The Research Council
of Norway

Medical and Health-Related Research

The Research Council of Norway's Policy for 2007 - 2012

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The Research Council of Norway
P.O. Box 2700 St. Hanshaugen
0131 OSLO

Telephone: +47 22 03 70 00
Telefax: +47 22 03 70 01
bibliotek@forskningsradet.no
www.forskningsradet.no

English translation:
Victoria Coleman and Carol B. Eckmann
Information services and language consultancy

Design cover:
Melkeveien Designkontor AS

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Preface

The primary objective of the Research Council of Norway is to promote top-quality research in response to the needs of society. This policy will form the basis for the Research Council's efforts to achieve its goals within the area of medical and health-related research. It must be viewed together with the activities of the other stakeholders and institutions in the research system.

This policy reflects the strategic principles set out for the Research Board of the Division for Science, and has been implemented for the 2007-2012 period. This policy will be followed up and elaborated on in an overall action plan and annual work programmes.

This policy is built upon the Research Council's overall strategy, subject-specific evaluations and programme strategies, guidelines set out by the relevant ministries and reports and other principal government documents.

This policy document has been drawn up by the Research Council's administration on the basis of input and comments from a reference group comprising members with broad scientific expertise as well as from representatives of the Research Council's advisory groups. The document has also been circulated for review to other key stakeholders in the field. The Research Council wishes to express its appreciation for all the valuable points of view that emerged during these efforts.

Anders Hanneborg
Executive Director
Division for Science

Kari Melby
Chair
Research Board of the
Division for Science

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Summary

The Research Council of Norway's policy for medical and health-related research encompasses activities under all three research divisions – from basic biomedical research to industry-oriented research and innovation.

A summary of the health status of the population and the need for health services is presented to provide a basis on which to describe the state of the art and identify challenges for the relevant disciplines. Certain challenges are given special focus, such as the need to better exploit the potential for cooperation implicit in translational research and cross-disciplinarity. In the same vein, it is necessary to enhance the utilisation of Norwegian health registers and biobanks, as enhanced cooperation at the national level and further development of today's infrastructure will directly benefit research activities and lead to new knowledge. Other key research challenges include efforts to develop a range of technologies to improve diagnosis and treatment, and the need for research on prevention instruments and global health problems.

The policy document also highlights challenges such as the need to increase recruitment of researcher candidates from the medical professions as well as the overall recruitment of women to researcher careers, the need for greater internationalisation, and the need for greater focus on ethical issues and gender perspectives in research.

A description is given of the flow of resources to publicly funded medical and health-related research and the distribution of resources among the research institutions. The document also explores the roles of and interaction between the major players in the research system, with particular focus on the role and functions of the Research Council.

The policy document describes how the Research Council can create added value for medical and health-related research. It concludes by setting out specific goals and priorities for the 2007-2012 period, during which the Research Council will:

- strengthen the best medical and health-related research
- secure more resources for medical and health-related research
- promote international research cooperation
- focus investments and promote national cooperation, particularly within the areas of:
  - molecular biology research including stem cell research
    neuroscientific research
  - research that utilises Norway's health registers and biobanks
  - imaging technologies
  - large national clinical trials and clinical/basic translational research
  - health and care services research
  - mental health research, particularly relating to children and adolescents
  - public health research
- improve advisory and research dissemination activities
- strengthen research for innovation and industrial development.

It is crucial that Norway, too, conducts functional genomics research. Norway – like other countries – is unique with regard to genetic background and environmental factors. Its biobanks and health registers offer exceptional potential for carrying out genetic and epidemiological studies. Norway is one of a few countries in the world where it is possible to carry out population-based genetic studies of complex diseases. To exploit this potential, focus must be directed toward developing technology for handling large quantities of samples and data (high-throughput screening). Major resources are being invested in stem cell research internationally, and Norway has established a national network in this field. Stem cell research will lead to knowledge about cell division and cell differentiation, which will in turn be crucial to understanding and treating an assortment of serious diseases.

3.1.2 Clinical disciplines

Clinical research sets the stage for improvements in methods of prevention, diagnosis, treatment and rehabilitation. Aspects such as treatment quality and cost-efficiency are also being afforded increasing consideration in clinical research activity. Patient-related clinical research carried out in the Nordic countries is highly sought-after. The combination of well-functioning health care systems and the ability to follow up study participants provides an excellent foundation for large clinical trials. Norwegian clinical medicine is clearly a valuable research area, but its potential has not yet been fully exploited. This is due in part to the fact that data registers on diagnosis, treatment and outcome cannot yet be optimally utilised, and in part to the fact that we still lack a national overview of and systemic knowledge about the occurrence of disease and diagnosis validity for nearly all diseases.

Norwegian clinical research is characterised by small research groups, smaller-scale studies, studies of patient pathways without control groups, and a lack of randomised controlled clinical trials of sufficient statistical strength. In addition, clinicians indicate that they have too little time to devote to research during the course of their hectic workday.

Norway’s pharmaceutical industry is small compared to the other Scandinavian countries. Much of the clinical research being carried out is financed by the international pharmaceutical industry. More funding from Norwegian industry is needed, as is an increase in public funding and product-independent clinical research. Large, industry-independent randomised trials require years of effort and are dependent on an adequate economic framework. Researchers are competing for patients for their research projects, and financial considerations may be a reason why priority is given to well-paid trials initiated by the pharmaceutical industry over projects addressing overarching clinical research questions.

Research that combines system models, controlled interventions, and clinical course and outcome is essential and must be carried out at sufficient scale. This requires greater cooperation across the dividing lines between research groups, disciplines and regions. Enhanced cross-disciplinarity, high-quality translational research, a broader data base and a research community of adequate size are necessary if Norway is to make a significant contribution to international research in the field, establish useful international contacts and increase researcher mobility.

