Our Purpose
A geriatric institute based in Singapore to conduct research and education on age-related health issues to promote healthy ageing

Our Vision
A research institute to help Singapore better prepare for the challenges of an ageing population

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GERI was set up in 2015 as a national entity under the Ministry of Health (MOH) to strengthen geriatric education, research and service planning in the health services and clinical aspects of ageing.

Our dedicated team in GERI has worked hard to place research on geriatrics and ageing as an important component towards supporting partnerships in finding innovative solutions for policy, practice and evidence-building.
2017/2018 has been a year of collaboration and development in improving the lives of our ageing population. This past year, we have deepened our commitment to meet the current and present needs of an ageing population, coupled with an increase in chronic diseases burden and a surge in frailty.

This annual report highlights the accomplishments achieved this year and the excellent work done by our team of researchers and staff.

It has been an exciting and productive year and while there is still more work ahead, I look forward to our continuing efforts to build a pathway to move research evidence into practice across the community and the healthcare system.

GERI’s continued focus in sharing best practices and providing tangible ideas to improve the delivery of elder care is paramount to the success of our vision.

PANG WENG SUN
Management Team

Senior Management

- Prof Pang Weng Sun\(^1\), Executive Director, GERI (centre)
- A/Prof Ding Yew Yoong\(^2\), Deputy Executive Director and Programme Lead, GERI (second right)
- Dr Wong Chek Hooi\(^3\), Deputy Executive Director and Programme Lead, GERI (second left)
- A/Prof Wee Shiou Liang\(^4\), Director and Programme Lead, GERI (first right)
- A/Prof James Alvin Low Yiew Hock\(^5\), Programme Lead, GERI (first left)
- Ms Kong Lai Ho, Senior Manager, Finance (absent)

\(^1\) Deputy Group Chief Executive Officer (Population Health), National Healthcare Group (NHG); Senior Consultant, Geriatric Medicine, Khoo Teck Puat Hospital (KTPH)

\(^2\) Senior Consultant, Department of Geriatric Medicine and Institute of Geriatrics and Active Ageing (IGA), Tan Tock Seng Hospital (TTSH)

\(^3\) Senior Consultant, Department of Geriatric Medicine, KTPH; Adjunct Assistant Professor, YLL-NUS and Health Services & Systems Research, Duke-NUS

\(^4\) Associate Professor of Health and Social Sciences, Singapore Institute of Technology (SIT); Adjunct Assistant Professor, Health Services & Systems Research, Duke-NUS

\(^5\) Senior Consultant, Department of Geriatric Medicine, KTPH; Programme Director, GeriCare@North
GERI aims to address gaps in acute, community and long-term care space through rigorous clinical and translational research. To achieve that, our initiatives are organised into four programmes.

A/Prof Ding conducts clinical and health services research in older adults. His substantive research interests include frailty, geriatric syndromes, and models of geriatric care, while methodological interests are quantitative methods for observational studies, programme evaluation, and casual inference.

A/Prof Ding completed public health and social research methods training at the University of Queensland and London School of Economics. He also underwent research fellowships at the Bedford Veterans Affairs Center for Health Quality, Outcomes & Economic Research and Boston University School of Public Health in Massachusetts, USA, and at the Institute for Clinical Evaluative Sciences in Toronto, Canada.

Dr Wong received his Specialist Accreditation in Geriatric Medicine from the Academy of Medicine, Singapore in 2004. He was a National Medical Research Council Research Fellow at McGill University, Montreal in 2005 and a Fulbright Research Scholar in 2009 at the University of California. Dr Wong also completed his Masters in Public Health in Health System and Policy at John Hopkins Bloomberg School of Public Health.

In 2012, he consulted at the Department of Ageing and Life course at the World Health Organisation. Dr Wong’s interests include mobility, frailty, community care, programme evaluation, health services research, and evidence-based policy in meeting the healthcare needs of the ageing population.
Each Programme Lead coordinates and drives pertinent research with our faculty members to ensure relevant expertise is brought to the table. The four programmes complement one another to provide a holistic approach in dealing with the challenges of an ageing population.

A/Prof Wee Shiou Liang
Director and Programme Lead
*Frailty Identification, Prevention & Management*

A/Prof Wee is passionate in and has been actively working to translate research evidence into policies and practices to help people remain productive and maintain their health and function. As a faculty member and Associate Professor of Health and Social Sciences at the Singapore Institute of Technology, A/Prof Wee is also involved in developing workforce-ready health and social care professionals through education that integrates learning, industry and community.

A/Prof Wee's areas of interest include aged and integrated care, frailty and health, exercise and nutrition science, as well as health services research, which includes implementation research, programme evaluation and outcomes research.

A/Prof James Alvin Low
Programme Lead
*Geriatric Education*

A/Prof James Low is the Senior Consultant of Geriatric Medicine and Palliative Care, Lead Clinician of the Long-Term Care and Chairman of the Clinical Ethics Committee at Khoo Teck Puat Hospital (KTPH). He is also the Programme Director of the GeriCare@North programme.

A/Prof Low is a member of the Palliative Care Specialist Training Committee and a Fellow of the Royal College of Physicians of Edinburgh and the Academy of Medicine, Singapore.

His research interest include General Geriatric Medicine, Palliative Care, Ethics and Communications.
Faculty Members

GERI is proud to have 18 faculty members this year to bolster our research and education excellence. Our faculty members are renowned experts in their respective disciplines, with each of them actively engaged in impactful research and training across the healthcare arena.

Joint Faculty

- Dr Chong Mei Sian
- Dr Iris Rawtaer
- Dr Rachel Cheong
- Dr Tew Chee Wee
- Prof Ng Tze Pin

- A/Prof Angelique Chan
- A/Prof Lim Wee Shiong
- A/Prof Philip Yap
- Dr Christopher Lien
- Dr David Matchar
- Dr Laurence Tan
- Dr Mallya Ullal Jagadish

Adjunct Faculty

- A/Prof Edward Poon
- A/Prof Tan Hwee Pink
- Dr Allyn Hum Mei
- Dr Laura Tay
- Dr Mathew Mathews
- Dr Raymond Ng
- Dr Samir Sinha
Our Team

Front row (left to right):
Benedict Pang, A/Prof James Alvin Low, Dr Wong Chek Hooi, Prof Pang Weng Sun, A/Prof Ding Yew Yoong, Dr Wee Shiou Liang, Prof Ng Tze Pin, Robin Choo

