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DOCUMENTED
BRIEFING

Health and Medical Research in Sweden

Observatory on Health Research Systems

Jan Tiessen

The research described in this report was prepared as part of RAND Europe's Health Research System Observatory Documented Briefing series, funded by the English Department of Health.

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Preface

This documented briefing provides an overview of health and medical research in Sweden. The report is part of a series of country-specific reports available from RAND Europe's Observatory on Health Research Systems, funded by the English Department of Health.

The report is divided into three parts. In the first part, the *Structure of the Swedish Health Research System*, including funding sources, sectors performing health and medical research, and health research priority setting, is presented. The second part, *Processes and Performance of the Swedish Health Research System*, focuses on the types of funding available and how funding activities are conducted, and provides exemplars of the system's performance. The third part presents an *Outlook* and considers current and emerging health research issues in Sweden.

The report is based on desk-based document review and will be updated on a regular basis. It does not attempt to discuss current policy options, or make recommendations for future strategy. The report will be of interest to government officials dealing with health and medical research policy, medical research councils, health and medical research charities, public and private institutions engaged in health research, and researchers.

The use of kr throughout this report stands for Swedish krona, unless stated otherwise.

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Summary

Summary: Key Points

- Strong position of county councils in health research
- Important role of public universities
- Absence of independent research institutes
- Wide variety of research funding
- Strategic influence of government on research priorities is substantial, but there is strong researcher influence on funding decisions
- Research capacity has been increasing while many believe that translation and performance has decreased

This documented briefing gives an overview of the Swedish health and medical research system. It provides an account of the main actors, main funding streams within the system, and various aspects of process and performance, including the setting of research priorities, research translation, and evaluations of the research financing.

In an international perspective, some of the most striking features of the Swedish health and medical research system are: the strong position county councils have in financing clinical research; the important part public universities play in conducting research; and the virtual absence of independent research institutes in medical and health research, as known from the United States. The other main findings of this documented briefing include the following:

- There is a wide variety of research funders, including public, private non-profit, and private for-profit funders. With an annual budget of 12 billion kr (1.32€ billion) (0.42% of GDP[2]) the pharmaceutical and biomedical industry is the largest funding body for health and medical research in Sweden, followed by the county councils and the Swedish Research Council, as the largest distributor of competitive research grants, handing out some 570 million kr (62€ million) (0.02% of GDP) per year to basic research in the field of medical research.

[2] Percentage of gross domestic product (GDP) statistics are calculated using OECD Statistics: GDP, Annual in millions Current Prices (National Currency). http:stats.oecd.org

- Not-for-profit medical research is predominately conducted in universities and their hospitals, and in county council hospitals, which are the main providers of medical research next to industry's own laboratories.
- Almost all aspects of medical research can be financed through different types of grants; however, some overheads are not reimbursed and are carried by the county councils and the universities themselves.
- For all public research funders, the government can influence the research priorities through annual performance targets and through the mission objectives included in their founding statute. The Swedish Research Council, however, is a predominantly researcher-governed organisation that sets its own priorities in basic research.
- Over the past decade, research capacity, as measured in the number of research positions and the number of doctoral degrees taken, has greatly increased.
- Research translation from basic to commercial research is supported by three government agencies. The link between pre-clinical and clinical research had been described as a traditional strength of the research system; however, many believe that this system is eroding.
- If the performance of the research system is measured using bibliometric methods, Sweden's position as one of the world's top medical research nations has been deteriorating since the mid 1980s.
- Sweden has in general a lively evaluation culture, with various evaluations also carried out about the performance of the research system.
- Recent hot topics in the medical research policy debate include the future of clinical research, overall funding levels for medical research, fraud in the conduction of research, the distribution of funds, and the research policy of the incoming government.

Acknowledgments

The author would like to give thanks for the valuable input of Observatory members Edward Nason, Amanda Scoggins, Tom Ling, Miriam Shergold and Sally Hargreaves, as well as careful editing by Lucy Bailey. Further constructive comments were provided by Quality Assurance reviewers Jonathan Grant and Charlene Rohr.

Abbreviations and terms

ALF	*Avtal om läkarutbildning och forskning* (Agreement on Medical Education and Research)
GDP	Gross domestic product
kr	Swedish kronor
SRC	Swedish Research Council
Vinnova	Swedish Governmental Agency for Innovation Systems

Introduction

Health and Medical Research in Sweden

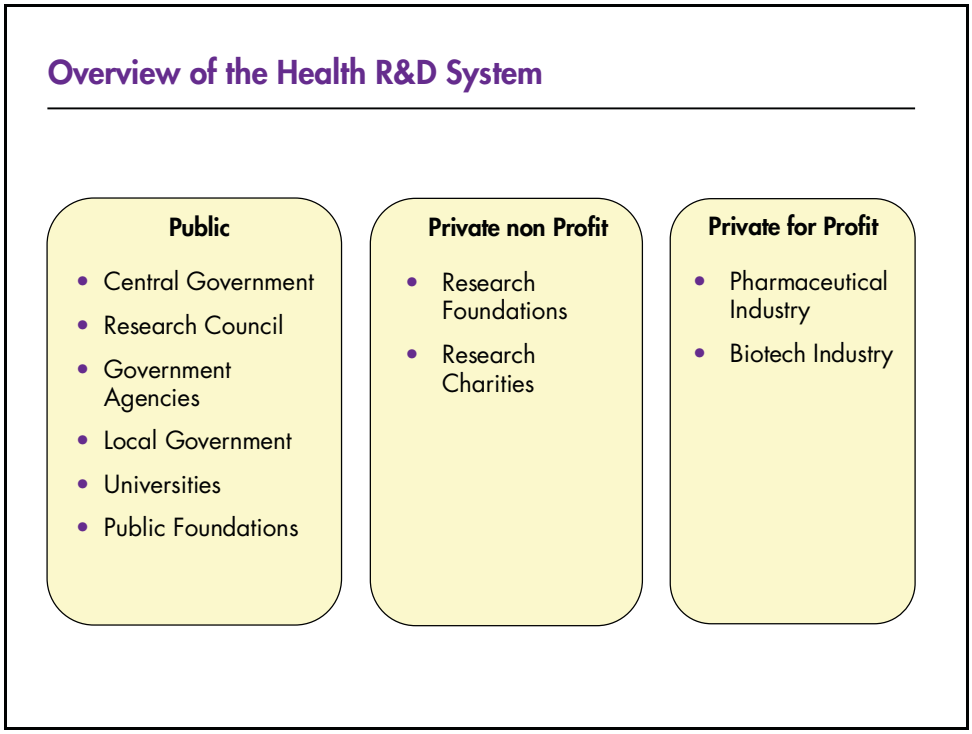
International Observatory on Health Research Systems

Jan Tiessen

July 2007

This documented briefing aims to give an overview of the Swedish health research system. It first gives an overview of the main actors within the health research fields, and then details the funding mechanisms and funding flows within this system. It illustrates the working of this system by giving portraits of three typical funding organisations. In the second section, this analysis focuses on the processes and performance of the Swedish health research system by analysing mechanisms of priority setting, considering research capacity, and examining the outputs of the research system. It concludes by providing an overview of topics that might be prominent in future health research policy debates in Sweden.

Structure of the Swedish Health Research System



The Swedish health research system is diverse, involving many public and private organisations that fund and conduct health research, ranging from pharmaceutical research to public health and health system research. This section gives a brief overview of the organisations, classifying them as public, private non-profit, and private for-profit organisations.

Public Organisations

1. Central Government
   - Ministry of Education and Research
   - Ministry of Enterprise, Energy and Communications
2. Government Agencies
   - Swedish Research Council (Vetenskapsrådet)
   - Swedish Council for Working Life and Social Research
   - Swedish Governmental Agency for Innovation Systems (Vinnova)
3. County Councils and Municipalities
4. Universities and University Hospitals
5. Public Foundations
   - The Swedish Foundation for Strategic Research
   - The Vårdal foundation (Swedish Foundation for Health Care Sciences and Allergy Research)
   - The Knowledge Foundation

Responsibilities for funding basic biomedical and public health research and the universities lie with the Ministry of Education and Research (*utbildningsdepartementet)*. Additionally the Ministry of Enterprise, Energy and Communications (*näringsdepartementet*) supports business focussed R&D funding thought to be of strategic importance to the Swedish economy. In 2004, a total of 4,153 million Swedish kronor (kr)[3] (0.16% of GDP) was invested from public funds into basic research in the medical field, and further 222 million kr (0.01% of GDP) into healthcare and public health research.[4]

Apart from the direct appropriations to the universities, the central government departments do not distribute funding themselves; instead there are several central government agencies that implement central government policies to support health and medical research.

- The Swedish Research Council (SRC) (*vetenskapsrådet*) is the major distributor of research funds to universities. In 2006, it commanded a total budget of around 3 billion kr (0.11% of GDP). Health research is handled by the Scientific Council for Medicine, which is one of five separate councils/committees within the SRC. In 2006, the scientific council for medicine distributed around 570 million kr (0.02% of GDP) to medical research (Vetenskapstådet, 2007).

[3] 1 kr = 0.11€ = £0.07 = $0.15 (as of April 19, 2007).

[4] Swedish government policy bill: Regeringen (2005), Forskning för ett bättre liv, Regeringens proposition 2004/05:80.

- The Swedish Council for Working Life and Social Research (*Forskningsrådet för arbetsliv och socialvetenskap*) is much smaller in size and promotes both basic as well as needs-based social science research in welfare-related topics, including research on public health and public health systems. In 2005, funding for medical research amounted to 93 million kr (Forskningsrådet för Arbetsliv och Socialvetenskap, 2006).
- Although the research councils are agencies under the Ministry of Education and Research, the Swedish Governmental Agency for Innovation Systems (*Vinnova*) belongs to the Ministry of Enterprise, Energy and Communications. Vinnova supports innovative, applied research in various fields, including research into medical technology and biotechnology. In 2006, 105 million kr out of a total budget of 1.5 billion kr (0.05% of GDP) was spent on biotechnology and related medical research (Vinnova, 2007).

