NIH NORGES IDRETTSHØGSKOLE



DEPARTMENT OF SPORTS MEDICINE

ACTION PLAN 2016-2020

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PREFACE

Developing an action plan that will chart the initiative over the next few years serves several purposes. Among other things, it creates the opportunity to evaluate oneself, good discussions and reflection.

The action plan for SIM has had an extensive process with the opportunity for all the department's employees to contribute. In early 2015, we appointed group leaders for our research areas: "Women, exercise and health", Jorunn Sundgot-Borgen; "Physical activity and health", Ulf Ekelund; "Monitoring of physical activity and fitness", Elin Kolle; "Prevention of sports injuries", Grethe Myklebust and Thor Einar Andersen; "Active rehabilitation of musculoskeletal disorders", May Arna Risberg; and "Fitness", Lene Anette Hagen Haakstad. In addition, we appointed group leader for "Education", Trine Stensrud and group leaders for "Organization and resources" Solveig Sunde and Tone Øritsland. Group leaders involved "their" people and drafted according to a specific template. Three department meetings and a half-day meeting outside the NIH have been set aside for plenary discussions.

We have chosen - as in previous years - to create a comprehensive action plan. Some of the message may then be in danger of drowning in the text, but nevertheless, we take the chance that it all appears clear. At the same time, we want to create a short version in the long term where objectives - and measures to achieve them - are even more clearly stated. SIM has many great and highly skilled employees. It has been a pleasure to lead the work.

Sigmund Alfred



Head of Department for Sports Medicine

Wish each other every success – and don't grudge each other's success

Be team member - NOT «me - myself - I»

Remember to honor those to whom honor is due

INTRODUCTION

The Department of Sports Medicine (SIM) is responsible for sports medicine – a broad subject area that includes several different areas in terms of both research and teaching. The two most important are: 1) The relationship between regular physical activity and health, and 2) Health problems related to sports practice. The subject area is multidisciplinary, and seeks to establish knowledge that is of importance for the practice of sports in general and for the use of physical activity in preventive and health-promoting work and in treatment and rehabilitation at various levels in and outside the health service.

Research conclusively documents that there is a close correlation between regular physical activity and good health. The paradox is that at the same time as we are gaining more and more knowledge about the health-giving effects of physical activity, there are strong indications that large parts of the population have become increasingly inactive. This societal development, with increasing inactivity-related health problems, consequently indicates a growing interest in the field and an increased need for competent personnel. There is a great need for increased research efforts in a number of areas to obtain a better knowledge base for interventions involving the use of physical activity in health-promoting, disease-preventive and rehabilitative work. Nationally, there is also a great need for personnel with research expertise in the field and for strong centres of expertise. This places great demands on quality in terms of teaching, supervision, further research in the field, as well as networking to disseminate and implement the knowledge that is developed so that visible results can be achieved.

NIH's strategic plan for the period 2016-2020 states that NIH shall a) educate competent and sought-after candidates who contribute to strengthening society with sports science insight and commitment, and b) conduct sports science research of high international quality and with clear social relevance. The objectives of the NIH's strategic plan are ambitious. SIM's action plan is designed to respond to the challenges we see and is also clearly anchored in the NIH's strategic plan.

The action plan is set up as follows – first a status overview of studies and research is given, then an overview of SIM's objectives and measures for teaching and research as well as organization and resources.

STATUS - STUDIES

SIM is responsible for the study programmes offered at bachelor's and master's level in Physical Activity and Health (FAH), a separate master's degree programme in sports physiotherapy with admission every other year, as well as the professional responsibility for continuing education in "fitness part-time". In addition, SIM has been appointed an associate professor during the period who has academic responsibility for the methodology and statistics education at NIH. Until recently, there has been a stable, high number of applicants to all the department's studies, but there are clear indications of a decline in the number of applicants to the bachelor's programme.