Norway has several active research communities in the mental health field. Psychosis research, treatment research and neuropsychological research are areas of scientific strength. In recent years there has also been growth in research on child psychology and psychiatry. There is a vital need for knowledge about the effect of treatment interventions and about the combination of mental health disorders and substance abuse. Mental health disorders and somatic disorders are often closely linked, and a broad scientific approach is required for dealing with this cluster of problems. It is vital to gain greater insight into the interplay between these types of disorders, as

well as into somatic disorders that are not accompanied by a conclusive diagnosis, such as myalgic encephalomyelitis (chronic fatigue syndrome) and fibromyalgia.

Clinical research in odontology is primarily conducted at the universities, and must be strengthened. The public dental health service has an outreach programme, which provides a good starting point for research on various clinical issues in representative groups. The interface between odontology and medicine is another important area of research.

The incorporation of alternative and complementary medicine into the established health services is gaining wider acceptance, reflecting the increasing use of alternative and complementary medicine among the general public. Although a national research centre for this has been established at the University of Tromsø, in general the amount of research being carried out in the field nationally and internationally is too low, despite the obvious need for knowledge and expertise.

In an international perspective Norwegian primary health services are of high professional quality, but are rooted more in experiential than research-based knowledge. While the specialist health services are required under the statutory framework to carry out research, the primary health services are not. Research in the primary health services encompasses clinical healthrelated research and public health research. It has a broad scope and is often practice and patient-related. There is a tremendous need for knowledge about, for example, how the primary health services in general, and general practice in particular, function in relation to users and to other health and care services.

Social science and humanities-related approaches to research are increasingly being applied to gain insight into patients' experiences and perceptions in relation to illness or treatment. The challenge is to elucidate aspects outside of the purely biological that will be of use to clinicians and patients when taking decisions regarding treatment measures.

3.1.3 Public health and other health-related disciplines

Public health research deals with the health status of the entire population or groups of the population. It addresses factors such as living conditions and social conditions, and explores how the health services and various measures meet the needs of and promote public health. Public health research is often cross-disciplinary and has close links to the social sciences.

Norway has nationwide registers containing detailed health information. Population-based studies have been conducted in all regions of the country, and there are a number of collections of human biological material. Together this gives the country an advantage in terms of research. There is a strong epidemiological research community in Norway, and with a future nationwide patient register with complete personal identification, the country can become a leader in register-based epidemiological studies. A number of the population-based health surveys include samples of biological material in addition to details about lifestyle and the environment. This provides a good starting point for studying how biological factors and environmental and lifestyle-related factors may interact to cause future illness. Linking population surveys with endpoint registers (new cancer cases, cause-specific mortality, information about diseases) makes it possible to study how biology and the environment/lifestyle, either separately or in conjunction with one another, affect specific diseases.

Epidemiological knowledge provides a basis for preventive efforts, but in many areas there is a lack of knowledge about effective disease-preventing activities and about the causes of growing social inequalities in health. Instrument-related research explores how various measures and

incentives may be employed to promote change. Research questions also involve the implementation of measures and identification of impact in relation to targets and target groups. While this research is often cross-disciplinary, research groups have been too small and too fragmented. Report No. 16 (2002-2003) to the Storting, *Prescriptions for a healthier Norway*, and Report No. 20 (2006-2007) to the Storting, *National strategy to reduce social inequalities in health*, have signalised an intention to enhance research on prevention and social inequalities in health.

Health-related research is often a component of cross-disciplinary research on clinical and community medicine. Key topics include lifestyle-related problems and diseases, care services and rehabilitation. There is a lack of knowledge about a number of aspects of the health and care services, from patient perspectives to the effects of measures implemented in practice. There is growing interest in the integration of various scientific traditions in joint projects that may incorporate biomedical, social science and humanities-related approaches. There are well-established health-related research groups at the universities, the largest university colleges and under the regional health authorities. There has been an increase in research activity and researcher training, particularly in the nursing and physiotherapy professions. All university colleges are required to carry out research. This means that expertise and research activity are widely dispersed, for example, among more than 25 locations in nursing alone. Activities that are spread too widely do not promote an effective research environment that can generate high-calibre research.

Health services research encompasses a broad range of disciplines and topics. Research adds to the knowledge base for political and organisational decision-making, and may provide significant socioeconomic benefits. Key topics include resource utilisation, management, organisation and financial management models. Report No. 25 (2005-2006) to the Storting, *Mestring, muligheter og mening* ("Coping, opportunities and meaning", Norwegian only), emphasises the need for research on care services for new user groups and for the rapidly escalating number of elderly persons. As from 2007 the Norwegian patient register contains information about all hospitalisations and outpatient treatment. This opens up new research opportunities and will generate new knowledge about how processes are performed in and use of health services. Research on the coordination between and within the various service levels is also a key topic. Health services research has been carried out by a number of small research groups, but in recent years there has been trend toward consolidating resources in certain fields of research into larger, more permanent centres of competence.

3.2 Specific challenges

3.2.1 Enhancing translational research and cross-disciplinarity

Translational research involves the transfer of research findings between different disciplines, answering scientific questions through the use of new and diverse methodological approaches. In a broad perspective, translational research can be used to transfer knowledge between clinical research and, for example, medical technology research and behavioural science research, or between epidemiological and population-based studies and clinical and basic medical disciplines. Traditionally, translational research has been used to transfer knowledge from basic medical research to clinical research ("from bench to bed") and vice versa.

Many research questions are so complex and wide-ranging that they cannot be solved by individual researchers or small teams of researchers alone. Larger research groups that possess differentiated expertise and competence in different fields are in a better position to address such questions in new, more cohesive ways. Increasingly, cross-disciplinarity is emerging as a key

element of the ability to conduct high-calibre research, procure new knowledge of significance for prevention, diagnosis, treatment and rehabilitation, and conduct good-quality translational research. Cross-disciplinary research requires professional dialogue over time as well as acknowledgement and equal status among researchers. Establishing an effective cross-disciplinary research environment is a time-consuming process, and reaching a minimum critical mass is crucial to success. This can only be achieved by providing skilled cross-disciplinary research groups with adequate long-term funding.

