

**Karolinska  
Institutet**



# ***Aging* Research Center**

**Stockholm  
University**



## **Activity Report**

### **Year 2002**

IN COLLABORATION  
WITH



*Stockholm  
Gerontology  
Research Center*

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<b>Laura Fratiglioni</b>	Professor, substitute coordinator ARC
<b>Åke Seiger</b>	Prefect Neurotec, Karolinska Institutet

### Activity Report compiled by:

Laura Fratiglioni, Cecilia Larsson, Eva von Strauss  
Stockholm, February 2003

# Organisation

## Introduction

During 2002, ARC has established itself as an independent research center through activities in five main areas: 1) employing personnel, furnishing the premises, installing technical equipment and developing an internal and external network; 2) developing relationships with other research centers financed by FAS (Swedish Council for Working Life and Social Research), namely Institute for the Study of Ageing and Later Life (ISAL) and 'Center for Health Equity Studies (CHESS)'; 3) developing an informative approach that can be used both in research and within the general population with different instruments and methods 4) continuing the large population-based studies focusing on public health and prevention, and 5) implementing new research lines, including more biologically-oriented projects. At the start of 2003, ARC is already a well-known research center within the area of dementia, both nationally and internationally, and is a recognized training center within Karolinska Institutet's research education program.

## Positions at ARC

During the year, three positions were taken: one professor of psychology (Lars Bäckman) and two lecturers, one in geriatric medicine (Johan Fastbom) and one in psychology (Agneta Herlitz). One half-time position as scientific coordinator (Eva von Strauss) was established during the autumn. Applications for the social gerontology positions are still being assessed by the adjudicators.

## ARC's homepage

For those that are curious, please see [www.neurotec.ki.se/DOGE/ARC](http://www.neurotec.ki.se/DOGE/ARC). There a complete description of our work can be found, which is updated monthly. Information on the organisation, staff, research, educational programs, and contact information for the center is provided in a simple but precise manner, which is accessible both to researchers and the general public.

## Internal network

The large task of developing and installing an internal network has been accomplished through initiatives taken together with Äldrecentrum. Most understand the importance of such an initiative but few realize how time-consuming the task of building an internal network is. In an already established working environment, such as a hospital university, one gets such a network 'for free'.

## FAS evaluation

After a visit to our center on 2nd December 2002, where we presented our work and the most important results from 2001-2002, Anita Gradin and Robert Erikson from FAS were able to award us the extra economical contributions of one million per year during 2003-2005 that FAS had granted us during the first three years.

## Information and education

Approximately 30 weekly seminars have been carried out in collaboration with Äldrecentrum. An annual and ongoing research education course for PhD students "Applying epidemiological methods in aging research".

A five-point course in dementia for healthcare personnel: "Dementia – it's development and consequences."

Data has been presented and discussed at both national and international conferences.

Information has been provided to the public on many occasions through the media. A press conference on aging research was carried out with 10 journalists.

# Personnel

Staff working at ARC during 2002 includes senior researchers that are financed by ARC, and post docs, PhD students, and other staff that are financed by KI, SU, Äldrecentrum, or through other research grants.

*Coordinator:* Bengt Winblad, professor  
*Vice coordinator:* Laura Fratiglioni, professor  
*Scientific coordinator:* Eva von Strauss, RN, PhD  
*Administration:* Helene Hägglund, Cecilia Larsson

## Geriatric medicine

*Senior researchers:* Laura Fratiglioni, professor; Johan Fastbom, lecturer  
*Post doc:* Hedda Agüero-Torres, PhD; Eva von Strauss, PhD; Hui-Xin Wang, PhD  
*PhD Students:* Anna Beckman; Christel Cornelius; Diana DeRonchi; Linus Jönsson; Anita Karp; Inga Klarin; Jan Nilsson; Erik Nilsson; Gunilla Nordberg; Stephanie Paillard-Borg; Katie Palmer; Galina Passare; Chengxuan Qiu; Margareta Westerbotn

## Psychology

*Senior researchers:* Lars Bäckman, professor; Agneta Herlitz, lecturer  
*Post doc:* Åke Wahlin, associate professor; Håkan Fischer, associate professor  
*PhD Students:* Anna-Karin Berger; Anna Derwinger; Sari Jones; Julie Yonker; Erika Jonsson Laukka; Åsa Livner  
*Research assistants:* Jenny Rehnman; Lotta Sjöström

## Social gerontology

*Senior researchers:* Marti Parker, associate professor (substitute); Mats Thorslund, professor  
*Post doc:* Ingemar Kåreholt, PhD  
*PhD Students:* Bettina Meinow; Emilia Forssell; Kristina Larsson  
*Research assistants:* Neda Agahi