Middle row (left to right):
Mary Ng, Ho Soon Hoe, Xie Bing, Qiu Shijia, Kate Ying, Julian Loke, Yu Chou Chuen, Khalid Bin Abdul Jabbar, Sylvia Ngu, Nivedha Balachandar, Vivienne Le, Stephanie Fong, Charlene Lau, Jean Seah

Back row (left to right):
June Tan, Mimaika Luluina Ginting, Ivana Chan, Amber Lim, Ong Siew Pei, Teresa Elizabeth Koh, Emily Koh, Silvia Sim, Shermaine Ong, Sean Olivia Nicholas, Yeo Pei Shi, Lynette Ha, Nongluck Pussayapibul, Penny Lun, Isabelle Lim

Absent from group:
Aizuriah Binte Mohamed Ali, Daniella Ng, Isabel Ng, Kong Lai Ho, Lee Jia Qi, Liu Xiao, Queenie Tan, Rachel Li, Reuben Ng, Wong Lok Hang
Over the years, GERI ramps up efforts to augment aged care related education and fulfill our mandate to translate knowledge into practice and policy, so as to improve the health of our ageing population.

As a national agency, GERI disseminates and promotes knowledge sharing within GERI as well as with policymakers, practitioners and key stakeholders in healthcare.
Events 2018 / 2019

We organised seminars, workshops, and roundtable discussions to share and discuss our research findings as well as to foster high level exchange of ideas with the relevant stakeholders.

7 April 2018
Translating the Science of Frailty in Singapore

The National Frailty Consensus Discussion at Changi General Hospital (CGH) was graced by Ms Teoh Zsin Woon, Deputy Secretary of Health. GERI along with the Chapter of Geriatricians, College of Physicians, Singapore, the Society for Geriatric Medicine, Singapore (SGMS), and the Institute of Geriatrics and Active Ageing (IGA) hosted more than 100 key stakeholders in the health sector.

9 April 2018
Ageing Without Dementia

GERI’s joint faculty member, Prof Ng Tze Pin shared his flagship research - the Singapore Longitudinal Ageing Study (SLAS) - and demonstrated the SLAS Mild Cognitive Impairment (MCI)-Dementia Risk Prediction Tool. During the 3-hour seminar, Dr Wee Shiou Liang also presented GER’s National Innovation Challenge (NIC) Project on Early Detection and Multi-Domain Intervention for Dementia.

27 April 2018
Practical Ethics and Conversations at EOL for Busy Clinicians

GERI organised a team-based learning workshop with the Clinical Ethics Network + Research Ethics Support (CENTRES) to empower clinicians in making better ethical decisions for end-of-life (EOL) patients. Led by A/Prof James Low, the workshop was highly commendable for the breadth and depth of its real-life cases discussion.
2 July 2018
**Presenting GERI’s E-Resource Centre**

GERI is pleased to launch our very own e-resource centre: uCentral. This Library Management System enables GERI staff and faculty members to enjoy seamless and integrated access to all GERI subscribed e-journals and databases via the mobile app (icon shown above) and website www.unboundmedicine.com/ucentral.

30 July 2018
**Hosting of Thai Dignitaries**

GERI hosted the Deputy General Director from the Ministry of Public Health (MOPH) Thailand and Head of the Special Task Force for Activating Research (STAR) on Long-Term Care (LTC) for Older Persons Chulalongkorn University during their 2-day visit to Singapore.

This visit is part of a 3-year collaboration between Singapore and Thailand, featuring a curriculum development and delivery programme aimed at improving the provision of LTC for the elderly in South East Asia.

31 July 2018
**International Dialogue on the Provision of LTC for the Elderly between Singapore and Thailand**

On the second day of the Thai’s visit, A/Prof Kenneth Mak, Deputy Director of Medical Services from the Ministry of Health (MOH) was invited to present a keynote speech at the Seminar cum Signing Ceremony (titled above).

Apart from witnessing the signing of the Collaborative Teaching Agreement between GERI, MOPH, Chulalongkorn University and Khoo Teck Puat Hospital (KTPH), represented by GeriCare@North, panelists (pictured) discussed in length how Singapore and Thailand are strengthening the delivery of palliative and end-of-life care in the LTC sector.

Moderated by GERI’s adjunct faculty member, Dr Laurence Tan, the panel of international experts also addressed burning questions from the audience, consisting of C-level executives and directors of nursing from Nursing Homes, Hospices and Community Hospitals.
26 September 2018
**Handling Missing Data in Research and Evaluation**

At the 1st GERI’s Knowledge & Practice Series, A/Prof Ding Yew Yoong imparted contemporary approaches to researchers and practitioners on how to deal with missing data in research and evaluation.

He shared that missing data in the scientific world is prominent especially when examining data of older adults. This is due to older adults having a higher rate of drop-out, higher likelihood of death and thus rendering the information capturing process incomplete.

27 October 2018
**Training Geriatricians of the Future**

GERI was honoured to have hosted Prof Finbarr C Martin, President of the European Medicine Geriatric Society, at a half-day seminar at Ng Teng Fong General Hospital. Chaired by Prof Pang Weng Sun, the seminar offered attendees a rare insight into the latest geriatric medicine training programme in the United Kingdom (U.K.). By tapping into Prof Finbarr’s expertise in both the U.K. and Europe, local geriatricians engaged in a discussion to further improve Singapore’s geriatric medicine training and assessment for senior residents.

30 October 2018
**Frailty & Malnutrition among Community-Dwelling Older Adults**

In the October installment of GERI’s Knowledge & Practice Series, A/Prof Wee Shiou Liang and Prof Ng Tze Pin revealed that physical frailty can indeed, be reversed through multi-domain such as nutritional, physical and psychosocial interventions.

With that goal in mind, GERI’s researchers and Dr Stella Ma of NUS unveiled a 3-year translational study at the seminar, which is aimed at delaying and/or reversing frailty in 300 seniors in the community.

On 19 February 2019, GERI co-organised the same topic with IGA at the Center for Healthcare Innovation (CHI). The similarly framed 1-hour lunchtime talk attracted participants from across all the three healthcare clusters.

This announcement was subsequently reported in the Straits Times on 8 November 2018 titled “Frailty tests for elderly at senior activity centres”.

Together with invited industry experts, Dr Tew designed, delivered and assessed the 13-week course by providing learners with not just pragmatic knowledge and skills on mental health issues surrounding older adults, but also addressed current knowledge gaps and research agenda in this area.

Representing GERI as the course’s main instructor, GERI’s faculty member Dr Tew Chee Wee employed a blended teaching approach comprising classroom activities, online lectures and field attachments.

