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AGEING WELL IN WESTERN SYDNEY AND BEYOND

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PROFESSOR PAUL BREEN

Clinical practice changes to reduce complications from medical devices such as needle-less access connectors and elastomeric infusion pumps

DR GOUGH LUI

Creation of HEXAS, a wearable neural stimulation device to improve balance and reduce falls risk

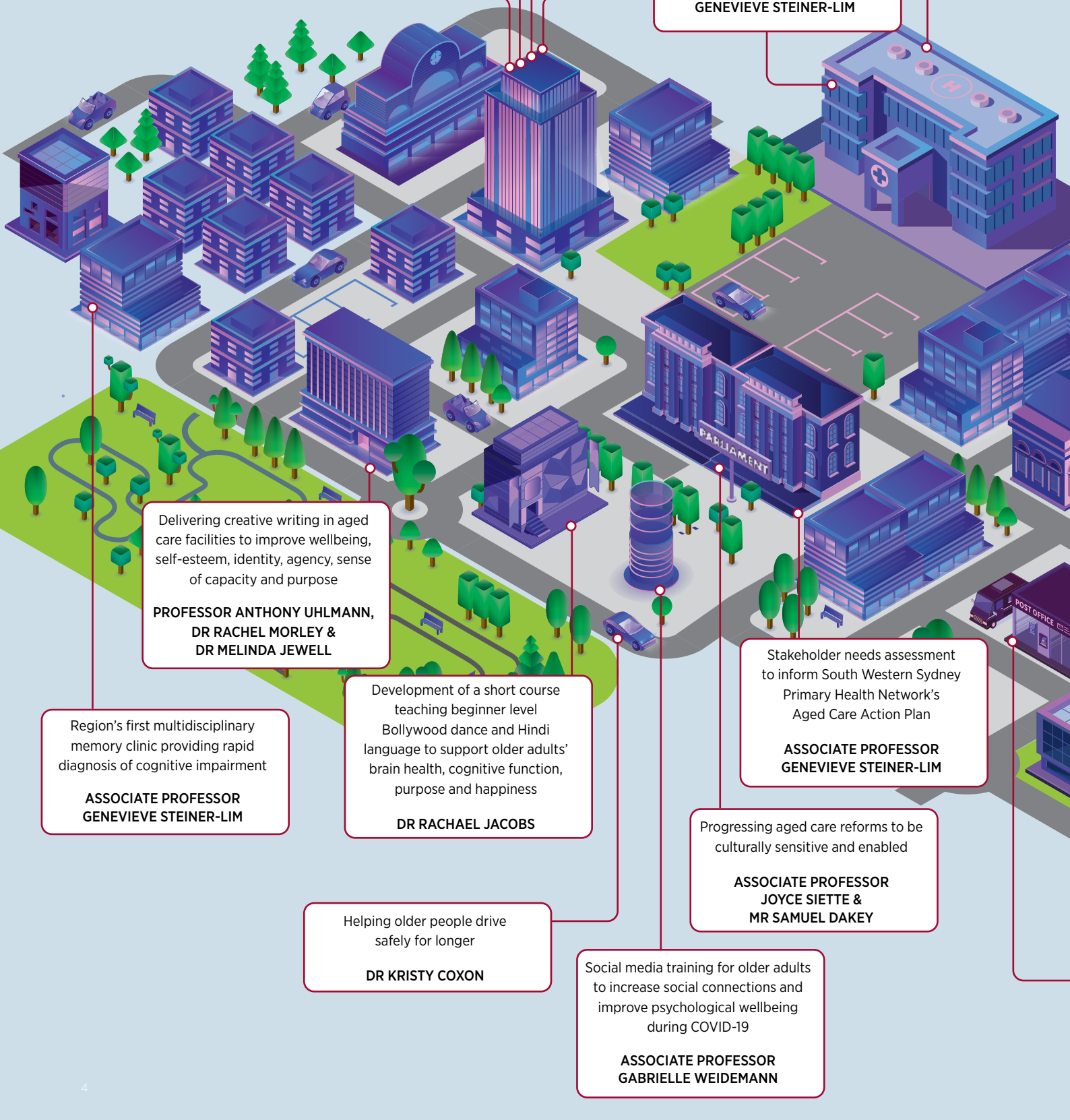
PROFESSOR PAUL BREEN & PROFESSOR JORGE SERRADOR

Developed a home-based biofeedback device to enable monitoring of chronic constipation and faecal incontinence

DR JERRY ZHOU

Development of Project AI-ED which harnesses the power of AI to reduce preventable emergency department visits in older adults

ASSOCIATE PROFESSOR GENEVIEVE STEINER-LIM



Delivering creative writing in aged care facilities to improve wellbeing, self-esteem, identity, agency, sense of capacity and purpose

PROFESSOR ANTHONY UHLMANN, DR RACHEL MORLEY & DR MELINDA JEWELL

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Investigating the cognitive benefits of therapeutic effects of purified phytocannabinoids in rodent models

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Investigating the underlying mechanisms by which body warming (e.g. saunas) may improve disease pathology of Alzheimer's disease

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Exploring novel therapeutic compounds for Alzheimers, ALS, and neuroinflammation

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Improving the human rights of older persons and how voting rights were experienced by older people

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Evaluation of a virtual photo elicitation app on communication and connectivity between family members and aged care residents

DR NICOLE PEEL & ASSOCIATE PROFESSOR ARIANNE REIS

Assessing the effectiveness of sensory interventions to develop evidence-based guidelines for such interventions in residential aged care

MS NIKKI TULLIANI

Delivery of the "Able and Stable" exercise program to prevent falls and reduce recurrent falls

DR THOMPSON & PROFESSOR DAFNA MEROM

Co-designed MemoryAId, which utilises AI in a customisable, intuitive device for people living with dementia to use independently

ASSOCIATE PROFESSOR CELIA HARRIS & PROFESSOR PAUL BREEN

Implementation of Brain Bootcamp; effective, evidence-based personalised brain health kits for older adults to reduce dementia risk

ASSOCIATE PROFESSOR JOYCE SIETTE & MS LAURA DODDS

Established novel methods of ecologically assessing memory performance in older adults

ASSOCIATE PROFESSOR JOYCE SIETTE

Tracking of carer experiences as they navigated health and aged care services

ASSOCIATE PROFESSOR CELIA HARRIS

EXECUTIVE SUMMARY

In Western Sydney, the dynamics of ageing present both challenges and opportunities that require a transformative approach to enable healthy ageing. Our executive summary explores the unique context of ageing in Western Sydney, highlighting why this is now the moment to embrace change and innovation for the wellbeing of future generations.

Western Sydney, like many other western industrialised communities, is experiencing a significant demographic shift, with the proportion of the community aged over 65 growing considerably. In Western Sydney, this is occurring amidst rapid urbanisation within a culturally and linguistically diverse population. This demographic transition brings challenges related to healthcare accessibility, social inclusion, intergenerational equity, ageing in place, and the need for age-friendly environments. Simultaneously, it presents an ideal opportunity to reimagine ageing, aged care, and community support structures to address older adults' evolving needs across the region.

At the same time, the 21st century presents unparalleled challenges and opportunities, including technological advancements, global connectivity, and environmental sustainability, all of which intersect with the ageing population in Western Sydney. Digital health solutions, assistive technologies, and telehealth services have the potential to transform healthcare delivery, improving access and monitoring, as well as promoting independent living among older populations.

Within the context of ubiquitous technological advancement and change, we discuss how innovations have been tailored to the unique needs and cultural diversity of Western Sydney's ageing population. Collaborative partnerships spanning healthcare, technology, academia, government, and community organisations have been instrumental in driving Western Sydney University's substantive progress.

However, there remains work to be done. Investment is required in further transdisciplinary research, data-driven insights, and a commitment to evidence-based practices that will guide the development of effective, appropriate, sensitive, and inclusive solutions for older adults in our region. It is through sustained collaboration and innovation that we pave the way towards a future where healthy ageing is not just a goal, but a lived reality for all in Western Sydney.

