DEMENTIA RESEARCH NETWORK IRELAND

Prevention, Cure & Care for Neurodegenerative Diseases

DRNI Early Career Researcher Day

Centre for Public Health,
Queen's University Belfast
4th March 2025

ABSTRACT BOOK

QUEEN'S UNIVERSITY BELFAST

Health Research Board

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Welcome to DRNI Early Career Research Day 2025!

DRNI Early Career Research Day brings together early career professionals working in the area of dementia research from across the island of Ireland. The objective of the day is to allow early career professionals from all disciplines to meet with their peers and share their research, to promote increased collaboration, and career opportunities. We are especially thrilled that this year’s event is taking place for the first time in Northern Ireland.

This event was organised by the DRNI ECR Steering Committee:

Anne Marie Miller, Dementia Trials Ireland; Andrea Kwakowsky, University of Galway; Ruth Usher, University College Cork; Joanne Gallagher, Nurse Practitioner, Later life psychiatry; Catherine Hughes, Ulster University; Isabelle Killane, TU Dublin; Dympna O’Sullivan, TU Dublin; Suzanna Dooley, HSE/Trinity College Dublin; Calum Marr, Queen’s University Belfast; Nicola Ward, Queen’s University Belfast; Heather Eames, Trinity College Dublin; Francesca Farina, University of Chicago; Vanessa Moore, DRNI.

We thank you for joining us and we hope you enjoy the day!

Sean Kennelly

Professor Sean Kennelly
Co-chair and Principal Investigator, Dementia Research Network Ireland (DRNI)
Clinical Associate Professor, Department of Medical Gerontology, Trinity College Dublin. Consultant Physician in Geriatric and Stroke Medicine, Director of Memory Assessment and Support Service, Tallaght University Hospital.

DRNI supports and facilitates collaborative interdisciplinary research integrating the basic, clinical and social sciences with the aim of bringing about a demonstrable impact on dementia research, knowledge translation and policy development. DRNI was established in 2012 and is funded by the Health Research Board.

To become a member of DRNI, please contact Vanessa Moore (mooreva@tcd.ie) or see dementianetwork.ie.

PPI Contribution

DRNI want to thank our Public and Patient Involvement (PPI) contributors for their time and effort in judging the presentations from a PPI perspective. Their input is invaluable, and the importance of PPI involvement in research cannot be overstated.

Acknowledgements

DRNI wishes to thank the ECR Day Judging Panel for contributing their time and expertise:

Dr Claire McEvoy, Queen's University Belfast; Dr Joe Kane, Queen's University Belfast; Dr Maria Pierce, Maynooth University; Dr Dominic Trépel, Trinity College Dublin; Professor Imre Lengyel, Queen's University Belfast; Dr Francesca Farina, University of Chicago.

Sincere thanks to the members of the expert panel on academic publishing:

- Dr Andrea Kwakowsky, University of Galway and Associate Editor, Journal of Alzheimer's Disease; Associate Editor, Behavioral and Brain Functions; Editorial board member- International Journal of Molecular Sciences.
- Dr Dominic Trépel, Trinity College Dublin and Senior Associate Editor, Alzheimer's & Dementia.
- Professor Imre Lengyel, Queen's University Belfast and Associate Editor, Ophthalmology Science; Associate Editor, Investigative Ophthalmology and Visual Science; Associate Editor, Frontiers in Nutrition.
- Dr Francesca Farina, University of Chicago and Associate Editor, Journal of Alzheimer's Disease.

DRNI are very grateful to the Alzheimer Society of Ireland, Dementia Trials Ireland and Neuroscience Ireland for providing travel bursaries for the event and want to thank them for their generosity and support.

THE Alzheimer SOCIETY OF IRELAND

DTI Dementia Trials Ireland

Neuroscience Ireland

DRNI especially want to thank Dr Calum Marr and Dr Nicola Ward, both from Centre for Public Health, QUB, for their help in organising the day.

Finally, a sincere thank you to all the ECRs who are attending in-person and virtually, and to those who submitted abstracts to present their research.

Programme – DRNI ECR Day

Centre for Public Health, Institute of Clinical Sciences, Queen's University Belfast, Royal Victoria Hospital, Belfast BT12 6BA.

10.00-10.30	**Registration**
10.30-10.40	**Welcome and opening remarks**
	Dr Claire McEvoy, Queen's University Belfast and Co-chair, DRNI
10.40-12.00	**Theme 3 - Diagnostics, therapeutics and improving quality of life in dementia 1**
12.00-12.30	**COFFFE BREAK & POSTERS**
12.30-13.10	**Insights into academic publishing – Expert panel discussion**
	Dr Andrea Kwakowsky, University of Galway
	Dr Dominic Trépel, Trinity College Dublin
	Professor Imre Lengyel, Queen's University Belfast
	Chair: Dr Francesca Farina, University of Chicago
13.10-14.10	**LUNCH & POSTERS**
14.10-15.30	**Theme 3 - Diagnostics, therapeutics and improving quality of life in dementia 2**
15.30-16.00	**COFFFE BREAK & POSTERS**
16.00-16.45	**Theme 1 - Dementia risk reduction and prevention & Theme 2 - The lived experience of dementia**
16.45-17.00	**Prize giving and closing remarks**
	Dr Vanessa Moore, Scientific Project Manager, DRNI

Oral presentations

Theme 1

Dementia risk reduction and prevention

B-vitamins and Brain Health in Older People: A randomised controlled trial of B-vitamin intervention on cognitive performance

Michelle Clements, Research Associate in Nutrition, Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University

M. Clements[1], C.F. Hughes[1], K. Moore[1], L. Hoey[1], M. Ward[1], K.M. Porter[1], C. Cunningham[2], M.C. Casey[2], J.J. Strain[1], A.M. Molloy[3] and H. McNulty[1]
[1]Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine, Northern Ireland, United Kingdom, [2]Mercers Institute for Research on Aging, St James's Hospital, Dublin, Ireland, [3]School of Medicine, Trinity College Dublin, Dublin, Ireland.

Introduction: B-vitamins involved in one-carbon metabolism may have important roles on cognitive function in ageing but evidence from randomised trials is inconsistent. Our 2-year RCT aimed to investigate the effect of combined B-vitamin intervention on cognitive performance in older adults (aged ≥70 years).

Methods: Participants (n=328) were randomised to receive daily either combined folic acid (400µg), vitamin B12 (10µg), vitamin B6 (10mg) and riboflavin (10mg) or placebo. Cognitive performance was assessed before and after intervention using the Repeatable Battery for the Assessment of Neuropsychological Status.

Results: B-vitamin intervention for two years had no overall effect on global cognition, however, within the visuospatial cognitive domain, B-vitamin intervention compared with placebo significantly improved scoring: mean (95% confidence interval) score of 96.8 (93.9, 99.6) *vs* 95.3 (92.5, 98.1) respectively.