In addition to the didactic teachings, GERI also organised a study visit to St Joseph’s Nursing Home (STJH), in an effort to showcase our local tele-geriatrics system. GERI’s coordinating team and the Master Trainers received a warm reception from Sr Gillian, Director of Nursing of STJH and her team.
11 January 2019
**GERI’s New Year Party**

As our yearly tradition, GERI ushered in the new year with a scrumptious buffet lunch. In addition to a treat to the stomach, the staff also got to walk away with many lucky draw prizes. GERI’s girls posed for a photo after enjoying a rendition by Prof Ng Tze Pin and GERI’s nightingale – Xie Bing.

29 January 2019
**Hosting of Prof Howard Bergman**

In conjunction with CGH’s Health Manpower Development Plan (HMDP) 2019, GERI leveraged on Prof Howard Bergman of McGill University’s expertise in family medicine, integrated care and frailty management. Together with IGA, Chapter of Geriatricians and SGMS, Dr Wong Chek Hooi chaired the one day event with a morning talk cum workshop, followed by a lunchtime talk and concluded with a research roundtable discussion.

Presenters of the Talk cum Workshop - “Improving Care for Older Adults with Complex Needs Transitioning from Hospital to Community” gathered around Prof Howard Bergman to share the overview of care schemes delivered by Singapore’s transitional and community care team.

At the research roundtable discussion which was co-chaired by Dr Wong Chek Hooi and A/Prof Lim Wee Shiong, Prof Howard met up with our panel of distinguished experts consisting of A/Prof Ding Yew Yoong, Prof David Matchar, Dr Christopher Lien, A/Prof Reshma Merchant, A/Prof Joanna Yoong, and Dr Wan Chen K Graham, to evaluate the programmes and health systems effectiveness in the models of care for frail older adults in the community.

Speaking at the lunchtime talk, Prof Howard highlighted the pressing need for intervention research in order to prevent and/or delay the onset of frailty and its adverse outcomes.
4 – 9 March 2019

1st Round of Train-The-Trainers

GERI’s faculty members Dr Tew Chee Wee, Dr Laurence Tan and A/Prof Edward Poon flew to Thailand to conduct this second run of the “Skills Training for LTC Nurses in Thailand”.

20 trainees comprising nursing instructors from Thailand universities, public health technical officers from MOPH as well as registered nurses from nursing homes and LTC hospitals, attended the 6-day workshop.

Similar to the Master Trainers course, this workshop was also highly praised for its effectiveness in increasing the trainees’ knowledge, skills and confidence in providing nursing home care. They underwent the Objectively Structured Clinical Evaluation (OSCE) on the last day of their training so as to determine their level of competencies across four areas namely physical examination, ethics, nursing care discussion, and communication skills.

19 March 2019

Barriers to appropriate prescribing for older adults with multi-morbidity

In this co-organised lunchtime talk with IGA, A/Prof Ding Yew Yoong, GERI’s research associate, Ms Penny Lun and Dr Sabrina Lau of Tan Tock Sheng Hospital (TTSH) shared the first phase of the project - appropriate prescribing for older adults with multi-morbidity.

A/Prof Ding opened the session with the study’s overarching aim to reduce potentially inappropriate prescribing (PIP) among older adults. A scoping review was therefore conducted to identify the barriers to effective prescribing in outpatient setting. Penny further elaborated that findings from this scoping review will contribute to the development of a physician-pharmacist collaborative care intervention.
We invest in research and evidence to make elder care safer and better.

GERI’s work are featured across multi-disciplinary journals such as the International Psychogeriatrics, JAMDA and JAGS.

In addition, GERI has also increased the number of commissioned reports to the Ministry of Health, the Ministry of Social and Family Development as well as across ASEAN to translate and disseminate evidence that impact health policy and practice.
Through these publications, we hope to contribute meaningfully to the existing wealth of geriatric knowledge. This enables our findings to be made widely available to the global healthcare research community.

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DOI: [https://doi.org/10.1093/geront/gny160](https://doi.org/10.1093/geront/gny160)


Commissioned Reports

GERI is honoured to be part of many vital projects that contribute meaningfully to both local and international health systems. Our commissioned reports, consisting of key findings and brief policy recommendations, are widely distributed to organisations worldwide involved in the organisation and provision of care for older adults.


To bridge the gap between research and practice, GERI strategically outlines our work into four programmes to address the different aspects of MOH’s priorities to move beyond:

• Hospital to Community
• Quality to Value, and
• Healthcare to Health.

GERI collaborates extensively with our various stakeholders in the ageing research and care space across institutions so as to enhance current practices, extend healthspan and enable older adults to age-in-place.
Clinical Geriatrics & End-of-Life

With an increased life expectancy, it is inevitable that older adults will experience illnesses and their consequences. Clinical geriatric research strives to inform the effective prevention and management of these age-related conditions.

[NEW]
Prediction of Survival in Advanced Dementia: Developing Prognostic Models

Collaborators: Tan Tock Seng Hospital (TTSH), Khoo Teck Puat Hospital (KTPH), National Healthcare Group (NHG) Health Services & Outcomes Research

Palliative care is a specialised, multi-disciplinary, and holistic approach to caring for seriously ill people and providing support to their families. Currently, access to palliative care in advanced dementia is hindered due to the difficulty in prognostication.

This study aims to study the set of variables which enable clinicians to identify patients with end stage dementia who are suffering from burdensome symptoms, thus improving access for them to receive supportive care. A prognostic assessment tool which is applicable across different healthcare settings will ensure that patients dying with dementia do not have unaddressed symptoms, communication and palliative needs which are particularly prevalent in the last year of life.

[NEW]
Delineating Potentially Modifiable Causes for Early Re-Admission in Seniors following Acute Hospital Discharge: CEASE study

Collaborators: Sengkang General Hospital (SKH), Tan Tock Seng Hospital (TTSH)

Older adults are at increased risk of hospital admission and re-admissions, imposing significant burden on the individual as any hospital admission is hazardous for those who are frail.

The primary objective of this study is to delineate potentially modifiable patient-, social- and healthcare system-related risk factors for unplanned readmission within 30 days of hospital discharge in community-dwelling older adults in a local population. Our secondary objective is to examine whether inclusion of these modifiable risk factors improves performance of existing statistical models that incorporate predominantly administrative data to predict unplanned hospital readmission of older adults in Singapore.