UNDERSTANDING AGEING DYNAMICS & INTERDISCIPLINARY APPROACHES IN WESTERN SYDNEY

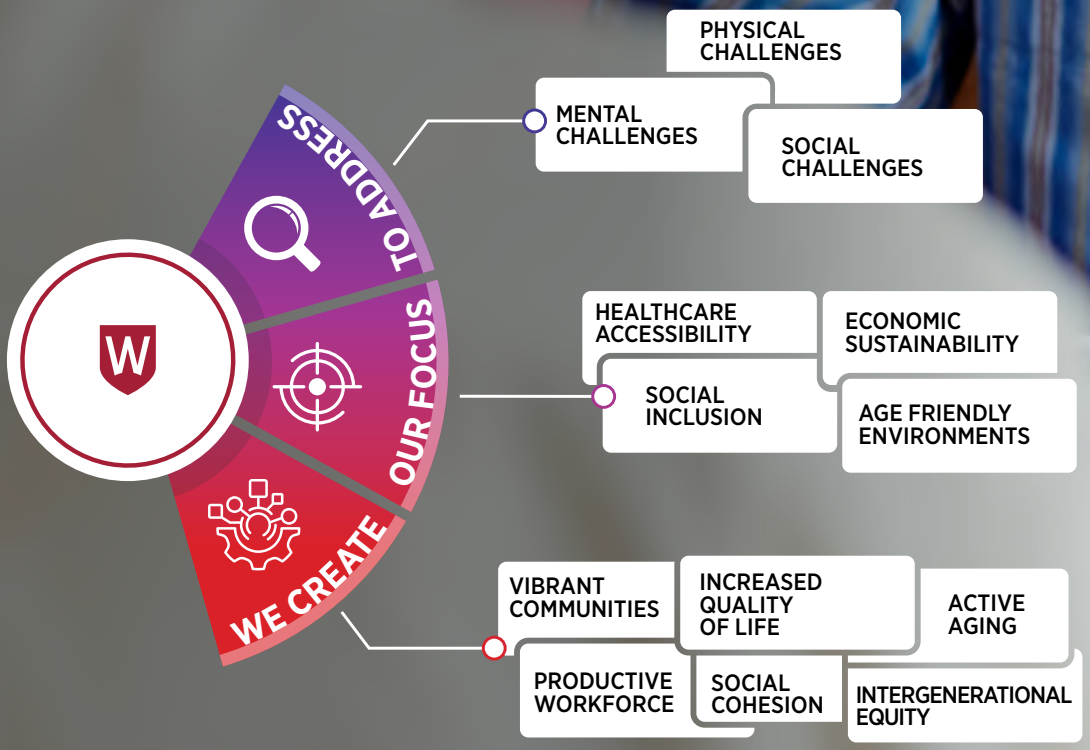
Western Sydney's ageing demographics currently reflect a significant shift towards an older population. This trend is driven by increased life expectancies and lower birth rates, but is also occurring in the context of changing societal dynamics, which influences healthcare accessibility, social inclusion, economic sustainability, and the need for age-friendly environments [1].

According to the Australian Bureau of Statistics, the ageing population is projected to continue growing, with estimates suggesting that by 2050, one in four residents in Western Sydney will be aged 65 years or older [2].

The physical, mental, and social challenges that individuals experience as they grow older will continue to impact themselves and their communities [3].

To promote healthy ageing, Western Sydney University adopts a transdisciplinary approach. Combining expertise from computer science, social science, health science, psychology, public health, medicine, implementation science, and change management has enabled us to develop holistic solutions that consider the multifaceted nature of ageing.

Our collaborative approach with community partners and local stakeholders will continue to support innovation, drive evidence-based practices, and facilitate the translation of research into practical interventions that benefit older adults and the broader community.



3 AGEING & AGED CARE

ISSUES IN WESTERN SYDNEY: A LOCAL PERSPECTIVE

Socioeconomic status, access to health services, housing conditions, and community support networks can significantly impact older adults' wellbeing [4]. Addressing these social determinants is essential to promote healthy ageing and reduce health inequalities across the region.

Ageing populations in Western Sydney face psychological and cognitive health challenges, including loneliness, depression, anxiety, and age-related cognitive decline [5]. These challenges require tailored interventions encompassing mental health support, cognitive stimulation programs, and social engagement initiatives to enhance wellbeing among older adults.

Health disparities within the ageing population highlight the need for innovative solutions in ageing and aged care. The Australian Bureau of Statistics reports disparities in health outcomes based on factors such as ethnicity, socioeconomic status, and geographic location [6]. Implementing targeted interventions, diversity-sensitive models of care, and community-based initiatives can address these disparities and improve health outcomes for older adults in Western Sydney.

Digital solutions are transforming healthcare access and social connectivity for our communities. Telehealth services, remote monitoring devices, and digital platforms can facilitate virtual consultations and access to health information, especially for people in remote or underserved areas. The rise of artificial intelligence can guide allocation of health resources, identify patients at risk of hospitalisation or poor health outcomes, guide precision-medicine approaches, and help to inform clinical-decision making.

New technologies continue to emerge, supplementing physical function that declines with ageing, providing treatments outside the traditional hospital clinic, and providing earlier disease detection and tailoring of care plans. Healthcare is evolving into a more interactive and responsive experience for older adults. The pace of technological advancement is now accelerating at the fastest pace in human history. We need to manage this immense power to maximise the experience of ageing.

Policy considerations and public health initiatives are critical to creating an age-friendly Western Sydney, particularly for individuals who have unmet healthcare needs. Rapid changes to aged care legislation and policy, along with a shifting industry landscape, necessitate proactive measures to ensure access to quality care, affordability, and support services for older adults. Collaborative efforts between government agencies, healthcare providers, community organisations, advocacy groups, prisons and researchers are essential to develop and implement policies that promote age-friendly environments, inclusive services, and equitable access to healthcare resources.

GROWTH OPPORTUNITIES

STRATEGIES FOR WELLBEING & INNOVATION

Existing and new collaborations between Western Sydney University, local councils, hospitals, health services, and community organisations have offered significant growth opportunities for impactful ageing and aged care initiatives.

HEALTH SYSTEMS

Positive Ageing Plans supporting people experiencing cognitive impairment or decline

Collaborations with health services for integrated care models to improve access and outcomes

Falls prevention programs covering risks, medications, bone health, and exercise

New models of care to support older people in the community

Incorporating research and education into clinical practice

Informing policy and practice to empower older people to thrive in the community

Caring for people and carers living with dementia

Recreation and the impact on the wellbeing of older adults

Sensory interventions for older adults living with dementia

COUNCILS

Joint initiatives focusing on age-friendly city planning and public health campaigns

Partnerships with local Councils to reform Disability Inclusion Action Plans

CORRECTIVE SERVICES

Improving the lives of ageing individuals within the prison system

PRECLINICAL

Testing the therapeutic effects of purified phytocannabinoids

Explorations of disease mechanisms

Novel therapeutic compounds for Alzheimer's disease, ALS, and neuroinflammation

MENTAL WELLBEING

Actively working with clinicians and service providers to support wellbeing

CULTURAL DIVERSITY

Commitment to embracing and advocating for diverse cultures where inclusive dialogue enables insights into diverse perspectives, preferences, and needs

HEALTH TECHNOLOGY

Enhancing healthcare delivery, and patient outcomes

Assistive technologies research from psychologists, cognitive scientists, software and biomedical engineers, and Artificial Intelligence experts

Leisure-based virtual games and activities to improve ageing adults' wellbeing

Engaging older drivers with advanced vehicle technologies

Medical devices

COUNCILS

Our collaborations with local councils have created opportunities for joint initiatives that focus on age-friendly city planning and public health campaigns aimed at promoting healthy ageing. These initiatives involve developing urban environments that are accessible, inclusive, and supportive of older adults' needs and cognitive health. For example, implementing age-friendly infrastructure such as sensory-friendly shopping experiences, dementia training for customer-facing services, accessible public transport, improving signage and navigation at libraries, hospitals, and shopping centres, and community spaces that cater to diverse age groups and health conditions.

Throughout South Western Sydney, Dr Diana Karamacoska and her team have partnered with local Councils to reform Disability Inclusion Action Plans and Positive Ageing Plans to better support people experiencing cognitive impairment or decline. This region is anticipated to have the highest increase in dementia prevalence in NSW by 2050, and thus, policy-driven actions are needed now to ensure a healthier, inclusive future [7]. Councils play a significant role in implementing community-oriented solutions for inclusion, accessibility, and equity. By partnering with the University, these Councils fast-tracked establishing their cities as dementia-friendly or inclusive communities – a global public health initiative to reduce stigma, promote wellbeing, and facilitate help-seeking.

HEALTH SYSTEMS

Our collaborations with hospitals and health services have continued to lead to the development of integrated care models, telehealth services, and research projects focused on improving healthcare access and outcomes for older adults, including people living with dementia and their family caregivers.

