



Institiúid Mercer
um Aosú Bisiúil

Mercer's Institute
for Successful Ageing
(MISA)

Ospidéal San Séamas
St. James's Hospital

Mercers Institute for Research on Ageing

Annual Report 2017

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Introduction

The Mercer's Institute for Successful Ageing, officially opened fifteen months ago, has already contributed hugely to the quality of care of the older person on St. James's Hospital campus. In addition to providing superb outpatient and inpatient facilities for our patients, the new research, training and educational resources have contributed hugely to the training of clinical and professional staff from not only within St. James's Hospital but from other hospitals, nursing homes and the community from all over the country.

The training of professional staff from all over Ireland in the care of the older person is a major objective of the Mercer's Institute for Successful Ageing and it is a cause of joy and satisfaction to see the contribution of our new facilities in realising this objective and to find our lecture theatres and seminar rooms continuously full.

Likewise, the Dementia Services Information Centre (DSIDC), which is based in our new MISA building, continues to lead the further education of professionals from all over Ireland in the management of patients with dementia. This year we enclose a special section on the work of the DSIDC.

Our programmes are particularly beneficial to professionals working in the community and in nursing homes helping them to optimise the level of care that they provide to their patients.

This report is divided into different sections, Bone Health, Falls and Syncope, The Memory Clinic, Our Bioengineering and Medical Physics Unit, The Irish Longitudinal Study in Ageing (TILdA), Creative Life, Educational and Training programmes and our Local Asset Management Project (LAMP) which looks at the resources of the local community and how they can benefit our patients by the use of social prescribing.

A new clinical initiative, providing a rapid response service of a Doctor, Clinical Nurse Specialist, Medical Social Worker and Therapy Staff to the older patient in the Emergency Department has been very successful and the audit of this programme, presented at a recent European Falls Conference, which took place in Dublin, won first prize. Dr James Mahon also won the Irish Gerontological Presidential Prize at this year's AGM in Wexford for his work in the area of bone health.

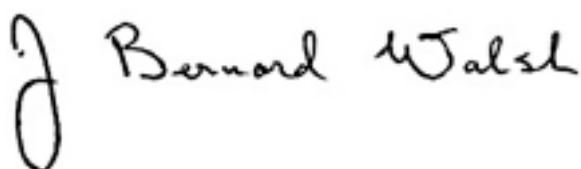
Appended to this report is a list of publications, presentations and lectures undertaken by the Mercer's Institute staff over the past twelve months.

Professor JB Walsh at the unveiling of the 'Tír na nÓg' mural at MISA

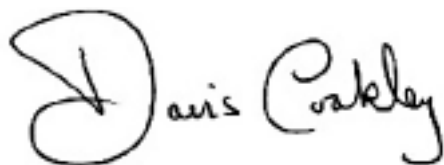


Again, we express our deep appreciation of the incredible support that we have received from Mr. Chuck Feeney and Atlantic Philanthropies which has enabled us to build the new Mercer's Institute building setting a new standard for the care of the Older Person not only in Ireland but internationally. We are also extremely grateful for the support that we continually receive from the Executive and Board of St. James's Hospital, from the Health Service Executive and from the Department of Health. A very special thanks goes to the Governors of the Mercer's Hospital Foundation Board who have been stalwart in their support of all our initiatives over the last thirty years. Their support continues to be our main core capital for all our new projects and development funding and we are exceedingly grateful to them.


We also wish to thank our clinical colleagues, our medical, nursing and rehabilitation staff and our superb operational and administrative team. We particularly wish to thank Ms. Carol Murphy, Administrative Officer of the Mercer's Institute and of the MedEL Directorate and her colleague Ms. Judy Oxley who again this year has coordinated the collating, layout and printing of our annual report.

A handwritten signature in black ink that reads "J Bernard Walsh". The "J" is large and stylized, with a long vertical stroke.

Professor J. Bernard Walsh,
Director of the Mercer's Institute for Research and Ageing

A handwritten signature in black ink that reads "Davis Coakley". The "D" is very large and loops around the first part of the name.

Professor Davis Coakley
Chairman of the Steering Committee of the Mercer's Institute of Successful Ageing

A handwritten signature in black ink that reads "Rose Anne Kenny". The signature is fluid and cursive.

Professor Roseanne Kenny,
Director of the Mercer's Institute for Successful Ageing

Bone Health & Osteoporosis Unit

2017 has been a year of advancement and progress for the Bone Health and Osteoporosis Unit. The service has settled into its new home in the MISA Building. Patient numbers continue to grow. 6160 patients attended the service this year. There has been significant growth in assessment, diagnosis and management of patients with osteoporosis and fractures. In addition, the Unit sees patients with hyperparathyroidism and other conditions relating to bone metabolism. Professor J Bernard Walsh, Dr Miriam Casey, Dr Kevin McCarroll and Dr Rosaleen Lannon are the principal consultants in the Unit and coordinate research activities and the overall running of the service.

Summary of Unit:

- Clinical Nurse Specialist (CNS) led Pre-Assessment Clinic
- GP advice
- Osteoporosis and Bone Health Medical Clinic
- Fracture Liaison Service (Incorporating Orthogeriatric Service & Hip Fracture Integrated Care Pathway)
- Colles (wrist) Fracture and Peripheral Fracture Clinic
- Vertebral Fracture Clinic
- Recombinant Parathyroid Hormone therapy (PTH) patient monitoring
- V Zoledronic acid administration and monitoring
- Denosumab injection administration and monitoring
- DXA (Clinical Densitometry) Service
- Inpatient Falls and Fracture Prevention Service
- Audit
- Service development and education
- Research

Clinical Nurse Specialist (CNS) led Pre-Assessment Clinic

The CNS-led Pre-Assessment Clinics, which occur twice weekly, continue to be the first point of contact for patients who are referred for assessment of their bone health and risk of fracture.

Patients attend from 4 sources:

- External referrals from general practitioners or other hospitals
- General medicine, surgery and other clinics within St James's Hospital including the MedEL Department
- Fracture Liaison Service
- Referrals from DXA Service based on severely low bone density results or the presence of vertebral fractures

A comprehensive assessment is performed on all patients. This includes review of risk factors for osteoporosis, risk factors for falls and advice on diet, lifestyle modifications and education on treatments. On a patient's first attendance at this clinic an extensive screen is undertaken. This includes a DXA scan, a calcaneal bone ultrasound and a full biochemical and haematological work-up including serum bone turnover markers.

When results of the screening are completed and reviewed by CNSs and the Clinical Fellow in Bone Health, a full summary report and a detailed individualised management plan is sent to the

patient's GP. Many patients are sent a subsequent appointment to the Bone Health and Osteoporosis Medical Clinic for further review and management, often for the purpose of offering IV Zoledronic acid therapy or PTH therapy.

In 2017 a total of 1278 patients were seen in the Nurse Led Pre-Assessment Clinic (PAC), this represents a similar number to 2016. The number of new patients rose. The number of patients making return visits also remains high, highlighting the essential role of the CNS in monitoring the efficacy of treatments as well as promoting adherence and managing side effects. The summary of numbers of patients seen in the various nurse led clinics is as follows:

Pre-Assessment Clinic (PAC)

New patient	544	489	568
Return patient	846	791	710
Total PAC	1390	1280	1278



Fig. 1 - Reduction in wait times for Pre Assessment

GP Advice Service

Due to the increasing number of referrals to the Bone Health Unit in recent years, new initiatives were sought in 2015 to improve speed and quality of access to our specialist services. One such programme commenced was the GP Advice Service. This allows for external (mainly GP) referrals to be rapidly triaged and acted upon by the Bone Health Fellow. Based on clinical need, the patient is either listed for a rapid PAC appointment, or alternatively has a comprehensive, immediate and individually-tailored long-term management plan sent to the referring doctor within a week of receipt of referral. Since commencing this programme, waiting times for PAC have dropped from 32 weeks in 2014 to 12 weeks in 2015 and further to 8 weeks in 2016 and maintained at this level since.

Osteoporosis and Bone Health Medical Clinic

The weekly medical osteoporosis clinic has been in operation for more than a decade. It caters for patients already seen in the Pre-Assessment Clinic, who have been identified as requiring additional input and monitoring, often due the severity and complexity of their osteoporosis. Patients attending for new and return visits can be commenced on treatments such as IV Zoledronic acid, recombinant parathyroid hormone therapy or may be referred onwards to our colleagues in Radiology for procedures such as vertebroplasty if required. This clinic also provides opportunity for performing additional blood tests, giving education sessions to patients and administering therapies such as loading doses of Vitamin D replacement.

In keeping with the programme of providing rapid-response advice to GPs for less complex cases, and fast tracking of more complex patients to the Bone Health Medical Clinic, we saw total numbers of attendees reduce slightly in 2017. Waiting times for clinic appointments remained under 8 weeks. This allowed us to ensure that all patients get speedy access to the Bone Health management they need, and that the most complex patients have a minimal waiting time.

Osteoporosis and Bone Health Medical Clinic Annual Numbers

Total	1441	1560	1589	1738	1433	1514	1335
New	371	351	335	398	218	234	230
Return	1070	1209	1254	1340	1215	1280	1105



Fig. 2 Reduction in wait times Osteo & Bone Health clinic

Fracture Liaison Service (Incorporating Orthogeriatric Service and Hip Fracture Integrated Care Pathway)

Incidence of fractures is extremely high and will increase with the ageing population. Fractures affect the quality of life of patients. After a hip fracture 80% of patients are unable to perform basic tasks independently. In SJH we are dedicated to identifying older patients presenting with fractures and offering screening for future fracture risk and/or treatment for osteoporosis,

All older patients presenting to St James's Hospital with a peripheral fracture are identified and offered assessment and follow-up at the CNS-led Pre-assessment Clinic. This service incorporates a weekly orthopaedic ward round where patients in need of the service are identified. These patients are commenced on appropriate bone protection therapy at an early juncture.

In 2017, patients with hip fractures were assessed on a weekly round by a Specialist Registrar and CNS, and a bone protection programme commenced. All patients are then offered an appointment in the Pre-Assessment Clinic.

Annual numbers of hip fractures in SJH

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	167	172	180	197	253	166	159	181	195	188	189

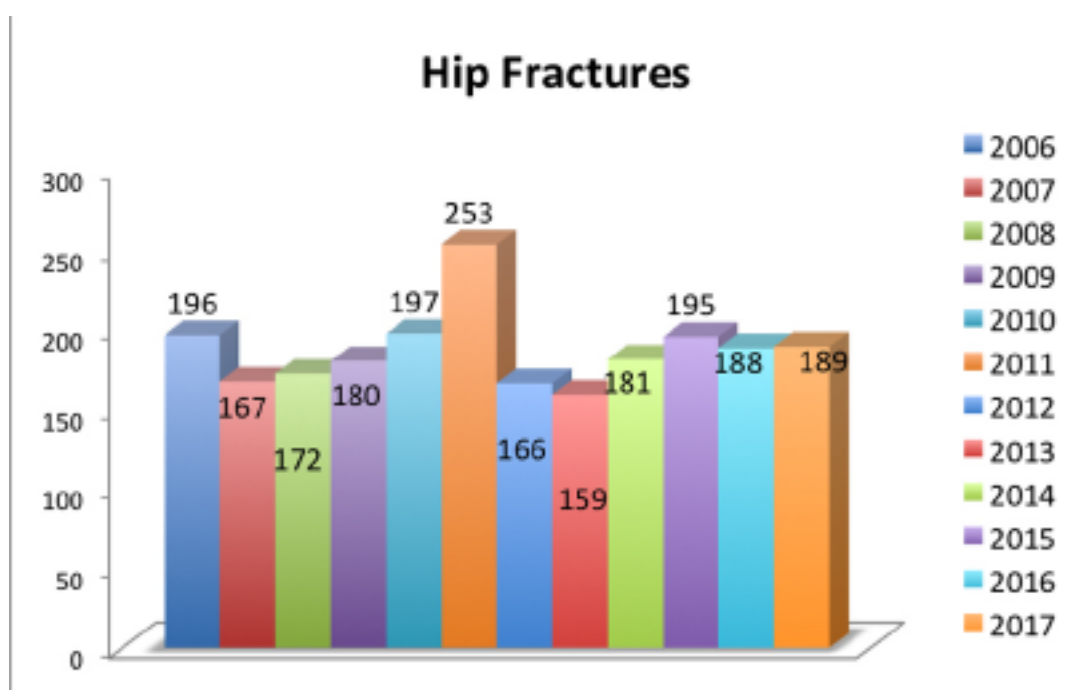


Fig 3. Hip Fracture Patients admitted annually

A new and central aspect to the Fracture Liaison Service has been the rolling out of both an Integrated Care Pathway for hip fracture patients and the Irish Hip Fracture Database. In conjunction with our colleagues in ED, Orthopaedics and allied health care, we are working to ensure targets are met for the six key performance indicators in the care of hip fracture patients: Time to surgery; time to admission to ward; pressure ulcer and skin care assessment; bone health review; falls assessment; and orthogeriatric review. Review of the IHFD confirms that figures in SJH for all key performance indicators compare favourably with the national average and have improved and continue to improve each year.