[NEW]
Appropriate prescribing for older adults with multimorbidity: from barriers to solutions

Collaborators: Tan Tock Seng Hospital (TTSH), Changi General Hospital (CGH)

This study addresses the clinical issue of inappropriate prescribing for older adults with polypharmacy. The purpose is to provide guidance for the development of an intervention programme that promotes improved prescription for older adults receiving outpatient care at public hospitals.

The specific aims are: 1) to identify key barriers to appropriate prescription for older adults in the outpatient setting; 2) to identify medication prescribing guidelines that are available for older adults with multimorbidity; 3) to identify interventions components that have been adopted to reduce inappropriate prescribing among older adults with multimorbidity in outpatient care.
[NEW] Promoting Health Longevity through Mitigation and Prevention of Frailty in Community-Dwelling Elderly (ProLIFE)

Collaborators: Sengkang General Hospital (SKH), Singapore General Hospital (SGH), Tan Tock Seng Hospital (TTSH)

This project is funded by the National Innovation Challenge (NIC) on Active and Confident Ageing. GERI is a co-investigator in this study which has two primary aims: (1) to develop an efficient comprehensive assessment tool employing validated instruments comprising a multi-domain rapid geriatric screen and physical performance battery. This tool can be administered by non-clinicians in the community to identify frail older adults and those at high risk for developing frailty; (2) to determine whether a community multi-factorial intervention in pre-frail older adults that incorporates physical exercise and nutrition with strategies to enhance self-management abilities improves physical performance and prevents frailty progression. Beyond this, the secondary aim is to examine whether distinct subtypes of physical frailty follow different trajectories.

[NEW] Identifying Key Psychosocial Predictors of Hospital Readmission Among Older Adults: Application of Textual Analytics in Electronic Health Records

Collaborators: Ng Teng Fong General Hospital (NTFGH), Nanyang Technological University (NTU), Singapore University of Social Sciences (SUSS)

This project is funded by the ARISE-GERI Joint Research Fund. The specific aims of our study are: (1) to assemble a lexicon of electronic health records-available search terms that define key psychosocial factors, namely depressive symptoms, anxiety, poor social support, financial strain, living alone, and caregiver stress; (2) to develop lexicon-based case detection algorithms for identification of each of these psychosocial factors; 3) to ascertain whether psychosocial factors identified by textual analysis add to existing prediction models for 30-day hospital readmission which are based on clinical and administrative data of older adults.
Health Services & Policy Research

[NEW] Falls prevention evaluation and development for older adults in the community (FrEDA)

**Collaborators:** NUS Global Asia Institute (GAI), Yishun Health (YH), Woodlands Health Campus (WHC), Tan Tock Seng Hospital (TTSH), Singapore Institute of Technology (SIT), Duke-NUS Medical School, University of Southern California, Monash University, Ministry of Health (MOH)

GERI is proud to be the host institution and lead Principal Investigator for the FrEDA study, a cross-institutional collaborative project (2019 – 2022) awarded under the National Innovation Challenge (NIC) on Active and Confident Ageing Grant Call on Falls Prevention.

This 3-million dollar study harnesses the capabilities of multi-institutions to understand motivation to participation in fall screening and interventions among community-dwelling older adults with different fall risks.

The FrEDA study also aims to develop and evaluate an acceptable and sustainable fall prevention ecosystem based on a behaviour change model to improve the participation of older adults in falls screening, assessment and fall prevention programmes.

This study is carried out within the Central and North regions of Singapore, and focuses its research on three domains: Economic, health system delivery and social behavioural, for both individual and system level approaches.

[ON-GOING] The ComSA Patient-Centered Care (COPACC) Study: Utilisation, Health and Economic Evaluation of a Community-Based Primary Care Geriatric Hub at Whampoa

**Collaborators:** Tsao Foundation, Ministry of Health (MOH), National Healthcare Group (NHG)

GERI is tasked to evaluate the effectiveness of the ComSA Hua Mei Clinic Whampoa which provides a new centre-based primary care model for complex and frail older adults aged 40 years and above. This model of care uses a patient-centred care approach and management for patients referred by partnering primary care providers, acute hospitals and from community walk-ins.

This service integrates the provision of primary care with bio-psycho-social needs assessment to address the issues of complex care, as well as preventive health for complex older patients.

A formative evaluation was conducted to report patients’ experience with usual care from their previous providers, the early findings on medical quality and healthcare utilisation, and to understand the feasibility and adaptations of the early implementation strategies, contextual factors, and adaptation strategies needed to achieve optimal goals.

A summative evaluation, including an impact evaluation on healthcare utilisation, cost, health status, patient activation, quality of life, client satisfaction and experience of care, will be completed at the end of the study.
### RESEARCH PROJECTS

#### [ON-GOING]
**Analysing the impact of ageing policy on age stereotypes in Singapore**

**Collaborators:** ARISE, Nanyang Technological University (NTU), Ministry of Health (MOH)

While trends in ageing-related stereotypes in large online corpus have been studied in many Western countries, no studies of Singapore English online sources have been done to date. By doing so, we hope to analyse age stereotypes in Singapore, as well as the factors associated with ageing stereotypes.

In addition, by analysing data for both prior and after the introduction of ageing-related policies, we aim to ascertain potential changes in societal attitude due to policy changes. This could be an important tool to understand the impact of policies on societal perceptions.

#### [ON-GOING]
**Ageing in Place Community Care Teams Evaluation (AIP-CCT)**

**Collaborators:** Khoo Teck Puat Hospital (KTPH), Duke-NUS Medical School (Health Services and Systems Research Programme)

This study uses large administrative data to characterise and identify population segments among frequently hospitalised enrolled in a 3-month multidisciplinary home-based intervention, the Ageing-in-Place Community Care Team (AIPCCT) programme and to map resource allocation.

Analyses include mapping and segmenting the population using both expert-driven segmentations (a priori) and a data-driven approach (post-hoc). The needs distribution for each segment will be characterised by the socio-demographic, clinical, psychosocial, disease complexity, hospital and program utilisation characteristics.

Preliminary analyses were done to compare the discriminative properties of the a priori segmentation with the data-driven segments on predicting future healthcare utilisation, program utilisation and mortality. Final analyses will include characterising the utilisation and mortality) by a modelling approach.

#### [COMPLETED]
**Health Springs: A Community Facility to Promote Healthy Ageing at High Rise Housing in Singapore**

**Collaborators:** Khoo Teck Puat Hospital (KTPH), Texas A&M University

This study tests the general applicability of the Health Springs design proposal as a new public amenity for housing estates on different groups of the community, to promote overall physical health, social interaction and intergenerational activity.