FALLS PREVENTION

The South Western Sydney Local Health District offered the "Able and Stable" exercise program to prevent falls and reduce recurrent falls among older adults. This comprehensive program incorporates an educational component covering risk factors for falls, home and community hazards, visions, medications and bone health, and an exercise component, which includes balance and coordination training, muscle strengthening and stretching exercises. Clients are individually assessed and receive home-based tailored exercises. Each weekly session lasts 90-minutes; 60 minutes devoted to exercise and the rest for education. The program is offered for 10 weeks with a booster session at 3 months.

Dr Thomson, Dr Amitabh Gupta, Dr Rocco Cavaleri and Professor Merom received a seed grant to evaluate the extent to which social isolation, levels of falls self-efficacy, attitudes to exercise, and experience with exercise explain enrolment to the program, attendance, and maintenance of participation in the program. Ongoing collaborations will occur with Fairfield, Liverpool, Campbelltown, and Camden Hospitals, which have referred older adults who experienced falls to the program.

NEW MODELS OF CARE TO SUPPORT OLDER PEOPLE IN THE COMMUNITY

In her role as Co-Director for the Age and Ageing Clinical Theme for Maridulu Budyari Gumal (SPHERE) Research Translation Centre, Associate Professor Genevieve Steiner-Lim led a needs assessment for the development of a new model of care for a community outreach geriatrics service (COGS) for Campbelltown and Camden Hospitals in South Western Sydney Local Health District [8]. COGS provides medical and nursing care for older people in residential aged care facilities as an alternative to hospital-based treatment, preventing avoidable admissions and providing coordinated care. This collaborative project led to the roll out of COGS at a district level, and in 2022 (compared to 2019) resulted in 1389 fewer ambulances for people aged 60 years and over coming from residential aged care facilities to Emergency Departments across Bankstown, Bowral, Campbelltown, Fairfield, and Liverpool Hospitals.

Associate Professor Steiner-Lim also successfully spearheaded the development of a region-first multidisciplinary memory clinic, bringing together a wide network of stakeholders, including clinicians, researchers, local government, state and federal policy makers, and industry representatives. The memory clinic model of care incorporates research and education into clinical practice, providing rapid diagnosis of cognitive impairment, supporting people to stay at home for longer, reducing unnecessary ED and GP presentations, hospital admissions, and improving integrated care [9].

INFORMING POLICY AND PRACTICE TO EMPOWER OLDER PEOPLE TO THRIVE IN THE COMMUNITY

Well-integrated community aged care services empower and enable older people to live and thrive in the community by supporting activities of daily living. To inform integrated community aged care service planning and delivery across South Western Sydney, Associate Professor Steiner-Lim led a needs assessment with over 160 stakeholders, including older people, their caregivers, and healthcare providers. The work fed directly into South Western Sydney Primary Health Network's Aged Care Action Plan to inform local health policy and was published as an integrated care case in the leading international journal of integrated care, demonstrating how the study design, methods employed, and lessons learned can be adapted internationally for future needs assessments to inform policy, strategies, and integrated aged care service delivery.

A network of Western researchers were part of a multidisciplinary team coordinated through SPHERE to identify key gaps in aged care service delivery and dementia risk assessment across primary, community, and hospital-based care settings across Australia. They identified that appropriately skilled staff are required to meet the health and care needs of ageing populations, yet shared competencies for the workforce are lacking. The team bridged this evidence-to-practice gap by developing a national framework on core competencies for registered health professionals in aged care and unregistered aged care workers [10].

INNOVATIVE MODELS OF CARE IN AGED CARE

Delivering medical services in aged care presents significant challenges due to residents' high levels of frailty, multiple comorbidities, and increased dependency. General practitioners (GPs) are crucial in servicing this population, in community settings and aged care facilities. Despite their importance, there are notable gaps, particularly in after-hours care, often provided by locum services. A joint proposal from the Australian Medical Association and the Royal Australian College of General Practitioners in 2006 highlighted numerous barriers and disincentives that deter GPs from visiting aged care facilities [11]. This prompted a search for innovative medical care models. Haines et al. introduced an in-house GP model to aged care facilities, which they found led to a 50% reduction in unplanned hospital transfers and admissions, as well as a 50% decrease in out-of-hours GP call-outs [12]. Associate Professor Lei Si and colleagues have also demonstrated that this model offers economic benefits to aged care providers and state governments [13].

CARING FOR PEOPLE LIVING WITH DEMENTIA AND THEIR FAMILY CARE PARTNERS

Funded by Maridulu Budyari Gumal SPHERE, Associate Professor Celia Harris and a team from the MARCS Institute, Carers NSW, University of Technology Sydney, and Liverpool Hospital conducted a workshop attended by key stakeholders, including people with lived experience of being a care partner, researchers across disciplines, and healthcare professionals, with the goal of improving wellbeing of persons with dementia and their family carers. This workshop heard from lived experience experts who did not believe educational and psychosocial interventions would improve wellbeing. Instead, family carers requested that the onus of improvement in wellbeing be investigated through the health and aged care systems that people encounter during their caring experience. In response, researchers, clinicians, and lived experience experts co-designed a 6-month longitudinal project that tracked carer experiences as they navigated health and aged care services. Results indicated fluctuating carer needs with three key time points of heightened need: dementia diagnosis, carers requiring in-home care assistance, and transition into residential care.

Our findings suggest a critical role of transition points in the journey of dementia care, impacting the kinds of support that family care partners need from the healthcare and aged care systems. Recommendations included education and training to highlight three main carer needs – knowledge, support, and connection – and the importance of prioritising these needs differentially according to the stages of the carer journey.

RECREATION AND HEALTH

Dr Nicole Peel and Associate Professor Arianne Reis have been working with NGOs in the aged care sector to improve staff and volunteers' understanding of recreation and health, and how leisure and recreation can make a significant impact on the wellbeing of older adults. The team is providing leisure education training to aged care staff and volunteers to upskill the workforce and provide better services to aged care residents.

A team led by Nikki Tullani is currently reviewing the effectiveness of sensory interventions (i.e., interventions targeting the human senses physical touch, sight, hearing, smell and taste) for older adults living with dementia to develop an evidence-based sensory intervention program in residential aged care [14].

CORRECTIVE SERVICES

The prison population in Australia is both increasing and ageing. Between 2009 and 2019, there was an increase of 79% of people in prisons aged 45 years or older [15]. Accelerated ageing due to the prison environment and the poorer health of those entering the prison system means that those aged 45+ are categorised as older prisoners in Australia [16]. Older people in prisons generally have worse physical and mental health than their younger counterparts, with older people in prisons significantly more likely than younger ones to have been diagnosed with chronic conditions such as cardiovascular disease, arthritis and diabetes [17]. Older people in prisons are also more likely than younger ones to report poor mental health despite being less likely to have been diagnosed with a mental health problem [17]. Dr Nicole Peel and Associate Professor Arianne Reis have been working with corrective services to improve the lives of ageing individuals within Long Bay and Silverwater prisons. The researchers are implementing leisure activities in the ward using a generativity approach to empower ageing prisoners to regain a positive sense of self and purpose. So far, the project has been making extraordinary gains, with older prisoners reporting immense joy in engaging in the leisure activities and re-connecting with views of themselves they had long lost through their experience of the criminal justice system.

LUER LOCK FAILURE

Dr Gough Lui and team pursued a forensic engineering assessment of needle-less access connectors and elastomeric infusion pumps. This was instigated through collaboration with the Hospital in the Home program at Liverpool Hospital NSW following several instances where medication failed to flow from the elastomeric infusion pump to the patient. The cause of failures was unknown and impacted patient treatment. The investigation found variance in the torque and force required to activate the different needleless connectors to be at fault. This research supported a change in clinical practice, which all but eliminated failure of flow events from 14.7 events/1000 elastomeric pumps in the last 3 months of 2018 to 0.3 in the first 6 months of 2020 [18].

HEALTH TECHNOLOGY

The use of digital health solutions tailored to Western Sydney's ageing population has advanced healthcare accessibility and quality for older adults in our region. These innovative tools and platforms can enhance healthcare delivery, improve patient outcomes, and support individuals to actively manage their health.

Assistive technologies have huge potential to help people living with dementia to complete activities of daily living, socialise, and participate in meaningful activities. Despite this, the uptake of assistive technologies for people living with dementia is low [19]. Most existing technologies are not designed to be used independently by people living with dementia. Consequently, they are not sufficiently adaptable to meet the capabilities and changing needs of this population. Together with collaborators at Deakin University, Associate Professor Celia Harris and Professor Paul Breen, we have established an interdisciplinary team at Western Sydney University, including people with lived experience of dementia, psychologists, cognitive scientists, software and biomedical engineers, and Artificial Intelligence experts.

