

# Clinical Research

Panel 4A

Evaluation  
Division for Science

Molecular Biology  
*Panel 3*

Botany, Zoology  
and Ecology-related  
Disciplines  
*Panel 1*

Public Health and  
Health-related  
Research  
*Panel 5*

Clinical Research  
*Panel 4B*

Clinical Research  
*Panel 4A*

Physiology-related  
Disciplines  
*Panel 2*

Psychology and  
Psychiatry  
*Panel 6*





## **Clinical Research – Panel 4a**

**All surgery, anaesthesiology, oncology, physical medicine and rehabilitation, gynaecology, paediatrics, dermatology and venereology, ophthalmology, otolaryngology and all clinical odontology, including corresponding translational research**

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## Preface from the Research Council of Norway

The Research Council of Norway (RCN) is given the task by the Ministry of Education and Research to perform subject-specific evaluations. According to the plan for these evaluations the RCN carried during 2010 and 2011 out a comprehensive evaluation of Norwegian research within biology, medicine and health in Norwegian universities, hospitals, relevant university colleges and relevant research institutes. Evaluations have previously been performed within these subjects/fields, in biology in 2000 and medicine and health in 2004.

Due to the large span in disciplines and the number of scientific groups involved in the evaluation, seven international panels of experts were established; each of them reviewed one of the following subfields:

Panel 1	Botany, Zoology, and Ecology-related Disciplines
Panel 2	Physiology-related Disciplines
Panel 3	Molecular Biology
Panel 4a	Clinical Research – Selected Disciplines
Panel 4b	Clinical Research – Selected Disciplines
Panel 5	Public Health and Health-related Research
Panel 6	Psychology and Psychiatry

The Research Council of Norway would like to thank the panel for the comprehensive work the panel has performed.

Oslo, October 2011

Hilde Jerkø (sign.)  
Director  
Division for Science

Mari K. Nes (sign.)  
Director  
Division for Society and  
Health

## Preface from Panel 4a

Clinical research is tightly linked to structures of the national health care systems everywhere. It is also critical what the general attitude towards clinical research is in the university hospitals and other clinical institutions. In all Nordic countries clinical research is mainly, if not exclusively, done in university hospitals. Thus a joint strategy of clinical research in universities and university hospitals is of an utmost importance for the success of clinical research.

The primary aim of the evaluation was to obtain an objective expert opinion about the status of clinical research in Norway. The second aim was to evaluate the progress of clinical research since the previous evaluation in 2004. It should be mentioned here that since the previous evaluation there have been major changes in the organization of most university hospitals as well as the medical faculties in Norway. Some departments and institutions have disappeared and new ones have been formed via different mergers and re-organizations. Thus in many instances it is rather difficult to judge if changes in the research activity of a certain evaluation unit are linked to the changes in the organization or to some other reasons.

The bibliometric analysis of Norwegian clinical research clearly indicates a strong progress both in quality and in quantity during the evaluation period. Almost all departments and institutions have improved their performance, some even dramatically. One very clear change when compared to the previous evaluation was a general trend to form much larger research groups. It is quite obvious that this is a major reason for enhanced performance of the clinical research community.

The evaluation panel recognizes several areas of clinical research that are at a high international level. However, there are also disciplines that obviously need some intervention in order to develop further. The load of routine clinical work was reported to be increasing continuously and the evaluation panel identified lack of research time as a major obstacle for further development of clinical research. This also seems to be a major concern among clinical researchers and could be a major threat in recruitment of the next generation of clinical researchers.

The evaluation panel presents several recommendations that it considers to be important in the development of Norwegian clinical research towards international excellence. The evaluation panel is optimistic about the future development of clinical research in Norway since, in contrast to many other countries, there are necessary economical resources available and a strong drive among researchers towards the better quality of clinical research.



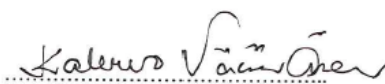
## Statement from the panel, with panel members signature


This is the report from panel 4a in the Evaluation of Medical sciences.


The conclusion and recommendations in this report are based on the supplied information from the institutions and the bibliometric analysis (from NIFU) and hearings with representatives from the units evaluated. The hearings took place in March 28<sup>th</sup> - April 1<sup>st</sup> 2011 in Oslo. This report is the consensus view of the panel 4a. All members of the panel have agreed with the assessments, conclusions and recommendations presented here.

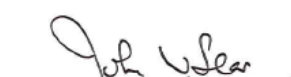
Conflict of interest between Anne-Lise Börresen (under evaluation) and one of the panel members, Klas Wiman, was noticed in the beginning of evaluation week. It was taken into account, and Klas Wiman has not contributed in the evaluation in the part that has dealt with Anne-Lise Börresen's research output.


This report is the documentation of the panel's work. The panel consisted of the following members:

  
Professor Kalervo Väänänen  
University of Eastern Finland  
Finland  
Chair


  
Professor Klas Wiman  
Karolinska Institutet  
Sweden

  
Professor Inger Kjær  
University of Copenhagen  
Denmark

  
Professor John W. Sear  
University of Oxford  
England

  
Professor Katarina Svanberg  
Lund University Hospital  
Sweden

  
Professor Veronika Fialka-Moser  
Medical University Vienna  
Austria

  
Professor Terence Stephenson  
Royal College of Paediatrics and  
Child Health  
England

PhD Riikka Pellinen, University of Eastern Finland, acted as scientific secretary of the evaluation committee.



## **Executive summary with general conclusions**

The panel's conclusion is based on three sources of information, namely 1. Publication and citation analysis collected by Nordic Institute for Studies in Innovation, Research and Education (NIFU), 2. Self assessment reports of research institutions, and 3. interviews. For the most part the self assessment reports were giving adequate information. However, the main problem was the huge difference between the sizes of level 2 evaluation units, variation being from a single research group to a large department. In most cases NIFU report could be used only on level 1 evaluation because it was impossible to dissect out level 2 information from the report. Due to recent reorganization of some universities the data from NIFU's report was very difficult to use even in level 1 evaluation. All interviews were arranged in Oslo, which from practical point of view was found to be a good solution. Just as in the self assessment reports there was too much variation between the representation of the different level 1 and level 2 organizations.

A general conclusion of the panel is that the progress of clinical research in Norway since the last Research Council of Norway (RCN) evaluation in 2004 has been very good. Both the quantity of publications and the quality of clinical research in general has clearly improved. However, there are rather large differences between disciplines and in some cases also between universities.

Another general conclusion is that the impact of the last evaluation has been extensive. A lot of strategic decisions were reported to be taken due to the previous evaluation and a lot of structural changes have taken place at various levels. However, it is impossible for the panel to judge how much of these changes are in fact due to the last evaluation.

## General description of the field

As mentioned above there are large differences between different disciplines when evaluated according to the quantity and quality of research output. In addition, there were remarkable differences in the spirit and attitude of research communities between different universities and university hospitals. There are a number of conclusions that can be drawn at national level and others that are more relevant to either one or two university/university hospital entities.

More or less all evaluated research entities complained of lack of time which could be devoted to their research activities. It was also evident that both the clinical duties and teaching were prioritized over research. Even in positions like professor II, there seemed not to be any time devoted exclusively for research. The panel got the impression that this situation has been getting worse during the recent years.

Overall gender distribution is too much in favor of men. Age structure of professors and also other senior staff is far from optimal. Far too large a percentage of those who are active in research are already over 60 years. In spite of this many younger researchers could not recognize any clear pathways to higher academic positions. Especially there are too few positions for post-doctoral researchers. It was also reported on several occasions that it is difficult to find competent post-doctoral fellows even to those few positions.

PhD training is very strongly on the agenda of most research institutions. The funding system may emphasize the PhD 'production line' too much. The quality assurance of PhD training is variable and needs to be harmonized.

In addition, the general understanding among clinical researchers is that academic positions are so much less paid than clinical work that it is already a major obstacle in recruitment of teaching and research faculty.

In many clinical departments teaching is almost completely based on professor II positions. The panel is very hesitant that this arrangement could be the basis for further development and improvement of clinical research and even teaching. There was also a common understanding among those who were interviewed that 50:50 positions would give much better overall results. In addition, there was a lot of variation between different universities/university hospitals in the number of these positions indicating that it is not only a question of economics.

Collaboration at different levels has clearly increased since the previous evaluation but there is still a lot to do before optimal level of collaboration has been reached. This includes internal as well as external collaboration. There are far too few European connections. National

collaboration between clinics and laboratories as well as interdisciplinary collaboration should be enhanced. There is a lot to be gained in terms of research quality if more collaboration at different levels could be created.

There are still too many publications in national journals although the situation has been improved since 2004. International publication is obligatory for international funding but it also improves the level of science as well. This requirement does not mean that the panel does not appreciate publication of national professional journals which are also important but for different reasons.

Most of the funding for clinical research is channeled via regional funding instruments. This funding does not seem to be competitive otherwise than at local level. It creates a problem since competitiveness in quality is not promoted and may even work against integration of research activities towards better productivity and quality. One may even consider that in some instances regional money is too easy to get and may inhibit applications to national and international funding agencies.

As mentioned above the quantity and quality of clinical research in general has improved a lot and there are several institutions and departments that are doing very well also in international competition. However, there are some rather large areas of research that are seriously lagging behind. One of these areas is research in odontology. All of the three dental departments should improve their research performance to be able to compete at the international level. The other large area which worries the panel is surgical disciplines with some very positive exceptions. Some research areas, for instance oncology and orthopedics are progressing very well.

Norwegian clinical research is in transition also due to the reorganizations of research infrastructures through the country. This has created evident differences between four universities/university hospitals since they seem to be in very different transition phases. This is also sensed in the general attitudes and excitement towards research. This may also be connected to inefficient or sub-optimal research leadership in some occasions.

NIFU's report forms a good basis to evaluate research output and recent development at the level of universities/university hospitals and evaluation level 1. It should also be mentioned that these figures were in very good agreement with the panel's general impression of research activity in different institutions.

According to number of publications and citations it is clear that clinical research in Trondheim has improved dramatically since the last evaluation. It should also be emphasized that on the

basis of interviews the general attitude towards research and the importance of research in Trondheim was very high. In addition, the panel was impressed about the good level of collaboration between different university faculties and the university hospital. A model of “integrated university hospital” seems to function well also in reality.

In the case of Oslo region there is still a lot of confusion among different employers due to recent mergers. However, the general impression of research spirit was positive. The panel wants to emphasize that the integration process should be completed as soon as possible. At present it is too soon to evaluate the success of mergers from the point of view of clinical research. The panel feels that there are a lot of reasons to believe that mergers of different hospitals will form an excellent basis to build up one of the leading clinical research clusters in the Oslo region.

In terms of the number of publications Oslo region has continued its good level and citation indexes show that clinical research in UiO/OUS is developing well but there are a lot of possibilities for further improvement.

The University in Bergen (UiB)/Haukeland University hospital has also improved its performance in clinical research according to the statistics. In several interviews, however, there were a lot of criticisms of the present funding situation, on collaboration between the university and the hospital and especially on the time allocation between clinical duties, teaching and research. The panel suggests that leaders of University of Bergen and the University Hospital should pay special attention to improve the leadership at different levels and also to improve discussion and collaboration between the university and university hospital at different levels. It should be mentioned here that Stavanger University Hospital was a very positive exception.

In Tromsø, the University (UiT) and the University Hospital North Norway (UNN) do not have, at least from the evidence the panel saw, a joint research strategy and goals in clinical research. This should be discussed soon since there seem to be a lot of difficulties in recruitment and also in retention of younger researchers to the university. Accordingly the statistics of the clinical research performance in the University of Tromsø and UNN is at the modest level in general.

In all universities/university hospitals a lot of effort has been focused on different patient registers. These give an excellent platform for many kind of research and should be used widely. In addition, they have opened and will open a lot of possibilities for national and international collaboration. The panel could see the strength of the registers but is to some extent concerned if too many PhD theses are based solely on registry data.

## General recommendations

1. There is an urgent need to develop new models to allocate time between clinical work, teaching and research. This process should be done in close collaboration between universities and university hospitals. The relevance of present professor II positions (100:20) must be reconsidered and replaced by more flexible models.
2. A new national scheme to fund clinical post-doctoral fellows should be developed.
3. Research Council of Norway should consider establishment of clinical research schools in collaboration with regional research funding bodies. This would improve and harmonize clinical PhD training.
4. The allocation of regional research money should be based more directly on research quality of funded research groups. It is important to develop it towards more transparent process.
5. Some clinical disciplines may need additional funding at national level in order to be able to develop international competitiveness (e.g. surgical sciences, dental sciences).
6. Consider national funding to improve research collaboration at different levels, both national and international.
7. In all universities more attention should be paid to recruitment of new academic staff to clinical professorships. More attention should be paid also on gender issue in recruitments.

## University of Bergen, Faculty of Medicine and Dentistry

### Department of Clinical Dentistry

**General comments and organization:** In 2008 the Faculty of Medicine and the Faculty of Dentistry merged into one faculty: the Faculty of Medicine and Dentistry. The Department of Clinical Dentistry, the Faculty of Medicine and Dentistry, comprises 13 basic sections organised into four research clusters. All scientific staff members are organised in these four clusters. There are 12 PhD positions and there is integrated post-graduate clinical and PhD training. PhD applicants from abroad are in majority. Competition between the three universities in Norway, Centres of Competence and a general lack of scientific personnel make recruitment difficult.

Total number of research personnel (professors, associate professors, PhD candidates and post-doctoral fellows) is 47,1. Out of these 39,1 are funded by institution/university and 8 by external funding. During the last three years 13 PhDs have graduated. For 2009 grants as percentages of total research and development expenditures was reported to be 8,8 % (3 375 000 NOK). There are 11,7 professor I positions, 0,2 professor II positions, 12,4 associate professors, 2,5 post-doctoral fellows and total number of PhD students is 20 (eight financed through the quota program).

Productivity of the department in terms of the number of publications has been decreasing markedly during the last five years. Productivity is rather poor when compared to other departments of the same size. Citation index is below the world average by field and also clearly below the Norwegian average. Journal profile index is at a moderate level. Age distribution among scientific staff worries the panel.

An earlier evaluation (2003) concluded that there was a weak research strategy and unfortunately this seems to be true also today. There are too many departments with too few scientific staff members. It is unfortunate that Centres of Competence drain research institutions. There is a decrease in research activity due to recent retirements. Sharing and utilising research equipment and infrastructure at the faculty level could improve this situation. At the same time strong efforts should be made to improve external funding, which is at a very low level.

The panel recommends that research is structured, focused and more visionary and that small research groups are merged into larger groups with common aim and focus.



It is recommended that national and international collaborations are strengthened. It is also recommended that a new national strategy is created that can ensure a formal association between the Centres of Competences and the Department of Clinical Dentistry.

### *Biomaterial*

**General comments and organization:** The Biomaterial research cluster includes participants from different departments at the University of Bergen, and the research is divided into three main project blocks: Performance of clinical biomaterials; Degradation and bio response; and Biobanks. The cluster seems well established in collaboration with Nordic Institute for Odontological Materials (NIOM) and others. The unit's strengths are close collaboration with medicine, interdisciplinary platform, extensive cooperation with e.g. surgical sciences and the Bergen Hospital Trust. Bergen Hospital Trust (Norwegian: Helse Bergen HF) is one of the five health trusts owned by the Western Norway Regional Health Authority. Research tradition is seemingly strong and functions in collaboration with a biomedical cluster. Weaknesses of the unit include outdated facilities and lack of diversity in research projects. There is no material available for personnel resources of the group.

**Training:** There are too few PhD students (currently four) .The recruitment of clinicians to PhD projects is difficult and PhD students are also recruited from basic sciences.

**Collaboration:** Part of Biomaterial research cluster. Collaborates with the Department of Surgical Medicine e.g. in hip implant research and toxicology and immunology.

**Scientific quality:** This is a strong unit with a strong research tradition.

**Societal impact:** Research activities have a very translational approach / outcome.

**Recommendations:** It is recommended that the national and international collaborations are continued and expanded and that international funding is sought for the research projects.

**Grading:** Good

### *Oral Infections and Inflammation*

**General comments and organization:** The Oral Infections and Inflammation research cluster includes participants from different departments at the University of Bergen, other institutions nationally (e.g. the Gade Institute) and internationally. Research in the cluster is divided into four project blocks: Bone and root resorption; Pulp physiology; Periodontal disease; and

Sjögren's syndrome. The projects are all based on biobanks. As a result of the reorganization at the faculty level, five researchers have left the cluster recently and only five remain. Accordingly, cross-sectional collaborations have been established. Weaknesses of the group are reduced scientific output due to merge, heavy teaching load, and reduced access to financial support. The group consists of 6,5 permanent academic position holders and 10 PhD students. More detailed personnel structure could not be extracted from the self assessment.

**Collaboration:** Group's strength is the long tradition for international collaboration in the cluster. Cross disciplinary collaboration has increased after the merge.

**Scientific quality:** Research is mainly clinical and teeth are used as model systems for inflammation. More than 20% of publications are published in Norwegian language.

**Recommendations:** It is recommended that the cluster focuses on hypotheses of common interest for the different disciplines in dentistry. There is currently a great variation in research topics. Perhaps a closer integration with medicine would be an advantage for the cluster.

**Grading:** Fair

### *Patient and Community based Clinical Dental Research*

**General comments and organization:** The Patient and Community-based Clinical Dental research cluster is organised into four thematic areas: Clinical, Interdisciplinary, Community-based and Global oral health research. Each area includes several projects, some EU funded. The cluster is headed by one person and each project has its own project leader. The cluster is quite large; it has 12 senior staff members (professors, associate professors) and 11 PhD students. It is difficult to gain an overview from the self evaluation report regarding structure and organization of research. Group's weaknesses are limited resources (external funding) and small projects with different focus.

**Training:** Over the last 10 years, the group has had a high number of PhD candidates. Currently there are difficulties in recruiting Norwegian PhD students and post-doctoral fellows.

**Collaboration:** The group has good international collaborative networks.

**Scientific quality:** Main research focus in this cluster is clinical and applied. There is great variation in the number of publications produced by the members of this cluster. The quality of the research varies accordingly. Of the publications, approximately ¼ are in Norwegian, and many appear in Scandinavian journals.

**Societal impact:** Research focus in global health research.

**Recommendations:** The cluster does solve many health- and social-related problems, which is admirable, but it is recommended that the cluster describes its hypotheses and aims more clearly, and aims to publish more of its activities in even higher ranking journals.

**Grading:** Fair

### *Tissue Engineering*

**General comments and organization:** The Tissue Engineering research cluster comprises one group of researchers, including 5 senior scientists and clinicians (professors), 7 PhD students and 3 master's students. Additionally, the group includes guest researchers from different countries. The cluster is motivated to find a "tool box" (biocompatible biomaterials and cell types) for bone regeneration utilising the knowledge of researchers and clinicians from different disciplines. Also mesenchymal stem cells and osteoblasts are collected, and genes and protein expression profiles are investigated. For oral science the goal is that stem cells can be used in treatment of oral cavity disorders. The group is an active partner in 2 large collaborative EU funded projects. Group's weaknesses are that it has been founded quite recently, it has a need for special advanced equipment, and lacks Good Manufacturing Practice (GMP) facilities.

**Training:** The group has currently six PhD students of whom three will defend their thesis in 2011. In 2010 the group produced several PhD degrees.

**Collaboration:** The group participates in two EU projects, and has both national and international collaboration projects ongoing with altogether 25 partners in Europe.

**Scientific quality:** The research in this group is creative, original and has clear perspectives and goals. The research is funded nationally and internationally. The group has a high publication rate.

**Societal impact:** The group sees that one of its central aims is to improve the quality of life and health within European community.

**Recommendations:** The panel recommends that this research cluster is supported with the necessary resources. The cluster has potential, i.e. great ideas, common focus and structured. It is impressive and should be recognised that this small group in relative short time has gained such impact.

**Grading:** Good

## Haukeland University Hospital and University of Bergen, Faculty of Medicine and Dentistry

### The Gade Institute

**General comments and organization:** The institute has undergone several changes of the organization during the last decade. Now the institute is divided into two sections mainly on thematic basis, namely Section of Pathology and Section of Microbiology, Immunology and Transfusion medicine. This is considered a reasonable division with regard to teaching activities but not optimal for research purposes. The institute has a common administration with Department of Surgical Sciences.

Organization of research is based on three thematic research programs: Infection, Inflammation and Cancer. The Head of Research of the institute leads the Research Council which coordinates the three thematic programs and Bergen Research School of Inflammation.

Total number of research personnel is 108. Out of these 61 are funded by institution/university, 24 by hospital and 23 by external funding. During the last three years 16 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 51% (29 367 000 NOK). There are 14 professor I positions, 6 professor II positions, 11 post-doctoral fellows and total number of PhD students is 30.

Productivity of the department in terms of the number of publications has been increasing clearly during the last five years. However, it is not known how much this is due to the previous fusions. At present productivity is good when compared to other departments of the same size. Citation index is above the world average by field and also above the Norwegian average. Journal profile index is at a moderate level.

### Cancer

**General comments:** The Gade Institute was founded in 1912 as an institute for pathology. This unit was not included in the evaluation of clinical research in 2004. It was, however, evaluated in 2000; the various groups were considered good, fair or poor.

**Organization:** In 2003 the Faculty of Medicine at University of Bergen was reorganized from 30 to 7 institutes. This resulted in a merge of the two sections at the Gade Institute. A new reorganization took place 2008 and the Faculty of Medicine and Dentistry were merged together. In 2009 all research groups in microbiology and immunology were collocated into a new laboratory building at the Haukeland University Hospital. The institute has a Research

Council directly under the leadership at the institute. There are three thematic research areas: Infection, Inflammation and Cancer. The Cancer program is divided into 4 groups named after the principal investigator. It has a total of 56 persons, including 6 professors, 2 professors II, and around 5 positions for senior researchers or post-doctoral fellows.

**Training:** There are currently 48 PhD students at the Gade Institute and 27 within the cancer program. There are 9 post-doctoral fellows at the Gade Institute.

**Research collaboration:** The Cancer Unit of the Gade Institute is the Norwegian node in an EU funded melanoma project. International collaboration is reported from the individual group leaders, for instance with universities in the US, the UK, China and Finland. There are also projects for developing countries with training of PhD students from e.g. Kenya and Sudan. A so-called sandwich program with alternating research activity in Norway and in the country of origin has also been initiated.

**Research activity and scientific quality:** Research is being pursued in five different fields. The Tumor Biology group is focused on two main areas: Vascular interaction including Angiogenesis, and Biomarkers for aggressive cancer and Novel therapeutic targets. This group has high number of publications (65) and 5 completed PhD students, and recent publications in high impact journals such as PNAS. The group in Quantitative Pathology and Cancer, which is mainly based at the Stavanger University Hospital, is the most active group as judged from the number of PhD students (9) and has published 50 papers during the period of evaluation. The Oral Cancer group has an emphasis on the study of the interaction between cancer cells and surrounding tissue. The number of publications is 25 and 5 PhD students have completed their PhD. The group dealing with Virus and Cancer has studied the reprogramming and transformation of prostate cancer cells including epithelial-mesenchymal transition (EMT). The output is 30 publications and one completed PhD.

With regard to citation and journal indicators during the period 2005-2008, the publication metrics for the Gade Institute is not given for the Cancer Unit separately, from where approximately 20% of all the publications originate. The rating for the institute as a whole is above in 3 of the separate metrics with 121 for the citation index in the field, 120 for the journal citation index and 105 for the citation index in Norway and just at the average for journal profile (101).

Overall the groups within the Cancer program perform relevant cancer research of reasonably high quality. All of them seem to be running active international collaborations and a good proportion (35%) of their publications appears in journals with impact factor above 4. They aim at increasing the frequency of high impact publications.

The activity among the academic staff members is rather uneven, as shown by the number of publications which varies from 6 to 65 papers for each individual during the six years of evaluation, and the number of active PhD students which varies from 0 to 9.

The unit is well equipped with research facilities and many of the standard technologies available, such as expression microarrays, DNA sequencing and flow cytometry, are available. The low capacity of the technical staff for routine biobanking and isolation of DNA/RNA from patient samples is listed as a significant problem.

One weakness is a decline in basic funding. Less than 50% is external funding. The EU funding is only approximately 5% of the total. Indeed, the groups are actively trying to get more external funding. Two of the groups have recently received funding from Helse-Vest and are partners in new grants from the Research Council of Norway.

**Societal impact:** The research conducted within the Cancer program is translational and may clearly provide benefit to the cancer patient in the future.

**Recommendations:** This unit should strive to improve its publication record further, and make sure that all staff members increase their output. Increased integration among the groups within the unit and locally within UiB would enhance the quality of the research. Also, better funding is important in order to allow recruitment of skilled post-doctoral fellows and technical staff.

**Grading:** Fair - Good

### **Institute of Medicine**

**General comments and organization:** The Institute of Medicine has been formed via several different fusions of previous departments during the last ten years. It now consists of 13 sections which primarily fulfill the teaching obligations. Each section comprises at least one full time and several part time professors. The present conclusion of the department is that the structure is too rigid and they are now shifting their structures in a more “research friendly” direction.

According to their present strategy, new scientific staff will be recruited into those sections that are active in research. More internal resources are also targeted to research and technical staff will be re-located according to the research activity.

Total number of research personnel is 239. Out of these 145 are funded by institution/university, 19 by hospital and 75 by external funding. During the last three years 60 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 38,6 % (32 870 000 NOK). There are 32 professor I positions, 24 professor II positions, 16 post-doctoral fellows and total number of PhD students is 67.

The deputy chair of the department, chairs a Research Board which discusses some strategic issues. Within most sections of the institute there are 1-2 research groups headed by a full time or part time professor. However, clinical demands tend to overrule the scientific requirements.