When it comes to solving the pressing health problems we are facing, there is much to be gained from making even better use of the potential for cooperation than is currently the case. The Research Council is in a unique position to support cross-disciplinary research. Through the utilisation of various measures, guidelines and funding instruments, researchers who would normally not be in contact with one another can be brought together in shared initiatives.

3.2.2 Improving utilisation of health registers and biobanks

There is an acknowledged need to enhance national cooperation on and further develop current infrastructure for large-scale databases, including the structuring, quality control and accessibility of data. The Research Council proposed this as a strategic area in its input to *Commitment to Research*.

Over the past 10-20 years there has been increasing integration between epidemiological and molecular biological research, which has given rise to a need for much larger studies, for example to analyse the interaction between genetic factors and various environmental factors. These studies may in turn provide an important basis for preventive measures. The utilisation of health registers and biobanks in research requires long-term public funding. Funding for the collection of endpoint data is particularly important for creating medical quality registers and diagnosis registers in the specialist health services that can serve as a national resource for research.

Methodological expertise in epidemiology, genetics, functional genomics, statistics and data analysis is required to optimally utilise health registers and biobanks as knowledge sources. As modern technological analysis methods are very resource-intensive, the establishment of national expert groups and cooperation agreements is advisable.

3.2.3 Medicine in the future – challenges facing health services?

In future, medicine will be characterised by an increasing degree of specialisation and greater application of technological fields such as biotechnology, imaging technologies, data technology and nanotechnology. Although these will provide a range of new treatment possibilities, they will also pose a number of challenges for the health services.

The mapping of the human genome and the development of functional genomics and new technology have resulted in a paradigm shift in biology and medicine. This has led to the development of bioinformatics and systems biology based on integration and mathematical analysis of large series of data. This, in turn, has facilitated the introduction of personalised medicine – the diagnosis and treatment of the individual patient based on knowledge about that individual’s genetic variations and systems biology. The availability of Internet-based medical information, which enables patients to obtain knowledge about their illness and participate at a whole new level in their own treatment, represents another major adaptation.

There are high expectations associated with gene therapy. In clinical practice the challenge is not only to succeed in replacing and modifying disease-causing genes, but also to address a range of questions relating to patient information and counselling, early identification of potential disease, and, not least, difficult ethical choices in treatment and prioritisation of patient groups.

The ability of stem cells to grow and differentiate holds unique potential for treating various major public health diseases. Stem cells from the patient himself or herself, or from a donor, are used today in clinical practice as part of established treatment (bone marrow transplants, growth of new skin, cartilage and bone tissue). Treatment with embryonic stem cells is still years in the future. Many researchers believe that future treatment methods will involve stimulating the body's own stem cells, which will be made possible by implementing knowledge about which factors regulate growth and differentiation.

The production of images of internal body structures – medical imaging – has become widely utilised in research, prevention, diagnosis and treatment. The pioneering development of various imaging techniques would not have been possible without data technology. Nanotechnology and nanomedicine will provide radical new strategies for targeted cancer treatment, nanorobots for cardiovascular surgery and functional biomaterials to replace dead tissue.

A society characterised by the rapid flow of vast amounts of information and ever-higher levels of knowledge will have an impact on the role of health care workers. The modern patient is no longer the object of a physician's treatment, but rather a partner in cooperation in a joint project. User participation and interventions that promote patient participation in clinical decisions and enhance patients' coping skills are essential in this context.

As life expectancy and the number of elderly rises, health services will be confronted with a mounting need to provide good chronic care. Different incentives often steer resources away from care services toward acute and highly-specialised health services. As the public's level of knowledge rises, so do its expectations regarding and demands for advanced individual treatment. It may increasingly be the case that resources – not knowledge – set the limits for services offered to patients and to the public at large. This will inevitably give rise to complex assessments, prioritisation processes and debate about which types of treatment and care the public health services will be able to offer. It is therefore crucial that treatment and care services are founded on *research-based* knowledge.

It is also vital that medical and health-related research focuses on cost-efficiency in the health care system. New, expensive diagnostic and treatment methods may in many cases reduce costs if they result in shorter hospital stays, faster patient rehabilitation and more rapid return to normal levels of functionality for patients.

One health policy aim is to "prevent more to treat less". This requires intensifying research activity on causal factors, disease mechanisms and preventive measures. Particular attention will be focused on children and adolescents. A healthy lifestyle and an environment free from health-damaging factors are essential for good public health. The need to strike a balance between society's responsibility and the responsibility of the individual for his or her health is an ongoing debate that will become increasingly important in light of the rise in lifestyle-related illnesses and growing social inequalities in health.

Less than 10 per cent of expenditures on health research worldwide is devoted to health problems in developing countries, while these represent 90 per cent of all global health problems. Norway has an obligation to carry out research on global poverty-related health problems. With regard to prevention, a major Norwegian initiative on vaccine research is underway, but greater focus is

In 2005 a total of NOK 597 million was spent in the institute sector, which includes independent research institutes (the Norwegian Institute of Public Health, SINTEF Health Research, etc.) as well as non-university hospitals. Figure 4.1 breaks down R&D expenditures by funding source and research-performing institution.

NIFU STEP has compiled new statistics for R&D resources for medical and health-related research in the Nordic countries (not including R&D conducted by industry). Although coverage differs somewhat, the numbers have been made as comparable as possible. Figure 4.2 shows that Norway spent NOK 780 per capita on medical research in 2005, while Sweden spent substantially more – over NOK 1,000 per capita – when converted to purchasing power parity (PPP) NOK. Denmark and Finland spent NOK 600 per capita, while Iceland spent NOK 550 per capita.