Conclusion: Optimising B-vitamin status in older populations may have important impacts on cognitive health, and in turn help to preserve better quality of life in ageing.

A systematic review of the environment, DNA methylation and cognition

Sophie Glover, PhD candidate, Queen's University Belfast, School of Medicine, Dentistry and Biomedical Science, Centre for Public Health

Background: The increasing prevalence of neurodegenerative diseases poses a significant public health challenge, prompting a growing focus on addressing modifiable risk factors of disease (e.g. physical inactivity, and air pollution). The environment is a significant contributor of risk factors which are known to impact the brain and contribute to disease risk (e.g. air pollution and noise pollution). Epigenetics can offer insights into how various environmental exposures impact the body to contribute to cognitive outcomes.

Main body: We examined studies which have associated an environmental exposure to a type of epigenetic modification, DNA methylation, and a cognitive outcome. We included 14 studies which focused on four categories of environmental exposure: air pollution (n=3), proximity to roads (n=1), heavy metals (n=6) and pesticides (n=4). Overall, n=10/14 studies provided evidence that DNA methylation is statistically significant in the association between the environment and cognition.

Conclusion: Our findings underscore the need for methodological improvements and considerations in future studies (e.g. considering tissue-specificity of methylation profiles and stratifying analysis by socio-economic determinants of disease). This review demonstrates that further investigation is warranted, the findings of which may be of use in the development of preventative measures and risk management strategies for neurodegenerative disease.

Exploration of genetic and nutritional determinants of cognitive dysfunction in older age through application of GWAS and machine learning techniques in the TUDA study

Shane Gordon, PhD Student, Nutrition Innovation Centre for Food and Health (NICHE), Ulster University

Introduction: Nutritional factors, particularly B-vitamin status, and genetic factors play critical roles in cognitive health during ageing, but their interactions have not been fully explored.

Methods: A genome-wide association study (GWAS) combined with machine learning (ML) techniques was conducted to identify key determinants of cognitive dysfunction in older adults from the Trinity-Ulster-Department of Agriculture study. This analysis integrates comprehensive data on genetic variants, nutrition, health, lifestyle factors, and cognitive function, assessed using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).

Results: The GWAS identified two single nucleotide polymorphisms (SNPs): rs429358 in the *apolipoprotein E* gene (odds ratio [OR] 1.59, $p = 5.87 \times 10^{-9}$) and rs3771791 in the *hexokinase 2* gene (OR 1.41, $p = 4.67 \times 10^{-8}$). The best performing ML model – random forest - identified age, vitamin B6, and plasma homocysteine as the most important determinants of cognitive dysfunction (RBANS < 70). Notably, neither SNP were identified by the ML models.

Conclusion: Among the top determinants of cognitive dysfunction identified by the ML models were biomarkers of B-vitamin status (homocysteine and B6), providing evidence of key targets that could be included in public health strategies aimed at the prevention of cognitive dysfunction and dementia.

Theme 2

The lived experience of dementia

Investigating the co-management of diabetes and dementia: a challenging duo

Florence Sharkey, Lecturer, School of Nursing and Paramedic Science, Ulster University

Florence Sharkey, Lecturer in Nursing, Professor Vivien Coates, Professor of Nursing Practice Research. School of Nursing and Paramedic Science, Ulster University, Magee Campus, Northland Road, Londonderry, BT48 7JL, Northern Ireland.

Introduction: The incidence of diabetes mellitus and dementia is rising rapidly and these conditions require considerable management to maintain health and wellbeing.

Method: A scoping review of the literature was conducted and qualitative, semi-structured focus group interviews, conducted in May 2022. Purposive sample of community and diabetes specialist nurses (n-15) drawn from five health and social care trusts in Northern Ireland.

Results: Fifteen nurses participated in the interviews. Four themes were identified: 1) Who's responsibility is it? 2) Community and diabetes specialist nurses: the pivot point 3) Education to manage co-mobilities, 4) Interprofessional communication.

Conclusion: Community and diabetes specialist nurses face many challenges when supporting individuals living with diabetes mellitus and dementia. Sharing patient information among practitioners in different settings is critically important but challenging. Information technology could overcome the limitations of 'silos' of note keeping and further education to establish more effective communication and partnership working are recommended.

Theme 3

Diagnostics, therapeutics and improving quality of life in dementia

A negative experience: Exploring the perspectives of healthcare assistants on pain management at end-of-life for people living with dementia in a nursing home

Brenda Au, MSc Dementia, Centre for Gerontology and Rehabilitation, School of Medicine, University College Cork

Catriona Curtin[1], Suzanne Timmons[1]
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Introduction: End-of-life pain management for people with dementia is often challenging for healthcare professionals working in nursing homes, as recognising pain in people who are often nonverbal can be difficult. Healthcare assistants in Irish nursing homes do not have a formal role in end-of-life pain management but are potentially uniquely positioned to contribute. Most prior research on end-of-life pain management for people with dementia has concentrated on the perspectives of nurses and physicians. This research explores the perspectives of healthcare assistants.

Methods: This qualitative phenomenological research used inductive thematic analysis to analyse data from semi-structured interviews with 11 healthcare assistants in one nursing home.

Results: Caring for people with dementia at end-of-life evoked negative emotions in most healthcare assistants. End-of-life pain management was considered sub-optimal and needed improving. Healthcare assistants felt overlooked and played a limited role in pain management. Most were confident recognizing pain and all would like to have a role in end-of-life pain management.

Conclusion: Healthcare assistants could potentially be formally trained to assess pain in people with dementia at end-of-life. However, more research is needed on effective ways to train healthcare assistants in pain assessment and how to enhance their role as part of the care team.

How Lipids Influence α-Synuclein Structure: A New Target for Lewy Body Dementia

Dr Shayon Bhattacharya, Department of Physics, SSPC – the Research Ireland Centre for Pharmaceuticals, Bernal Institute, University of Limerick.

Lewy body dementia (LBD) is characterized by the toxic aggregation of α-synuclein (αS). Recent evidence suggests that αS naturally forms tetrameric structures, which may act as protective intermediates, preventing pathological aggregation.

Using advanced Molecular Dynamics (MD) simulations, we investigate how αS tetramers interact with different lipid environments—cellular membranes and micelle nanoparticles—and how these interactions influence tetramer stability and aggregation resistance.

Our results reveal that **compact αS tetramers preferentially bind to highly charged membrane surfaces**, stabilizing aggregation-resistant conformations. In contrast, **extended tetramers** are favoured on moderately charged surfaces, where they may be more prone to dissociation. Additionally, micelle curvature plays a key role—strongly negatively charged micelles can isolate αS tetramers, preventing their conversion into toxic aggregates.