Productivity of the department in terms of the number of publications has been increasing nicely during the last five years, and is rather good when compared to other departments of the same size. Citation index is above the world average by field and also above the Norwegian average. Journal profile index is at a good level. The age distribution among scientific staff is alarming since a major fraction of them are already over 60 years.

Institute of Medicine has established two core facilities and provides some support for those groups applying for external funding, especially from EU. It has strengthened external collaboration and has done a number of recent recruitments from outside the University of Bergen.

### *Hematology – Oncology group*

**General comments:** This unit is focused on both solid and hematological tumors. In the 2004 evaluation, this unit was judged positively. Its scientific output was considered good, but the age structure was identified as a problem.

**Organization:** The unit has four groups, working with Gastrointestinal tumors, Genital tumors, Breast cancer, and Hematological tumors. They are located close to each other and seem to interact intensively. There are 6 professors (including 2 professors II), 12 clinicians, 8 senior scientists/post-doctoral fellows, 14-22 PhD students, and 12 technicians. The unit has good funding from the Norwegian Cancer Society, but only limited funding within the University of Bergen and from Helse-Vest RHF.

**Training:** The unit has a PhD program for both PhDs and MD, PhDs.

**Research collaboration:** All four groups have international collaborations with groups in the US, UK, France and/or the Netherlands. In addition, animal studies are performed in collaboration with the University of Bergen.

**Research activity and scientific quality:** Overall this unit performs translational cancer research of high international quality. The participating groups have numerous publications in high impact journals, including both basic science journals and more clinical journals. The combination of research on solid tumors and hematological malignancies may seem odd but has historical reasons. The focus on biology, the large biobanks with tumor samples, and the proximity of the clinic are real assets. Also, the unit has a small animal optical imaging facility. The vision for the future is dynamic translational research, and not only to combine laboratory and clinical research but to wholly integrate those with epidemiological research. The focus on radiotherapy is interesting and important.

**Societal impact:** The unit performs impressive translation of research from basic science to clinical applications, with direct benefit to the cancer patients. One example is the improved survival in prostate cancer and testis cancer.

**Recommendation:** The research at this unit is of high quality. The translational approach (from biology to the clinic) is very good. However, the unit should try to improve recruitment of young clinicians and scientists. Furthermore, it appears that researchers within the unit do not have a good communication with the Faculty of the University of Bergen, and that novel technologies are lacking to a certain extent. For instance, deep sequencing and bioinformatics are needed. These weaknesses should be addressed. With regard to funding, this unit has the potential to obtain substantial grants from the EU. This would allow even more extensive interactions with European research groups. The interactions with other groups in Norway seem rather limited; there is probably a lot to gain from strengthening such contacts.

**Grading:** Very good

### Department of Clinical Medicine

**General comments and organization:** The Department of Clinical Medicine (DCM) combines together 6 clinical sections, namely Medical Genetics and Molecular Medicine, Neurology, Obstetrics and Gynecology, Ophthalmology, Pediatrics and Psychiatry. These are located either at Haukeland University Hospital or at Stavanger University Hospital. DCM recognizes 18



different research groups. Research groups include participants from several sections. All research groups are reported to have a minimum requirement for leadership, participants (senior and junior), external funding as well as independent publication record.

The organization of DCM seems a bit confusing and disorganized with lots of levels and small departments. The research group is the working unit. It is argued that education needs the small disciplinary structures. In addition, clinics form one level and it appears that actually buildings make the framework. The panel admits that it may function well if all members of the community are well aware of the structure.

Total number of research personnel is 136. Out of these 88 are funded by institution/university, 18 by hospital and 26 by external funding. During the last three years 19 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 44,8% (24 000 000 NOK). There are 22 professor I positions, 12 professor II positions, 19 post-doctoral fellows and total number of PhD students is 16.

Productivity of the department in terms of the number of publications has been increasing steadily during the last five years. At present productivity is good when compared to other research organizations of the same size. Citation index is well above the world average by field and also above the Norwegian average. Journal profile index is at a good level. However, there is concern that there has been actual decline in the quality of research when compared to previous evaluation.

Although the institute has done a number of structural changes since the last evaluation, the organization appears fragmented and suboptimal. The panel recommends that the institute should take clear actions to focus research into larger entities and develop some new tools (e.g. 50:50 positions) to renew and enhance the research capacity of the whole department.

### *Bergen Gynecologic Cancer Research Group*

**General comments:** The Institute of Clinical Medicine and Molecular Medicine was evaluated in 2004. The great value of the unique biobank with normal and tumor tissues of well-defined patient material for genetic and molecular biological analyses was highlighted in the report. However, the scientific production of the Department of Obstetrics and Gynecology was only considered fair.

**Organization:** The unit has 2 professors, 8 PhD students, 4 post-doctoral fellows and 2 technicians. The research activities are divided into subprojects, including Molecular alterations for targeted therapy in metastatic gynecologic cancer, Molecular imaging, Targeted therapy in ovarian cancer, and HPV vaccine in cervical cancer. Also, a number of clinical trials are conducted at the Department of Gynecologic Oncology at the Haukeland University Hospital. Clinical and academic staff meets monthly to discuss recent research results and how the staff can contribute to bring relevant findings to the clinic.

**Training:** Currently there are 6 PhD students and 4 post-doctoral fellows within the unit (as of December 2009). One PhD student has graduated since 2007. The number of PhD students appears to be increasing. Among the medical doctors at the department, 60% have a PhD and the aim is to reach 100% during the next 10 years. A PhD program in gynecologic oncology has been established; 4 medical doctors are enrolled along with two MSc students. The unit supports alternating duties between academia and the clinic with 50-50% appointments, especially for post-doctoral fellows, and encourages visits abroad.

**Research collaboration:** The unit has extensive collaborations with a number of groups and universities, both locally in Bergen (for instance with the Gade Institute) and Oslo, and internationally (e.g. Harvard Medical School, Memorial Sloan-Kettering Cancer Center, University of Hamburg, and University College London). The group is involved in a disease working group within the Cancer Genome Atlas project at National Institute of Health (NIH). The unit appears to have strong and fruitful international collaborations with frequent visits by the academic staff to renowned institutions abroad.

**Research activity and scientific quality:** The overall aim of the unit is to establish an internationally leading center for translational research on gynecological cancer, including the development of novel targeted therapy. It seems to be well on its way towards this ambitious goal. Researchers in the unit have published a number of papers in journals with high impact factor over the last five years, for example in PNAS, New England Journal of Medicine, and Cancer Cell. The number and quality of the publications has increased. Although some papers are from large collaborative projects, some are initiated from this group and largely performed in this department.

The biobank with samples from more than 1700 patients is an asset (as already noted by the evaluation 2004), and the group has implemented state of the art technologies for the characterization of the clinically annotated gynecologic tumor material. Moreover, several

clinical trials are being conducted at the unit and the goal is to run trials in the future with molecularly targeted therapy based on improved understanding of genetic alterations in gynecologic tumors.

Funding seems solid with relatively large grants from several sources, including the Research Council of Norway, Helse Vest RHF, and the Norwegian Cancer Society, and also NIH (collaborative project).

**Societal impact:** The translational research carried out at the unit is likely to have a positive impact on diagnosis and treatment of gynecologic cancers in the future. The Molecular Markers in Treatment in Endometrial Cancer (MOMATEC) trial has produced markers for detection of metastasis.

**Recommendation:** The panel overall impression was positive. The focus on gynecologic cancer is one of the strengths of the unit and the achievements are impressive. The unit should have continued support at least at the current level.

**Grading:** Very good.

### *Clinical Fetal Physiology Research Group*

**General comments and organization:** The Clinical Fetal Physiology Research Group has been built up during the last ten years. It consists of two professors, one in fetal Doppler ultrasound and the other in registry studies, 3 post-doctoral fellows, and one clinician with a PhD. In the near future 3 PhD students, one 50% researcher and 3 junior clinicians will join the group. Three midwives take part in a WHO study. Neither of the group leaders attended the interview because of some last minute problems (and nor did they attend in 2004 for the previous report).

**Training:** Two PhDs have graduated in 2007-2009.

**Research collaboration:** Collaboration with General Electronics, within the university (Centre for International Health, Pediatrics, Radiology, Biology, Biochemistry, Public health, Registry based epidemiology), nationally (Tromsø, Bergen, Oslo, and NTNU), and internationally (UK, Sweden, Chile, Canada, Germany). National collaboration seems to be based on shared PhD students and recruitment of post-doctoral fellows. Both project leaders are widely known in Norway and contribute to clinical settings in Norway.

**Research activity and scientific quality:** The group describes two areas of research: Fetal Doppler ultrasound and fetal growth and Registry studies. Integration of research into the clinic, with focus on high risk pregnancies, is the ultimate goal of the group. The group has produced 66 publications in last 5 years. Altogether five 1<sup>st</sup> or last author publications in Obstetrics and Gynaecology (Impact Factor = 4.4, 2<sup>nd</sup> highest Obstetrics and Gynaecology journal) in 2008-2010 and in Paediatrics Research in 2008 (a highly scientific journal with a lower Impact Factor). Also publications in American Journal of Epidemiology in 2010 (although not 1<sup>st</sup>/last author), which is a highly respected journal. However, many of the weaker publications are in Norwegian language with low penetration.

**Societal impact:** Provided a detailed clinical antenatal ultrasound service.

**Recommendation:** A small, historically successful group that is well focussed on two areas of research. However, both project leaders are over 60 years old and there is no obvious succession planning other than relying on current post-doctoral fellows. Difficult to know the future vision without the project leaders attending to engage in discussion, which was the case for Obstetrics and Gynecology also in the 2004 evaluation.

**Grading:** Good

### *Bergen Diabetes Research Group*

**General comments and organization:** Group has 2 professors (I), one associate professor, 5 post-doctoral fellows, 6 PhD students, two researchers with PhDs, 2 clinicians, and 6 technicians /administrators, altogether 24 people. A big, strong successful group working mainly on clinical and molecular aspects of diabetes organized into five nodes of research: Monogenetic diabetes, Hypoglycaemia, Clinical medicine, Protein function, and Polygenic diabetes. The group is strong with high level of funding and high quality publications. Well- funded from diverse sources (2.1 million Euros from RCN alone from 2010).

In the previous evaluation in 2004, there was an age and leadership problem in the group. These have been solved since and continuity has been aimed at as well as stronger leadership.

**Training:** A good track record of PhD students and post-doctoral fellows and international collaborations.

**Research collaboration:** Researcher visits to collaborating institutions are encouraged (Harvard, Chicago, Houston, Exeter, and Cambridge). International collaboration network is extensive.

**Research activity and scientific quality:** Group mainly works on clinical and molecular aspects of diabetes organized into five nodes of research: Genetics, Hypoglycaemia, Clinical medicine, Protein function, and Polygenic diabetes. Many areas have been chosen in order to think ahead and build for the future.

Group has strong papers in PNAS 2010, Diabetes 2010, Journal of Medical Genetics 2009 and many in Paediatric Diabetes (Impact Factor = 2.6, highest paediatric endocrinology journal). Over the last 3 years, however, many of their best papers are not 1<sup>st</sup>/last author (e.g. joint with other researchers). It was claimed that there were more strong papers in cell biology coming through thanks to 2 more recent post-doctoral fellows who had been to Harvard. However, a unit can only be judged on what is published and accessible. Apparently, last name authorships have been given to post-doctoral fellows to promote their career.

**Societal impact:** Provides a clinical diabetes service for 2<sup>nd</sup> largest Children's Hospital in Norway. The group has established the Norwegian Registry of Maturity Onset Diabetes of the Young Diabetes (MODY).

**Recommendation:** Working on 5 areas of childhood diabetes research may be too much for a relatively small university (population of Bergen 250,000). Group is ambitious with aim of getting 'Centre of Excellence' status. However, their strategy is to go from 25 people to 40 in a new 500 m<sup>2</sup> research area in the new Children's Hospital by coalescing the current 5 nodes into 3 and adding 2 more. These would be cardiovascular complications of diabetes and a hormone lab. It could be beneficial for the group to focus on their obvious strengths in genetics and cell biology.

**Grading:** Very good – Excellent

### *Research Group for Pediatric Follow-up Studies*

**General comments and organization:** This is a successful group very well known by leaders in their field and they present their work widely. The group was established in 2008 and is based at the section of pediatrics but collaborates actively with a number of other institutions. The group consists of one professor I (100%), 3 professor IIs (20%), one associate professor (20%), two post-doctoral fellows (50%), one research nurse (50%), 16 PhD students and several research students and clinicians. Activities are divided into 16 areas of research projects, but more than 80% of effort/resources are devoted to the following 3 research areas:

1. Long term follow-up of prematurely born children based on local, regional and national cohorts. Developmental, emotional, physical and respiratory consequences and quality of life are major areas of interest
2. Registry studies of long term health and function related to characteristics of newborn infants
3. Epidemiology of growth and overweight in children, and effects of prevention and treatment of overweight children

Of the 16 research areas, not all have a single PhD student working on the subject.

**Research activity and scientific quality:** Group has published 88 papers since 2005 (35 since 2009) but some of these publications seem to be from the diabetes group. Strong papers in JAMA 2010, Paediatrics 2010, Archives in Disease of Childhood 2010, Thorax 2009, but many are published in Scandinavian paediatric journals and in Norwegian.

**Societal impact:** Provides a clinical neonatal service.

**Recommendation:** Working on 16 areas of follow-up studies may be too much for a relatively small university (population of Bergen 250,000). These included foetal alcohol exposure, exercise induced dyspnoea, vitamin B12, congenital dislocation of the hips, hypophosphataemic rickets, childhood cancer etc.

The justification is that this is necessary to attract young people into academic paediatrics but this is not a convincing argument. A more modern approach is to offer aspiring academics a small number of options where they can see the group is highly successful with a track record of good publications and PhD completion. This reassures the applicant regarding the likely success of their own future research career. It might be beneficial for the group to focus on their obvious strengths in preterm follow-up studies.

**Grading:** Good

### *Research Group for Congenital Heart and Vascular Physiology*

**General comments and organization:** Research group for congenital heart and vascular physiology was established in 2010, although group members have been working together on a more loose collaboration scheme for a long time. Group members come from three different departments at the University of Bergen and clinicians come from Haukeland University Hospital. Associate members come from two more departments at the university. The members

meet at least once every other week. In the group there are 3 professor Is, one professor II, 4 PhD students and 3 clinicians. There are no post-doctoral fellows in the group. It is not clear whether the group is a true academic unit or a loose collaboration of primarily clinicians from Department of Clinical Medicine, Department of Biomedicine and Institute of Medicine.

**Training:** The age of PhD students at the department is remarkably high; only one PhD student is under 30 years of age. Many group members have had research training also abroad.

**Research activity and scientific quality:** Research area is broad. Apart from one paper in Pediatric Research in 2009, group's publications are mostly in Norwegian language journals. Difficulty to publish in high quality international journals is claimed to be the problem of paediatric cardiac research worldwide, Paediatric cardiology has a low Impact Factor, which is a huge problem for the field.

**Societal impact:** The group provides clinical paediatric cardiology service for 2<sup>nd</sup> largest Children's Hospital in Norway.

**Recommendation:** This group might benefit from collaboration with the other strong elements of paediatric research in Bergen e.g. cardiovascular outcomes of cohorts of preterm infants, or vascular complications of diabetes / metabolic syndrome. Non-invasive measures of vascular resistance by brachial artery ultrasound are now being reported internationally.

**Grading:** Weak

### *Section for Ophthalmology*

**Organization:** The section for Ophthalmology is one of six sections at the Department of Clinical Medicine (DCM). The sections are all located within the Haukeland University Hospital and are all involved in medical education and teaching. The leader of the Ophthalmology section is included in the department board. The academic staff at the section contains in total 7 persons, including 3 professors (53-64 years old), out of which 2 are fulltime positions (100%), 2 professors/consultant ophthalmologists (50-56 years old) with 20% research time and 2 (female) post-doctoral fellows and consultant ophthalmologists (less than 40 years old).

**Research activity:** The research activity is divided into two groups; one in Ocular oncology and one in Ophthalmogenetics. Special interest is devoted to important research areas, such as Visual impairment in children, Occupational ophthalmology, and Molecular studies of hereditary

eye disorders. The Ocular oncology is a highly specialized area and therefore the number of patient referrals to Haukeland University Hospital is large.

Evaluated from the publications the section has a low number of papers in 2006 with 2 papers, 2007 4 papers and 2009 5 papers out of which 1 seems to be a proceeding. The number is increased in 2010 with 9 papers; 5 from the Ophthalmogenetics and 3 from the Oncology group. The years 2008 and 2005 include 10 papers each year. The total number of publications, review papers and book chapters per academic staff varies a lot from 85 to 13; the post-doctoral fellows not included. Their number is 10 and 12.

**Training:** The recruitment of PhD students is overall very low with only 3 PhD students at the moment. The number of completed PhD exams over the period 2005-2010 is 2 and they come from the same staff member. On the other hand there is no student at the moment in this group.

**Collaboration:** An example of interdisciplinary and international research collaboration is the use of laser-based spectroscopy for non-invasive diagnosis of intraocular melanoma. The collaboration in the oncology group with Lund University includes novel technique but all the technical development is performed in Lund with clinical application at the section. The Molecular ophthalmogenetic group has collaboration both nationally and internationally.

**Recommendations:** There is no or very little collaboration in between the two groups in the section. New trends, such as laser ablation is not emphasized at the section. Evaluated from the number of PhD students and publications the research has not a strong position at the section. The section should reconsider the research strategy.

**Grading:** Fair - Good



## Department of Surgical Sciences

**General comments and organization:** The Department of Surgical Science (DSS) consists of eleven sections (Thoracic surgery, Vascular surgery, Gastrointestinal surgery, Endocrine surgery, Urological surgery, Plastic surgery, Radiology, Neurosurgery and Otolaryngology/Head and Neck surgery, Orthopaedic surgery, Anesthesiology, and Intensive Care and Chirurgia minor).

Total number of research personnel is 170. Out of these 63 are funded by institution/university, 101 by hospital and 6 by external funding. During the last three years 22 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 17 % (4 590 000 NOK). There are 15 professor I positions, 23 professor II, two post-doctoral fellows and total number of PhD students is 46.

The Departmental Council has representation from all sections. The Research board is composed of the research group leaders as well as departmental heads. In addition to the head of the department there are two vice heads, responsible for research and teaching.

The research strategy is very much based on research groups. There is a very strong demand for more time and internal resources for surgical research, including a claim that the university and the faculty favor basic research.

Productivity of the department in terms of number of publications is very variable and has been increasing somewhat during the last five years. Productivity is rather low when compared to other departments of the same size. Citation index is slightly above the world average by field but clearly below the Norwegian average. There is an obvious need to publish more papers in more highly ranked journals.

In the hearing with the panel the leadership was very defensive, to an extent which might be very unhelpful for the development of the department. The leadership does not see any other reasons for the low productivity than lack of time and lack of internal resources and claims that the scientific output compared to resources available is excellent. However, the panel got the impression that basic requirements for research could be better but are almost equal compared to the other clinical departments. The whole Department of Surgical Sciences seemed unhappy and felt they were excluded from university resources.

Many similar weaknesses that were identified in 2003 evaluation are still present. It is evident that the research is not sufficiently focused. Further, the external funding is weak. The panel encourages the Faculty to take immediate actions to initiate a strategy process in the department.

### *Surgical outcome Research Group (SORG)- General Surgery*

**Organization:** The clinic of general surgery consists of five departments: Vascular surgery, Acute and Gastrointestinal surgery, Breast and endocrine surgery, Plastic surgery and Burns National Centre, and Urology. The policy is to stimulate good research in each department. There is no joint strategy for research and it is obvious that research does not have important position the department.

There are 12 professors but only two of them have professor I position. The department has also 4 “D-positions”. Personnel structure is not described in the self assessment report beyond this. Department does not allocate any funding, personal or space resources to research. The amount of external funding is low. All departments seem to have lot of problems to recruit PhD students.

All five departments have some research activity but it is very unevenly distributed. Department of breast and endocrine surgery, having two professor II positions has produced nine PhD degrees and the publication record is good both in terms of quantity and quality. This department has external funding and participate e.g. in NIH-funded project. In addition, Department of Gastroenterological surgery and Department of Urology have a reasonable scientific production. Department of Vascular Surgery, having one professor I and two professor two positions has very modest publication record. This is also true for Department of plastic surgery and Burns.

**Societal impact** of the research could be important. At the present level of research, impact of this department is mainly dependent on their valuable clinical work.

**Recommendations:** General Surgery should immediately start serious discussions with the faculty and university hospital in order to develop research strategy for the unit. Limited resources should be focused better and the leadership must be reorganized. This unit could improve a lot of their research performance even with better funding.

**Grading:** Weak. However, it should be emphasized that there are some nodes of good research activity.

### *Surgical outcome Research Group (SORG)- ENT/ H&N*

**General comments and organization:** The Section of Otolaryngology/Head & Neck (ORL/H&N) surgery hosts the National Centre for Vestibular Disorders, established by the Norwegian Ministry of Health & Care. The department is responsible for teaching “ENT diseases” to medical students. The clinical department has an annual budget from Helse- Vest RHF of 1 million NOK,

specifically allocated to the unit named the National Centre for Vestibular Disorders. The section has recently received its own laboratory for experimental research.

The Section of Otolaryngology/Head and Neck is a part of the Department of Surgical Sciences, Faculty of Medicine and Dentistry, University of Bergen. The leader of both the university section and the Haukeland clinical section of ORL/H&N is the same professor. The group consists of altogether two professors I, four professors II, and several consulting physicians with a PhD degree. Number of PhD students is not given.

There is lack of external funding. Most of the academic staff approaches retirement. There is limited time for research among the academic staff.

**Training:** PhD students are mainly recruited internally.

**Collaboration:** There is international collaboration, mostly associated with the scientific leader and head of the department who has recently retired. There is also collaboration with the Gade Institute.

**Scientific quality:** There is a strategy for research following two lines: basic science-inspired research and population research based on Norway's track system. The following research areas are studied: Head and neck cancer, Benign laryngology, Oto-neurology, Vertigo (The National Centre for Vestibular Disorders), Otology, Rhinology, and Mb Sjögren.

**Recommendations:** The unit should apply for international funding. The research production should be more even among the academic staff. It is important that the new leader under recruitment can offer a strong leadership in science. The panel recommends that the national collaboration is extended and includes the Department of Clinical Dentistry.

**Grading:** Weak

### *The Norwegian Arthroplasty Register (NAR)*

**General comments:** NAR is a nationwide registry for orthopedic joint implants. The Norwegian Orthopedic Society is the owner of the register and it is located at the Department of Orthopedic Surgery, HUS. It has been ongoing since 1987 and it has reached excellent international reputation. The data is collected from reports prepared by surgeons.

**Organization:** The registry has 4 full time secretaries, 2 statisticians and 2 IT-specialists. The academic staff consists of 10 senior researchers (professors I and II) and 10 PhD students. The NAR also include the Hip Fracture Registry (2005) and the Cruxiate Ligament registry.

**Training and Research collaboration:** The registry has been rather successful in training. Eleven PhD degrees have been obtained in research projects related to Registry. In addition, there are ongoing PhD projects in other Nordic countries and a lot of other national and international collaboration.

**Scientific production and scientific quality:** The registry has published almost a hundred papers in good and excellent scientific journals. In addition, a direct societal impact of this research is high. It thus forms a continuous follow-up system for orthopedic implants and operations. NAR is well recognized internationally and is one of the most well-known implant registries.

**Recommendation:** NAR should be supported at the national level since it really serves the whole Norway and also other countries. Societal impact could be direct and very high.

**Grading:** Good

### *Bergen Experimental Surgery Team - Thoracic Surgery*

**General comments and organization:** This group is composed of 4 senior staff members. The chief cardio-thoracic surgeon is the leader of this unit. In addition, the chief surgeon holds a position as professor II (20%) and leader of Section for Cardio-thoracic Surgery at the Department of Surgical Sciences (Faculty of Medicine and Dentistry, University of Bergen).

Two well qualified senior cardio-thoracic surgeons with academic qualifications also hold university positions as professor II (20%). In addition, one full time professor with experience in experimental surgical research, but without any clinical speciality, is also connected to the evaluation unit. The professor has no clinical workload. One professor II has recently retired and one will retire within the next year. The remaining two professors are both men in their mid-fifties.

The CV's list three professors, all aged 70, with 13 publications between them over the last 5 years. It was a little unclear whether they had already retired, or were shortly to retire, and what was their recent clinical load. There are no PhD students or post-doctoral fellows in the group. The chance of recruiting academic replacements seems slim given the view that there were no start-up costs for new research.

**Training:** Combining research and clinical training are encouraged and allowed, and yet there are currently no PhD students or post-doctoral fellows in the group. It is unclear why the thoracic Experimental Surgical Unit has had only 2% of the department's dissertations 2004-11.

**Research collaboration:** Number of collaboration projects, especially international, is low.

**Research activity and scientific quality:** The group carries out research in 6 areas: Risk of cerebral emboli in coronary artery bypass surgery, Genetic markers in lung cancer, Results following aortic valve repair, Results after surgical treatment of atrial fibrillation, Accidental hypothermia, Surgery for lung metastases following colorectal primary cancer, Health related quality of life and psychosocial aspects in patient with aortic valve stenosis (AS) with and without aortic valve replacement (AVR).

In addition, there is animal research. In anaesthetised pigs three experimental models involving ischemia and reperfusion are currently used; a) cardioplegic arrest and reperfusion, b) coronary occlusion and reperfusion and c) unstable coronary syndrome. The University of Bergen pays for the core facilities of this large animal unit which models cardio-pulmonary bypass and the consequences for the myocardium.