Patients who sustain a fracture not requiring an admission to the hospital are also followed up and monitored after their discharge from the Emergency Department.

Colles (wrist) Fracture and Peripheral Fracture Clinic

Colles fractures are important to identify, as their presentation may be an early indicator of osteoporosis. These patients are offered a follow-up appointment at a specialised nurse-led osteoporosis clinic, which occurs every 2nd Thursday morning. This clinic reviews risk factors for falls and osteoporosis. Patients are commenced on treatment as indicated by their assessments.

Vertebral Fracture Clinic

Patients with vertebral fractures are identified, assessed and cared for by the Bone Health and Osteoporosis Unit. This Unit has been providing care for patients with vertebral fractures for many years. Traditionally the Unit assessed and cared for patients with vertebral fractures that based on retrospective referral from their GP. Patients attending for DXA diagnosed with vertebral fractures are offered appointments for assessment in the clinic directly. Over the last two years electronic databases are interrogated weekly identifying inpatients with vertebral fractures. We hope through improved identification of patients we can initiate earlier appropriate treatment for this vulnerable patient group and hence improve their healthcare outcomes.

Recombinant Parathyroid Hormone therapy (PTH)

854 patients have been prescribed recombinant Parathyroid Hormone treatment to date. These patients are often complex with severe osteoporosis and multiple fractures and have been refractory to other treatments. In patients with vertebral fracture, international studies have shown a substantial improvement in bone quality and also in back pain following this treatment. All patients on Parathyroid Hormone therapy are regularly followed up in the CNS-led service to monitor bone biochemistry and to observe for any side effects, the occurrence of which are rare.

IV Zoledronic acid administration and monitoring

Intravenous Zoledronic acid is a useful treatment in the prevention of both vertebral and non-vertebral fractures in patients with osteoporosis. It has been shown to significantly reduce mortality in patients after hip fracture. It provides an alternative to oral bisphosphonates and is an option in patients who are deemed not suitable for PTH therapy and in patients post PTH therapy.

The infusion may be given at a standard (4mg) dose once yearly, or a lower (2mg) dose 6-monthly. Patients are assessed by the medical team at the Bone Health Clinic prior to administration of the drug. Serum calcium and vitamin D levels are measured within one week of the infusion by the CNSs in order to monitor for hypocalcaemia. This has led to a reduction in the incidence of complications from the infusion.

There were 412 infusions administered in 2017, an increase of 20% compared to 2016. This highlights the importance of this therapy – which can reduce the chance of vertebral fractures by up to 70% – in treating frail patients with severe osteoporosis.

Denosumab injection administration and monitoring

In late 2010 Denosumab was introduced for the treatment of osteoporosis. To date over 1000 patients have been prescribed the drug in our Bone Health Clinic. It is administered as a

subcutaneous injection every 6 months either by the CNSs or in the community. Serum calcium and bone markers are measured 2 weeks post-dose. Reported side effects have been rare, making it a safe and convenient treatment option in our older population.

DXA (Clinical Densitometry) Service

Our DXA service carried out 3135 scans in 2017. The number of scans performed this year is more than 2016. The new DXA machines also facilitate extended research activities, including a project investigating lateral spine bone mineral density, which may be of benefit to patients with conditions such as ankylosing spondylosis.

This service is open to referrals from general practitioners in the local community and further afield as well as other consultants within the hospital. Patients who have significant osteoporosis on DXA will be offered assessment in the Bone Health Clinic.

Annual numbers of DXA scans performed in SJH

	Number of DXAs Annually in SJH
2006	917
2007	1794
2008	2025
2009	2184
2010	2494
2011	2554
2012	2705
2013	2906
2014	3643
2015	3285
2016	3051
2017	3135

Inpatient Falls and Fracture Prevention Service

In early 2012 the falls and injury prevention programme was rolled out across the hospital. Since this intensive awareness drive, the risk management office has reported a reduction in the falls rates on all wards. The CNSs continue to work closely with the hospital falls management group in updating the falls risk assessment to reflect the need for a more cohesive MDT approach and incorporate HSE/NICE guidelines. A pilot project began in February 2015 to trial a modified falls assessment and MDT intervention record, and following its initial success, was instituted hospital-wide from early 2016. The Bone Health CNSs liaise with ward staff nurses and provide ongoing falls prevention education through the hospital and meet with the Hospital Falls Management Group on a two-monthly basis.

Audit

Internal audits in the Unit during 2017 have been conducted on sources and outcomes for clinic referrals, indications for DXA scan requests and outcomes for patients attending Pre-Assessment Clinic, as well as concordance with key performance indicators for care of hip fracture patients. Audit results are discussed and actioned upon at bi-weekly meetings in the Unit.

Service development and education

Bi-weekly departmental “Bone Club” meetings encompass a wide range of topics and formats including research discussion groups, osteoporosis educational lectures and business meetings to discuss service development.

Service provision initiatives in 2017 have entailed increasing capacity for total number of patients assessed as outlined above. In addition, we work closely with our colleagues in specialist departments such as Radiation Oncology, Gastroenterology, GUIDE and Rheumatology to refine pathways of care for patients at high risk of osteoporosis.

Members of the Bone Health Unit have provided osteoporosis teaching sessions to medical and nursing students and interns and physiotherapists in the hospital, as well as to wider medical audiences in the Royal College of Physicians and at SJH Grand Rounds.

Education was delivered by the CNSs to the Pulmonary Rehab group every two months, and for MSc in gerontology, FETAC for Healthcare Assistants as well as ongoing education on falls management throughout the hospital. Bachelor of Nursing students are also facilitated in the falls and osteoporosis service. The CNSs had an information stand in the Hospital Concourse to mark World Osteoporosis Day in October 2017.

Finally, technological advances are being embraced by the Bone Unit, with development of a new electronic database, and the Unit aims to transition to a paperless system in the coming year.

Research

Continuous research forms an integrated part of the Bone Health and Osteoporosis Unit. The team are conducting a number of ongoing projects. Members of the team travelled to national and international conferences presenting research and keeping up to date with advances in the field. Members of our team attended WCO-IOF-ESCEO in Florence in Marcy, ASMBR in Denver in September, IGS in Wexford in September as well as Irish Hip Fracture Conference and Falls Frailty Bone Health (FFBH) in Dublin. Below we detail recent ongoing research in our Bone Health Unit:

“Characteristics and Outcomes of Older Adults following Hip Fracture”

Principle investigators: Prof JB Walsh

Dr MC Casey

Dr K McCarroll

Clinical investigator: Dr James Mahon,

Clinical Fellow in Bone Health – MD Thesis

This prospective study has completed recruitment of acute hip fracture patients in SJH for one year to compile cross-sectional data on this cohort, followed by a one-year longitudinal follow-up to

measure functional and bone health outcomes after treatment with IV Zoledronic acid and Ergocalciferol. In addition, the study will characterise patients' progress through the hospital's hip fracture integrated care pathway.



Dr. Rosaleen Lannon, Ms. Nessa Fallon and Ms. Georgina Steen - World Osteoporosis Day

Dr James Mahon with prize for award winning abstract - IGS 2017

Falls and Syncope Unit

At some point in their lives, 40% of individuals will have an episode of blackout or faint. For the majority of younger individuals this represents a benign faint and they do not need to be assessed by a doctor. However, if this proves recurrent or if a blackout occurs in an older individual this does require investigation, due to the risk of underlying cardiovascular aetiology.

The Falls and Syncope Unit (FASU) is a day case assessment clinic that runs five days a week where patients with unexplained falls, syncope and presyncope are investigated using state of the art cardiovascular technology. The FASU operates a one stop assessment clinic and allows for a detailed investigative work-up. It is endeavored that all tests are carried out on the day and a diagnosis often made with only one visit being required by the patient. The FASU aims to negate the need for hospital admission in those presenting with syncope and falls. Once diagnosed patients can link into existing hospital resources (including referral to MedEL Day hospital for gait and balance retraining or referral to cardiology services) but the vast majority are dealt with solely by the clinic and discharged back to the community.

The clinic commenced in 2003 with Dr Conal Cunningham and with the arrival of Professor Rose Anne Kenny, moved to a new expanded site beside the Emergency Department in 2005. An increase in staff and space allowed for a rapid increase in the numbers of patients assessed. Activity continues to increase significantly every year with the main source of referrals coming from the Emergency

Department, Inpatient Referrals within St James, GP's, Cardiology services, Neurology Services, MedEL services and Peripheral Hospitals from all around the country. It provides the largest syncope clinic service in Ireland. In 2016 FASU moved to the new MISA building with the addition of new technologies such as NIRS (near infrared spectrometry), video recording and gait assessment laboratory.

Clinic Staff

Consultants

Professor Rose Anne Kenny (Director)
Dr Conal Cunningham (Co-Director)
Dr Joseph Browne
Dr Susie O Callaghan (locum)
Specialist Registrars / Registrars
Dr Paul Claffey (Lecturer in Medical Gerontology)
Dr Robert Briggs (TILDA Research Registrar)
Dr Triona Mc Nicholas (TILDA Research Registrar)
Dr Cunningham Registrar Clinic Registrar (rotated)

Specialist Nurses

Ms Ciara Rice
Ms Dymphna Hade
Ms Lisa Byrne
Ms Louise Clerkin (newly appointed 2017)

Administrative Staff

Ms Michelle Doyle
Ms Clare Dooley

Allied Health

Ide O'Shaughnessy provides OT to FASU inpatient referrals
Sinead Carton and Sheila McCarthy provide a physiotherapy service to FASU day case patients on Wednesday and Friday from 11-13.

Investigations undertaken routinely in the FABU include:

- Electrocardiogram
- Active stand (finometer allows for continuous beat to beat blood pressure and heart rate to be recorded).
- Head up Tilting: Italian Protocol and Front-loaded.
- Carotid Sinus Massage
- 24-hour blood pressure monitors (N = 16)
- Cardiac event monitors (N=16)
- Holter monitors (N=1)
- Internal loop Recorder Monitoring
- Hallpike and Epley Manoeuvres (diagnostic test and particle repositioning therapy for BPPV)
- Autonomic Function Test

- Gait Assessments
- Vestibular Assessments
- Blood Testing.
- 24 Hour Urine Collection (Urine Volume and Electrolytes)

FABU accepts referrals for persons (in-patients and out-patients) for:

- Falls (mechanical and unexplained)
- Syncope
- Transient Loss of Consciousness
- Vertigo
- Dizziness
- Blackouts
- Faints

Outpatient referrals may be made by General Practitioners within the St James's catchment, St James's Hospital Consultants and other hospitals and agencies, via Consultant Neurologists, Cardiologists and Geriatricians.

Consultant-led Clinics

Clinics take place on Monday, Tuesday, Wednesday and Fridays accepting referrals from age 16 upwards. Wednesday clinic is a national tertiary referral service. On all clinic days, inpatient referrals are seen in addition to booked appointments if possible. In the event an inpatient referral has not been reviewed prior to discharge, it is prioritized as an outpatient. All referrals originating within the hospital are electronic via EPR.

Nurse-led Clinics:

There are 16 nurse-led clinics per week, they include the following;

- Autonomic Function Testing
- Ambulatory Blood Pressure Monitoring
- Holter Monitoring
- Cardiac Event Monitoring
- Internal Loop Recorder Monitoring/Remote monitoring.

This system allows for quick assessment of blood pressure and heart rate on a 24 hour or seven day basis. Downloading of results and reporting are carried out by nursing staff.

Nurses within the clinic act as a direct line of contact for patients, who phone in on a 07.30-16.30 basis and are able to advise and instigate conservative measures often preventing unnecessary A&E attendances. This is in addition to the following activities amongst others; routine and non-routine phlebotomy e.g. Synacten testing and patient education regarding internal loop recorder insertion and remote monitoring via Carelink.

Carelink

In 2010 a remote monitoring system for Implantable Loop recorders was established. This service provides a facility where patients can send heart recordings for immediate review by nursing and medical staff, thereby improving efficiency and safety for these patients. To date over 500 patients

across Ireland have availed of this service. The service allows for immediate review of heart rate activity thereby reducing the number of hospital visits required for that patient by 75%.

Physiotherapy Service in FASU

A Physiotherapy service was introduced to FASU in December 2016. This currently involves a Physiotherapist (Clinical Specialist or Senior grade) attending Professor Kenny's clinic every Wednesday and Dr Cunningham's clinic every Friday for 2 hours. Appropriate patients attending FASU are referred by the medical team or nursing staff. Physiotherapy assessment includes a subjective assessment of falls history, baseline mobility and physical activity levels, and an objective assessment which includes the analysis of strength, range of movement, gait, posture and balance. Physiotherapy intervention consists of advice and education in the areas of falls prevention and appropriate levels of physical activity, design and provision of an individually-tailored home exercise programme and referral onwards as required, generally to Primary Care Physiotherapy or Robert Mayne Day Hospital. Up to 3 POTS patients are currently being reviewed for a period of 6 weeks to 3 months for the progression of exercise programmes of lower limb strengthening, core control and advice on the benefits of exercise.