Housing residents, as well as design and planning professionals were included in the study. In addition, we seek to understand the views, opinions and attitudes on ageing and the built environment, the perceived benefits of the Health Springs concept. This is to build strategies between the community and urban planners involved in housing planning.

#### [COMPLETED]
**40-year Projections of disability and living arrangements of older adults in Singapore**

**Collaborator:** Ministry of Health (MOH)

Against a rapidly ageing population, projections were done to size up the demand for long term care (LTC) services for long-range policy planning. These projections typically focused on functional factors such as disability.

Recent studies indicate the importance of social factors such as living arrangements—seniors living alone are more likely to be institutionalised, resulting in higher demand for LTC services. This study projects LTC demand based on functional and social factors and provide 40-year projections of disability prevalence and elder living arrangements in Singapore through secondary analyses of Singapore’s nationally representative Retirement and Health Survey and data.

These projections provided a glimpse of the growing demand for LTC services for rapidly ageing Singapore.
**RESEARCH PROJECTS**

[COMPLETED]
Lifespace Mobility and Wayfinding Experience in Age-Friendly Neighbourhoods

**Collaborators:** Singapore University of Technology & Design (SUTD), Urban Redevelopment Authority (URA), Housing & Development Board (HDB), Ministry of Health (MOH), Khoo Teck Puat Hospital (KTPH), Agency for Integrated Care (AIC), CPG Consultants, Lekker Architects Pte Ltd, Tierra Design (S) Pte Ltd, Building Construction Authority, Aim and Associates

Older adults experience shrinking lifespace as they age and become more dependent on their immediate neighbourhoods to maintain independent mobility. The role of the built environment becomes critical to support and promote the older persons’ well-being and community participation.

This study is the first in Singapore to adopt a mixed-methods approach to understand the lifespace mobility, outdoor gait performance, activities and travel behaviour of community-dwelling older adults living in three neighbourhoods.

Global Positioning System (GPS) tracking technology is used to triangulate with travel diaries and walking interviews. In addition, focus group discussions and caregiver interviews of cognitively impaired persons gave insights into their perceptions of lived environments and how it influenced wayfinding behaviour among vulnerable older adults.

This forms part of the Innovative Planning and Design of Age-friendly Neighbourhoods in Singapore research and design project funded by the Ministry of National Development (MND) and the National Research Foundation (NRF) under the Land and Liveability National Innovation Challenge (L2 NIC).

The results from the study are used to inform evidence-based design and urban planning policies by architects, urban planners and policy makers to enable ageing-in-place and in the use of design, to promote physical, mental and social wellbeing.

The first abstract was accepted and presented as an oral presentation and panel discussion at SALUS’ Healthy City Design International conference at the Royal College of Physicians, London in October 2018.

[COMPLETED]
National Fall Awareness and Prevention Programme: Knowledge, Attitudes and Practices of Falls, Fall-Related Risk Factors and Fall Prevention among Community-Dwelling Older and Middle-Aged Adults in Singapore (KAP Study)

**Collaborators:** Centre of Ageing Research and Education (CARE) Duke-NUS Medical School, Tan Tock Seng Hospital (TTSH), Khoo Teck Puat Hospital (KTPH)

Falls are one of the most common causes of accidental injury among older adults, which can lead to loss of function and mortality. The KAP Study was the first national cross-sectional study conducted in 2017 to understand the knowledge, attitudes and practices of falls, fall-related risk factors and falls prevention among older and middle-aged community-dwelling adults living in the Northern and Central regions in Singapore.

There is a need to understand older adults’ perceptions of falls, risk of falls and fall intervention to improve adherence to falls interventions and to adopt behaviours to reduce falls risk.

Understanding the knowledge and attitudes of middle-aged adults are also vital from a life course approach, which helps to understand differences in perceptions in ageing and middle-aged adults as caregivers for an Asian perspective surrounding falls. Findings from this study were presented as a symposium at the 8th Biennial Australian and New Zealand Falls Prevention Conference in 2018.
[COMPLETED] Exploring Meaning, Loss, and Identity among Terminally-Ill Patients through Engagement in Food Related Occupational Therapy in a Community Hospital Palliative Sub acute Care Ward in Singapore

**Collaborators:** Yishun Community Hospital (YCH), Khoo Teck Puat Hospital (KTPH)

Limited research has been done to explore the impact of food-related occupational engagements on terminally ill patients. In this study, a qualitative study was conducted to explore the impact of food-related occupational therapies on patients’ meaning, loss, resilience and identity from the perspectives of inpatients and healthcare professionals in the palliative ward of a local community hospital. These findings could inform the future practice on food-related occupational therapy for palliative patients in Singapore and how it could potentially contribute to improve their end of life experiences. This study is supported by Agency of Integrated Care’s ILTC research grant.

[COMPLETED] Health Outcome & Process Evaluation on Project Tri-generational Homecare (HOPE @ Trigen)

**Collaborator:** Yong Loo Lin School of Medicine, National University of Singapore (NUS)

This study evaluated the impact of a multidisciplinary student volunteer healthcare team comprising Medical, Nursing, Pharmacy, Psychology and Social Work university students (TriGen Homecare on frequently readmitted community-based patients under the Ageing-in-Place (AIP) programme.

This included the improvement of their self-efficacy in chronic disease management and quality of life (QoL), and to examine the impact on hospital admission rates and length of stay (LOS).

[COMPLETED] Care for Older Persons in ASEAN+3: The Role of Families, Local and National Support Systems

**Collaborators:** College of Population Studies, Chulalongkorn University, Thailand; Department of Community Development, Ministry of Culture, Youth And Sports, Brunei Darussalam; Department of Elderly Welfare, Ministry of Social Affairs, Veterans and Youth Rehabilitation, Cambodia; Social Welfare Research and Development Centre, Ministry of Social Affairs, Indonesia; National Committee for Disabled People and The Elderly, Ministry of Labor and Social Welfare, Lao PDR; Department of Human Development and Family Studies, Universiti Putra Malaysia, Malaysia; Department of Social Welfare, Ministry of Social Welfare, Relief and Resettlement, Myanmar; Department of Social Welfare and Development, Philippines; Department of Social Welfare, Incheon National University, Republic of Korea and Department of Social Protection Studies, Institute of Labor Science and Social Affairs, Vietnam

Increasing life expectancies and low birth rates in ASEAN countries have increased concerns regarding the provision, access, and quality of care provided for older adults. The challenges are not only in meeting the current and future projections of long term care needs but also how fast to scale up long term care while maintaining fiscal sustainability for the countries.