The group has 63 publications over the last 5 years. However 17 of these are attributed to the Level 2 units within Department of Surgical Sciences. Only 12 are published in Scandinavian journals. These publications are hard to judge as they are classified as cardiac, lung, experimental and miscellaneous and so there is a vast range of journals and fields. However, as one example, the experimental pig model seems to have produced the following: 2005 Journal of the American Society of Echocardiography, 2007 European Journal of Echocardiography, 2008 European Journal of Cardiological Surgery, and 2009 Annals of Thoracic Surgery. All journals of cardiac and thoracic surgery have low Impact Factors.

**Societal impact:** Big cardio-thoracic clinical service.

**Recommendation:** The Thoracic Experimental Surgical Unit is unusual in having a 100% non-clinical post. There seems to be little exciting vision for the future, even if money was available; the leaders are unlikely to come across as happy, fulfilled, inspirational role models; they were unable to articulate what was special or leading about their research.

**Grading:** Weak

### *Bergen Experimental Surgery Team- Anesthesiology*

**General comments:** Department of Anesthesia and Intensive Care covers following clinical areas: Anesthesia, Intensive care, Burn treatment (national unit), Acute prehospital medicine and Pain treatment. There are three main research groups and in addition some individual researchers.

**Organization:** The unit has clinical department and is connected to the Department of Surgical sciences in the university. The department has mainly clinical positions, 55 consultants and 25 residents, and a small academic staff. The size of academic staff has been reduced to one full time professor and three professor II positions. There are two D-positions for residents.

**Training:** Recruitment for resident positions is good and 6 PhD degrees have been completed during last five years. Increase of D-positions for clinical researchers should be considered.

**Research collaboration:** Should be enhanced.

**Research activity and scientific quality:** Animal experimental part of the research is strong but is going down due to the lack of technical assistance. Publication record is good, having several papers in very good journals.

**Societal impact:** The research is important to improve to treat critically ill patients. This could have a lot of direct and indirect societal impact.

**Recommendation:** The panel emphasizes the importance of translational research in the development of strong research profile. The department should considered continuous support also for the experimental work. It is also of utmost importance to arrange positions for younger clinical researchers. Research groups are encouraged to increase collaboration with basic researchers which could open joint possibilities for external funding.

**Grading:** Fair - Good

### *Neuro-Oncology Research Group*

**General comments:** This unit is one of several research groups within the Department of Surgical Sciences. The evaluation in 2004 identified a number of problems, including poor leadership, problems with recruitment, insufficient internal and external collaborations, and the need to implement modern molecular biology techniques. The scientific output was considered fair to good.

**Organization:** The staff consists of one professor I (age 51), one professor II (age 58), one part time associate professor (age 45), and one neurosurgical resident (age 34) with his own group. In addition, one professor I has recently retired but keeps one PhD student. All staff members have combined research and clinical positions and run their own research groups.

**Training:** There are altogether 5 PhD students but no post-doctoral fellows.

**Research collaboration:** The unit collaborates with established biomedical research groups in Bergen as well as laboratories elsewhere in Norway and internationally, e.g. Stanford University. A long-standing collaboration with The Department of Biomedicine, UiB, seems particularly important. Collaborations are also ongoing with Neurosurgery departments in both Norway and Sweden.

**Research activity and scientific quality:** The unit has a long-standing research focus on intracranial tumors. There is good access to clinical samples and collaborations with basic science laboratories. The Department of Surgical Sciences, to which the Neuro-Oncology group belongs, had 75 publications 2010, an increase from 22 in 2005. However, the citation index is clearly below the Norwegian average. The Neuro-Oncology group has published 71 papers in peer-reviewed journals within the last 5 years, and 4 students have completed their doctoral dissertation. Around half of the publications are from one retired professor, whose research is focused on intracranial arachnoid cysts. A few articles appear in high impact journals like PNAS, Cancer Research and Oncogene, in all cases the papers come from collaboration projects. The radiosurgery is claimed to be unique in the world. The productivity of the Neuro-Oncology group seems rather uneven between the groups, and the total scientific output is relatively modest.

**Societal impact:** The overall aim is to improve treatment of glioma. There would be a significant positive societal impact if progress could be made towards this goal. However, the potential impact is limited by the various problems associated with the unit, such as recruitment and poor scientific productivity. The Vestibular schwannoma (VS) group serves as a national center for patients with VS.

**Recommendation:** Most of the professors at this unit are in their 50's and the scientifically most productive professor has recently retired. Thus, it is important that the unit recruits young researchers that can bring novel ideas and techniques, develop research, and improve the scientific output.

Recruitment of more researchers with expertise in basic biology would strengthen the laboratory science at the unit. More full-time academic positions including post-doctoral fellow positions are necessary. Efforts must be made to improve the funding situation.

**Grading:** Fair

### *Bergen Upper-extremity Research Cluster (BURC)*

**General comments and organization:** The upper extremity study groups have been established during the last 25 years. The activity of the groups is closely connected to clinical work. The research cluster is divided into four teams: Hand and wrist group, Bergen distal radius study group, Shoulder and elbow group, and Orthopedic oncology group.

Hand and Wrist Group is composed of one professor (group leader), four consultant surgeons two of whom have MD, PhD degrees, and two are PhD students. Last year two young colleagues were included.

Bergen Distal Radius Study Group was established in 1988. Group consists of one professor and two young PhD candidates. Papers dealing with all kinds of problems about distal radius have been published during these 20 years.

Shoulder and elbow group conducts and supervises clinical studies related to arthroscopy and reconstructive surgery in the shoulder and elbow, (but also in knee and ankle). The permanent academic staff of the section consists of one professor and one lecturer employed by the University of Bergen and associated with the Orthopedic Department at the Haraldsplass Deaconess Hospital.

The Sarcoma group is based mainly on one consultant orthopedic surgeon, one consultant oncologist, and one PhD student. On the clinical side this is a multidisciplinary group (orthopedic surgeon, oncologist, radiologist, and pathologist). The Sarcoma group hosts the Scandinavian Sarcoma Register.

**Training:** There is problem in PhD training, since PhD students work full time as surgeons and don't have protected time for research.

**Collaboration:** According to self assessment report, the collaborative network appears to be broad and international.



**Scientific quality:** Number of publications is low, altogether 43 listed, of which more than half are in Norwegian.

**Societal impact:** Translational research is going to be started with the aim to get more money for research.

**Recommendation:** The group should increase publication rate in English. The Arthroplasty registry national and international cooperation could be an opportunity to improve research. The PhDs should be able to focus more on their PhD studies.

**Grading:** Fair

## Stavanger University Hospital

### *The Surgical Research Group*

**General comments:** Stavanger University Hospital (SUH) obtained university hospital status in 2003. In the same year it launched its first strategic research plan and re-formulated it last year. According to these plans research related to Cardiology, Cancer, Acute medicine, Psychiatry and Neurology were prioritized.

**Organization:** The Stavanger University Hospital is one of four hospitals within the Western Norway Health Trust. The hospital is organized into six divisions: Surgery, Pediatrics, Medicine, Psychiatry, Medical services, and Internal services. Recently, a research department has been established in order to strategically strengthen research activities. Four research groups are included in the assessment. These include Cardiology, Surgery, Psychiatry, and the Norwegian center for movement disorders. Panel 6 in this evaluation evaluates the Psychiatry research group. SUH is organized in divisions with a director in charge of all tasks, including research. Research activities in the hospital are organized through a Department of Research. The Research director, who reports to the CEO, is responsible in collaboration with The Research Board and division leaders to organize research activities in the hospital. The hospital provides funds for one researcher group director for each five prioritized areas. At present the hospital itself is the main funder of research activities. The research strategy emphasizes research groups that are large, have formally defined projects, are interdisciplinary enough, and have external funding.

The hospital had a total of 231 scientific staff members in January 2010. These included one professor, 16 professors II (i.e. part-time), 15 associate professors, 34 researchers, eight post-doctoral fellows, and 48 PhD students. Between 2007 and 2009, a total of 19 PhD students graduated within the hospital.

For 2009 grants as % of total research and development expenditures was reported 38,8% (33 079 000 NOK). There is only one professor I position, 11 professor II positions, 8 post-doctoral fellows and total number of PhD students is 48.

**Research activity and scientific quality:** Productivity of the department in terms of the number of publications has been increasing markedly during the last five years. At present productivity is excellent when compared to other research organizations of the same size. Citation index is far above the world average by field and much above the Norwegian average. Journal profile index is at a very good level. It is thus obvious that the chosen strategy has been very successful so far.

**Recommendation:** During the hearing the panel was very impressed about the excitement and positive attitude to research among all participants, in contrast to many others. The hospital should be strongly encouraged to continue their efforts.

**Grading:** Excellent

## University of Oslo, Faculty of Dentistry

### Institute of Clinical Dentistry

**General comments and organization:** Total number of research personnel is 93,5 (excluding groups Technical staff and Others). Out of these 91,5 are funded by institution/university, none by hospital and 2 by external funding. During the last three years 6 PhDs have graduated. Funding is reported unclearly in the facts sheet, and therefore not commented here. There are 22 professors I positions, 3 post-doctoral fellows and the total number of PhD students is 25.

The Faculty of Dentistry in Oslo comprises a faculty administration and two units: the Institute of Clinical Dentistry and the Department of Oral Biology. The institute of Clinical Dentistry has four clinics: Clinic for Adult Oral Care, Clinic for Child Oral Care, and Clinic for Specialist Management and Clinical Research Laboratory.

A large number of patients are available for research, and the institution has an electronic patient record system. Number of PhD candidates (12 funded by the faculty) and publication rate have increased. The institute has a combined programme for specialist and PhD training.

During the last year the institute has suffered from budget reductions in research funding. There is no real tradition for applying for external funding. Research groups in the institute are small. Citation and journal indicators of publications from 2005-2008 show around or below mean citation index. Research equipment appears to be old-fashioned. Heavy teaching load and increased time used on administration has eroded the time available for research.

The panel sees that the institute has no clear strategy. The units are too small and the progress since 2001 has been weak overall. Three year funding from RCN is too short to change the research profile of the institute. The large number of patients is considered as strength. The research quality of the professors ranged from very weak to very good. The number of 12 PhD stipends funded by the Faculty is fully acceptable. The advice from the panel is to involve the PhD students in a strategic focus on new fields in dentistry and to reduce the data-collecting activity. There is a need for change, also in the organization of the scientific groups.

### *Craniofacial Clinical Research*

**General comments and organization:** The Oslo Centre for Interdisciplinary Craniofacial Research, Diagnostics and Treatment was established in 2006. The Centre is divided into five teams led by researchers with a background in dentistry. The teams are: Severe skeletal

malocclusion, Complex dental conditions in children and young adults, Juvenile idiopathic arthritis, Complex dental conditions in adults, and Dental conditions in elderly.

The institute has large patient archives demonstrating growth, development and treatment from childhood to adulthood and archives demonstrating different treatment outcomes. Auto transplantation is a treatment, which was initiated in Oslo. Follow-up studies exist for 30 years. Juvenile arthritis also has a significant publication profile. The division of five teams appears redundant as three of the teams focus on dental diagnostics. It was also unclear what type of research was performed within gerodontology. Personnel structure is not described in the self assessment report.

**Training:** There are difficulties in recruiting PhD students to do clinical research, which is a general problem in dental research.

**Collaboration:** There are national and international collaborations ongoing in some sections, but in others the level of collaboration appears to be low.

**Scientific quality:** The scientific quality ranges from weak to good with significant papers focusing on temporomandibular joints.

**Recommendations:** It is recommended that the institute focuses on the strengths and establishes research hypotheses. The institute should use the available archives for hypothesis-generated research. The institute should apply for external funding and strengthen national and international collaborations.

**Grading:** Fair - Good

### *Health Promotion and Disease Prevention*

**General comments and organization:** The group comprises 16 researchers from different departments at the Institute of Clinical Dentistry. Nine PhD students are associated to this group. All professors are older than 55 years.

There is a need for recruiting younger scientists to the group. The research topics are diverse. Accordingly, focus should be on specific topics. Among the research topics are: surveillance of oral health problems, identification of risk factors for oral disease, health systems, evaluation of prevention and treatment interventions, and studies of consequences for oral health of behavioural and social factors. These topics seem to be overlapping and are not strictly defined.

**Training:** So far, recruitment of PhD students has not been a problem.

**Collaboration:** National and also international collaboration is mainly performed with public dental health care institutions in collaborating countries.

**Scientific quality:** The quality is varied from weak to good and the publication rate of the academic staff in general is not impressive, though some have a more than adequate production. The strong research focuses on dental erosion and lifestyle diseases.

**Societal impact:** Disease prevention is a field in which dentists have had great success. This group demonstrates fine work within this field and focus is given to clinical relevance.

**Recommendations:** The group must strengthen their research and focus on hypothesis-based research. The diversity in research is a weakness. The age profile should be changed and collaborations should be strengthened nationally and internationally.

**Grading:** Fair

## Oslo University Hospital and University of Oslo, Faculty of Medicine, Institute of Clinical Medicine

### Division of Critical Care

**General comments and organization:** Division of Critical Care (DCC) consists of eleven departments (Anesthesiology, Anesthesia, Operating rooms, Intensive care, Postoperative care, Sterile goods, Pain management, Emergency rooms, Trauma care, Centre for Prehospital Acute Medicine, Research and Development). Most of these are operating at 3-4 locations.

Total number of research personnel is 33. Out of these 6 is funded by institution/university, 19 by hospital and 8 by external funding. During last three years 13 PhDs have graduated. For 2009 grants as % of total expenditures was reported 38 % (4 137 000 NOK) and 32,5 % (2 664 000 NOK) for Oslo University Hospital and Institute of Clinical Medicine, respectively. There are 3 professor I positions, 2 post-doctoral fellows and total number of PhD students is 13.

Need for strong research leadership is well recognized in their strategy and building of it is ongoing. DCC has increased research time for all professors II from 20% to 50% funded by the Division. The Division has started bi-annual meetings for all PhD students and annual meetings for researchers with invited external reviewers.

Division of Critical Care aims to support thematic research programs groups based on collaborative and interdisciplinary work that is centered on common clinical problems. They recognize several strengths like a large population base, good clinical databases and increased research time for academic positions. However, they still have rather fragmented structures and research groups. A long-term strategy for DCC is needed to build an institute.

### *Perioperative Medicine*

**General comments:** The unit consists of several research groups within all “old hospitals”. Reorganization is planned to take them all into Clinic H. This may open new possibilities to further integration.

**Organization:** At present there are nine separate groups each having their own research agenda. It remains somewhat open how much strategic planning has taken place in concerning integration of research efforts. However, most of the groups are rather strong and seem to have their own research plans. In some groups there are also full time molecular biologists in addition of clinical researchers. Associated to the group are four professors, eight senior

researchers/post-doctoral fellows, 25 PhD students (of whom majority hold clinical positions), and one technician.

**Training:** The unit is able to recruit a lot of good PhD candidates. Now the plan is to channel some of that funding to support post-doctoral positions in order to improve the quality of research. This decision is supported by the panel.

**Research collaboration:** There is fruitful collaboration between the Intervention Center and also with the industrial partners. For instance sensor development could open possibilities for spin offs. Lot of extensive connections to excellent foreign laboratories exist and should be maintained.

**Research activity and scientific quality:** Research activity is good and expected to increase. Most of the groups have good publication record and also external funding.

**Societal impact:** Research in this unit may have immediate societal effect, also in terms of economics.

**Recommendation:** The unit has several good ongoing projects. It may still gain some benefit having closer collaboration, e.g. transplantation team and immunology. Good translational approach should be continued. It would be critical to oversee that the merge does not take all intellectual efforts and ongoing good research activities disappear. Post-doctoral funding must be secured.

**Grading:** Very good

### *Acute Prehospital Medicine*

**General comments:** This group has an excellent office and lab space in Ullevål. The group is one of the world leading groups in CRP field and has excellent reputation in the field. The unit has good external funding support and has good access to use infrastructure including laboratories at IEMF. Group members take call on the ambulance which has over 40 year experience of clinical studies. All this gives an excellent platform for research in prehospital medicine.

**Organization:** The group consists of professor I, professor II, a senior scientist and three post-doctoral fellows. In addition there are several PhD students working in clinical training positions. There is a good balance (an exception according to our overall experience!) in PhDs and post-doctoral fellows.



**Training:** About one PhD degree per year has been completed. Post-doctoral fellows are recruited from own PhD students. Many of them work also some time in foreign clinics.

**Collaboration:** The group has extensive collaboration to USA and a lot of collaboration with local and international companies.

**Research activity and scientific quality:** The group is top actor in cardiac arrest research. They have very good publication list and also some patents.

**Societal impact:** Research in this group has already had a marked societal impact since they have been a key player in changing CPR guidelines with striking results.

**Recommendation:** The work of this group should be supported further. Since the leader of the group has been instrumental in the development of this field and is now over 60 years the department should make sure that there is enough continuity of research tradition also in the future. The panel wants to express its concern about the fact that ethical permissions for clinical trials could take more than a year.

**Grading:** Excellent

### *Pain management*

**General comments:** Pain management is organized in the department but executed in the whole hospital. Pain research is conducted in several units with a co-operation between researchers. The main strategy of the group is to strengthen this network further in order to gain added value for their own efforts in the field.

**Organization:** The group consist 2 full professors, one professor II and a senior scientist, a post-doctoral fellow and PhD students.

**Training:** This group has very long and strong tradition in training of anesthesiologists within pain research. In addition, several students having different backgrounds have been involved.

**Collaboration:** The group has extensive internal collaboration with other units of OUS. In addition, they have been involved in major collaborative studies with scientists and clinicians from other countries.

**Research activity and scientific quality:** The group has been active in publishing their results in best international journals (like Pain) of their field. Publication record is very good.

**Recommendation:** At present redesigning of pain services in Oslo would offer an excellent possibility to form Multidisciplinary Pain Center. The panel expresses full support to this. It would be of great importance to plan this together with Oslo University Hospital (OUS) and UiO. Since pain research is multidisciplinary and actors are in different units the flexible administrative structures are needed also in the future.

**Grading:** Very good

### **Division of Surgery and Clinical Neuroscience**

**General comments and organization:** The Division of Surgery and Clinical Neuroscience was formed in 2010 and consists of the following departments: Orthopedic Surgery; Ophthalmology; Ear, Nose and Throat; Physical Medicine and Rehabilitation; Neuropsychiatry and Psychosomatic Medicine; Neurology; Neurosurgery.

Total number of research personnel is 128. Out of these 38 are funded by institution/university, 30 by hospital and 60 by external funding. During last three years 30 PhDs have graduated. For 2009 grants as % of total expenditures was reported 45% (27 958 000 NOK) and 29,0% (8 168 000 NOK) for Oslo University Hospital and Institute of Clinical Medicine, respectively.

There are two professor I positions and one post-doctoral fellow but a remarkable number of PhD students (62).

Research leadership is somewhat different from the other eight divisions. This Division has a "Working group" of three professors who meet once a week. The Research Board of the Division consists of those three professors and the Clinic Director, the Deputy Director, the Clinic Advisor and the professor from Department of Neurology. All the professors and group leaders form the Research Council meet 2-4 times per year. The panel has some uncertainty evaluating how functional this type of leadership could be.

Departments are very uneven in their research performance. In most of the departments research is still very much based on individuals and small research groups. In some cases, like in the Neuro Research Unit and in Orthopedics, researchers have been able to form larger research coalitions.

A research strategy for the whole Division is under preparation. Since the merging of the Division of Surgery and Clinical Neuroscience from several previous units has just happened and is still ongoing, it is difficult to judge how successful the new unit will be. The panel feels that there are

good possibilities for further development but is somewhat worried about the lack of strong leadership, heterogeneity and lack of joint research strategy.

### *Department of Orthopedics*

**General comments and organization:** The Department of Orthopedics has merged from four previous orthopaedic units. Research is organized under Section for Research and Centres of Competence. The head of this section chairs the board, which is composed of all the professors and senior researchers in the department. The board has a monthly meeting and all strategic decisions concerning research are decided in the board.

The academic staff consists of eight professors (2 females). Half of them are over 60 years. The department has 8 younger doctors where 50% of the working time is dedicated for research. The department has succeeded to develop some very strong research areas, including osteoporotic fractures, imaging, autologous cartilage and stem cell transplantations into joints etc. Several clinical studies have also evaluated alternative methods for surgery and the department has been active in developing new form of therapies for orthopaedic diseases. The research is supported with good infrastructure and during recent years the funding has been successful. Recruitment of national and international PhD students is said to be very easy indicating also good international reputation of the department.

**Scientific quality:** The department has several researchers with very good publication record. They have mostly published in best specific journals of their fields but also a number of papers have appeared in more general medical journals, like JAMA and NEJM. The department has also got a lot of publicity in newspapers etc. There is extensive national and international research collaboration ongoing and the external funding is very strong.

**Societal impact:** This type of clinical research has obvious and almost immediate societal impact. It can lead to improved patient care with shorter times in the hospital, better function with less pain etc. All this could lead also to reduced cost for the society.

**Recommendation:** The leadership should try to make sure that the good spirit and positive attitude continues in spite of major changes in the structure. Specific attention should be given to allocate enough time for research; the policy of D-positions should be continued.

**Grading:** Excellent

### *Department of Ophthalmology*

**Organization:** The Clinic for surgery and clinical neuroscience is divided into two research units out of which the Department of Ophthalmology belongs to one together with five other departments. The department of Ophthalmology is the result of a merger in between the corresponding units at Ullevål University Hospital and The National Hospital in Oslo in 2004. The department has a dual research leadership organization with one professor II leading the research activity at Center for Eye Research and one professor II the university unit.

**Research activity:** There are 3 main research subjects; Clinical research in the cornea and the lens; Translational stem cell research with focus on tissue damage/repair and Clinical retinal research. The stem cell group was the first one in Scandinavia to isolate corneal stem cells, modifying the cells and transfer them back to patients. Another focus area is diabetic retinopathy with morphometric analysis of retinal vessels. An interesting study is focused on age related macular degeneration in which two medications are compared, out of which one moderately cheap and another more expensive drug. Translational research is pursued and major achievements have been achieved, which can be monitored by the increase in impact factor publications as well as in the number of PhD students enrolled.

The academic staff is composed of 2 professors II, 3 associated professors, 1 researcher, 1 post-doctoral fellow and 1 instructor. The distribution of PhD students now under supervision are 2 for each for the professors II, 2, 1 and 0 for the associated professors, 1 for the Researcher, 1 for the post-doctoral fellow and 5 for the Instructor. The number of publications (2005-2010) for the staff is 9 for each of the professors II, 17, 9 and 6 for the associated professors, 5 for the Researcher, 10 for the post-doctoral fellow and 8 for the Instructor.

**Scientific quality:** The total number of publications from the department during the period 2005-2010 is 53 with the distribution of 5 2010, 10 2009, 8 2008, 16 2007, 8 2006 and 6 2005. Out of these 19 (36%) are published in Scandinavian Journals; Acta Ophthalmol Scand or Acta Anaesthesiol Scand and 2 in Norwegian language.

**Training:** During the time interval 2006 – 2010 3 PhD dissertations were completed. At the moment 3 PhD students are enrolled in clinical projects and 4 PhD students in translational research activities. Furthermore, 3 students are working with laboratory procedures as training before being enrolled.

**Collaboration:** The research groups have national and international collaboration with universities and research organizations in Norway, Denmark, Spain, Hungary, and USA.

**Recommendations:** To enhance the possibility to join European research networks, and also through these apply for EU grants. The strong position in translational research would facilitate these efforts.

**Grading:** Good - Very good

### *Department of Ear, Nose, and Throat*

**General comments and organization:** This is a young unit, established after merger between Ullevål and Rikshospitalet in 2004. There has been a reduction in staff, turbulent leadership with five shifts and unfocused research. New leadership has taken control in 2008. Main focus groups for research are Cochlear implants, Human papilloma virus (HPV) in head and neck cancer, and Upper airway research. There is a large clinical population and multidisciplinary integration. There is a strategy for staff recruitment and organization of infrastructure. Focusing in research has been organized at research group level. The department includes three professors, 11 PhD students, and 31 MDs (10 with PhD degree).

**Training:** Clinicians with PhDs co-supervise PhD thesis in order to ensure sufficient supervision. No PhDs have graduated during the evaluation period, and the next defence will take place in 2012.

**Collaboration:** There is collaboration with national groups, particularly Centre for Rare Disorders, and international groups.

**Scientific quality:** All deaf children in Norway are referred to the centre. There seems to be a good development in research in this area, but there are only few publications since 2008.

It is claimed that some of the first evidence for the link between HPV and head and neck cancer was discovered by this group. Since 2008, the number of publications is low.

**Recommendations:** The opportunities for this highly specialized department are positive. Increased external funding to recruit competent research personnel is recommended.

**Grading:** Fair

### *Department of Physical Medicine and Rehabilitation*

**Organization:** In the Department of Physical Medicine and Rehabilitation the research is organized in the university unit. The department has two professor II positions and a close tight

to one professor II in molecular biology and two professors (15%) at the Institute of Psychology. In addition there are two senior researchers, a post-doctoral fellow and 8 PhD students.

The department reports to have a lot of governmental funding, which has been given for developing a center for rehabilitation in Oslo. The department has chosen to focus the research mainly into two areas, namely painful musculoskeletal disorders and trauma rehabilitation. In both of these areas there are ongoing prospective studies with study plans that should produce novel data and help to build evidence based treatment protocols for rehabilitation. Researchers have also access to modern gate laboratory, but have not been using it too much so far.

**Collaboration:** The importance of collaboration, both national and international is strongly emphasized in the research strategy. To some extent this has been realized already.

**Scientific quality:** There has been an increase in publication activity since the last evaluation. The department has published about 25 papers/year mostly in good international journals on their research area. There are also some papers in more general medical journals.

**Societal impact** of research in the department could be very high. A special challenge in research in physical medicine and rehabilitation is the lack of validated and relevant measures. Research in the department is focusing on producing this type of data. In addition, return to work has been selected as an important goal of intervention.