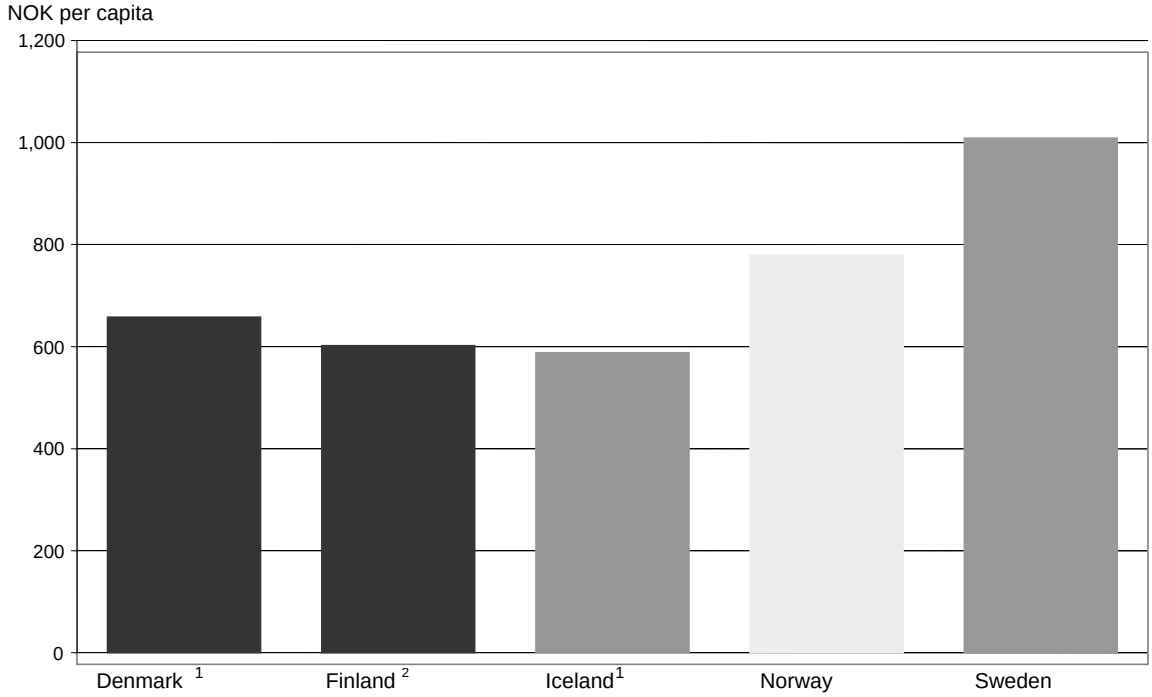

Fig. 4.2 Expenditures on medical research in the public sector in the Nordic countries (per capita) in 2005 or most recent year adjusted to 2005 level. Converted to PPP NOK.

1) Figures for Denmark and Iceland are from 2004 and 2003 respectively and adjusted to 2005 level.
2) Figures for Finland are somewhat underestimated as they do not encompass R&D conducted at non-university hospitals

Substantially more R&D is conducted by trade and industry in the other Nordic countries than in Norway. When the pharmaceutical industry's R&D expenditures are added to public sector expenditures, Sweden's position as the leader in spending is strengthened, and Denmark surpasses Norway by a wide margin. The statistics from Finland and Iceland are not specific enough for comparison in this context.

On a national basis the field of medicine[1] comprised 21 per cent of all operating expenses for R&D conducted in Norwegian universities and university colleges and the independent institute

[1] The national R&D statistics compiled by NIFU STEP are classified according to the system used by the Norwegian Association of Higher Education Institutions. The field of medicine encompasses the following disciplinary groups: basic medical/odontological disciplines, clinical medical disciplines, health disciplines, clinical odontological disciplines, sports medicine, and other and common medical disciplines.

sector combined in 2005 (NOK 16 billion in total). This figure has increased considerably during the past decade: in 1993 it was 14 per cent. The field of technology comprised an equal amount (21 per cent), while mathematics/natural sciences and social sciences each totalled nearly the same (20 per cent). The humanities accounted for seven per cent, while agriculture and fisheries disciplines/veterinary medicine accounted for 10 per cent in the university and university college sector (Figure 4.3). The figure shows that relatively little R&D in the field of medicine is carried out in the independent institute sector.

Funding for medical research in the public sector is allocated by a number of sources. The Ministry of Education and Research, at 38 per cent, is the primary source of funding for the higher education sector, closely followed by the Ministry of Health and Care Services, at 34 per cent. These two ministries are also the primary sources of funding channelled through the Research Council to medical research in this sector (13 per cent). Private associations, funds and donations are a third source of funding (eight per cent), and play a more significant role in the field of medicine than in other fields. The proportion of external funding in the fields of technology, mathematics/natural science, and agriculture and fisheries disciplines/veterinary medicine is higher than in the field of medicine, and this funding is primarily provided by industry. The smallest sources of funding for the field of medicine are industry (two per cent) and foreign sources (three per cent). The latter has increased in recent years, a trend that is expected to continue.