At the local and regional levels, the 21 county councils and 290 municipalities, which are the main providers of health services in Sweden, also finance R&D in health. In 2005, county councils and municipalities financed internal and extramural health research with 3.16 billion kr (0.12% of GDP). Six county councils are also a channel for government funds in itself, since they are reimbursed by the government for costs related to giving the universities access to the health service for the education of medical doctors and the performing of clinical research. This agreement between the Ministry of Education, Research and Culture and the county councils is called the ALF agreement (*Avtal om Läkarutbildning och Forskning*; Agreement on Medical Education and Research). In 2005, these ALF funds contributed 1.45 billion kr (0.05% of GDP) to health research at the regional level (Statistika Centralbyrån, 2007).

The universities and university hospitals, which receive their base funding though government block grants, are the main providers of basic biomedical research and also contribute to the financing of research through the allocation of the basic funding they receive. Sweden currently has six medical faculties, located in Gothenburg, Linköping, Lund, Stockholm (Karolinska Institute), Uppsala, and Umeå.

Besides these organisations, which all receive their funding on an annual basis though their budget allocations, there are three research foundations. These foundations finance their activities from a public endowment made in the mid-1990s. These three research foundations are of particular relevance to health research:

- The Swedish Foundation for Strategic Research (*Stiftelsen för Strategisk Forskning*) supports research that is deemed to be of particular strategic importance in the fields of natural science, technology, and medicine. The total spending in 2006 amounted to 550 million kr (0.02% of GDP), of which around 120 million kr were designated for medical research.[5]
- The Vårdal Foundation (*Vårdalstiftelsen*), otherwise known as the Swedish Foundation for Health Care Sciences and Allergy Research (*Stiftelsen för vård- och allergiforskning*)

[5] Data from the Swedish Foundation for Strategic Research Web site, http://www.stratresearch.se (as of April 16, 2007).

supports high quality research into health-care science and allergy research. In 2006, the Vårdal foundation spent 60 million kr on health research (Vårdalstiftelsen, 2007).

- The Knowledge Foundation *(Stiftelsen för Kunskaps och Kompetensutvecklingen, KK-Stiftelsen)* has three main tasks: to improve the knowledge transfer between industry, universities, and higher education institutes and research institutes; to support research in specific fields at the new Swedish universities; and to promote the use of information technology, especially in health and health care and education. Currently, it focuses on support for the 'new universities'. There is no breakdown on the medical and health research costs, and total spending in 2005 amounted to 432 million kr (0.02% of GDP).[6]

[6] Data from The Knowledge Foundation Web site, http://www.kks.se/templates/StandardPage.aspx?id=478 (as of April 16, 2007).

Private Organisations

Non-Profit Organisations: Research Charities and Foundations

- Swedish Cancer Society
- Swedish Children's Cancer Foundation
- Swedish Heart-Lung Foundation
- Swedish Diabetes Association's Research Foundation
- Swedish Brain Foundation
- Swedish Society of Medicine
- Swedish Society for Medical Research
- Knut and Alice Wallenberg Foundation
- Wenner Gren Foundations

For Profit Organisations

- Pharmaceutical Companies
- Biotechnology Companies

Besides the publicly funded bodies, there are many private foundations and charities that support medical research. Some charities and foundations are organised along the lines of specific diseases and sicknesses, such as:

- The Swedish Cancer Society (*cancerfonden*) is an independent charity that raises money for cancer research. In 2007, the Swedish Cancer Society will award around 300 million kr (0.01% of GDP) to research projects, care development projects, in cancer research positions, grants, and other areas.[7]
- The Swedish Children's Cancer Foundation (*barncancerfonden*) acts as an interest organisation and finances research related to child cancer. In 2005, it handed out research funds of 87 million kr.
- The Swedish Heart-Lung Foundation (*Hjärt-Lungfonden*), which pays for the majority of independent heart and lung research in Sweden, annually grants around 85 million kr to research related to heart and lung diseases.[8]
- The Swedish Diabetes Association's Research Foundation (*Stiftelsen Svenska Diabetesförbundets Forskningsfond*) supports research on causes and therapies for diabetes with annually around 14 million kr.

[7] Swedish Cancer Society Web site, http://www.cancerfonden.se (as of April 16, 2007).

[8] Swedish Heart-Lung Foundation Web site, http://www.hjart-lungfonden.se/english/default.asp (as of April 16, 2007).

- The Swedish Brain Foundation (*Hjärnfonden*) supports brain research with post-doctorate grants, and in 2005 these amounted to 6.5 million kr.

Two organisations of the medical profession also support biomedical research:

- The Swedish Society of Medicine (*Svenska Läkaresällskapet*), which represents half of all Swedish doctors,[9] distributes 20–25 million kr annually in the form of project support, fellowships, and travel grants to researchers. Of this, 6.5 million kr are from special funds and the National Board of Health and Welfare (*Socialstyrelsen*), a government agency under the Ministry of Health and Social Affairs.[10]
- The Swedish Society for Medical Research (*Svenska Sällskapet för Medicinsk Forskning*) is a charity that supports young researchers through fellowships and travel grants. In 2005, it distributed around 20 million kr.

Additionally, there are foundations that are geared to support scientific progress in general. One of the largest of these foundations is the Knut and Alice Wallenberg Foundation (*Knut och Alice Wallenberg Stiftelse*), which is based on a private endowment by the Wallenberg family. It mainly supports the purchase of expensive scientific equipment, offers postgraduate fellowship programmes, finances selected research projects of significant potential, and is involved in larger educational research projects. The Knut and Alice Wallenberg Foundation does not support applied research.[11] In 2005, grants of 601 million kr (0.02% of GDP) were awarded to some one hundred different projects. As in previous years, most of the grants have been given to Swedish universities and academies, which predominately use the funds for expensive equipment and specific research project.[12]

The Wenner-Gren Foundations (*Wenner-Gren Stiftelserna*) support scientific research and international exchange of researchers by offering fellowships to post-doctorate researchers and sabbatical fellowships to senior academics. In 2001, around 12 million kr were given to researchers in the medical field (Enerbäck, Lindsten, and Olivecrona, 2004).[13]

[9] The society has currently around 18,000 members.

[10] Data from the Swedish Society of Medicine Web site, http://www.svls.se/slsinfo/110,113.cs?cs_dirid=110 (as of April 17, 2007).

[11] The Knut and Alice Wallenberg Foundation Web site, http://www.wallenberg.org/kaw/in_english/default.asp (as of April 17, 2007).

[12] There is no breakdown available into the fields of research; however, biomedical basic research is very prominent in the current projects.

[13] Data from the Werner-Gren Foundations Web site, http://www.swgc.org/ (as of April 17, 2007).

As in most of the western world, pharmaceutical and biotechnology industry is the biggest investor into health R&D. Traditionally, the Swedish pharmaceutical sector is heavily export oriented, and generated a trade surplus in pharmaceutical products of 31 billion kr in 2005 (1.16% of GDP) (Läkemedelsindustriföreningen, 2006). In 2005, the Swedish pharmaceutical industry invested 12.4 billion kr (0.46% of GDP) into its own R&D. The Swedish pharmaceutical sector is dominated by the two big multinationals, Astra-Zeneca, which still conducts around 43 percent of its R&D in Sweden (Läkemedelsindustriföreningen, 2006), and Pfizer, which took over Sweden-based Pharmacia in 2003 and has since substantially downscaled its Sweden-based activities. Around these companies and in the main university cities of Stockholm, Uppsala, and Lund/Malmö, there are clusters of smaller biotechnology companies that are partly spin offs, partly joint ventures with the large companies (Swedish Institute, 2003). In addition, there are several other well-established pharmaceutical, biotech, and medical equipment companies with development or production facilities in Sweden, such as Ferring, Fresenius Kabi, Pharmalink, and Recip.

Main Funding Sources of Health and Medical Research

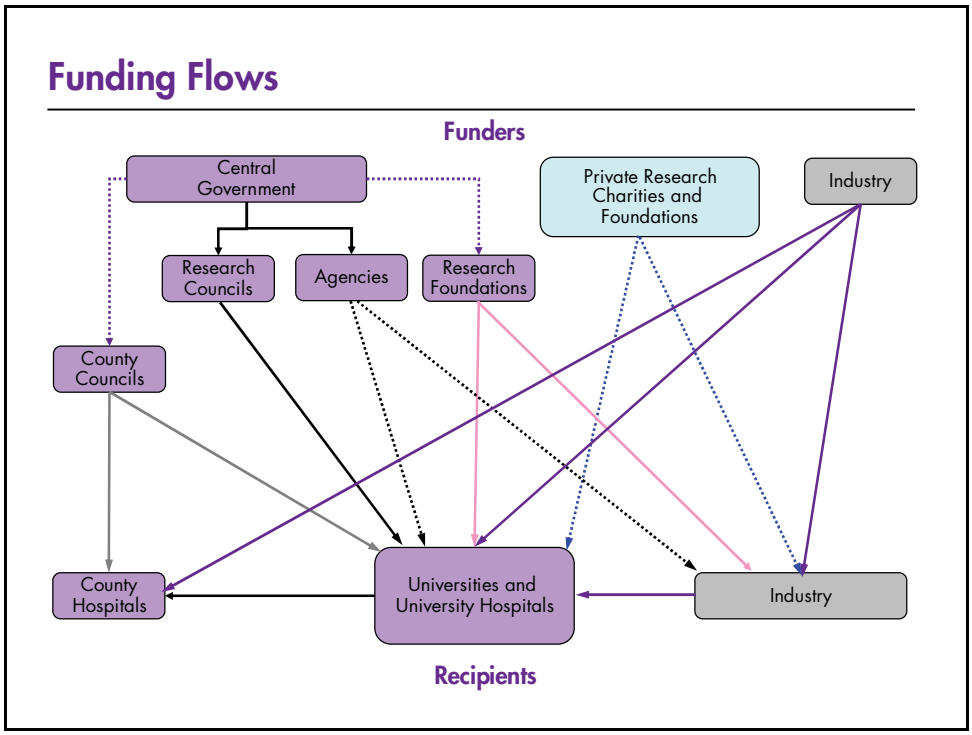
Funding Source (year)	million kr
Industry (2005)	12,421
Municipalities and County Councils (2005)	3,154
The Swedish Research Council (2006)	570
Swedish Cancer Society (2007)	300
The Swedish Foundation for Strategic Research (2006)	120
Swedish Governmental Agency for Innovation Systems (Vinnova) (2006)	105
The Swedish Council for Working Life and Social Research (2005)	93
Swedish Children's Cancer Foundation (2005)	87
Swedish Heart-Lung Foundation (annually circa)	85
Vårdal Foundation (2006)	60
The Swedish Society of Medicine (2006)	20–25
Swedish Society for Medical Research (annually)	20
Swedish Diabetes Association's Research Foundation (annually)	14
The Wenner-Gren Foundations (annually)	12
Swedish Brain Foundation (2005)	6.5
Medical Faculties own funds and income (2001)	251
Knut and Alice Wallenberg Foundation (2005)	601*
The Knowledge Foundation (2005)	432*