**Recommendation:** The panel advice to continue to focus research in the two selected areas. They should further increase collaboration with other hospitals and musculoskeletal researchers.

**Grading:** Good - Very good

### *Department of Neurosurgery*

**General comments:** In the evaluation of 2004, the output of this unit was considered Good.

There were concerns regarding poor leadership and lack of research focus. It was not possible to find the Division of Surgery and Clinical Neuroscience in the 2004 evaluation; here the panel refers to the evaluation of Neuroscience (neurology and neurosurgery) at the Faculty of Medicine, Oslo.

**Organization:** The Department of Neurosurgery has 6 professors and 19 PhD students. There are three research groups, the Vilhelm Magnus Laboratory for Neurosurgical Research, the Neurovascular-Hydrocephalus Research Group (NHRG), and Oslo Neurosurgical Outcome Study

Group (ONOSG). The Vilhelm Magnus Laboratory for Neurosurgical Research was started in 2005 and is a founding member of SFI CAST (the Cancer Stem Cell Innovation Center), and a member of the Norwegian Center for Stem Cell Research. The NHRG and ONOSG were both established in 2010 after merging of several research groups.

**Training:** The unit currently has 19 PhD students. Between 2005 and 2010, 7 students obtained a PhD degree.

**Collaboration:** The unit has an extensive network of international collaborations, including for example groups at Harvard, Caltech, University of Copenhagen, and Karolinska Institute, Stockholm. There are also ongoing collaborations with other universities in Norway, and within Oslo, and the three groups have numerous collaborations between each other.

**Research activity and scientific quality:** The unit puts strong emphasis on translational research and mixed teams with both clinicians and basic scientists, and has competence in molecular biology and state-of-the-art technology. This is clearly one of its strengths. The Neurosurgical research group studies adult human neural stem cells for treatment of Parkinson's disease and stem cell-based therapy against malignant brain tumors. Microarray analysis has led to the identification of genes that are up-regulated in glioma stem cells as compared to normal brain stem cells. The group will study selected genes in mouse models. A dendritic cell vaccination phase I/II clinical study has shown very interesting results.

The NHRG is focused on hydrocephalus, subarachnoid hemorrhage, and brain pathophysiology monitoring. A hydrocephalus biobank has been established and molecular genetics studies are being initiated. The ONOSG studies cervical degenerative diseases, neurotrauma, and neural tumors, with the emphasis on quality control studies. This is the most clinical of the three groups.

The unit has modern cell and molecular biology techniques, e.g. confocal microscopy, FACS and microarrays, and has established a biobank with cells, tissues and RNA, and also runs clinical trials (phase I/II) based on experimental work within the unit.

The research output is quantitatively impressive. A total of 176 papers were published in peer-reviewed journals during 2005-10. Most articles are published in journals such as Neurosurgery, Journal of Neurosurgery, British Journal of Neurosurgery, and Acta Neurol Scand.

Funding is indicated as a limiting factor for all three groups.

**Societal impact:** Potentially significant. Work within the unit may lead to improved treatment of for instance brain tumors, hydrocephalus and brain trauma.

**Recommendation:** The panel was pleased with the ongoing research. The unit would benefit from a stronger focus on fewer projects. The external funding is weak and could probably be improved, given the active research and high productivity.

**Grading:** Very good - Excellent

### **Women and Children's Division**

**General comments and organization:** Division of Women and Children (DWC) include nine departments (Neonatal Intensive Care, Pediatric Emergency Medicine, Pediatric Medicine, Clinical Neurosciences for Children, Pediatric Research, Rare Diseases, Obstetrics, Gynecology, Gynecological Oncology). The Division has been undergoing restructuring during last year and many of the structures are still evolving.

Total number of research personnel is 124. Out of these 30 are funded by institution/university, 73 by hospital and 21 by external funding. During last three years 28 PhDs have graduated. For 2009 grants as % of total expenditures was reported 49 % (20 929 000 NOK) and 30,4 % (8 276 000 NOK) for Oslo University Hospital and Institute of Clinical Medicine, respectively.

There are 3 professor I positions, 17 professor II positions, 3 post-doctoral fellows, 1 senior researcher, 15 Researchers with PhD and total number of PhD students is approximately 50. This number includes PhD students within this evaluation unit. However, the unit Perinatal medicine has also included PhD students associated with their research, but employed (and thus evaluated) elsewhere, including abroad. This was not done for the other two level 2 units.

Research leadership is based on similar model used in all nine divisions with some minor modifications. The Head of Research is chairing The Division Scientific Advisory Board and is responsible for the university functions except teaching. All research personnel are allocated within relevant hospital departments.

### **Gynecology and Obstetrics**

**General comments and organization:** Due to the reorganization process the Obstetrics and gynaecology group research is spread across 3 sites in Oslo a few kilometres apart (Rikshospitalet, Radium Hospital and Ullevål). It comprises the largest obstetric delivery unit in



Norway. Some of the leaders work at all three locations. Unit has a good funding situation (especially gynaecology). Succession problem identified in previous evaluation in 2004 seems to have been solved. All the research activity at Departments of Obstetrics, Gynaecology and Gynaecological Oncology (except obstetrical research) was included as three units:

Unit A: Obstetrics and Gynaecology, OUS, Ullevål

Most of the obstetrical and gynaecological research activities of the Women and Children's Division are organised through this research group of 13 persons at location Ullevål. Group has its main research area within molecular understanding of pregnancy complications, in particular preeclampsia, diabetes in pregnancy and pathological placenta function, as well as ovarian and endometrial cancer.

Unit B: Gynaecological Oncology, OUS, Radiumhospitalet

Clinical trials of cancer management (10 ongoing studies, 6 prospective multinational randomized studies).

Unit C: Assisted reproduction (and gynaecology), Rikshospitalet

This research group is mainly focusing on reproductive ageing, endometriosis and polycystic ovary syndrome.

Bringing these three units into collaboration is a challenging task in the starting phase. Not all research groups have yet found their spot in the new department. Personnel structure is hard to extract from the material in detail, but there appears to be approximately one professor I, four professors II, one associate professor, three senior scientist/post-doctoral fellows, 24 PhD students, five nurses, and more than 20 clinicians /senior consultants associated with the group.

**Training:** There are 24 PhD projects ongoing in the group with addition of 4 projects that are outside the unit in collaboration projects. Post-doctoral projects are fewer, only three ongoing, with unit B without a single post-doctoral fellow.

**Collaboration:** Unit is involved in a worldwide collaboration project funded by Bill and Melinda Gates foundation.

**Research activity and scientific quality:** Each unit has created a research strategy, but too many research areas are covered by the group (33 projects + 24 PhD projects and 3 post-doctoral projects). In the previous evaluation, research was also said to be fragmented. Focusing has been suggested, but at the same time the unit has been successful in building up new projects.

There are particular strengths in pre-eclampsia research and gynaecologic cancer research.

From 2005-June 2010 the group has produced 490 publications:

UNIT A: Total 210 publications/1547 citations. Leading scientist: 44 /299.

UNIT B: Total 186 publications/2114 citations. Leading scientist: 76 /598.

UNIT C: Total 84 publications/360 citations. Leading scientist: 21 /109.

Many of these publications appear in strong journals.

**Societal impact:** The largest obstetrical (7300 deliveries annually) and gynecological department, the latter including the largest endoscopy and urogynecology units in Norway. One of Europe's largest in treatment of gynecologic cancer serving a population of 2.6 million.

**Recommendation:** This unit should be strongly supported. Unit should focus on increasing the quality of their publication as the volume is already high.

**Grading:** Very good - Excellent

### *Pediatrics*

**General comments and organization:** The unit is physically based at Rikshospitalet and Ullevål. The strongest research areas are ORAACLE/GA2LEN (allergy) (2 senior academic staff), meningococcal disease, immunodeficiency and neurology (1 senior academic staff each). Diabetes in the young was evaluated elsewhere, but is nevertheless an active research group in this unit. A Centre for Habilitation and Rehabilitation Models (CHARM) will be established from 2011 with 25 million NOK.

Another 3 senior academic staff are spread across chronic fatigue, child psychiatry and paediatric neurology.

Rather confusingly, the written self assessment states that paediatric research is carried out within three departments in the Woman and Children's division (W-CD) in OUS:

1. Department of Clinical Neuroscience for Children have three main paediatric foci; neurology, psychiatry and habilitation. Additionally, cystic fibrosis (CF) is organised within the department, but as part of a National Competence centre together with adult CF, to be re-allocated to a new department in the future.

2. The second unit, Department of Acute Paediatric Medicine is involved in studies of infectious diseases as well as intensive care/child abuse
3. The third and largest paediatric unit, Department of Paediatrics have research projects within almost all paediatric disease groups. This unit includes the ORACLE research group and research within meningococcal disease and immunodeficiency.

It is said that a strategic research plan should be developed within a relatively short time to ensure research in all areas in which they treat and teach patient care, without losing the possibility of strategic support of some defined areas. Surely this is trying to cover research in too many areas. Numerous projects were claimed to result from collaborations within paediatrics. Already in the 2004 evaluation paediatrics was noted to have a large and stable publication volume, but that the department should focus, which obviously has not taken place.

**Training:** There are 9 clinical positions which are with 50% research time and the possibility of entering a PhD program. Post-doctoral fellowships are only three.

**Collaboration:** Numerous collaboration projects are ongoing.

**Research activity and scientific quality:** The strongest research areas are ORACLE/GA2LEN (allergy), meningococcal disease, immunodeficiency and neurology. There is a good number of publications (331 in total for the evaluation period), mainly international (approximately only 15% in Norwegian) with high impact factor journals included. Unit has islands of excellence but a long tail of less strong research with little critical mass.

**Recommendation:** This unit should be strongly supported.

**Grading:** Good - Very good

### *Perinatal medicine*

**General comments and organization:** "Perinatal medicine" group's research activity covers Women's health, Foetal medicine, Obstetrics (Rikshospitalet), and Neonatology and Perinatal/paediatric cardiology and circulation both in Ullevål hospital and Rikshospitalet. The research in the "Perinatal Medicine" group covers a large number of projects with wide themes. 14 group leaders cover totally 19 researchers and more than 40 PhD projects in:

- I. Women's Health, Antenatal Care, and Pregnancy Surveillance
- II. Fetal Medicine and Obstetrics

III. Neonatology

IV. Perinatal/pediatric cardiology

It is said that a strategic research plan should be developed within relatively short time to ensure research in all areas in which they treat and teach patient care, without losing the possibility of strategic support of some defined areas.

**Training:** There is a good number of PhD students in a wide variety of projects, but a very limited number of post-doctoral fellows. Most of graduated PhDs go back to clinic, with minority continuing research activities.

**Collaboration:** There appears to be active international collaboration ongoing. Local collaboration with the Intervention Centre on animal studies is strong.

**Research activity and scientific quality:** The group's research activity covers a large number of projects on a large spectrum, which is justified by ensuring of clinical competence on all fields. From 2005-June 2010 many of the group's publications are in strong journals (e.g. British Medical Journal, International Journal of Obstetrics and Gynecology, Pediatric Research). There is evidence that the group is leading rather than following. E.g. for 2010 for non-Scandinavian papers, there are 4 first author papers, 16 last author and 10 intermediate authorships. There are also 5 Scandinavian publications and 9 Norwegian language papers.

**Societal impact:** Many research projects have been carried out in the sub-Saharan Africa, where research has had an impact on the morbidity and mortality. The group provides a busy pediatric clinical service.

**Recommendation:** This research group should be supported strongly. The group should not try to cover too many research areas, but aim at focusing on strongest areas. PhD projects should be offered only in strong fields.

**Grading:** Very good

### Division of Surgery and Cancer Medicine

**General comments and organization:** The Division of Surgery and Cancer Medicine (DSCM) is one of the nine divisions that make up Oslo University Hospital (OUS). It is formed by 6 departments (Department of Oncology Treatment, Department of Medical Physics, Department of Gastroenterological Surgery, Department of Breast and Endocrine Surgery, Department of

Urology, Department of Clinical Services) and 2 institutes (Institute for Cancer Research and Institute for Medical Informatics). Total number of academic staff at DSCM is 150 persons (20% positions in both the clinics and at the institutions, which means a 30 full time academic positions). Clinician with PhD performing Research and Development means 90% in ordinary clinical work and 10 - 15% R&D, in addition to a lot of voluntary work, which is not visible. This is the same at the institutions.

There are 33 professors but only 2 professor I positions. The mean age in the professor group is 58 years. DSCM hosts several core facilities, including advanced technology for radiation treatment and biology, microarrays and mass sequencing, confocal microscopy, flow cytometry, and high quality data bases. Many of these serve also other local or national research units. An upgrade of research equipment has been done recently when moving to the new research buildings at Montebello. As an indication of research quality there are three Center of Excellence (CoE) -like units, namely CoE-Cancer Biomedicine, Jebesen Centre for Breast Cancer Research and Cancer Stem Cell Innovation Center. The division does not have any problems with recruitment of new researchers for different positions and has a significant number of post-doctoral fellows (52 out of 150) in the staff.

Total number of research personnel is 428. Out of these 30 are funded by institution/university, 107 by hospital and 291 by external funding. During the last three years 65 PhDs have graduated. For 2009 grants as % of total expenditures was reported 46% (143 990 000 NOK) and 53,2% (21 763 000 NOK) for Oslo University Hospital and Institute of Clinical Medicine, respectively.

DSCM is organized in a hierarchical, vertical manner and is led by the division director. At the next level, heads of departments or institutions are responsible for coordination of the research. There are 14 members in the Research Council of the division, which is chaired by the Director of Research. The role of the Director of Research remains somewhat unexplained in research leadership. However, organization and leadership appear functional.

The research strategy of DSCM is to integrate basic, translational and clinical research for optimal care of cancer patients. DSCM treats large number of patients with almost all types of cancer. It has already several large research groups and networks and clinical research is supported by cancer biomedicine. This gives an exceptional possibility to develop a world class Comprehensive Cancer Center in Oslo. However, one should be aware of the danger of fragmentation if the personnel lacks the sense of a common goal.

The DSCM produces about 20% and 30% of all OUS publications and citations, respectively. Many of the papers are published in excellent journals, the average impact factor being almost 5. It also produces a significant number of PhDs. Roughly half of the research funding is from external sources. Only small amount of this comes from international sources.

DSCM was established in 2009 as part of the OUS and thus represent a new entity compared to previous evaluations. Only the Institute for Cancer Research has remained as a complete unit since year 2000. The success of DSCM research-wise thus remains to be seen but the panel was very impressed by the present progress and feels that the division has developed a good strategy for the future. The panel is very confident that with reasonable economical investments and determined leadership, DSCM could be developed to one of the leading cancer research centers in the world.

### *Oncology and Medical Physics*

**General comment and organization:** Department of Oncology was formed in 2010 via merging oncology departments at the Radium Hospital and Ullevål into one unit. It is very large unit with more than 800 employees. Department of Medical Physics is a separate department but collaborates closely with Oncology. Personnel working in research and development consist of one professor I (50%), six professors II (20%), four associate professors, one post-doctoral fellow, and 18 clinicians with PhD.

**Collaboration:** Both departments have close collaboration with Institute for Cancer Research. The department has 12 different units according to the clinical needs, and treats large patient volumes being one of largest oncology centers in Europe. The department has a dedicated section for Clinical Cancer Research and the goal is that more than 25% of patients are included in clinical trials. Most of the oncologists have their PhDs and there is a good number of 50:50 positions for post-doctoral researchers. However, the age profile of the department is far from the optimal.

The department does not have any recruitment problems but reports to have good flow of young medical doctors into vacant positions. Especially 50:50 positions are reported to be popular. There are more than 20 PhD students in the unit. There is no data available on the personnel structure otherwise.

**Research activity and scientific quality:** The department has published about 700 papers during the evaluation period. Most of them are published in international journals. Some of them are in

well recognized journals like NEJM, Lancet, Blood, Cancer Research etc. All units have published quite nicely, although there is quite a lot of variation between sections. However, there are a lot of papers, as expected, where first or last author is not from the department. Especially strong publication records are observed in the area of lymphoma, breast cancer and gastrointestinal cancer.

In addition to scientific publications the department announces to have filed several patents and also some spin off companies have originated from the research activity of these research groups. The department of Medical Physics publishes about ten papers a year and their research focus is on image guided radiotherapy of cancer.

Several clinical trials are ongoing and indicate that the department is active and well recognized clinical center. The trials represent all phases of drug development.

**Training:** The Department of Oncology gives training both to clinical oncologists and also PhD training in oncology. A good number of PhD students have graduated during last five years.

**Collaboration:** There is a lot of internal collaboration between sections and at the national level. Several established collaborations with international cancer centers are reported.

**Societal impact:** The Department of Oncology delivers updated cancer treatment to the huge number of patients. It is also very active in developing new cancer treatments and to a lesser extent diagnostics.

**Recommendations:** The department should continue the integration process of two previous departments as strongly as possible. At this stage they should focus on building a joint research strategy. The panel urges also to put more emphasis on international recruitment in the future. The department should also further enhance their collaboration with the Institute for Cancer Research.

**Grading:** Very good - Excellent

### *The Surgical Departments*

**General comments:** The unit “Surgical departments” consists of five different surgical departments at different locations: I Department of Gastrointestinal Surgery at Radium Hospital, II Department of Gastrointestinal Surgery at Ullevål University Hospital, III Department of Gastrointestinal Surgery at Aker University Hospital, IV Department of Breast and Endocrine Surgery, and V Department of Urology. The academic staff is minimal. There has never been a

full time professor in these departments. Personnel working in research and development consist of four professors II, nine clinicians with PhD, one post doctoral fellow, and one senior research scientist.

However, in some departments the research performance is very strong. If wise decisions and recruitments are done, Oslo has good possibilities to become a leading comprehensive cancer research center in Europe. This will require clearly more investments into clinical academic positions, e.g. 50-50 positions and also full professors. Personnel structure is not otherwise described in the self assessment report.

**Organization:** Gastrointestinal surgery is done in three different hospitals, each having somewhat different research profile. Reorganization of activities in Oslo is considered more a threat than a possibility. Administration should pay a lot of attention to handle wisely the integration process.

**Training:** The main problem is to recruit young surgeons into PhD programs since there are not enough incentives to have MD, PhD degrees. D-positions are clearly needed to ensure successful recruitment.

**Collaboration:** Gastrointestinal cancer group in DNR has an extensive collaborative network having both academic as well as industrial partners.

**Scientific quality:** This unit has published about 30 papers/year in good international journals. Gastrointestinal cancer group in DNR have several patents and an impressive record of spin off companies together with the Intervention Center. It is obvious that this department is also a gateway of new treatment modalities of cancer to Norway. Department of Gastrointestinal surgery in Ullevål has focused mainly on pancreatic and colorectal cancer. Colorectal cancer is also a main research topic in Aker. Research on breast and prostate cancer is also of good quality. More emphasis should be put on translational approach in both cancers.

**Societal impact:** The research work of Surgical departments have had and most likely will have a marked societal impact. This could manifest either via improved treatment methods or commercialization of new treatment methods.

**Recommendation:** Oslo has a good potential to become a leading European Center in treatment and research of gastrointestinal and some other forms of cancer. Successful integration of activities in three different units is of crucial importance in that process. The panel suggests that OUS and UiO will develop a joint long term strategy for that purpose (if not available yet). First



steps would be to establish 50-50 positions for young post-doctoral fellows and also some for senior scientists. Integration of activities of these departments with the Intervention Center should be confirmed.

**Grading:** Very good - Excellent

### *Institute for Cancer Research*

**General comments:** In the evaluation of 2004, this unit got very good reviews. Since that time, there have been mergers with other hospitals in Oslo. The unit moved into a brand new research building next to the Radium Hospital in August 2009.

**Organization:** The unit is a department of the Division of Surgery and Cancer Medicine at Oslo University Hospital and is located at the Norwegian Radium Hospital, Montebello. It is divided into seven sections, each consisting of two to five research groups. The sections are autonomous units responsible for research, budgets and personnel. There are 320 employees, including 18 professors, a total of 34 senior scientists and researchers with a doctoral degree, 65 post-doctoral fellows, 101 PhD students, and 103 technical and administrative personnel. There are more female than male employees in several categories including the section head level. The unit has core facilities such as flow cytometry, microarrays, bioinformatics, imaging and SNP genotyping. The Center for Comparative Medicine provides immunodeficient mice and rats for biological studies as well as evaluation of novel therapeutic approaches.

**Training:** The unit teaches and supervises pre-graduate and graduate students from different faculties in Oslo and other universities in Norway, and also has a large number of foreign students. The unit stimulates exchange of students, post-doctoral fellows and other academic personnel at the international level. A total of 58 PhD degrees and 45 Master degrees were awarded at the Institute during 2005-2010.

**Collaboration:** The unit labels itself "extrovert" and has multiple and extensive research collaborations both locally, nationally and all over the world, for example with the Cancer Center and Stanford University. Many of the groups participate in multicenter studies.

**Research activity and scientific quality:** This unit is at the very frontline of cancer research in some fields, e.g. cell biology, lymphoma, and breast cancer. Nationally, it is obviously very strong. The publication record is outstanding. A total of 940 original papers and reviews were published during the 2005-2010 period. This year, the number of publications is already close to

200, and the unit has 55% of the publications in the Division of Surgery and Cancer Medicine. Researchers from the unit have published papers in high impact journals such as Nature, Nature Immunology, Genes & Development and J Clin Oncol.

One of the major strengths of this unit is the mixture of basic biology, tumor biology, and more translational and clinical cancer research. The ambition is to not just follow trends but to maintain a broad scientific basis and set the trends. This is of course a very ambitious aim but it appears that the unit to some extent has been able to live up to it. Several of the groups have a very impressive record of publications and awards.

Moreover, the unit has produced research that has led to a number of clinical trials and several new companies. Although the publication records of the different groups vary, the research activity and scientific quality is overall very high.

**Societal impact:** The translational research at the unit has strong potential for diagnosis and treatment of cancer. In fact, this research has already resulted in several companies and clinical trials, for instance a recent trial with immunotoxins.

**Recommendations:** The unit performs cancer research at the highest international level and deserves continued funding, preferably at an even higher level. Threats such as lack of tenured positions and strong dependency on external funding should be dealt with appropriately. Researchers at the unit should be encouraged to publish more articles in journals with high impact.

**Grading:** Very good - Excellent.

### *Institute for Medical Informatics*

**General comments and organization:** The Institute for medical informatics was established in 2005 and is located at the Radium Hospital. The title of the unit is opaque and somewhat misleading. Is this really an Institute of Cancer Genetics (cytogenetics and genomic instability) supported by computer scientists developing tools to aid cancer diagnosis (e.g. iOncolex for iPad; quantitative chromatin analysis)? The unit is a mixture of clinical service and R&D and their resources are spread among:

25% Diagnostics (eg karyotyping, FISH)

33% Development

41% Research

The unit has 72 staff members including 3 surgeons, 2 pathologists, computer scientists, physicists, and software and hardware specialists. Personnel working in research and development consist of one professor I (20%), two professors II, one post-doctoral fellow, and three senior research scientists.

The unit has an ambitious attitude. They aim to publish in the 10% of most cited journals in their fields (cancer genetics, pathology, med informatics) with Impact Factor > 5 which they say they fulfil.

**Training:** Recruitment situation is good, limitations to recruit result from lack of space and funding.

**Collaboration:** There appears to be good number of collaborations ongoing both nationally and internationally.

**Research activity and scientific quality:** The unit produces approximately 20 papers annually. The price for one publication appears high: 0.9 million NOK (approximately 0.1 million euros) per paper. To put this in context, Scotland claims to produce 75 papers per US \$ 1 billion (about 0.01 million euros per paper), but this is in all areas of research, including humanities and arts, and lab science is more expensive.

**Societal impact:** It appears to be a mixture of clinical service including diagnostics (e.g. karyotyping, FISH). Their ambition is to make original contributions in improving the diagnosis of cancer rather than follow trends and fashionable developments.

**Recommendation:** Support strongly but rename and brand to reflect true strength in cancer genetics (albeit supported by computer science, imaging and bio-informatics).

**Grading:** Very good - Excellent

### Division of Specialized Medicine and Surgery

**General comments and organization:** Division of Specialized Medicine and Surgery (DSMS) is also a new and novel construction being one of nine divisions of OUS/UiO. It comprises four clinical departments (Dermatology, Rheumatology and Infectious Diseases; Hematology; Hepatic-, Gastrointestinal-, and Pediatric Surgery; Organ Transplantation, Gastroenterology and Nephrology) and Research Institute of Internal Medicine (RIIM). Most of the activities are now at the Rikshospitalet, but some departments still run some activities in other hospitals too. The division is also home to some core facilities, for instance the transgenic animal facility.

Total number of research personnel is 118. Out of these 63 are funded by institution/university, 30 by hospital and 25 by external funding. During the last three years 24 PhDs have graduated. For 2009 grants as % of total expenditures was reported 43% (25 976 000 NOK) and 53,5% (38 577 000 NOK) for Oslo University Hospital and for Institute of Clinical Medicine, respectively.

At present the research has been organized along ongoing functional research activities. Most of the research is done in relatively small research groups. The division presents four research areas of international standard, namely cardiovascular inflammatory research, inflammatory diseases of liver and intestine, thrombosis and organ transplantation research.

No joint research strategy exists yet and the panel got an impression that there are some difficulties in preparing it since a decision on a merger of the two divisions, DSMS and DCS, is pending.

Division Research leadership has organized according to the model used also in other divisions. Like in other divisions DSMS is led by the head of division. At the next level, heads of departments are responsible for coordination of the research. There is also a Research Board led by the Head of Research. Each department will appoint an academic research leader who may also be a head of the department.