These findings suggest a potential **therapeutic strategy**: engineering artificial micelles or charged lipid surfaces to **'trap' αS tetramers in a non-toxic state**, reducing the risk of aggregation. By guiding αS assembly away from pathological forms, this approach may offer new avenues for stabilizing αS in LBD, providing insights into lipid-based interventions for neurodegenerative diseases.

The Eye as a Proxy for Alzheimer’s Disease: Vascular Insights from Down Syndrome

Dr Lajos Csincsik, Postdoctoral Research Fellow, Centre for Public Health, Queen’s University Belfast, Belfast

Jamie Mitchell[1]; Adam Threlfall[2]; Kenneth Sloan[3]; Luke Smyth[1]; Jessica Beresford-Webb[4]; Madeleine J. Walpert[4]; Tunde Peto[1]; Tom MacGillivray[2]; Tony Holland[4]; Imre Lengyel[1]; **Lajos Csincsik[1]**.
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Background: Retinal and choroidal vascular changes are proposed as non-invasive, cost-effective biomarkers for Alzheimer’s disease (AD), but these are underexplored in individuals with Down syndrome (DS), the largest genetically predisposed group for AD.

Methods: Multimodal eye imaging, including ultra-widefield imaging and optical-coherence-tomography, was performed on 24-adults with DS (mean age 39±7) and 17-euploid controls (mean age 36±9). Images were analysed using VAMPIRE-software and ImageJ plugins.

Results: The DS retinas exhibited supernumerary vessels that were wider and thinned more rapidly along their paths. There was a more complex central retinal vascular tree and a less complex peripheral network, with increased numbers of peripheral microaneurysms and haemorrhages compared to controls. The choroid displayed reduced vascularity in DS.

Conclusion: Retinal and choroidal vascular changes in DS may reflect early AD pathology, potentially linked to amyloid-angiopathy. These abnormalities could serve as biomarkers for patient stratification in future clinical trials.

What matters in treatment? A discrete choice experiment on the preferences of those affected by dementia with Lewy bodies

Paula Sinead Donnelly, PhD Candidate, Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast

Introduction: Acknowledging that treating one symptom may exacerbate another, this study quantifies the treatment preferences of those affected by dementia with Lewy bodies (DLB), including their willingness to accept trade-offs between symptoms.

Methods: A discrete choice experiment was developed with a DLB research advisory group, pretested, and administered online. Six attributes were included: impact of the four core DLB symptoms, rate of cognitive and functional decline, and risk of adverse events (with amyloid-related imaging abnormalities being the chosen example). The experimental design comprised six blocks of eight choice sets. Each choice set compared two hypothetical treatments and no treatment. Preliminary DCE data were analysed using a random-parameters logit model to estimate the relative importance of the DLB symptoms and maximum acceptable risk.

Results: At interim analysis, 95 respondents participated (n=18 individuals with DLB, mean age 64.6; n=77 care partners, mean age 59.2; 86.3% female). Visual hallucinations were the most important attribute, followed by cognitive and functional decline. Respondents accepted increased adverse event risks for improvements in any symptom, with the highest trade-off being for visual hallucinations, exceeding a 30% increased risk.

Conclusions: Visual hallucinations and cognition and functioning should be prioritised as primary outcomes in future clinical trials.

Horizon Scan for Pharmacological Disease Modifying Therapies for Alzheimer’s Disease

Heather Eames, PhD candidate, Department of Pharmacology and Therapeutics, Trinity College Dublin and the National Centre for Pharmacoeconomics

Introduction: Horizon Scanning (HS) is a systematic process of identifying new drugs in development. HS can inform healthcare decision makers and aid preparedness. A vast pipeline of Alzheimer’s disease-modifying therapies (AD DMTs) exists. Information on the expected number of drugs, targets, and routes of administration are useful in understanding how current treatment pathways and healthcare services might be impacted.

Methods: The aim of this research was to capture the horizon of AD DMTs using international publicly-available HS systems, International Horizon Scanning Initiative, and Irish HS-notification system. Drugs supported by randomised controlled trials (at least Phase 2), in participants (at least 50 in each arm) with early AD, with confirmed biomarker status at baseline, were considered for inclusion.

Results: A total of 34 AD DMTs, acting on several targets, were identified. These included three vaccines, with remaining drugs administered; orally (n=16), via intravenous infusion (n=13), or via subcutaneous injection (n=2).

SENSE-Cog Residential Care: A feasibility pilot cluster trial on hearing and vision support for residents with dementia in long-term care

Petya Grigorova, Dementia Trials Ireland, Trinity College Dublin

Background: Hearing and vision loss are common in residents with dementia (RwDs) in long-term care (LTC) and negatively impact quality of life. Enhancing sensory function may improve dementia-related outcomes. The SENSE-Cog Residential Care pilot trial assessed the feasibility of a comprehensive sensory intervention for RwDs with concurrent sensory loss.

Method: This cluster randomised controlled trial involved nine LTC facilities in Ireland. Sites were allocated to “care as usual” (CAU) or a multi-component sensory intervention including: (1) personalised hearing and vision support; (2) staff training in sensory health; (3) sensory-friendly environmental adaptation; and (4) mapping sensory care provision. Feasibility, acceptability, and intervention uptake were assessed through recruitment, retention, and data collection on sensory assessments, device use, quality of life, and staff feedback.

Results: Of 60 screened LTCs, 9 enrolled. Of 42 PwD screened, 27 were recruited (13.5/month); 26 remained at three months. All intervention residents (n=12) received full sensory assessments, with provision of glasses (n=12), hearing aids (n=4), and listening devices (n=6). Sensory training was delivered to 42 staff, with two per site receiving in-depth training. Intervention uptake was high, and data collection exceeded expectations.

Conclusion: Recruitment, data collection, and intervention delivery were feasible, supporting the need for a full-scale RCT.

DOTS: An Innovative Approach to Enhance Pain Management for People with Dementia in Acute Care

Dr Deirdre Harkin, Lecturer, School of Nursing and Paramedic Science Ulster University

Background: Effective pain management is a critical responsibility for healthcare professionals in acute care settings. However, addressing pain in individuals with dementia presents significant challenges due to cognitive impairment and communication difficulties. These factors often result in pain being unrecognised or insufficiently treated. Research highlights the urgent need for innovative, structured approaches to improve pain management in this population.

Aim: The aim of the study was to collaborate with healthcare professionals to develop an evidence-informed approach that ensures consistent, comprehensive pain management for individuals with dementia from hospital admission to discharge.

Methods: A Participatory Action Research (PAR) approach was used, engaging key stakeholders throughout the study.

Results: The study led to the development of the DOTS framework, a mnemonic tool guiding healthcare staff in pain management. DOTS prompts: Do you know your patient? Observe your patient, Treat your patient, So, how is your patient now?