To date 102 patients (age range 18-92 years, mean age =75 years) have been assessed by the Physiotherapy service in FASU. The majority of these patients are older adults with a history of falls or who are at risk of falls. A poster presentation outlining the profile of patients referred to Physiotherapy in FASU, as well as the results of a Referrer Feedback Survey was presented at the IGS 65th Annual and Scientific Meeting in September 2017 (*Age and Ageing*, Volume 46, Issue Suppl_3, 1 September 2017, Pages iii13–iii59). This demonstrated that Physiotherapy assessment allowed for identification of and early intervention for modifiable falls risk factors. While referrer feedback indicated that a Physiotherapy service in FASU was a useful adjunct to multifactorial falls risk assessment.

Collaboration with Home First

Home FIRsT are a Specialist Older Persons Team based in the Emergency Department. The team's aim is to facilitate the safe discharge of older people who would otherwise require hospitalisation. Comprehensive Geriatric Assessment begins in the Emergency Department with specialist nursing, functional, cognitive and social needs assessments. Close links with FASU are an integral part of the Home FIRsT patient pathway. Since Home FIRsT commenced service in May 2017, FASU have facilitated the urgent review of 28 patients. These patients presented to the Emergency Department following a collapse or unexplained fall. A small percentage of these patients required FASU review within 7 days to facilitate safe discharge from the Emergency Department. A number of patients requiring review within 48-72 hours post unexplained fall/collapse have been reviewed in the Robert Mayne Day Hospital with their Holter Monitor or ABPM facilitated by FASU.

Falls and Blackout Clinics

Summary of Attendances All Clinics (Professor Kenny / Dr Cunningham / Autonomic Clinic / Monitor ClinFalls and Blackout Unit: Monitor Clinic Falls and Blackout Unit:

Activity 2017	
Autonomic Function Tests	31
Monitor Clinic	2188
Carelink	500
Physiotherapy Clinic	54
Day Cases	2558

Teaching and Audit

Ciara Rice has organized the 6th National Syncope Training Days which has been increased to a 2 day event due to the demand –this took place for the first time in the MISA seminar room. The course directors are Professor Rose Anne Kenny and Dr Conal Cunningham. This was a well-attended and successful training event.

Training of both medical and nursing students occurs on an ongoing basis along with visiting nursing staff from centres in other hospitals where syncope units are in the early stages of development.

Audit occurs on an ongoing basis in the FABU, with particular focus on improving service provision. Presentations to other departments within the hospital such as cardiology and emergency room staff occurs intermittently, as a means of providing training and developing awareness of the service, in addition to facilitating interdepartmental collaboration, both clinically and in terms of research.

A Clinical Case Conference occurs in FASU regularly. This is a forum for all staff in the FABU to present and discuss clinical cases and review literature relevant to falls and syncope.

Research

Dr Susie O'Callaghan has recently finished her training in Geriatric Medicine and General Internal Medicine. She is currently a locum Consultant in AMAU. Susie was the recipient of Trinity College Dublin Provost Teaching Award 2017. She is also a TILDA fellow. She has published in the area of neurocardiovascular instability and is focusing on the association of orthostatic hypotension and falls for her PhD.

Dr Triona McNicholas is the Davis Coakley research fellow who is working as part of the TILDA team. She is undertaking a PhD under the guidance of Professor Rose Anne Kenny and her research focuses on cardiovascular ageing and autonomic function, and its impact on cognition and falls. Her work within the TILDA project has been presented at both national and international conferences and she has used her clinical experience in FASU in a publication on the management of vasovagal syncope. She also successfully completed the Diploma in Syncope and related disorders in the Royal College of Physicians.

Dr Paul Claffey is currently an Assistant Professor of Medical Gerontology in the School of Medicine and is also a TILDA fellow. He is currently completing an MSc in the area of near infrared Spectroscopy and syncope.

Dr Robert Briggs is a specialist registrar in Geriatric Medicine with a clinical and research interest in

cognition and mental health in later life. He is currently working as research fellow in TILDA completing a PhD focusing on the association between neurocardiovascular instability and depression in later life.

Memory Clinic

The memory clinic provides a diagnostic service for patients concerned by cognitive decline. A multi-disciplinary team assess each patient.

In 2017, 525 patients were assessed in the Memory clinic (299 new and 226 return patients). Each patient attended at least two visits to the clinic: first visit for assessment and second for feedback of diagnosis and treatment plan.

Each assessment visit takes two hours and feedback visits usually take an hour. A proportion of patients with more complex presentations required further visits to carry out extra investigations to clarify the diagnosis.

The breakdown of the diagnosis of patients who attended the Memory clinic in 2017 are as follows: We have 73 patients who attended the clinic but have not yet received a diagnosis due to long waiting lists for MRI brain scans and other investigations.

Diagnosis	2017	2016
Vascular dementia	2	1
Probable Alzheimer's dementia	77	80
Alzheimer's Mixed dementia	31	35
Lewy Body Dementia	1	2
Fronto -Temporal Dementia	14	15
Sub cortical dementia	1	5
Subjective memory complaints	98	93
Functional	13	5
Miscellaneous diagnosis	6	12
Diagnosis unclear	12	26
Vascular cognitive impairment	36	37
Mild cognitive Impairment	150	91

Lumbar puncture (L.P.)

Cerebral spinal fluid is an important bio-marker for diagnosis of Alzheimer's type dementia. The number of patients undergoing L.P. in the Memory Clinic has increase significantly over the past year. In 2016, 16 patients underwent a lumbar puncture in the Memory clinic this increased to 38 patients undergoing this procedure in 2017. The lumbar puncture clinic is held monthly in the Memory clinic and is a joint venture between Neurology and the Memory clinic.

NILVAD

This study was successfully concluded in November 2017 on budget and data analysis and dissemination is ongoing. We expect the findings to be published in 2018.

DemPath

The purpose of DemPath which is funded by Genio Trust is to create and integrated care pathway for dementia at St. James's Hospital and to improve education and the environmental supports for

patients, carers and health care professionals. During 2017, we have continued with our educational efforts and environmental improvements; Natalie Cole PhD, Project Manager left to take up a new position and has been replaced by Margo O'Neill as Lead. The goals for this coming year are to roll out the e-learning modules and to imbed the care pathway from the ED to ward and back to the community.

NeuroExercise Update

NeuroExercise is a European JPND funded multicentre RCT examining 'The Effects of an Extensive Exercise Programme on the Progression of Mild Cognitive Impairment'. Recruitment at Trinity College Dublin commenced in March 2016 and is now completed. 62 people with MCI have been randomised and we anticipate that the study will finish September 2018. All study assessments and exercise interventions take place in the Clinical Research Facility at St. James's Hospital. 7 external sites around the Dublin area with established memory clinics also refer suitable participants to the study team.

Steadfast Study- vTv Therapeutics north Carolina, Phase III.

Randomised, Double-Blind, Placebo Controlled, Multi-Centre registration Trial to evaluate the efficacy and safety of Azeliragon (Steadfast) in patients with mild Alzheimer's disease receiving Acetylcholinesterase inhibitors and/or memantine.

510 patients enrolled worldwide, commenced in St. James's Hospital in February 2017, 13 subjects enrolled, St. James's study site is the largest in IRL/UK. Study period is 21 months, investigational product/placebo duration is 18 months with 21 month follow up; subjects may enroll in a 6 month open label evaluation thereafter. Study assessments are 3 monthly, subjects are reviewed in the memory clinic, principal investigator is Prof. Brian Lawlor and it is being coordinated in St James's Hospital by Lisa Crosby our Research CNM.

Family Members Attitudes Towards Alzheimer's disease

Dr Michelle O'Brien, Specialist Registrar in Geriatric Medicine, is currently engaged in research regarding the attitudes of family members around the disclosure of a diagnosis of Alzheimer's disease to a loved one. This is a repeat of a study performed 20 years ago and published in the BMJ. Its aim is to explore whether attitudes and perception has changed in the intervening two decades. Data collection is completed and is currently being prepared for submission.

7th Annual Memory Clinic Conference Friday 16th June 2017

Dementia: Addressing the Risk Factors

The 7th Annual Memory Clinic Conference took place on Friday 17th June 2017 in the Trinity Sciences Centre, St James's Hospital. The conference was jointly hosted by the Mercer's Institute for Successful Ageing (MISA) and the Dementia Services Information and Development Centre (DSIDC), the conference entitled "Difficult to Diagnose Dementias". We had the pleasure of welcoming a number of world class speakers in this field, including: Assistant Professor of Psychiatry and Neurology at Columbia University, Professor Ted Huey, who alongside Professor Tim Lynch presented a talk on Fronto-Temporal Dementia; "New Insights into Fronto-Temporal Dementia"; Professor Ken Wilson spoke on the services he provides for younger people with progressive brain disease and dementia and also adults of working age with alcohol related brain damage; Dr Cliona Ni Cheallaigh who has been studying cognitive impairment in the homeless community and other socially disadvantaged groups; Dr Justin Kinsella, Consultant Neurologist from St Vincent's Hospital discussed Genetics and Dominantly Inherited Alzheimer's; Professor Julie Snowden works in a

specialist multidisciplinary clinical diagnostic unit for early onset and atypical dementias and is a doyen in the world of Neuropsychology and presented on these cases; Dr Mircea Balasa a clinical neurologist and current GBHI fellow with a specialist interest in memory who presented on his research into CSF biomarkers; Dr Clodagh Power, Research Fellow in the St James's Memory Clinic, who has been examining the phenomenon of phenocopy presentation. The conference was attended by over 120 healthcare professionals and feedback from the audience was extremely positive.

Psychiatry Research Fellow

Dr. Clodagh Power completed her research fellowship in the Memory Clinic in July 2017 and has resumed her Psychiatry BST. She is currently completing her thesis for a Doctor in Clinical Medicine entitled 'Dementia in the Acute General Hospital - Prevalence, Practices and Outcomes', which is due for submission in August 2018.

Dr Kevin Glynn is the current Psychiatry Research Fellow who commenced working in the Memory Clinic in July 2017. He recently completed his basic training in Psychiatry and is taking time out to pursue research before continuing on to his higher specialist training. His research interests include subjective memory complaints in the elderly and their link to psychiatric and medical comorbidities. He is currently auditing the patients who have attended the clinic over a number of years, and the prevalence's and incidences of diagnosis over multiple time periods. He is also undertaking a project comparing the Quick Mild Cognitive Impairment (QMCI) screening tool with existing screening tools in use at the memory clinic, which has implications for patient referral, diagnosis, and treatment within the clinic.

Watts Research Fellow

Dr Oisín Hannigan is the current Watts research fellow and commenced his post in July 2016. His research interests are based around quality of life in the elderly. He currently has a number of ongoing research projects, including research into topics such as; morbidity and mortality in those listed for long-term care from a hospital setting; overall statistics on mortality in those who are living in long term care, the effects of socioeconomic background and social deprivation on admission to long term care, and the feasibility of the use of virtual reality software as both a recreational tool and a possible behavioural aid the elderly. The findings of these studies will be submitted as part of his thesis for a doctorate in clinical medicine through Trinity College Dublin, under the supervision of Dr David Robinson.

Dr Robert Coen. Senior Neuropsychologist.

Summary of activities / developments in MIRA – January – December 2017

Primary duties relate to the Neuropsychological assessment of clients referred to the MIRA Memory Clinic and overseeing assessments undertaken by Nurse Irene Bruce and additional staff as appropriate including discussion of all cases at our weekly Consultant led Multi-Disciplinary Consensus Meetings. Duties also include Clinical supervision of Trainee Clinical Psychologists who undertake specialist placements in MIRA as part of their Clinical Training, teaching / training on programmes for Trainee Clinical Psychologists and Medical Students, and research supervision / collaboration on a variety of studies and research programmes, plus active participation in Global Brain Health Institute (GBHI) initiatives. Below is a summary of Clinical and research-related activities January – December 2017:

The Irish Longitudinal Study on Ageing (TILDA).

Having assisted with the development and implementation of the cognitive battery used in TILDA (PI Prof Rose Anne Kenny), Dr. Coen in collaboration with TCD Psychology Dept. staff, post-grads and TILDA staff continues to consult on TILDA developments and was a Collaborator on the successful submission for continued funding for TILDA Phase II to fund Wave 5 and Wave 6 to 2022.

January – December 2017: Semantic/phonemic verbal fluency discrepancy in MCI paper accepted for publication (with Dr. Roisin Vaughan, Clinical Supervisor Prof. Brian Lawlor) - see publications list.

Carotenoid supplementation in age-related macular degeneration (AMD).

In collaboration with Principal Investigator Prof. John Nolan, Waterford IT, Dr. Coen is an active advisor / collaborator on three major studies evaluating cognitive outcomes following Carotenoid supplementation: (i) Enrichment of Macular Pigment and its impact on vision and blindness: Central Retinal Enrichment Supplementation Trials (CREST) (ii) Carotenoids and Age-Related Dementia Study (CARDS). (iii) a study of carotenoid supplementation in Mild Cognitive Impairment (MCI) was designed and has now commenced, with Supervision of the PhD Researcher (Rebecca Power) shared by Dr. Coen and Prof. Nolan.

