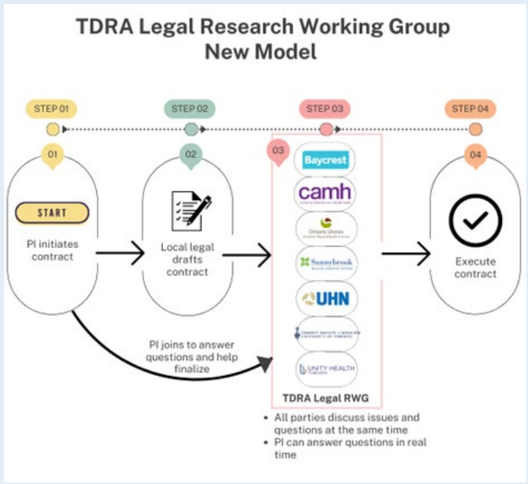
- Basic Science
- Caregiving
- EEG
- Equity, Diversity and Inclusion
- Fluid Biomarkers
- Genetics
- Long-Term Care
- Memory Clinics Standardization
- Neuroimaging
- Neuropathology
- Neuropsychology
- Neurostimulation
- Neurotechnology
- Open Science

APPENDICES

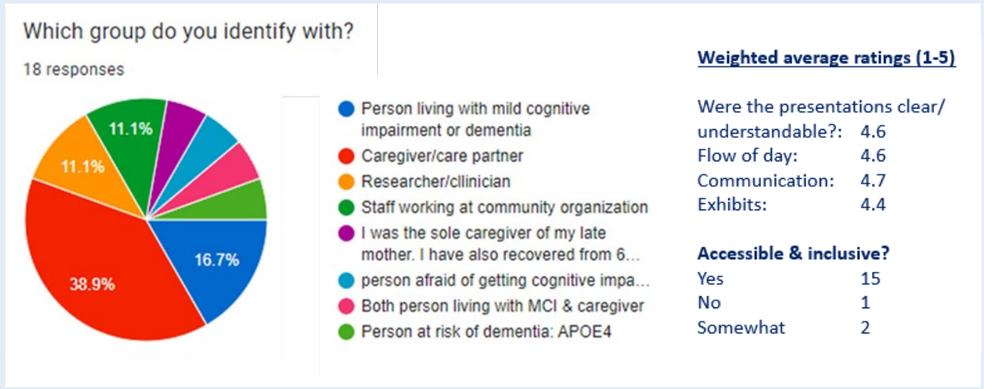
APPENDIX 12: COMPARISON OF THE LEGAL PROCESSES IN RESEARCH

Old Model vs. New Model with efficiency gains from the TDRA Legal Research Working Group





APPENDIX 13: SUMMARY DATA FROM BRAIN HEALTH & DEMENTIA EVENT



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