Together, this team have co-designed a customisable, intuitive device that people living with dementia can use independently to video call with loved ones and complete meaningful activities. This device, called MemoryAId, is designed to empower people living with dementia to lead independent, meaningful lives, connected to their loved ones and do activities that are valuable to them. MemoryAId leverages the familiar "call to action" of a ringing handset phone, enabling people with dementia to keep in touch with others via intuitive video calling, as well as offering personalised assistance: reminders for daily activities and prompts for initiating meaningful pursuits. The prototype MemoryAId device has undergone

multiple design iterations following a series of co-design sessions with people with lived experience. All users found the MemoryAId device helped them to complete their valued tasks more frequently than was possible without the device.

Also taking advantage of new technologies, Dr Nicole Peel and Associate Professor Arianne Reis partnered with a game developer company and aged care facilities to provide leisure-based virtual games and activities to residents. The project assesses the effect of a virtual photo elicitation app on communication and connectivity between family members and aged care residents. A number of aged care facilities in the Western Sydney region are involved in the project, and recreation therapy students are engaged in data collection as part of their placements in aged care settings. This is part of a broader program of research to support access to leisure and recreation to aged care residents as a way to improve ageing adults' wellbeing.

ENGAGING OLDER DRIVERS WITH ADVANCED VEHICLE TECHNOLOGIES

Driving is an important occupation for many older Australians. While driving supports community participation and independence, driving safety may be compromised if skills, function, and health decline in later life. Dr Kristy Coxon has a research program involving older people of Greater Western Sydney and beyond in projects focused on helping older people drive safely for longer and stay active and engaged in their communities. Through engagement with older people, this research gives a voice to local and regional older people and directly impacts them by seeking evidence of robust, regionally-relevant strategies to mitigate road crashes and injury in older drivers and promote community participation regardless of driving status.

For example, Dr Coxon, along with her collaborators from UNSW (Professors Keay, Ivers and Brown), conducted a large community-based randomised controlled trial involving 380 drivers aged 75 years and older to evaluate the effectiveness of an individualised education-based safe-transport program for older drivers [20]. The goal of the education was to help older drivers make safe and informed decisions about their driving behaviour by matching their driving exposure to their driving capabilities. This research led to new knowledge about safe driving behaviour in older people (e.g., older drivers with poorer function drove less, took fewer trips, and stayed closer to home than those with higher function) and interventions to help older drivers stay safe and mobile for longer [20, 21].

Advanced vehicle technologies, such as lane-keep assist, blind spot warning and adaptive cruise control, have the potential to help older people drive safely later in life. While advanced vehicle technologies do not replace an active alert driver, they may compensate for some changes in ability and function as people age. Despite potential benefits, the use of advanced vehicle technologies by older drivers remains low, with older drivers reporting a lack of training in their use [22]. In partnership with older drivers and experts, Dr Coxon and colleagues developed and trialled an education program to promote older drivers' adoption of advanced vehicle technologies so older drivers do not 'miss out' on proposed and anticipated safety benefits. Pilot study results revealed the program was well received and accepted by older drivers and feasible to deliver. Drs Coxon and Cheal, with colleagues (UNSW: Professors Keay and Brown, USyd: Dr O'Donnell), are currently conducting an efficacy trial to evaluate the impact of the education program on older driver safety and competence in using these technologies.

MEDICAL DEVICES

Anorectal disorders, such as chronic constipation and faecal incontinence, affect both children and adults, with up to 19% of older adults experiencing these issues [23]. Anorectal biofeedback is an established therapy using neuromuscular feedback to restore normal function, yet it is often limited to specialised clinics [24]. To address this, Dr Jerry Zhou's team developed a home-based BF device, consisting of an insertable probe and mobile app, enabling remote monitoring and decision-making by therapists. A start-up company, Amazing Gut Pty Ltd, was created to facilitate the commercialisation of the device.

Meanwhile, at the MARCS Institute, Professor Paul Breen, Professor Jorge Serrador and colleagues created HEXAS, a wearable neural stimulation device to improve balance and reduce fall risk, particularly in older adults [25]. Currently, there are limited treatment options available that can compensate for vestibular loss. A novel neuromodulation treatment is clearly needed and is now in development at Western Sydney University.

Peripheral neuropathy, dysfunction of the peripheral nervous system, can result from a broad range of clinical pathologies, but is most often a consequence of diabetes [26]. Professor Breen is developing a device for diabetic peripheral neuropathy that enhances neural signals to improve sensation in the feet, potentially reducing the risk of foot ulcers and amputations [27].

Currently, heart failure is affecting 480,000 Australians (about 160,000 in NSW), with over 60,000 new diagnoses made every year [28]. Professor Gaetano Gargiulo's team developed a non-invasive sensor system for early heart failure detection, aiming to reduce hospital admissions and provide personalised care through remote monitoring. The system includes patented, innovative, non-invasive sensors (that are mounted on the body surface of the patient in specific locations), an app (that displays signals, key data/risk scores and notifications from the clinical team regarding the patient care plan), a cloud database for signals and biometric data (with proprietary algorithms being developed for calculating risk scores) and a clinician portal (to allow the care team to remotely access data and deliver personalised care plans to the patient based on data from the sensors).

These innovations highlight the potential of medical devices to improve health outcomes and quality of life for various conditions of older adults.

PRECLINICAL WORK

Currently, only limited treatment options are available for Alzheimer's disease (AD). Research in cells and animals has shown that constituents of the cannabis plant (i.e. phytocannabinoids) can reduce AD-related pathologies, including amyloid-β aggregation and tau hyperphosphorylation, and can reverse and prevent cognitive decline in disease-relevant rodent models [29]. Professor Tim Karl's team is currently testing the therapeutic effects of purified phytocannabinoids (e.g. cannabidiol, CBD), combination treatments using more than one phytocannabinoids (e.g. CBD and delta-9-tetrahydrocannabinol, THC), and full extracts from cannabis strains [30]. These compounds are tested in transgenic mouse models for AD for their effects on behavioural symptoms and brain pathology. To date, the most promising therapeutic compound appears to be CBD [31].

Western Sydney University's vibrant preclinical platform also includes explorations of disease mechanisms, including neuroinflammation, post-synaptic tau (one of the toxic proteins implicated in Alzheimer's disease), and the molecular origins of fronto-temporal dementia and amyotrophic lateral sclerosis (ALS; more commonly known as Motor Neurone Disease). Novel therapeutic compounds for Alzheimer's disease, ALS, and neuroinflammation are also being investigated by Associate Professor Erika Gyengesi, including medicinal cannabis (e.g., cannabidiol), Australian Aboriginal bush medicine, curcumin from Curcuma longa (turmeric), parsley, alpha lipoic acid, standardised herbal medicine formulas (e.g., Sailuotong, SLT) and cytokine suppressive anti-inflammatory drugs.

However, current pharmacological treatments for Alzheimer's disease have severe side effects, with little improvement of symptoms. Passive heating (e.g. sauna) has been shown to have beneficial effects on chronic diseases such as cardiovascular disease, diabetes, obesity and depression [32]. Higher sauna frequency is correlated with lower incidence of Alzheimer's disease and dementia [33]. Heat treatment has no significant side effects, which could be easily applicable to humans and implemented in clinical settings. Dr Porto's team is currently investigating the underlying mechanisms by which body warming may improve disease pathology and behaviour impairments at early and late stages of the disease, thereby also evaluating possible sex effects. They use transgenic mouse models for dementia to have an in-depth characterisation of disease-relevant behaviours and brain pathology.

MENTAL WELLBEING

Our work in older adults' mental health and wellbeing encompasses a wide range of activities and community engagement efforts across our region. Through research dissemination to members of the community, in addition to service providers, we aim to support the wellbeing of older adults. We also aim to respond to the needs of key stakeholders by actively working with clinicians and service providers to support wellbeing through the provision of knowledge and resources via keynote presentations and outreach programs. Our initiatives include interactive webinars, face-to-face presentations, and specialised educational forums, providing members of the public with insights and practical strategies for managing their mental health effectively.