January – December 2017: From strand (ii) a paper has been published. From strand (iii) control participants (n=60) have now been recruited and MCI recruitment is nearing completion. A presentation was made (RP) at the Annual Conference of the Psychological Society of Ireland - see publications list.

Viral Hepatitis C Associated Neurocognitive Dysfunction in Ireland in the DAA era.

Dr. Coen was a co-applicant on this HRB funded research project (PI Prof Suzanne Norris, co-applicants Prof Rose Anne Kenny, Dr. John Gormley, Dr. Colin Doherty, Dr. Kelly O'Brien). The first aim of this study is to determine the prevalence and pattern of neurocognitive function in HCV-infected patients. The second is to determine if cognitive impairment can be stabilised or ameliorated through two differing interventions (i) viral eradication with DAA antiviral therapy (DAA treatment intervention study) (ii) a formal exercise programme to investigate the effects of exercise on cognitive function in this cohort (Exercise intervention study). Dr. Coen provided training and supervision for the Neuropsychological aspects of this research, which has now commenced. The Neuropsychological strand is being researched by Orla Strahan with assistance from additional Psychology students and will form the basis for her PhD with joint supervision by Dr. Coen, Dr. Paul Dockree TCD and Dr. Colin Doherty.

January – December 2017: To date over 600 patients have been screened and 125 have been seen or have been triaged to the detailed Neuropsychological strand. Presentations have been made at the American Association for the Study of Liver Diseases (AASLD)

Annual Conference, Washington and at the Annual Conference of the Psychological Society of Ireland. At the latter Orla Strahan won the prestigious Deirdre McMackin award at the conference as an early career researcher making a substantial contribution to Neuropsychological research in Ireland - see publications list.

Cognitive Impairment in patients with HIV Infection.

In conjunction with Dr. Colin Doherty, Consultant Neurologist and others, Dr. Coen provided supervision for Dr. Patricia McNemara's PhD research on Cognitive Impairment in patients with HIV Infection. Her research has been completed. A paper has been published - see publications list.

January – December 2017: A longitudinal strand has been commenced (Dr Lilia Zaporozhan under Dr. Doherty's supervision, again with input from Dr. Coen) and is on-going.

NILVAD: A European Multicentre Double-Blind Placebo Controlled trial of Nilvadipine in Mild to Moderate Alzheimer's disease.

NILVAD is an investigator driven Phase III Clinical Trial funded by the European Commission under FP7 (Principal Investigator Prof. Brain Lawlor). It entails a multicenter European trial in 8 different languages in 9 countries. Dr. Coen is the Work Package Leader for Education and Training and also took the lead in acquiring and developing for use across 8 European countries the primary and secondary outcome measures (ADAScog, SMMSE, CDR and DAD).

January – December 2017: Data collection was completed at the end of 2016 and has been analysed. The key publication reporting findings has been submitted for publication.

The effects of an extensive exercise program on the progression of mild cognitive impairment (MCI).

Dr. Coen has been involved in an advisory capacity regarding the cognitive assessment aspects of this multicenter study in 3 countries (PI Prof. Stefan Schneider, Institute for Movement and Neurosciences at the German Sport University in Cologne). Sub-studies are being undertaken by Kate Devenney (TCD, Academic Supervisor Prof Brian Lawlor) towards a PhD with input from Dr. Coen.

January – December 2017: Recruitment closed at end of June 2017. Over 100 participants were recruited and data collection / analysis is ongoing. The study protocol has been submitted for publication and is under review.

The Trinity, University of Ulster and Dept. of Agriculture (TUDA) Cohort Phenotype / Genotype database.

Dr. Coen in collaboration with Dr. Kevin McCarroll has investigated cognition related aspects of the TUDA data. Papers have been previously published from the initial cross-sectional component of this study. A longitudinal component has now been added and Dr. Coen has been involved in implementing that including study methodology and staff training.

Neuropsychological functioning and prosthetic rehabilitation outcomes.

In collaboration with Dr. Fiadhait O'Keefe, NRH and colleagues in DCU and NUI Maynooth, Dr. Coen was a co-investigator in research undertaken by Richard Lombard-Vance for his PhD (now awarded) investigating neuropsychological functioning in lower limb amputees. A paper has been submitted and is being revised following review - see publications list.

Awareness in Traumatic Brain Injury and Front temporal dementia.

Dr. Coen was a co-applicant with Dr. Fiadhait O'Keefe and colleagues in the National Rehabilitation Hospital and University College Dublin (Dr. Simone Catron, NRH, Principal Applicant) for a study of rehabilitation of awareness deficits in Traumatic Brain Injury (TBI) and Front temporal dementia (FTD). A HRB Partnership grant was awarded and Mary Fitzgerald (Higher Diploma in Psychology) was employed as the primary researcher. A novel computer-based attention rehabilitation procedure was developed and piloted, in collaboration with colleagues in UCD, TCIN, and the Nathan Institute, New York, making modifications to the DART (Dual-task Attention to Response Task) incorporating multimodal feedback. A paper has been published - see publications list.

The Vascular Impairment of Cognition Classification Consensus Study.

A large multinational group of clinicians and researchers (Skrobot et al.) participated in a two-phase Vascular Impairment of Cognition Classification Consensus Study (VICCCS) to agree on principles (VICCCS-1) and protocols (VICCCS-2) for diagnosis of VCI. Dr. Coen participated as a Delphi respondent in the VICCCS Studies designed to provide standardised guidelines for diagnosis and assessment of VCI.

Local Asset Management Project

LAMP continues to make progress on its work streams of community engagement, mapping, and portal design for access to the directory of services.

LAMP has formed a partnership with the Liberties Post-Leaving Cert College at Bull Alley and is supporting a Social Services Level 6 student in gaining work experience by expanding and adding detail to our directory of services. LAMP was successful in a National Lottery funding application to support one of our community partners, the South Inner City Community Development Association, to enhance the mapping.

LAMP was successful in an application for funding to QIC eHealth, a Quality Innovation Corridor that funds digital health initiatives. This funding will be used to improve functionality and appearance of the LAMP website. There are now almost 120 registered users of the LAMP services portal.

With respect to community engagement, LAMP has engaged the Health Service Executive to begin to develop a strategy for social prescribing in Ireland. LAMP was represented at the Social Prescribing Network of the United Kingdom and Ireland in Belfast in October and in London in January 2018. LAMP will host the next regional (Ireland) meeting of the network in MISA in March 2018.

Neurovascular Service

We wish to congratulate Prof Joe Harbison on completing a highly successful term as National Clinical Lead for Stroke in August 2017. He has held the position since 2010. The third quarter National Mortality figures for stroke were recently published and demonstrated a 19% decrease in in stroke mortality for the time period since the creation of the Stroke Programme in 2011.

Prof Harbison has recently been appointed to the external review group of the UK National Stroke Audit and is involved in the redrafting of the pan-European Helsingborg Declaration for Stroke defining stroke standards across Europe.

We wish to take this opportunity to thank Professor Harbison for his huge contribution to the care of stroke patients - He has made a huge contribution to the development of acute stroke services in St James's Hospital, throughout Ireland and internationally.

The stroke service has continued to engage in teaching and research. It has participated in papers which were published in Circulation, Stroke Research and Treatment, The European Stroke Journal

and Value in Health over the last year in addition to local Journals. It has had 8 abstracts accepted for the forthcoming European Stroke Organisation Conference in Gothenburg in May.

Prof Harbison has recently been asked to undertake the role of Director of Undergraduate Teaching and Learning for the School of Medicine in Trinity and will be scaling back some of his duties in stroke with Dr Ruth McDonagh due to take up a post in St James's Hospital in July to support Prof Harbison in his current hospital Stroke role.

Dr Ruth McDonagh also plans to undertake a PhD in Bone Health in Stroke patients, uniting two of MISA's major research emphases.

Medical Physics and Bioengineering

The Medical Physics and Bioengineering Department (MPBE) continues to support and advance patient care in MISA. The MPBE team at MISA comprises Dr. Gerard Boyle, Dr. Tim Foran, Dr. Ciarán Finucane, Dr. Chris Soraghan, Dr. Mindaugas Norkus and Ms. Laura Perez Denia, who was welcomed to the team in 2017 as a research assistant. Laura had previously completed an M.Sc. in Bioengineering, TCD, and her thesis was conducted in the Falls and Syncope unit designing and validating a novel system for assessing neurocardiovascular instability in young and older adults. Central to the work of the team is the Biomedical Engineering Lab which houses and facilitates the continual growth of innovation and research. The Biomedical Engineering lab at MISA provides a space for engineering concepts and skills to be applied to clinical and research problems in medicine, with a particular focus on older age. The lab is hosted by Mercer's Institute for Research on Ageing (MIRA) and the Dept. of Medical Physics and Bioengineering (MPBE) at St. James's Hospital.

The unique attributes of the lab are its integration with and physical proximity to the working life of a large acute hospital. This allows engineering and medicine to work together close to the point of care. In this way, medical and engineering effort can be combined and focused on identifying and solving problems that are of real concern to patients and clinicians.

The Biomedical Engineering lab hosts hospital personnel and visiting postdoctoral, postgraduate and undergraduate students working on clinical projects with a technological or engineering science component. The MISA lab is equipped to support electronic prototyping, software development, data analytics, optics development, system modelling and 3D printing.

A 5-year strategic plan for the development of the Biomedical Engineering Lab has been set out by MPBE and was presented to MISA in early 2017. The plan will serve as the template for increasing the impact of engineering and engineering science in the care of older people at MISA.

Clinical support

Introduction of Near-Infrared Spectroscopy Technology

The team led the development of standard operating protocols for the clinical use of Near-Infrared Spectroscopy (NIRS) and autonomic function testing technologies in the Falls and Syncope Unit (FASU). NIRS allows for the quantification of blood oxygenation in the brain. Data from the NIRS technology will complement existing clinical tests and will be analysed for its potential added value in the diagnosis and further understanding of falls and syncope.

Expansion of Falls Prevention Technology

The team worked with the SJH Falls Management Committee in a project to expand the use of patient occupancy alarms (to assist in falls prevention) to wards outside of MISA. This pager-based system facilitates ambulatory alerts to Ward staff of patients at risk of falls who have exited a bed or chair, particularly aiding management of single bed occupancy rooms. Extension of the technology to additional wards was assisted by reference to experience from the initial installation of devices in

MISA wards in April 2016. A grant of €2,500 was awarded by the SJH Foundation to Dr. Chris Soraghan and Dr. Tim Foran on behalf of the Falls Management Committee to purchase bed and chair occupancy sensors for the hospital to assist in reducing falls risk. Further research into improved sensing methods for the early detection of patient mobility from a chair or bed is ongoing and is informed by the limitations of current systems as experienced in the MISA environment.



Figure: NIRS technology (forehead sensor) introduced into clinical testing in FASU

Design and Innovation

Ocular Microtremor Technology

Enterprise Ireland awarded a commercialisation fund grant to Dr. Gerard Boyle and Dr. Mindaugas Norkus in November 2017 to continue the development of eye tremor (*itremor*) measurement technology. This award builds on a prior award from Enterprise Ireland which concluded in Oct 2017. The new award will facilitate a second stage of *itremor* commercialisation and will be focused on collecting clinical data to help support the commercial case for the technology.

This cutting edge tool is designed for enabling quick and simple evaluation of brain health in Traumatic Brain Injury (TBI) and sports concussion. With a limited number of tools currently available on the market, the *itremor* technology presents a potentially unique solution for the diagnosis of TBI and concussion in emergency and sports medicine. In particular, the topic of concussion in contact sports has been brought into the spotlight due to concerns about the potential long-term health implications of repeated concussion at both professional and amateur levels.

The *itremor* development team has formed a collaboration with the Concussion Research Interest Group (CRIG) at St. James's hospital/Trinity College Dublin. As part of this collaboration, the *itremor* team will study the potential of eye tremor in assessing TBI in contact sports such as Rugby and Mixed Martial Arts (MMA).

SJH Design Challenge Week

The Biomedical Engineering team at MISA implemented 'SJH Design Week' for a third year in February 2017, where clinical staff from across SJH collaborated with medical device design students from the National College of Art & Design (NCAD) and TCD in bringing design solutions to clinical problems. The design outputs of this week were presented at SJH Grand Rounds on March 23rd 2017. Example projects from 2017 include design of a mobile infection control tray for wards;

design of a leg elevation device for theatre; cable management system for ward bedsides; and a portable PPE station. Twenty eight students worked intensely for 1 week in small teams on 8 shortlisted projects and presented their solutions to an open forum in the MISA Seminar Room. The Design Week initiative aims to encourage and help individual staff members to develop ideas they have to improve the hospital experience for patients and staff.

Following on from Design Week in 2016, the Biomedical Engineering Lab continued to support the design and manufacture of a device for reducing the risk associated with transferring patients from a trolley to the operating table. Funding of €1000 was awarded (joint application between Caoimhin O’Conghaile in Theatre and Dr Chris Soraghan in MPBE) in January 2017 by the SJH Foundation Small Grants Competition to have a number of these made for SJH. These were manufactured, tested and are in now in use in the Theatre Department at SJH.