Conclusion: DOTS provides a structured, person-centred strategy for pain management in dementia care. Further research is needed to evaluate its implementation and impact across healthcare settings.

Value-based prices of emerging disease-modifying therapies for Alzheimer's Disease in 174 countries: A cost-effectiveness and threshold analysis

Men Thi Hoang, PhD Candidate, School of Medicine, Trinity College Dublin

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Introduction: This study aims to conduct a cost-effectiveness analysis, combined with country-level cost-effectiveness thresholds, estimates value-based prices (VBPs) for lecanemab and donanemab for 174 countries.

Method: Cost-effectiveness of lecanemab and donanemab estimate incremental cost and Quality-adjusted Life Year (QALY) over usual care. Published cost-effectiveness thresholds were used to estimate value-based prices of these drugs in 174 countries.

Results: Compared to usual care, lecanemab and donanemab, respectively, increase average QALYs by 0.3 and 0.4. By country income status, VBPs for lecanemab and donanemab (respectively) range between $208-$8,860 and $320-$12,864 (high income), $72-$954 and $112-$1,367 (upper middle income), $7-$531 and $15-$823 (lower middle income) and $2-$14 and $7-$23 (low income). Incorporating the cost of informal care can increase VBPs by up to 96% for lecanemab and 156% for donanemab.

Conclusion: VBP indicates what 174 countries should be willing to pay. This framework can also be refined in negotiation country prices.

Investigating the Association between Cognitive Function with Retinal Thickness, Choroidal Thickness and Lens Opacities in People with and without Down Syndrome

Dr Aoife M.L. Hunter, Postdoctoral Research Associate, Centre for Optometry and Vision Science, Biomedical Sciences Research Institute, Ulster University

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Introduction: The risk of Alzheimer’s disease (AD) is substantially higher in Down Syndrome (DS), making early detection of those at risk of AD crucial. This study investigated the association between cognitive function with peripapillary retinal nerve fibre layer thickness (pRNFLT), whole retinal thickness (WRT), choroidal thickness (CT) and small dot lens opacities (SDLO) in Down syndrome (DS) and healthy controls (HC).

Methods: pRNFLT, WRT and subfoveal CT were measured in 50 HC (mean age: 66.2 years) and 15 DS participants (mean age: 20.9 years). The presence or absence of SDLO was determined. IQ was assessed using the KBIT-2. Multivariate linear regression models assessed relationships between pRNFLT, WRT and subfoveal CT (response variables) and both IQ and SDLO presence (fixed effects) with group (DS/HC) as a covariate. Age and axial length were included as fixed effects to adjust for such factors in the model.

Results: Positive significant relationships were observed between IQ and global (β=0.28, P=0.040), inferonasal (β=0.60, P=0.028), and inferotemporal pRNFLT (β=0.50, P=0.049). Positive significant relationships were observed between SDLO presence (HC=0%, DS=40%) and inferotemporal (β=45.8, P=0.0018) and temporal pRNFLT (β=18.1, P=0.036). Superonasal pRNFLT was negatively associated with SDLO presence (β=-31.3, P=0.021). Subfoveal CT was positive associated with DS (β=171.1, P=0.0499).

Conclusions:HC and DS participants with thicker pRNFL exhibited higher IQ. DS participants with SDLO exhibited thicker inferotemporal and temporal, but thinner superonasal pRNFL.

Title: How, for Whom, and to What Extent Do Hospital-to-Home Transitions Work for Older Adults with Multimorbidity Including Dementia? Findings From a Realist Review

Lauren Lawson, PhD candidate, NIHR Patient Safety Research Collaboration, Newcastle University

Introduction: Older adults with dementia often have additional conditions, and experience frequent, fragmented, hospital-to-home transitions. Frequent transitions increase exposure to errors, miscommunication, and treatment delays, leading to poor outcomes (e.g. mortality, preventable readmission). Understanding these processes is key to improving care. This realist review explored how, for whom, and to what extent hospital-to-home transitions work for this population.

Methods: Nine databases were systematically searched using key terms. Contexts, mechanisms, and outcomes were synthesised to develop an explanatory framework.

Results: Seventy documents were included. Our framework identified dementia care management, knowledge, information exchange standards, system, and the role of family/friends as integral components. Fragmented pathways and poor collaboration exacerbated service gaps, creating delays, unsafe discharges and increasing carer burden. Limited dementia training and non-standardised documentation hindered planning. Carers supported post-discharge needs without training, increasing distress and readmissions.

Conclusion: Tailored interventions are needed. This realist approach provides insights for future intervention development.

Implementing and evaluating the DOTS approach to improve pain management in people living with dementia in acute care settings: a review of patients' documentation

Faisal Mahama, PhD Researcher, Institute of Nursing and Health Research, Ulster University

Introduction: Pain is a highly individual experience, making it difficult to define and measure accurately. Studies show that individuals with dementia often experience undertreated pain compared to those without dementia. Harkin and colleagues worked with key stakeholders to develop an innovative approach (DOTS) to assist multidisciplinary teams to provide holistic in-patient pain management for people living with dementia (PLWD).

Methods: The study uses a four-phase multiple-methods approach to conduct a pre-post quasi-experimental study guided by the COM-B, MRC, and NICE real-world evidence frameworks.

Results: The study's pre-implementation findings align with existing literature, highlighting that pain is often poorly managed in PLWD. Contributing factors include insufficient knowledge of pain management and the underutilisation of appropriate pain management approaches for PLWD.

Conclusion: This study provides a rigorous yet practical approach to implementing and evaluating pain management approaches in PLWD, using multiple methods with established frameworks.

Retinal biomarkers for Alzheimer’s disease in the prodromal and preclinical population - The Deep and Frequent Phenotyping study

Jamie Mitchell, Queen's University Belfast, Wellcome Wolfson Institute for Experimental Medicine

Alzheimer’s disease (AD) therapies require biomarkers for early detection. The Deep and Frequent Phenotyping (DFP) study aims to identify such biomarkers by combining established AD markers with experimental approaches, including multimodal retinal imaging.

Participants aged ≥60 years with prodromal AD and controls underwent ultra-widefield (UWF) and Optical Coherence Tomography imaging. Retinal vascular parameters (RVPs) and retinal layer thicknesses were analysed in relation to AD risk factors: Family History of Dementia (FHD) and ApoE4 carrier status.

FHD (n=40) was associated with higher arterial Fractal Dimension and Width Intercept (WI) but lower Width Gradient compared to non-FHD (n=51). ApoE4 carriers (n=11) had reduced arteriolar and venular WI versus non-carriers (n=80). FHD (n=41) showed trends towards thickened Retinal Nerve Fibre Layer in nasal and inferotemporal regions.

These findings suggest that retinal imaging may provide non-invasive AD biomarkers. Future work will examine longitudinal trends and their role in disease tracking.