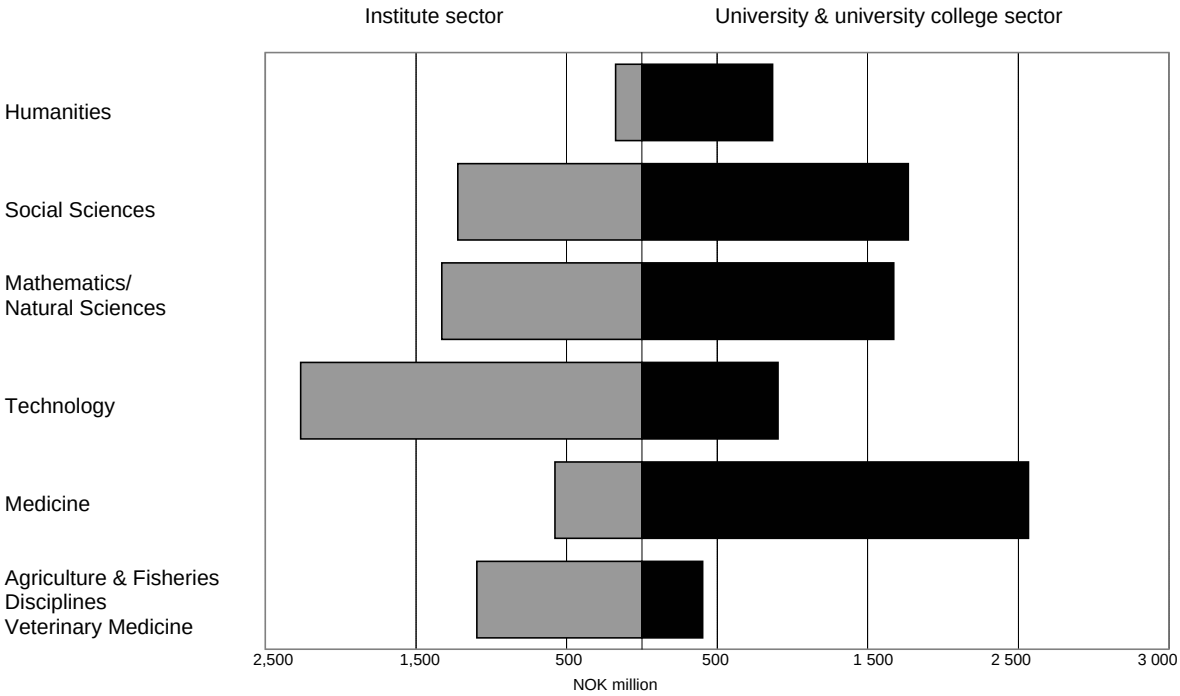

Fig. 4.3 Operating expenses for R&D in the university and university college sector and the institute sector according to field. NOK million.

4.2 Medical and health-related research – funders

Most research funding in the field of medicine is allocated directly to research institutions in the form of *basic allocations*. These basic allocations entail that universities, university colleges and hospital institutions with an integrated university function (university hospitals) have the main responsibility for research, research-based education and researcher recruitment for their entire range of disciplines and courses of study. The regional health authorities are responsible for

research and teaching within the specialist health services, with the particular – but not sole – responsibility for clinical patient-oriented research. Independent research institutes carry out research in defined thematic areas.

In addition to basic allocations, there are three main sources of health research funding awarded on the basis of a application process: 1) public funding from various ministries channelled through the Research Council, 2) allocations from the regional health authorities via the mandatory cooperative body established between the regional health authorities and the universities, and 3) financing from private associations and foundations that engage in fundraising. These sources have different roles to play in the research system, and efforts should be made to achieve both optimal differentiation of these in relation to one another and the best possible coordination of allocations and strategic initiatives.

4.2.1 The Research Council of Norway

As shown in Figure 4.1, the Research Council provided project funding totalling NOK 420 million in the *field of medicine* in 2005 in the higher education and independent institute sectors. This comprised 12 per cent of overall resources allocated to the field. The Research Council also funded research of *relevance to health* for a substantially larger sum.

Projects at the Research Council are categorised (coded) according to several types of variables. One variable involves the thematic and technological priorities set out in the government white paper *Commitment to Research*. Health (health-relevant research) as referred to in the white paper has a broader scope than the category defined by national R&D statistics in the field of medicine, which is limited to research at institutes/units classified within the field. In the Research Council's own statistics, the thematic area of health also encompasses health-relevant research projects carried out at psychology and other social science institutes as well as natural science and technology institutes, and in addition includes some projects conducted by private enterprises. According to the Research Council's own portfolio analysis, allocations totalled NOK 666 million in 2006.

The majority of health research projects are funded under the Division for Science, which has the responsibility for all basic and applied medical and health-related research at the Research Council. There are two main funding instruments used to finance projects: *funding for independent projects*, which is open to all medical, odontological, psychological and other health-related research questions, and *research programmes*, which have a defined thematic scope. The Division for Strategic Priorities and the Division for Innovation also provide funding for health research projects in a few larger-scale programmes. National funding announcements are issued for thematically independent funding and for funding over individual programmes, and both of these instruments can thus be said to represent *national arenas for competition*.

The instruments employed by the Research Council to enhance the *quality of research* are funding schemes in which scientific merit is the sole or primary criterion. These comprise the Centres of Excellence (CoE) scheme, large-scale researcher-initiated projects (STORFORSK) and funding for independent projects. The major difference between these is the size of the allocations and the duration of the projects. In addition, the Outstanding Young Investigators (OYI) scheme targets younger researchers at the post-doctoral level. In accordance with the EU Seventh Framework Programme for Research and Technological Development, the primary objective of these instruments is to promote "frontier research" – groundbreaking research that crosses traditional disciplinary dividing lines and research types (basic research, applied research), when this is appropriate.

As shown in Figure 4.4, some 35 per cent of funding within the thematic area of health is allocated via quality-enhancing instruments, first and foremost through funding for independent projects and the CoE scheme. This funding largely stems from the Ministry of Education and Research and the National Fund for Research and Innovation. Approximately 45 per cent is allocated over various research programmes (including the FUGE programme), and 11 per cent via user-driven innovation projects (trade and industry).

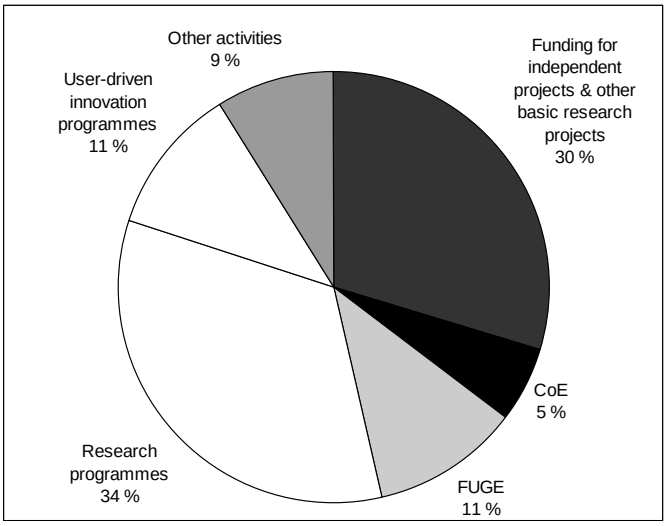

Fig. 4.4 Overall funding for health research via primary instruments in 2006

In addition to thematically independent funding from the Ministry of Education and Research and the National Fund for Research and Innovation, the Research Council receives allocations from the Ministry of Health and Care Services for health research. The purpose of this funding is to enable the ministry to fulfil its sectoral responsibility for research, and the ministry instructs the Research Council to allocate funding over thematically defined research programmes. Programmes primarily involve thematic areas, disciplines and research fields in which there is a need to intensify research activity in order to meet social and health policy objectives. The programmes themselves issue funding announcements for *researcher-initiated* projects. Many researchers believe that funding for the research programmes diminishes the amount of funding available for independent projects. This is not the case. Funding from the Ministry of Health and Care Services is thematically earmarked, and cannot be alternatively allocated to independent projects.