Mobile App Development – The SJH Campus Guide

The SJH Campus Guide app designed by Anthony Edwards (Clinical Photography) and Dr Chris Soraghan (MPBE) for helping patients, visitors and staff navigate the hospital campus was made available in the App Stores in 2017 (Android and Apple - search for ‘St. James’s Campus Guide’ on the app store).

Support to the LAMP Programme (Local Asset Mapping Programme) from Biomedical Engineering Lab

Dr Gerard Boyle and Dr Chris Soraghan continued to support technical aspects of the LAMP programme, further developing the online portal to enable Social Prescribing. The LAMP portal allows users to search for local services and activities related to health and wellness. Having secured eHealth Ireland’s Quality Innovation Corridor (QIC) funding with Dr David Robinson (€25,000), LAMP are working with an external developer to improve and develop features of the on line portal. Dr Gerard Boyle demonstrated the portal at the Joint Conference of the European Medical and Biological Engineering Conference (EMBEC) and the Nordic Baltic Conference on Biomedical Engineering (NBC), Tampere, Finland in June 2017. The LAMP database was managed by MPBE and continued to expand through data collected by Fintan O’Toole and Adele Burke, and members of SICCD(a Liberties based community development group).

Clinical Microsystems Quality Improvement

Dr. Chris Soraghan was accredited as a Level 1 Coach in Clinical Microsystems in October 2017 as part of a hospital-wide Clinical Microsystems Quality Improvement coaching programme. This programme is run by the Dartmouth Institute Microsystem Academy and facilitated by QSID. Chris continues to coach a multidisciplinary team (~12) in the Acute Medicine Assessment Unit (AMAU) along with co-coach Peig Carroll (Quality Manager in HOPE). The AMAU team’s initial focus is on improving the MDT meeting process. The AMAU team won Best Poster for their Microsystem’s improvement work at a recent Quality Improvement Celebration Event held in MISA Seminar Room (Dec 2017).

MPBE Research

Neurocardiovascular Research

The team continue to collaborate with Prof Rose Anne Kenny, the TILDA Longitudinal Study on Ageing, and FASU on translational neurocardiovascular projects. The aim of this collaboration (MPBE lead Ciaran Finucane) is to further explore insights into physiological mechanisms that lead to falls, faints, cognitive impairment and other age-related issues. The location of the Engineering

Lab within the MISA building facilitates a translational activity that has seen population validated measures applied in clinical cohorts in FASU.

Cerebral Perfusion in Disorders of Ageing

The introduction of NIRS technology into FASU has enabled several research avenues to be explored in understanding how changes in brain blood flow as measured by near-infrared spectroscopy can be used in the management of disorders related to ageing e.g. falls, stroke. Currently analytical methods are being developed to capture and process the signals acquired during clinical tests.

Orthostatic Hypotension as a Risk Factor for Injurious Falls in Older Adults

In collaboration with researchers from TILDA the team has identified novel neurocardiovascular risk factors for injurious falls in older adults. After standing blood pressure drops, a slow rate of recovery of this blood pressure has been identified as a novel risk factor for injurious falls and has been recently described in work published in the Journal of the American Geriatric Society with colleagues from TILDA and the University of East Anglia. The importance of this work was also recognised in an accompanying editorial by Professor Lipsitz from Harvard Medical School. Under the guidance of Prof Kenny and Dr Finucane these biomarkers are now in regular use in the Falls and Syncope Unit at MISA to inform patient falls risk assessment.

Amsterdam Medical School Collaboration

As part of our ongoing collaborative work with our European partners lead by Prof Wouter Wieling from the Amsterdam Medical Centre, a team from MISA/TILDA (Prof Rose Anne Kenny, Dr Hugh Nolan and Dr Ciaran Finucane) recently published an expert review of the importance of continuous blood pressure measurements across the lifespan in syncope assessment (Journal of Internal Medicine). Two further papers written by this core team are in review with Clinical Autonomic Research and the Open Heart Journal.

Schlegel Research Institute for Ageing, Waterloo, Canada

An international collaborative study initiated by Dr Ciarán Finucane and Professor Richard Hughson from the Schlegel Research Institute for Ageing in Waterloo is currently assessing the role of cerebral hypoperfusion in falls risk in retirement villages throughout Ontario Canada. Preliminary results suggest that cerebral perfusion abnormalities are common in older adults and are often unidentified by standard peripheral BP measurements, and place individuals at an increased risk of falls.

Falls and Bone Health Research

A paper investigating the relationship between vision and gait in older adults taking part in the TILDA study examined the biopsychosocial risk factors associated with falls in the elderly and was published recently in Journals of Gerontology. The study's research findings indicate that poor contrast sensitivity, but not visual acuity is related to poor gait performance in older adults. The importance of these findings are clinically significant and may result in a new awareness about the importance of vision and particularly contrast sensitivity in the field of geriatric medicine especially in conditions which are related to gait disturbances like falls. The lead author of the paper was Dr. Eoin Duggan. The work was funded by a HRB Summer Student Scholarship and conducted under the supervision of Dr Ciarán Finucane and collaborators from TILDA (Dr Hilary Cronin, Dr Orna Donoghue and Prof Rose Anne Kenny). A validation study exploring Mandible Ultrasound as a Novel Screening Approach for Osteoporosis suggest that ultrasound of the mandible can differentiate between subjects with osteoporosis and an age matched healthy control group, demonstrating its

potential as a novel screening tool for osteoporosis in the community. The study was led by Dr Anna Beatie (School of Dentistry) and findings were published recently in the Journal of Densitometry.

Education and Student Activity

The team actively engage with students of biomedical and physics backgrounds and provide intern and work placements with a view to exposing college students to interesting projects in the MISA clinical space. The team also took part in an outreach primary school programme where 5th and 6th class students from St. James's School on Basin Lane visited SJH, the aim being to encourage eventual participation in third level education.

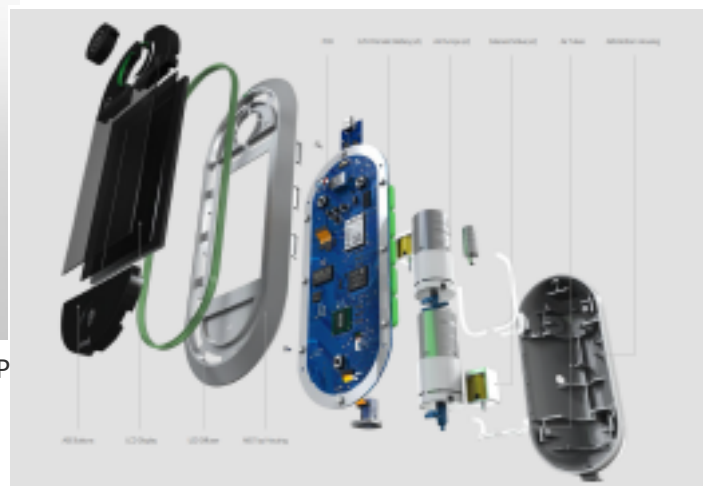
Examples of innovative student projects and placements in the Biomedical Engineering Lab are as follows:

Karl Martin (Supervisors: Dr Colm O'Kane & Dr Ciarán Finucane) a product design student from Bolton St. DIT, developed a concept product for a novel compact blood pressure monitor device for syncope and falls risk assessment during an 8 month final year project placement. Karl has since been nominated for a number of design awards on the basis of his work. Aysha Shah (Supervisors: Dr. Ted Burke & Dr. Ciarán Finucane) a final year electronic engineering student from Kevin St DIT completed a project developing a prototype of a continuous blood pressure monitoring device for syncope assessment.

Ronan McKevitt (Supervisors: Dr. Tim Foran and Dr. Chris Soraghan) a Physics with Biomedical Sciences student from DCU joined the Lab on a 4 month placement. Ronan's contributed to the development of a novel sensor modality using 3D printing to detect the presence/absence of a patient in a hospital environment, taking into account the design constraints realised in the use of similar technologies in wards in MISA. Michelle Sybring and Michael Carmody (Supervisors: Dr. Ciarán Finucane and Prof. Rose Anne Kenny) explored the development of a simple fainting assessment tool, which could be used by community based clinicians. This project applied machine learning methods to analyse the transient patterns that occur in cardiovascular variables recorded during a simple 5 minute lie-to-stand test. The work produced new physiological insights Tindicating that both young and older fainters exhibit autonomic neural hypersensitivity when compared to age-matched controls.



Figure: conceptual design of a novel compact BP monitor for syncope & falls risk assessment (Karl Martin/Dr Ciaran Finucane)



These key physiological differences enabled a machine learning algorithm to successfully identify younger and older fainters with 80% accuracy, providing the basis for a simple clinical decision support system.

Bioinstrumentation Module – National College of Art and Design

The Biomedical Engineering Team and colleagues from MPBE delivered a teaching module on Bioinstrumentation to students completing their MSc in Medical Device Design at NCAD on Thomas Street. The teaching also involved a team project which looked to solve a design problem using the technical principles learned during the 12 week course. This is the third year MPBE have run the module and this year the students presented an infographic of their work in the Creative Life Space beside the large festive Christmas tree – inviting the public to come interact and ask questions. One project included how we might imagine personal robotics in the home to cater for an ageing population.

NEST – Networking and Educating Students Together

Dr Chris Soraghan in MPBE served on the NEST committee again this year. NEST is a very broad multidisciplinary group whose aim is to network, communicate, share, research and promote methods and experiences in mentoring students at the hospital. In response to a multidisciplinary survey of staff educators (N=200) to identify the key issues for mentors and to assess awareness of inter-professional learning (IPL), NEST held a number of workshops where internal and external speakers came to present on topics such as: student professionalism, CPD as a student educator, reflective practice, inter-professional learning (IPL), and managing the struggling student.

TILDA: The Irish Longitudinal Study on Ageing

The role of research in responding to the challenges and opportunities of an ageing society requires a multidisciplinary and integrated approach. TILDA is a large-scale nationally representative study of more than 8,500 people aged 50 and over, and it is one of the most comprehensive longitudinal study on ageing worldwide. TILDA maintains an extensive database of the health, social and economic characteristics of older persons in Ireland, across all areas of the ageing process including prevalence and incidence of disease; physical, mental, cognitive, behavioural and biological health; the socio-economic determinants of health and wellbeing; and the underlying genetic factors that influence or are influenced by the ageing process.

TILDA Research Highlights for 2017.

All reports listed can be found on the TILDA website at <https://tilda.tcd.ie/publications>.

Academic papers can be found at <https://tilda.tcd.ie/publications/publications-search/>

Topic Report on Sexual Activity

To mark Valentine's Day, TILDA launched an important study on the sexual activity of Ireland's older adults. There were a number of positive findings on this understudied and infrequently discussed area. The analysis shows that frequent sexual activity is the norm amongst the over 50's with 59% being sexually active and of those, 69% sexually active weekly or monthly. Being sexually active was found to have positive implications for a person's health and their perception of ageing. It was also found that there are differences between men and women in terms of importance attributed to sex and frequency of sexual activity as each gender got older. The study also paints a picture of strong relationships amongst Ireland's older adults with a large majority of people reporting that they had a very close relationship with their spouse or partner and living with a spouse or partner being a key determinant in whether someone is sexually active.

Lead author of the report Joanna Orr, TILDA researcher commented: *“Our research shows that sexual activity is an important part of life for many of those aged 50 and over in Ireland, including significant proportions of those in their 60s, 70s and beyond. Continued research into this area is not only important for understanding the links between sex and health and happiness, but also to dispel the myth that sexual activity is incompatible with advancing age. It is important that health and social care professionals working with older populations are capable of respecting this aspect of individuals’ lives and take this into consideration when giving advice and making decisions regarding their wellbeing.”*

Professor Rose Anne Kenny, Principal Investigator of TILDA said: *“The data concurs with international data and emphasizes the contribution of sexual activity to quality of life and good physical and mental health. Where difficulties with sexual activity are present, effective treatments are available and we anticipate that the new data will reinvigorate GPs and healthcare professionals to enquire about patients’ sexual activity as part of routine clinical assessment and care.”*

Wave 3 Report

In 2017 TILDA released its Report on the analysis of the data collected at Wave 3. This report presents findings from Wave 3 of TILDA, which impact on the health and well-being of Ireland’s adult population aged 54 years and over and maps changes that have occurred since the first wave of TILDA data collection in 2010. Potent factors which influence health and well-being are volunteering, caring, financial transfers, health insurance coverage, health care utilisation, health screening, diet, medication use and prophylaxis such as vaccination uptake. The prevalence and impact of these factors are presented in the context of subjective and objective health and well-being, including common age-related disorders such as falls, pain, urinary incontinence, hearing loss and depression.

Key findings include:

Older adults in Ireland far from being reliant on social supports are the net contributors to their extended family and the communities in which they live

A pervading theme which resonates at each wave of data collection is the enormous contribution that adults aged 50 and over make to Irish society. This is evident both in the amount of care provided to others and in financial and other transfers. Contrary to perceptions, the overwhelming direction of transfers of time and financial assistance is to children and grandchildren. For example, adults aged 54 years and over who have children are more likely to provide financial assistance to their children (48%) than receive financial help from them (3%). Furthermore, half of adults aged 54 to 64 years and 65 to 74 years provide regular childcare for their grandchildren for an average of 36 hours per month. This facilitates labour market participation of parents and flexibility of schedules for unanticipated events. In the main, the consequences of such transfers are better health and well-being for the provider. For adults with living parents (14%), one quarter assisted their parent(s) with basic personal care while 43% provided help with other activities such as household chores, errands, shopping, and transportation. Half of older adults also provided financial help to their parent(s).