Integrated Care Pathway (ICP) for Lewy-Body Dementia in Ireland

Aoife O'Brien, Research Assistant, Institute of Neuroscience, Trinity College Dublin

Iracema Leroi[1], Suzanne Timmons[3], Aoife O'Brien[1], Irina Kinchin[1], Jayne Conlon[1], Anusha Yasoda-Mohan1, Loredana Frau[1], Sue Thomas[2]
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Background: The EMERALD Lewy research program aims to improve diagnosis and care for people with LBD in Ireland. A key output is a nationally agreed integrated care pathway (ICP), co-produced with service users. This would enhance healthcare quality, coordination, efficiency and patient satisfaction.

Methods: Guided by an ICP expert, a multi-stakeholder team, we co-produced the ICP, linked to ongoing policy and service development through Ireland's National Dementia Service, and adapted for Ireland.

Results: The developed ICP is designed to improve the quality of service/support for people with LBD and their families. It enables health care services to scope service provision gaps, making explicit, at a system level, the services required to effectively manage LBD.

Conclusion: The EMERALD Lewy ICP will be the basis to improve diagnosis and care for people with LBD in Ireland.

β-amyloid’s neurotoxic mechanisms as defined by in vitro microelectrode arrays

Aoife O'Connell, PhD Candidate, Department of Pharmacology & Therapeutics, School of Medicine, University of Galway

Given the growing prevalence of Alzheimer’s disease, understanding the exact mechanisms underlying this process has become a top priority. Microelectrode arrays (MEAs) have been used to investigate β-amyloids’ toxic effects on neuronal activity and assess pharmacological approaches to treat Alzheimer’s disease.

We conducted a systematic overview of MEA based studies, highlighting the main outcomes and disparities based on the status of the current literature and recent findings from our laboratory. The current literature and our results indicate that β-amyloid has an inhibitory effect on synaptic plasticity and induces network connectivity disruptions.

Overall, the literature and our findings corroborate the theory that β-amyloid induces neurotoxicity, having a progressive deleterious effect on neuronal signalling and plasticity. These studies also confirm that MEAs are valuable tools for investigating β-amyloid pathology from a functional perspective, helping to bridge the gap between cellular and network pathology and disease symptoms.

Classifying Neurodegenerative Diseases from Temporal EEG Electrodes: Towards Wearable Brain Health Monitoring

Anneliese Walsh, PhD Candidate, School of Engineering, Trinity College Dublin

Introduction: Ear-EEG presents an interesting opportunity to enable regular, accessible brain health monitoring through integration into wearable devices. This study examines the classification performance of neurodegenerative diseases, Alzheimer's Disease (AD) and Fronto-temporal Dementia (FTD), from temporal EEG electrodes to inform the feasibility of ear-EEG-based brain health monitoring.

Methods: EEG recordings from 88 participants (29 control, 36 AD and 23 FTD) at rest with eyes closed were analysed. Models were built with temporal electrode (T3, T4, T5, T6, F7, F8) features, including sub-band power characteristics and band power ratios.

Results: Classification of healthy vs. AD achieved 81.8% accuracy, while multiclassification of healthy, AD and FTD achieved 63.8% accuracy, indicating a challenge for distinguishing between dementias.
Conclusion: Results suggest that temporal EEG data can support dementia classification, highlighting the potential for ear-EEG in brain health assessment. Future work will focus on developing an ear-EEG-based brain health metric, enabling proactive brain health monitoring.

Poster presentations

Theme 1

Dementia risk reduction and prevention

Investigating Risk Factors and Referral Practices in Lewy Body Dementias

Loredana Frau, Institute of Neuroscience, Trinity College Dublin

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This study aimed to explore the role of risk factors such as demographic variables (age, gender) and comorbidities (e.g., diabetes, vascular diseases), along with referral practices (reasons for referral and discharge outcomes) in Lewy Bodies dementias (LBD). The sample consisted of 45 patients diagnosed with Dementia with Lewy Bodies (DLB) or Parkinson’s' Disease Dementia (PDD) (mean age = 75, SD = 5.78), and 43 controls with dementia not related to LBD or PD (e.g., MCI-PD; mean age = 67, SD = 8.65).

Data were collected from medical records at the Mind & Movement Clinic-St. James's Hospital in Dublin. Comparative analyses were used to identify differences in both risk factors and referral patterns between the two groups. Additionally, Pearson correlations and Chi-Square tests were applied to assess relationships between risk factors and referral outcomes. The results of this study highlight key insights that may improve diagnostic and referral practices for individuals with LBD.

Theme 2

The lived experience of dementia

Sex and Gender considerations in Lewy Body Dementia: a perspectives paper

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Lewy Body Dementia (LBD) is a neurodegenerative disorder with significant variability in clinical presentation and treatment response. Sex and gender differences play a crucial role in the diagnosis, progression, and management of LBD, yet they remain underexplored in clinical practice and research. Emerging evidence highlights variations in symptom presentation, disease progression, and response to treatment between males and females, necessitating a more tailored approach to diagnosis and care. Additionally, societal and environmental factors, such as gender disparities in healthcare access, further shape LBD risk and outcomes.

This perspectives paper proposes a conceptual framework integrating biological sex factors—such as neuropathology, neurochemistry, and genetics—with sociocultural gender influences, including healthcare access, caregiving roles, and stigma. By examining their interplay, we highlight the need for sex-based diagnostic tools, gender-sensitive interventions, and equitable healthcare policies. Addressing these factors will improve diagnostic accuracy, treatment efficacy, and patient outcomes. Future research should prioritise sex-specific biomarkers, gender-aware clinical trials, and interdisciplinary approaches to enhance LBD care.

Exploring Personal Experiences of Diagnosis and Care in Lewy Body Dementia: An Irish Perspective

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Introduction: This study represents the first in-depth exploration of diagnostic and care pathways for Lewy Body Dementia (LBD) in Ireland. Through interviews with patients, carers, and healthcare professionals, the research aims to identify key gaps and areas for improvement in LBD care.

Methods: Semi-structured interviews were conducted with 12 individuals diagnosed with mild to moderate LBD, analysed using a descriptive phenomenological approach focusing on diagnosis, post-diagnostic support, and awareness. Seventeen care partners were also interviewed, as well as healthcare professionals from diverse roles, including GPs, geriatricians, psychiatrists, neuropsychologists, occupational therapists, and other multidisciplinary team members.

Results: Patients reported significant delays in diagnosis due to complex symptoms, lack of awareness, and stigma. Carers highlighted a lack of support, lack of confidence in the healthcare system, and the emotional and psychological impact of caregiving. Healthcare professionals emphasized knowledge and information needs, resource and support limitations, and geographical and occupational disparities in care delivery.

