Activity report 2023–2025

ARC
AGING RESEARCH CENTER

Karolinska Institutet

Stockholm University

Our mission

...is to improve the health and wellbeing of older individuals by contributing to the understanding of the ageing process from a biomedical, psychological, and sociological perspective in relation to life-long social and physical contexts.

ARC's research is internationally recognised and grounded in a strong multidisciplinary approach. We provide education across a range of disciplines and educational levels. By collaborating with partners outside academia, we ensure that our research is relevant, usable and sustainable, and reaches its intended audiences. Through a variety of channels, we share our research findings both within and beyond the scientific community.

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Activity Report 2023–2025

The Aging Research Center (ARC) was established in 2000 by Karolinska Institutet (KI) and Stockholm University (SU).

ARC is internationally renowned for its research on the health of older people, examining health trends and inequalities, brain ageing and prevention of dementia and disability.

Our research questions:

- Why do we age?
- Why do we age so differently?
- How can we decrease disease and disability?
- How can we provide better treatment and care?

Our research areas:

- Brain ageing
- Dementia and mental health
- Geroscience
- From morbidity to frailty: health complexity in ageing
- Health and social care organisation, use and equity
- Health inequalities
- Social relations and loneliness

Our research activities are characterised by:

- A focus on health in ageing with the goal of preventing, delaying, or decreasing morbidity and disability in old age
- An acknowledgement of the importance of life course processes on health and functioning in old age
- A focus on both individual and social group differences in late life health and disability
- A multidisciplinary approach that includes medical epidemiology, psychology, and social gerontology
- An integration of epidemiological and social science studies with clinical and molecular research
- Contributions to improve treatment, social care and healthcare of older people
- A neuroscientific approach with a focus on neural correlates of cognitive functions and healthy brain ageing
- Data collection, management and provision of other large databases on ageing via national infrastructure and international collaborations
- The creation of large databases from population-based studies on ageing and health

Photo: Josefine Anjou

Contents

A word from the Director and Division Head

The past three years at the Aging Research Center have been filled with exciting research, new projects, and many achievements. While we cannot mention every accomplishment, we are pleased to share some of the most important highlights from 2023 to 2025.

During this period, ten doctoral students successfully defended their theses, demonstrating the wide range of our research. In 2025 we reached a major milestone: 100 completed doctoral dissertations since the centre was established.

ARC has organised and hosted several seminars, workshops, and lectures. Notably, we held three symposiums to honour Professors Lars Bäckman, Johan Fritzell and Laura Fratiglioni, for their pioneering work in brain ageing, social policy, and geriatric epidemiology. We are proud of their significant contributions to ageing research.

In 2024, under the theme "Ageing in a Transforming World," we played a central role as KI welcomed 800 delegates from around the world to the 27th Nordic Congress of Gerontology. The main findings from the congress have been summarised in a published article, highlighting key areas for the future of ageing research and policy.

We also celebrated ARC's 25th anniversary at the end of 2025, marking a quarter-century of dedication and progress. We thank all our guests, as well as current and former colleagues, for joining us in this celebration.

Over these three years, our team has naturally evolved. Some colleagues have moved on to new roles, while others have joined us from different universities. These changes highlight our strong reputation and our ability to attract talented researchers. It also strengthens our broad national and international collaborations with researchers from different disciplines and research institutions.

We would also like to recognise the vital role of our administrative and technical staff. Their dedication and behind-the-scenes work keep our daily operations running smoothly and support the success of our research. In 2023, we introduced ARC's updated website on the KI platform, making it easy and accessible for anyone interested in ageing research to explore our work.

Looking ahead, we are excited to be part of the new TraCeDem centre, working together with colleagues at the Department of Neurobiology, Care Sciences and Society (NVS) and KI on the topics personalised dementia prevention and care.

As environmental changes, globalisation, and shifting demographics continue to affect society, our research will follow these trends to help build a more inclusive and sustainable society for all ages. ARC is well positioned to continue producing high-quality multidisciplinary research on a wide range of topics related to ageing. This work depends not only on strong research and good data, but also on a friendly, supportive, and collaborative work environment. Every member of ARC plays an important role in creating and maintaining this positive atmosphere.

Photo: Maria Yohuang

Carin Lennartsson, Director, and Erika Jonsson Laukka, Head of Division.

About ARC

ARC – a centre supported by SU and KI since 2000

The ongoing collaboration between SU and KI has allowed ARC researchers to pursue high-quality interdisciplinary studies in areas such as ageing, health, geriatric epidemiology, and the psychology of ageing.

While ARC is administratively and physically based at KI, SU's continued support underpins our activities, offering stability and access to essential resources like the Stockholm University Brain Imaging Centre.

ARC also takes an active role in teaching, coordinating undergraduate and postgraduate courses at both universities. In addition to research and education, we make it a priority to share our findings with audiences both inside and outside academia.

Organisation

ARC's organisational structure includes the Operational Leadership Team, the Strategic Leadership Team, two Junior Representatives, and the External Advisory Board.

Operational Leadership Team

The Operational Leadership Team at ARC oversees day-to-day management and communication. The team comprises the Head of Division Erika Jonsson Laukka; the Director and Deputy Head of Division Carin Lennartsson; Assistant Head Chengxuan Qiu; Economy Coordinator Cecilia Annerholm; Safety Representative Maria Wahlberg, HR Administrator Ellinor Lind, Division Administrator Maria Yohuang and Communications officer Lotte Brandt. Their primary responsibilities include making routine decisions and facilitating the smooth flow of information within the centre.

Strategic Leadership Team

The Strategic Leadership Team consists of the research group leaders at ARC. The team convenes every month and shares responsibility for major strategic discussions and decisions. Between 2023 and 2025, the division encompassed ten research groups organised under three main scientific themes: Medical Epidemiology, Psychology, and Social Gerontology.

- Neda Agahi, Principal Researcher
- Amaia Calderón-Larrañaga, Principal Researcher
- Serhiy Dekhtyar, Principal Researcher
- Grégoria Kalpouzos, Senior Lecturer
- Erika Jonsson Laukka, Chair, Senior Lecturer
- Carin Lennartsson, Senior Lecturer
- Chengxuan Qiu, Senior Lecturer
- Debora Rizzuto, Principal Researcher
- Davide Liborio Vetrano, Principal Researcher
- Weili Xu, Professor

Junior representatives

- Mariam Kirvalidze, elected ARC's PhD representative since 2024
- Javier Oltra, elected ARC's Postdoc representative since 2024
- Abigail Dove, elected new Postdoc Representative at the Department of Neurobiology, Care Sciences and Society in 2025
- Frida Smids, elected new PhD student representative for 2026 by the Doctoral Student Association (DSA)

External Advisory Board

In accordance with the agreement between KI and SU, ARC has an External Advisory Board comprised of members appointed by both institutions. This Board convenes around three times per year to review and provide guidance on ARC's scientific, financial, and organisational progress, as well as its engagement with the wider community.

Current members are:

- Hugo Westerlund, Professor of Epidemiology at the Stress Research Institute, Department of Psychology and Director of the national REWHARD infrastructure consortium at SU (new Chair)
- Maria Ankarcrona, Head of NVS and Professor of Experimental Neurogeriatrics, KI (KI-representative)
- Martin Annetorp, Community Health Manager, Stockholm County's healthcare area
- Bo Burström, Professor/senior physician, Department of Public Global Health (GPH), Karolinska Institutet
- Maria Eriksdotter, Professor of Geriatrics at NVS (new member)
- Susanne Rolfner Suvanto, Manager/co-owner, Omvårdnadsinstitutet (the Nursing Institute)
- Maria Stanfors, Deputy Dean, Lund University School of Economics and Management (LUSEM), Professor, Department of Economic History and Centre for Economic Demography, Lund University
- Petra Ulmanen, Lecturer at the Department of Social Work, SU (new member)
- Ulrika Winblad, Professor of Health Services Research at the Department of Public Health and Caring Sciences, Uppsala University (new member)

Adjunct member:

- Carin Lennartsson, Director/Deputy Head of ARC, Senior lecturer

Photo: Federica Poiana

ARC staff, affiliates and visiting researchers

ARC employs 20 senior researchers, (e.g. professors, senior lecturers and assistant professors), 40 junior researchers (e.g. postdocs and doctoral students), and 12 administrative and technical staff (e.g. research coordinators, statisticians, database managers).

ARC encompasses ten research groups, spanning psychology, social gerontology, and medical epidemiology.

As of 1 January 2025, we welcomed a new research team headed by Senior Research Specialist Walter Osika.

Additionally, many researchers are affiliated with ARC, further contributing to its collaborative and multidisciplinary research environment.

Visiting researchers and students

Over the past three years, ARC has had the privilege of hosting more than 40 visiting researchers and students from across the globe.

Photo: Maria Yohuang

Research

Photo: Naria Ieck

Major findings in the last three years

Brain ageing

Cognitive and olfactory decline

One of our aims is to understand brain ageing and its associations to cognitive (including olfactory) decline. Using data from the IronAge study, we showed that higher iron levels in blood and a worsening in cardiovascular health, especially in older adults, were related to more brain iron accumulation, which is deleterious to cognition (Gustavsson et al., 2024). We also demonstrated tight relationships between higher brain iron load, impaired dopaminergic system and lower memory performance in older age (Gustavsson et al., 2023). Finally, we developed a deep learning tool using artificial intelligence to automatically identify, segment and extract iron load from small nuclei located in the midbrain. From this study, we further showed for the first time an increase of iron in the substantia nigra and subthalamic nucleus over a period of three years across adulthood (Falahati et al, 2024).