Adults aged 50 years and older in Ireland are the backbone of our volunteer structure with more than half volunteering during the previous year and 17% doing so at least once per week. Again,

volunteering is significantly associated with better mood and quality of life as is regular social participation i.e. sports and social clubs. Thus, we provide empirical support to the contention that, far from later years being a time characterised by decline and increased dependency, older adults continue to make valuable contributions to society, with many characterised by active citizenship and participation in the lives of their families and their communities.

Health care coverage and health insurance require more flexibility for competitive market

In the two-year period between Waves 2 and 3 (2012 to 2014), the proportion of older adults aged 65 years and over covered by a full medical or General Practice (GP) visit card has declined by 4% (from 79% to 75%) while private health insurance cover has increased by 5% (from 47% to 52%). VHI Healthcare remains the dominant provider of private health insurance policies for this age group of whom only 4% cancelled their private health insurance policy in the previous 2 years. Given that flexibility to switch insurer is key to a competitive market, the high market share of one health insurer merits a full examination and possibly changed policy considerations.

Health service utilisation has increased for the over 80s

Despite being 4 years older, there has been limited overall change in healthcare utilisation in the population aged 54 years and over, i.e. visits to GP, hospital admission, emergency department (ED) or outpatients department (OPD) attendance. However, increased ED attendance (from 16% to 25%) and hospital admission (16% to 26%) was observed in the oldest old, i.e. those over 80 years, compared with 2010. This has significant policy implications for implementation of admission avoidance services and for dedicated tailored care of the oldest old in emergency settings. It is well documented that length of stay in hospital is significantly longer in the oldest patients and these increases in ED attendance and hospital admissions will likely have knock on consequences for hospital and community services. Consequently, innovations in early detection of risk factors and earlier interventions to avoid admission should be an important policy focus.

Increased uptake in influenza vaccinations and national screening programmes for cancer

The provision of influenza vaccinations and the national breast cancer screening programme (BreastCheck) appear to have had a positive impact on uptake. Between 2012 and 2014, the uptake in the population aged 50 years and over has increased by 9% for influenza to 48%, by 6% for breast mammograms to 55% and by 11% for breast lump checks to 65%. Other preventative testing has also increased with cholesterol testing up by 10% to 82% and prostate cancer screening (PSA and digital examination) up by 9% to 71%.

The prevalence of untreated 'treatable' conditions has not changed in 4 years - requires fresh policy drive

TILDA conducts both objective and subjective assessments of health, whereby the discrepancy between diagnosed and undiagnosed disorders can be detected. At Wave 1, we reported significant discrepancies for hypertension, high cholesterol, osteoporosis, osteopenia and atrial fibrillation in the order of up to a 40% mismatch. These are the key risk factors for stroke, heart failure, kidney failure and injurious falls. The prevalence of undiagnosed disorders was almost unchanged 4 years later. Innovative policy interventions to raise awareness of these common and treatable disorders is critical

Falls are common and one in five necessitate hospital attendance - opportunities for national falls prevention strategies

Remarkably, 40% of older adults experienced a fall between waves. This figure rose to 60% in women aged 75 years and over. Importantly, 20% sustained an injurious fall necessitating hospital attendance - this equates to 60,000 people per year in Ireland. Given the well-publicised pressures on emergency departments these data should emphasize the importance of the introduction of national falls and syncope prevention services. These are poorly served at present in Ireland, however there is strong evidence for benefit in falls and fracture prevention, coupled with significant reductions in healthcare costs and in particular in hospital costs. A history of falls is a major risk factor for future falls and should signal the need for a comprehensive falls risk assessment. Known risk factors, many of which are modifiable, are common, particularly in recurrent fallers, and this further underscores the importance of early assessment and management of falls risk.

Modifiable contributors to disability such as pain, urinary incontinence, hearing loss and depression are common and often untreated

Pain is a common complaint affecting a third of older adults in Ireland, with the majority reporting chronic back pain. In TILDA, pain is an important cause of disability in addition to other adverse consequences such as low mood, increased GP utilisation and decreased quality of life. These may be addressed by increasing awareness and adequate pain management.

Whereas 1 in 7 older adults in Ireland experience urinary incontinence, this figure rises to almost 1 in 3 in older age groups. Incontinence is up to three times more common in women and in both sexes and it has a negative impact on quality of life, mood and social participation. Despite a high burden of symptoms, and the availability of treatments, only 3 out of 5 report their symptoms to a doctor, nurse or other healthcare professional. Only by raising awareness of urinary incontinence and challenging the notion that it is an inevitable part of ageing; will we improve recognition and management of this condition. Importantly, efforts should also focus on modifying risk factors for urinary incontinence such as smoking and obesity; both identified previously by TILDA as major public health challenges.

Hearing loss is highly prevalent among older adults in Ireland, particularly in men - half of adults aged 75 years and over experience some hearing loss. Older men in particular experience difficulty following a conversation due to hearing loss and are particularly limited in their ability to follow conversations with several people, thus leading to lower social participation and quality of life, and more loneliness and depressive symptoms. Although not successful in everyone, hearing aids can improve several aspects of life that have been compromised by hearing loss. Despite this, and the availability of financial support for hearing aids in Ireland, their use is low. Screening for hearing loss at an earlier stage, and promotion of uptake of hearing aids, has the potential to improve the ageing experience for many.

One in 20 older adults in Ireland experienced a major depressive episode in the past year. Depressive symptoms are also common, but only 30% of older people with depressive symptoms are prescribed appropriate medical therapy for depression. Depression has a significant detrimental effect on the health and independence of older people in Ireland. The prevalence of depression and of treated depression has not changed over the past four years emphasizing the necessity for new

approaches to raise awareness among older people as well as their families and healthcare professionals. Depression is not an inevitable consequence of ageing and treatment is effective. In the same way that campaigns have addressed the issue of mental health in younger people, similar efforts to reduce the stigma around mental health in later life and to encourage older people to seek help from a healthcare professional when they are experiencing symptoms of depression are now imperative.

High obesity rates and poor adherence to dietary guidelines in older adults - need for age-related policy recommendations for obesity

Overweight and obesity are estimated to cost over €1bn annually in the Republic of Ireland and the prevalence is highest in older age groups. Previous TILDA research has found that 36% of older adults in Ireland are obese, while a further 43% are overweight. Furthermore, an estimated 1 in 10 have type 2 diabetes, with an additional 5.5% classified as having pre-diabetes. In Wave 3, we collected detailed dietary information to better understand these obesity data. We found that the majority of older adults do not meet the 2012 Department of Health Food Pyramid recommendations. A lack of compliance with recommended daily intakes is evident across all six shelves of the Food Pyramid and 1 in 7 adults aged 54 years and over do not comply with recommendations for any of the shelves. Of particular concern is the failure of a large proportion of older adults to meet the recommendations for fruit and vegetable intake (76%), and a marked overconsumption of food and drinks high in fat, salt and sugar (68%). Our data suggests that dietary patterns are influenced by affordability of certain foods, thus lower income may limit healthy food choices. There is an urgent need for a contemporary national nutrition policy, which recognises older persons as a high-risk group for lifestyle-related illness. The lack of policy recommendations specific to the ageing population in the recent Obesity Policy and Action Plan is of concern. Policy should promote measures to ensure appropriate food availability and affordability for all citizens.

Oral Health Report

A study on the oral health status of older adults in Ireland was another report launched in 2017. This was completed in partnership with the TCD Dental School. Focussing on interviews carried out in Wave 3 of the study between March 2014 and October 2015, the report found that dental status was related to both quality of life and mood, and those who had not retained their own teeth had lower quality of life, higher depressive symptoms and more loneliness. People who had lost all their teeth were more likely to rate their physical health negatively. Diabetes was also more common among edentulous adults aged 64 to 75 years, which has implications for ongoing management of their health as oral disease can have a negative impact on the regulation of diabetes. Additionally, many older people with no teeth were also on multiple medications.

Key findings:

- One in six (18%) of adults aged 54 years and over in Ireland has no natural teeth although most have dentures in place of teeth.
- Prevalence of tooth loss increases with age, with 40% of those aged 75 years and over having no natural teeth compared to 7% of those aged 54 to 64 years.
- Older adults living in rural Ireland are twice as likely to have lost all their teeth as those resident in Dublin (22% versus 10%).
- Rural dwellers also visit their dentist less frequently, with 15% not attending at all in recent

years compared to 7% in Dublin.

- Older adults who have lost their teeth are more likely to be current smokers, than those who have retained them and the difference is particularly noted in those aged 54 to 64 years (40% v 15%).
- Overall, 6% of older adults report problems with everyday activities such as eating, speaking or laughing because of issues with their mouth/teeth or dentures, while over a quarter of those with no teeth, with or without dentures experience difficulties with activities such as eating, smiling or speaking.
- Older adults with no teeth, with or without dentures report less active social participation, lower quality of life, increased depressive symptoms, and increased loneliness compared to adults with all their own teeth.
- Use and awareness of state dental services is low, particularly amongst those with no teeth.

Dr Christine McGarrigle, one of the report authors commented, *“This research highlights the need to ensure oral health is given greater priority amongst older people with multiple health conditions.”* Professor Brian O’Connell, Dean of the Dental School, TCD and an author of the report added, *“The use of dental health services is important to ensure oral health. We found in this study that among older people, there were wide discrepancies in the use of dental services by location and by dentition status. There was a particularly large discrepancy in the frequency of attending a dentist between people living in Dublin and in rural areas, suggesting services may be harder to access in the latter. The fact that older people in rural areas were much more likely to have lost all their teeth could be a consequence of more limited availability of dental services, or it could be related to the fluoridation of public water supplies, given water supplies in rural areas are more likely to be from non-fluoridated, private sources. In either case, it suggests greater accessibility to dental services is needed for this cohort. “*

End of Life Report

In December 2017 TILDA launched a report giving unique insight into end of life experiences of older people in Ireland, entitled the End of Life Report. This report received significant media coverage. The report covered issues such as where TILDA participants died, which services and care they received and their quality of life, health and disability leading up to their death.

The research found that significant proportions of older people experience particular modifiable health problems towards the end of life, which if dealt with appropriately through screening and treatment, could significantly improve quality of life in a person’s last year.

The authors also found that while the use of healthcare services by older adults increases in the last year of life, there is no evidence of the highly intensive end-of-life care that is seen in other countries and which is often associated with inappropriate care and undesirable outcomes. What is striking, however, is the high proportion of unpaid care provided by family members accounting for 42% of all care received.

The research also found that a high proportion of people who needed home, community and allied health services were unable to access them and the reasons for failure to access services suggests that substantial numbers of people were unaware of services and/or were reluctant to apply. Finally, almost half of those who died, died in hospital. This a relatively high percentage compared to similar countries. It can have a negative impact on the end of life experiences of people and their family as well as a cost implication for the healthcare system. The research used 375 interviews

completed by family members and friends of TILDA participants who died since the study began in 2009, representing 73% of confirmed deaths among TILDA participants between Wave 1 (2009) and Wave 3 (2014) of the study.

Novel Communication of Findings

In 2017 with the assistance of Irish Life TILDA developed a number of information posters based on its findings. These are available for download off the website at <http://tilda.tcd.ie/publications/reviews-newsletters/>.

Awards

The work of TILDA and its researchers was acknowledged on a number of occasions during 2017. The Principal Investigator Professor Rose Ann Kenny received a Trinity Innovation Award for her contribution to both TILDA and the establishment of the Mercers Institute for Successful Ageing http://www.tcd.ie/news_events/articles/trinity-innovation-awards-2017-celebrating-innovative-research/8391.

Professor Kenny was also awarded annual IGS Presidential medal in at the Irish Gerontological Society's (IGS) annual scientific meeting in Wexford. This was awarded for her work on the Irish Longitudinal Study of Ageing and promoting interdisciplinary approaches to working with older people <https://tilda.tcd.ie/news-events/2017/1713-rose-anne-igs-medal/>

TILDA Research Fellow, Prof. Susie O'Callagan, was awarded a Provost's Teaching Award. This award is in recognition of enthusiasm and commitment in ensuring students receive quality teaching and learning and celebrates academic staff who have made an outstanding contribution in the pursuit of teaching excellence in the University <https://tilda.tcd.ie/news-events/2017/1705-provosts-teaching-award/>

Dr Aisling O'Halloran, TILDA Research Fellow, won the best abstract award at the European Falls, Frailty and Bone Health conference held in Dublin on 9-10th November 2017. Aisling discussed the inflammatory marker interleukin 18 (IL-18) and frailty in older adults. She presented new evidence that IL-18 was significantly higher among older adults living with pre-frailty and frailty after adjustment for other markers of chronic inflammation and health. This indicates IL-18 may be a more informative marker of frailty and biological ageing with potential implications for [development of new treatments https://tilda.tcd.ie/news-events/2017/1716-ffbh-award-aoh/](https://tilda.tcd.ie/news-events/2017/1716-ffbh-award-aoh/)

TILDA Tweets

Thanks to the social media expertise of Deirdre O'Connor, one of the long standing TILDA team members, the TILDA Twitter account had a very active 2017. It has amassed over 2,000 followers and keep everyone up to date with over 1,100 Tweets.