Health-related research programmes and initiatives at the Research Council

Large-scale Programmes

- Functional Genomics in Norway (FUGE) some 1/3 of its budget is used for health-related objectives

Other programmes

- Global Health and Vaccination Research
- Mental Health
- Health and Care Services
- Public Health
- Clinical Research
- Alcohol and Drug Research
- Environment, Genetics and Health
- Absenteeism due to illness and exclusion from working life

Research initiatives

- NevroNor
- Cancer research
- Stem cell research
- Ageing research
- EMBL node – molecular medicine
- Gambling addiction

The greatest relative increase in allocations over the past decade has come from the Ministry of Health and Care Services. The ministry is by far the largest source of funding for health-related research programmes at the Research Council, although funding is provided by other ministries as well. Health-related research programmes and initiatives at the Research Council are listed in the box to the left. Health research projects are also carried out under programmes with different primary objectives.

4.2.2 Regional health authorities

The regional health authorities bear the main responsibility for broad-based, patient-oriented clinical research and translational research within the specialist health services. This is reflected in their research strategies. In 2005 research allocations from the Ministry of Health and Care

Services earmarked for the five (now four) regional health authorities totalled NOK 394 million. For 2007 this sum is nearly NOK 409 million. Allocations from the ministry are comprised of two components: basic funding (40 per cent) and performance-based funding (60 per cent), which is allocated on the basis of average research results in the past three years. The regional health authorities supplement the earmarked research allocations with resources of their own, often on a substantial scale. They have their own research commissions, and most of the research funding is administered and allocated via formal cooperative bodies for research that incorporate representatives of the regional health authorities and the universities in a specific region. The Research Council participates in these bodies as an observer. There are four cooperative bodies that allocate funding to researchers in their own region. Although this takes place in various ways, all the cooperative bodies employ two main types of funding: *strategic funding*, which is not awarded on a competitive basis but directly to specific research fields to meet strategic objectives, and *funding awarded on the basis of a competitive application process*, which is primarily open to researchers employed at a health institution in the region and which is generally awarded on the basis of scientific merit.

4.2.3 Voluntary foundations and donations

The Norwegian Cancer Society, the Norwegian Foundation for Health and Rehabilitation, and the Norwegian Council on Cardiovascular Diseases (under the auspices of the Norwegian Public Health Association) are the three largest non-government players that issue funding announcements. In 2005 these three associations, together with several smaller associations and funding sources, accounted for one-tenth of the research resources in the field of medicine. These associations issue national funding announcements for research funding which is awarded on a competitive basis within limited thematic areas associated with specific diseases (Norwegian Cancer Society, Norwegian Council on Cardiovascular Diseases) or with groups of diseases (Norwegian Foundation for Health and Rehabilitation). Annual meetings are held between the Research Council and these associations, along with the Norwegian Council for Mental Health, to exchange information, experience and views related to tasks and roles. Research activity in a specific area such as cardiovascular disease under the auspices of a private foundation does not imply a reduction in activity in the corresponding area at the Research Council.

4.3 Cooperation and distribution of tasks in medical and health-related research – the role of the Research Council

A national cooperative group (*Nasjonal samarbeidsgruppe for medisinsk og helsefaglig forskning*, abbreviated NSG) was established in 2005 to facilitate dialogue and coordination for medical and health-related research. The NSG consists of representatives from the universities, the regional health authorities, the Norwegian Institute for Public Health, the Research Council, the Norwegian Knowledge Centre for the Health Services, and the Directorate for Health and Social Affairs. The Ministry of Education and Research and the Ministry of Health and Care Services – the two major research funders – participate as observers. The NSG serves as a strategic advisory forum for its members and works to promote optimal utilisation of research resources by, among other things, providing input relating to cooperation and division of responsibility.

The members of the NSG have discussed collaborating on areas of special national interest, i.e. areas in which the various stakeholders will work together and individually to draw attention to, strengthen and prioritise research activities.

researcher groups, ensure that research communities have adequate funding to conduct advanced scientific research, and recruit a sufficient number of new researchers.

The Research Council will

- work together with the university faculties and other stakeholders to ensure that the proportion of overall public research funding allocated to medical and health-related research stays at the current level once the target for overall investment in research totalling three per cent of GDP by 2010 has been met
- work to ensure that its share of the growth in overall resources for the field is increased
- work to increase the amount of funding allocated to thematically independent research
- work to improve the conditions for research by investing in research infrastructure and promoting functional cooperation on operations and utilisation

Goal no. 3: The Research Council will promote international research cooperation

International research cooperation is an essential component in the effort to enhance research quality and scientific development. Breakthroughs and developments in research literally know no boundaries. Norwegian health researchers have a long tradition of cooperating with researchers in other countries, particularly in the USA, but increasingly in European countries as well. Nonetheless efforts are still needed to increase researcher exchange and more fully exploit the opportunities available via many different international cooperation agreements and research institutions.

The development of the European Research Area has picked up speed with the implementation of the EU Seventh Framework Programme, and Norway's presence must be felt. The thematic priority area Health and sub-areas involving health-related topics under other thematic priorities hold greater potential than ever before for the Norwegian research community. The Research Council is responsible for promoting synergies and coordinating the interplay between funding for national initiatives and funding for participation in international research cooperation.