Singapore promotes a model where care responsibilities are foremost the responsibility of the individual, followed by the family, the community and finally the government. Thus, the different actors (family, community, Voluntary Welfare Organisations, private sector and government) take varying degrees of responsibilities in funding, regulating, and actually providing care. These distributions of tasks have been changing over time: for example, the government is increasingly taking the role of being a care provider.

The summary report on Care for older adults in ASEAN has been published and was introduced by the Prime Minister of Thailand at Thailand’s Social Expo on August 3, 2018 in Bangkok.

ASEAN has published the full consolidated report in August 2018. This project is led by Chulalongkorn University, and provided the first comprehensive report on long term care for the ASEAN countries, China, Japan and South Korea.

As these countries experience rapid population ageing, we hope that this would provide a platform for increased discussion and cooperation among ASEAN+3 countries on care for older adults. The country report on Singapore was written by GERI and CARE with inputs from the Ministry of Health (MOH) and of Social and Family Development (MSF).
Frailty Identification, Prevention & Management

**[NEW]**
Malnutrition and Frailty: Integrated community-based and clinic-supported screening and lifestyle interventions

**Collaborator:** National University of Singapore (NUS)

As part of the National Medical Research Council (NMRC) Health Service Research Grant (HSRG), this study aims to design, develop and evaluate a community-based programme of nutrition and frailty screening, assessment and treatment that will guide the implementation of simple, effective and generically appropriate programme to reduce frailty in a community health and social setting.

**[NEW]**
Community pilot study on effect of Ba Duan Jin (BDJ) in functional performance among frail seniors

**Collaborators:** Tsao Foundation, A*STAR, Newcastle University, National University of Singapore (NUS)

Ba Duan Jin (BDJ) is a simplified Qigong popular with seniors and can be a viable and sustainable group physical activity for community health promotion. There is evidence that BDJ benefits balance, strength and quality of life in older people. The strengthening of ‘Qi’ may also address the exhaustion aspect in the Fried frailty phenotype.

With the chief TCM physician of Hua Mei clinic, we will investigate the feasibility and effect of a 12-week BDJ training to improve functional performance in pre-frail and frail community dwelling older adults.

**[NEW]**
The effects of functional power training on the functional performance in community dwelling older adults

**Collaborators:** Presbyterian Community Services, Pacific Activity Centres, Fei Yue Family Service Centre, Yong-en Care Centre

This project stemmed from a feasibility pilot study that look at functional power training programme for frail older adults in the community.

Frail older adults can be screened and recruited by community providers such as the senior activity centres and has the potential to improve function and reverse frailty status. Randomised controlled studies of implementation research is being planned with senior activity centres.

To maximise the level and functional independence among older adults, it is important to understand the determinants of frailty in order to innovate solutions, prevent and manage it.

To maximise the level and functional independence among older adults, it is important to understand the determinants of frailty in order to innovate solutions, prevent and manage it.
### RESEARCH PROJECTS

#### [NEW]
**Stakeholders understanding and experience of frailty and frailty screening in the acute care setting in Singapore**

**Collaborators:** Khoo Teck Puat Hospital (KTPH), Ng Teng Fong General Hospital (NTFGH), Changi General Hospital (CGH)

Accompanying the unprecedented growth in the older adult population worldwide is an increase in the prevalence of frailty, an age-related clinical state of increased vulnerability to stressor events. This increased vulnerability results in lower social engagement and quality of life, increased dependency, and higher rates of morbidity, health service utilisation and mortality.

Early identification of frailty is necessary to guide implementation of interventions to prevent associated functional decline. Consensus is lacking on how to clinically recognise and manage frailty. To facilitate the translation of frailty screening and intervention practice, this project explores the perspectives of health care professionals (general surgeons, orthopaedic surgeons, anaesthetists, nurses, and emergency doctors) on frailty and frailty screening, so as to develop a feasible and effective frailty screening programme for older patients in the acute care settings in Singapore.

#### [ON-GOING]
**Understanding ethic differences in attitudes and behaviours toward active ageing**

**Collaborators:** Silver Generation Office (SGO), Ministry of Health (MOH)

This collaborative project with SGO and MOH evaluates the validity of volunteers’ observations of residents’ health status, with the seniors’ hospitalisation and emergency department visits one year prior to their date of interview. This is to identify seniors who should be prioritised for first or subsequent visits and assistance based on their healthcare needs.

#### [ON-GOING]
**End of Life in Dementia – Grief in Dementia Family Caregivers (GRIEF)**

**Collaborators:** Institute of Mental Health (IMH), National University of Singapore (NUS)

With population ageing and the corresponding increase in the number of people with dementia living longer, formal and informal community care must complement each other well. This study aims to find out about the changing emotional needs of informal caregivers of people with dementia over time, so as to determine how to better support the caregivers and persons with dementia in their home environment.

#### [ON-GOING]
**Knowledge-based decision support system to empower caregivers in dementia care**

**Collaborators:** Khoo Teck Puat Hospital (KTPH), Institute of High Performance Computing (IHPC)

It is estimated that 70% of persons with dementia live at home, and most of them are cared for by family members with or without domestic helpers. Without sufficient knowledge and skills, frustration and helplessness may creep in during the course of care. A pressing need of both family members and domestic helpers is dementia-specific information and skills of coping with patients’ problem behaviours.

The proposed project aims to design and develop a novel Information Technology (IT) driven knowledge based decision support system to assist users in the provision of care to persons with dementia. With personalised knowledge and skills from our proposed system, caregivers can feel less stressed but more empowered to care for the patients.

#### [ON-GOING]
**Integrated smart diaper and monitoring system for people with dementia and incontinence**

**Collaborator:** NanoBio Lab (NBL)

Incontinence and use of diapers is common in people with more advanced dementia, many of whom are residents of nursing homes. Ensuring timely change of soiled diapers is a challenge and residents often lie in soiled diapers for prolonged periods, increasing risks of diaper dermatitis, skin ulceration and/or infection.

We worked with A*STAR NanoBio Lab (NBL) to develop and test an intelligent continence management system (iCMS) that would alert caregivers of diaper wetness to facilitate timely diaper change in frail patients with advanced dementia. In addition to wetness sensor, this 2nd phase is funded by A*STAR Med Tech Grant to develop additional faeces sensor.
In the last 1-2 decades, there has been a core of consensus that person-centered care (PCC) involves valuing and using people’s subjective experience of illness regardless of cognitive ability, and acknowledging that the person should be the focus of care delivery and not the disease or illness.