*Total spending across all research fields (no disaggregated data available)

Source: various (see text)

The main funder of Swedish health and medical research is the pharmaceutical industry with more than 12 billion kr (0.46% of GDP) provided in 2005. Surprising, is the strong position of the county councils and municipalities, which in 2005 spent over 3 billion kr (0.11% of GDP) on health and medical research; however, half of these funds are from central government. The SRC is the largest provider of independent research grants, followed by the Swedish Cancer Foundation and the public research foundations, the Swedish Foundation for Strategic Research and Vinnova.

Four funding sources will be examined in more detail in this briefing, the county councils as the largest funders of clinical research, the SRC as a representative of public basic research funding, the Swedish Cancer Foundation as a research charity funding basic and clinical research, and the Foundation for Strategic Research as a public funder directed at promoting applied and strategic research.



The funding provided by the various public and private actors is channelled into two main research providers, which actually conduct research. These are the universities and their hospitals in cooperation with other hospitals or industry research facilities and the industry sector. There is only a small number of independent (public) research institutes operating in Sweden, which gives the Swedish research landscape a rather distinct character (Sandström and Sandén, 2002). For the field of health and medical research, these institutes are of no significant importance. The public research institutes are concentrated in the defence field and there is no industry research institute devoted to medical research.

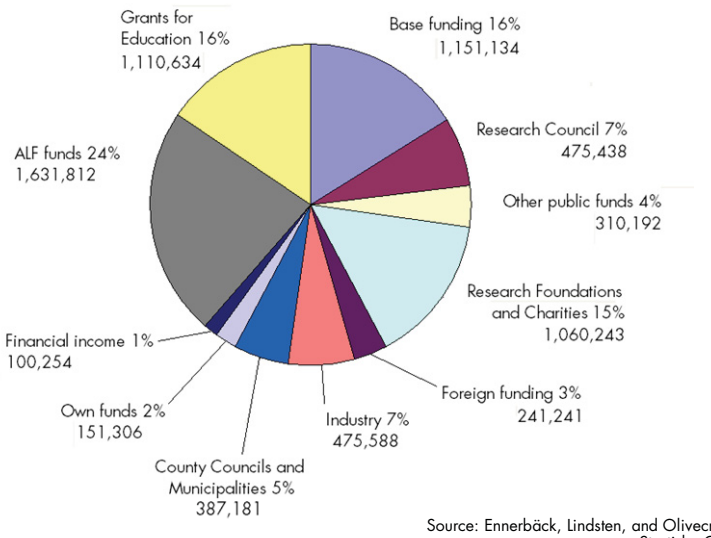
The largest provider of research in Sweden is the industry sector, which conducted health and medical research of a total value of 12.4 billion kr (0.46% of GDP) in 2005.[14] This research is predominantly done in their own facilities. In 2001, the medical faculties at Swedish had a total budget of 7.1 billion kr at their disposal, including base funding and grants for undergraduate education (Enerbäck, Lindsten, and Olivecrona, 2004). As the most important recipient of public research funds, the universities are analysed in more detail in the next section.

The bulk of the research (95 percent) financed by the county councils and through ALF funds is conducted intramurally, that is in the county council's hospitals, giving them an important role in clinical research (Statistika Centralbyrån, 2007).

[14] Data from Statistika Centralbyrån, "Statistical Database," Topic: Education and Research, http://www.ssd.scb.se/databaser/makro/start.asp?lang=2 (as of April 11, 2007).

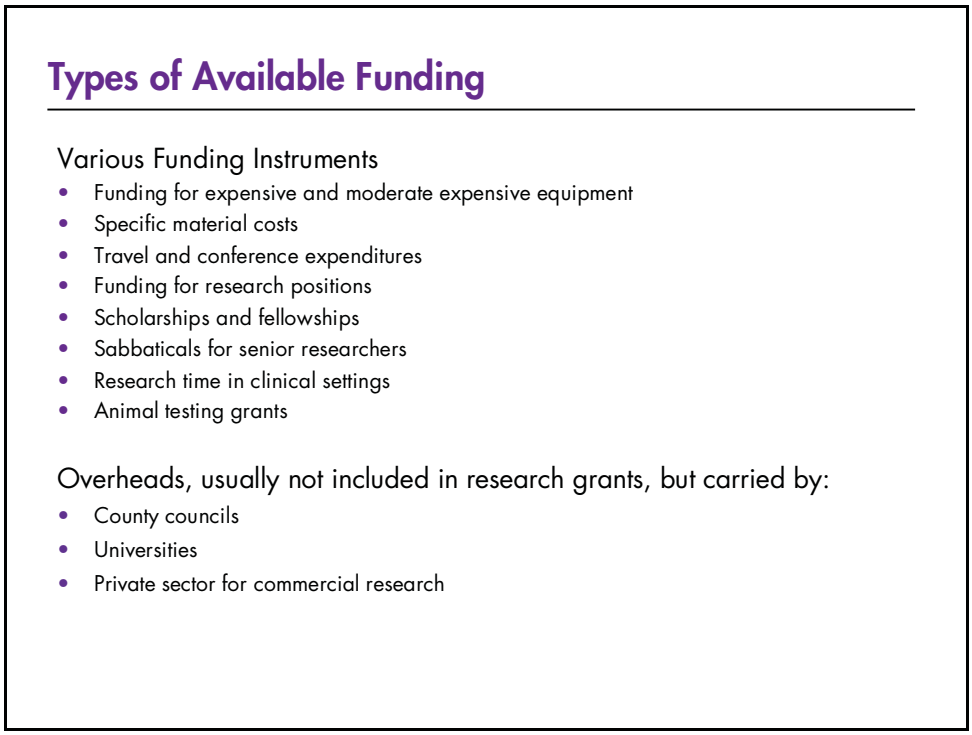
Universities as Research Providers

Income of medical faculties at Swedish universities in thousand kr, in 2001



Source: Ennerbäck, Lindsten, and Olivecrona (2004); Stastiska Centralbyran.

Data from an extensive evaluation of Swedish medical research show the income of the six medical faculties in Sweden and the sources of external research funds for 2001 (Enerbäck, Lindsten, and Olivecrona, 2004). Besides base funding and funding for undergraduate education, the ALF funds are the largest external source of income (24 percent), followed by income from research foundations and charities (15 percent), and funds from industry and the SRC (7 percent each). The high importance of the foundations and charities is the result of a shift towards more private and not-for-profit funding, and less public funding during the 1990s (Enerbäck, Lindsten, and Olivecrona, 2004). In addition, foreign funding, mainly from the European Union and foreign research councils, has increased during the past decade, contributing now to 7 percent of the funding.



There is a wide range of research-related costs that are funded by the funding bodies of health and medical research. However, most of the research grants exclude the overheads of research. Although there is no universally shared definition of research overheads, they usually include the normal running costs of a university or research institute. This might include costs for the use of laboratories and standard material used therein, costs for normal office computer equipment, rent and utility costs for the premises, and costs for library access, etc. Costs of research personnel, however, are often partly covered by research grants, but apart from fellowship and scholarship programmes, the salary of the applicant is often excluded from the project grant.

Because most of non-commercial health and medical research is carried out at universities and university hospitals or at county council hospitals, county councils and universities bare most of the overheads for research. The universities are expected to finance research overheads through the direct appropriations (base funding and grants for education) they receive from the government. In 2001, base funding for medical faculties in Sweden amounted to 1.2 billion kr (0.05% of GDP), and support for education of students to 1.1 billion kr (0.05% of GDP).

The county councils' hospitals in which health and medical research is taking place are reimbursed by central government for the costs they incur through clinical research conducted by universities in their hospital. It has been estimated that these government grants and further expenditure from the county councils covered around 50 percent of all overheads from clinical research in 2001, with the remainder being financed by the universities and the private sector (Hoorens et al., 2005).

County Councils and Municipalities: Mission and Responsibilities

Mission

"Health and medical services are aimed at assuring the entire population of good health and of care on equal terms. Care shall be provided with respect for the equal dignity of all human beings and for the dignity of the individual. Priority for health and medical shall be given to the person whose need of care is greatest"

Responsibilities

County Councils and Regions

- Providing health care
- Public health

Municipalities

- Health protection
- Care of the disabled and elderly

Sveriges Kommuner och Landsting

In Sweden, the local level has its own responsibilities in implementing the policies of the comprehensive welfare state, which also include the fields of health care and public health. The Swedish county councils (*landsting*)[15] are responsible for providing health care and dental services and to improve public health, whereas the municpialities (*kommuner)* are in charge of the care for elderly and the disabled, which accounts for almost 30 percent of their budgets (Swedish Association of Local Authorities and Regions, 2007). In addition, the municipalities have responsibilities in health protection.