BACHELOR'S DEGREE PROGRAMME IN PHYSICAL ACTIVITY AND HEALTH

The bachelor's programme in FAH is a health education where emphasis is placed on both biological and social science perspectives of physical activity and inactivity. The programme aims to provide students with competence related to planning, leading, implementing and evaluating health-

promoting and preventive measures with particular emphasis on measures that can promote physical activity in a public health perspective, and provide a basis for work with health-promoting and preventive measures in the public, private and voluntary sectors. The programme qualifies for the title Physical activity and health advisor NIH.

The department has an upper ceiling of admitting 50 new BAFAH students each year within the current framework. As Table 1 shows, student enrolment has been relatively stable - close to the target figure of 50 - even though the number of applicants per place has decreased. The graduation rate for the 2-year course has varied somewhat, with an average of 77% for the period 2012-2015. This is 3% lower than the target for the period 2011-2015.

		Physical Activity and Health (BAFAH)	
Cohort	Tot. ant. students	Completed program	Completed (%)
2006-2008	56	44	78,6
2007-2009	44	25	56,8
2008-2010	74	48	64,9
2009-2011	55	42	76,4
2010-2012	46	38	82,6
2011-2013	49	41	83,7
2012-2014	53	36	67,9
2013-2015	46	34	73,9

Table 1: Overview of the number of students and completion rate for the bachelor's programme in Physical activity and health in the period 2006-2015.

The subject content of 2BAFAH (year 2) is mainly theoretical and forms the basis for the more practically oriented 3BAFAH (year 3). In the autumn semester year 3, 30 elective credits are planned. The department currently offers five recommended elective modules of 10 credits. Students are free to choose other courses at NIH or at other colleges/universities in Norway or abroad. Two to seven students per year have chosen to take this semester abroad in the last period. The FAH program includes six weeks of professional practice during the final semester, three weeks in the private sector and three weeks in the public sector. Through continuous student evaluation and input from the academic communities, minor adjustments have been made continuously. However, no major changes have been made since the last revision in 2011.

MASTER'S DEGREE STUDIES IN SPORTS SCIENCE AND SPORTS PHYSIOTHERAPY

The Master's Degree Programme in Sports Science and Sports Physiotherapy with specialisation in physical activity and health shall qualify students for independent and scientific work with sports science issues and tasks within sports medicine disciplines. The department has the capacity to admit 15 - 18 new master's students each year within the current framework, as well as the admission of 20 students every other year to the master's degree in sports physiotherapy.

The number of applicants to SIM's master's programme is high. During this period, 95 master students at SIM have graduated. The graduation rate is good, with an average of over 90% for the period 2011-2015. The completion rate in the standard time is also high #, and on a par with the target. A number of student assignments have sufficient scope and quality to be published in international journals. The grade level is also consistently high.

The Master of Sports Science at NIH has been revised in the period 2011-2015, and new courses have been developed specialized for each department. The danger of the revision is that we will have

increased silo thinking. SIM has therefore chosen to give clear signals to the other departments that we would like to collaborate on guidance and projects.

FITNESS DELTID

NIH Fitness is a flexible, student-financed course of study that is organized under the Centre for Continuing Education and Training, but is academically anchored by SIM. During this period, NIH Fitness has graduated approximately 130 students annually who take PT education – from 10 to 30 credits. Of these students, about 35 students attend Bergen and Trondheim. The study programme is mainly aimed at those who want to work in the fitness industry.

In the spring of 2012, the courses group training and cycling instructor were removed as credit-rewarding courses, and are today conducted as courses without credits with a final test. In line with market developments and less need for training supervisors in the fitness industry, a merged personal trainer course totalling 20 credits (training supervisor + personal trainer) was also established in 2012. From autumn 2013, the personal trainer has also been offered as a comprehensive program of a total of 30 credits. Due to lower student application numbers for training supervisors and personal trainers, it was decided in the autumn of 2014 that these should no longer be offered as individual courses.