One study based on data from the Swedish National Study on Aging and Care in Kungsholmen (SNAC-K), identified three distinct cognitive ageing profiles, maintained high cognition, moderate decline, and accelerated decline, highlighting substantial inter-individual heterogeneity in cognitive ageing and specific predictors for this heterogeneity (Ekström et al., 2024). We also found that poorer olfactory performance was associated with increased all-cause and cause-specific mortality over 6 and 12 years, with the strongest associations observed for neurodegenerative causes of death (Ruane et al., 2025), and that olfactory dysfunction increases progression to dementia among individuals with cognitive impairment, especially within the next six years (Oltra et al., 2025b). Studies examining the underlying mechanisms of olfactory impairment in ageing showed significant associations between higher cerebrovascular burden and lower brain volume, as well as increasing brain pathology over time, and rate of olfactory decline over 15 years (Oltra et al., 2025a). We also found that higher baseline levels of blood-based Alzheimer's disease (AD) biomarkers, including p-tau217, p-tau181, neurofilament light chain (NfL), and glial fibrillary acidic protein (GFAP), were associated with steeper olfactory decline, providing further evidence that olfactory loss can be linked to dementia-related brain changes (Ekström et al., 2025). Relatedly, in MIND-China, blood biomarkers of AD and cerebral neurodegenerative and microvascular lesions are common neuropathologies linking olfactory impairment with Mild Cognitive Impairment in older adults (Dong et al., 2023).

We also contributed to the improvement of identification and prediction of cognitive decline and AD, employing many kinds of biological and brain markers. Using data from the Alzheimer's Disease Neuroimaging Initiative, we developed and validated a multidimensional network approach that integrates genetic information, cerebrospinal fluid biomarkers, brain scans, and cognitive tests to capture heterogeneity in AD progression (Sarraf et al., 2025).

Dopamine and cognitive ageing

Another important research line examines whether age-related decline in the dopamine system underlies cognitive decline. Using longitudinal data from the COgnition, BRain, and Aging study, we showed that faster dopamine D2 receptor (DRD2) decline across several age-sensitive brain regions was associated with greater working memory decline, higher dementia and cardiovascular risk, and accelerated biological aging (Karalija et al., 2024). Further, decline in DRD2 availability in working memory-relevant regions predicted working memory decline only in individuals who showed performance reductions over time (Papenberg et al., 2025).

Using DyNAMIC data, we found compelling evidence outlining distinct phases in the age-related reductions of D1 dopamine receptors (D1DRs) across adulthood, likely reflecting both developmental and degenerative processes. This discovery implies a model in which excessive DA modulation in early adulthood and insufficient modulation in ageing have detrimental impacts on brain function and cognition (Johansson et al., 2023). We also demonstrated the consequences of declining D1DR on brain function, including the dedifferentiation of striato-cortical functional connectivity (Korkki et al. 2025), and reduced segregation of cortico-cortical connectivity (Pedersen et al., 2023), both of which contribute to impaired cognitive abilities in older age.

Health and lifestyle factors

Several health and lifestyle factors influence brain ageing. We have shown that favourable cardiovascular health profiles in older adults could slow vascular brain ageing and mitigate accelerated vascular brain ageing due to genetic predisposition to metabolic risk factors (Li, et al., 2023). We also found an association between accelerometer-assessed physical activity and better processing speed in young-old individuals, however not among those aged ≥ 80 years (Ars et al., 2025).

Another project investigated the link between self-reported sleep and microglial density, a marker of neuroinflammation, in healthy middle-aged and older adults. We found that both insufficient and prolonged sleep were associated with increased microglial density in brain regions relevant for cognition (Balter et al., 2025).

Dementia and mental health

We have shown that single disorders (e.g., ischemic heart disease; impaired lung function), but also multiple co-occurring diseases, particularly those involving cardiovascular and neuropsychiatric conditions, were associated with an earlier onset of cognitive impairment, dementia, reduced likelihood of reversion to normal cognition, and shorter dementia-free survival (Imahori et al., 2023; Grande et al., 2024; Valletta et al., 2023). Multimorbidity was also implicated in the risk of late-life depression, although we also noted important variation in depression diagnoses by gender in Sweden (Triolo et al., 2023; Triolo et al., 2024; Bacigalupe et al, 2024).

To validate our results, we have replicated many of the multimorbidity-dementia findings from SNAC-K in diverse contexts, including: 1) a large intervention study from China, 2) genetically informative twin cohorts, and 3) large-scale biomedical databases. Co-occurring cardiometabolic diseases exhibited robust associations with dementia across a multitude of settings (Ren et al., 2024, Dove et al., 2023 Dove et al, 2024a).

To elucidate the mechanisms underlying these effects, we explored the role of cardiometabolic and multi-system multimorbidity in brain ageing. We found that multi-system multimorbidity was implicated in hippocampal atrophy, ventricular enlargement, and increased white matter hyperintensity burden, consistent with combined neurodegenerative and vascular processes (Valletta et al., 2024). Complementary research from the UK Biobank, leveraging brain age estimates derived from machine learning analysis indicated that type 2 diabetes and prediabetes were associated with accelerated brain ageing, whereas favourable cardiometabolic profiles were associated with younger-appearing brains (Dove et al., 2024; Huang et al., 2024). A similar pattern of results was noted in MIND-China, whereby both the burden and the clustering of cardiometabolic multimorbidity were associated with dementia, likely underpinned by inflammatory and neurodegenerative pathways (Liu et al., 2024).

Having several chronic diseases can influence blood markers that are linked to Alzheimer's disease and neurodegeneration. In SNAC-K, higher multimorbidity burden or certain combinations of diseases were found to increase the levels of Alzheimer's related proteins in the blood, including p tau181, p tau217, NfL and GFAP. These links were even stronger in people with on-going inflammation in the body (Valletta et al., 2024; Marengoni et al., 2025). Kidney dysfunction was similarly linked to increased biomarker concentrations without independently increasing dementia risk. This suggests that chronic diseases may affect how these markers appear in the blood and may bring forward the visible symptoms of neurodegeneration, rather than directly causing dementia (Gasparini et al., 2026). Longitudinal analyses showed that having higher levels of p tau217, p tau181, NfL, and GFAP increased the chance of developing dementia. These markers also predicted faster progression from mild cognitive impairment (MCI) to dementia and made recovery from MCI less likely (Grande et al., 2025; Valletta et al., 2025). Beyond blood tests, research from the MIND- China study identified five simple and widely available factors that could help predict dementia risk in a rural population. These factors could be useful for identifying people who might benefit from early prevention efforts (Liu et al., 2025).

With an eye towards prevention, we have explored the role of protective factors in dementia, brain ageing, and mental health outcomes. Our research indicated that healthy dietary patterns and engagement in cognitively and socially stimulating activities attenuated the associations of CMDs with dementia risk and MRI markers of neurodegenerative and vascular brain damage (Dove et al., 2024c; Dove et al., 2024d). Using 15-year follow-up data to map transitions throughout the cognitive continuum, we demonstrated that greater cognitive reserve may contribute to cognitive health by delaying cognitive deterioration in the prodromal phase of dementia (Li et al., 2024). Greater cognitive reserve was also protective against depressive burden among older adults (Triolo et al., 2025), underscoring the value of mental, social, and physical engagement in preserving late-life cognition and mental health.

Environmental factors

We have investigated the association between long-term exposure to air pollution and dementia risk, focusing on the potential modifying role of homocysteine and methionine (Grande et al., 2023). In a large population-based cohort, higher exposure to fine particulate matter (PM2.5) was associated with an increased risk of incident dementia, even at relatively low pollution levels.

Elevated homocysteine levels amplified the detrimental effect of air pollution on dementia risk, but this effect was largely attenuated after excluding individuals who developed cardiovascular diseases, suggesting that homocysteine primarily operates through cardiovascular-related pathways. In contrast, higher methionine levels were associated with a reduced dementia risk linked to air pollution exposure, and this protective association appeared largely independent of cardiovascular disease, although the underlying mechanisms remain unclear.

Overall, our results support a multifactorial model indicating that air pollution contributes to dementia through both direct effects and indirect pathways involving cardiovascular health. Homocysteine appears to serve as a marker of cardiovascular vulnerability rather than representing an independent mechanism.

Geroscience

A new research area in ageing biology focuses on finding blood markers that reflect how our bodies decline and become vulnerable to diseases. This idea is based on the geroscience hypothesis, which says that basic ageing processes like chronic inflammation, metabolism problems, and cell aging drive many chronic diseases. Targeting these processes could delay several age-related diseases at once, rather than treating each separately.

One key question is how ageing-related blood biomarkers change over time. Studies tracking people over years show that ageing causes specific and sometimes non-linear changes in biomarker concentrations in blood, with inflammation and metabolism proteins showing the clearest patterns (Picca et al. 2025). This helps define measurable signs of biological ageing.