Within Swedish health-care law, there is a broadly formulated goal on the objectives of health-care provision at the county level: "Health and medical services are aimed at assuring the entire population of good health and of care on equal terms. Care shall be provided with respect for the equal dignity of all human beings and for the dignity of the individual. Priority for health and medical care shall be given to the person whose need of care is greatest."[16]

As part of their activity in health care and public health, county councils and municipalities conduct health-related R&D. In 2005, total intramural and extramural expenditure on health research at the local level amounted to 3.16 billion kr (0.12% of GDP) (Statistika Centralbyrån, 2007). However, the role of municipalities in allocating this funding is small, as more than 99.5 percent of the funding comes from the county

[15] In some areas, county councils gained more responsibilities, e.g. in regions development, and are now often referred to as regions. However, for the purpose of this briefing, regions will be included in the term 'county councils'.

[16] Hälso- och sjukvårdslagen (SFS1982:763), unofficial English translation published by the Swedish government, available at http://www.sweden.gov.se/content/1/c6/02/31/25/a7ea8ee1.pdf (as of 25 June 2007).

councils. Within the county councils, spending is heavily concentrated on the four county councils (Uppsala, Östergötland, Stockholm, and Västerbotten) and two regions (Skåne and Västra Götaland), each of which have a medical university or faculty. In total, they are responsible for 93 percent of all health R&D spending on the local or regional level. Around half of these funds (49.6 percent) are funds from the central government (so-called ALF funds, see box), which are earmarked to compensate for the costs of clinical research done at the hospitals of these county councils and regions (Statistika Centralbyrån, 2007). The remainder of this section will thus concentrate on the activities of these six county councils and regions.

ALF Agreement

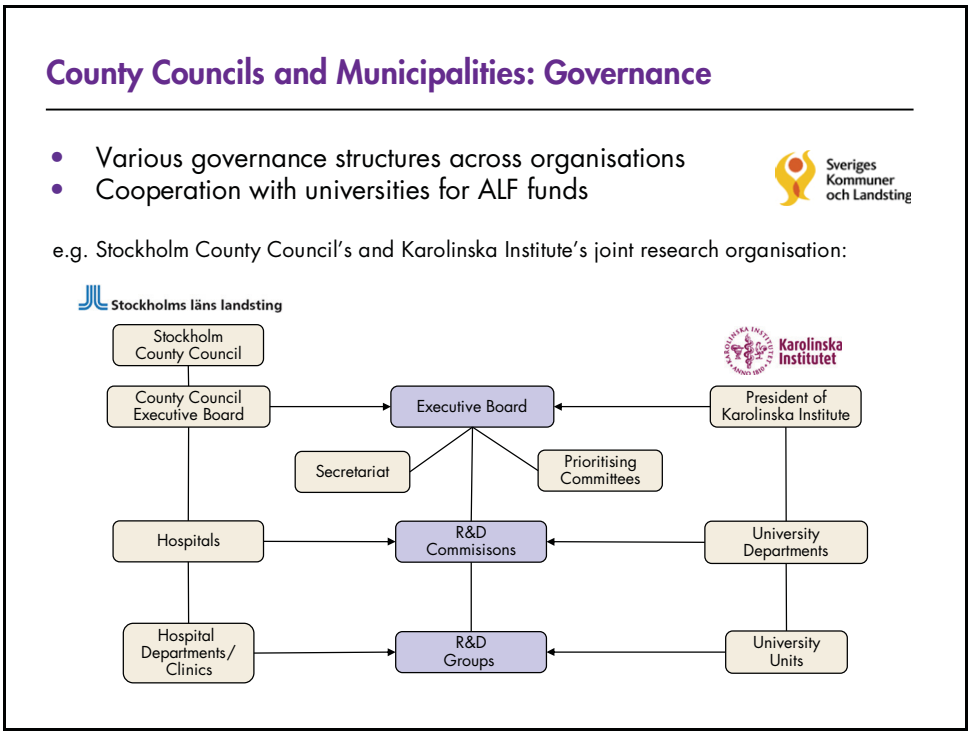
ALF (*Avtal om läkarutbildning och forskning*; Agreement on Medical Education and Research) is an agreement for cooperation between the government, six county councils and regions, and universities, which regulates the reimbursement from the government to county councils for the access given to universities to carry out research and education in clinical settings. In 2005, the ALF funds were 1.45 billion kr (0.05% of GDP) (Statistika Centralbyrån, 2007). The agreement is a central one complemented by regional agreements. Each of the agreements is determined after negotiations between the parties involved. The central agreement is an umbrella arrangement that regulates reimbursement levels and states the issues to be regulated in the regional agreements between the universities and county councils. Examples of issues to be regulated in the regional agreements are the creation of a joint management organisation and health-care areas that should be prioritised for research. The purpose of a joint management organisation is to make sure that decisions on how the available means are going to be spent are taken jointly. The intention of the ALF Agreement is to promote collaborative strategic initiatives for clinical research. The joint management organisation will not only discuss how to distribute the ALF funds but all the funds possessed by the parties for clinical research (Tillhammar, 2003).

The funds support university research and are distributed mainly based on project applications and documented research results. However, the funds are at the disposal of the county councils.

The ALF funds are divided explicitly between clinical research and education. About 80 percent of the funds cover clinical research expenses.

The ALF Agreement has improved the financial conditions for many researchers who carry out clinical research. However, according to some, the visibility of reimbursement for research from the government that comes with the ALF Agreement has reduced the opportunity for using 'free' time in the health service for research purposes. Earlier, when reimbursement was a part of the overall healthcare budget, the division between health service and research was less clear.

Source: Hoorens et al. (2005)



Funding decisions for medical research are taken within the county councils' or municipalities' governance structures (i.e. with the publicly elected county and municipal councils as the highest decision-making bodies), although the specific application and decision-making procedures differ substantially between the individual county councils. However, most of the research funds (including the councils' own funds) are distributed under the framework of the ALF agreement, for which specific governance structures exist in the county councils and regions. Decisions about funding are usually made by bodies in which representatives from the local universities as well as the county councils are represented.

Stockholm County Council, for example, organises its research activities through several joint bodies with the Karolinska Institute, Stockholm's medical university. At the executive level, there is a body that includes the top civil servants of the county council and the head of the Karolinska Institute. Its main responsibilities are to coordinate research activities and to decide about the strategic use of the funds available (e.g. how much should be given out competitively, how much should be used as base funding, etc.). Below this level are several R&D commissions, each responsible for the coordination of research at the individual hospitals, and finally, there are R&D groups, within hospitals, which are responsible clinical areas or disciplines (Karolinska Institute, 2007).

For Stockholm County Council, funding decisions for competitive distributed research grants are made through eight prioritising committees, each consisting of national experts from various medical faculties across the countries. Funding decisions take into account the research question, the proposed methodology, the available competencies and the feasibility, the anticipated benefit for the patients, and if applicable, the progress already

made in a project (Stockholms läns landsting, 2006). Other county councils and regions have similar arrangements in place to distribute their funding.

County Councils and Municipalities: Funding Profile

- Almost all funding goes to clinical research
- Six county councils are the largest funders
- Funding provided as block grants to hospitals and as competitive research grants to researchers
- Largest expenditure types:
  - Labour costs
  - Current/running costs

Local and regional Health R&D in 2005	million kr	Share of total
Total	**3,154**	**100%**
From county councils	3,140	99.6 %
From municipalities	14	0.4 %
From the six county councils/regions	3,061	93.4 %
Intramural research	3,010	95.4%
Extramural research	144	4.6%

Sveriges Kommuner och Landsting

Source: Statistika Centralbyrån, 2007

In 2005, total intramural and extramural expenditure on health research at the local level amounted to 3.16 billion kr (0.12% of GDP), of which only 14 million kr (0.44 percent) came from the municipalities and 3.14 billion kr (99.56 percent) came from the county councils, with the dominance of the six councils with universities (Statistika Centralbyrån, 2007).

Given the purpose of the ALF funds and the concentration on clinical research, it is not surprising that nearly all funding (95 percent) is spent on intramural research in the county hospitals. For all intramural research (i.e. predominantly health), labour costs are the largest expenditure type (59 percent), followed by other costs, such as heating, electricity, cleaning, material etc. (39 percent). Extramural research is primarily conducted at universities, with non-profit organisations and local R&D units being other recipients of funding.

The funds distributed by the county councils are designated to support clinical research, which has the potential of benefiting the patients of the county councils' hospitals. The designated research funds are distributed as block grants to certain hospitals or departments within them, and parts of them are distributed as competitive research grants to researchers. Over the past few years, and especially with the negotiation of the current ALF framework agreement and the new regional agreements in 2003 and 2004, there has been a trend in increasing the competitive research grants at the expense of block grant base funding for the hospitals.[17] For example, the Skåne region distributes no money direct to the hospitals and distributes nearly all research funds in a competitive process (202