Contributing to the Public Discourse on Retirement and Ageing

On 30 August, Prof. Virpi Timonen and Dr. Irene Mosca presented TILDA data at a workshop organised by the Retirement Planning Council of Ireland. The Council provide support, information and guidance to people planning for retirement. Prof. Timonen presented a talk entitled "Health and Wellbeing: Active Ageing for Older Adults in Ireland". Dr. Irene Mosca presented a talk entitled "The Impact of Voluntary and Involuntary Retirement on Mental Health: Evidence from Older Irish Adults". The aim of the workshop was to share knowledge on the challenges older adults face in Ireland and in particular on the challenges they face when they transition out of work and into retirement.

On Saturday 8 July, TILDA Research Director Christine McGarrigle spoke at the Citizen's Assembly, presenting TILDA evidence on "Creating Opportunities in Retirement, Evidence from TILDA". The presentation forms part of a meeting by the Assembly to consider how best to respond to the challenges and opportunities of an ageing population. Dr McGarrigle discussed findings from the TILDA Wave 3 Report detailing the contribution that older people make to their families and communities. <https://tilda.tcd.ie/news-events/2017/1707-citizens-assembly/>

TUDA Study

Principal Investigators: Prof Conal Cunningham, Dr Miriam Casey, Dr Kevin McCarroll, Prof Anne Molloy.

The TUDA (Trinity, Ulster, Dept of Agriculture) study is the largest cross-sectional study of its type in all-Ireland and represents a collaboration between the Mercer's Institute for Research on Ageing, MedEL Directorate at St James's Hospital, Dublin, Trinity College, Dublin and the University of Ulster.

The TUDA study database comprises 5186 non-institutionalised adults aged over 60 recruited into three disease defined cohorts exhibiting early phenotypic evidence of disease. Those with brittle bones (1394) and cognitive impairment (1699) represent the respective bone and cognitive cohort and were recruited from St James's Hospital, Dublin. Those with high blood pressure comprise the hypertensive cohort (2093) and were recruited from GP practises in Northern Ireland.

TUDA provides a rich source of detailed valuable clinical information profiling patients medical history, psychosocial status, nutrition, frailty and includes comprehensive cognitive testing and validated functional and mood scales. In addition, numerous serum biomarkers have been measured as well as blood bio-banked for future genetic analysis. TUDA is one of the largest and most comprehensively characterised cohorts of its kind in the area of ageing research. As the cohorts are disease defined, it provides a unique insight into the potential role and interaction of several pathogenetic factors in older adults including nutritional, genetic and health and lifestyle factors in the development of common diseases of ageing.

TUDA 5+

A follow up study of TUDA participants (TUDA 5+) is currently underway and is designed to reassess subjects five years post their initial assessment. To date, approximately 500 participants have been recruited into TUDA 5+ by our colleagues at the University of Ulster. In addition, recruitment of subjects into the same study at St James's Hospital is due to commence in 2018. Brian Mullin and Kerry Boyd who are both postgraduate students in nutritional science have been appointed to recruit for this study. It is envisaged that TUDA 5+ will comprise approximately 1000 participants when complete. Importantly, all study subjects will have all of the original detailed assessments repeated and furthermore detailed information on dietary intakes will be obtained. TUDA 5+ provides a tremendous opportunity to explore determinants of age related disease such as cognitive decline. Initial blood samples in the TUDA study were biobanked so novel markers can be explored.

VALID Study

An important study arising out of TUDA 5+ is VALID - Valerolactones and healthy Ageing: Linking Dietary factors, nutrient biomarkers, metabolic status and inflammation with cognition in older adults. The VALID study aims to determine the potential role of catechin/procyanidin-rich foods in

preventing cognitive decline over a 5-year follow-up period using data from TUDA 5+. VALID is a collaboration between TUDA partners (Mercers' Institute for Research on Ageing, Trinity College Dublin & University of Ulster) and the University of Parma, Italy. The VALID Project is supported by the EU Joint Programming Initiative 'A Healthy Diet for a Healthy Life' through participating organization's local funding agencies.

<http://www.jpi-valid.com>

TUDA Publications

Data from TUDA was used to explore the association between area level socio-economic deprivation and cognitive function. This involved characterising deprivation level for each study participant by geo-mapping study subjects. While few studies have explored other health outcomes with area level deprivation, none to date have looked for a relationship with cognition. 'The study explored the relationship in 5186 participants and showed that area deprivation was an independent risk factor for cognitive dysfunction with those living in more deprived areas having a 40% greater risk of impairment. Findings were accepted for publication in the *Journal of the American Geriatric Society* in Dec 2017 and were cited in editorial review of the same journal upon publication.

The largest study of dairy intakes in older adults in Ireland was published in *Journal of Nutritional Health & Ageing* using data from the TUDA study. Dr Eamon Laird found that 96% of older adults ($n=4317$) did not meet current dairy intake recommendations. Furthermore, blood concentrations of vitamin B12 biomarkers, red cell folate, vitamin B2 and vitamin B6 were significantly worse in those in the lowest versus the highest tertile of intake. The results show that older adults who are already vulnerable to micronutrient inadequacies, are forgoing the nutritional advantages of vitamin-rich dairy products.

In another study arising out of TUDA, greater yogurt consumption was associated with increased bone mineral density and physical function. Findings were published in *Osteoporosis International* and suggest that improving yogurt intakes could be a valuable public health strategy for maintaining bone health in older adults. The results were widely reported by the news media including the *New York Times*.

In a further study of 5138 TUDA study subjects, ambient UVB dose and sun enjoyment were found to be important predictors of vitamin D status in older adults. This study was novel in using the Tropospheric Emission Monitoring Internet Service database, to extract geo-specific daily ambient UVB dose at wavelengths that could induce vitamin D synthesis (D-UVB) for each TUDA participant. Results support the role of sun exposure in helping to maintain vitamin D status in older adults despite impaired skin synthesis with increasing age.

Education and Training

Cora O'Connor was appointed as MISA Education and Training Coordinator and commenced post in July 2017. A MISA education and training steering group was formed to act in an advisory role on upcoming programmes of education to be developed and held in MISA. The steering group consists of Prof Conal Cunningham, Prof Rose Anne Kenny, Ms. Carol Murphy, Ms. Joe Donlon, Ms. Cora O'Connor, Mr. Matthew Gibb, Ms. Niamh Murphy, Dr Gerard Boyle, Ms. Roisin Nevin, Dr Ann Hever,

Dr Triona Mc Nicholas, Dr Paul Claffey, Consultant Geriatrician (Rotating), and Clinical Nurse Manager/Clinical Nurse Specialist (Rotating). The group meets quarterly.

A 5-day Foundation course in Gerontological Nursing has been developed and was successfully held in MISA in October 2017. The course was fully subscribed and attended by registered nurses from many speciality areas including the community, acute care and residential settings. This course has received Category 1 approval with the Nursing & Midwifery Board of Ireland and has been submitted for accreditation with the Trinity Centre for Practice and Healthcare Innovation at the School of Nursing and Midwifery, Trinity College, Dublin. (TCD accreditation effective as of January 2018)G



Technology Workshop - Bioengineering Students Presenting their projects

A confirmed programme of events has been developed for 2018 including:

5-day Foundation course in Gerontological Nursing being held in 29th January to 2nd February

Biogerontology for Clinicians International conference being held in 16th & 17th February

Falls and Syncope International 3-day training event in 28th February 1st March & 2nd March

Home First community outreach training Workshop on 9th March

Medicine, Law and the Older person conference on 13th April

An introduction to Biostatistics for healthcare professionals on 18th May

Ongoing meetings are being held in relation to developing a Biotechnology conference in conjunction with the Medical Physics and Bioengineering staff in MIRA, a Frailty interdisciplinary education programme in conjunction with TILDA, Bone health and osteoporosis conference and Frailty, Falls and Sarcopenia interdisciplinary conference.

The Dementia Services Information and Development Centre (DSIDC)

DSIDC is a national organisation committed to best practice in all aspects of dementia care. Our mission is to improve the quality of life and care for all those affected by dementia. We aspire to make Ireland a place for people to live well with dementia supported by family members and service providers with a thorough understanding of dementia. Staff at the Centre provide education and awareness sessions, disseminate information, participate in research and collaborate with other professional groups. These collaborations are both national and international reflecting the effective synergy between the Centre's academic research policy and service development pillars of Education, Information and Research.

Throughout 2017 DSIDC staff continued to provide education to health service professionals nationwide. This included the provision of dementia workshops in a number of private nursing homes and HSE dementia specific units. In addition staff from the Centre delivered in house workshops and gave a number of lectures on dementia related topics to various professional and voluntary groups throughout the country. The DSIDC continued to work with other organisations including MISA, Our Lady's Hospice, Nursing Homes Ireland, Trinity College and the HSE, in the development and provision of more focused aspects of dementia education. During 2017 the DSIDC launched an online teaching resource for schools: *The Brain from the Fantastic to the Forgetful*. Teachers and students can now download an interactive pdf version of this comprehensive brain awareness programme providing an easily accessible learning platform for the student. DSIDC continued to make a significant contribution to the e-learning programme of the hospital-led DemPath project and also contributed to MISA's Creative Life section in relation to increasing dementia awareness and education. The DSIDC Education Centre, incorporating a dementia specific library, now features on the HSE Libraries website as a partner library.

In June 2017 MISA and the DSIDC co-hosted the 7th Annual Memory Clinic conference. The event was a thought provoking and successful day and was well attended by medics and health care professionals. Staff participated in several national and international conferences, including the Alzheimer Europe conference in Berlin. The DSIDC were also involved in the launch of the HSE's 'Understand Together' campaign. The aim of the campaign is to raise people's awareness of dementia and to help them find supports and resources in the community.

The DSIDC provide a professional consultancy service offering advice on a broad range of issues including architectural design, service evaluation, quality of life issues, situational analysis and strategic planning. The DSIDC staff responded to queries, from health care professionals and members of the public about topics such as quality of life interventions for nursing homes, responsive behaviours and ability assessments for activities and life story work. During 2017 the DSIDC published both new and revised versions of dementia specific and brain health information booklets. These are available for download from the DSIDC website www.dementia.ie.

The DSIDC website, Facebook and Twitter accounts continue to be a valuable information source for both health service professionals and the general public and offers users a forum to seek out assistance, information and advice on any dementia related enquiry they may have. The DSIDC aim to keep professionals and the public upskilled with the latest thinking on best practice in dementia care. A popular new addition to the website is a weekly news bulletin highlighting interesting articles and research which have appeared in the media during the week.

In November 2017 Matthew Gibb and the DemPath project team were the proud recipients of a European award for an evaluation of the Hospital's way finding system. This evaluation augmented a detailed report submitted to the CEO by the Patient Experience Office outlining recommendations to improve people's experience of the St James's Hospital campus. Learning from the evaluation informed the development of the signage system in the MISA building.

During 2017 Professor Suzanne Cahill retired from her post as Director of the DSIDC and Matthew Gibb was appointed to the position of Acting Director. We would like to take this opportunity to thank Suzanne for her valued contribution to DSIDC and wish her every success and happiness in the future. Steering Committee meetings were held in January and September and a National Advisory Group meeting was held in November. All professional activities undertaken by the DSIDC are overseen by a Steering Committee. Dr Declan Byrne continues as Chair of the Committee and Professor J B Walsh as Vice-Chair.

Creative Life Centre at Mercer's Institute for Successful Ageing.

In the creative Life domain of MISA, we share a philosophy of value for creativity and well-being. We educate communities regarding health and wellbeing through the prism of the arts, teaching that good health is not just about the absence of disease, but increasingly about improved quality of life. Thus, creativity has an important role to play in better quality of life and successful ageing. By enhancing psychological and emotional well-being, permeating and enriching everyday life, the creative life a domain aspires to improve personal fulfillment for staff, patients and the public. We employ the arts as a conduit to exercise mind and body and therefore enhance skills and heighten self-confidence and motivation.

The Creative Life Centre promotes and highlights the creativity of older people, enabling them to express themselves through art, sculpture, poetry, literature, music and drama. It includes a volunteer network of all age groups, but primarily of older people themselves. The Centre interfaces closely with employee groups, retirement organizations, charities, local community centers, schools and colleges, locally and nationally.

The Centre is a community resource and provides a structured forum for people of all ages to experience the positive aspects of creativity in ageing. In addition to being a local resource, the Centre interfaces with the wider Irish society, acting as a model of how creativity and the arts can contribute to successful ageing throughout Ireland and beyond.