Using this approach, we studied multimorbidity (i.e., having multiple diseases) as a sign of shared ageing biology. A review found consistent links between multimorbidity and markers of inflammation, metabolism, organ dysfunction, and brain degeneration (Zazzara et al., 2025), but also noted the need for more rigorous longitudinal studies. Research in a large Swedish group identified key metabolic biomarkers linked to total disease burden, specific disease patterns, and faster disease development over 15 years, confirmed in a U.S. group (Ornago et al. 2026).

The same approach was used to study older adults' responses to COVID-19. Different biological types were found, marked by inflammation, organ issues, or mild changes, each linked to different health outcomes (Zucchelli et al., 2024). This suggests that biological ageing might affect how well someone recovers from acute health problems.

Finally, the study looked at brain degeneration and muscle health together. Higher blood levels of Alzheimer's markers were linked to faster muscle strength loss (Ornago et al., 2025) and a higher risk and quicker worsening of muscle loss (sarcopenia), especially for certain proteins, with differences by sex and age (Ceolin et al., 2025). This supports the idea that brain disease and overall ageing together drive physical decline.

From multimorbidity to frailty: health complexity in ageing

Multimorbidity: patterns, trajectories, and outcomes

Multimorbidity, defined as the coexistence of multiple chronic conditions, is a central focus of our ageing research, reflecting its growing relevance for individuals, health systems, and societies. Our work has approached multimorbidity not as a static disease count, but as a dynamic and heterogeneous process shaping care needs and long-term outcomes.

A first core line of research has focused on how multimorbidity is studied and conceptualised. We have examined how multimorbidity patterns are identified across different data sources, highlighting methodological heterogeneity and the need for more longitudinal, person-centred approaches (Beridze et al., 2024). In parallel, we have contributed to international collaborations synthesising evidence on multimorbidity trajectories, shifting attention from cross-sectional assessments to changes in disease burden and care complexity over time (Calderón-Larrañaga et al., 2025).

A second line of research has addressed factors that accelerate disease accumulation. Our studies have shown that unhealthy dietary patterns are associated with faster multimorbidity progression (Abbad-Gomez et al., 2025), while late-life depression, particularly when symptoms are more severe or complex, has been linked to unfavourable multimorbidity trajectories (Triolo et al., 2023). Together, these findings highlight multimorbidity as a partially modifiable process with implications for prevention.

A third line of work has examined the consequences of multimorbidity patterns for health outcomes. Our research has demonstrated associations between specific disease constellations and kidney function decline (Beridze et al., 2025), injurious falls and inappropriate prescribing among older adults with atrial fibrillation (Trevisan et al., 2025; Amrouch et al., 2024), as well as depression risk and long-term transitions to dementia and death (Triolo et al., 2024; Valletta et al., 2023).

Frailty, physical function, resilience, and complex health phenotypes

Frailty, physical function, and resilience have constituted another major line of our research, addressing vulnerability and heterogeneity in ageing trajectories. This work has treated these constructs as dynamic, multidimensional health phenotypes closely linked to functional decline, cardiovascular risk, and care needs.

A key focus has been the measurement and identification of frailty and complex health phenotypes. We have validated the Health Assessment Tool across Swedish ageing cohorts, demonstrating its utility for capturing overall health and vulnerability (Abbadi et al., 2024). In parallel, we have developed the Primary Care Frailty Index as a feasible tool for frailty detection in routine primary care (Vetrano et al., 2023).

Yet another line of work has examined longitudinal trends and trajectories. Our studies have shown that gains in life expectancy have not been matched by equivalent gains in robustness, pointing to longer lives lived with frailty (Tazzeo et al., 2024). Other work has characterised trajectories of physical function alongside behavioural, psychological, and social well-being (Saadeh et al., 2023) and demonstrated that device-measured physical activity patterns are associated with long-term cardiovascular risk, with important age-related differences (Lager et al., 2025).

Our research has assessed the clinical significance of frailty and functional impairment, identifying increased risks of hospitalisation and rapid functional deterioration in older adults with atrial fibrillation (Trevisan et al., 2025; Okoye et al., 2024). Additionally, our findings indicate a higher likelihood of injurious falls among individuals experiencing balance impairment and concerns about falling (Welmer et al., 2023).

Finally, we have advanced physical resilience as a modifier of health risk. Higher resilience has been shown to offset mortality risk even among individuals with genetic susceptibility to shorter survival (Stark et al., 2025). In addition, nutritional factors have emerged as key components of resilience, with protein intake associated with mortality risk among older adults with chronic kidney disease (Carballo-Casla et al., 2024).

Photo: Erik Somnäs

Health and social care organisation, use and equity

COVID-19 and older people's care

The COVID-19 pandemic had major consequences for older people's health and care. In Nordic comparisons, Sweden showed an earlier mortality peak and notable differences in excess mortality patterns compared with neighbouring countries over 2020–2023 (Burström et al., 2025). Within Region Stockholm, mortality risk was consistently highest among care home residents and home-help users and was linked to socioeconomic disadvantage and population density (Doheny et al., 2024). Care managers highlighted that everyday care conditions were shaped by high infection-control challenges related to staff shortages, high sick leave, limited preparedness, rapidly changing guidelines, and difficulties obtaining protective equipment and training. They stressed the importance of clear routines, stable communication, and supportive leadership to maintain infection prevention and safe care (Agerholm et al., 2023a; Liljas et al., 2024a).

Care coordination, transitional care, and integrated approaches

A consistent finding is that older people with complex needs rely on effective coordination between healthcare and social care. We have identified barriers and facilitators to coordination at hospital discharge, such as gaps in information transfer, unclear responsibilities, and organisational differences (Agerholm et al., 2023b; Liljas et al., 2024b). These studies highlight practical improvement areas including clearer communication pathways, shared expectations across organisations, and stronger post-discharge follow-up. More broadly, our review of Swedish experiences with integrated, person-centred interventions summarises what has worked, under which conditions, and where implementation gaps persist (Kirvalidze et al., 2024).

Related to health and social care expenditure in the last year of life, we identified six distinct patterns that show there is no single "typical" end-of-life pathway (Doheny et al., 2025). These findings suggest that planning and resource allocation should account for different trajectories and support early, responsive coordination (Doheny et al., 2025). Related studies of long-term care trajectories and healthcare use identify predictors of avoidable and unavoidable hospital admissions, and transitions across care settings over up to 15 years, underscoring the combined role of health, functional capacity, and care-related factors in shaping hospital use and care pathways (Gentili et al., 2026; Gentili et al., 2025; Tazzeo et al., 2024; Ars et al., 2025).

Equity, safety, and prerequisites for good care

Several studies highlight risks and inequalities in care for older adults. We synthesised evidence on infection risk in home care, identifying vulnerability factors and stressing the need for preventive routines that work in real home environments (Liljas et al., 2025). We also mapped socio-demographic differences in polypharmacy and potentially inappropriate medication use across care needs and settings, underscoring the importance of medication safety for older people in diverse living situations (Doheny et al., 2023).

In Nordic comparisons, we assessed equity in ambulatory care sensitive conditions across capital regions, identifying both similarities and differences in how welfare state principles play out in practice (Satokangas et al., 2023). We also showed that socioeconomic position and social networks strongly influence unplanned hospital admissions and emergency care use, even after accounting for health status (Harber-Aschan et al., 2023; Naseer et al., 2023). Finally, we compared how responsibilities for older people's care are organised in Denmark, Finland, and Sweden, providing essential context for cross-country differences (Agerholm et al., 2024).

Effective care and public health measures also depend on people's ability to access, understand, and use health information. We validated the Swedish version of the HLS19-Q12 instrument, supporting its use as a brief measure of general health literacy (Wångdahl et al., 2025). At the national level, we found that limited health literacy is common in the oldest age groups, highlighting it as a widespread challenge in the ageing population (Kayser Leeoza et al., 2025).

Formal and informal care

Our research has revealed that older adults are increasingly providing financial support within families, particularly to grandchildren. However, access to these transfers has become more unequal, with higher socioeconomic groups receiving larger sums (von Saenger et al., 2025). While many adult children support ageing parents, practical care is primarily provided by working-class daughters, reflecting a gendered and class-structured division of labour (von Saenger et al., 2023). These patterns suggest that later-life support is becoming more familial alongside rising socioeconomic inequality and declining public provision.

In parallel, we have shown that the use of formal and informal care changes substantially before, during, and after the detection of cognitive impairment and dementia (Sakakibara et al., 2025). We have also demonstrated that caregiving intensity, burden, and health consequences vary markedly among older caregivers, who represent a major source of informal care in later life (Kirvalidze et al., 2023; Kirvalidze et al., 2025). In addition, we reviewed global evidence on effective strategies to reduce the negative health consequences of informal caregiving and provided recommendations to address support gaps (Kirvalidze et al., 2023).

Health inequalities

Socioeconomic inequalities in health remain one of the most persistent findings in health research. In Sweden, like in many high-income countries, they are substantial, and have been widening since the 1990s. Fritzell and Fors (2025) show that both absolute and relative mortality inequalities increased between 1995 and 2017 among those aged 65–79 in Sweden, and discuss potential mechanisms behind the patterns, including fundamental cause theory.