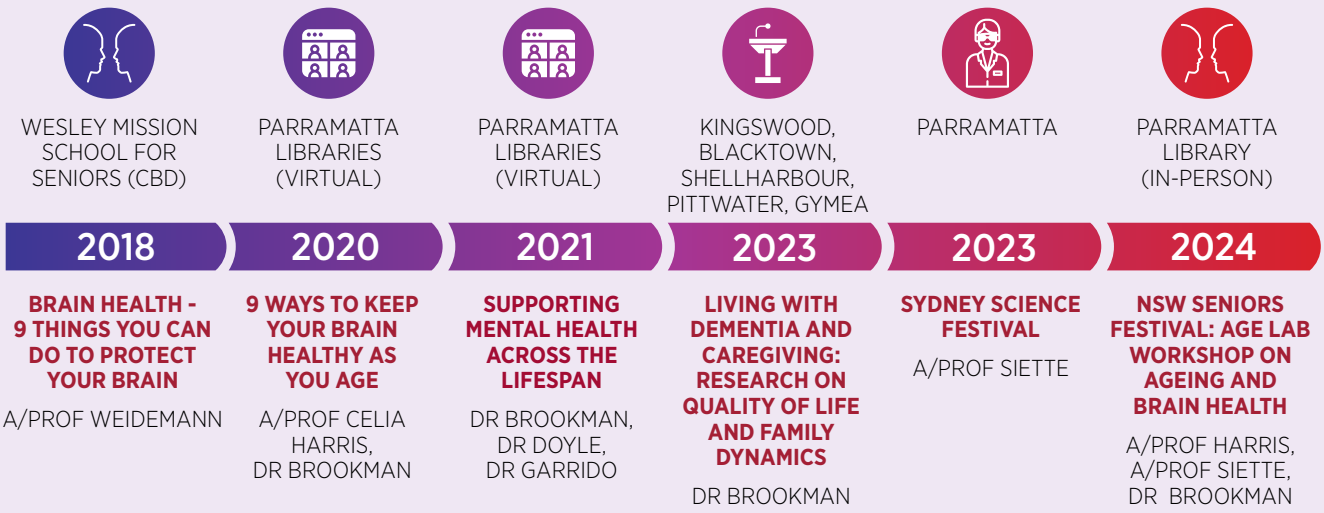


FIGURE: Key activities and engagement

FROM RESEARCH TO PRACTICE: OUR APPROACH

CULTURAL DIVERSITY

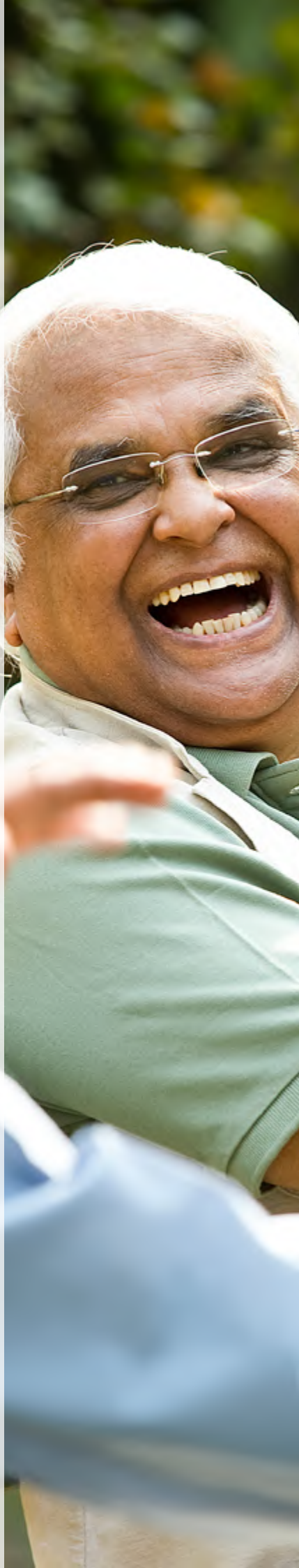
As a region, Greater Western Sydney has one of the most diverse cultural communities in the world. There are more than 150 different languages spoken in Greater Western Sydney, with substantial populations of Arabic, Mandarin, Vietnamese, Hindi and Tagalog-speaking communities, among many others. In many parts of Western Sydney, more than 50% of the population are born overseas. As a University, Western Sydney University stands out by actively integrating a diverse cultural perspective into every facet of its operations, offering a distinctive environment for research exploration and inclusion. The University hosts students from over 150 countries, reflecting a commitment to embracing and advocating for diverse cultures. This dedication is recognised by our achievement in the Times Higher Education (THE) impact ranking, where we secured the 2nd position for our efforts in reducing inequalities.

Embracing culturally-driven understandings is paramount. We champion a strengths-based approach to diversity in ageing and aged care. We see these as valuable opportunities to tap into the diverse talents, experiences, and resources in our communities. We focus on nurturing our community's strengths, building resilience, and enabling older adults to shape decisions that impact their lives.

We actively involve older adults, families, caregivers, and community leaders to amplify community voices on ageing and aged care. At Western Sydney University, we host many workshops and events where inclusive dialogue enables insights into diverse perspectives, preferences, and needs. This collaborative approach energises our academics to create solutions that respect cultural beliefs, maintain dignity, and build individual autonomy.

5 SHOWCASE LOCAL INITIATIVES & SUCCESS STORIES

This section presents case studies showing innovative approaches, technologies, and interventions that have enhanced ageing outcomes in our region.



CASE STUDY 1: CANTERBURY BANKSTOWN DEMENTIA ALLIANCE

DR DIANA KARAMACOSKA

Dr Diana Karamacoska convened with the Canterbury-Bankstown Council to establish the Canterbury Bankstown Dementia Alliance and address the unmet needs of over 8,000 people living with dementia in the region. This led to the development of a culturally sensitive education initiative that has reached over >1,500 members of English and non-English speaking people about dementia, support services, and strategies for inclusivity; training >100 university students and customer-facing public servants on dementia-inclusive communication and assistance; and touring several facilities with people living with dementia to identify accessibility improvements. To ensure the sustainability of this work, Canterbury-Bankstown Council embedded these actions within their Disability Inclusion Action Plan and has committed to becoming a dementia-friendly city through its Positive Ageing Plan. Such collaborations bridge community priorities with evidence-based strategies and fast-track knowledge translation into practice.

https://www.youtube.com/watch?app=desktop&si=MIt5giOVPb3T04n_&v=Y-sJx8_xmvk&feature=youtu.be

CASE STUDY 2: CELEBRATING POCKETS OF BRILLIANCE IN THE AGED CARE SECTOR

PROFESSOR ANN DADICH

With advances in healthcare, we – as a population – are ageing. As people age, some of us will experience complex and chronic issues, like frailty and dementia, which can be associated with negative personal, social, organisational, and economic consequences. Yet the Australian aged care sector has a limited capacity to offer the care that older people and carers need and want. This was demonstrated by the Royal Commission into Aged Care Quality and Safety [34, 35], which revealed startling findings and a need to rethink how we offer care to older people. While some services perform poorly, others perform considerably better – this begs the question, how and why do some individuals and teams positively deviate from the many poor practices that permeate the Australian aged care sector?