Conclusions: This study highlights the urgent need for systemic changes in Ireland's healthcare system to improve diagnostic pathways and tailored support services for LBD. Addressing knowledge gaps, resource limitations, and inequities in care delivery will benefit both patients and carers.

Capturing their voices: a scoping review of research on the perspectives of people affected by dementia with Lewy bodies

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Introduction: This scoping review aimed to map the extent, type, and nature of research focusing on the perspectives of those affected by dementia with Lewy bodies (DLB).

Methods: We searched six databases and two grey literature sources for published work providing perspective data. Eligible methods captured data beyond symptom characterisation and measurement. Two reviewers independently applied selection criteria. Quantitative and qualitative syntheses were conducted.

Results: 140 sources were included. Research articles comprised 89.3%. Excluding non-structured reflections and commentaries (n=4), 68.4% were quantitative and 65.4% cross-sectional. The most common method was standardised measures assessing multidimensional concepts (e.g., caregiver burden). Of these, the Zarit Burden Interview was the most cited. Interviews were the most common qualitative approach. We identified 27 topic categories, with Emotional and psychological well-being most investigated, and 14 topics investigated three times or less.

Conclusion: We observed limited methodological diversity and a disproportionate focus on specific topics, leading to research gaps, many of which align with those identified as research priorities by individuals with DLB and care partners. We recommend exploring novel methods for systematically capturing patient and care partner perspectives in DLB cohorts, particularly on topics of highest priority to those affected by DLB.

Setting up a Memory Service Patient and Public Involvement (PPI) Group

Rebecca J Egerton, PhD Candidate, Centre for Public Health, Queen's University Belfast

Professor Bernadette McGuinness[1], Dr Katherine Patterson[2], Dr Emma Cunningham [1]
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Introduction: PPI is important in research planning to ensure the aims, methods, and impacts of the research are appropriate and acceptable. Involving older people with cognitive impairment in these processes requires additional considerations.

Methods: Patients attending local geriatrician-led Memory Clinics, and their families, were invited to join the group via a poster (with email contact details) and clinician-initiated conversation. Those expressing interest were contacted via telephone or email. Information regarding meeting details and studies to be discussed will be shared via post and email. The first meeting will be in February 2025. Reimbursement rates will be based on NIHR guidelines.

Key Initial Learnings to date

1. Most patients and carers asked to be contacted by telephone and/or post rather than e-mail.
2. Electronic voucher reimbursement is therefore inappropriate.
3. No participant proactively contacted the team via the poster information.

Models of Peer Support for Lewy-Body Dementia: A Systematic Scoping Review

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Background: Models of support for people living with LBD and/or their caregivers are not always available, accessible or acceptable. The aim was to systematically scope the body of existing literature to better understand models of peer support for people living with LBD and their families.

Methods: The search strategy process was iterative and was refined as evidence emerged and was reviewed. All types of study designs and both quantitative and qualitative studies of peer support interventions were considered for inclusion.

Results: The studies were largely heterogeneous in sample characteristics, study design and intervention characteristics. Trends indicated potential benefits of peer support.

Conclusion: Few empirical evaluations of LBD peer support models have been conducted. Many models appear to lack a theoretical basis and/or intervention protocol, which impedes identification of the 'active ingredients' and presents significant challenges.

Simplifying Information Materials for People Living with Dementia and Their Carers Using LLMs: Initial Experiences from the CoDESIGN project

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Introduction: The CoDESIGN (Co-creating Dementia Support for InteGrated care, a Novel platform approach) project brings together a transdisciplinary team from TU Dublin and Dundalk Institute of Technology and stakeholders including people living with dementia and their carers. Together we aim to co-design and co-create a new holistic digital platform for integrated dementia self-management support, for both those living with dementia and for their carers. Part of the work of the project is to provide information on living with dementia, using existing publicly-available documents. We aim to simplify the readability of these documents for those who require this.

Methods: We investigate the use of Large Language Models, such as ChatGPT, to simplify the readability of documents to specified reading ages, using automated scoring of the input and output documents for readability, and subjective scoring for actionability and completeness.

Results: The simplified text showed good performance for actionability, but variable performance for completeness and for introduction of spurious content.

Conclusion: Documents were simplified, although not by as large a degree as requested. Some key points were omitted from simplified material; new key points were introduced, suggesting that a human-in-the-loop is required to verify the simplified material.

Where are the hidden voices? Challenges and barriers in conducting research involving people with young-onset dementia

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Introduction: Living with Young-Onset Dementia (YOD) brings unique challenges. In Ireland, over 4,300 individuals live with YOD. The lack of specialised services for YOD requires targeted research to develop dedicated health and social care solutions. However, engaging this population in research is challenging.

Challenges and barriers: Despite extensive efforts to reach out through dementia advisors, dementia-related organisations and services across the island of Ireland, a limited number of people with YOD participate in ongoing research studies. The PhD student researcher’s observations and Patient and Public Involvement (PPI) consultations suggest barriers such as social isolation, concerns about public attitudes and stigma and having to meet unfamiliar people. Other potential barriers include a lack of personal motivation, distrust in research, and the absence of immediate financial incentives.

Conclusion: Understanding these challenges is crucial for developing strategies to engage people with YOD in research, facilitating more inclusive and supportive services for them.

Theme 3

Diagnostics, therapeutics and improving quality of life in dementia

A Sex Stratified Approach to Drug Repurposing in Alzheimer's Disease

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Chloe Anderson, Magda Bucholc, Paula L McClean and Shu-Dong Zhang

Introduction: Without any form of effective treatment, the Alzheimer's disease (AD) patient population is expected to increase rapidly. With underlying aetiology being unclear, it is difficult to create effective treatments. Multiple factors which increased risk of developing disease have been identified with post-menopausal women appearing to be more at risk of developing AD than men. It is unclear exactly why two thirds of the patient population are female, but despite this difference in risk, men and women currently receive the same treatment options for AD.

Aims: We aim to identify drug repurposing candidates for male and female AD patients to determine if men and women require different drugs for AD.

Methods: After identifying eight datasets, we applied a differential gene expression analysis to enable gene signatures to be constructed for each patient population. sscMap was then used to identify drug repurposing candidates and a literature search was used to validate results.

Results: We identified nine top drug candidates for male patients, seven for female patients and a further seven for the combined population.

Conclusions: It is highly likely that men and women would benefit from different drugs for AD and our results suggest that a more personalised approach to drug development in AD is necessary.

What is missing in Lewy Body Dementia quality of life assessments?

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Background: Lewy Body Dementia (LBD) significantly impacts quality of life (QoL), yet no LBD-specific patient-reported outcome measure (PROM) exists. This gap undermines understanding of lived experiences and accurate evaluation of interventions, potentially misallocating healthcare resources. This study establishes the need for an LBD-specific, preference-based PROM for assessing QoL.