Cross-national comparisons of edentulism (total tooth loss) reveal substantial variation: while Nordic countries show the lowest inequalities among high and upper-middle income countries, the very lowest inequalities appear in the two low-income countries included (Celeste et al., 2026). Another pertinent discussion in the field of health inequalities is to what extent health disparities tend to converge or diverge over the life course. Based on novel analyses, Fritzell and Rehnberg (2023) demonstrate alternating periods of convergence and divergence across the life course in Sweden, depending on whether inequalities are measured in absolute or relative terms.

Work and retirement conditions also shape late-life health inequalities. Eyjólfsdóttir et al. (2025a; 2025b) find that poor physical and psychosocial work environments are associated with an increased likelihood of retirement, and that postretirement health improvements are temporary, returning to preretirement levels after a brief "honeymoon" period.

In studies of disease determinants, Gebreslassie et al. (2025) show persistent educational differences in blood pressure across the life course. The whole distribution of blood pressure tended to be higher among those with lower education, indicating that inequalities are not driven solely by high-risk subgroups.

Education is strongly associated with better health in later life, though the extent to which this relationship is causal versus driven by familial factors remains an important question. Using family-based and genetic data, Ericsson et al. (2024) show that the association is partly explained by familial and genetic confounding but remains even after accounting for these influences. Both educational attainment and genetic propensity for education independently predict health outcomes and mortality, suggesting multiple pathways linking education and health. Overall, the findings indicate that while family background and genetics matter, education itself contributes to better later-life health, implying that educational opportunities may contribute to long-term health benefits.

Social relations and loneliness

Older adults consistently rank social relationships as essential for their life satisfaction and ageing well. Understanding the prevalence and patterns of social isolation and loneliness is therefore essential for addressing their impact on wellbeing. Based on the SWEOLD study, about 12 per cent of older adults in Sweden often or almost always feel lonely, while 6 per cent are severely socially isolated, with stable levels since the early 1990s. Both loneliness and social isolation are more common among women, the oldest old, people living alone, and those with low education, as well as individuals with disabilities or mental health problems, groups in need of targeted interventions (Dahlberg et al., 2024).

Loneliness often increases after mobility limitations (Augustsson, 2025a), but people respond to these changes in different ways. Some individuals or groups never regain their previous level of life satisfaction, while those who do recover are more likely to have had frequent contact with friends before the impairment (Agahi et al., 2024). While friendship contact generally declines with age, later-born generations maintain more contact with their friends than earlier cohorts (Augustsson et al., 2025b), indicating an increasingly important role of friendships. Still, close family relationships, especially with children and partners, remain the strongest sources of support for wellbeing and loneliness in very late life (Augustsson et al., 2026). It is the quality of these close relationships, rather than the number or frequency of contacts, that most strongly shapes loneliness (Norlin et al., 2025), underscoring the need to facilitate meaningful social integration in old age.

Conclusions and future perspectives

Over the past three years, our research has generated robust evidence that brain ageing, cognitive decline, dementia, and late-life health outcomes are shaped by interacting biological, lifestyle, environmental, and social factors. The findings demonstrate that processes such as dopaminergic decline, iron accumulation, multimorbidity, cardiovascular and metabolic health, as well as social and environmental exposures are closely linked to cognitive impairment, dementia risk, functional decline, and mortality. Together, this work advances our understanding of ageing as a dynamic and heterogeneous process and identifies measurable markers and modifiable factors that are highly relevant for early identification, prevention, and more person-centred approaches to care.

Taken together, these findings underscore that ageing-related cognitive and health outcomes cannot be explained by single diseases or isolated risk factors. Instead, they reflect complex and interrelated biological, behavioural, and social processes unfolding over time. By integrating brain imaging, blood-based biomarkers, health trajectories, and social and environmental contexts, this body of work provides a strong scientific foundation for more holistic models of brain health, healthy ageing, and care in later life.

Building on these results, a crucial next step is to translate the identified biomarkers, risk profiles, and protective factors into earlier and more targeted prevention strategies. It will also be essential to continue monitoring health inequalities among older adults, as persistent disparities in education, work and retirement conditions, and social relationships have been shown to significantly impact late-life health outcomes. Future research should enhance longitudinal, person-centred methodologies by combining markers of biological ageing with lifestyle, social, environmental, and care-related factors. The goal is to better distinguish groups with varying health risks, guide the development of targeted interventions, and facilitate integrated health and social care for older adults.

Photo: Ian Gadelius

Scientific production in numbers (2023–2025)

For further information and full list of publications, please visit our homepage at https://ki.se/arc

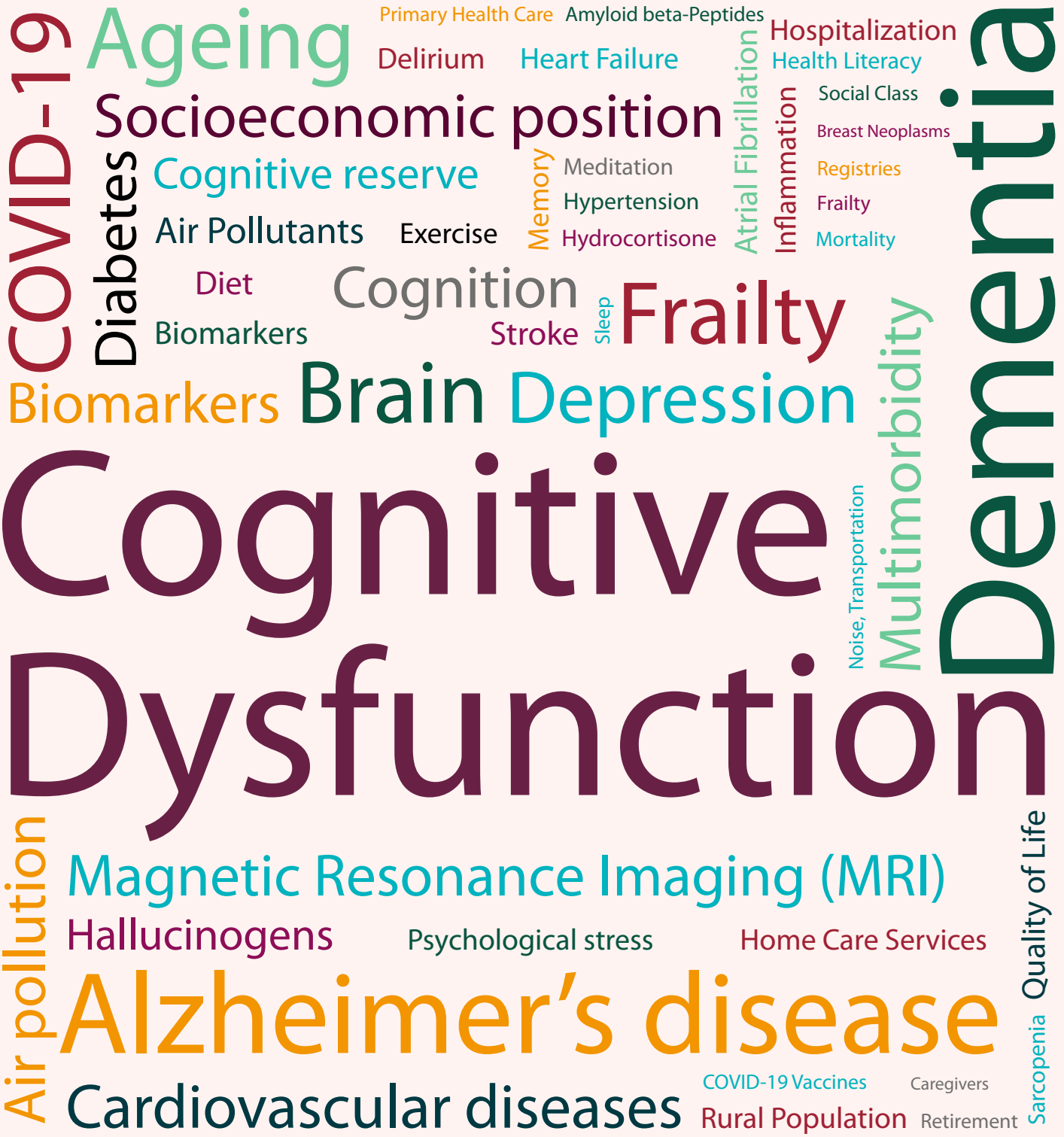

Cognitive Dysfunction
Dementia
Ageing
Socioeconomic position
COVID-19
Diabetes
Cognitive reserve
Air Pollutants
Exercise
Diet
Biomarkers
Cognition
Stroke
Sleep
Frailty
Brain
Depression
Biomarkers
Primary Health Care
Amyloid beta-Peptides
Delirium
Heart Failure
Hospitalization
Health Literacy
Social Class
Breast Neoplasms
Registries
Frailty
Mortality
Memory
Meditation
Hypertension
Hydrocortisone
Atrial Fibrillation
Inflammation
Noise, Transportation
Multimorbidity
Air pollution
Magnetic Resonance Imaging (MRI)
Hallucinogens
Psychological stress
Home Care Services
Alzheimer's disease
Cardiovascular diseases
COVID-19 Vaccines
Caregivers
Rural Population
Retirement
Sarcopenia
Quality of Life

Photo: Julien Angelini

Education

Courses

ARC researchers lead or are involved in organising several courses at both KI and SU. Some of the courses are offered on a yearly basis as part of the undergraduate, master's or doctoral programmes, while others are free-standing courses.