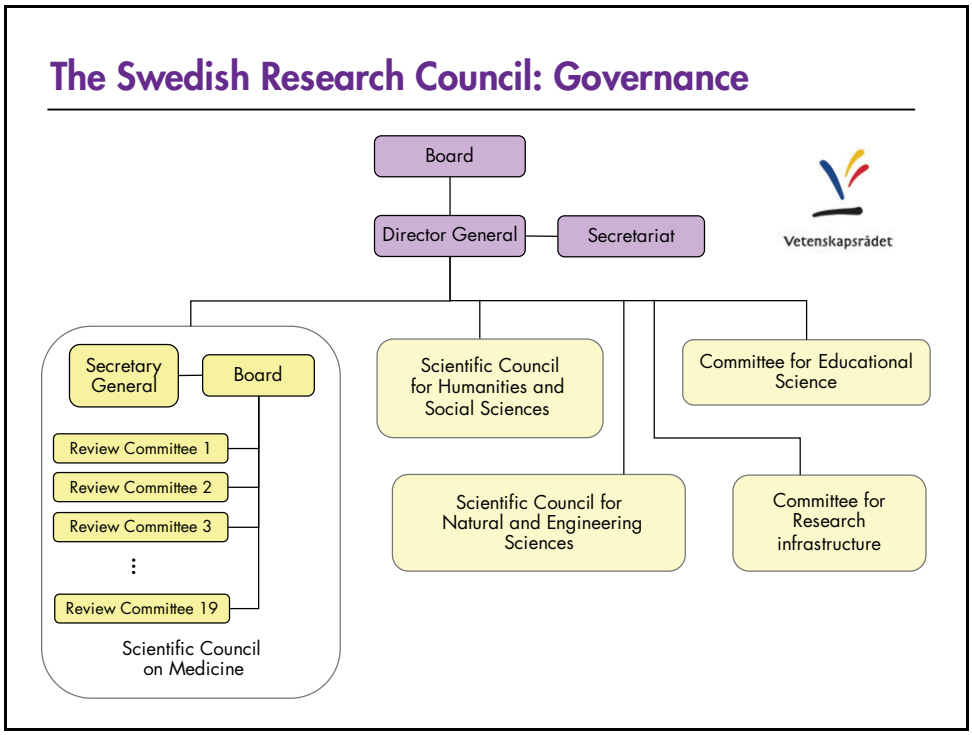
[17] See Sjukhusläkaren, "Tema klinisk forskning: Så fördelas ALF-medlen" *Sjukhusläkaren* 2/2006, http://www.sjukhuslakaren.se/206_index.html (as of April 22, 2007).

million kr in 2005). By contrast, in Uppsala, all clinics get a guaranteed amount of ALF funds, of which parts are then distributed competitively within the clinics. Only 25.3 million kr are distributed in an open competitive system.[18]

[18] See Sjukhusläkaren, "Tema klinisk forskning: Så fördelas ALF-medlen" *Sjukhusläkaren* 2/2006, http://www.sjukhuslakaren.se/206_index.html (as of April 22, 2007).

The Scientific Council for Medicine, within the Swedish Research Council (SRC), is the largest distributor of competitive research grants in the field of medical research in Sweden.

The SRC has the objective to support and advance basic research of highest quality in all fields of science with the aim of making Sweden a leading research nation in the world and contributing to a sustainable development of the society. This involves three main activities: financing research, advising the government on research policy, and providing research information to the research community to foster national and international and interdisciplinary cooperation (Regeringskansliet, 2006). Within this framework, the Swedish Council for Medicine is responsible for providing medical expertise.



The SRC is an agency under the Ministry of Education and Research, and as such it receives a set of annual performance targets and has to report annually on the progress towards these targets.

The SRC is governed by a board, consisting of the Chairman, 11 members, and the Director General.[19] Eight of the board members are elected by the research staff of the Swedish universities, and the remaining three and the chairman of the board are appointed by the Swedish government.[20] Within the frame set by parliament and the government, the board determines the strategic direction of the SRC, takes key decisions, such as funding of expensive research equipment and high performance computer systems, funds for national research centres, etc.

Day-to-day business and operational responsibility for the organisation is delegated to the director general, who is appointed by the government. The director general is responsible to the government for the performance of the SRC.

Funding decisions within the single disciplines are taken by the specific scientific councils (Scientific Council for Humanities and Social Sciences, Scientific Council for Medicine, and Scientific Council for Natural and Engineering Sciences) and the two committees (Committee for Educational Science and Committee for Research Infrastructures).

[19] Swedish government regulation/bylaw: Förordning med instruktion för Vetenskapsrådet (SFS 2000:119).

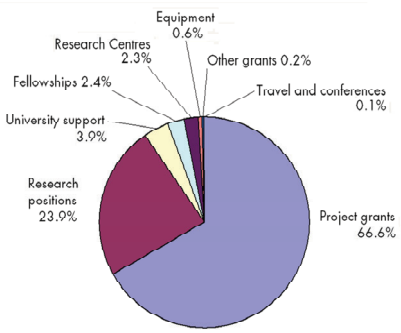
[20] Elections are indirect through 145 electors, elected in six constituencies by the research staff of the universities within these constituencies. Each constituency has a different number of electors it can elect, representing the different university and discipline structure in the respective area; for details see: Förordning om elektorsförsamling vid forskningsråd (SFS 2002:1018).

The Scientific Council for Medicine is led by a board of seven elected members and four appointed members, including the chairman. The board is supported by a secretary general, who is an expert in the scientific field of the Council and is also a member of the organisation's senior management group. The board appoints the members of the review committees (currently 19 committees), each with six members who assess the grant applications. The members of the review committees are active researchers with knowledge of the respective fields of the applications. These committees convey their recommendations to an advisory committee, which prepares the material and presents it to the Scientific Council for a decision.

In essence, the SRC and the Scientific Council for Medicine can be described as researcher-governed organisations, as the majority of board members are elected by the research community, with a strong professional backbone represented by the Director General, the secretaries general, and the administrative staff.

The Swedish Research Council: Funding Profile

Funding instruments used
(as percentage of total grant volume)



Source: Vetenskapsrådet (2007)

Distribution to subfields

Field	Share (%)
Microbiology, immunology, and infections	17.8
Nervous system	14.8
Cell and molecular biology	12.6
Heart and blood vessels	6.7
Diabetes	4.7
Cancer	4.5
Psychiatric diseases	4
Biochemical structure and metabolism	3.7
Musculoskeletal system	3.7
Genetics	3.2
Endocrinology	3.1
Nursing	2.7
Developmental biology	2.5
Digestive system and kidney	2.4
Public health	2.4
Other	11.2

The funding provided by the Scientific Council on Medicine is largely distributed on a reactive basis, in that the Council reacts on the demands of the scientific community. The grant-giving process is based on rigorous peer review by the members of the review committees.

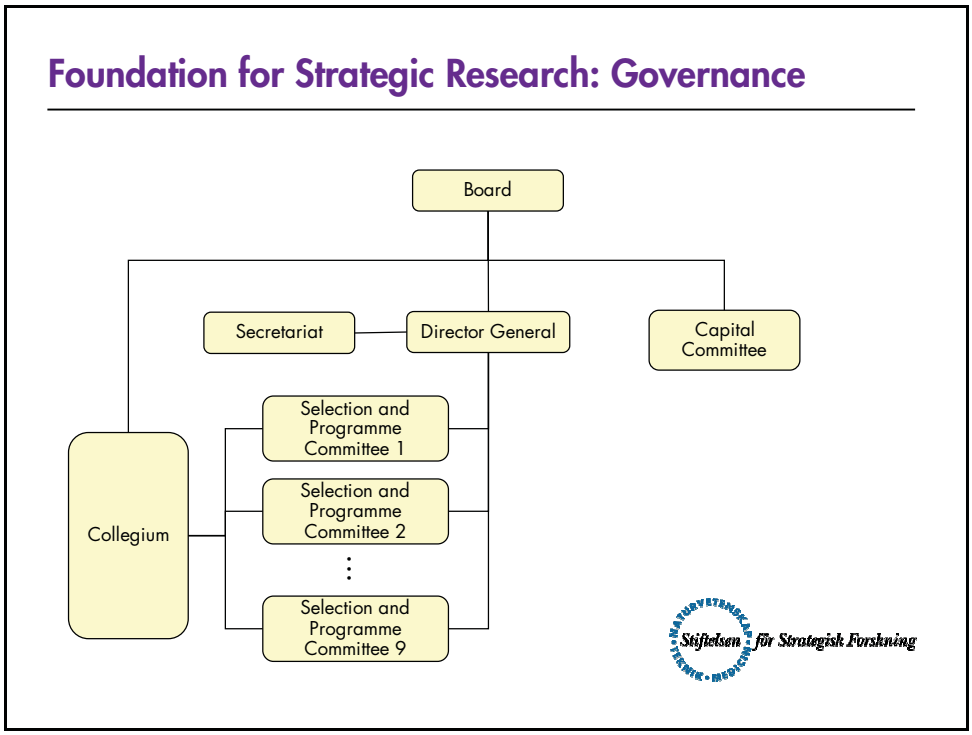
In 2006, the Council received 1310 applications for funding (excluding post-doctorate positions and fellowships, and expensive equipment), of which 32 percent were approved. Of the 128 post-doctorate applications, 23 percent were approved by the Council.

Two thirds of funding is distributed in the form of project grants, which are distributed on a triennial basis for salaries, material costs, travel costs, publication costs, and other project costs, the remainder of funds is mainly distributed to research positions (23.9 percent).

Research into microbiology, immunology, and infections, the nervous system, cell and molecular biology, heart and blood vessels, diabetes, and cancer contributes to 60 percent of the Council's research funding.

Founded with an endowment of 6 billion kr from the wage earner fund in 1994, the Foundation for Strategic Research was set up to support scientific, technological, and medical research. The aim is to "promote the development of strong research settings of the highest international standards and of importance for Sweden's long-term competitiveness" (Stiftelsen för Strategisk Forskning, 2007).

The Foundation defines 'strategic research' as research, which has the long-term potential to benefit Sweden by making it more competitive in economic terms, but also by providing a knowledge base for new companies, by making it a vibrant research place, and by improving quality of life, etc. Research supported by the Foundation encompasses basic, as well as applied research, and any research in between (Stiftelsen för Strategisk Forskning, 2007). Being independent from annual budget appropriations, the Foundation enjoys a great deal of independence in defining research funding strategies and in defining funding procedures with the framework set by the statute of the foundation.



The Foundation for Strategic Research is managed by a director general, who is responsible to a board with 11 members, all appointed by the Swedish government. The director general is supported by a permanent staff of 16 individuals. Additionally, the Foundation created an advisory group (Collegium), which acts as a pool of experts for various advisory groups on strategy, distribution of funds, etc. It consists of 50 experts from research, university, and societal organisations. The capital management is outsourced to professional capital management companies and supervised by a five-member capital committee who report to the main board. To assess the grant applications and to give advice on the specific programmes of the Foundation, there are currently nine Selection and Programme Committees in place, partly recruited from the Collegium (Stiftelsen för Strategisk Forskning, 2007).