The division has not provided the figures of their publication activity like some other divisions. However, there are some very strong groups included. Unlike other divisions the number of post-doctoral fellows is very low in DSMS. The development of RIIM will be of major importance in the future for this division.

### *Gastrointestinal Cancer*

**General comments and organization:** The unit has 3-4 PhD student positions, 10 full time researchers of whom about half are MDs (including gastroenterologists and surgeons), and the rest biologists, nurses etc. There are 2 professors (100% hospital, 20% university) who contribute both in teaching and research.

Organization of gastrointestinal surgery in both the division of Specialized Medicine and Surgery (DSMS) and the division of cancer and surgery has posed specific problems, and in November 2010 a decision was made to create a new department across the two divisions, and a decision on a merger of the two divisions is pending. Research institute has many methods including high throughput sequencing and animal studies etc.

**Training:** The PhD students are usually recruited among trainees and residents of the unit, currently there are 4 PhD students at the unit. In past 5 years, 5 PhDs have graduated.

**Collaboration:** The research group is small but has a lot of collaboration.

**Research activity :** Strengths lie in cholangiocarcinoma research, which is funded by private person for 100 million NOK for 10 years. The focus of research is on the molecular level. The publication list of GI cancer group is extensive. The group has also gained a Centre of excellence status since the submission of self assessment report. Number of publications is high compared to number of staff.

**Recommendations:** Recommendations are hard to state since it is difficult to get an idea of the group's activities, and it almost seems as the group is not running the projects them self.

**Grading:** Good

### *Norwegian Paediatric Surgery Research Group*

**General comments and organization:** The group is located at Pediatric surgery at Rikshospitalet in Oslo University Hospital. It is the largest center of pediatric surgery in Norway and has thus access to large patient material. Pediatric surgery is a very small specialty in Norway with only 16 pediatric surgeons working full time. The group sees that "Research is an invaluable tool to get to be acknowledged in the international pediatric surgical society". Collaboration with psychiatry group makes Norway one of the best centers in the world to deliver important research about consequences of surgery in children.

The group has at present three persons that have a part-time position at the university and a full time position in the clinic. In addition there are 3 PhD students (100%) and 3 part time PhD students aiming at MD, PhD degree. There are no post-doctoral fellows.

The group has four areas of research: 1. Anorectal motility (8 areas) especially using endosonography, 2. Surgical treatment of feeding problems and gastro-oesophageal reflux (4 areas), 3. Minimal invasive surgery in children (2 areas), and 4. Parent/child psychological stress, mental health and psychosocial adjustment in relation to surgical interventions (9 areas).

The group is trying to cover research in too many areas. They are most likely known outside Norway for 1 and 4 above. However, it is difficult to point out exactly what is the unique research focus of the group.

Difficulties arise from the organizational change in which nurses belong to individual organizational unit ("nurse's clinic"). Coordination of studies has become challenging and time consuming as a result of this structural change.

**Collaboration:** Collaborators come mainly from other Nordic countries. Collaborates with the Intervention centre.

**Research activity and scientific quality:** An exciting example of surgical research which also highlighted some of the problems at the unit was a RCT of open versus laparoscopic surgery for fundoplication for Gastro-Oesophageal reflux. Primary outcome = recurrence rate. 88 children were recruited over 7 years (study was powered to recruit 180). Such a slow recruitment saps the enthusiasm for research and it may be out of date by the time it is published. The study seemed to have no steering committee and not to be yet published. Group has also joined with GOSH (London) in a RCT of open versus laparoscopic inguinal hernia surgery. The group has 24 publications over the last 5 years.

The Journal of Paediatric Surgery (Impact Factor 0,846) is the highest Impact Factor paediatric surgical journal on unit's publications. 4 of their publications are in Journal of Paediatric Surgery, with 2 in the higher ranked Journal of Surgical Research and publications in Paediatric Research, Journal of Paediatric Gastroenterology, Journal of Paediatric Gastroenterology and Nutrition, and the American Journal of Medical Genetics. 1/3 of group's publications are in Scandinavian journals.

**Societal impact:** The group is responsible for most of paediatric surgery for whole of Norway, thus having a very busy clinical service.

**Recommendation:** Try to develop a Scandinavian wide research network and consider European wide trials for rarer conditions to speed up recruitment. Perhaps the most realistic option is to be a contributor rather than a leader e.g. to large European wide trials initiated from elsewhere. Create at least one 50% academic post where 50% of the time is devoted to research.

**Grading:** Fair

### **Division of Cardiovascular and Pulmonary Diseases**

**General comments and organization:** Division of Cardiovascular and Pulmonary Diseases is one of nine new divisions in OUS/UiO. It consists of following six departments: Thoracic Surgery, Cardiology, Vascular Surgery, Respiratory Medicine, Institute of Experimental Medical Research

and Institute for Surgical Research. They are very different in size; the smallest one having only one employee.

In the Division of Cardiovascular and Pulmonary Diseases total number of research personnel is 74. Out of these 37 are funded by institution/university, 21 by hospital and 16 by external funding. During the last three years 25 PhDs have graduated. For 2009 grants as % of total expenditures was reported 50% (33 764 000 NOK) and 40,9% (23 470 000 NOK) for Oslo University Hospital and Institute of Clinical Medicine, respectively.

The division has divided the research into four thematic areas: Cardiac research, Cardiothoracic research, Vascular research and Pulmonary research. Almost all researchers submitting CVs are included in Cardiac research (40 out of 51). Thus the other 3 thematic areas are very small in terms of personnel. Two of the above mentioned Institutes are considered to be core facilities for experimental research. In addition, there is a Virtual Centre for Heart Failure Research (CHFR).

The head of division is formally responsible for clinical and research activities. The Head of Research has been delegated the administrative responsibility for the scientific activities and he/she chairs the Research Council of the division as well as Board of Research Coordinators. Although the structure of research leadership is clear it remained somewhat uncertain to the panel how functional it is at the moment.

Choosing core areas has been a “bottom up” process during the years and it appears that this strategy would be used also in the future. However, since three out of four thematic areas have so limited research personnel this strategy should be considered very carefully.

Both the overall research productivity and external funding of the division are rather modest, although there are some groups with stronger external funding. The division should start the strategic planning of its research structure immediately.

### *Vascular research*

**General comments:** Oslo Vascular Center (OVC) is largest vascular center in Norway but has very small academic staff: two professor II positions.

**Organization:** The unit consists of three sections: Section of Vascular Surgery, Section of Vascular Investigations and Hospital Ward Section. Each of these have own section leader and one of them has professor II position. Number of research personnel is two professors II, one

clinical research fellow and one researcher (physiologist). In addition of pathogenesis, diagnosis and treatment of vascular diseases also health economics is included in research agenda. There are no animal facilities available.

**Training:** During last five years seven PhD-students have been recruited to the department. However, it has not been reported how many of them have already graduated.

**Collaboration:** Mainly local collaboration.

**Scientific quality:** The unit has published 28 papers during last five years, 1/3 in Norwegian and Scandinavian journals. Only occasional papers in more acknowledged journals.

**Recommendation:** There is an urgent need to reconsider the whole research strategy of OVC. It is quite evident that research wise this unit is a bit outdated. It is now scattered around the city. Is there a possibility to collect some of the activities? The collaboration with the Intervention Center should be enhanced. Recruitment plan should be developed since members of the senior staff are retiring after a few years.

**Grading:** Weak

### *Cardiothoracic research*

**General comments:** The unit was created two years ago by fusing three surgical departments and acts now in two different locations (Ullevål University Hospital and Rikshospitalet University Hospital). It is now one of the largest departments of its field in northern Europe. Thus a lot of patients are available also for research. Laboratory and experimental studies are performed in collaboration with several other departments in different places. Clinical studies are run either in the Department or in the Intervention Center.

**Organization:** Organizationally the departments are combined but research wise they still seem to be separated. Most researchers are members of internal networks but also a number of small research groups have been formed. The head of the department is helped by Research Coordinator. Interestingly a lack of research space is mentioned. The department operates at several different locations. Organization is rather scattered. Some departments are very small. Detailed information on personnel structure is not available.

**Training:** There was no information available.



**Research activity and scientific quality:** There are some active researchers in the department. As a whole the department is not that productive. There are papers in good international journals but panel's impression is that this unit in research wise is lacking behind.

**Recommendations:** More deep integration of the department should be done as soon as possible. In the hearing the participants emphasized the importance of "bottom up" strategy for research. On the other hand complaint for insufficient funding was also presented. The panel urges to do strategic decisions concerning the distribution of limited resources for research and advice giving up resistance to change. Closer collaboration with the Intervention Center is recommended. Question on lack of space for researchers should be solved immediately. Post-doctoral positions also for clinical disciplines should be arranged.

**Grading:** Fair - Good

### Division of Diagnostics and Intervention

**General comments and Organization:** Division of Diagnostics and Intervention (DDI) was formed in 2009 by merging all laboratory medicine, pathology, radiology and intervention medicine from four different hospitals into one administrative unit. It employs approximately 2200 employees in 8 different departments (Medical Biochemistry, Pharmacology, Radiology and Nuclear Medicine, Microbiology, Immunology, Pathology, The Intervention Centre) that are located in several different locations. In practice, the merge is still ongoing and there are plans to redesign the structure of the DDI.

Total number of research personnel is 295. Out of these 101 is funded by institution/university, 107 by hospital and 87 by external funding. There are 19 professor I positions and 29 professor II positions. The number of post-doctoral fellows is 56. During the last three years 76 PhDs have graduated. For 2009 grants as % of total expenditures was reported 47% (128 273 000 NOK) and 37,9% (71 656 000 NOK) for Oslo University Hospital and for Institute of Clinical Medicine, respectively.

Like in other divisions, DDI is led by the head of division. At the next level, heads of departments are responsible for coordination of the research. Daily management tasks are managed by the Head of Research. In addition, a Research Coordinator has been recently hired. Many but not all leaders hold joint positions. There is also a Research Board led by the Head of Research. The roles of different leaders remain somewhat unclear, especially their roles in strategic planning. Both the organization and leadership appear to be in development phase. The panel feels that these should be clarified as soon as possible.

At present most of the research is done in rather small research groups. The presented strategy indicates that there should be at least four researchers in a group. There seems to be a good drive to identify strong research areas for the future, but this is still an ongoing process. One of the strengths (could also be a threat) in the division is that its employees come from many different disciplines. This gives good possibilities to develop genuine multidisciplinary projects but in order to be successful needs very determined leadership. This is also supported by the fact that DDI houses several important core facilities.

Since the merging of the DDI from several previous units has just happened and is still ongoing it is difficult to judge how successful the new unit will be. The panel feels that there are good possibilities for further development but is somewhat worried about the heterogeneity and lack of joint research strategy.

### *The Intervention Center*

The Intervention Centre was established 1996 as a research and development department by the Norwegian parliament. It got the following tasks: (1) Development of new procedures. (2) Development of new treatment strategies. (3) Compare new and established treatment strategies. (4) Study social, economic and organizational consequences of new methods. Thus the Intervention Centre is a common toolbox for all clinical specialities with four areas of research: (1) MR-guided therapy, (2) Other image guided therapy (X-ray, video, ultrasound, CT), (3) robots and simulators and (4) information technology, image processing, medical sensors and telecommunication. In contrast to most other units, The Intervention Centre is shielded against clinical production requirements.

At present it has a staff of 45 fully employed persons. 60% of these are non-medical, mainly engineers and physicists. The academic staff includes 1 professor of Faculty of Medicine, 1 professor and 1 associate professor of Faculty of Mathematics and Natural Sciences, and 1 professor of Faculty of Information Technology, Mathematics and Electrical Engineering at the University of Natural Sciences in Trondheim.

**Training:** 22 PhDs have been trained since 1996, 12 during last five years.

**Collaboration:** The Intervention Centre has extensive collaboration with other clinical units in UiO and a lot of connections also to other universities and university hospitals. Convergence of medicine and technology is considered to be a special strength. The Centre is active in EU projects as well as other national and international networks. It has very extensive industrial collaboration.

**Research activity and scientific quality:** The Centre has published about 300 papers since it was established and about 50 papers/year during last five years. The number of publications has been slightly increasing during last years and the quality of papers is considered to be good although this type of cross disciplinary approach should give possibilities for some more spectacular publications. The amount of publications is considered to be very good since the patenting requires an immense amount of extra work. Importantly The Centre claims about 20 patents and informs that six medical technology companies have emerged as spin-offs since its establishment. There is no reported conflict between patenting and publishing. Most likely this is due to that there is a clear plan how to deal with ideas and the patent process is started really early, so everything is settled before the publications are written.

**Recommendations:** The panel considers The Intervention Centre to be unique in European level. It is a new concept which should be acknowledged. The close connection to NTNU is also great and unique. Thus the panel encourages both the universities and university hospital to support further development of the Intervention Centre. At its best it could form a new model to enhance positive outcomes of clinical research into the society. The panel also recognizes a need for sufficient independency of the unit also in the future, and demand for strong leader as the driving force.

One out of four original duties of the Intervention Centre was to study social, economic and organizational consequences of new methods. The panel concludes that in this sector The Centre should clearly improve its performance.

**Grading:** Very good – excellent. (The panel emphasizes here that it has used somewhat different criteria in the evaluation than with other units due to unique duties and profile of The Centre).

### **Akershus University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine**

**General comments and organization:** Akershus became a university hospital in 2001. The organization model of the hospital is now divided into five different clinical divisions (Psychiatry services, Surgery, Medicine, Obstetrics and Gynecology, Pediatrics and Adolescent Medicine). The CEO has delegated the overall responsibility of research in the hospital to the deputy CEO. The university activity at Akershus is organized into three divisions within the Institute of Clinical Medicine. The reason for having only three divisions instead of five is the very low number of research personnel in the hospital. The three divisions are Internal and Laboratory Medicine, Surgery and Health Services Research and Psychiatry.

The leaders of the three research divisions will be included in the research network at the Institute of Clinical Medicine during 2011. The university administrative staff of Campus Akershus includes 5 persons and the head holds the position as deputy head of the Institute of Clinical Medicine, and is a member of the board at Akershus. Cooperation between Akershus and University of Oslo has been formalized with a cooperation agreement.

Akershus has a central research committee with five members from Akershus and five from University of Oslo. A major task of it is to allocate strategic grants within the organization. The directors of the clinical divisions hold overall responsibility for research in their divisions. It remains unexplained to the panel what is the exact role of the three research divisions in practice. The hospital research center has the main responsibility for research support, including statistics, data registries etc. In their research strategy Akershus University Hospital has identified eight research groups.

Total number of research personnel is 122. According to the report out of these 40 are funded by institution/university, one by hospital and 81 by external funding. During the last three years 13 PhDs have graduated. For 2009 grants as % of total expenditures was reported 48,4 % ( 33 129 000 NOK). The Department has a total of five professors, 11 associate professors, 17 professor IIs, 17 researchers, seven post-doctoral fellows, and 65 PhD students. Between 2007 and 2009, 13 PhD students graduated within the department.

Research productivity in terms of number of publications has been improved during the last five years. Citation index by field is above the world average but clearly below Norwegian average in the field. Journal profile is at the average level.

Akershus University Hospital has not been evaluated in previous RCN evaluations. Reorganization is still ongoing and thus makes it very difficult to judge how successful the

structure will be in terms of clinical research. The panel encourages the unit to continue formation of larger and more coherent research groups. The number of fulltime research personnel is far too low in order to get optimal results. The decision to increase allocated time for research is strongly supported and the policy should be continued. It is also recommended that all actions should be taken to achieve a better integration of the research and clinical work. The panel got the impression that this is at a very early phase in the hospital although it became a university hospital in 2001.

### *Clinical and Molecular Oncology Research Group*

**General comments:** This unit was established fairly recently and was therefore not evaluated in the last evaluation 2004.

**Organization:** The unit is led by professor I, and a steering group of 3 PIs (all MD, PhDs). The staff includes 7 professors (level: 4 professors I, 3 professors II, gender: 4 females), 1 associate professor and 3 post-doctoral fellows. Five out of 11 staff members are female, and most staff members (8/11) are younger than 50 years. The groups represent a wide range of competence fields, such as molecular biology, mathematics and biostatistics, surgery, oncology and pathology. Each PI is responsible for project decisions and application for external funding. Thus, the unit seems to have a rather decentralized organization with a “natural selection” of viable projects within the unit.

Research fields within the unit:

1. Molecular epidemiology and Oncology (1 professor, 1 post-doctoral fellow)
2. Surgery, breast and colorectal cancer (1 professor)
3. Pathology, inflammation and colorectal and breast cancer (1 professor)
4. Gastric cancer and infectious agents (1 post-doctoral fellow)
5. Clinical Oncology Malignant melanoma and breast cancer (1 professor II)
6. Clinical Oncology Colorectal and prostate cancer (1 professor II)
7. Bioinformatics and biostatistics (1 associate professor)
8. Epidemiology, inflammatory disease and cancer (1 professor, 1 professor II, 1 post-doctoral fellow)

**Training:** PhD students are mainly clinical scholars (MDs), molecular biologists, or bioinformaticians. Two PhD students have been recruited internationally. Many of the students have spent some time in laboratories abroad, e.g. at Princeton University.

**Collaboration:** All subgroups within the unit have collaboration locally with for instance the Radium Hospital. Some groups are also closely collaborating with other groups within the Institute of Clinical Medicine. There is also international collaboration with universities in the US, Canada, Finland, Israel, France and Belgium, and members of the unit are also involved in a joint EU project (see below).

**Research activity and scientific quality:** The research appears strong in most of the groups at the unit. Major assets include access to clinical material and modern biotechnology including microarrays (Agilent platform). Several groups are focused on translational research including studies of tumor samples, for example in breast and prostate cancer. For breast cancer, state of the art technologies are used to characterize tumor samples from different compartments. This will hopefully lead to improved diagnosis and more individualized therapy in the future. For prostate and colorectal cancer, the research is aiming at identification of biomarkers related to therapeutic efficacy and normal tissue toxicity. In a radiotherapy trial, the aim is to find predictive biomarkers of tumor responsiveness. The study seems to give a unique opportunity for exploring tumor hypoxia as a determinant for radiation resistance and metastatic behavior. Both these aspects are of significant interest and importance in the whole field of oncology. This project is part of an EU FP7 joint effort.

The group in Epidemiology, inflammatory diseases and cancer is the most productive with 80 published papers and 3 completed PhD exams during the period 2005-10. However, only 1 PhD student is active at the present time. The Molecular epidemiology group also shows a high number of published papers and book chapters (59), completed PhD exams (3) and 8 PhD students presently active in research. This group has publications in high impact journals such as PNAS (2006, 2010) and Cancer Research (2008). The Clinical Oncology in malignant melanoma and breast cancer has 48 published papers, 1 completed PhD and 1 PhD student presently active. The groups Bioinformatics and Clinical Oncology in colorectal and prostate cancer have published 29 and 24 papers, respectively. The group Surgery, breast and colorectal cancer has the lowest number of publications but is among the top three in number of both completed PhDs and active PhD students. Most articles are published in journals with medium impact factor.

The projects have their own funding. One example is the group Molecular Epidemiology and Oncology which is funded from the Norwegian Research Council (RCN), the Norwegian Cancer Society (DNK) and Helse Sør-Øst. The Clinical Oncology, Colorectal and Prostate Cancer project is part of an EU FP7 project (see above).

**Societal impact:** Potentially significant. A better classification of tumors with regard to various molecular markers may allow improved diagnosis and personalized treatment in the future.

**Recommendation:** The unit deserves continued support. The lack of basic research and risk of being restricted to patient screening studies was listed as a potential threat. This could perhaps be addressed by recruitment of one or several groups with a strong basic research profile.

**Grading:** Very good

### *Obstetrics and Gynecology Research Group*

**General comments and organization:** Obstetrics and Gynaecology Research Group has one professor II (80% non-clinical time – 20% funded by university and 60 % funded by the Akershus University Hospital), one researcher (20 %), Assistant professor II (– 20% funded by university and 20 % funded by the Akershus University Hospital, and 10 PhD students. There are no post-doctoral fellows in the group. Since 2005 the group has obtained funding from the Norwegian Research Council, Rehabilitering og Helse, Akershus University Hospital Strategic Funding and Helse Sør-Øst. Other researchers who are based on other departments have been recruited with external funding. Associate professor (20%) is in charge of research within gynecology and professor 20% (2006) is in charge of research within obstetrics. This department is the third largest Obstetrics and gynecology department in Norway, as measured in number of patients.

**Training:** Most PhD students are involved also in clinical work.

**Collaboration:** There are several national collaborators, but the number of international collaborators is low and restricted to Scandinavia.

**Research activity and scientific quality:** The research group focuses on two areas of research of clinical importance: pelvic floor dysfunction and adverse pregnancy outcomes (i.e. fetal death, fetal growth restriction).

Unit has a high volume of outputs but a lot of their publications are in Scandinavian journals. The profile of their journals is improving. Apparently they have publications not listed in their self assessment.

**Societal impact:** Lot of clinical service and the career path is directed to training of clinicians.



**Recommendation:** Panel sees that the group should invest more on research. The publication activity has recently moved to better journals and the group should continue this.

**Grading:** Very good

### *Surgical Research Group*

**General comments:** The surgery unit encompasses following departments: Gastro-intestinal surgery, orthopedics, urology, anesthesiology, Ear, Nose, Throat (ENT), breast and endocrine surgery, and vascular and thoracic surgery. The departments have established a joint local research council and elected one person to be responsible for research infrastructure in all surgical departments. However, research is not coordinated to any extent between different surgical departments. Research is facilitated by having a research coordinator. It is reported that the research is of relatively low priority in the unit and even office space is not available for research purposes.

**Organization and training:** Research organization is very weak and information on personnel structure is not available. There is also lack of supervisors having PhD degree. This is further complicated by the fact that it is difficult to recruit people who are interested in research. At present there are 12 PhD-students (5 in GI-surgery, 2 in ENT, 3 in orthopedics and 2 in vascular and thoracic surgery. In fact almost all research is planned as doctoral theses.

**Collaborations:** Most of the collaboration is within area of GI-surgery, both national and also some international collaboration exist.

**Research activity and scientific quality:** Overall research activity and publication record of the unit is rather low. There are some papers in good journals (GI surgery, orthopedics mainly). External funding is reported to be very modest. The scientific output in terms of publications has been growing to some extent but is still very moderate (15-20 papers/year for the whole unit).

**Societal impact:** The clinical research done in the unit may have some impact but most of the societal impact of this unit is via routine clinical work.

**Recommendation:** Surgical Unit needs clear strategy for research and the leadership of the Akershus as well as the Surgical unit should rank research in much more higher in their agenda. It should be considered to focus research efforts to only those areas that already have some activity, like GI surgery. Otherwise it would be very difficult to develop Surgical Unit to the level

of university hospital. In the beginning there is need for increased internal funding in order to develop capacity to obtain external funding.

**Grading:** Weak - Fair.

### *Child & Adolescent Research Group*

**General comments and organization:** The Child and Adolescent Research Group is situated in the Centre of Pediatric and Adolescent Medicine that from 2011 will cover 105 000 children from premature newborns up to eighteen years of age. In the strategy plan for the department, two main research fields have been identified, i.e. neonatal medicine and respiratory viral infections. The neonatal medicine research focuses on resuscitation strategies and asphyxia, and nutrition, growth and development of premature babies. The respiratory infection focus is on epidemiology and molecular biology of host and viral agents. Group consists of one professor II with 80% of time for academic/administrational work, and a supervising clinician with PhD, 9 PhD students and one in the medical student research program. There are no post-doctoral fellows in the group.

**Training:** Supervision responsibility is mainly on one professor.

**Collaboration:** A number of multidisciplinary collaboration projects both nationally and internationally are ongoing.

**Research activity and scientific quality:** Research strategy has been formulated lately. The clinical service has 18 publications over the last 5 years (but the two best papers, published in 2 strongest journals, Journal of Pediatrics & New England Journal of Medicine [a large collaboration project] do not have any co-authors from the group). They have a clear hypothesis flowing from these studies to look at RNA expression in naso-pharyngeal aspirates to determine whether infants with more severe RSV disease have lower levels of Dicer expression.

It is unclear why unit has only 10 publications (Department of Obstetrics and gynaecology has 53 over the same time period) and 4 PhD students (Department of Obstetrics and gynaecology has 8 over the same time period). Many of their publications are in Scandinavian journals.

**Societal impact:** Group has a busy clinical service, and contributes to 3 networks on Preterm nutrition, Asphyxia, and Gestational diabetes.

**Recommendation:** The output of the group is hard to evaluate, there is a need to clarify outputs from this university group.

**Grading:** Fair

## NTNU and St. Olav's Hospital, Faculty of Medicine

### Department of Cancer Research and Molecular Medicine

**General comments and organization:** The Department of Cancer Research and Molecular Medicine was organized into its present structure in 2002. It is now organized into five different sections that are: 1. Section for Molecular Biology, 2. Section for Cell Biology, 3. Section for Gastroenterology, 4. Section for Cancer and Palliation, and 5. Section for Applied Clinical Research. The last one is a core facility offering services for clinical researchers. In addition, the department has built several core facilities for basic medical research, including facilities for microarray, proteomics, bioinformatics and cellular imaging. The structure of the Department should facilitate the integration of the basic and clinical research. All sections include several research groups that consist of scientists and clinicians.

Total number of research personnel is 220. Out of these 104 are funded by institution/university, 11 by hospital and 105 by external funding. During last three years 33 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 59 % (69 456 000 NOK). There are 18 professor I positions, 23 post-doctoral fellows and total number of PhD students is 57.

A strategic research leadership is based on an Operational Management Team, which is led by head of department who reports to the Dean. The Operational Management Team has representatives from all different sections. The department head appoints leaders of each section. They are said to be instrumental for implementation of the strategy. However, the section leaders have no formal responsibility for budget or personnel. It remains unclear if this is the case only in The Department of Cancer Research and Molecular Medicine or if this is a general policy in the Medical Faculty. The panel expressed some concern whether responsibility and decision making power could be separated like this.