Undergraduate (first cycle)

- *Arbetsliv, åldrande och hälsa,* 7,5 credits, bachelor's programme in Education and Public Health Sciences, SU.
- *Samhälle och Hälsa,* 4.5 credits, Psychology programme, KI.
- *Utvecklingspsykologi,* Åldrande, 3.0 credits, Psychology programme, KI.

Master's (second cycle)

- *Aging and Age-Related Disorders from a Biological, Epidemiological and Clinical Perspective,* 15 credits, Health Care and Medicine, KI.
- *Geriatric Epidemiology*, 1.5 credits, Public Health Epidemiology, KI.
- *Life-course Perspectives on Ageing and Health,* 7.5 credits, Public Health Sciences, SU.
- *Public Health Science – Concepts and Theories,* 7.5 credits, Public Health Sciences, KI.

Doctoral (third cycle)

- *Cognitive Aging, neuropsychology, and cognitive diagnostics.* 1.5 credits, KI.
- *Inequalities in Health – Mechanisms and Measurement.* 3.0 credits, KI.
- *Multidisciplinary Approaches to Aging Research in Healthcare Sciences.* 3.0 credits, KI.
- *Societal and Life-course Perspectives on Inequalities in Aging.* 3.0 credits, KI in partnership with SWEAH.
- *Application of Epidemiological Approaches to Aging Research.* 1.5 credits. KI.
- I*ntegration of neuroimaging and cognition in normal aging and dementia.* 2.0 credits, KI.

Other courses

- *Confirmatory Factor Analysis and Structural Equations using Mplus,* led by Roger Keller Celeste and held at ARC/KI.
- *Lecture on Bayesian Statistics,* with Mattias Villani, SU, co-organised with the doctoral programme in epidemiology and the Division of Clinical Epidemiology at KI.
- *Health literacy for researchers* (webinar series).

Doctoral students' activities

ARC Juniors

In addition to the activities in which a doctoral student is expected to participate, ARC juniors serve as representatives in internal as well as external structures and organisations, such as the Doctoral Students Association, the ARC Internal Board, the KI Pedagogical Strategy Group, or Medicinska Föreningen, to name a few.

Some of ARC's doctoral students are also part of the Swedish National Graduate School on Ageing and Health (SWEAH), a consortium consisting of twelve higher education institutions, coordinated by Lund University, and founded in 2014. The overarching long-term goal of SWEAH is to develop and strengthen the recruitment base of future leaders in research on ageing and health.

ARC Junior Retreats

On 31 May 2024, ARC junior researchers, consisting of research assistants, PhD students and postdoctoral researchers, spent the day at Grand Hotel Saltsjöbaden for a writing retreat. The day was facilitated by Anna Borgström, writing instructor at KI University Library, and included writing blocks, as well as peer review sessions. ARC junior staff gave each-other feedback, worked on their manuscripts, and enjoyed the nice weather.

On 2 June 2025, a group of 19 doctoral students and postdoctoral researchers from ARC came together for a one-day retreat at the Skepparholmen conference venue in Nacka. The retreat theme was visual communication in research. The morning session was devoted to a lecture by an expert from Visualize Your Science AB, focusing on the fundamentals of effective data presentation, including graphs, posters, and graphical abstracts. In the afternoon, participants collaborated in small teams to design and refine graphical abstracts based on their own projects.

Doctoral thesis defences

Between 2023 and 2025, ten doctoral students at ARC defended their thesis, and we reached the 100th thesis in June 2025.

2023

Jing Wu:

"Ambient Air Pollution and Transportation Noise: How They Affect Mental Health in Older Adults"

The thesis investigates how long-term exposure to air pollution and transportation noise affects cognitive function and depression in older adults.

Yuanjing Li:

"Cardiovascular health and brain aging: a population-based MRI study"

This thesis centres on examining the relationships between cardiovascular health, cognitive reserve, and the process of brain ageing.

Xin Xia:

"Cardiovascular Health, Orthostatic Hypotension, and Cognitive Aging"

The central objective of this thesis was to investigate how cardiovascular health and orthostatic hypotension — a marked decrease in blood pressure upon standing — relate to cognitive ageing in later life.

Federico Triolo:

"Depression and chronic diseases in old age: understanding their interplay for better health"

The main objective of this thesis was to explore how depression and the burden of somatic diseases interact in later life, with special focus on their clinical heterogeneity, longitudinal progression, and bidirectionality.

2024

Jonatan Malmros (formerly Gustavsson):

"Determinants of age-related brain iron accumulation and links to neurocognitive functions"

This thesis aimed to deepen our understanding of how iron builds up in the brain during normal ageing, and how this process is connected to age-related changes in brain function and cognition.

Abigail Dove:

"Cardiometabolic disease and dementia risk: identifying compensatory factors".

The main goals of this thesis were to examine how cardiometabolic diseases, a group of related conditions including type 2 diabetes, heart disease, and stroke, are connected to the development of dementia, and to determine modifiable lifestyle factors that might help counteract the negative influence of these diseases on cognitive and brain health.

2025

Clare Tazzeo:

"Investigating the interplay between frailty and healthcare utilization in older adults."

This thesis shows that people live longer but spend more years with frailty. Heart attacks, falls, and infections accelerate frailty, which increases avoidable hospitalisations and shapes end-of-life care, highlighting the need for prevention and better care.

Isabelle von Saenger:

"Care and financial support in ageing families: the changing shape of inequality."

The main aim is to deepen our understanding of how patterns of care and financial support, particularly between older parents and adult children, have changed over the past 30 years within the framework of the Swedish welfare state. It also explores how gender and socioeconomic inequalities both shape and are shaped by these changing patterns.

Giorgi Beridze:

"Multimorbidity and kidney health in old age: methodological considerations and longitudinal associations"

This thesis investigates how coexisting chronic conditions relate to kidney health in older adults and addresses key methodological challenges in measuring and interpreting kidney function in ageing populations.

Erika Augustsson:

"Anchored or Adrift? Social Connection, Health, and Loneliness in Later Life"

The thesis explores the significance of social connections in old age through historical trends and the interplay between relationships and well-being.

Photo: Sandra Humer

Impact and outreach activities

Scientific impact

ARC's principal scientific contribution is realised through the publication of research findings in peer-reviewed journals. In addition, our researchers are actively involved in a wide array of research networks, maintaining extensive collaborations both within Sweden and internationally.

Engagement in national and international workshops and conferences also plays a significant role in amplifying scientific impact, providing opportunities to present and discuss research outcomes with the wider scientific community. Our researchers often oversee the organisation of symposia and workshops, several of which are featured below.

A selection of activities

Symposium on person-centred and integrated care for older people, 2023

Researchers from universities nationwide, together with the Swedish Agency for Health and Care Services Analysis and Region Jönköping, convened at KI for a symposium on person-centred and integrated care for older adults. International speakers also contributed to the discussion.

SNAC-K DAY – A Day in the spirit of ageing, 2023

Study participants in the extensive SNAC-K study invited by the Stockholm Gerontology Research Center and KI gathered to hear about the latest research findings from the study.

27th Nordic Congress of Gerontology, 2024

Inaugurated by Queen Silvia of Sweden, the 27th Nordic Congress of Gerontology was held in Stockholm under the theme 'Ageing in a transforming world'. The event brought together over 870 delegates from 44 countries and highlighted how rapid societal and environmental changes, persistent ageism and social inequalities, and advances in ageing biology demand more inclusive, older-person-centred research, education and policy, with particular attention to climate change and international ageing strategies.

Beyond amyloid and tau: the importance of co-pathologies in Alzheimer's disease, 2024

ARC and the Center for Alzheimer Research (CAR) hosted a symposium with top specialists to discuss co-pathologies in Alzheimer's disease, sponsored by The Journal of International Medicine and SFOepi at KI.

Senior Day in Kungsträdgården, 2025

An event bringing together politicians, organisations, researchers, and the public to celebrate and explore aging. SNAC-K was represented by members of the research team and data collection staff.

Social policy, inequality and health – symposium in honour of Professor Johan Fritzell, 2025

A symposium that brought together leading scholars to celebrate the remarkable contributions of Professor Johan Fritzell to research on social policy, inequalities, and health over the course of his career.

Loneliness among older adults – research and implications for practice in the Nordic region, 2025

A webinar hosted together with the Nordic Welfare Centre and Dalarna University, presenting new research on loneliness among older adults in the Nordic countries. Researchers together with representatives from civil society and local authorities shared their views on loneliness and how to connect research with practice. The event attracted decision-makers, care practitioners, civil society organizations, researchers, and others interested in the living conditions of older adults.

Laura Fratiglioni – A half century of dementia research: traversing biology, epidemiology, and public health, 2025

The symposium honoured Laura Fratiglioni's extensive contributions to dementia research, bringing together leading international experts to reflect on past advances and future directions across biology, epidemiology, prevention and public health, with a strong focus on life-course approaches, multimorbidity and innovative strategies for dementia prevention.

ARC 25-year jubilee

On 1 December 2025, researchers, collaborators, alumni and friends gathered to celebrate our 25-year anniversary. The afternoon highlighted the significant progress achieved since our establishment in 2000 and underscored the continuing importance of our efforts for ageing research in Sweden and internationally. The lectures were engaging, intellectually stimulating, and thoroughly enjoyable. The event concluded with an expression of gratitude to the ARC initiators.