This project aims to characterise the extent of person-centred care in nursing homes and determine its relationship with the quality of life amongst nursing home residents. It further involves a novel, non-linear, transdisciplinary evidence-based approach to the planning and design of nursing homes, based on a person-centric care model validated by high fidelity, real-world data and participation of neighbourhood communities.

This empirically-driven, technologically-advanced and functionality based approach informs an evidence-based design research to create environments that are truly far more ‘elder-friendly’, ‘dementia-friendly’ and ‘future-ready’ than they have ever been – factors contributing to the sustainability of innovative new typologies of nursing homes.

CARITAS is a MOH funded dementia integrated (complex) care intervention model in the North led by the KTPH memory clinic. The lack of understanding of how complex integrated care programmes achieve their outcomes due to the lack of acceptable methods leads to difficulties in the development, implementation, adaptation and scaling up of similar interventions.

Using a theory-driven realist evaluation approach to examine CARITAS, this study aims to generate contextually relevant evidence for improving of efficiency and effectiveness of integrated dementia care as well as informing policy and practice regarding integrated care.

This project evaluates the effectiveness of a 12-week commercially available and community-delivered computerised cognitive training programme on cognition, gait and balance amongst healthy community-dwelling older adults.

Neeuro is working with the People’s Association to implement this through their active ageing clubs. Participants pay for participation and other than effectiveness, we are also assessing its potential to scale up and be sustainable.

Cognitive impairment is not detected in substantial proportions of older people at primary care who have the condition. Early detection allows for earlier diagnosis and appropriate intervention, education, psychosocial support, and engagement in shared decision-making regarding life planning, financial matters and health care.

This project aims at early and systematic detection and intervention of cognitive decline and dementia in the population.

We will implement and evaluate the feasibility of a scalable preventive community-based intervention programme with the aid of a technological platform that can be used safely to improve and maintain the cognitive functioning in seniors.
<table>
<thead>
<tr>
<th>Research Project</th>
<th>Collaborator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[ON-GOING]</strong> Effect of Hearing Aids on Cognition in Older Adults with Hearing Loss: a Randomised Controlled Trial</td>
<td></td>
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<tr>
<td>Collaborator: Ng Teng Fong General Hospital (NTFGH)</td>
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<tr>
<td>This study aims to investigate the effect of hearing treatment on cognitive function in older people with mild cognitive impairment and hearing loss.</td>
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<tr>
<td><strong>[ON-GOING]</strong> Normative Values of Physical and Cognitive Measures of Healthy (Older) Adults in Singapore</td>
<td></td>
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<tr>
<td>Collaborator: Khoo Teck Puat Hospital (KTPH)</td>
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<tr>
<td>This study aims to develop a set of physiological functions and a neuropsychological function database for our population between 20 and above 85 years old community dwelling adults to better understand the physiological profiles across age groups. These assessments include gait, hand grip test, Timed Up and Go test (TUG), and Physiological Profile Assessment (PPA), body composition scan, Repeated Battery for the Assessment of Neuropsychological Status (RBANS).</td>
<td></td>
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<tr>
<td><strong>[ON-GOING]</strong> Singapore Longitudinal Ageing Studies (SLAS)</td>
<td></td>
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<tr>
<td>Collaborator: National University of Singapore (NUS)</td>
<td></td>
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<tr>
<td>A longitudinal study conducted in collaboration with A/Prof Ng Tze Pin, investigating the biological, clinical, psycho-social and behavioural predictors of health status in prospectively followed up cohorts of older persons.</td>
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<tr>
<td><strong>[COMPLETED]</strong> Evaluating the effectiveness of choral singing for persons with dementia</td>
<td></td>
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<tr>
<td>Collaborator: Khoo Teck Puat Hospital (KTPH)</td>
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<tr>
<td>Based on the previous year’s pilot study, this project aims to evaluate the feasibility and effectiveness of choral singing (a form of active music therapy) for older adults with dementia.</td>
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<tr>
<td>Establishing age-related normative standards can increase the usefulness of the tests and improve the interpretability of test scores in various ways. Healthcare professionals in future could utilise this information to better predict, manage and prescribe treatment related to health promotion and ageing issues in the clinical population.</td>
<td></td>
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</table>
Geriatric Education

The ageing population brings with it many challenges, one of which is in the training and up-skilling of geriatric healthcare professionals. Geriatric Education endeavours to develop improved training methods for healthcare professionals, so as to promote quality care for the older adults.

[NEW]
A Mixed Methods Evaluation of the Effectiveness of a Community Nurse Training Programme in Singapore

Collaborators: Community Care Team (CCT) from Khoo Teck Puat Hospital (KTPH), CCT Nurses in Singapore

The study aims to evaluate the effectiveness of the Ageing-in-Place Community Care Team (AIP-CCT) training course. It is also to assess the barriers and facilitators in the learning and in translating the knowledge and skills acquired from the training to practice in a community care setting. Furthermore, the study explores the experiences of newly trained AIP-CCT nurses, 3 months on in practice, and to establish if the course prepares them for the reality of practice in the community.

[NEW]
Adaptation and pilot testing of the ENABLE (Educate, Nurture, Advise, Before Life Ends) intervention for advanced cancer patients

Collaborators: National Cancer Centre Singapore (NCCS), Tan Tock Seng Hospital (TTSH), Khoo Teck Puat Hospital (KTPH)

GERI with its collaborators aim to develop and evaluate a palliative care intervention known as ENABLE-SG for the local Singapore context. The intervention, consisting of multicomponent psycho-educational sessions, have been shown to improve patient and family caregiver outcomes in America. The Research Collaborative Agreement was recently signed and $30,000 has been allocated to GERI by NCCS to conduct the research under the 8th Singapore Millennium Foundation Research Grant (3-year project).

[NEW]
Differences in the perceptions of end-of-life care preferences between non-dyad patients and proxies in Advanced Care Planning (ACP) in an Asian context

Collaborator: Khoo Teck Puat Hospital (KTPH)

This study is to determine the differences in the perceptions of patients and proxies in decision making for end-of-life care as seen in ACP discussions.
[NEW] Stakeholders understanding and experience of frailty and frailty screening in the acute care setting in Singapore

Collaborators: Khoo Teck Puat Hospital (KTPH), Ng Teng Fong General Hospital (NTFGH), Changi General Hospital (CGH)

Accompanying the unprecedented growth in the older adult population worldwide is an increase in the prevalence of frailty, an age-related clinical state of increased vulnerability to stressor events. This increased vulnerability results in lower social engagement and quality of life, increased dependency, and higher rates of morbidity, health service utilisation and mortality.