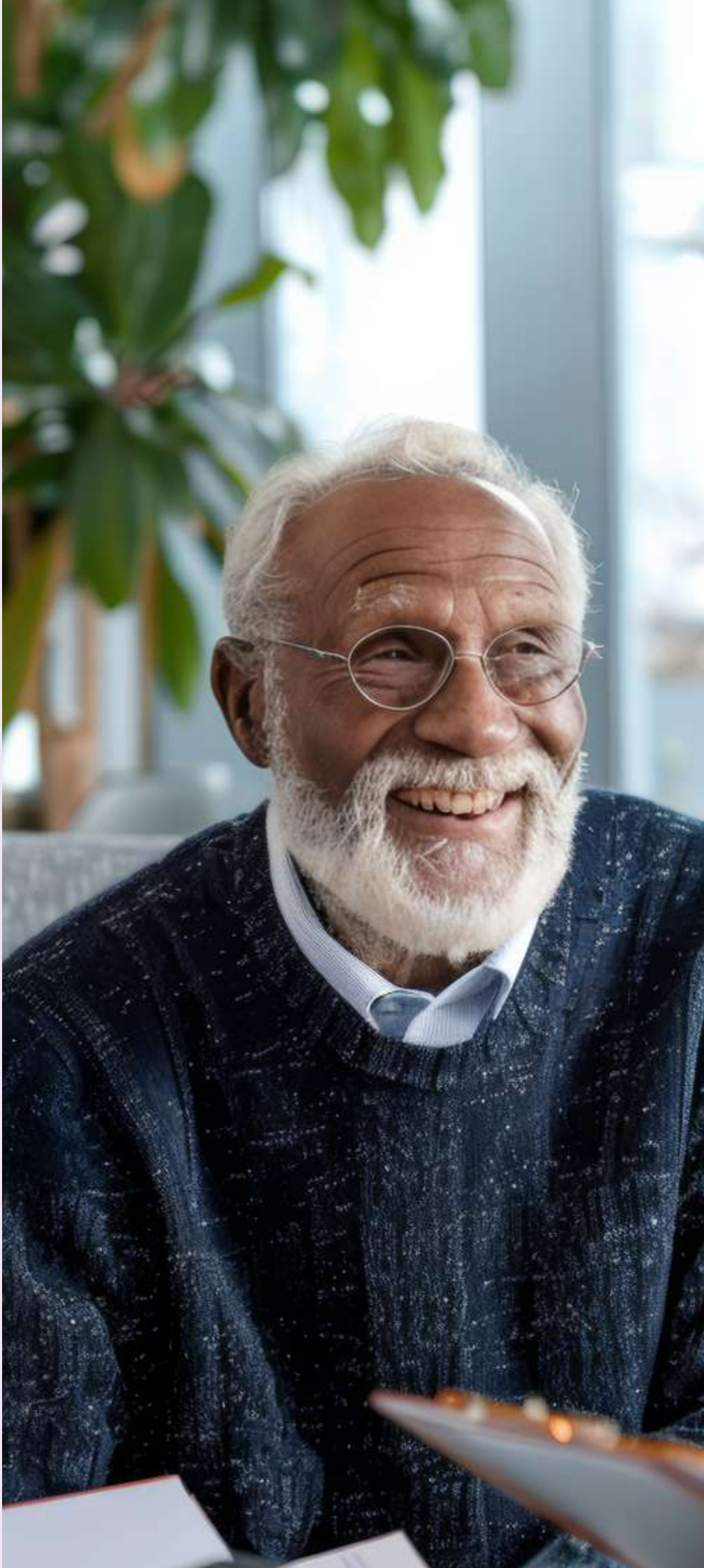
This study addressed this question. Rather than focus on problems within the aged care sector, it clarified what constitutes a brilliant model of aged care, which brings joy and delight to service providers and/or service users and exceeds expectations. To redress the imbalance towards negativity, the study identified the pockets of brilliance within the aged care sector and learnt from them to co-design a brilliant model of aged care with stakeholders. Led by Professor Ann Dadich, this involved identifying individuals, teams, and services deemed to be brilliant and clarifying what enabled and sustained brilliant aged care. To illustratively convey the research findings, an artwork was developed, epitomising what makes for brilliant aged care (see below).

FIGURE: Brilliant Aged Care by Armelle Swan, MFA, Sydney-based visual artist

CASE STUDY 3: COGNITIVE SCAFFOLDING PROJECT

ASSOCIATE PROFESSOR CELIA HARRIS

Memories of the past are critically important as we age. For older people receiving aged care, opportunities for reminiscing with care staff may provide important cognitive and emotional benefits for both parties, enhancing person-centred and relationship-based care. Scientific research suggests that particular communication strategies during conversations lead to immediate and long-term benefits for memory, cognition, and wellbeing [36]. We used this research to develop an intervention to provide aged care staff with concrete and practical tools for enriching everyday conversations during routine care. Partnering with aged care provider Whiddon, we conducted a workshop with 16 residential and community care staff, followed by a 4-week practice period during which staff recorded conversations with residents. Staff feedback indicated successful use of the techniques, and benefits as well as barriers to implementation. Analysis of conversations focused on which techniques were present and how care recipients responded to them. This pilot is now being followed by a much larger funded trial across multiple sites, aiming to establish the benefits for both staff and care recipients, as well as identify barriers and facilitators to implementation in practice. Overall, we are using this new knowledge to develop a set of evidence-based tools and training materials to provide staff with skills in having meaningful conversations with residents for dissemination across the aged care industry. This research and our ongoing project emphasise the importance of everyday social interactions between aged care staff and residents in benefitting the cognition and wellbeing of older people living in aged care. This research has the potential to benefit a large number of people, given over 400,000 Australians receive aged care services.



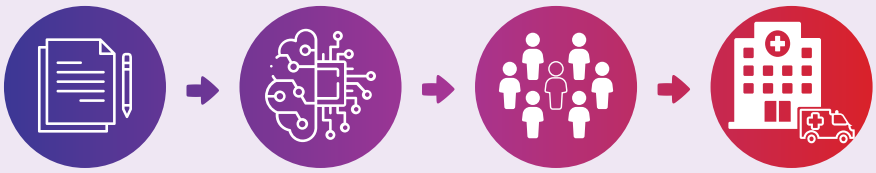
CASE STUDY 4: PROJECT AI-ED – THE RIGHT CARE IN THE RIGHT PLACE AT THE RIGHT TIME

ASSOCIATE PROFESSOR GENEVIEVE STEINER-LIM

People aged 65 years and older comprise up to 41% of Emergency Department (ED) presentations in Australia [37], around half of which are admitted to hospital [38]. Following an ED visit, older people have an increased risk of hospital admission, hospital-acquired complications, longer ED stays, repeat ED visits, readmissions, and adverse health outcomes and mortality both in the hospital and after discharge [38-40]. Yet, up to a quarter of ED presentations are potentially preventable [41, 42].

Imagine a future where older people are supported to thrive in the community outside of the hospital. Project AI-ED is transforming this future into a reality by detecting older people at-risk of hospitalisation, empowering early intervention strategies, improving communication amongst care providers, and integrating services to ultimately promote care for older people in the community [43]. By harnessing the power of artificial intelligence (AI), we are identifying older people at-risk of going to hospital, providing timely access to primary and community healthcare, and promoting integration and continuity of care with multidisciplinary teams. Our project is developing an algorithm that rapidly and accurately flags older people at high-risk of a preventable ED presentation to target these early interventions.

The innovation and ambition for Project AI-ED lies in the use of cutting-edge methods, including AI-driven machine learning models. The approach is novel by incorporating biopsychosocial factors, linking data from aged care service providers, and comparing older people across different care settings, local health districts, and cultural backgrounds. Project AI-ED will lead to improved health outcomes and quality of life by enabling independence and functionality and diminishing disability and deterioration by delivering the right care in the right place at the right time.



The emergency department is often the last point of call for desperate patients. As a result, I can't help but feel inadequate when I have to explain that the ED isn't well placed to meet their needs. We're great at providing quick fixes, but struggle to provide the long term support and resources that older patients require.

ED DIRECTOR, SWSLHD

I didn't want to come to hospital as I know I will just get sick but what other choice did I have? My wife died and I live alone. I keep falling over and this time I hurt myself real bad! My kids have their own life and I don't want to be a burden. My GP couldn't see me for 2 weeks... and really what else can he do for me anyway...

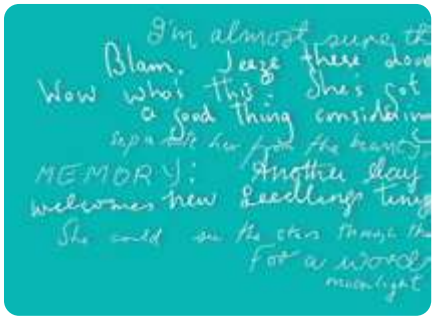
71 YEAR OLD MALE, FAIRFIELD LGA



CASE STUDY 5: AGEING CREATIVELY: CREATIVE WRITING AS A TOOL FOR HEALTHY AGEING

PROFESSOR ANTHONY UHLMANN (LEFT), DR RACHEL MORLEY (CENTRE). DR MELINDA JEWELL (RIGHT)

Led by Professor Anthony Uhlmann and colleagues at the Writing and Society Research Centre, 'Ageing Creatively' examined how Creative Writing can support wellbeing, positive identity, and strong communities in aged care. In 2015 and 2016, the research team delivered two mixed-method pilot studies that investigated 1) the best methods for teaching creative writing in aged care facilities, 2) the extent to which different creative writing processes add to participant wellbeing and belonging; 3) the best methods for sustaining interest in writing practice over a sustained period of time; and 4) the best methods for collecting data about participant experiences. Two pedagogical models were deployed: the first was a 'life writing' approach that used participant memory as a resource for writing, and the second was an 'experimental' approach that challenged language conventions. Through user testing and qualitative and quantitative data collection methods, the project demonstrated that the use of sustained creative writing activities in aged care leads to improved wellbeing, self-esteem, identity, agency, sense of capacity, and purpose. It also showed how the writing process can foster a sense of meaning and identity for older writers. Outcomes included the successful design and delivery of a comprehensive workshop model suited to aged care, the publication of an anthology produced by writing group members, a showcase performance event, the development of an early web model for disseminating creative works, and the publication of a journal article in *New Writing*. Critically, one of the two pilot groups continues to meet on a regular basis.