In addition, we received a grant from Forte to organise a day dedicated to ageing research. The event, titled 'Forum för äldreforskning – Vad har vi uppnått och vart är vi på väg?' (Forum for Aging Research – What have we achieved and where are we heading?), was held on 5 February 2026 and brought together ageing research experts from all over Sweden to share their findings. Researchers, practitioners, stakeholders, and other interested individuals were invited to participate.

Societal impact

ARC is involved in a range of outreach activities with the purpose of sharing knowledge and promoting understanding and awareness of ageing research in the public domain. In this section we highlight some of the activities and events organised, with the aim of informing the public, policy makers and society at large.

Appointments

- The Ministry of Health and Social Affairs appointed 14 new members to the Government's Council on Geriatric Research, including Laura Fratiglioni and Mats Thorslund.
- The Lancet has announced a new commission aimed at reorienting frailty in clinical practice, public health, and policy. Davide Liborio Vetrano is one of two experts from KI, who are involved in this important initiative.

Prizes and awards

- Laura Fratiglioni awarded the Bengt Winblad Prize 2023

The prize is awarded annually by the Swedish Society of Medicine to a person who has made outstanding contributions to Alzheimer's research.

- Lars Bäckman awarded the European Federation of Psychologists' Associations' Aristotle Prize 2025

The award recognises individuals who have made a substantial and original contributions to psychology, particularly in the field of cognitive ageing.

Clinical and public health impact

KI researcher spotlight multimorbidity in older people in new WHO report

The report is based on a meeting of the WHO's Clinical Consortium on Healthy Ageing (CCHA), held in November 2024, at which experts from around the world gathered to discuss ageing, functional decline and specific age-related difficulties with a focus on low- and mid-income countries. Sweden was represented by Davide Liborio Vetrano.

Insights from the SBU on the ARC review of interventions to support for family carers

The Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) recently provided a commentary on a review conducted at ARC and led by Mariam Kirvalidze and Amaia Calderón-Larrañaga. The review focused on interventions to support informal caregivers, family members or close friends who care for older adults without formal compensation.

KI-report on costs of dementia diseases to the Ministry of Health and Social Affairs

The report 'Antalet demenssjuka och kostnader för demenssjukdomar i Sverige 2023', commissioned by the Ministry of Health and Social Affairs, was presented to Anna Tenje, Minister for Older People and Social Security. Anders Wimo and Amaia Calderón-Larrañaga have been primarily responsible for the report, which shows a forecast with a great increase for the number of people with dementia by 2050 and for the heavy financial responsibility of municipalities.

Presenting SWEOLD

Carin Lennartsson and Stefan Fors presented and discussed SWEOLD to the Minister of Older People and Social Security, Anna Tenje. They were also invited to the National Competence Centre for Old Age Care at Socialstyrelsen to present and discuss current research projects at ARC and SWEOLD.

Scoping review of informal caregiving and loneliness

Lena Dahlberg and Mariam Kirvalidze conducted a scoping review on behalf of the Swedish Gender Equality Agency, focusing on informal caregiving and loneliness. The report specifically investigates loneliness among spousal carers aged 65 and above, factors associated with increased risk of loneliness in this population, potential consequences of loneliness, and the carers' own perceptions of their experiences.

ARC International Forum and seminar series

The ARC Seminar Series consists of bi-weekly hour-long seminars, usually held on Tuesdays, and forms an important part of ARC's multidisciplinary scientific environment. It is primarily aimed at presenters from other KI departments as well as universities and research centres in and around Stockholm. In line with ARC's interdisciplinary profile, the organising committee includes representatives from geriatric epidemiology, psychology, and social gerontology, and the seminars are advertised via the KI calendar and circulated among the relevant departments at KI (including the Institute for Environmental Medicine, the Department of Medical Epidemiology and Biostatistics and the Center for Alzheimer Research), as well as Stockholm University.

Regular ARC seminars are complemented by the International Forum series, which is geared toward more established international guest speakers who visit KI as thesis opponent, dissertation committee member, or for other special engagements. Typically lasting two hours, International Forums provide ample opportunity for in-depth discussion with the eminent speakers.

Between 2023 and 2025, ARC hosted a total of 52 seminars and international fora.

Outreach activities

Media and popular science

Our researchers frequently participate in the media, giving interviews, writing articles, or participating in podcasts in the more traditional channels such as Swedish Television (SVT), Swedish Radio (SR) or Swedish papers and magazines.

Our research also reaches policymakers, practitioners and the general public through the popular science magazine Äldre i Centrum (ÄiC), which is based at ÄC.

The magazine focuses on health and disease in ageing and highlights key developments in the field. Each of its four annual issues features an ARC spread and typically includes at least one article written by one of our researchers. In 2024, an entire issue was dedicated to the 27th Nordic Congress of Gerontology.

In addition, the magazine's editorial team produces the ÄiC podcast, where our researchers regularly participate as invited guests.

Loneliness and social isolation have drawn increased media attention in recent years, with several ARC researchers contributing to the discussion. For instance, Lena Dahlberg appeared in Studio 65 to talk about the theme "Alone is not always strong." Together with Carin Lennartsson she also participated in an episode of the programme Kropp och Själ, Sveriges Radio P1, discussing loneliness and what can be done about it. In Dagens Nyheter, Isabelle von Saenger discussed how older adults meet for fika to combat loneliness.

Health literacy is another topic that has attracted considerable attention both in the media and within the healthcare sector. As an expert, Josefin Wångdahl is frequently invited to give lectures both in Sweden and internationally, and she was also interviewed in KI's podcast Medicinvetarna, episode #151, where she discussed her research on health literacy and explained why it is such an important field.

Ageing and dementia remain areas of strong public interest. LifeScience Sweden, Neurologi i Sverige and il Giornale reported on a study showing that certain blood biomarkers can predict dementia up to ten years before diagnosis, featuring comments from Giulia Grande and Davide Liborio Vetrano. Mitt i Stockholm interviewed Laura Fratiglioni and Amaia Calderón-Larrañaga about the long-running SNAC-K study, which shows that today's 80-year-olds are generally healthier than previous generations, though health varies across Kungsholmen. And in Financial Times, Chengxuan Qiu described how improving brain vascular health may help delay dementia symptoms.

Erika Jonsson Laukka was also interviewed twice by Dagens Nyheter about the **subjective experience of time and age** as you grow older.

Ingrid Ekström was interviewed by BBC journalist Tim Smedley regarding a study published in the journal Environmental Health Perspectives which shows there is a link between higher pollution levels and poorer smelling ability among older adults.

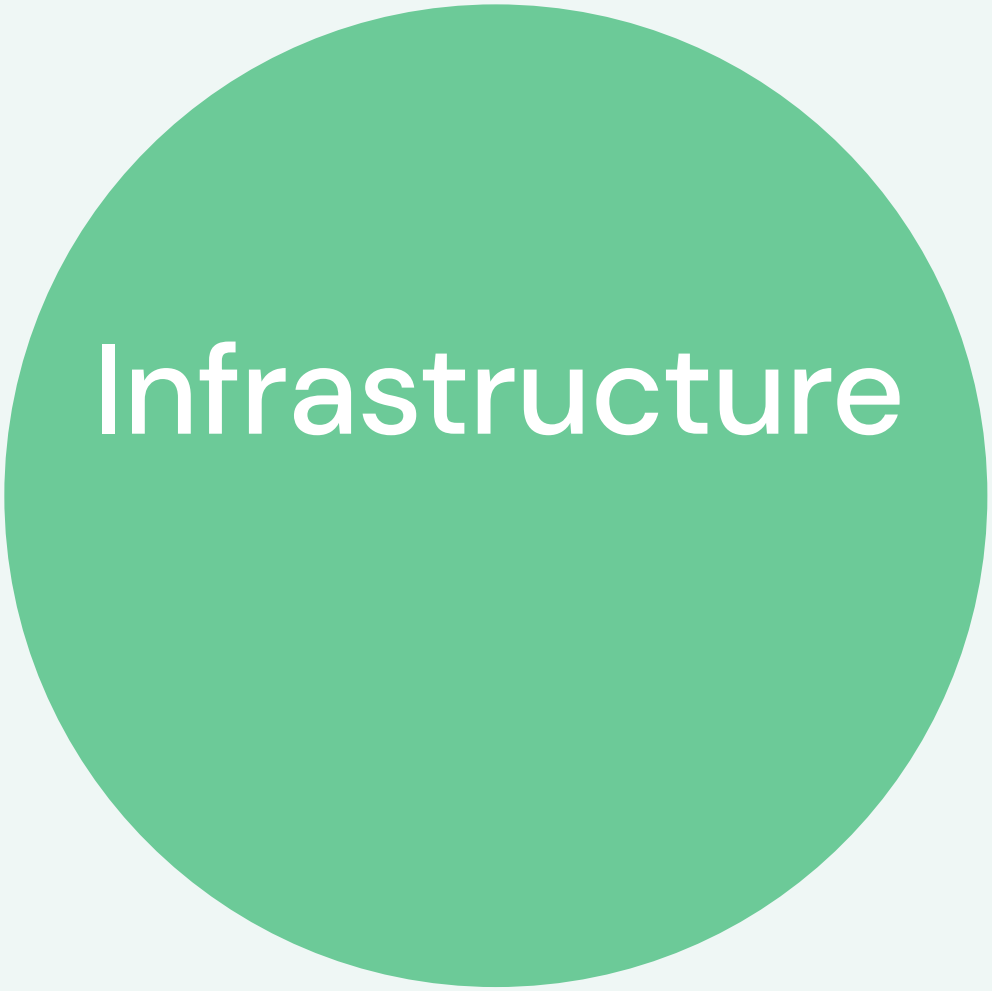
Informal caregiving by older adults has also attracted media attention. In Senioren, Mariam Kirvalidze and Amaia Calderón-Larrañaga presented a national study on the everyday lives of older informal caregivers in Sweden and how support can be improved. In Socionomen, Mariam Kirvalidze discussed research highlighting the physical, mental, and social toll of caregiving, and the types of support that may help. Svenska Dagbladet published an interview with Isabelle von Saenger, discussing how older people have become increasingly dependent on support from their families.