## Database (in collaboration with Äldrecentrum)

*Database managers:* Maria Wahlberg (maternity leave), Peter Axelsson

## Data input (in collaboration with Äldrecentrum)

*Coordinators:* Tina Kiderud (maternity leave), Gunilla Svanhagen (substitute)  
*Nurses:* Emma Josefsson; Anna Lowe; Malin Wikström; Cecilia Rahn  
*Physicians:* Christel Cornelius; Anna-Lisa Melin; Eija Mustapirtti; Annika Garmén; Jelena Johnsson  
*Psychologists:* Silja Norderdahl; Åsa Livner; Maud Aminoff Fyring; Ingemar Karlsson; Tiina Carlstedt; Tanja Talarek  
*Research assistant:* Weihua Liu

## Information (in collaboration with Äldrecentrum)

*Information manager:* Inger Raune  
*Librarian:* Carl-Erik Olsson

# Research

ARC carries out epidemiological studies on different health related aspects of aging and the elderly. New projects started during 2002 with a more experimental study design.

Our activities during 2002 include the successful publication of 73 articles in peer reviewed journals. Many of these articles were published in highly respected journals. Furthermore, three of our students have carried out their half-time examinations and two students have completed and defended their PhD theses.

To summarize our production from a qualitative perspective, we have chosen to list below our collaborators - foreign guest researchers that came with their own research financing to work at ARC - along with a short description of our largest ongoing research projects.

## New collaborators

- Department of Geriatric Medicine, University of Brescia, “Clinical research on dementia”
- Andrus Gerontology Center, USC - NIA grant proposal
- Center for Health Equity Studies (CHESS), Stockholm University
- The Swedish Institute for Social Research (SOFI), Stockholm University

## Guest researchers

During the year we have had 6 guest researchers: 1 from England, 3 from Italy, 1 from China, and 1 from USA. In addition, Ingemar Kåreholt has been a guest researcher at the Max Planck Institute for Demographic Research in Rostock, Germany during the autumn of 2002.

- David Bunce, psychologist, PhD, Psychology Department, Goldsmiths University of London (6 month sabbatical).
- Anna-Rita Atti, MD, University of Ferrara (8 month scholarship from Italy).
- Roberto Monastero, MD, neurologist, University of Palermo (12 month scholarship from Italy).
- Patrizia Mecocci, professor, University of Perugia (3 weeks).
- Wenyong Huang, MD, PhD, Department of Public Health, Guiyang Medical College, China (12 month post doc).
- Merrill Silverstein, associate professor in gerontology and sociology at the University of Southern California (3 months).

## Large ongoing research projects

**The Kungsholmen Project.** (Project leader: Bengt Winblad) Data collection was completed during 1987 to 2000. A total of 2 500 persons participated, who were 75 years or older living in the Kungsholmen area in central Stockholm. Twenty-three PhD theses have been written using data from the first three examinations (1987-1993) and much data remains to be analyzed from the last three follow-up examinations (1994-2000). Most of the research that has been ongoing in 2002 has been conducted using this data.

**SNACK population-based study.** (Project leader: Laura Fratiglioni) Within the framework of the national SNAC-study (Swedish National study on Aging and Care), SNAC-Kungsholmen has a special focus on physical and mental functioning in the elderly around and after the age of retirement. Participants in SNACK are aged from 60 years and older. During 2002, 960 persons were examined by a doctor, nurse and psychologist. A total of 1700 persons have participated since 2001. Of these, 441 have been examined with magnetic resonance imaging (MRI) (318 during 2002), and 150 have had Electro-Encephalography (EEG) examinations. At one occasion preliminary data has been presented together with data from the Care System section of SNACK.

**The Betula Project.** (Project leader: Lars-Göran Nilsson and Lars Bäckman) The project started in Umeå in 1988. At the baseline examination, 1000 participants were randomly selected from residents of Umeå, aged 35-80 years. Since then, a further two follow-up examinations have been conducted in the same individuals. In addition, new cohorts were examined during 1993-1994 and 1998-1999. A fourth follow-up examination is planned for 2003-2004. Publication of data is now underway, i.e. within ARC, to investigate how memory functioning and health status change in the elderly.

**SWEOLD.** (Project leader: Mats Thorslund) A large part of 2002 was devoted to planning a follow-up of SWEOLD (SWEOLD II). The planning includes the designing of a new protocol and instructing to interviewers. In August, the interviewers were trained at ARC and they began interviewing participants in September. The work with SWEOLD II has been conducted in collaboration with the Center for Health Equity Studies (CHESS), and The Swedish Institute for Social Research (SOFI) at Stockholm University.