Methods: A mixed-methods approach was used, incorporating: 1) in-depth interviews with people living with LBD, exploring their perceptions of a 'good life'; 2) a systematic review of qualitative literature on QoL themes in LBD; and 3) critical analysis of existing QoL measures. Thematic analysis synthesized data, and mapping identified gaps in current measures, assessing their relevance to LBD-specific experiences.

Results: Key QoL domains for LBD were identified. Lived experience highlighted a broad symptom spectrum, including fluctuating cognition, independence, and psychiatric symptoms, often overlooked by existing tools. Current measures failed to address the interplay of cognitive, motor, and psychiatric symptoms unique to LBD.

Conclusion: This study underscores the need for a tailored LBD-specific PROM to improve patient-centred care and outcome measurement in clinical trials. Such a measure would reflect the unique lived experiences of LBD, ensuring more accurate and meaningful assessments of QoL.

Improving Research with Long-term Care Facility Residents with Dementia in Ireland

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The number of long-term care facility (LTCF) residents with dementia (RwD) in Ireland is projected to increase significantly over the next two decades. Coupled with a more complex, higher dependency resident profile, LTCFs face mounting pressures to maintain care standards. Innovative, targeted solutions are urgently needed, yet recruiting LTCFs for research remains challenging.

This study aims to enhance research involving RwD by (i) identifying barriers and facilitators to LTCF research participation and (ii) establishing research priorities concerning RwD.A pragmatic, mixed-method approach is employed, including a national survey (n = 200) followed by one-to-one interviews (n = 20) with LTCF managers, nursing directors, care staff, RwD, and their families. Patient and Public Involvement (PPI) is integrated throughout the research process.

Preliminary survey (n = 180) and interview (n = 6) results indicate that key barriers include concerns over data misuse and doubts about research benefits for residents, while facilitators include trust in the researcher and clear, accessible study objectives. By mapping the research landscape in Irish LTCFs, this study will inform the design of targeted interventions to better address the specialized needs of RwD.

A Systematic Review of Cardiovascular Autonomic Dysfunction in Dementia with Lewy Bodies

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Introduction: Autonomic dysfunction is a prominent feature of alpha-synucleinopathies, with cardiovascular dysautonomia being the second most common autonomic complication. These conditions exhibit a prodromal phase with early autonomic dysfunction, but the role of autonomic biomarkers in disease prognosis and phenoconversion remains unclear.

Methods: This systematic review addresses whether cardiovascular autonomic dysfunction, particularly orthostatic hemodynamics, predicts prognosis and phenoconversion in alpha-synucleinopathies. Independent researchers reviewed cohort, observational, longitudinal, and epidemiological studies from EMBASE, Web of Science, CINAHL, and Google Scholar. A subset analysis focused on Dementia with Lewy Bodies (DLB).

Results: From 4986 titles, 13 studies met inclusion criteria, including 12 on phenoconversion and one on prognosis. Findings suggest that lower HR response to orthostatic change predicts DLB conversion, and severe orthostatic hypotension correlates with shorter survival. Studies were heterogeneous with small sample sizes.

Conclusion: Further large, multicentre studies are needed to validate cardiovascular dysautonomia as a prognostic biomarker in alpha-synucleinopathies, identifying those who might benefit most from potential therapeutic advances.

Implementing a Multicomponent Sensory Support Intervention in Long-Term Care: Staff Perspectives from the SENSE-Cog Residential Care Feasibility Study

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Background: Around 64,000 people in Ireland have dementia, with 20,000 in long-term care (LTC). Sensory impairments in residents with dementia (RwD), often go undetected, worsening cognitive decline and social isolation. The SENSE-Cog Residential Care (SENSE-Cog RC) feasibility study evaluated a multicomponent sensory support intervention (SSI-RC) aimed at improving sensory health in LTC. The intervention included sensory assessments and aids, staff training, environmental modifications, and organisational mapping of sensory care pathways.

Method: This study examined the experiences of LTC staff in the intervention arm of the SENSE-Cog RC trial. Semi-structured interviews were conducted with 13 staff members, including Sensory Champions and managers, across four facilities. Thematic analysis identified key facilitators and barriers to implementation.

Results: The intervention was integrated into daily routines but faced challenges. Some RwD struggled to adapt to sensory aids, while staff faced time constraints in maintaining devices and monitoring adherence. Sensory Champions emphasised the need for managerial support and teamwork. Environmental modifications, such as adjusting lighting and noise, required ongoing effort. Collaboration with external providers also needed improvement.

Conclusion: A structured, holistic approach to sensory care is essential. These findings will inform future refinements to enhance feasibility and scalability, improving quality of life for RwD.

Economic evaluations of strategies targeting pre-diagnosis dementia populations: A systematic review

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Objective: The objective is to evaluate and summarise the recent evidence on the economic evaluations of all strategies targeting the dementia populations prior to diagnosis.

Method: A comprehensive literature search on EMBASE, PubMed, Econlit, Web of Science, CINAHL, and NHS EED was conducted. Publications were evaluated based on eligibility criteria, title and abstract screening, full-text review, and quality evaluation using the CHEERS 2022 checklist.

Result: All 21 included articles were conducted in high-income countries and covered strategies across identification (38%), pharmacological interventions (14%), non-pharmacological interventions (43%) and management (5%). The number of publications since 2016 has doubled compared to the preceding 16 years. Despite significant variation across the studies, the combination of early identification and symptomatic treatment demonstrated the most compelling evidence of cost-effectiveness. The average modified CHEERS scores of included articles were 67%.

Conclusion: More economic evaluations are needed to provide evidence on the cost-effectiveness of strategies targeting pre-diagnosis dementia populations.

Enhancing Safety and Independence for People with Dementia: Integrating Open-Interface Sensors, Voice assistant, and Automations for Fall Preventions in Bathrooms, Kitchen Monitoring and Medication

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Dementia is a chronic and progressive neurodegenerative illness, affecting memory, behaviour, personality and functional and cognitive abilities. It greatly impacts quality of life for the person living with dementia (PLwD) presents significant challenges due to progressive memory loss and cognitive decline, which greatly impact their quality of life and place considerable demands on informal caregivers (ICs) such as family member or friends.

The integration of open-interface sensors and voice assistants into smart home platforms such as Home Assistant, which is aimed at enhancing safety and independence for PLwD. With increased cognitive and physical decline, the rate of falls in bathrooms, hazards in the kitchen, and omissions of medication also increases. Our approach therefore focuses on smart monitoring systems that are tailored for these high-risk areas.

We use real-time voice reminders through Google Assistant, aiming to develop safe behaviours that minimize accidents. In bathrooms, sensors detect occupation or inactivity for longer-than-usual time periods, thus alerting the caregivers or calling for voice reminders for assistance. The contact sensors on Fridge, smart kettle and motions sensors in kitchen will remind and record nutrition or hydration intake like how many times he opened fridge and temperature sensors monitor the cooking pattern in kitchen. The Voice assistants and smart pill box remind medication intake on time for adherence, thus reducing the chances of missed or wrong dosages.