The research strategy is based on present strong research areas and teams. The department has very good infrastructure and equipment. In contrast to many other departments, the age balance is not worrying. However, the gender balance raises some concern.

Productivity of the department in terms of the number of publications has been increasing strongly during last five years. Citation index is well above world average by field and also somewhat above Norwegian average.

The Department of Cancer Research and Molecular Medicine has taken several strategic actions after the evaluation. These include enlargement of research groups and establishment of core

facilities. According to the results it looks obvious that these changes have strengthened the research productivity of the department both in terms of quantity and quality.

### *Opioids, Symptom Management and Palliation*

**Organization:** The research unit Opioids, Symptom Management and Palliation consists of 12 professors at different levels (6 professors, 5 adjunct professors and 1 associate professor), 2 researchers, 2 post-doctoral fellows, 4 clinical consultants (2 with university affiliation), and 22 PhD candidates. Within the period 2005 - 2010 10 PhD students defended their doctoral thesis. The age distribution of the staff is between 67 and 32 years. It is a distribution in the personnel including clinical activities (palliative medicine, oncology and anesthesiology), basic research (molecular biology, pharmacology and general biology) as well as methodologies, such as statistics and epidemiology.

**Collaboration:** The collaboration can be seen along a time line from the establishment of the unit in 1998 with local interaction at the hospital. When the Pain and Palliation Research Group (PPRG) was formed in 2001 the collaboration was extended nationally. As a result of the PPRG and its activities an international collaboration was initiated with the goal to improve advanced cancer care both in basic and clinical research and use the results in a translational effort. Through the 6<sup>th</sup> EU Framework the European Palliative Care Research Collaborative (EPCRC) was formed with the primary investigator and the project manager both from NTNU. When the Cancer Research Centre (PRC) was founded in Trondheim 2009 the world wide international platform in palliative medicine was established.

The research is a close collaboration between the university and the clinical activities through St Olav Hospital, which is an integrated hospital where research activities on one floor are mixed into the clinical facility with open patient departments below and wards above the research facilities.

**Research activity:** The research in palliative medicine in Trondheim is interdisciplinary and covers also very basic research at a biomolecular level. The clinical research has one focus on radiation therapy and some recommendations have reached many clinical communities. This includes the emphasis on hypofractionation (few fractions with high energy of ionizing radiation), e.g. for lung cancer and bone metastases. It is however not quite clear that the research behind these recommendations only originates from Trondheim. The outcome for the patients has been measured in terms of pain and survival. A clear advantage for these palliative patients is the short treatment period taking into account the expected survival time.

In the pain research, basic biomolecular results have contributed to the recommendations for opioid delivery to the patients. It has been shown that the distribution schemes for opioids can be changed if the pain is classified objectively by monitoring the clinical biomarkers. Here the group has published leading publications challenging the so called “pain ladder”, in which opioids are the last step in the ladder. The group has taken international initiative for recommendations based on data collection and the aim is to reevaluate the pain relief strategy.

Palliative research is in general weak so it is even more impressive that the NTNU/St Olav Hospital have been so successful in elevating the research field to a high level. There are many factors behind this, such as the integrated St Olav Hospital itself and the broad multidisciplinary basis for the research (clinical and basic research and the methodologies for performing research). Another important factor is that the initiative and the leadership for the worldwide international collaboration in some of the units originated from Trondheim.

There is approximately 60-70% external funding from a variety of research agencies, such as EU, The Research Council of Norway, Norwegian Cancer Society, Ministry of Health and Care and from the industries (mainly the nasal distribution of the opioids).

**Scientific quality;** There is a high number of publications and citations from the unit, but the distribution among the staff is uneven with 7 - 307 peer-reviewed papers per researcher during the period 2005-2008.

The publication rating from the Department of Cancer Research and Molecular Medicine during the period 2005 – 2008 is above the average level for all matrixes with citation index in the field (130), and for the journal (116) and for the journal profile (105). It is also above the average (100) for the citation index for Norway (108) and for the journal profile (112).

**General comments:** The unit has a strong leadership and the outcome is very impressive based on the research activities presented in scientific papers. However the distribution of papers among the staff members is very uneven as well as the number of PhD student supervision distribution among the staff. It is not clear how much contribution comes from collaborating partners. The statistics gives a clear indication that the unit is internationally well recognized.

**Recommendations:** Based on the success of the research in palliative care the perspective for the next five years is to:

- take a leading position internationally in pain and cachexia research
- contribute to personalized treatment in palliative cancer care

**Grading:** Good - Very good

### Department of Circulation and Medical Imaging

**General comments and organization:** The Department of Circulation and Medical Imaging is one of five academic departments under the Faculty of Medicine. The department includes the following disciplines: anesthesiology, biomedical engineering, cardiology, cardiopulmonary physiology, cardiothoracic surgery, exercise medicine, pulmonary medicine, radiology and vascular surgery. Moving into the new university hospital opened a possibility to further develop integration of clinical service, translational medical research and medical technology. The department hosts several large common infrastructures, for instance Medical Imaging Laboratory, serving the whole faculty.

Total number of research personnel is 184. Out of these 71 are funded by institution/university, 21 by hospital and 92 by external funding. During last three years 37 PhDs have graduated, including PhD, Dr. med., and Dr. philos. For 2009 grants as % of total research and development expenditures was reported 62 % (56 795 000 NOK). There are 14 professor I positions, 23 post-doctoral fellows and total number of PhD students is 61.

A strategic research leadership is based on an Operational Management Team, which is led by the head of department who reports to the Dean. Research leadership is well described and seems to consider both strong individual and collective aspects of modern management.

After the previous evaluation the department has become a “resource center” of medical technology for the whole of NTNU. It was reorganized in 2002 and since then the department has focused on interdisciplinary collaboration between clinical medicine, translational biomedicine and medical technology. There is a strong emphasis in the strategy to carry on results and innovations all the way from idea to clinical applications. It appears that the department has a very ambitious but realistic strategy and its implementation is strongly encouraged by the panel. The strategy recognizes the importance of developing good infrastructure and also the importance of carrying research results all the way from idea to

clinical applications. The biobank and investments to develop a strong group in the area of exercise physiology and medicine are good indicators on this. The structure of the department is innovative and it is clearly well prepared for future challenges in medical research.

Productivity of the department in terms of the number of publications has been increasing a lot during last five years. Citation index is good but there is obviously a need to develop publication policy towards more prestigious journals in the future.

It appears that Department of Circulation and Medical Imaging has followed previous recommendations and the panel encourages it to continue investments into translational research and interdisciplinary projects.

### *Cardiovascular Clinical and Translational Science*

**General comments and organization:** The unit Cardiovascular and Translational Science group belongs to the Department of Circulation and Medical Imaging. The group is composed of a network of well-established clinicians, who are also active in teaching and research at the department. They represent a diversity of specialties, such as anesthesiology, emergency medicine, cardiology, cardiothoracic surgery and immunology. Allocated time for clinical duties and university-related tasks (teaching and research) is 100% and 20%, respectively. They are all working at St Olav Hospital, which is an integrated hospital where research activities are mixed into the clinical facility on a floor with open patient departments below and wards above the research facilities.

The initiative to this concept came from the regional authorities. The way of integrating clinical activities and research in a hospital facility like at St Olav is unique and has few similarities worldwide. The initiative BioX at Stanford University is along the same concept. At St Olav Hospital it was planned that all senior clinicians should have the possibility to take off 20% of their activity to research work. It is not quite clear if this planning was fully realized until now. The strategic vision includes positions of 50/50 % clinical and research activity as well as the establishment of an academic department fully integrated with the clinical partners. The threat is here as in all other settings the heavy burden from the clinic. The strength is the foundation built on several decades of development of ultrasound and magnetic resonance techniques, which are mentioned as locomotives in the process. The imaging center is the most strategic part with global interaction. The weakness is that there is a lack of strategic focusing, and few randomized clinical trials.



In total 15 senior members belong to the unit out of which 3 full professors, 4 professors II, 6 associate professors and 2 researchers.

**Scientific quality:** Citation and journal indicators during the period 2005 – 2008: The publication metrics for the unit are high and above the average level in 3 of the separate metrics with 142 for the citation index in the field, 142 for the journal citation index and 109 for the citation index in Norway and just at the average for journal profile (100).

**General comments:** There seems to be a great potential which might not be fully utilized. The technology is very strong and therefore pushing the development. On the other hand there are very few randomized clinical trials so the medical pull might not be equally strong. The trend in Trondheim and at NTNU seems to be led by proactive thinking and not clamped in old traditions. Instead of repairing old structures new facilities are being built.

**Recommendations:** The Unit has strong funding on regional and national level but low level activity on the European scene. Therefore, the recommendation is to strengthen the interaction within Europe for building international networks of excellence for jointly funded projects.

**Grading:** Very good - Excellent

### **Department of Laboratory Medicine, Children's and Women's Health**

**General comments and organization:** Department of Laboratory Medicine, Children's and Women's Health (LBK) was formed from several smaller units and is now organized into four sections by medical disciplines (Pediatrics, Gynecology/Obstetrics, Anatomy/Pathology/Forensic Medicine, Laboratory Medicine) and a fifth section for technicians. The Faculty of Medicine and the St Olav Hospital are now closely co-localized and many people have positions in both organizations. Although the department was established in 2002 it still reports that there is an ongoing integration process with discussions at all levels. In the hearing it was explained that LKB was a "marriage of convenience" based on geographical location rather than a strategic initiative.

Total number of research personnel is 92. Out of these 61 are funded by institution/university, 11 by hospital and 20 by external funding. During last three years 16 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 32 % (14 513 000 NOK). There are 13 professor I positions, three post-doctoral fellows and total number of PhD students is 13.

A strategic research leadership is based on an Operational Management Team, which is led by the head of department who reports to the Dean. The Operational Management Team has representatives from five sections, the administrative employees, scientific employees, and students. It meets once a month and discuss all important matters. In addition, there is an Institute Council that consists of the Operational Management Team and external representatives, and meets 1-2 times per semester. There is an obvious difficulty in allocating enough research time for the scientific staff due to clinical work and teaching.

LBK's vision is to generate research-based knowledge *in all* its disciplines. LBK reports that in order to cover teaching responsibilities it has to maintain the structure of many research groups. Molecular medicine, research related to biobanks and the HUNT survey, and translational research are reported to be main strategic research areas. The department has worked at trying to facilitate the establishment of collaborative networks and larger research groups.

Productivity of the department in terms of the number of publications has been increasing a lot during last five years. Citation index is well above the world average by field and also above the Norwegian average. However, there is an obvious need to publish more papers in more highly ranked journals.

The department has made several changes since the last evaluation but some of the previous problems seem still to exist. Although the productivity has increased, the panel got the impression, that there is still a need to clarify and sharpen the research strategy.

### *Gynecology*

**General comments and organization:** The Gynecology group is small, it consists of 2 professor IIs (20 % positions), one associate professor I (100 % position), one university lecturer II (50 % position ear-marked to teaching), and one Research Scientist, altogether 5 members. Most of the members are heavily engaged in clinical work at the university hospital and in teaching activities. The group has been established so that it ensures a broad coverage of the field of gynecology for clinical and teaching purposes and the group is described as "a small group with a broad focus". Focusing is opposed by the personnel. The Gynecology group had no representative at the interviews.

**Training:** In 2005-2009 the group has produced only two PhD dissertations, although there are no recruitment problems. Low number of PhD degrees is said to result from lack of capacity for supervisors.

**Research activity and scientific quality:** Based on bibliometrics, researchers' activity is strong, but fragmented. Many publications appear in weak journals (e.g. *Maturitas* [ranked 22<sup>nd</sup> out of 40 Obstetrics and Gynaecology journals by Impact factor], *Acta Obstetrica et Gynecologica Scandinavica* [ranked 36th out of 40 Obstetrics and Gynaecology journals by Impact factor]), or in journals published in Norwegian. In many of the listed publications St Olav's academic personnel are not the first or last author. The best 3 publications from the CV's are mostly from over 5 years ago. Publication in Norwegian was justified by wide distribution to Norwegian gynaecologists.

**Recommendation:** Focus on succession planning for their strength in antenatal ultrasound.

Resolve the problem with gynaecology research which was identified 7 years ago in the previous review. Focusing of research activities which was suggested on 2004, has not taken place. However, it is unclear what resources would be freed up by stopping gynaecological research.

**Grading:** Fair

### *Obstetrics*

**General comments and organization:** The unit consists of 6 researchers from 2 different sections at the Department for Laboratory Medicine, Children's and Women's Health (LBK). Five members are from the Department of Gynecology/Obstetrics and 1 from the Department of Anatomy/Pathology/Forensic Medicine. Four researchers also belong to National Center for Fetal Medicine (NCFM). All group members also have positions at the university hospital.

All clinical positions carry a large clinical work load. Allocation for academic work is only 20% (professor II, associate professor II) except for the one researcher from the Department of Obstetrics and one from NCFM /NTNU, who both have full academic positions (professor I and associate professor I) in addition to their 20% positions in the clinic.

Obstetrics has the National Centre for Ultrasound since 1990 and is referred high-risk pregnancies from all over Norway for invasive foetal procedures. This population, and control pregnancies from the local population of 180 000 people, have provided a rich source of data for theses and publications. There is a claim of political interference in potential randomised trials of ultrasound scanning.

**Training:** In addition to PhD training the unit has established an education program for midwives to be trained as ultrasonographers.

**Research collaboration:** The unit has strong, long collaboration with department of circulation and medical imaging leading to good results in fetal ultrasound technologies.

**Research activity and scientific quality:** Some publications in stronger journals (e.g. Ultrasound Obstetrics and Gynaecology [ranked 8th out of 40 Obstetrics and Gynaecology journals by Impact factor], but also many in Acta Obstetrica et Gynecologica Scandinavica [ranked 36th out of 40 Obstetrics and Gynaecology journals by Impact factor], or Norwegian language journals. In many of the listed publications St Olav's academic personnel are not the first or last author. The best 3 publications from the CV's are mostly from over 5 years ago.

**Societal impact:** Collaborations with Nelson Mandela School of Medicine at the University of KwaZulu-Natal, Durban, South Africa for training of midwives in South Africa to undertake basic ultrasound. They also develop equipment for ultrasound appropriate to a 3rd world working environment.

**Recommendation:** The Unit should continue their work in the area of ultrasound research. In order to confirm future progress and such a good level of research the Unit should find a way to allocate more time for research. It is unlikely that in the future 20% positions could be enough.

**Grading:** Good

### Department of Neuroscience

**General comments and organization:** The Department of Neuroscience was formed in 2003 by a merger of three previous departments (Clinical Neuro medicine, Psychiatry and Bone and Joints). It is now organized into seven different sections that partly represent different medical specialties, partly geographical locations and partly strategic research priorities. These sections are following: 1. The Neurocentre Section, 2. The Stroke and Geriatrics Section, 3. The Adult Psychiatry Section, 4. The Regional Centre for Child and Adolescent Mental Health, 5. The Movement Centre Section, 6. The Norwegian HER Research Centre and 7. Neuroscience Laboratories. The department hosts several laboratories and seems to have good infrastructure for both clinical and translational research.

Total number of research personnel is 207. Out of these 104 are funded by institution/university, 15 by hospital and 88 by external funding. During last three years 28 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 44 % (31 488 000 NOK). There are 18 professor I positions, 21 post-doctoral fellows and total number of PhD students is 48.

A strategic research leadership is based on an Operational Management Team, which is led by the head of department who reports to the Dean. Operational Management Team has representatives from all different sections. The department head appoints leaders of each section.

In the recent strategy process the department has identified four areas with the potential to reach excellence. These areas are: 1. Neurodegenerative diseases, 2. Headache disorders, 3. Mobility disorders and 4. Psychiatry. The department has given modest economic incentives to these groups. Now the aim is to facilitate the evolution of larger research groups and also integrate both clinical and basic researchers into the same groups. This is expected to enhance translational and multidisciplinary research. Follow-up of research development is done by using several different indicators, including publications, external funding etc.

Productivity of the department in terms of the number of publications has been increasing strongly during last five years. Citation index is well above world average by field.

The structure of the department is rather unique. It remains somewhat unclear how far the integration of different disciplines under different sections has proceeded. However, the panel finds that the department should continue according to the presented strategy.

### *Mobility Disorders*

**General comments and organization:** The Movement Disorder group was established in 2010 and now forms one of four strategic areas at the Department of Neuroscience. The core consists of two previous groups: Research group on Geriatrics and the Stroke Research group. It forms the important part of Human Motor Control (HMC) network under the NTNU prioritized area Medical Technology. Both the Movement Disorder research group and HMC Network are led by the same person. The staff of Movement Disorder research group consists of two professors II positions, one associate professor, one senior researcher, one post-doctoral fellow and five PhD students. In addition clinical staff members both at the Stroke Unit and the Department of Geriatrics participate into research activities.

**Research activity:** The group aims to improve clinical practice through better diagnosis and interventions and to improve rehabilitation of neurological, orthopaedic and geriatric disorders. NTNU has competencies within clinical research, technology and human movement science and also provides a good infrastructure for this type of multidisciplinary work. Since the group is so recently established they do not have a solid joint strategy yet. However, in the hearing the

panel got an impression that this work was in good progress. Ongoing research is focusing on developing care and rehabilitation for stroke patients. The results from the Trondheim Stroke Unit trial are imbedded in the Norwegian guidelines on stroke. They also develop clinical care pathways for elderly.

**Scientific quality:** Members of the group have good publication record. Most of the papers are in moderate or good specialized journals. The research area they are focusing is of growing importance in the future. The clear strength of the group is joining of medicine and technology. However, the panel advises that it is better to have a medical pull rather than technological push.

This research can directly affect care of the number of patients and may thus e.g. reduce the time spent in hospital, improve rehabilitation of severely injured patients. It may also produce new technological innovations for future patient care.

**Recommendations:** The panel feels that the group is developing important and unique knowledge for somewhat neglected clinical needs. The group should urgently develop a joint strategy and strengthen their external funding. They should also be more ambitious in the publication policy.

**Grading:** Very good - Excellent. This is not judged by the present excellence but is partly based on very promising future possibilities and importance of emerging research area.

### *Orthopedics*

**General comments and organization:** The core of the evaluation unit Orthopedics is the Norwegian National Centre of Competence for Orthopedic Implants (NKSOI). The staff of the NKSOI consists of medical doctors, orthopedic surgeons, engineers and one physiologist. Around the NKSOI there is a larger but more loosely organized Orthopedics Group at the Department of Neuroscience and at the Department of Orthopedic Surgery and Rheumatology at St Olav's Hospital. The Spinal research group is part of the National Centre for Spinal Disorders at St Olav's Hospital and NTNU and the staff consists of orthopedic surgeons, a neurosurgeon, a neurologist and nurses. The evaluation unit does not have a joint leadership but all three research groups have their own leaders.

**Collaboration:** Although the evaluation unit appears rather loosely organized it seems to work in a coherent and effective way together. The spinal research group has developed a national network having partners in all Norwegian university hospitals. This unit has been involved in

several large clinical trials, including two ongoing international multicenter studies on repair of cartilage injuries. The unit has access to operating theatre where 50% of capacity is dedicated to research activities. It appears that the collaboration between different partners is very good. The unit has also several ongoing projects with medical companies. The head of NKSOI is not employed at NTNU and is looking more close collaboration with NTNU in order to facilitate more efficient collaboration. The evaluation unit has good possibilities to exploit the knowledge from technology and medicine to develop new models of treatment for instance to ligament injuries.

**Scientific quality and societal impact:** Several members of the groups have a good publication record. Most of the papers have been published in best journals of the orthopedic field. However, papers in highly ranked medical journals are not that common. Groups are involved in several trials developing new treatment modalities and have extensive collaboration both nationally and internationally.

All research done by these groups may not be “rocket science” but is very important. Societal impact of their work is very high and may have considerable impact on health economics.

**Recommendation:** The panel recommends the evaluation unit to continue and deepen their internal integration between different groups. It further suggests reducing the number of small projects. Collaboration between NKSOI and NTNU should be arranged on formal basis. This evaluation unit deserves strong support both from the university and from the university hospital.

**Grading:** Very good - Excellent

## University of Tromsø, Faculty of Medicine and Dentistry

### Department of Clinical Dentistry

#### *Department of Clinical Dentistry*

**General comments and Organization:** The Department of Clinical Dentistry was established at the Faculty of Health Sciences in 2003. Its strategy is to provide an international research environment where both local and international scientists are active. The department is organized in four main areas: Administration and management; Dental and dental hygienist programme; Research and PhD programme; Administration and operation. All disciplines are included in one department. There are 31 staff members (15 professors, PhD students and administrative staff).

**Training:** PhD students have been recruited continuously. There are now 9 PhD students. The unit is actively involved in the faculty strategy in order to maintain a high international level of the PhD programme.

**Collaboration:** Two research areas, paediatric dentistry and cognition and oral health, involve international collaborations. The latter is funded by the Swedish Research Council. One new group cooperates on *in vitro* studies with the Department of Pharmacology. There is also collaboration with the Institute of Odontology in Bergen regarding biomaterials, and with Umeå University in Sweden regarding population studies and genetic factors.

**Research activity and scientific quality:** The unit is focused on research on cariology, community dentistry, epidemiology, dental materials, endodontics, gerodontology, oral medicine, orthodontics, and periodontics. Two research areas are established in clinical dentistry, i.e. paediatric dentistry and cognition and oral health. International cooperation has been established. Leakage of substances from implants is a general focus area. Major strengths of the unit include good opportunities for research, including population studies, and collaboration with the local community and the local centre of competence, newly established. However, the unit has had difficulties in recruiting teachers and researchers from other universities in Norway, although the situation has improved. A reason for this seems to be that better conditions are offered at the Centres of Competence. The citation index is around or below average in Norway.

**Recommendations:** A research strategy for Norwegian dental research is needed. This strategy should emphasize recruitment of academic staff and administrative structures at the different dental institutes. The recruitment of academic staff to the Centres of Competence in competition with the universities should also be evaluated. The panel recommends a broader



and more structured collaboration within Norway between the dental institutes. It is also suggested that Tromsø establishes a North Pole network among universities in the northern hemisphere that have the same scientific and educational challenges. Apparently, such collaboration has already been initiated with Arkhangelsk University.

**Grading:** Fair – Good

### **Department of Clinical Medicine**

**General comments and organization:** Department of Clinical Medicine (IKM) is the “university part” of the clinical departments in the university hospital. Research-wise IKM consists of 16 research groups, mainly headed by a professor I. The number of research groups has been reduced from 22 to 16. Many of those problems that were pointed out in the last evaluation still exist. Recruitment problems seem to continue, as well as lack of time for research, etc.

Total number of research personnel is 248. Out of these 177 are funded by institution/university, 32 by hospital and 39 by external funding. During the last three years 54 PhDs have graduated. For 2009 grants as % of total research expenditures was reported 38 % (15 362 000 NOK). There are 26 professor I positions, 4 post-doctoral fellows and total number of PhD students is 24.

Research productivity in terms of number of publications has improved steadily during the last five years. Citation index by field is below the world average and clearly below Norwegian average in the field. Journal profile is below the average level.

Interface between university and hospital is said to be a source of conflict. Lack of research time is indicated as a major limiting factor of research productivity.

There are several reasons to suggest more close collaboration between the university and the university hospital. In addition, it is suggested that special emphasis should be paid to post-doctoral positions as well as PhD positions. Otherwise the recruitment may become even more difficult in the future.

### ***Pediatrics Research Group***

**General comments and organization:** The pediatric research group consists of three professors I, three professors II, three research scientists /post-doctoral fellows, nine PhD students, two engineers and 2,5 research nurses.

This multidisciplinary research group aims to obtain new knowledge on health and diseases of children and adolescents. Within paediatrics 4 areas of research were highlighted:

1. Infectious diseases
2. Neonatology
3. Child and Adolescent Mental Health Services
4. Oncology especially solid tumour neuroblastoma research

The project groups have regular meetings. Funding is only/mainly from regional health authorities. Recruitment of clinicians was said to be easy.

**Training:** Three PhD degrees have been finalized during 2005-2010 and several are ongoing. There is an initiative for creating a combined MD, PhD program.

**Collaboration:** Some groups are active participants of research networks both at national and international level. The group itself is complementary including pediatricians, psychologists, psychiatrists and molecular biologists. Group has participated in EU projects as partners, not as coordinators.

**Research activity and scientific quality:** The group reports to have good laboratory infrastructure. The group has published about 80 papers during last five years. Some of them are in good international journals and occasionally also in excellent journals.

Neonatal research was the strongest of the areas along with the well respected lead for neuroblastoma research. One example of a recently published, high impact factor study was 'Early Intervention Improves Cognitive Outcomes for Preterm Infants: Randomized Controlled Trial [*Pediatrics* 2010; 126:5 e1088-e109]. Prematurely born babies are recognized to be at greater risk of cognitive problems. In this study parents were randomized to the Mother-Infant Transaction Program or a control group. The follow up study showed this affected the development of prematurely born children.

Research funding by North Norway Health Authority has increased. It was claimed that EU grants are too tedious to make although many other Norwegian Researchers have been successful in getting EU grants. It was considered easier to apply for funding from other sources.

**Societal impact:** The clinical academics are responsible for some of the paediatric service for Tromsø Hospital but this is true of all the clinical academics the panel met in Norway and also of

the EU and USA. There was no claim that their share of clinical duties was more burdensome than elsewhere in Norway.

**Recommendation:** The group should further continue towards better integration in order to achieve critical mass to perform even more demanding research tasks. The group should focus more on a small number of strong areas of research. Their example of a successfully concluded randomised trial leading to a prominent publication in a widely cited journal is given above. The group should think about doing more work along these lines.