**HARMONY.** (Project leaders: Margaret Gatz and Nancy Pedersen) The goal is to map genetic and non-genetic risk factors for dementia. The project includes 13 000 twins that underwent a screening test via a telephone interview. About 1 600 persons were suspected to have cognitive impairment and were examined by a doctor and nurses. Half of them received a diagnosis of dementia according to DSM-IV criteria, and two thirds of these had Alzheimer's disease. ARC, in collaboration with the University of Gothenburg, is responsible for the physician examinations and the diagnoses.

**Brain imaging.** (Project leaders: Lars Bäckman and Håkan Fischer) This recently started project, investigates the biological basis for cognitive processing in the brains of the elderly, with focus on memory for emotional and neutral personal experiences (especially episodic memory). In this topical study, functional magnetic resonance imaging (fMRI) is used to register how the brain works when performing different types of cognitive tasks. This brain imaging method provides a unique possibility to study the human brain at work. The study is conducted at Karolinska hospital's MRI-center. In another brain imaging project, Positron Emission Tomography (PET) is used measure dopamine functioning in the human brain. The relationship between dopamine functioning and cognitive functioning in the elderly is of particular interest. The project is conducted in collaboration with Lars Farde's research group at the Psychiatric Institution, Karolinska hospital.

**The dementia project - SBU** (The Swedish Council on Technology Assessment in Health Care). The aim of the project is to establish a scientific overview of dementing disorders by compiling a systematic review of already established knowledge. This is done by thorough reviewing of published scientific studies. Experts from the Nordic countries have been invited to participate. Those responsible at ARC are: Hedda Agüero-Torres, Johan Fastbom, Laura Fratiglioni, Eva von Strauss. ARC has developed an input file, which is connected to a database, to use while reading the articles.

# Research results

All of the results during 2002 are presented in detail in the 2002 Annual Report, which is available to download as a PDF from ARC's homepage. A short summary is given below.

## Geriatric medicine

Both low diastolic blood pressure and high systolic blood pressure increase the risk of Alzheimer's disease and other dementias. The relationship between low diastolic blood pressure and the increased risk of dementia was particularly evident for persons taking antihypertensive drugs. Conclusions are that the atherosclerotic process may explain the observed associations. Not all persons with cognitive impairment will develop dementia. Only one third of cognitive impairment persons develop dementia within three years, with 25% actually improving. To identify which impairments lead to dementia, we have investigated a three-step process. The results show that almost all persons that have impairment in all three factors will develop dementia of some form over three years. These results have received much attention both in the research world (published in the British Medical Journal) and in the general public (Rapport and Aktuell).

In collaboration with the University of Bologna we have shown that the risk for cognitive impairment in HIV-positive persons is higher in homosexual persons that are not undergoing treatment.

The high consumption of drugs by the elderly continues even after the age of 80 years, and the elderly are often treated for their symptoms rather than their disease. Women and elderly that live in special housing use more drugs than others. In collaboration with Äldrecentrum, drug use was investigated in elderly persons with comorbidity, which showed an extensive use of drugs (9 prescriptions per person on average), and a lack of quality, as a high use of drugs can cause confusion and other central nervous system side effects.

In a European project in 6 countries, we found that nearly half of elderly persons have one or more combinations of drugs that can lead to clinically relevant interactions. Every tenth drug combination seen in the study should be avoided according to Swedish recommendations.

In a project together with the Swedish National Board of Health and Welfare we have developed quality indicators for evaluating the drug use in the elderly. In 2002, the document was referred to different Swedish authorities in charge of drug utilisation in the elderly, including the country's drug committees and is currently altered according to the suggested points. The indicators have also been tested in various activities throughout the country, for example Apoteket AB:s drug utilisation reviews. The entire project will be reported to the Swedish government at the end of 2003.

In a Nordic study, we measure formal and informal use of resources for people with Alzheimer's disease, which was then recalculated into costs. A cognitive test (Mini-Mental State Examination) was a strong predictor of costs. Every point of decrease on the test translated into a costs of approximately 15 000 SEK per year, which confirmed earlier estimates made on data from the Kungsholmen project.

## Psychology

Episodic memory functioning reduces gradually over the life cycle, whereas semantic memory functioning remains remarkably intact even in high age. Furthermore, we found a relatively strong relationship between diabetes and cognitive impairment in the elderly.

In a study examining whether estrogen levels at menopause affects cognition, we found that middle-aged and elderly women that were treated with estrogen had better episodic memory functioning than women in the control group.

Elderly persons can benefit from memory training, and training in self-generated strategies has a similar effect as training in specific memory techniques. Memory training not only improves the ability to acquire new information, but also prevents forgetting of stored information. This is particularly true for self-generated strategies.

As is seen in Alzheimer's disease, we have found a preclinical phase with memory decline in vascular dementia. Persons that develop vascular dementia have reduced memory functioning up to 6 years before clinical diagnosis.