Structure

Creative life Director: Professor Davies Coakley,

Coordinator: Roisin Nevin,

Steering Committee: Professor Davies Coakley, Professor Rose Anne Kenny, Professor Philip Napier NCAD, Ms Helen Donoghue IMMA, Mr David Clarke ,Dr David Robinson, Dr Ann Marie O'Dwyer ,Ms Carol Murphy ,Ms Joe Donlon, Mr Vincent Callan, Mr Niall McAlwee

Executive:

Roisin Nevin commenced her role as Creative Life Coordinator in MISA in April 2017; adopting a person centered model of care to include creativity. The Creative Life area is a central hub for the hospital which combines music, art, lectures and demonstrations for participating and passing persons of all ages from patients to staff to communities. The space uses plasma TV and stereo sound with projection displays to highlight messages and events.

Activities

Over 4200 people have directly participated in Creative Life events in 2017 and multiple more have enjoyed the activities when passing through MISA. Events included:

May Bealtaine festival of film, choirs, concerts, lectures celebrating the arts. Highlights – two day public lecture series on social, creative and health in successful ageing including personal reflections from human rights activist, film director and screening of the “Dare to be Wild”- attended by public, staff and patients; world class harp and operatic concert, indoor and outdoor art exhibitions.

Summer community events program of art, interior design and music including joint initiatives with IMMA, Irish Therapy Dogs, Dublin City Council, Fatima –F2, Flanagan’s Field, Age Action, national U3A , Age and Opportunity

Positive ageing week - Highlights – 3 day public lectures series, photography exhibition (Photovoice- expression chronic illness through photographic lens), therapeutic garden (Flanagans field), ARTzheimers exhibition, Tai Chi interactive sessions, history of art lectures, entertainment public and wards - Retired Active Men’s Social - RAMS Choir.

Weekly activities on wards and day hospital- Music performance by patients, family members and artists, Irish therapy dogs, IMMA lead ward based interactive art, staff lead Halloween and Christmas competitions.

RTEs Nationwide feature of MISA and creativity in ageing

The **Bleeping Interns Choir**: unique experiment to enhance staff experience in first year after qualification and reduce stress- train and public performance in creative life

World War 1 remembrance – exhibitions and lectures

NCAD Student Programme -12 week education and training programme for students on health and ageing

The Creative Life hub has connected patients, families, hospital staff, local and national communities and continues to enhance health and well-being through participation in the arts.

All events are linked to Pulse news, Facebook, twitter, intranet, photography and videography.

Websites

<http://misa.ie/creative-life-centre/>

<http://www.stjames.ie>

<https://twitter.com/stjamesdublin>http://www.imma.ie/en/subnav_1.htm

<http://www.ncad.ie/about>

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<http://www.artzheimers.com/>

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Snapshots from Creative Life Events 2017



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Canney M, O'Connell MDL, Sexton DJ, O'Leary N, Kenny RA, Little MA & O'Seaghdha CM. 2017.

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Vitamin D deficiency and resource utilization – A prospective association

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Broderick B, O'Toole R, Fallon N, Mahon J, McCarroll K.

Teriparatide and Denosumab combination treatment in a bone health clinic

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Conference Abstracts

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Quantitative Ultrasound of the Mandible as a Novel Screening Tool for Osteoporosis

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Development of i-tremor technology for assessment of head injury and concussion
R2I-2017 Innovation Workshop, IEEE UK & Ireland CPMT Chapter, May 18, 2017, Dublin City University (DCU), Dublin, Ireland.

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O'Shea N, Mullen C, Part S, Waugh A, Soraghan C, O'Shaughnessy I, et al.
Inter-Professional Clinical Education Workshops; What clinicians want?
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Ravese PR, Wallace A, Byrne P, Norkus M, Lennon B, Sherwood R.
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Ravese PR, Wallace A, Byrne P, Norkus M, Lennon B.

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Soraghan C, Geary U, O'Dowd E, Boyle G.

Progressing Staff Ideas Through Design –

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'Hospital Design Week', releasing the design potential of clinical staff. European Medical & Biological Engineering.

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Vasovagal Syncope is Associated with Relative Autonomic Hypersensitivity and Lower Stroke Volume during Active Standing.

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Conference Presentations:

Ferguson D, Strahan O, Coen RF, Dockree P, Doherty C, Norris S. (2017) [abstract]

A high prevalence rate of a positive screen for neurocognitive dysfunction in patients with chronic Hepatitis C infection in an Irish clinic.

Presented at the American Association for the Study of Liver Diseases (AASLD) Annual Conference, Oct 2017, Washington, USA.

Hannigan O, Ntlholang O, Power C, Claffey P, Roseingrave R, Farley R, Bruce I, Gibb M, McCarthy M, Malomo K, Coen R, Balasa M, Lawlor B, Robinson D.

The Alzheimers Questionnaire: Optimising Cut Points For An Irish Memory Clinic Population

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Hannigan O, O'Shea Farren D, Sparrow R, McNicholas T, Soraghan C, Robinson D.

The Great Escape: Virtual Reality as a Complementary Therapy in the Elderly in Residential Settings, a Pilot Study

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The Detection, Diagnosis and Impact of Delirium and Cognitive Impairment Amongst Over 65s in an Irish Tertiary Referral Hospital.

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Power C, Gunawardena S, Greene E.

End of Life Care Planning and Information Handover Amongst Dementia Patients Awaiting Long Term Care.

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[CP] at the 16th Annual Kaleidoscope International Palliative Care Conference 30th and 31st May 2018

Power C, Hannigan O, Claffey P, Gibb M, Bruce I, McCarthy M, Coen R, Robinson D, Lawlor B.A.

Phenocopy Fronto-Temporal Dementia.

Presented [CP] at the 7th Annual Memory Clinic Conference June 2017, Dublin

Power C, Hannigan O, Gibb M, Bruce I, McCarthy M, Coen R, Robinson D, Lawlor B.A. [abstract]

Phenocopy Frontotemporal Dementia: A Case Series from a National Memory Clinic and a Review of the Literature.

Presented [CP] at 25th European Congress of Psychiatry, Florence, Italy April 2017

Power C, Hannigan OJ, McNicholas T, Farley R, Bruce I, McCarthy M, Coen R, M Gibb, Lawlor BA, Robinson D.

Range of Diagnoses Received by Patients Aged 50 and under Attending a Memory Clinic for First Assessment.

Age and Ageing 46(Suppl 3):iii13-iii59 Presented [OJH] at the Irish Gerontological Society Annual Scientific Meeting, September 2017

Power C, McCarthy B, Lawlor BA, Greene E.

Antipsychotic Prescribing Practices Amongst Elderly Patients of an Irish General Hospital.

Platform Presentation [CP] at the European Delirium Association Annual Meeting Oslo, Nov 16th-17th 2017

Power C, McCarthy B, Lawlor BA, Greene E.

Antipsychotic Prescribing Practices Amongst the Elderly of St. James's Hospital, Dublin.

Presented [CP] at 25th European Congress of Psychiatry, Florence, Italy, April 2017

Power R, Coen RF, Beatty S, Mulcahy R, Moran R, Stack J, Howard AN, Nolan JM. (2017) [abstract]

Supplemental retinal carotenoids enhance memory in healthy individuals with low levels of macular pigment in a randomized, double blind, placebo-controlled clinical trial.

Presented [RP] at Psychological Society of Ireland Annual Conference. The Irish Psychologist, 44(1) Suppl; S19

Rofes A, DiLiberto GM, Theo E, Coen RF, Kotz SA, Lalor, EC, Lawlor BA, Dickree P. (2017) [abstract]

EEG tracking of grammatical structures with different cloze probabilities in connected speech.

Presented at the Annual Meeting of the Society for the Neurobiology of Language, Baltimore, Maryland.

Strahan O, Ferguson D, Coen RF, Dockree P, Doherty C, Norris S. (2017) [abstract]
Viral Hepatitis C Associated Neurocognitive Dysfunction in Ireland in the DAA Era.
Presented [OS] at Psychological Society of Ireland Annual Conference. The Irish Psychologist, 44(1)
Suppl; S20. Winner of the Deirdre McMackin award for early career researcher making a substantial
contribution to Neuropsychological research in Ireland.

*Orthostatic Hypotension at Baseline Associated with a Decline in Cognitive Function at Four Year Fol-
low-up?*
IGS September 2017

Orthostatic hypotension, orthostatic intolerance and fear of falling
FFBH November 2017

Does the presence of orthostatic hypotension at baseline predict decline in global cognition?
Findings from the Irish Longitudinal Study on Ageing (TILDA)
BGS November 2017

Book Chapter:

Depression in Late Life: Etiology, Presentation and Management
Power C, Greene E, Lawlor BA
Chapter Contribution to Mental Health and Illness of the Elderly
Editors: Helen Chiu and Kenneth Shulman
Published by Springer as part of the series Mental Health and Illness Worldwide

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Dr Brendan McCarthy

Steering Committee Members

Prof Davis Coakley (Chairman)
Prof J Bernard Walsh (Director)
Prof Rose Anne Kenny
Prof Brian Lawlor
Dr Conal Cunningham
Dr Miriam Casey
Prof Joseph Harbison
Dr Elaine Greene
Dr David Robinson
Dr Kevin McCarroll
Mr Paul Gallagher
Ms Carol Murphy (Administrator)

Watt's Clinical Research Fellow

Dr Oisin Hannigan

Memory Clinic Research Fellow

Dr Kevin Glynn

Lecturer

Dr Paul Claffey

Falls and Osteoporosis Unit Clinical Research Fellows

Dr Moira Rafferty

Clinical Neuropsychologists

Dr Robert Coen
Dr Marie McCarthy

Clinical Nurse Manager

Ms Irene Bruce

Senior Social Worker

Mr Matthew Gibb

Biostatistician

Prof Cathal D. Walsh

IT Consultant and Technology Adviser

Mr Vincent Quinn

Bone Health Clinical Nurse Specialists

Ms Niamh Maher

Ms Nessa Fallon

Ms Georgina Steen

Bone Health Radiographers

Ms Eva Hendy

Ms Maurisha Moffat

Ms Sally Ann Lynch

Ms Alma Brooks

Falls & Syncope Unit Clinical Nurse Specialists

Ms Ciara Rice

Ms Lisa Byrne

Ms Dympna Hade

Ms. Louise Clerkin

Medical Physics and Bio-Engineering

Dr Gerard Boyle

Dr Christopher Soraghan

Dr Ciaran Finucan

The Irish Longitudinal Study of Ageing (TILDA) Project Team:

Prof Rose Anne Kenny, Lead Principal Investigator

Dr Christine McGarrigle, Research Director

Dr Hilary Cronin, Medical Director

Dr Orna Donoghue, Project Manager

Ms Lucy Doogan, Finance & HR Manager

Dr Ann Hever, Research & Development Manager

Mr Niall Turner, Operations Manager

Dr Hugh Nolan, Biomedical Engineer

Dr Belinda King-Kallimanis, Epidemiologist

Dr Cathal McCrory, Social Epidemiologist

Dr Siobhan Leahy, Health Researcher

Ms Margaret Foley, Senior Data Manager

Dr Louise Newman, Biomedical Engineer

Dr Hugh Nolan, Biomedical Engineer

Research Fellows:

Dr Aisling O'Halloran
Dr Joanne Feeney
Dr Matthew O'Connell
Dr Patrick Moore
Dr Irene Mosca
Dr Lorna Roe
Dr Mark Ward
Dr Helen O'Brien
Dr Eamon Laird
Dr Frank Moriarty
Dr Catriona Murphy

Executive Officers:

Ms Deirdre O'Connor, Academic PA to Professor RA Kenny

Research Assistants/Research Nurses:

Ms Sinead McLoughlin
Ms Aideen Sheehan
Ms Mary O'Shea

TUDA Study

Principle Investigators
Dr Kevin McCarroll
Dr Conal Cunningham
Dr Miriam Casey

Co-Investigator
Dr Eamon Laird

Research Assistants
Ms. Kerrie Boyd
Mr. Brian Mullen

BIOMARKAPD Study Principal Investigator:

Prof Brian Lawlor Scientific
Dr Ann Marie Miller, Project Manager
Dr Sarah O'Dwyer, Study Clinician
Mr Garret Rochford, Research Assistant

Partnerships

St. James's Hospital:-

Medicine for the Elderly
Psychiatry for the Elderly
Clinical Biochemistry
Clinical Medicine Palliative Care
Infectious Diseases
Rheumatology
Orthopaedics
Gastroenterology
Hepatology
Haematology
Renal Medicine Endocrinology
Histopathology
Dementia Services Information and Development Centre

Trinity College Dublin:-

Department of Medical Gerontology
Department of Psychiatry
Department of Old Age Psychiatry
Department of Psychology
Department of Bioengineering
Department of Mechanical Engineering
Department of Statistics
Department of Sociology
Department of Anatomy
Trinity College Institute for Neurosciences
Global Brain Health Institute (GBHI)

Tallaght Hospital – Adelaide & Meath Hospital incorporating The National Children's Hospital (AM-iNCH):-

Age Related Health Care
Department of Psychiatry of Later Life

Royal College of Surgeons in Ireland (RCSI) Department of Anatomy

St. Patrick's Hospital

University College Dublin

Conway Institute
Department of Veterinary Medicine