The group should definitively obtain funding from other sources than regional. If their research is being held back by lack of resources, which most of the Norwegian researchers we met claimed, they should consider leading collaboration with at least 2 other EU partner countries to access the FP7 EU program.

**Grading:** Fair

### *Translational Cancer Research Group*

**General comments:** The research group was established in 2005 as collaboration between the Department of Pathology and Department of Oncology at the University Hospital of North Norway (UNN). In 2009, the clinical cancer research activity at the Department of Oncology was merged with the Translational Cancer Research group. The evaluation of 2004 noted that the Institute of Clinical Medicine needs a focused research strategy and a dedicated academic leader. The scientific production of the Oncology unit was considered good.

**Organization:** The Translational Cancer Research group consists of the Protein expression group with 9 researchers (3 post-doctoral fellows, 7 PhD or MD, PhD students, 2 technicians; the MicroRNA group with 5 researchers (2 post-doctoral fellows, 2 PhD or MD, PhD students, 3 master students, 1 technician); the Cell culture/Radiation group with 7 researchers (1 professor, 1 assistant professor, 3 post-doctoral fellows, 1 radiation physicist, 1 PhD student, 1 technician); and the Clinical Cancer Projects group with 6 researchers (1 full time professor, 4 part time and/or associate/assistant professors, 1 PhD student). The mean age for professors is 54. The gender balance is 62% males and 38% females. The unit is led by two full professors, with annually alternating leadership between the two.

**Training:** Six PhD students have obtained a PhD degree since 2008. There are currently 11 PhD or MD, PhD students, 3 master students, and 8 post-doctoral fellows at the unit. A formal PhD training is organized by the faculty. It has been easy to recruit PhD and MD, PhD students.

**Collaborations:** The unit has a number of international collaborations with for example University of Oxford, University of Glasgow, and the Prostate Cancer Research Center, London, UK, and Hospital General Universitario, Valenica, Spain. Collaboration is also ongoing with the Norwegian Radium Hospital, Oslo. Through SWENOTECA, the unit collaborates with other cancer centers in Norway and Sweden on testis cancer research and clinical studies.

**Research activity and scientific quality:** The unit has a mix of cell biologist, pathologists, and clinicians with competence ranging from basic to clinical research, and techniques such tissue microarrays, gene expression microarrays, sequencing, proteomics, imaging and biostatistics. Major research projects are focused on angiogenic markers such as VEGF, FGF and PDGF, *in situ* immunity, epithelial-mesenchymal transition (EMT), miRNA profiling, and radiosensitivity in various types of tumors. One important goal is to establish individualized radiotherapy for cancer patients and improve efficacy of such treatment. The unit runs phase I and II clinical trials in lung and testis cancer.

The UNN and the hospitals in Bodø and Arkhangelsk, Russia, provide access to human cancer samples.

Funding seems to be a limiting factor. Financial support from University of Tromsø or the UNN is not sufficient for the ongoing research. The unit has not been particularly successful in getting EU grants. It is noteworthy that the health sector and the UNN provides a larger share than the University of Tromsø for PhD student and post-doctoral salaries.

The scientific output in terms of publications has accelerated over the last 5 years. A total of 126 original papers were published during 2005-10. Of these, 27 are original translational research articles and 78 are original clinical research articles. However, most publications are in journals with only a medium impact factor.

**Societal impact:** The translational research at the unit may lead to beneficial effects for health care in the future.

**Recommendation:** Increased funding from the University of Tromsø, e.g. post-doctoral positions, would strengthen the research at the unit. It is also important to try to improve external funding, for example from the EU. Clinical researchers need more time for research. The unit should try to improve integration of basic research in clinical studies. The phase II trials have been more clinical than translational so far.

The panel also recommends that the unit should strive to publish in journals with higher impact factor. This could be achieved by for example submitting fewer but better manuscripts.

**Grading:** Fair – Good

### *Bone and Joint Research Group*

**General comment:** The Bone and Joint Research Group (BJRG) was formed at 2009 by joining orthopaedic and rheumatology groups. There are 13 members, including two full professors and one associate professor. In addition to professors there are five associate professors/lecturers in part time positions, two post-doctoral fellows, and three PhD students.

**Organization:** BJRG is organized into clinical and translational part. In both of these teams there are several small subgroups.

**Training:** For some years now there has been steady recruitment of PhD students (50:50 positions). One PhD degree per year has been completed. There is obvious need for post-doctoral positions.

**Scientific quality:** The group has rather good publication record. The group has good reputation in cartilage research, i.e. transplantations.

**Recommendation:** This group has clear potential. They should increase their collaboration and should put more focus on translational research. Having such many subgroups is not effective. The group should consider further integration of research and focus not more than two thematic topics. They should be supported more strongly and should be more active in applying funding.

**Societal impact** of this work is high, since they are studying very common and important diseases.

**Grading:** Fair - Good

### *Gastrointestinal Surgery Research Group*

**Organization:** The research group has one full professor, four professor II and two associate professor II positions. In addition, there are two senior residents, having PhD degree and six PhD students. There is funding from regional health authorities and from RCN. The research group has Surgical Research Laboratory with facilities for large animal experiments. They also have a status of National Competence Centre in pelvic incontinence.

**Training:** The group has rather stable PhD production and feel rather confident about further recruitment possibilities.

**Collaboration:** The group has established rather intensive research collaboration both at the international and national level. ERAS-group is a good example and forms a platform for a common international perioperative database.

**Research activity and scientific quality:** Research activities include four different projects: peri-operative care and metabolism, Colo/rectal cancer, anal incontinence and liver failure and liver regeneration. Some of these include both clinical and basic science arms. The group has produced about 70 papers during last five years. Most of them are in good international journals. The group is also running national colorectal registry and has been active in establishing international peri-operative database.

**Societal impact:** Group's work to develop evidence based treatment models and especially to optimize peri-operative practice could have remarkable impact on society since it includes a high numbers of patients.

**Recommendation:** The group should further focus their research area and select a couple of the topics where it really could make an international breakthrough.

**Grading:** Fair - Good

### *Anesthesia and Critical Care Research Group*

**General comment:** This evaluation unit consists of three groups who have recently joined to form one "large research group" according to suggestion in previous evaluation. The group runs National Competence Centre for studies of accidental hypothermia.

**Organization:** The group has two professors I, two professors II and one associate professor. One professor from Arkhangelsk, Russia, is employed in a 20 % externally financed position and a consultant/ post-doctoral fellow applying for grants to proceed the sheep experiments on acute lung injury. In addition there are five research fellows/PhD students, whereof two part time anaesthesiologists. The group also has 5 research line students. Three out of the professors are more than 60 years of age.

**Collaboration:** The group reports several collaborations with domestic and international departments.

**Training:** It is reported that 6 PhD degrees will be finished during 2011-12. The group has been successful to recruit researchers from Russia.

**Research activity and scientific quality:** Three research groups are working on four topics. It remains unclear how much actual collaboration exists between groups. Hypothermia research is internationally well recognized and includes collaboration for instance with Mayo clinic. It also has basic research arm. Research on critical care focuses on acute lung injury and sepsis and includes large animal models. Work in developing countries has constituted e.g. the basis of the WHO landmine trauma center in Tromsø and has had impact on teaching of health care professionals in developing countries. Groups have published about 40 papers during last five years. Many of them are in Norwegian and Scandinavian journals.

**Societal impact:** Both work in developing countries and trauma research could improve patient survival.

**Recommendation:** Research group is in the process of integration and it should be continued. The groups should join also forces to improve their capacity to obtain external funding, which is very modest at the moment. The group should take specific actions to ensure its performance during the transition phase when present professors retire.

**Grading:** Fair - Good

## University Hospital of North Norway (UNN)

**General comments and organization:** Total number of research personnel is 213. Out of these none is funded by institution/university, 148 by hospital and 65 by external funding. During last three years 55 PhDs have graduated. For 2009 grants as % of total research expenditures was reported 56,9% (182 072 000 NOK). There is no professor I positions, 6 post-doctoral fellows and total number of PhD students is 25. The funding from the hospital is very minimal for research but it is stated that it is now increasing.

Research productivity in terms of number of publications has been improved during last five years. Citation index by field is above the world average but below Norwegian average in the field. Journal profile is at the average level.

The collaboration between clinical departments at the University of Tromsø (UiT) is minimal. It was indicated that merger of the units between UNN and UiT has been suggested but the university is not interested in this allegedly. The clinical research center has more stable funding. It is indicated that UNN does not have recruitment problems.

The panel encourages much closer collaboration between the UNN and UiT. There is also an urgent need to increase hospital funding for research, being far below the level in other university hospitals.

### *Clinical Cardiovascular Research Group*

**Organization:** The research group consists of 8 professors at different levels; (1 professor I, 2 professors II, 4 associate professors and 1 professor emeritus), 1 Fellow, 1 consultant cardiovascular surgery, 1 consultant cardiologist, 1 researcher and 2 PhD students.

The unit is a research department at the division for Cardio Thoracic and Pulmonary diseases at the University Hospital (UNN) and at the Department of Clinical Medicine at the University of Tromsø. The group has been successful in recruiting young researchers and can therefore be looked upon as a staff with good potential for the future. The weaknesses are that the group is small and that it has a lack of post-doctoral positions. The organization of the research activity at UNN is complicated as the Department of Clinical Medicine at the University of Tromsø does not have a close connection to the research group at the UNN. This means that there is not a clear line in between the patient related research in the research group at UNN and the University of Tromsø.



**Research activity:** The Clinical Cardiovascular Research Group has 4 main research areas. Two clinical trials (Norstent and Rabagast) are planned to take place within the research area of intervention cardiology with the basis in the research group Vascular biology and treatment of coronary artery. From the presentation neither of these trials has yet been started. A study within the “Tromsø Study” for epidemiology is planned within the Imaging and pictures activities. In the research group Myocardial protection one clinical study is running. Another clinical trial utilizing the Large animal laboratory in collaboration with the Vascular biology group is planned.

**Collaboration:** There is a weak collaboration in between the Clinical Cardiovascular Research Group and University of Tromsø. The “Tromsø Study” is planned in collaboration between the two entities. On a national level collaboration in interventional cardiology is planned with the NTNU in Trondheim. International collaboration takes place or is planned within the Baltic PCI (percutaneous coronary intervention) study group. The researchers have individually built up networks.

**General comment:** An evident weakness is that there is a lack of external funding besides the institutional funds. The implication of this is that some laboratory work cannot be continued and e.g. collected samples have had to be stored without analysis. The recruitment of PhD students and post-doctoral fellows has been good. However they are recruited from clinicians who want to combine clinical and academic work with the evident threat unfavorable for the research part of the activity. In general the research groups are small and therefore vulnerable as there is a threat of losing personnel e.g. to southern part of Norway.

**Recommendation:** To build much stronger connection in between the Department of Clinical Medicine at the University of Tromsø and the research group at the UNN. This will enhance the possibility to connect the patient related research at these two entities taking into account that the population basis for clinical research is limited.

**Grading:** Fair

### *Women's Health and Perinatology Research Group*

**Organization:** The research group consists of 7 professors at different levels; (1 professor I 50% activity, 3 professors II, 2 associate professors and 1 assistant professor), 1 Fellow, 1 researcher and 3 PhD students. (Students working in other health regions, but supervised by the members

of this research group or where the members of our research group only have a co-supervisor role, are not included).

The group was established in 2009 when 3 former research groups were merged together. The research leader has a professor II position with only 20% research/teaching activity and 100% as a clinician. The group has scientific competence in many areas and has also international collaboration. As for the group in cardiovascular research there is a lack of post-doctoral fellow and full time academic positions.

There are 1500 deliveries/year for the 8 clinicians to take care of which is a comparatively low number as compared to university hospital obstetric clinics elsewhere in Europe.

The professor II with 20% academic position has almost no time dedicated for research, which is divided into 14 areas grouped into 3 subgroups. There is no specific area in which the group is leading and can be pointed out as a focus on the European/world level with the exception of one area.

**Research activity and scientific quality:** According to the tradition for the group a substantial part of the papers are published in Norwegian language and one reason for that might be that one main objective is to exchange and promote new ideas and share methodological expertise among their peers in Scandinavia.

Citation and journal indicators 2005-2008 publications for the units at University Hospital of North Norway and the University of Tromsø: The publication rating from the UNN is above the average level for citation index in the field (115), for the journal (110) and for the journal profile (105). It is below for the citation index for Norway (93). The corresponding values for the department at the University of Tromsø are less favorable with 96, 101, 95 and 74, respectively.

**Recommendations:** The unit should:

- open up the collaboration between the Clinical Cardiovascular Research Group at UNN and the Department of Clinical Medicine at the University of Tromsø.
- apply for external funding
- build more strong networks for EU applications
- increase the number of publications in international journals
- apply for post-doctoral positions
- focus more on a small number of strong areas of research

**Grading:** Fair

## Sunnaas Rehabilitation Hospital

**General comments and organization:** Sunnaas Rehabilitation Hospital (SunHF) was founded in 1954 and in 1995 it became a part of University of Oslo. Research has been performed since 1980s. However, it started to formulate its research strategy in 2003 after the last research evaluation. At present SunHF has a national competence center for seven rare disorders and a competence center with special pedagogy, and several national, multiregional and regional clinical services within specialized medical rehabilitation.

Total number of research personnel is 43, mainly part time positions. Out of these 6 are funded by institution/university, 13 by hospital and 20 by external funding. During the last three years 6 PhDs have graduated. For 2009 grants as % of total research and development expenditures was reported 20 % (3046 000 NOK). There are no professor I positions, seven professor II positions, 5 post-doctoral fellows and total number of PhD students is 21.

**Research activity and scientific quality:** SunHF has established Department of Research which is led by Director of research. The Department of Research has its own budget and it covers both research and laboratory activities. Most of the research is done by PhD students and SunHF has paid special attention to strengthen research supervision (e.g. guest professors). Many senior clinicians don't have any research experience. Research productivity has increased but is still rather modest in terms of publications and quality of papers. Their publication list is considered to be from fair to good (*Journal of rehabilitation medicine* is the leading, European journal and official journal of ISPRM, ESPMR, UEMS and Board PRM). Strong rehabilitation groups collaborate and interact with basic science, which is only partly seen here.

There is some discrepancy on publication numbers between self assessment and the RCN bibliometric report which should be clarified between parties. At present most of the publications are in English although there are still a number of Norwegian publications, too.

Research strategy of SunHF is based on biannual plans. The panel has serious concern that this is too short sighted. Independence from the University of Oslo is still reported to be an important advantage also from the point of research. The panel here disagrees since in order to develop strong research oriented rehabilitation center SunHF should develop tight connections to several other disciplines in UiO.

**Recommendation:** The panel recognizes several improvements since the last evaluation. SunHF has increased the internal budget for research gradually being now 3,8% and aiming to 7% . This has allowed a rapid progress in the academic competence of SunHF. The panel encourages

continue with similar strategy and considers SunHF a leading rehabilitation center in Norway. In addition, there are realistic possibilities to develop it towards one of the leading rehabilitation centers in the world. This is in accordance with the decision to be a national competence center in specialized rehabilitation.

**Grading:** Fair

## Abbreviations used in the report

### Institutions

University of Oslo (UiO)  
University of Bergen (UiB)  
University of Tromsø (UiT)  
Norwegian University of Science and Technology (NTNU)  
University Hospital of North Norway (UNN)  
Akershus University Hospital (AHUS)  
Oslo University Hospital (OUS)  
Ullevål University Hospital (UUS)  
Haukeland University Hospital (HUS)  
Stavanger University Hospital (SUH)  
Sunnaas Rehabilitation Hospital (SunHF)

### Other

NIFU - Norwegian Institute for Studies in Innovation, Research and Education  
RCN – Research Council of Norway  
DCM - Department of Clinical Medicine (UiB)  
DSS -The Department of Surgical Science (UiB)  
DCC - Division of Critical Care (UiO)  
DWC - Division of Women and Children (UiO)  
DSCM - The Division of Surgery and Cancer Medicine (UiO)  
DSMS - Division of Specialized Medicine and Surgery (UiO)  
CHFR - Virtual Centre for Heart Failure Research (UiO)  
DDI - Division of Diagnostics and Intervention (UiO)  
IKM - Department of Clinical Medicine (UiT)  
NAR - The Norwegian Arthroplasty Register  
LBK - Department for Laboratory Medicine, Children's and Women's Health (NTNU)  
NKSOI - National Centre of Competence for Orthopedic Implants  
NHRG - The Neurovascular-Hydrocephalus Research Group  
W-CD - Woman and Children's division (OUS)  
OVC - Oslo Vascular Center (UiO)  
DNK - Norwegian Cancer Society

## Appendices

### Appendix 1. Mandate

#### **Evaluation of research in biology, medicine and health in Norway 2010 - 2011**

##### **Mandate for the evaluation**

The Research Council of Norway (RCN) is given the task by the Ministry of Education and Research to perform subject-specific evaluations. The Division for Science has decided to evaluate research activities in biology, medicine and health and psychology in Norwegian universities, university hospitals, relevant research institutes and relevant university colleges.

Evaluations have previously been performed within these subjects/fields, in biology in 2000 and medicine and health in 2003.

##### **1. The objective of the evaluation**

The main focus of the evaluation should be the scientific quality of Norwegian research within biology, medicine and health and psychology in Norwegian universities, university hospitals, relevant research institutes and relevant university colleges.

The evaluation will reinforce the role of the RCN as advisor to the Norwegian Government and relevant ministries. The evaluation will give knowledge, advice and recommendations on biological, medical and health related research and give the institutions as well as the RCN and relevant ministries a better basis for determining future priorities within and between fields of research.

*Specifically, the evaluation will:*

- provide a critical review of the strengths and weaknesses of the above fields, both nationally and at the level of individual research groups and academic departments. The scientific quality of the research will be reviewed in an international context.
- assess to what degree the previous evaluations have been used by the institutions in their strategic planning
- discuss to what degree the research units perform research in accordance with the strategy of their institution
- identify the research units which have achieved a high international level in their research, or have the potential to reach such a level
- identify areas of research that need to be strengthened in order to ensure that Norway in the future possesses necessary competence in areas of national importance. A key aspect is to enable the RCN to assess the situation regarding recruitment within the scientific fields
- discuss to what extent the research meets the demand for interdisciplinary research and future societal challenges

##### **2. Organization and methods**

International evaluation panels will be appointed for the following fields:

- Botany-, zoology- and ecology- related disciplines
- Physiology related disciplines including corresponding translational research
- Molecular biology, including corresponding translational research

- Clinical research, including corresponding translational research (two panels)
- Public health and health-related research
- Psychology and Psychiatry

Self-assessments including information about the organization and resources, as well as future plans, will be provided by the research units. In addition the panels will be provided with bibliometric analysis. Representatives from the involved units will be invited to meet the panels for presentations and discussions.

Each of the evaluation panels will write a report with evaluations of the different research units as well as specific recommendations. These reports will be sent to the research units for factual control. In order to provide general recommendations at a national level for research within these fields, Joint Committees will be established comprising members from each of the different evaluation panels/research areas.

Specific criteria for inclusion and exclusion – see attachment.

### **3. Tasks of the evaluation panels**

The panels are requested to

- Evaluate research activities with respect to scientific quality, national and international collaboration. Scientific quality should be the main focus
- Evaluate how the research is organized and managed.
- Submit a report with specific recommendations for the future development of research within biology/medicine/health/psychology in Norway, including means of improvement when required.

### **Aspects to be assessed in the panel reports:**

#### **3.1 National level**

- Strengths and weaknesses
- Research cooperation nationally and internationally
- Recruitment and mobility
- General resource situation regarding funding and infrastructure
- Cooperation with other sectors of society (e.g. industry)

#### **3.2 Institutional level**

To be defined as the institution as such, or as a university department, or a research institute.

Depending on the size of the institution level 3.2. and level 3.3. may be merged. In case of two levels, level 3.2 focus on organisation and strategy, level 3.3. on research quality and production.

- Organisation, research leadership and strategy
  - Including follow up of recommendations given in previous evaluation/s
- Resource situation
  - Funding, staffing, infrastructure and the balance between resources and research activities
- Scientific quality
  - Including the description of a publication strategy



- Training, mobility and career path
  - Recruitment and policies for recruitment
  - Policy for mobility and career path
  - Policy for gender and age balance in academic positions
- Research collaboration
  - Collaboration and networking activities at national and international level including interdisciplinary and multidisciplinary research activities, as well as translational research (from basic to applied research or vice-versa)

### 3.3 Research units

- Organisation, research leadership and strategy
  - Including resource situation (staff and funding) and research infrastructure
- Research activities
  - Scientific quality and production
- Training, mobility and career path
  - Recruitment and policies for recruitment
  - Policy for mobility and career path
  - Gender and age balance in academic positions
- Research collaboration
  - Collaboration and networking activities at national and international level including interdisciplinary and multidisciplinary research activities, as well as translational research (from basic to applied research or vice-versa)

### 4. Time schedule

Panel meetings will take place in Oslo March-June 2011  
Deadline for submitting draft panel reports August 2011  
Deadline for submitting final reports October 2011  
Deadline for joint reports November 2011

### 5. Miscellaneous

Other important aspects of Norwegian biological, medical and health related research that ought to be given consideration.

### Attachment (to mandate)

#### Delimitation and organisation

The panels are asked to base their evaluation on self-assessments from the research units, factual information, bibliometric analysis and hearing meetings.

Starting point for the present evaluation will be the research performed at the institutions in question. The university departments and several institutes in the institute sector are too large to be evaluated as one single research unit. In order to give an overview of the research the evaluation will be carried out as follows:

*Departments at the universities and university colleges and institutes in the institute sector (named institution)*

1. The institution – level 1 – describes its organisation and research strategy in a written document as well as factual information including funding, number of permanent and preliminary positions etc.

2. The level below the institutions (section, group, program etc.) is the unit that will be evaluated and which prepare the self-assessment for the research – level 2.

In some institutions the level 2 units might be placed in different panels. If so the institute structure and strategy will present their activities to all relevant panels. Large evaluation units within level 2 belonging to different panels may split in different evaluation units or will be evaluated in a panel covering the main content of their research.

The units to be evaluated at level 2 need to be units already established. However it is important that the evaluation units to be evaluated have a certain minimum size. If the research performed within two or more evaluation units belong together thematically, it may be an advantage to prepare a joint self-assessment making it clear that the self-assessment describes the research in two or more groups. Level 2 units with minor scientific activities and production, are to be described on level 1, the general description of the institute.

#### *Research at the university hospitals*

The research performed in the university hospitals is often part in integrated research units between the university and the hospital. It will normally neither be practical, nor natural to separate the self-assessment from these units. It is preferable that these integrated units give a joint self-assessment and a joint oral presentation at the hearing meetings. The universities are asked to take the main responsibility for the self-assessment when the research unit is led by a researcher who has his/her main position at the university. The same is asked from the university hospital when the research unit is led by a researcher who has his/her main position at the hospital.

## Appendix 2: Criteria for grading

<b>Excellent</b>	Research at the international front position: undertaking original research of international interest, publishing in internationally leading journals. High productivity.
<b>Very good</b>	Research with high degree of originality, but nonetheless falls short of the highest standards of excellence. A publication profile with a high degree of publications in internationally leading journals. High productivity and very relevant to international research within its sub-field.
<b>Good</b>	Research at a good international level with publications in internationally and nationally recognized journals. Research of relevance both to national and international research development.
<b>Fair</b>	Research that only partly meets good international standard, international publication profile is modest. Mainly national publications. Limited contribution to research
<b>Weak</b>	Research of insufficient quality and the publication profile is meagre: few international publications. No original research and little relevance to national problems.

## Appendix 3: Letters to the institutions

### Fagevaluering av biologi, medisin og helsefag, inklusive psykologi invitasjon til informasjonsmøte og

#### invitasjon til å plassere forskningsenhetene i evalueringspaneler

Det vises til tidligere informasjon om fagevalueringen i brev av 25.2.2010, samt våre nettsider om evalueringen; [www.forskningsradet.no/biomedhelseevaluering](http://www.forskningsradet.no/biomedhelseevaluering)

#### Informasjonsmøte

Vi inviterer til informasjonsmøte på Gardermoen, Radisson Blu Airport Hotel

***tirsdag 24. august kl 10.30 – 15.00***

Informasjonsmøtet er primært for representanter for ledelsen ved involverte fakulteter og institutter i UoH-sektoren og instituttsektoren.

Hensikten med møtet er å informere om evalueringen med fokus på organiseringen, mandatet for evalueringspanelene, egenvurderingene og faktainformasjon, tidsplan med mer. Program for møtet og lenke til påmelding legges på [www.forskningsradet.no/biomedhelseevaluering](http://www.forskningsradet.no/biomedhelseevaluering) i løpet av uke 26. ***Påmeldingsfrist er mandag 16. august***, og det er mulig å melde seg på allerede nå <https://web.questback.com/norgesforskningsrd/kyl3fa8ebo/>. På våre nettsider vil vi i uke 32 legge utkast til faktaark og mal for egenvurdering. Kommentarer til disse dokumentene kan gis på informasjonsmøtet.

#### Dialog og tilbakemelding

Vi inviterer med dette institusjon/institutt til å plassere sine evalueringsenheter i de ulike panelene, se definisjon i vedlegg 3, Avgrensning og organisering. For å være sikre på at vi har etablert hensiktsmessige paneler og at vi får en noenlunde jevn fordeling av evalueringsenheter i panelene, ber vi om en tilbakemelding fra alle institusjoner/institutter med forslag til plassering av evalueringsenhetene for den enkelte institusjon/institutt så snart som mulig og senest ***fredag 27. august***. Tilbakemelding til [evalbiohelse@forskingsradet.no](mailto:evalbiohelse@forskingsradet.no). Ta gjerne kontakt underveis ved behov.