Brain imaging research has shown that there are age differences in the brain regions that activate and process emotional information, which suggests a biological basis for the changes that occur over the life cycle in our way of handling emotional reactions. Additionally, we have demonstrated that age-related losses in the dopamine system cause age-related decreases in a number of cognitive domains, such as episodic memory, mental speed and executive functioning.

## Social gerontology

Follow-up time plays an important role in analysis of variations in mortality risks. Certain variables show stronger associations with mortality over the first year of follow-up, while other variables have a similar correlation with risk of death over the whole follow-up period. Persons that had health risks in 1968 had a high risk of mortality. This increased risk was independent of social class but was influenced by social contact and lifestyle (drinking and smoking).

Subjective health is related to risk of mortality both in elderly men and elderly women. In men, the strongest association with mortality risk was their response to the question about subjective health, but this was not the case for women.

Research within the social gerontology section has also contributed to the increasing knowledge of applied statistics.

Improvement in the population's mobility (ability to walk, run, and use stairs) during the period 1974-1991 can be explained by changes in the community in terms of social class structure and women being increasingly employed in the workforce.

# External financing

Grants from FAS cover the operational costs and the salaries for senior researchers. Grants from KI and SU are used to maintain and update our large databases, and provide salaries for post docs and some PhD Students. The large research grants, which are reported below, make it possible for us to employ PhD students and carry out research to the standard that is necessary to maintain our position as a national center of excellence.

Institution	Title and Project leader	Period	Amount (SEK)
The Swedish Social Science Council (SFR)	"The influence of social environment on dementia" <i>Laura Fratiglioni</i>	2000-2002	1 800 000
Swedish Council for Working Life and Social Research (FAS)	"Cognitive and physical functioning in old age" <i>Lars Bäckman, Laura Fratiglioni</i>	2000-2002	2 400 000
		2003-2005	3 900 000
The Swedish Research Council (VR), longitudinal studies	"SNAC in Kungsholmen:" <i>Laura Fratiglioni</i>	2001-2004	4 400 000
The Bank of Sweden Tercentenary Foundation	"Sex differences in cognitive functions" <i>Agneta Herlitz</i>	2002-2003	2 100 000
The Swedish Research Council (VR), Medicine	"The relationship between blood pressure, cognitive impairment and dementia in aging" <i>Laura Fratiglioni</i>	2002-2004	660 000
The Swedish Research Council (VR)	"Brain and memory in aging and dementia" <i>Lars Bäckman</i>	2002-2004	1 100 000
The Swedish Research Council (VR) – (special grant for excellent research)	"Brain and memory in aging and dementia" <i>Lars Bäckman</i>	2002-2003	1 300 000
The Swedish Research Council (VR)	"Study of age and sex differences in the neuronal underpinnings of emotion" <i>Håkan Fischer</i>	2002-2006	2 500 000
The Swedish Research Council (VR) (equipment)	Assessment equipment for autonomic functions. <i>Håkan Fischer</i>	2002	380 000

# Activities planned for 2003

The goals for 2003 are summarized in the following six points:

## Organisation

Appoint a professor and a lecturer in social gerontology.  
Replace the administrator that will retire at the beginning of 2004.

## Collaborations

Two planned meetings with ISAL, campus Norrköping, Linköping university, to create a closer connection between education and research.  
Scientific organisation of an international conference on Mild Cognitive Impairment, Stockholm, 3-5 September 2003.

## Education

To create a research education program that includes four one-week courses in epidemiology, pharmacology, social gerontology and cognition.  
Weekly seminars in collaboration with Äldrecentrum, and practice seminars for half time examinations and disputations.  
An evening "brain-storm" at ARC on "Frailty in the elderly".

## Information

Organisation of a meeting with the participants in the SNACK-population study, and with politicians and staff working in elderly care in Kungsholmen, 25 March 2003.  
Publication of a special issues of Äldre i Centrum that summarizes the most important results from the Kungsholmen Project and introduces SNACK. The magazine will be sent to all participants of the SNACK project, as well as politicians and staff working in elderly care in Kungsholmen.  
Completion of a brochure about "The House of Aging Research", in collaboration with Äldrecentrum.

## Research

Two disputations are planned for Autumn 2003. At least four half-time examinations will also be carried out.  
Data input for the SNACK project will continue.  
Data analysis and reporting of results to the research community and the public will continue as before in 11 main research areas:

Dementia: Risk factors for dementia Early detection of dementia Natural history of dementia Pharmacoepidemiology in the elderly	Functional decline in the elderly Cognitive aging Gender differences in cognition Health and cognitive functioning in the elderly Brain imaging in emotion and cognition	Multifaceted aging Health economics Well-being in the elderly International aging research
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## Finances

Applications will be sent to the large Swedish scientific grant bodies.  
Strategies for receiving donations from companies and private person will be implemented.  
Possibilities to obtain financing from abroad will be investigated.