Coverage of research on **diet and healthy ageing** has reached both traditional and popular outlets. A popular-science article in The Conversation presented the implications for older adults, and Illustrerad Vetenskap profiled the work by Adrián Carballo-Casla, with practical guidance for healthy ageing. Mainstream Swedish media, including Aftonbladet, has also highlighted these studies.

Geroscience is a rapid emerging discipline in ageing research, Davide Vetrano was interviewed by the magazine Nordic Life Science about the revolutionary promise geroscience holds for the prevention of most of chronic diseases affecting humans.

ARC celebrated its **25th anniversary in 2025**, which received extensive coverage throughout the year, with numerous articles published, including on the websites of ARC, KI and NVS.

Photo: Sara Eng


Infrastructure

The National E-infrastructure for Aging Research

The National E-infrastructure for Aging Research (NEAR) is Sweden's national platform for integrating and harmonizing longitudinal population-based studies on aging and health. It is a consortium and national collaboration between eight Swedish universities: Karolinska Institutet, University of Gothenburg, Lund University, Umeå University, Uppsala University, Jönköping University, Blekinge Institute of Technology, and Stockholm University. Together, NEAR comprises data from 16 large cohort studies, encompassing over 90,000 individuals aged 50 years and older who have been followed for 12–52 years. These studies include detailed and multidisciplinary information on health, physical functioning, cognition, lifestyle, social factors, and care use, with several cohorts linked to national health, population, and environmental registers. The Swedish Research Council financially supported the infrastructure in 2018 and 2022.

Photo: Linda Ydemar

Collaboration contributes to empowering ageing research

By providing high-quality epidemiological data, NEAR has supported over 900 peer-reviewed publications to date, spanning both national and international projects. NEAR fosters cross-disciplinary collaboration and enables broad, interdisciplinary research goals that single databases often cannot achieve. Moreover, the integrated infrastructure adds significant value by increasing sample size and diversity, which enhances representativeness and generalizability. These strengths help address the growing public health and clinical needs of an aging society. Ultimately, this collaborative approach could lead to sustainable intervention strategies for improving the health and well-being of older persons in the coming decades.

Future perspectives

Structurally, NEAR aims to integrate additional cohorts, support new data collection, including later-born birth cohorts, and incorporate phenotypic and genotypic profiles to reflect evolving exposures and chronic disease patterns. These efforts will capture demographic changes and diverse life-course experiences, ensuring representativeness and equitable care. Scientifically, NEAR will strengthen precision aging research by leveraging molecular biomarkers, digital health metrics, and AI-based tools for prediction and simulation. Strategically, NEAR plans to deepen collaborations with Swedish Quality Registries, environmental institutes, and European initiatives. Late 2025, NEAR received the NordForsk award for the "NEXT-NORD project: NEXT Generation Transdisciplinary Aging Research for Nordic Excellence," with the long-term vision of building a sustainable, integrated Nordic infrastructure for aging research that enables robust cross-country networks, comparisons, and collaborations.

Team

NEAR is led by a Steering Group composed of experts with nationally and internationally recognized competence in aging research, research infrastructures, societal issues related to aging, and user perspectives. The Internal Leading Group comprises NEAR Director Debora Rizzuto and one representative from each of the NEAR databases. The Operational Group comprises a team of database coordinators, statisticians, research and project coordinators, and a scientific promoter and communicator.

Photo: Linda Ydemar

Ongoing data resources

Ongoing data resources

ARC's research draws on data gathered from a variety of ongoing and completed longitudinal studies at local, national, and international levels, as well as national registers and smaller-scale experimental and clinical investigations.

A selection of ongoing data collections:

Swedish National Study on Aging and Care in Kungsholmen – SNAC-K

The goal of SNAC-K is to collect longitudinal population-based data to understand the ageing process, and to identify possible preventive strategies to improve health and care in older adults. The data is jointly managed by ARC and the Stockholm Gerontology Research Center (ÄC). PI: Amaia Calderón-Larrañaga (2001-).

The Swedish Panel Study of Living Conditions of the Oldest Old – SWEOLD

The aim of SWEOLD is to collect relevant, high-quality and up-to-date data about older adults' living conditions and health. PI: Carin Lennartsson (1992-).

ElastAge

ElastAge investigates the biomechanical properties of the brain tissue such as cerebral stiffness using a new MRI technique, in cognitively healthy individuals, patients at the preclinical and prodromal stages of Alzheimer's disease. This is a collaboration between KI, the memory clinics of Karolinska University Hospital, and KTH the Royal Institute of Technology in Stockholm. PI: Grégoria Kalpouzos (2023–).

The Long-COVID study

The Long-COVID study is following up on patients diagnosed with post COVID 19 syndrome and aims to identify modifying factors and brain correlates to long-lasting cognitive and olfactory deficits in this group, as well as their prognostic impact for well-being and daily functioning: PI: Erika Jonsson Laukka (2022–2023).

Mechanisms associated with olfactory and cognitive function in ageing

A data collection programme carried out at the Memory Clinic, Karolinska University Hospital. The aim of this study is to investigate the associations between olfactory function, cognitive abilities, and dementia. PI: Erika Jonsson Laukka (baseline: 2021–2023).

Validation of the Health Assessment Tool (HAT) in primary care

HAT is an instrument that comprehensively appraises health and functioning in older adults. Data were collected in six different urban, semi-rural and rural primary care centres across Sweden between 2022-2024 to examine the validity and feasibility of implementing HAT in routine primary care. PI: Amaia Calderón-Larrañaga (2022-).

Nationwide survey

In 2023, ARC and the National Competence Centre for Relatives (Nka) launched a nationwide survey to explore wellbeing and the effects of caregiving among older caregivers in Sweden. Survey data have been linked with longitudinal data from nationwide health registers. PI: Amaia Calderón-Larrañaga (2023-).

Two PET projects in Umeå

ARC is also involved in conducting two large positron emission tomography (PET) projects in Umeå, with the aim to study the dopaminergic system in ageing:

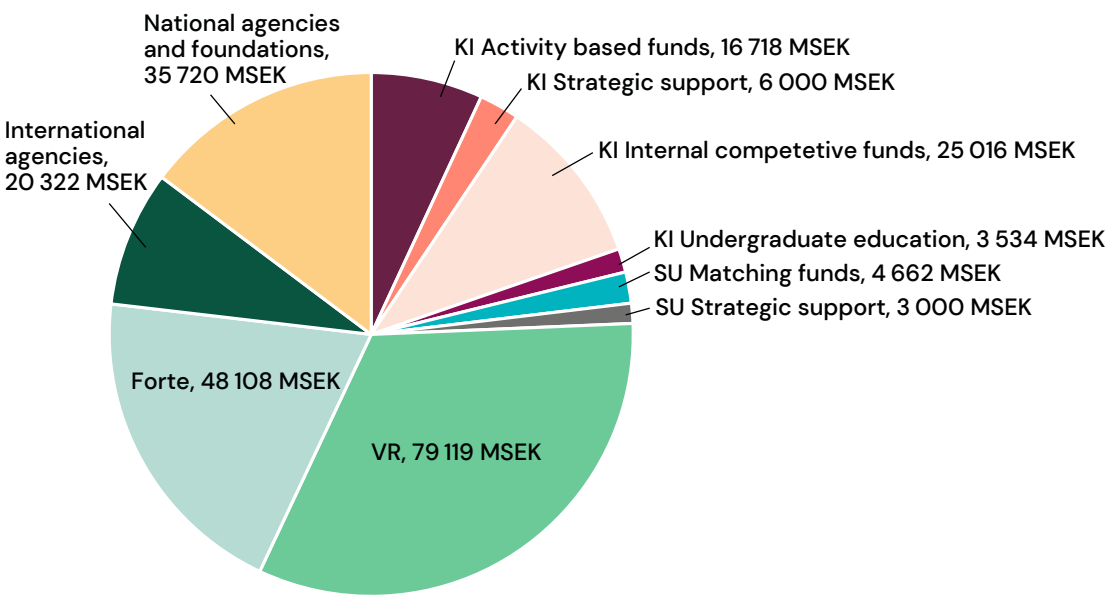
- COBRA – the Cognition, Brain, and Aging project. PI: Lars Bäckman.
- DyNAMIC – Dopamine, Age, Connectome and Cognition. PI: Alireza Salami.