Vi ber også om å få oppgitt en kontaktperson ved hver institusjon/institutt. Det vil blant annet være behov for dialog i etterkant av fristen slik at sammenlignbare forskningsfelt ved de forskjellige institusjonene, så langt mulig, plasseres i samme panel.

#### Panelinndeling

Det planlegges en inndeling i syv paneler (se vedlegg 4). Panelinndelingen er basert på Norsk inndeling av vitenskapsdisipliner (vedtatt av Universitets- og høgskolerådet i 1994) for klassifisering av forskning. I arbeidet med å rekruttere eksperter til fagpanelene er følgende kriterier lagt til grunn:

- Det enkelte panel skal dekke disiplinene innenfor panelet

- Det tilstrebes å finne eksperter med bred kompetanse som kan dekke flere områder
- Det vurderes om det er mulig å få med ett medlem i hvert panel som deltok i forrige evaluering for å bidra til kontinuitet
- Det tilstrebes at hvert panel har minst 40 % av begge kjønn
- Det tilstrebes en viss spredning i alder blant medlemmene

Det er lagt strenge habilitetsregler til grunn ved utnevning av panelmedlemmene.

### **Mandat for evalueringen**

Mandatet for evalueringen følger vedlagt, vedlegg 3.

### **Utvidet tidsramme**

Det har tidligere vært gitt tentativ tidsramme for evalueringen. Tidsrammen har nå blitt noe utvidet. Dette medfører at høringsmøtene blir forskjøvet til perioden 20. mars -10. juni, kun ukene uten helligdager. Den utvidede tidsrammen gir noe mer tid til dialog med miljøene og arbeidet med egenvurderingen, samt bedre tid til ferdigstilling av rapportene. Evalueringen vil være avsluttet i løpet av 2011. Se tidsplanen i vedlegg 5.

### **Avgrensning og organisering**

Hovedfokuset i evalueringen skal være vitenskapelig kvalitet i forskningen. Evalueringen er på gruppenivå, ikke enkeltforskernivå. Evalueringen vil bli gjennomført av fagfeller i paneler sammensatt av meritterte utenlandske forskere ("peer review") og alt materialet i evalueringen skal være på engelsk.

Evalueringen omfatter mange ulike institusjoner og antallet forskere er stort. Forskningsrådet har satt en grense for minstepørrelse for institusjon/institutt som inviteres til å delta i evalueringen. Det angitte antallet vitenskapelig ansatte gjelder innenfor hvert fagområde, dvs. innenfor biologi eller medisin og helsefag. Noen forskergrupper/forskere har deltatt i nylig gjennomførte fagevalueringer, disse skal ikke evalueres på nytt.

### **Kontaktpersoner i Forskningsrådet**

Spørsmål i tilknytning til evalueringen kan rettes til:

- Prosjektleder Berit Nygaard, telefon 22037174, [bn@forskningsradet.no](mailto:bn@forskningsradet.no) – (ferie 5.7. – 9.8)
- Prosessleder Malena Bakkevold, telefon 95750533, [post@malena.no](mailto:post@malena.no) – (ferie 5.7 – 16.8)

Hvert av panelene har en egen fagrådgiver, se vedlegg 4 med oversikten over panelene.

### **Parallelle evalueringer som berører flere av forskningsmiljøene**

Formålet med fagevalueringer er å foreta en kritisk gjennomgang av forskningen med hensyn til kvalitet relatert til internasjonalt nivå, styrker og svakheter, rammebetingelser for forskningen og rekrutteringssituasjonen. I tillegg innhentes råd om hva som skal til for å styrke forskningen og hvilke prioriteringer som peker seg ut. De to første evalueringene nevnt nedenfor evaluerer spesielle satsinger i Forskningsrådets regi og overlapper bare delvis med fagevalueringen.

### *Evaluering av FUGE*

Det er en pågående evaluering av FUGE (funksjonell genomforskning) for å se på merverdien av programmet, og bla å få innspill til det videre arbeidet med satsing på bioteknologi.

#### *Midveisevaluering av SFF-II*

Formålet med evalueringen er å bedømme de vitenskapelige resultatene sentrene har oppnådd og å gi en vurdering av planene sentrene har utarbeidet for forskningen i siste 5-årsperiode.

Evalueringen finner sted i 2010 – 2011.

#### *Midtveisevaluering av SFI*

Evalueringen skal vurdere de forskningsresultater som er oppnådd og om virksomheten i senteret underbygger senterets mål. Evalueringen skal videre gi en vurdering av planene for virksomheten i den mulige siste 3-årsperioden. Evalueringen gjennomføres høsten 2010.

#### *Evaluering av idrettsvitenskap (sports sciences)*

Parallelt med fagevalueringen vil det bli gjennomført en felles nordisk evaluering av idrettsvitenskap 2010-2011. Evalueringen blir administrativt ledet av Finlands Akademi. Forskningsrådet ønsker at relevante norske miljøer skal delta i denne evalueringen, og vi vil sende ut separat informasjon om dette. Finlands Akademi avholder et informasjonsseminar om evalueringen 17. august, kl 12.00 – 15.30 i Helsinki.

#### *Evaluering av deler av instituttsektoren*

Fiskeri- og kystdepartementet (FKD) og Landbruks- og matdepartementet (LMD) har initiert evalueringer av deler av sin instituttsektor – se vedlegg 1

Med vennlig hilsen

**Norges forskningsråd**

Hilde Jerkø (sign.)

Avdelingsdirektør

Divisjon for vitenskap

Mari Nes (sign.)

Avdelingsdirektør

Divisjon for vitenskap

## **Vedlegg 1**

### **Institusjonene som omfattes av fagevalueringen**

#### **Universitetene**

Alle instituttene ved de medisinske fakultetene omfattes av evalueringen. Når det gjelder biologi og psykologi (bortsett fra ved UiB og UiT) vil evalueringen omfatte institutter og naturvitenskapelige museer som er deler av naturvitenskapelige og samfunnsvitenskapelige fakulteter.

#### **Helseforetakene**

Alle helseforetakene med universitetsfunksjon omfattes av evalueringen. I tillegg kommer Diakonhjemmet. For integrerte forskergrupper mellom universitetsinstitutter og helseforetak se vedlegg 2 Avgrensning og organisering. Når det gjelder øvrige helseforetak ber vi om at de regionale helseforetakene vurderer om det er andre helseforetak som faller innenfor rammene for evalueringen. Vi vil gjerne ha en dialog om disse med de regionale helseforetakene.

#### **Instituttsektoren**

For instituttsektoren generelt kan det ved enkelte institutter være at nivå 1 og nivå 2 er sammenfallende – se vedlegg 2 Avgrensning og organisering.

Forskningsrådet er kjent med at Fiskeri- og kystdepartementet (FKD) parallelt med fagevalueringen vil evaluere Havforskningsinstituttet. Havforskningsinstituttet ønsker å være en del av fagevalueringen og FKD ønsker å benytte seg av det innsamlede materialet som delinnspill til sin evaluering og i tillegg benytte panelets delrapport om instituttet fra fagevalueringen.

Landbruks- og matdepartementet (LMD) har bedt Forskningsrådet om å evaluere bla Bioforsk, Norsk institutt for skog og landskap og Veterinærinstituttet i løpet av 2010. Rapporten for denne evalueringen skal være ferdig 1. desember 2010 for å kunne være en del av grunnlaget for en ny melding til Stortinget om landbruks- og matpolitikken. Disse tre instituttene inviteres også til å delta i fagevalueringen av biologi, medisin og helsefag. Som vi skrev i vårt brev i februar er skillet mellom grunnleggende og anvendt forskning nå mindre fremtredende og det er økt samarbeid på tvers av forskningsart både innenfor biologiske fag og medisin og helsefag. Det er derfor ønskelig å evaluere hele forskningsfeltet innenfor de ulike fagområdene og institusjonene samtidig. Forskningsrådet ser det som viktig at også instituttsektoren deltar i denne brede fagevalueringen. Vi regner med at det materialet som ferdigstilles til evaluering av vitenskapelig kvalitet i LMD's evaluering vil kunne være et viktig grunnlag for materialet til fagevalueringen.

#### **Høgskolene**

Som i instituttsektoren kan det være at ved enkelte høyskoler er nivå 1 og nivå 2 sammenfallende.

## Vedlegg 2

### Avgrensning og organisering

Panelene skal basere sin evaluering på egenvurdering fra forskningsmiljøene, faktainformasjon, bibliometrisk analyse og møter med forskningsmiljøene.

Evalueringen vil ta utgangspunkt i instituttene og den forskningen som foregår der. Universitetsinstituttene og flere institutter i instituttsektoren er imidlertid for store og sammensatte enheter til at instituttet kan være evalueringsenheten. For at evalueringen skal gi oversikt over forskningen i *faget* gjennomføres evalueringen etter følgende modell:

#### *Institutter i UoH-sektoren og instituttsektoren*

1. Instituttet beskriver organisering og strategi for forskningen ved instituttet og gir faktainformasjon (finansiering, antall ansatte og stipendiater med mer) (nivå 1)
2. Nivået under instituttet (instituttgruppe, avdeling m.m.) *er den enheten som evalueres* og disse lager egenvurdering for forskningen (nivå 2)

Nivå 2 har ulike benevelser ved de forskjellige institusjonene (instituttgrupper, seksjon, avdeling, forskergruppe, tematiske program m.m.). Ved enkelte institutter vil det være slik at enheter på nivå 2 hører hjemme i forskjellige paneler. I de tilfellene vil instituttbeskrivelsen følge til alle panelene. Robuste/store undergrupper på nivået under nivå 2 som *kan* høre hjemme i forskjellige paneler, plasseres der hvor hovedtyngden av forskningen hører hjemme (mestprinsippet).

Enhetene som skal evalueres på nivå 2 skal være etablerte enheter, ikke konstruerte grupper for denne evalueringen. Det er viktig at enhetene ikke er for små. Dersom instituttene ser at forskningen i forskergrupper/evalueringsenheter tematisk hører sammen, kan det være en fordel at disse forskergruppene lager en samlet egenvurdering hvor det framgår at det er en fremstilling av forskningen i flere grupper. Evalueringsenheter/forskergrupper på nivå 2 som har liten vitenskapelig aktivitet og produksjon, beskrives i instituttets (nivå 1) generelle omtale i egenvurderingen.

Minstestørrelse på institusjon/institutt som inviteres til å delta i evalueringen er:

#### *UoH-sektoren, inklusive helseforetak med universitetsklinikkfunksjon*

- 1) Minst 5 vitenskapelig ansatte (professor I, førsteamanuensis I) innenfor hvert fagområde (biologi, medisin og helsefag) eller
- 2) Minst 5 fast ansatte forskere/klinikere med doktorgradskompetanse som har 40 % eller mer av sin stilling definert som forskning

#### *Andre helseforetak*

Minst 5 fast ansatte forskere/klinikere med doktorgradskompetanse som har 40 % eller mer av sin stilling definert som forskning

#### *Instituttsektoren*



Minst 5 fast ansatte forskere med doktorgradskompetanse som har 40 % eller mer av sin stilling definert som forskning innenfor hvert fagområde (biologi, medisin og helsefag).

#### *Forskning ved universitetssykehusene*

Ved universitetssykehusene er det i svært stor grad integrerte forskergrupper/enheter mellom universitetsinstituttene og helseforetaket. Det vil normalt verken være hensiktsmessig eller naturlig å skille egen vurderingen og presentasjonen av disse enhetene. Det er ønskelig at integrerte enheter mellom universitet og helseforetak gir en felles egen vurdering og en felles presentasjon.

Vi ber om at universitetet tar hovedansvar for egen vurdering og eventuell presentasjon når forskergruppen/enheten ledes av en som har hovedstilling ved universitetet, mens helseforetaket tar hovedansvar for egen vurdering og eventuell presentasjonen når enheten ledes av en som har hovedstilling eller hele stillingen ved helseforetaket.

#### *Kriterier for eksklusjon*

- Nylig evaluert i annen fagevaluering (eks sosiologi, økonomi, farmasi, kjemi, fysikk, geofag)
- Idrettsmedisinske fag – tas ikke med i denne evalueringen fordi en felles nordisk evaluering av idrettsvitenskap (sports sciences) vil bli gjennomført i 2010-2011.
- Sosialfaglig forskning (barnevern, sosialtjenester) inkluderes ikke i evalueringen.

## Appendix 4: Time schedule for hearing meetings

Panel 4a Clinical research, including corresponding translational research. Place: SAS Radisson Blu Plaza, Sonja Henies Plass 3, Oslo. Time: Week 13.

Panel 4a Clinical research, including corresponding translational research All surgery, anaesthesiology, oncology, physical medicine and rehabilitation, gynaecology, paediatrics, dermatology and venereology, ophthalmology, otolaryngology and all clinical odontology

– Week 13.

Date	Time	Institution/department	Unit
Mon Mar 28 2011	0830 - 0900	Panel Meeting	
		University of Oslo, Faculty of Dentistry	
	0900 - 1030	Institute of Clinical Dentistry	Craniofacial Clinical Research Health Promotion and Disease Prevention
	1030 - 1045	Panel meeting/Break	
		University of Bergen, Faculty of Medicine and Dentistry	
	1045 - 1215	Department of Clinical Dentistry	Biomaterial Oral Infections and Inflammations Patient and Community based Clinical Dental Research Tissue engineering
	1215 - 1230	Panel meeting	
	1230 - 1330	Lunch	
		University of Tromsø, Faculty of Dentistry	
	1330 - 1415	Department of Clinical Dentistry	Department of Clinical Dentistry
	1415 - 1430	Panel meeting/Break	
		University of Tromsø, Faculty of Health Science	
	1430 - 1615	Department of Clinical Medicine	Pediatrics Research Group Translational Cancer Research Group Bone and Joint Research Group Gastrointestinal Surgery Research Group Anesthesia and Critical Care Research Group
	1615 - 1630	Panel meeting/Break	
		University Hospital of North Norway (UNN)	
	1630 - 1715	University Hospital of North Norway	Clinical Cardiovascular Research Group Women's Health and Perinatology Research Group
	1715 - 1800	Panel meeting	

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Date	Time	Institution/department	Unit
Tue Mar 29 2011	0830 - 0900	Panel Meeting	
	0900 - 1000	Sunnaas Rehabilitation Hospital	Sunnaas Rehabilitation Hospital
	1000 - 1015	Panel Meeting/Break	
		NTNU and St. Olav Hospital	
	1015 - 1130	Department of Neuroscience	Mobility disorders Orthopedics
	1130 - 1145	Panel Meeting	
	1145 - 1245	Lunch	
		NTNU and St. Olav Hospital	
		Department of Circulation and Medical Imaging	Cardiovascular Clinical and Translational Science
	1330 - 1345	Panel Meeting/Break	
	1345 - 1445	Department of Cancer Research and molecular medicine	Opoids, Symptom Management and Palliation
	1445 - 1500	Panel Meeting/Break	
	1500 - 1600	Department of Laboratory Medicine, Children's and Women's Health	Gynecology Obstetrics
	1600 - 1630	Panel Meeting/Break	
		Haukeland University Hospital and University of Bergen, Faculty of Medicine and Dentistry	
	1630 - 1730	Haukeland University Hospital and The Gades Institute	Cancer
	1730 - 1800	Panel meeting	

Date	Time	Institution/department	Unit
Wed Mar 30 2011	0830 - 0900	<i>Panel Meeting</i>	
		Oslo University Hospital and University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	0900 - 1000	Division of Critical Care, Institute of Clinical Medicine	Preoperative medicine Acute prehospital medicine Pain management
	1000 - 1015	<i>Panel meeting/Break</i>	
		Haukeland University Hospital and University of Bergen, Faculty of Medicine and Dentistry	
	1015 - 1145	Haukeland University Hospital and Department of Clinical Medicine	Obstetrics and Gynecology: Bergen Gynecologic Cancer Research Group , Obstetrics and Gynecology: Clinical Fetal Physiology Research Group, Pediatrics: Bergen Diabetes Research Group Pediatrics: Research Group for Paediatric follow-up studies Pediatrics: Research group for congenital heart and vascular physiology, Ophthalmology: Section for Ophthalmology
	1145 - 1200	<i>Panel meeting</i>	
	1200 - 1300	<i>Lunch</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine continue...	
	1300 - 1400	Division of Diagnostic intervention, Institute of Clinical Medicine	The intervention centre
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	1400 - 1415	<i>Panel meeting/Break</i>	
	1415 -	Division of Surgery and Cancer Medicine, Institute of Clinical Medicine	Oncology and Medical Physics, The surgical departments, Institute for Cancer Research, Institute for Medical Informatics
	1530 - 1545	<i>Break</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine continue.....	
	- 1730	Division of Surgery and Cancer Medicine, Institute of Clinical Medicine	Oncology and Medical Physics, The surgical departments Institute for Cancer Research, Institute for Medical Informatics
	1730 - 1815	<i>Panel meeting</i>	

Date	Time	Institution/department	Unit
Thur Mar 31 2011	0830 - 0900	<i>Panel Meeting</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	0900 - 0945	Division of Cardiovascular and Pulmonary Diseases, Institute of Clinical Medicine	Vascular research Cardiothoracic research
	0945 - 1000	<i>Panel meeting/break</i>	
		Haukeland University Hospital and University of Bergen, Faculty of Medicine and Dentistry	
	1000 - 1145	Haukeland University Hospital and Institute of Medicine	Hematology- Oncology Group
	1145 - 1200	<i>Panel meeting</i>	
	1200 - 1300	<i>Lunch</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine.....	
	1300 - 1345	Division of Specialised medicine and Surgery, Institute of Clinical Medicine	Pediatric surgery Gastrointestinal Acute prehospital medicine Pain management
	1345 - 1400	<i>Panel meeting/break</i>	
		Stavanger University Hospital	
	1400 - 1445	Stavanger University Hospital	Stavanger Surgical Research Group
	1445 - 1500	<i>Panel meeting/break</i>	
		Haukeland University Hospital, University of Bergen, Faculty of Medicine and Dentistry continue....	
	1500 - 1700	Haukeland University Hospital, Department of Surgical Sciences	SORG – general surgery SORG – ENT/H&N The Norwegian Arthroplasty Bergen Experimental Surgery Team – Thoracic surgery Bergen Experimental Surgery Team – Anesthesiology Neuro – Oncology Research Group Bergen Upper-Extremity Study Group
	1700 - 1800	<i>Panel meeting</i>	

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Date	Time	Institution/department	Unit
Fri April 1 2011	0830 - 0900	<i>Panel Meeting</i>	
		Akershus University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	0900 - 1015	Akershus University Hospital, Institute of Clinical Medicine	Clinical and Molecular Oncology Department of Obstetrics and Gynaecology Surgical Research Group Department of Child and Adolescent Medicine
	1015 - 1030	<i>Panel meeting/break</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	1030 - 1200	Oslo University Hospital and Division of Surgery and Clinical Neuroscience	Dep of Orthopaedics Dep of Ophthalmology Dep of ear, nose and throat Dep of physical medicine and rehabilitation Dep of Neurosurgery
	1200 - 1215	<i>Panel meeting</i>	
	1215 - 1315	<i>Lunch</i>	
		Oslo University Hospital, University of Oslo, Faculty of Medicine, Institute of Clinical Medicine	
	1315 - 1500	Women and Children's Division, Institute of Clinical Medicine	Obstetrics and Gynaecology Paediatrics Perinatal medicine
	1500 - 1600	<i>Panel meeting</i>	

## Appendix 5: Overview of all panels

- Panel 1      **Botany, Zoology and Ecology-related Disciplines:** Evolutionary biology, ethology, marine biology, limnology, plant physiology, systematics and agricultural sciences
- Panel 2      **Physiology-related Disciplines** (human and zoophysiology), including corresponding translational research: Anatomy, physiology, neurobiology, toxicology, pharmacology, embryology, nutritional physiology, pathology, basic odontological research, veterinary medicine, fish health
- Panel 3      **Molecular Biology**, including corresponding translational research. Microbiology, immunology, cell biology, biochemistry, molecular biology, genetics, genomics, biotechnology including breeding and bioinformatics
- Panel 4a      **Clinical Research**, including corresponding translational research: All surgery, anaesthesiology, oncology, physical medicine and rehabilitation, gynaecology, paediatrics, dermatology and venereology, ophthalmology, otolaryngology and all clinical odontology
- Panel 4b      **Clinical Research**, including corresponding translational research: All internal medicine (cardiology, nephrology/urology, gastroenterology, endocrinology, haematology, infectious diseases, respiratory tract diseases, geriatric medicine), neurology, rheumatology, radiology and medical imaging and other clinical medical disciplines
- Panel 5      **Public Health and Health-related Research:** Public health, community dentistry and community nutrition. Epidemiology and medical statistics. Health services research, preventive medicine, nursing research, physiotherapy, occupational medicine, behavioural research and ethics, other health-related research
- Panel 6      **Psychology and Psychiatry:** Clinical psychology, social-, community- and workplace psychology, organizational psychology, personality psychology, developmental psychology, cognitive psychology, biological psychology and forensic psychology. Psychiatry, including geriatric psychiatry, child and adolescent psychiatry, biological psychiatry, and forensic psychiatry. Behaviour research

## Appendix 6: List of the panel members

### Panel 4A Clinical research, including corresponding translational research

Clinical research, including corresponding translational research: All surgery, anaesthesiology, oncology, physical medicine and rehabilitation, gynaecology, paediatrics, dermatology and venereology, ophthalmology, otolaryngology and all clinical odontology

Name	Institution
Professor Kalervo Väänänen (chair)	University of Eastern Finland, Kuopio. Finland
Dr. Riikka Pellinen (secretary)	University of Eastern Finland, Biocenter Kuopio, Finland
Professor Klas Wiman	Karolinska Institutet, Department of Oncology-Pathology, Sweden
Professor Terence Stephenson	Royal College of Paediatrics and Child Health, London England
Professor Katarina Svanberg	Lund University Hospital, Division of Oncology, Sweden
Professor John W Sear	University of Oxford, John Radcliffe Hospital, England
Professor Inger Kjær	University of Copenhagen, Orthodontic Department Denmark
Professor Veronika Fialka-Moser	Medical University Vienna, Department of Physical Medicine and Rehabilitation, Austria

## Appendix 7: Brief CVs for the panel members

<b>Name:</b>	H Kalervo VÄÄNÄNEN
<b>Degree(s):</b>	1. MD 1977 2. PhD 1980 3. Specialist in clinical pathology 1987
<b>Research field(s):</b>	1. Cell biology 2. Bone metabolism and skeletal diseases
<b>Present position:</b>	Academic Rector, University of Eastern Finland

<b>Name:</b>	Klas G. WIMAN
<b>Degree(s):</b>	1. Med kand (basic degree in medicine) Uppsala University 1977 2. PhD Uppsala University 1981 3. MD Karolinska Institutet 1989
<b>Research field(s):</b>	1. Tumor biology, apoptosis 2. p53, Wig-1, mRNA regulation 3. Novel cancer therapy, drug discovery, mutant p53 reactivation
<b>Present position:</b>	Professor of Molecular Cell and Tumor Biology

<b>Name:</b>	Inger KJÆR
<b>Degree(s):</b>	1. DDS (doctor of Dental Sciences) 2. Specialist in Orthodontics 3. Dr. Odont. 4. Dr. Med.
<b>Research field(s):</b>	1. Odontology 2. The dentition 3. The craniofacial profile 4. Syndromes 5. Embryology 6. Foetal pathology 7. Skeletal maturity 8. Bone tissue 9. Genetics
<b>Present position:</b>	Professor, Head of Section, Vice Dean, Institute of Odontology, Faculty of Health Sciences, University of Copenhagen

<b>Name:</b>	John William SEAR
<b>Degree(s):</b>	1. PhD BSc MBBS 2. FFARCS FANZCA
<b>Research field(s):</b>	1. Anaesthesia 2. Clinical Pharmacology ....
<b>Present position:</b>	Emeritus Professor of Anaesthesia, University of Oxford

<b>Name:</b>	Terence John STEPHENSON
<b>Degree(s):</b>	1. BSc 2. BM BCh 3. MRCP 4. DM
<b>Research field(s):</b>	1. Neonatal Medicine 2. Paediatric Emergencies
<b>Present position:</b>	President, Royal College of Paediatrics and Child Health & Nuffield Professor of Child Health at the Institute of Child Health, University College London

<b>Name:</b>	Veronika FIALKA-MOSER
<b>Degree(s):</b>	1. Prof. 2. Ph.D. 3. M.D
<b>Research field(s):</b>	1. cancer rehabilitation 2. lymphedema 3. musculoskeletal diseases 4. rehabilitation in osteoarthritis 5. rehabilitation in the acute hospital
<b>Present position:</b>	Chair - Department of Physical Medicine and Rehabilitation, Medical University Vienna

<b>Name:</b>	Katarina SVANBERG
<b>Degree(s):</b>	1.MD from Lund University 2.PhD from Lund University
<b>Research field(s):</b>	1. Biomedical Optics 2. Photodynamic Therapy 3. Radiation therapy
<b>Present position:</b>	Chief consultant in Oncology Professor of Oncology Distinguished Professor at the South China Normal University, Guanzhou, China Director for the Lund Medical laser Centre President for the Learned Society "International Society for Optics and Photonics (16 500 members)

<b>Name:</b>	Riikka PELLINEN
<b>Degree(s):</b>	1. MSc, University of Kuopio 2. PhD, University of Helsinki 3. Adjunct professor, University of Kuopio
<b>Research field(s):</b>	1. Gene transfer technologies 2. Bioprocess controlling 3. Production of virus vectors
<b>Present position:</b>	Coordinator of Doctoral Program in Molecular Medicine and Biocenter Kuopio, A. I. Virtanen Institute, University of Eastern Finland