By integrating such smart technologies into a single cohesive system, we can enhance the support in daily living. This proactive approach not only mitigates risks but also fosters a safer, more independent lifestyle for individuals with dementia. Future development may be required to extend sensor functionality and fine-tune AI-driven interactions for greater personalisation of care.

Teleconsultation in Memory Care: A Chilean Perspective on Enhancing Primary Healthcare through Digital Collaboration

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Introduction: Consultation is defined as "the joint and ongoing collaborative activity between the specialty team and the general health team at the primary level" (MINSAL, 2016). It serves as a resource for training and facilitates coordination, dialogue, role definition, and shared responsibilities between primary care and mental health specialty services. In Chile, teleconsultation strategies have been implemented in the Memory Unit at Guillermo Grant Benavente Hospital to improve the referral and counter-referral process between both levels of care. Teleconsultation can be conducted with or without the client present.

Methods: The teleconsultation strategy was executed by the Memory Unit, which included case presentations and discussions on relevant topics. This occurred bimonthly at three low-complexity centres. For the first half of 2023, we conducted an anonymous survey to measure the effectiveness of the strategy and analysed the results.

Results: The participants in the survey were primarily female medical professionals (68%) aged 30-35. The teleconsultations resulted in a 46% reduction in referrals and improved case resolution, along with significant knowledge gains regarding the diagnosis and management of dementia.

Conclusions: Teleconsultation effectively enhanced healthcare professionals' understanding of dementia care and improved the integration of services, despite challenges such as connectivity issues and platform usability.

Delusions in Lewy body disease: A retrospective cross-sectional study on associated factors and lived experiences

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Introduction: Delusions are common in LBD significantly impacting quality of life. This study examined clinical factors, characteristics and themes associated with delusions in LBD.

Methods: Clinical and demographic factors were compared between 91 individuals attending St. James's Hospital in Ireland with LBD both with and without delusions. Clinical scales include the Clinical Dementia Rating Scale (CDR), Epworth sleepiness scale (ESS), Addenbrooke's Cognitive Evaluation (ACE-III), and Neuropsychiatric Inventory-12 (NPI-12). Themes of delusions extracted from clinical descriptions were mapped onto a typology from primary psychiatric populations.

Results: Individuals with delusions were older, had higher CDR and ESS scores, lower ACE-III performance, higher scores on the NPI-12, and demonstrated cognitive impairment at the MCI or dementia level. Misidentification delusions were most common, followed by delusions of "being harmed, attacked, or killed".

Conclusion: These findings suggest delusions are related to disease stage, sleep, distinct cognitive and neuropsychiatric patterns, and follow a unique thematic typology.

Investigating Transcriptomic Data from Alzheimer's Disease Patients Reveals Sex-Differences in Microglial Gene Expression

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Introduction: Women are twice as likely as men to develop Alzheimer's disease (AD), with more rapid onset and cognitive decline. However, the reasons behind this difference remain poorly understood. Microglia, the brain's innate immune cells, show sex-biased differences in AD patients and animal models. Previous RNA sequencing studies have examined sex differences in a case-versus-control manner, but male-female differences in AD patients have not been fully explored.

Methods: We performed differential gene expression analysis between male and female AD patients using publicly available single-nucleus RNA sequencing datasets. R-Studio followed by pathway enrichment analysis with Ingenuity Pathway Analysis was used to assess selected datasets.

Results: Our analysis revealed sex-biased dysregulation in microglial expression of genes involved in inflammation, morphology and phagocytosis. In female AD patients, canonical pathways such as oxidative phosphorylation, energy production, and cytokine signalling were found to be upregulated compared to males, whereas mitochondrial dysfunction appeared to be downregulated in females.

Conclusions: Our findings highlight microglial functions that may drive sex-specific differences in AD and inform further studies *in vitro* and *in vivo* aiming at clarifying biomolecular mechanisms with hopes to guide the development of personalized therapies

Cognitive stimulation, alone and combined with acetylcholinesterase inhibitors, as an effective intervention for mild dementia: evidence from a 30-month longitudinal study

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Introduction: This longitudinal study investigated the effects of Cognitive Stimulation (CS), by itself and combined with pharmacological treatment, in mild dementia.

Methods: A total of 108 older adults with mild dementia attending Padua University Hospital (Italy) were recruited. Participants received either AChE inhibitors + CS (n=39) or CS alone (n=69). Cognitive functioning (MMSE, ENB-2 and CRIq for cognitive reserve) was assessed at baseline and every six months for 30 months.

Results: At baseline, no differences were observed between the two groups. Over time, CS alone was associated with the greatest improvement across all cognitive measures ($\beta = 0.50$, 95% CI 0.04-0.96, $p = 0.03$ for MMSE; $\beta = 1.79$, 95% CI 0.61–1.96, $p = 0.003$ for ENB-2), both in global cognition and in specific measures of attention, memory and executive function. Those benefits were especially pronounced for individuals with low cognitive reserve and men.

Conclusions: These findings provide evidence, currently underexplored, on the long-term efficacy of CS in maintaining cognitive functioning and symptom stability, reinforcing its role as a cornerstone in caring for older adults with dementia.

Extract of Ascophyllum nodosum as a potential neurotherapeutic

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Dylan Zinck, Connie Heather, Jodie Kearney, Niamh C. Clarke, Derek A. Costello

Chronic inflammation is a primary contributor to the pathogenesis of neurodegenerative diseases, including Alzheimer’s disease (AD). This results from uncontrolled microglial activation, leading to oxidative and excitotoxic neuronal death. In recent years, naturally-occurring compounds have gained interest for their therapeutic potential. Seaweeds, particularly brown seaweeds, have received attention as a rich source of bioactive compounds, including anti-inflammatory and antioxidant properties. *Ascophyllum nodosum* (AN) is a brown seaweed abundant along the Irish coastline. This study assesses the potential of AN extract to alleviate microglial activation and neurodegeneration in vitro. In addition, we examined its impact on pathological changes in a zebrafish model of AD in vivo.

Our results indicate that methanol-based AN extract significantly alleviates pro-inflammatory mediators nitric oxide, IL-6, and TNFα from lipopolysaccharide-stimulated microglia. AN extract also protected against hypoxic-mediated neuronal death. Taken together, these findings support further investigation of AN extract as a potential therapeutic agent for neurodegenerative disease.

Thank you for taking part in the 2025 DRNI Early Career Researcher Day!

If you wish to join DRNI, or for any comments or feedback, please contact Vanessa Moore (mooreva@tcd.ie).

Dementia Research Network Ireland

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