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[NEW] Spirituality in Older Adults with Chronic Illnesses: Finding Meaning and Strength in Later Years

Collaborator: The Institute of Policy Studies, National University of Singapore

The biophysical-spiritual model was proposed as a more comprehensive and whole-person model of care and research. GERI collaborates with the Institute of Policy Studies (IPS), NUS and community hospitals to identify the spiritual needs of our local elderly.

This research project seeks to understand the elderly’s perception and understanding of existential issues and spirituality when facing ill health and how the latter builds resilience in the face of adversity. The results of this project can potentially inform the development of formal spiritual care services in Singapore, and also the development of curriculum for spiritual care training of healthcare professionals.

[NEW] Unpacking Empathy – What’s in the Minds of Singapore Healthcare Professionals and Patients

Collaborators: Lee Kong Chian School of Medicine, Nanyang Polytechnic, Ngee Ann Polytechnic, Alice Lee Centre of Nursing Studies, Khoo Teck Puat Hospital (KTPH), Yishun Community Hospital (YCH)

Empathy is an important trait that is necessary in the caring professions as empathetic behaviours by healthcare workers improve patient outcomes. Evidence showed that empathy can be developed through education interventions. However, there has yet to be an effective empathy measurement to determine the effectiveness of training effort. Therefore, GERI and its partners aim to develop the new empathy scale to measure the multicultural domains of empathy.

This study seeks to explore and understand the perception of empathy among medical students, doctors and nurses and to construct a framework for measuring empathy in the healthcare setting. The scale is especially beneficial in improving screening, training, and service delivery for healthcare workers working in geriatrics and eldercare, given the specialisation’s high-touch nature.

[ON-GOING] Evaluation of the Living Matters Advanced Care Planning Training Course for Health Professionals Through a Multi-Centre Study

Collaborators: Khoo Teck Puat Hospital (KTPH), Tan Tock Seng Hospital (TTSH), Singapore General Hospital (SGH), Agency for Integrated Care (AIC)

The aim of this study is to explore the effectiveness of a national training workshop for Advance Care Planning (ACP) facilitators. The goals of this study are to determine the pre- and post-course knowledge, skills, attitudes, confidence and satisfaction of participants attending a workshop for ACP facilitators, to assess the participants’ and trainers’ acceptability and experiences of the ACP training workshop, to determine the barriers and enablers to the acquisition of knowledge and skills, translation of training into practice, and to make recommendations on how the course could better prepare ACP facilitators for the reality of practice.
EPAs describe the range of work activities that a senior resident must master in order to be trusted to work in a clinical care setting independently. EPAs also provide the framework for faculty to perform meaningful assessment of geriatric fellows.

GERI and its collaborator, support the Ministry of Health in developing EPAS for the geriatric medicine senior residency programme. The revised set of Geriatric Medicine EPAs will be reviewed and approved by the Residency Advisory Committee (RAC).

According to the National Archives of Singapore, there is no available government records or oral history interview on the development of medicine and health services in Singapore. Therefore, as the national institute for geriatric education and research, GERI is tasked to document the development of GRM and eldercare services in Singapore. This special project aims to create an archive of oral history interviews on the development and progress in geriatric medicine and eldercare services. These collection of official documents and interviews provide an opportunity to learn how the past has shaped the present, as well as how these lessons can be used in research and education to inform future development.
Collaboration has always been the cornerstone of GERI’s achievements. We would like to acknowledge and celebrate our third year milestone with our partners, colleagues and friends.

Together, we look forward to improving elder care by enabling our older adults to live healthier lives.
Financial Page
2018/2019
Balance sheet
As at 31 March 2019

<table>
<thead>
<tr>
<th>Assets</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant and equipment</td>
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<tr>
<td>Intangible assets</td>
<td>107</td>
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<tr>
<td><strong>Non-current assets</strong></td>
<td><strong>407</strong></td>
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<tr>
<td>Trade and other receivables</td>
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<tr>
<td>Cash and cash equivalents</td>
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<tr>
<td><strong>Current assets</strong></td>
<td><strong>1,402</strong></td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td><strong>1,809</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accumulated surplus</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total equity</strong></td>
<td><strong>200</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities</th>
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</thead>
<tbody>
<tr>
<td>Deferred income</td>
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</tr>
<tr>
<td><strong>Non-current liability</strong></td>
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<tr>
<td>Deferred income</td>
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<tr>
<td>Other payables</td>
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<tr>
<td><strong>Current liabilities</strong></td>
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<tr>
<td><strong>Total liabilities</strong></td>
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<tr>
<td><strong>Total equity and liabilities</strong></td>
<td><strong>1,809</strong></td>
</tr>
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</table>
### Statement of comprehensive income and expenditure

**Year ended 31 March 2019**

<table>
<thead>
<tr>
<th>Description</th>
<th>2019</th>
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</thead>
<tbody>
<tr>
<td>Grant income</td>
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<tr>
<td>Other operating income</td>
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<tr>
<td><strong>Total Operating Income</strong></td>
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</tr>
<tr>
<td>Staff costs</td>
<td>(2,822)</td>
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<tr>
<td>Supplies and consumables</td>
<td>(5)</td>
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<tr>
<td>Depreciation of property, plant and equipment</td>
<td>(137)</td>
</tr>
<tr>
<td>Amortisation of intangible assets</td>
<td>(61)</td>
</tr>
<tr>
<td>Purchased and contracted services</td>
<td>(1,173)</td>
</tr>
<tr>
<td>Research expenses</td>
<td>(1,207)</td>
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<tr>
<td>Operating lease expenses</td>
<td>(666)</td>
</tr>
<tr>
<td>Repairs and maintenance expenses</td>
<td>(895)</td>
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<tr>
<td>Minor asset expenses</td>
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<tr>
<td>Other operating expenses</td>
<td>(259)</td>
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<tr>
<td><strong>Surplus before tax</strong></td>
<td><strong>61</strong></td>
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<tr>
<td>Income tax expense</td>
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<tr>
<td><strong>Surplus for the year</strong></td>
<td><strong>61</strong></td>
</tr>
<tr>
<td><strong>Total comprehensive income for the year</strong></td>
<td><strong>61</strong></td>
</tr>
</tbody>
</table>