Her head was always full of words but now, just when she needed them most, they eluded her. It was perhaps what she had always feared too much imagination clouding that grain of truth which she needed right now to unblock the thoughts she felt lay squashed inside her there somewhere.

BRYDON

CASE STUDY 6: DANCING TOWARDS BRAIN HEALTH: BOLLYWOOD AND LANGUAGE DEVELOPMENT FOR AGEING AUSTRALIANS

DR RACHAEL JACOBS

The many benefits for older people of learning to dance and learning a language have been established in research, with many benefits linked to brain health [44-46], positive socialisation and a sense of wellbeing [47]. Led by Dr Rachael Jacobs, a pilot program in Western Sydney engaged with a Bollywood dance school to develop a short course teaching beginner level Bollywood dance and Hindi Language as an integrated course to adults of all ages. The Hindi language instructor was an 84 year old Indian-Australian woman living in Sydney. She collaborated with her daughter, the Bollywood dance instructor, who was also the researcher. Drawing on pedagogical and instructive methods in the arts field for language development, they designed a program of learning that used dance choreography as the basis for language development. The participants were of all ages, with more than a third being over 60 years old.

The evaluation found that participants over 60 chose to do the course specifically to improve their cognitive function or to maintain their brain health, as well as other reasons, such as wanting to get fit or travel to India. In a concluding survey, all participants said they acquired new language quicker and had greater recall when dance movements were used. Older participants overwhelmingly said they could think more quickly and recall language more easily when the music was played. They also said they felt happier after class. The pilot also interviewed the Hindi language instructor at the conclusion of the program, and she said she felt she had a purpose in the community when she was teaching this course. She also felt more confident recalling her Hindi language vocabulary when she was teaching, and she felt sharper and more cognitively 'bright' when she was in front of the class.

CASE STUDY 7: PROTECTING THE HUMAN RIGHTS OF OLDER PERSONS: A FOCUS ON THE RIGHT TO VOTE

PROFESSOR CATHERINE RENSHAW

One of the most important articles in the Universal Declaration of Human Rights (1948) is Article 2 – the provision against discrimination. Article 2 aims to ensure that all the rights set out in the Declaration apply to everyone, regardless of their "race, colour, sex, language, religion, political or other opinion, national or social origin, property or birth."

There is a notable omission in Article 2 – discrimination on the basis of age. Age discrimination is the most common form of discrimination – and it is the one least protected by international law. While there is a Convention on the Rights of the Child, a Convention on the Elimination of all forms of Discrimination Against Women, and a Convention on the Elimination of All Forms of Racial Discrimination, there is no equivalent Convention on the Rights of Older Persons. What this means, in practice, is that the human rights of older persons are less visible and are more vulnerable to abuse.

The project 'Older persons and the Right to Vote' explores the denial to older persons of one important human right - the right to political participation. In May 2022, in the context of Australia's federal election and the COVID-19 pandemic, a decision was made not to provide mobile polling in residential aged care facilities. The decision was made by the Electoral Commission and facility management – without input from older persons themselves. The result was that thousands of older Australians were unable to exercise their right to vote.

This project explores how deprivation of the right to vote was perceived and experienced by older persons. The research involves qualitative interviews with residents in aged care facilities in inner Sydney, the Western Suburbs and regional Australia, in the period June 2022 – December 2022. Preliminary findings were submitted to the Federal Parliamentary Inquiry into All Aspects of the Conduct of the 2022 Federal Election [48].

CASE STUDY 8: BRAIN BOOTCAMP AND DEMENTIA PREVENTION

ASSOCIATE PROFESSOR JOYCE SIETTE (LEFT), MS LAURA DODDS (RIGHT)

Brain Bootcamp is a lifestyle program that aims to educate the community about dementia prevention and the strategies they can adopt to reduce the risk of cognitive decline [49, 50]. Led by Western Sydney University Research Theme Fellow Associate Professor Joyce Siette, in collaboration with several partners, including the NSW Government, Brain Bootcamp has been delivering brain health kits to the doors of >1000 older adults around Australia. Since 2021, we have seen a 72% reduction in cognitive impairment and have helped over 6000 participants be on their way to better brain health [51]. With increasing evidence that up to 45% of dementia cases are modifiable and that small and simple everyday lifestyle choices such as what we eat, how much physical activity we do, how often we socialise, and how cognitively stimulated we are can have a significant impact on our brain health, the demand for practical tools to empower seniors and their families to take control of their lifestyle has escalated [52].

In particular, is the disproportionately unmet need in disadvantaged and potentially higher risk groups such as rural and regional seniors and culturally and linguistically diverse communities in Western Sydney. These groups have access to limited health resources and experience several barriers to education on brain health and cognition, including societal stigma, health workforce challenges and insufficient targeted support [53, 54]. Therefore, Brain Bootcamp has since expanded to reach 200 seniors in rural and regional Australia (Brain Bootcamp Frontiers).

Additional brain health resources to help seniors and our wider communities understand how we can lower dementia risk are currently being co-designed and developed with and for key language groups in Western Sydney, including Arabic, Mandarin, Cantonese, and Vietnamese. This work will support a large scale public health campaign to ensure accessible brain health education [55-56].

www.youtube.com/watch?v=j92A8ID5FJc

I didn't realise that there were so many other medical conditions that might have an impact on dementia.

OLDER ADULT

All the strategies that you explained in the booklet were very helpful.

OLDER ADULT

CASE STUDY 9: TRAINING OLDER ADULTS IN SOCIAL MEDIA ENGAGEMENT

ASSOCIATE PROFESSOR GABRIELLE WEIDEMANN

For some older adults, the transition to retirement or changes in health that restrict mobility, increase susceptibility to communicable disease, or necessitate a change in residence can increase social isolation. Indeed, the COVID-19 pandemic and the associated public health orders to restrict person-to-person transmission of the virus in Australia saw a substantial increase in social isolation, particularly amongst older adults in Australia. However, contact with friends and family via electronic or digital means was found to reduce the levels of psychological distress caused by social isolation [57].

This study sought to train older adults to use a social media platform, Instagram, to assess the feasibility and acceptability of social media engagement as an intervention to increase social connections and psychological wellbeing during the pandemic. A group of 35 older adults, ranging from 64 to 88 years old, were trained on how to use Instagram and their activity in the site was tracked over a period of 10 weeks. Participants in the experimental group were given specific social media engagement tasks over the 10-week period, while individuals in the control group were free to engage or not engage as they wished.

Most participants (82%) who began the study were retained through follow-up, and the Instagram training was found to be both feasible and acceptable to the participants who took part in the study. Social media engagement varied considerably across the sample, but qualitative feedback was generally positive about the experience [57]. Although social media engagement is generally quite low among older adults, this study counters the belief that it is difficult for them to learn how. Participants were given training in e-safety prior to completing the social media training.










TOP ROW: **DR CRIS TOWNLEY, PROFESSOR LYNN A. KEMP, DR NICOLE PEEL**

SECOND ROW: **PROFESSOR CAROLINE JONES, ASSOCIATE PROFESSOR MARK ANTONIOU, ASSOCIATE PROFESSOR CELIA B. HARRIS**

THIRD ROW: **DR RUTH BROOKMAN, ASSOCIATE PROFESSOR JOYCE SIETTE, ASSOCIATE PROFESSOR CHRISTINE WOODROW**

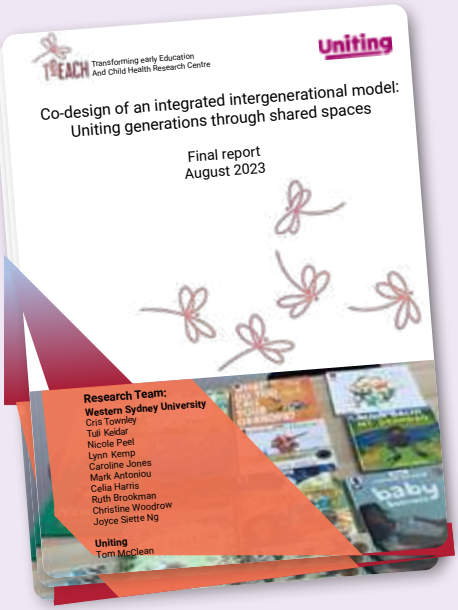
FOURTH ROW: **DR TOM MCCLEAN**

CASE STUDY 10: CO-DESIGN OF AN INTEGRATED INTERGENERATIONAL MODEL: UNITING GENERATIONS THROUGH SHARED SPACES

Led by researchers at TeEACH, the team reviewed relevant literature to understand what is already known about the impact of intergenerational care models on wellbeing and development outcomes for young children, older adults, other community members, and staff, and distil the core elements of program implementation that are most influential in determining positive outcomes [58].