Foundation for Strategic Research: Funding Profile

Funding Instruments

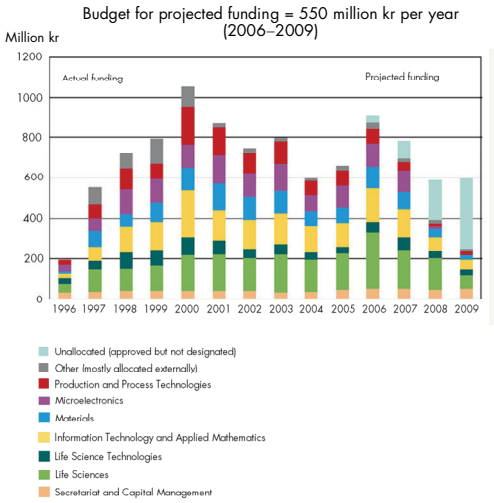
- Strategic Research Centres
- Framework grants
- Funding for individual researchers

Profile

- Funding within programmes
- Applicability of research
- Only initial funding

Stiftelsen för Strategisk Forskning

Distribution of funding to research fields



Source: Stiftelsen for Strategisk Forskning (2007)

Overall, new funding of the Foundation for Strategic Research amounted to 550 million kr in 2006, of which around 120 million kr were designated for medical research. The funding areas relevant for medical research have been designated as life sciences and life science technology.

Funding is usually provided on a competitive basis through application and review processes; however, grant giving is more strategic than the funding of, for example, the SRC. Applications are only accepted within specified programmes, rather than across the whole field of the discipline. Thus, funding can be targeted more easily into specific research fields or onto specific research questions.

Although the foundation has a broad portfolio of funding programmes, there are three instruments most commonly used in funding research:

- Strategic research centres are established in cooperation with and housed in the Swedish universities, and focus on a specific research problem. They involve leading scientists of the relevant fields and try to ensure scientific breadth by encouraging interdisciplinary activity and scientific depth by focussing on leading research groups. They also aim to include research education in the respective fields. Typically a strategic research centre would receive 40–80 million kr over a five-year period.
- On a smaller scale, framework grants provide a flexible tool to focus funding on strategic research issues. They might be used for support an interdisciplinary reorientation in important fields of research, to recruit researchers from outside Sweden or discourage researchers from leaving the country, or to support research

collaborations between universities and institutes and industry. Framework grants vary substantially in size, typically they are within the range of 4–20 million kr.[21]

- Finally, the third major stream of research funding is concentrated on researchers. The Ingvar Carlson Award Grant aims to encourage Swedish-educated, highly qualified post-doctorate researchers to return to Sweden. The INGVAR programme (Individual Grants for the Advancement of Research Leaders) is designed to support promising researchers with the potential of becoming outstanding research leaders by offering grants to build up their own research team.[22]

The time horizon of the Foundation for Strategic Research's funding is typically three to six years. The Foundation deliberately gives only initial and seed funding and is not committed to long-term funding of particular research fields and initiatives. In addition, funding is tied to a proof of the practical relevance of the research, i.e. researchers have to demonstrate the potential future relevance of their research.[23]

[21] Data from Swedish Foundation for Strategic Research Web site, http://www.stratresearch.se (as of April 16, 2007).

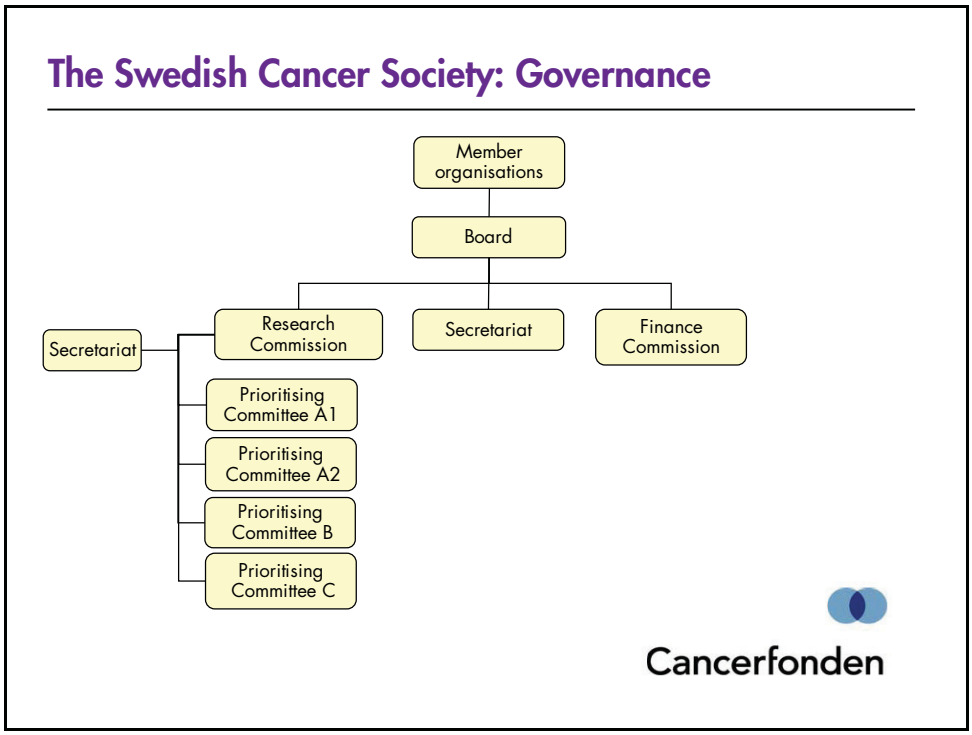
[22] *Ibid*.

[23] *Ibid*.

The Swedish Cancer Society is an independent non-profit organisation, with the main objective of raising and distributing money for cancer-related research. As the principal financier of cancer research in Sweden, the Swedish Cancer Society considers itself to act "essentially as a national research council".[24] The Society receives no public funding, thus fundraising is of crucial importance. The resulting funds rely mainly on private donations, supplemented by larger campaigns, such as the pink ribbon campaign for breast cancer research. Besides financing research, the Swedish Cancer Society disseminates information about cancer, and runs an advice and helpline service for cancer patients, their relatives, and friends. Annually, this helpline receives around 9,000 contacts by phone, e-mail, and on online forums. Finally, the Swedish Cancer Society is committed to use its expertise in the public debate and to help inform public opinion in questions relating to cancer.[25]

[24] Information from Cancerfonden Web site, http://www.cancerfonden.se (as of April 16, 2007).

[25] *Ibid.*



The Swedish Cancer Society is headed by a board, elected by the member organisations of the Cancer Society, including unions, the Red Cross, doctors associations, and a supermarket chain. The board sets the strategic goals and overseas the activities of the Society. The executive is formed by the General Secretary, his secretariat, the Financial Commission, and the Research Commission.

The Research Commission consists of researchers from Swedish universities, supported by their own secretariat. The Research Commission decides on grant applications through an open peer-review process, which aims to promote the highest quality research in the field of cancer, whatever the specific focus. This means that selection takes place in national competition and does not take account of the specific field within cancer research or geographic location. However, there are some exceptions under which targeted funds are awarded to research areas of particular urgency.

The funding decisions by the research commission are prepared by four prioritising committees, consisting of researchers in particular fields of cancer research. Decisions are taken on the scientific quality and originality, the expected new knowledge generated, and the feasibility and contribution the project would make to the overall aims of the Swedish Cancer Society. The main targets of the grant-giving activities are researchers and research groups, which the Society considers to be the most appropriate recipients to stimulate innovation.[26]

[26] Information from Cancerfonden Web site, http://www.cancerfonden.se (as of April 16, 2007).

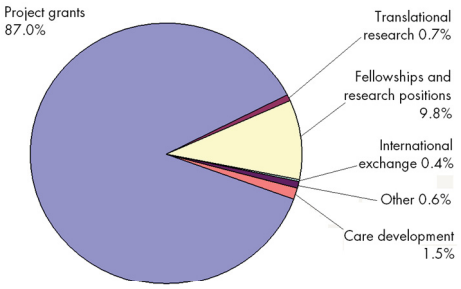
The process of selecting grant recipients is closely regulated and takes place in the following steps:

- Each year, in May, researchers submit applications describing the project aims and its expected results, along with a cost calculation.
- Applications are then sent to eight different prioritisation committees for evaluation.
- The various committees' proposals are assessed in October.
- In November, the Research Commission decides which projects will be funded.[27]

[27] The committees and the Commission jointly include some 60 experts in various cancer-related areas. Data from Cancerfonden Web site, http://www.cancerfonden.se (as of April 16, 2007).