The Research Council will

- design framework grant schemes and guidelines to enable a greater number of Norwegian health researchers to spend time abroad and a greater number of prominent international researchers to participate in Norwegian research communities
- work to achieve a higher success rate for Norwegian medical and health-related research under the EU Seventh Framework Programme than that achieved under the Sixth Framework Programme
- enhance information activities to encourage Norwegian researchers to utilise a greater number of arenas for international cooperation

Goal no. 4: The Research Council will target its initiatives and promote national cooperation

The Research Council's central, independent role in the research system puts it in a unique position to support a national strategic perspective. The Council's position enables it to supplement the roles of other stakeholders, contribute to regional and national cooperation, and support and coordinate major national initiatives. Relevant instruments include network-building, investment in infrastructure, and establishment of centres of specialist expertise and technology

platforms. The Research Council's activities encompass all disciplines and all types of R&D activity, which in turn gives it an exceptional opportunity to promote cross-disciplinary research and collaboration within the research and innovation system. The clear dividing line between clinical research and basic research is fading, and translational research holds the key to major future advances. It will therefore be vital to facilitate bridge-building in research.

The Research Council will

- promote fields of research in which Norwegian research groups demonstrate strength, and in which Norway has national competitive advantages, specific needs and which encompass the largest public health challenges
- collaborate with the universities, regional health authorities and other stakeholders to achieve optimal division of responsibility, as well as take the lead in selected fields
  in particular give priority to and promote:
  - *molecular biology research*, including *stem cell research*, which will be of great significance for the field of medicine in the future
  - *neuroscientific research*, in which Norway has an active research community that can achieve top-level international standing by working together
  - research that utilises Norway's *health registers and biobanks*, where the national challenge is to create a better framework for utilisation
  - *imaging technologies*, which through cross-disciplinary cooperation can lead to improved methods, new areas of application for diagnosis and treatment, and new business development opportunities
  - *large national clinical trials and clinical/basic translational research*
  - *health and care services research*, in order to meet the challenges posed by a growing number of elderly and chronically ill persons and a resource-intensive health care system
  - *mental health research*, particularly with regard to *children and adolescents*
  - *public health research*, with a focus on greater cross-disciplinarity to provide health benefits to all population groups through preventive measures and health-promoting activities

Goal no. 5: The Research Council will work to enhance advisory and research dissemination activities

There is a need to improve the Research Council's advisory function and research dissemination activities in the field of medical and health-related research. The public administration and allocating authorities are key users of research findings, and effective dissemination is crucial to ensuring that these findings are incorporated into the basis for decision-making and are applied in practice by the health services. State-of-the-art reviews, seminars, topic-oriented meetings and better dissemination via popular science material are essential if research is to benefit the public at large. Research should make an active contribution to public debate, thereby securing its legitimacy and position.

The Research Council will

- enhance the knowledge base and statistical basis regarding research
- provide better input by compiling state-of-the-art reviews and overviews
- encourage more research dissemination activities targeting the general public
- carry out research-based evaluations of health policy reforms and questions

Goal no. 6: The Research Council will work to strengthen research for innovation and industrial development

The health sector is a sector with a strong research tradition; however, the utilisation of research findings for business development and industrial aims in this sector is somewhat less developed. At the international level, biotechnology in particular has created a basis for new industry, for example, in connection with medicines, vaccinations, diagnostic tests and efficient food production. It is estimated that in a few years 40 per cent of the global economy will be linked to biotechnology. Medical imaging is playing an increasingly important role in prevention, diagnosis and treatment, and the market is growing rapidly. In biotechnology and imaging technology alike, we are on the cusp of a paradigm shift if the potential of nanotechnology is truly harnessed. Other areas that hold great potential for linking together research findings and business interests include ICT and chemical technology for diagnosis and treatment. The ability to rapidly implement new knowledge and technology will become a key competitive factor, and Norway must take active part in international developments. The three divisions of the Research Council cover the entire scope of research activities, from basic research to innovation. The Research Council's unique structure and its collaboration with Innovation Norway provide an excellent foundation for transforming research findings and business ideas into competitive industrial activities.

The Research Council will help industry to achieve its share of the three per cent target for research expenditures by

- enhancing integration and cooperation between biomedical, medical and technology researchers as the basis for new industrial development
- increasing value creation with the help of research-based business ideas generated by the scientific community
- raising awareness about patenting and securing the rights to commercialisable research findings
- promoting a culture of innovation within the health services

Appendices

Appendix 1 – Key documents

(Where English title appears in quotes document is only available in Norwegian)

- Ressursinnsatsen i medisinsk og helsefaglig forskning i 2005, rapport 9/2007, utdrag fra FoU-statistikken med nordiske sammenligninger ("Resources for medical and
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- Bioteknologisk FoU 2005, Ressursinnsatsen i universitets- og høgskolesektoren og instituttsektoren ("Biotechnological R&D, resources in the university and university college sector and independent institute sector"). NIFU STEP, April 2007.
- FP7 – Health, Cooperation Work Programme. DG Research, European Commission.
- Sosial ulikhet i helse ("Social inequalities in health"). Fact sheet. Directorate for Health and Social Affairs, 2007.
- Report No. 20 (2006-2007) to the Storting, National strategy to reduce social inequalities in health. Oslo: Ministry of Health and Care Services, 2007.
- Proposition No. 1 (2006-2007) to the Storting, Ch. 6, National Health Plan for Norway (2007-2010). Ministry of Health and Care Services, 2007.
- Utviklingstrekk i helse- og sosialsektoren ("Development trends in the health and social services sector"). Report. Directorate for Health and Social Affairs, 2007.
- Helse- og omsorgsdepartementets forskningsstrategi 2006-2011 ("Research strategy for the Ministry of Health and Care Services 2006-2011"). November 2006.
- Report No. 9 (2006-2007) to the Storting, Work, Welfare and Inclusion. Ministry of Labour and Social Inclusion, 2006.
- Report No. 25 (2005-2006) to the Storting, Mestring, muligheter og mening ("Coping, opportunities and meaning"). Ministry of Health and Care Services, 2006.
- Utviklingstrekk i helse- og sosialsektoren ("Development trends in the health and social services sector"). Report. Directorate for Health and Social Affairs, 2006.
- Nasjonal strategi for kreftområdet 2006-2009 ("National cancer strategy 2006-2009"). Ministry of Health and Care Services.
- Official Norwegian Reports 2005:1 God forskning – bedre helse ("Good research – better health").
- Official Norwegian Reports 2005:3 Fra stykkevis til helt – en sammenhengende helsetjeneste ("From piecemeal to unified – cohesive health services").
- ... og bedre skal det bli! – Nasjonal strategi for kvalitetsforbedring i sosial- og helsetjenesten (2005-2015) ("... And it will only get better! – National strategy for improving the quality of the health and social services (2005-2015)"). Oslo: Directorate for Health and Social Affairs, 2005.
- Report No. 20 (2004-2005) to the Storting, Commitment to Research. Ministry of Education and Research.