To address these considerations effectively, the research team from TeEach led the creation of a Theory of Change using a co-design process. This approach brought together the researchers' knowledge of existing evidence, Uniting's practice wisdom, and the lived experiences of young children attending the early learning centre, older adult residents, their families, and staff members. By involving all stakeholders as co-designers, this process built mutual accountability, shared power, and joint decision-making, ensuring the program was well-rounded and inclusive.

Our findings led to an intergenerational model of care, including activity sheets and the designing of activities suitable for various ability and mobility levels among both aged care residents and children. Topics include obtaining consent for participation, ensuring physical and COVID-19 safety, managing group sizes, planning specific participant involvement, preparing children for encounters with potentially distressed dementia patients, clarifying the commitment level for independent living volunteers, determining staffing needs, and arranging for appropriate insurance coverage. The report is now available, and we welcome further discussions with interested aged care providers.



It models to me what I feel like community should be like: all the generations together, not each nuclear individual by itself

(PARENTS)

You'd watch people who were ... nonverbal, or they were dysfunctional with dementia, and they'd have a kid on their lap, and they would get given a book purposefully upside down and around the wrong way and they would turn the book around, they'd move the hot cup of tea away from the kid and then they would read the book to the kid. That's absolutely amazing.

(LEADERSHIP)

We had a BBQ and we all gathered on the lawn, ... We took 20 of our pre-schoolers up, and they brought the residents from residential aged care down. Oh, they just had a ball. We put on music, they did a few games and that the residents just sat there with just big smiles on their faces. They were just so, so happy.

(LEADERSHIP)

CHALLENGES & GROWTH STRATEGIES

AGED CARE WORKFORCE TRANSFORMATION

The Royal Commission into Aged Care Quality and Safety has catalysed significant reforms in Australia's aged care sector, prompting a critical examination of existing norms, acts, and policies. This enquiry has found systemic issues and gaps in the delivery of aged care services, leading to a call for comprehensive changes to ensure quality, safety, and dignity for older adults.
Western Sydney University is reimagining aged care by exploring innovative care delivery models, including integrated care teams composed of diverse healthcare professionals, social workers, allied health practitioners, and community support workers.

The research community at Western Sydney University is working with culturally diverse communities to improve assessments of older people in aged care and advocate for culturally responsive provisions in upcoming aged care reforms.

On the practice front, our focus is on capturing older people's needs and capacities as accurately as possible. To achieve this, we are working with the aged care workforce to overcome cultural and linguistic barriers to assessing older people [59].

Within policy quarters, we are advocating for the inclusion of culturally responsive measures in the upcoming aged care reforms, specifically a culturally and linguistically enabled assessment pathway in the new Single Assessment System. Led by Dr Siette and Mr Dakey, her team is making an evidence-based case for an inclusive assessment pathway in the new assessment system.

CO-DESIGN AT HEART

Ageing is a highly individual and personal experience. Individuals encounter age-related physiological changes, diverse cultural backgrounds, and unique preferences and needs. To better understand the heterogeneous nature of ageing and tailor solutions to accommodate a broader spectrum of needs and preferences, it is essential that we build strong practices of co-design and collaboration with older people in Western Sydney. Co-design experts at Western Sydney University are developing co-design approaches and tools that are age appropriate and culturally appropriate. These approaches have been integral in understanding current models of care [pg 15], imagining new models of care [pg 14], designing emerging technologies for people living with dementia [pg 16], co-developing culturally tailored educational materials [pg 23] and progressing app user centred design for dementia prevention [60].

SUCCESSFUL AGEING

As individuals age, it becomes even more important to ensure the absence of disease and disability and maintain active social environments, high cognitive function, and physical functioning.

Leisure has the advantage of being freely accessible to individuals, with many benefits for health and wellbeing, including a heightened sense of purpose [62]. Physically, active leisure opportunities can increase cardiovascular fitness, improve strength, maintain mobility, and keep individuals agile, with activities such as swimming, walking, and gardening being accessible and appropriate to individuals as they age [60]. Socially, leisure allows for participation in groups within communities where people can attend dance classes, play sports, join special interest clubs to foster connections, combat loneliness, and maintain a sense of belonging [63]. Engaging in leisure allows for the cognitive benefits of mental stimulation to enhance cognitive flexibility and stave off dementia [63]. Best of all, leisure is enjoyable and can be an investment in holistic health and wellbeing through simple adjustments required as individuals age. With an ageing population, there is a need for higher investment in recreation and leisure and its impact on health and wellbeing.

IDENTIFYING FUNDING & PARTNERSHIPS

Our University presents unique opportunities for transdisciplinary research and innovation in ageing-related fields, leveraging state-of-the-art labs and facilities to drive impact. For instance, our MARCS Labs provide a cutting-edge platform to explore cognitive and sensory aspects of ageing, enabling researchers to investigate how ageing affects perception, cognition, and to develop new technologies for more accurate assessments [61]. Engineering departments contribute expertise in developing assistive technologies, smart home solutions, and mobility aids tailored to older adults' needs, promoting independence and quality of life.

The University's innovative simulation is dedicated to addressing ageing and aged care challenges through advanced education and research. Equipped with state-of-the-art technology, like eye tracking and motion sensing systems, our facilities are a dynamic learning hub for healthcare professionals and a testing ground for innovative solutions in aged care.

The University's Building O initiative focuses on creating age-friendly environments and inclusive designs that enhance accessibility, safety, and comfort for older adults.

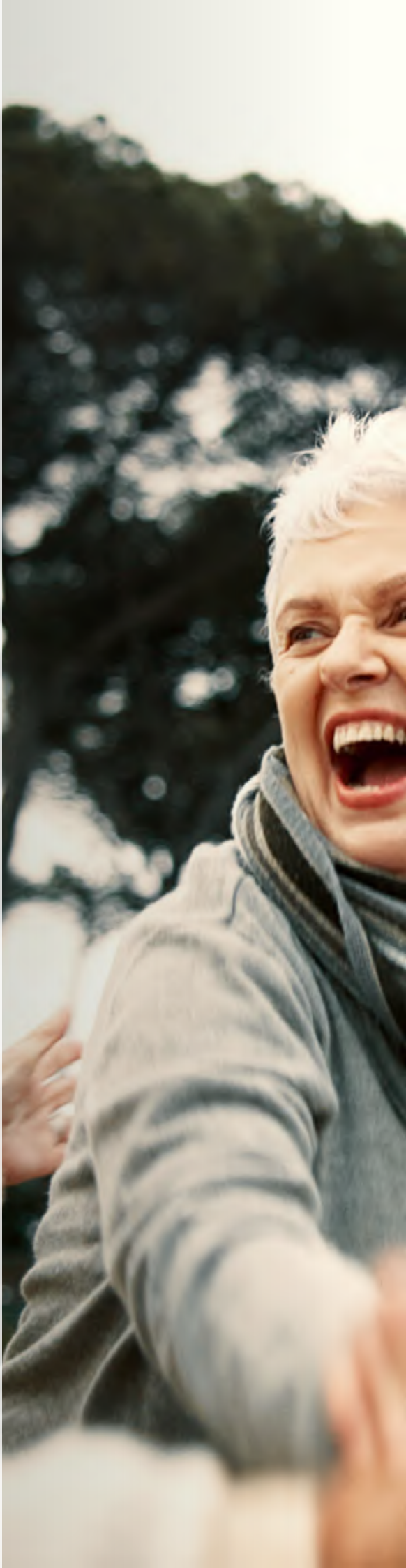
7 CALL TO ACTION

Western Sydney University's initiatives in ageing and aged care present key opportunities and strategies for advancing wellbeing and innovation in our region.

Through collaborative efforts, research endeavours, and investments, we can drive positive change in ageing-related initiatives both within our university and across the wider community.

We call upon stakeholders, partners, and investors to join us in our mission to enhance ageing and aged care. Collaboration, research partnerships, and strategic investments are vital to enabling a vibrant ecosystem that supports older adults' wellbeing and innovation in ageing.

Together, we can create impactful solutions that address the evolving needs of our ageing population.



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