The Swedish Cancer Society: Funding Profile

Funding instruments used
(as percentage of total grant volume)



Source: Cancerfonden (2006)

Distribution of project grants to subfields

Field	Million kr	Share (%)
Biochemisty, molecular biology	21.8	27.5
Cell biology, clinical tumour biology, pathology	19.8	25.0
Cell biology, genetics, haematology, pathology	16.1	20.3
Clinical oncology, clinical pharmacology	7.3	9.2
Clinical oncology, radiology	7.1	9.0
Clinical oncology including epidemiology	5.0	6.3
Care science, behavioural science	2.2	2.8

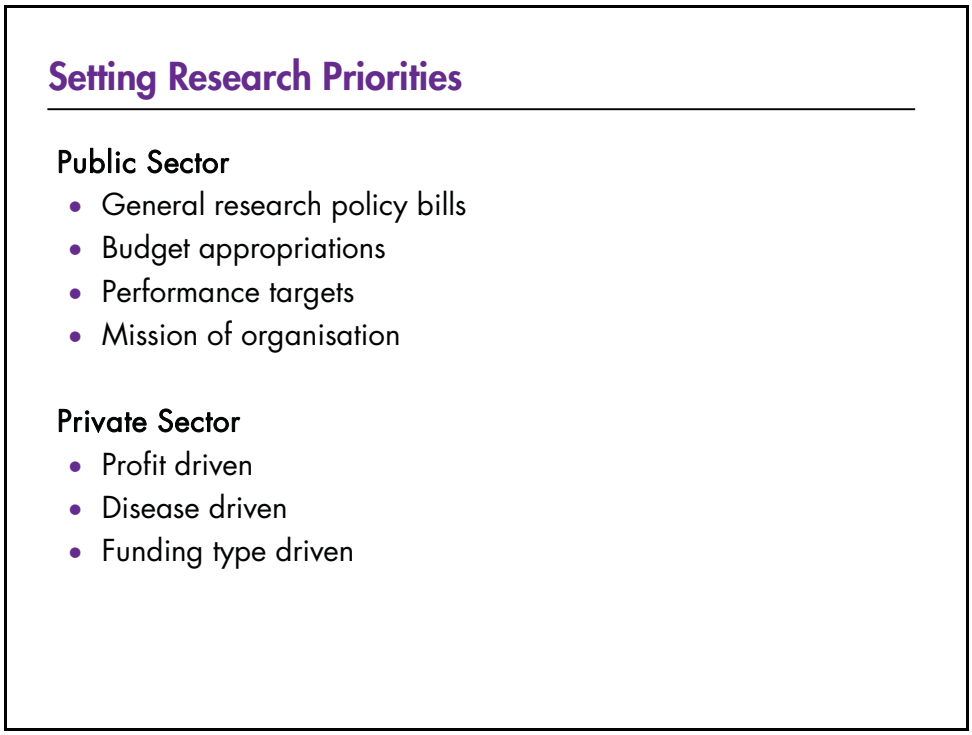
Cancerfonden

The Swedish Cancer Society funds both clinical and experimental research in a broadly defined field of cancer research, which includes research into the following areas: cancer, causes of cancer, molecular and cellular mechanisms, prevention, diagnostics, prognostics and treatment-related prediction, treatment, care, and palliation and rehabilitation.

In 2007, the Research Commission will award just over 300 million kr to research and care development projects, and in cancer research positions, grants, and other areas. Additional areas of support include participation in courses and conferences related to cancer, as well as scientific meetings and collaboration groups. Swedish Cancer Society grants can cover a wide range of costs associated to research, including staff costs, equipment (up to 100,000 kr), and travel and conference costs; however, overhead costs are not included in any grants.

In 2005, the Swedish Cancer Society funded research with 296 million kr, of which 87 percent were for project grants and around 10 percent for research posts (i.e. fellowships, research positions, and research time for clinical staff). The project grants are concentrated on biochemistry and molecular biology and cell biology. In 2005, slightly fewer than every second researcher applying for project funds received actual funding, with the overall success rate for project grant applications at 41 percent (Cancerfonden, 2006).

Processes and Performance of the Swedish Health Research System



As presented above, public health and medical research funding is targeted at various different research purposes, from basic research to applied research, and from public health to molecular medicine. Amidst this diversity, central government sets the framework for public research funding through their research policy bills. In the latest bill from 2005, covering the period 2005–2008, the government defines medical research as one of the priority areas.[28] It proposes budget increases for the SRC in the field of basic research and for the Swedish Council for Working Life and Social Research in the field of public health. In general, the agenda seems to be driven rather by general considerations of economic and scientific competitiveness rather than specific needs assessments of the population. Given the traditional consultations surrounding Swedish legislation and policy making, it is important to note that the SRC or the large research charities, given their specific expertise, have the possibility to substantially influence the government's research policy agenda.[29]

[28] Swedish government policy bill: Regeringen (2005), Forskning för ett bättre liv, Regeringens proposition 2004/05:80.

[29] Prior to the publication of the Government's medical research bill, the Scientific Council for Medicine produced a comprehensive strategy document on the future of medical research (Vetenskapsrådet, 2003); the 2004 evaluation of medical research in Sweden, with its strong plea for increased funding, can also be seen as an attempt to influence the research policy agenda (Enerbäck, Lindsten, and Olivecrona, 2004).

On the county level, funding has a clear focus on clinical research beyond this general decision, with an increasing proportion of the funding decisions being delegated to researcher-dominated bodies.[30]

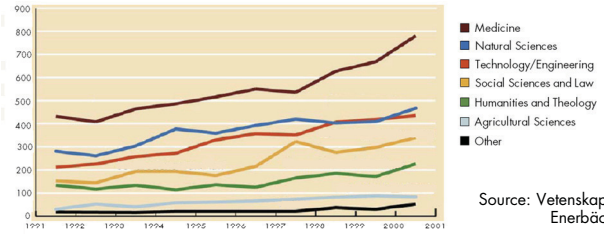
However, the main influence on health and medical research priorities is taken through other means. First, annual budget appropriations and performance targets allow government (and the parliament) to earmark funding and focus activities on specific outputs; second, the government defines the organisational missions of most of the public research funders, and appoints members of their boards. This is especially prevalent for applied and strategic research, whereas decision-making in basic research is dominated by the researchers themselves. Finally, the government has used its freedom to set up special mission agencies to target specific types of funding, e.g. fostering applied research, etc.

The private sector's research priorities seem to be less diverse. As in all other free-market economies, industry focuses its research efforts on the fields in which risks of pharmaceutical development and potential revenues promise a maximum return to the company. Non-profit organisations, such as the Swedish Cancer Society, have a narrower mission profile, mostly focusing on a specific disease. Focus on specific diseases and on profitable developments may lead to the neglect of some research areas for which there are neither large profits to reap nor a sufficient number of people affected to organise charitable research. Finally, charities might focus on specific types of funding, such as the Wallenberg Foundation's support for expensive technical research equipment.

[30] See the topical edition on clinical research of *Sjukhusläkaren*, "Tema klinisk forskning: Så fördelas ALF-medlen," *Sjukhusläkaren* 2/2006, http://www.sjukhuslakaren.se/206_index.html (as of April 22, 2007).

Research Capacity

Number of doctoral degrees by faculty area



Source: Vetenskapsrådet (2004); Enerbäck et al. (2004)

Number of research positions at Swedish medical faculties, full-time equivalents

Position	1994	1995	1996	1997	1998	1999	2000	2001
Adjunct	69	85	173	177	658	631	617	616
Research assistant	238	241	269	241	253	208	199	195
Researcher	329	332	381	438	520	596	642	683
Lecturer, adjunct							1	2
Lecturer, combined positions	51	56	162	194	190	184	155	150
Lecturer	350	365	395	345	465	404	366	373
Professor, adjunct	5	4	5	6	6	10	7	7
Professor, combined position	75	157	239	272	285	292	323	371
Professor	434	341	271	269	249	279	349	378
Total	1551	1581	1895	1942	2626	2604	2659	2775

Source: Enerbäck et al. (2004)

Besides financial resources, researchers are the key resource for conducting research. A sufficient pool of experienced researchers, as well as young talent, is essential for high quality research. A failure to attract young talent into a research field might lead to bottlenecks in conducting research as well as possible intellectual stagnation.

The 1990s saw an increase in research positions at the Swedish universities. However, the data leading to this conclusion has to be treated with care as it reflects some shifts between categories (e.g. professors with combined positions in 1994–1995) and it includes groups who were previously separated from the university statistics. In addition, self-reported data from the faculties indicate a substantially greater number of positions. However, even if overestimating the total numbers slightly, this data shows a marked increase in more senior research positions and a thinning out of positions at the more junior level, which might lead to future problems for recruiting at higher levels (Enerbäck, Lindsten, and Olivecrona, 2004).

The increase in the number of researchers has not gone hand in hand with increased public funding for research positions; thus, research positions are more dependent on external research funding than ever before.

Turning the attention to the education of future researchers, the past few years have witnessed an increase in postgraduate and doctoral students. As the number of doctoral examinations shows, the number of trained researchers has grown faster than in other disciplines. But as in the general case of research positions, public funding of doctoral education has not increased in line with the demand. In Umeå University, for example, only 29 percent of the doctoral students could be financed out of the respective funding, compared to 81percent in social and natural sciences.

An issue of particular concern to the SRC has been the lack of interest of medical students to choose a pre-clinical postgraduate education. Instead, most opt for a clinical postgraduate education (Enerbäck, Lindsten, and Olivecrona, 2004).

Research Translation

From basic research to commercial research

Government agencies supporting the commercialisation of knowledge:

- Vinnova
- Foundation for Strategic Research
- Knowledge Foundation

From pre-clinical to clinical research

- Traditional strength of Swedish health research system, but now eroding
- Funded by county councils, ALF funds, other research funders

Research translation addresses two process of medical innovation and research: (1) the transformation of scientific basic research into commercial innovation; and (2) the transfer of pre-clinical experimental research into clinical research settings.[31]

The transfer of scientific results into commercially viable innovation is undoubtedly the domain of the industry. However, there are several mechanisms, set up by the Swedish government, to facilitate this transfer.

A number of specific agencies, notably Vinnova, the Foundation for Strategic Research, and the Knowledge Foundation, have a focus on applied research and knowledge transfers between the sectors. Vinnova tries to promote more efficient collaboration between universities, research institutes, private sector, and public actors in field where potential growth is high. These collaborations are a platform for knowledge exchange and translation of research results.[32] The Foundation for Strategic Research focuses its funding on the applicability of the generated knowledge and focuses it on specific research issues of public relevance, Knowledge Foundation funds, amongst other in cooperation with Vinnova, joint projects with researchers and industry, and tries to support cross-sectoral networks.

Clinical research and the transfer of findings into actual healthcare procedures have traditionally been one of the strengths of the Swedish health research system

[31] This section draws on a prior RAND Europe report (Hoorens et al., 2005).