Funding

Financiers/funding agencies (in alphabetical order)

- Ahréns stiftelse
- Alzheimerfonden
- Canadian Consortium on Neurodegeneration in Aging
- Demensfonden
- European Research Council (ERC)
- European Union
- Folkhälsomyndigheten (Public Health Agency of Sweden)
- Forte
- Gun och Bertil Stohnes stiftelse
- Jonas and Christina af Jochnick Foundation
- Karolinska Institutet
- Magnus Bergwalls stiftelse
- Marie Skłodowska-Curie Actions
- MSD-Karolinska Institutet Partnership
- Riksbankens Jubileumsfond
- Stiftelsen 1759
- Stiftelsen Gustaf och Tyra Svenssons minne
- Stiftelsen för Gamla Tjänarinnor
- Stiftelsen Ragnhild och Einar Lundströms Minne
- Stiftelsen Sigurd och Elsa Goljes Minne
- Svenska Läkaresällskapet
- Svenska Sällskapet För Medicinsk Forskning (SSMF)
- Triton Advisers (Sweden) AB
- Vetenskapsrådet (The Swedish Research Council)
- Wallenbergs stiftelser

ARC income 2023–2025 (242 MSEK)



Major external research grants

A list of major external grants (i.e. over SEK 1,000,000) awarded to ARC researchers and covering the period 2023-2025 is shown below. In addition, several of our researchers also received travel and other smaller grants from various funding agencies during that same period.

Canadian Consortium on Neurodegeneration in Aging

- Davide Liborio Vetrano: Multinational Assessment of Risk factors and Vascular disease in Elders with Dementias using Longitudinal cohorts.

European Research Council (ERC)

- Alireza Salami: DOPAGE: Balancing Pre- and Post-synaptic Mechanisms for Optimal Brain Function across the Adult Lifespan.

European Union

- Davide Liborio Vetrano: AFFIRMO (Atrial Fibrillation integrated approach in Frall, multimoRbid and poly-Medicated Older people).
- Davide Liborio Vetrano: I-CARE4OLD (Individualized CARE for OLDer persons with complex chronic conditions in-home care and nursing homes).

Forte

- Neda Agahi: Aging in flux: How changing behaviors and lifestyles in the new cohorts are reshaping old age.
- Neda Agahi, Johan Fritzell and Tine Rostgaard (SU): Why are some people resilient when faced with adversities in later life and others not?
- Janne Agerholm: Coordinated Individual Care Plan as a tool in the transition to care closer to home: A multi-method approach to analysing experiences, effects, and equity.
- Janne Agerholm: Health literacy among older adults: Exploring older people's prerequisites for understanding health information and making informed health choices.
- Amaia Calderón-Larrañaga & Davide Liborio Vetrano: TraCeDem (KI Transdisciplinary Research Center for Personalized Prevention and Care).
- Amaia Calderón-Larrañaga: Older adults' contribution to informal caregiving: temporal trends, profiles and adverse health consequences.
- Amaia Calderón-Larrañaga: Identifying new strategies for integrated person-centered care of older adults with dementia: from early signs to severe stages.
- Adrián Carballo Casla: Personalised diet for healthier longevity: the role of dietary changes, sensitive windows of exposure, and psychosocial background.
- Lena Dahlberg: Research programme on Ageing, Loneliness, and Mental health: understanding the connections and enabling change (REALM).
- Megan Doheny: Untangling the relationship between health and social care spending in the last year of life.
- Laura Fratiglioni, Amaia Calderon-Larrañaga and Serhiy Dekhtyar: Time trends and lifelong determinants of multidimensional health in old age: A nationwide study with cross-country validation.
- Giulia Grande: Unravelling the role of glucose dysregulation in dementia progression: A multi-centre study across Europe and Turkey.
- Giulia Grande: Promoting cognitive health by exploring intergenerational differences in cognitive trajectories among Swedish older adults.
- Chengxuan Qiu and Miia Kivipelto: FINGER-Pro: Evidence-based health promotion interventions for healthy aging: adapting and implementing the FINGER multidomain model across different settings and sociocultural contexts.
- Debora Rizzuto: SoundMIND – effects of noise on cognition and mental health.
- Pär Schön: Ageing in place – from policy to practice. Consequences of the de-institutionalisation of Swedish eldercare for older people and their family members.
- Federico Triolo: A nationwide study of depression in old age: implications of chronicity and comorbidity for health consequences and care use.

- Davide Liborio Vetrano: Improving transitional care for Swedish older adults living with multimorbidity: integrating data-driven evidence and simulating personalized interventions (TRANSIT-ID).
- Davide Liborio Vetrano: Trajectories of care needs and care transitions after age 60: the interplay between individuals' frailty, their environment, and personal perspectives.
- Weili Xu: Understanding the complex and progressive care needs of older adults with cognitive disorders to provide timely and personalized care delivery.
- Weili Xu: Identifying unmet needs for coordinated person-centred dementia care.

Marianne och Marcus Wallenberg Stiftelse

- Marc Guitart-Masip: Quantifying prior beliefs for affective decision making and their relation to symptoms of depression.

Marie Skłodowska-Curie Actions

- Davide Liborio Vetrano: UNION (UnderstandiNg frallty tOwards a future of healthy ageing).
- Davide Liborio Vetrano & Caterina Gregorio: LETMEAGE (A complex system approach to metrics of aging for identifying personlalised interventions).

MSD-Karolinska partnership

- Davide Liborio Vetrano: Impact of lower respiratory tract infections on older individuals' global health status and healthcare utilization.

NordForsk

- Carin Lennartsson, Stefan Fors, and Johan Fritzell (co-applicants): Building Sustainable Care Systems for Older People in the Nordic-Baltic Region (SustainCare).
- Debora Rizzuto & Davide Liborio Vetrano: NEXT-NORD: NEXT generation transdisciplinary aging research for NORDic excellence (Nordic Research Infrastructure Hubs).

Riksbankens Jubileumsfond

- Ingrid Ekström: "Harmful Consequences Of Smell Loss In Older Age: a longitudinal population-based study".
- Malin Ericsson: Health inequalities in cognitive aging: Studies of education, socioeconomic childhood circumstances, and genetic predispositions.
- Goran Papenberg: The Role of DNA Methylation in Dopaminergic Neuromodulation of Cognitive Aging.
- Alireza Salami: Can reduced dopamine availability and disrupted functional brain connectome serve as biomarkers for cognitive decline in aging?.

SFOepi

- Amaia Calderón-Larrañaga: Multimorbidity and kidney function in old age: longitudinal trajectories and synergistic effects.
- Davide Liborio Vetrano: Pursuing new frontiers for a healthier aging: simulation-based manipulation of biological pathways involved in multimorbidity, frailty and dementia development.

StratNeuro

- Davide Liborio Vetrano: CHASE-H (CHASing the complex architecture of aging: integrating systems biology, Epidemiology, and intervention simulation for Healthspan extension)

Swedish Society for Medical Research (SSMF)

- Federico Triolo: Depression trajectories across the lifespan: exploring long-term course, symptom patterns, and biological aging.

Stiftelsen 1759

- Serhiy Dekhtyar: SNAC-K: Depression and chronic disorders in the elderly.

Vetenskapsrådet (VR)

- Bárbara Avelar Pereira: Against all odds: Uncovering the mechanisms underlying neurocognitive resilience in individuals with Alzheimer's pathology.
- Amaia Calderón-Larrañaga: Monitoring older adults' health for preventive and early interventions: use of the Health Assessment Tool (HAT) in the Swedish primary care setting.
- Laura Fratiglioni: Collateral damage of COVID-19 in older adults: short and long-term health consequences of the epidemic outbreak.
- Laura Fratiglioni and Debora Rizzuto: Renewal of the research infrastructure for NEAR.
- Marc Guitart-Masip: Mapping the neural and computational traces of lack of controllability and their relevance for depression.
- Marc Guitart-Masip: Psychobiological markers to improve diagnosis and to predict affective episodes in bipolar disorder.
- Grégoria Kalpouzos: Role of brain iron and microbleeds in cognitive and physical function in a population-based study on aging: A deep-learning approach.
- Erika Jonsson Laukka: Long-term follow-up of individuals with long-lasting cognitive deficits following mild COVID-19.
- Erika Jonsson Laukka: Olfactory function, cognitive aging, and dementia.
- Erika Jonsson Laukka: Long-lasting cognitive and olfactory deficits following mild COVID-19 – modifying factors, brain correlates and prognostic impact for well-being and daily functioning.
- Erika Jonsson Laukka: Biological correlates of cognitive and olfactory trajectories in aging and dementia.
- Goran Papenberg: Mechanisms of Cognitive Aging: The Roles of Brain Iron Accumulation and Neuroinflammation.
- Goran Papenberg: Quantifying hippocampal neurogenesis in the living human brain and its relevance for long-term memory.
- Chengxuan Qiu: Chronic hypoxia as a possible pathway linking clinical conditions of the heart, lungs, and blood with accelerated brain aging.
- Davide Liborio Vetrano: Biomarker signatures of progressing multimorbidity: in pursuit of personalized approaches to clinically complex older individuals.
- Weili Xu: Unlocking Cognitive Health: How Metformin Slows Brain Aging Through Precision Medicine.
- Weili Xu: Reducing Dementia Risk in Older Adults Affected by Cardio-Metabolic Disease.

References major research findings

In alphabetical order

Brain ageing

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From multimorbidity to frailty: health complexity in ageing

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