- Research Strategies 2005-2008: Medical Research for Health, Quality Health Care and Economic Growth. Swedish Research Council, 2003.
- Report No. 16 (2002-2003) to the Storting, Prescriptions for a healthier Norway. Ministry of Health.
- Report No. 26 to the Storting (1999-2000), Om verdier for den norske helsetjenesta ("On values in the Norwegian health services"). Directorate for Health and Social Affairs.
- Visjon helse 2015 – muligheter og utfordringer for norsk helsetjeneste ("Health vision 2015 – opportunities and challenges for the Norwegian health services"). Report. Mandag Morgen and NSH.

Research Council publications:

- Pharmaceutical Research in Norway – an evaluation. Research Council of Norway, 2006.
- FUGE An Evaluation of the Eleven National Technology Platforms founded by the Functional Genomics Programme in Norway. Research Council of Norway, 2006.
- Report on Science and Technology Indicators for Norway. Research Council of Norway, 2005.
- The Strategy for the Research Council of Norway 2004-2010, Research expands frontiers.
- Work programmes
  - Programme on Alcohol and Drug Research 2007-2011, work programme. Research Council of Norway, 2007.
  - Programme on Global Health and Vaccination Research (GLOBVAC), work programme. Research Council of Norway, 2007.
  - The Public Health Programme 2006-2010, work programme. Research Council of Norway, 2006.
  - Programme on Clinical Research 2006-2010, work programme. Research Council of Norway, 2006.
  - Research Programme on Health and Care Services 2006-2010, work programme. Research Council of Norway, 2006.
  - Research Programme on Mental Health 2006-2010, work programme. Research Council of Norway, 2006.
  - Research Programme on the Environment, Genetics and Health 2006-2010, work programme. Research Council of Norway, 2006.
  - Action Plan for the FUGE Programme 2005-2008.
  - FORNY Programme Description – Commercialising R&D
  - BIA Programme Description – User-driven Research based Innovation

- Evaluation of clinical, epidemiological, public health, health-related and psychological research in Norway. http://www.forskningsradet.no
  - Joint Committee Report: Structural issues arising from the panel evaluations. Research Council of Norway, 2004.
  - Clinical Research – Panel 1. Research Council of Norway, 2004.
  - Public Health and Health Services Research – Panel 2. Research Council of Norway, 2004.
  - Psychology and Psychiatry – Panel 3. Research Council of Norway, 2004.

- Evaluation of the biological sciences
  - Panel 2 – Physiology, neurophysiology, neurochemistry, anatomy, toxicology and pharmacology. Research Council of Norway, 2000.
  - Panel 3 – Microbiology, molecular biology, cell biology, genetics, biochemistry, immunology and biotechnology. Research Council of Norway, 2000.

  - Report of the Principal Evaluation Committee: Research in Biology and Relevant Areas of Biochemistry in Norwegian Universities, Colleges and Research Institutes. Research Council of Norway, 2000.
  - Biofagplanen: Styrking av norsk biofaglig forskning. En oppfølging av biofagevalueringen ("Plan for the biological sciences: Enhancing research in the biological sciences. Following up the biology research evaluation"). Research Council of Norway, 2003.
- Fra grunnforskning til bedre helse. 22 eksempler på at grunnforskning lønner seg ("From basic research to better health. 22 examples of how basic research pays off"). Research Council of Norway, 2001.
- Medisin og helse anno 2020 – en forskningsodyssé ("Medicine and health in 2020 – a research odyssey"). Research Council of Norway, 2000.

- Statistics Norway website
- Norwegian Institute of Public Health website
- Directorate for Health and Social Affairs website
- World Health Organisation (WHO) website
- Allocation letters from the Ministry of Health and Care Services

Appendix 2 – contributors

This policy was drawn up on the basis of input and comments from a reference group comprising members with broad scientific expertise. The members of the group are:

Professor Arnstein Finset, University of Oslo, Dept. of Behavioural Sciences in Medicine
Professor Olav Haraldseth, Norwegian University of Science and Technology (NTNU), Dept. of Circulation and Medical Imaging
Medical Director Else Høibraaten, Eli Lilly Norge AS (LMI/NFLL)
Professor Gerd Kvale, University of Bergen, Faculty of Psychology
Professor Per Magnus, Norwegian Institute of Public Health, Division for Epidemiology
Professor Inger Njølstad, University of Tromsø, Dept. of Community Medicine
Professor Ernst Omenaas, Haukeland University Hospital, Centre for Clinical Research
Professor Ole Sejersted, Ullevaal University Hospital, Institute for Experimental Medical Research
Professor Tone Tønjum, Rikshospitalet-Radiumhospitalet Medical Centre, Institute of Medical Microbiology
Professor Lars Vatten, Norwegian University of Science and Technology (NTNU), Dept. for Public Health and General Practice, Centre for Medical Technology
Professor Nina Vøllestad, University of Oslo, Institute of Nursing and Health Sciences