[32] Swedish government policy bill: Regeringen (2005), Forskning för ett bättre liv, Regeringens proposition 2004/05:80.

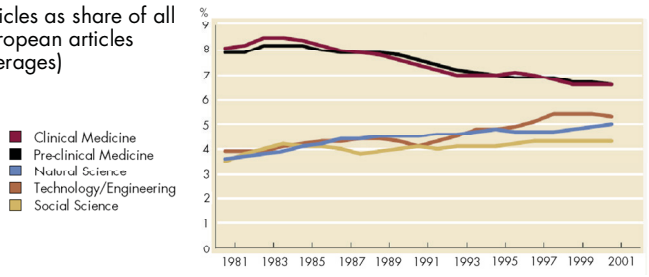
(Vetenskapsrådet, 2003).[33] However, government and the SRC are worried about a demise of clinical research in Sweden. The government points, amongst other things, to changing career patterns within hospitals, which no longer make research a necessary condition for advancement. In contrast the SRC sees the new funding mechanisms as a cause, which reduce the flexibility of conducting research in clinical settings (Enerbäck, Lindsten, and Olivecrona, 2004). In addition, the SRC points out that, "the crisis in Swedish clinical research is not primarily due to a lack of funds. The strained situation in the health service, with less time for research and less importance attached to research as a qualification for a medical career, are more important factors. These issues are important in the context of the Swedish health and medical services and must be resolved" (Vetenskapsrådet, 2004).

The ALF agreement, as previously discussed, is the main mechanism for the mutual exchange between pre-clinical and clinical research. By letting the pre-clinical researchers from the universities interact with the health service and carry out clinical research, pre-clinical research results are both translated into methods used in the health service and observations made from clinical results can feed into the pre-clinical research (Vetenskapsrådet, 2003). Additionally, the SRC provides research grants to clinical researchers and offers 'research time' to doctors.

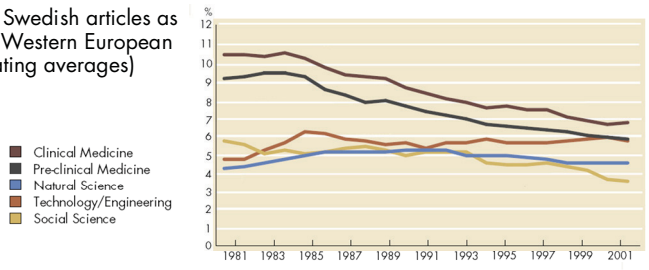
[33] Swedish government policy bill: Regeringen (2005), Forskning för ett bättre liv, Regeringens proposition 2004/05:80.

Performance of the Health and Medical Research System

Swedish articles as share of all Western European articles (floating averages)



Citations of Swedish articles as share of all Western European articles (floating averages)



Source: Enerbäck et al. (2004)

Although this overview of the Swedish health research system has so far primarily focused on the input side of health research and the institutions financing and performing the research, this section will focus on the output side of Swedish health research.

Bibliometric analysis is a common tool to measure the scientific output, and to a certain extent also the scientific quality of the output. The SRC conducts regular bibliometrical analysis of Swedish publications, broken down by science fields and the universities to which the authors are affiliated. For there 2004 analysis, Enerbäck and colleagues also included an international comparison with other European countries in their evaluation of Swedish medical research. Although the publication of scientific articles increased during the period under study (1981–2001), the relative share of Swedish articles declined substantially. If the number of article citations is displayed as a measure of scientific quality, rather than the number of articles, the picture looks similar. The output of medical research had been in a steady decline since the mid 1980s, and more recent analysis up to 2004 shows no break in this trend (Vetenskapsrådet, 2006). However, this decline has been taking place from an exceptionally high starting point. The SRC links these developments to a decline in public funding for medical research, which decreased by 150 million kr in real terms between 1994 and 2001, and at the same time, an increase in the cost intensity of high quality research (Vetenskapsrådet, 2004).

Process and Performance: Evaluations

Sweden has a rich evaluation culture, of which there are three examples in the field of health and medical research:

- Evaluating basic research in the health and medical field (SRC)
- International evaluation of Swedish Public Health Research (Swedish Council for Working Life and Social Research, and the National Institute for Public Health)
- A study of the R&D activities of Östergötland's county council (*Östergötlands Landsting*)

Another instrument for assessing the outputs of a research system are comprehensive evaluations of whole research fields, or specific evaluations of specific instruments or organisations. Sweden has a rich tradition of conducting evaluations of matters of public interest, which leads to a rich reservoir of available evidence on the functioning of the health research system. This section highlights three evaluations conducted recently in Sweden, on basic research, on the subfield of public health research, and on clinical research in a county council.

In 2002, the Scientific Council on Medicine within the SRC appointed an inquiry group to study the medical research situation in Sweden. This evaluation report, cited throughout this briefing, gave a comprehensive review of funding, education, and performance of the health research system The findings have however to be seen against the role of the SRC as the most important distributor of research funding in Sweden and its function as a lobby group for the research community. The main findings were as follows:

- Sweden has cut spending on medical and health research while other countries have increased their funding, so that by 2004 the level of spending was not sufficient to fund international competitive research.
- Resources are scattered among many small recipients.
- Despite additional resources, clinical research has large problems due to the strain under which the public health system operates. Medical personnel has less time to spend on research and research lost some of it's importance for a medical carreer.
- The number of postgraduate students is sufficient, although government funding is insufficient.

- Bibliometric analysis shows that Sweden is falling behind in terms of scientific publications, an important output and quality measure.
- Non-governmental funders are of increasing importance for the Swedish system, which leads to difficulties for non-mainstream projects to receive funding (Enerbäck, Lindsten, and Olivecrona, 2004).

In 2003, the Swedish Council for Working Life and Social Research and the National Institute for Public Health commissioned an international panel evaluation of the Swedish public health research system. The report provides a comprehensive mapping of the research fields, funding, institutions, and scientific merits (Diderichsen and Westrin, 2005; Källestål and Swanberg, 2005; Kamper-Jørgensen et al., 2005). Although being generally very impressed by the scientific quality of Swedish health research as a world leader in public health, with outstanding contributions to international research knowledge, the panel identified a number of key weaknesses of the system:

- The evaluators deemed the funding level to be too low and recommended the diversion of resources from other research fields towards public health.
- Some structural aspects hindered the development of the discipline; this included a lack of international cooperation and exchange, inadequate career structures for young researchers, and a generally too fragmented research landscape with research units that were too small.
- Productivity in some research groups could be increased.
- Research in interventions is currently underdeveloped in comparison to the research into causes of disease and descriptive studies.
- Interdisciplinary work and cooperation with other research units could be improved.

The County Council of Östergötland commissioned the Swedish Institute for Studies in Education and Research to evaluate its research activities, which are concentrated on clinical research (Deiaco and Melin, 2006). Based on a description of the county council's research system and a bibliometric analysis of the research output, the researchers formulated their key findings as follows:

- The quality of clinical research in Östergötland is below the national average.
- The problematic situation has become worse in recent years, and clinical research within the region is in moderate decline.
- One reason for the situation is the attitudes of staff towards clinical research and a lack of an adequate research culture within the community.
- The current problems cannot only attributed to economic reasons, as there are appropriate research funds available.
- Current management systems discourage the uptake of research among doctors.
- There is a lack of national and international collaboration and an insufficient integration into research networks.

Outlook

Hot Topics in Swedish Health and Medical Research Policy

- Funding of medical and health research, especially basic research
- The state of clinical research in Sweden
- The research policy of the non-socialist government
- Fraud in conducting research and distributing funds

Over the 1990s, research policy has increasingly become an issue of public discussion, as witnessed in a dramatic increase in newspaper and journal articles over time, which peaked during the debate of research policy bills in 1995 and 2005 (Sandström, 2006). Besides the daily broadsheets, debates in the area of medicine take place in *Dagens Medicin*, a weekly journal, or in doctors' newspapers such as *Läkartidningen*. The Scientific Council on Medicine itself publishes a quarterly, *Medicin & Forskning*, which covers scientific as well as science policy issues.

Four issues on medical and health research have been increasingly discussed in recent years, and are likely to be discussed in the coming years. These include the future funding of basic medical research; the current state of clinical research; the effect of government policy on research; and fraud.

Without a doubt, the (self-)evaluation of the Scientific Council for Medicine has had a huge impact on public debate, triggering a fierce discussion about future funding for basic medical research, particularly given the fairly bleak picture of the future of Swedish medical research in a recent report (Enerbäck, Lindsten, and Olivecrona, 2004).

Second, the state of clinical research has gained increasing attention in recent years,[34] which has promoted the government to appoint a public commission to analyse the

[34] See, for example, Sjukhusläkaren, "Tema klinisk forskning: Så fördelas ALF-medlen," *Sjukhusläkaren* 2/2006, http://www.sjukhuslakaren.se/206_index.html (as of April 22, 2007).

current situation and to develop recommendations how it should be improved.[35] Preliminary results will be released in 2008, and the final report is expected in 2009. The publication of these results will certainly stir a broad debate about the future of scientific research.

Third, the recently elected conservative government coalition has just taken over after 15 years of social democratic rule, and is likely to be eager to leave its mark on research policies. Thus, the presentation of the first conservative research policy bill will certainly create a heated debate. Various ideas on how to restructure the research landscape are currently floating in the public debate, including following the German example of targeting funding to selected 'elite universities' (Forska, 2006) or setting up a Swedish health research institute, which would mean to consolidate Swedish research into a centralised institution (Sandström, 2006).

Finally, there has been recent debate about fraud in research. This issue also concerns the manipulation of scientific results as well as the distribution of competitive research funds, and several selection committee members of funding bodies had been accused of diverting funds to their own research (Bornholm, 2006; Evengård, 2003; Sandström, 2006).

[35] Swedish government policy bill: Regeringen (2007), Kommittédirektiv: Utredning av den klinisken forskningens behov och villkor samt förslag till åtgärdsplan, Dir. 2007:39.

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