Annually it is conducted four fitness basis, six personal trainer, two diet & exercise, as well as one diet & health topic. The courses within group training and cycling instructor are arranged once per academic year. Personal trainer 30 credits are also carried out in Bergen and Trondheim.

In the fall of 2011, the NIH Fitness Convention was held for the first time. This has now become an annual event. The goal of the NIH Fitness Convention is to facilitate that everyone who works with both organized fitness activities (the school sector, sports teams, corporate sports teams/various sports clubs) and non-organized fitness activities (self-training, private training parties/groups and commercial gyms) annually will have the opportunity to update themselves on the latest research, try out some of the latest in various training concepts and to participate in an independent forum where they can meet others with the same interests and job. In cities with course courses, an annual Fitness Professional Day or Professional Evening is also arranged. The seminar(s) are free, and the target group is everyone who works with personal training and training of groups. The seminar(s) also help to highlight NIH Fitness' study programmes. In Oslo, approximately 300 people participate in this event every year.

CONTINUING EDUCATION (EVU)

There is considerable continuing education in sports medicine – primarily for doctors, physiotherapists, physical activity and health advisers and other health personnel. Although personnel from SIM and NIH often make up the bulk of the lecturers, these courses are mainly organized by external parties, such as the SIM and NIH lecturers. The Norwegian Association of Sports Medicine, the Professional Group for Sports Physiotherapy, the universities and county medical officers. In addition, a number of courses and seminars are organized by other public bodies and NGOs where SIM personnel participate as lecturers.

STATUS - RESEARCH

During the period 2011-2015, research activities at the department have concentrated on six main areas: 1) Physical activity and health, 2) Monitoring of physical activity and fitness, 3) Women,

exercise and health, 4) Prevention of sports injuries, 5) Active rehabilitation of musculoskeletal disorders, and 6) Fitness. In the coming period, areas 1) and 2) will be merged into one: Physical activity and health, so that there will be five main areas. There is a high degree of overlap between the different areas, and projects in different fields derive their research theoretical and methodological basis from the same research tradition. This research tradition includes epidemiological studies to first establish the incidence of and risk factors for a condition/injury/disease and then use randomized controlled trials to study the effect of various intervention/exercise interventions. The research field is therefore based on tradition in epidemiology and evidence-based practice.

SIM has been a significant contributor to the NIH's overall production of scientific papers. In the period 2011 to 2015, NIH has published 1200 articles with a referee system. SIM alone accounts for 545 of these – or about 45 percent of the total production at NIH. The proportion of publications at level 2 and in leading general medical journals with a high impact factor is also very high for SIM, 36% for the entire period (198 out of 545 publications). During this period, SIM has had 18 public defences excluding those who defend their dissertations at the University of Oslo, Bergen or elsewhere.

As regards external funding, it has been around NOK 70 million or an average of about NOK 14 million per year. By comparison, SIM's internal budget is about 15 million per year. Our goal of being a leader internationally and maintaining major research activity has been achieved by a clear margin.

1) PHYSICAL ACTIVITY AND HEALTH

The objectives for the period 2011-2015 were to increase the scope of research activity, focus research activity on dose-response ratios and maintain high research quality. The scope of research activity has increased markedly during the period, measured as the number of published articles in the area of physical activity and health.

The group has carried out several strategic projects during the period, among which can be mentioned *'Physical activity in patients with lung cancer'*, a randomized exercise study among patients who have recently undergone surgery for lung cancer. Additional studies in the area include '*The Physical Activity and Minority Health Study*' (FAM), a randomized exercise study among Pakistani men and *Active Smarter Kids* (ASK), a school-based intervention study. Other projects that have been or are underway include a project on the mechanisms of development of asthma among young athletes as well as a prospective cohort study on the development of lung function, body composition and physical fitness through puberty in children who are active in organized sports.

During the period, we also conducted a new survey of physical activity among a nationally representative sample of 6-, 9- and 15-year-olds (UngKan2). We have also conducted a new survey of physical activity levels in the adult and elderly part of the population (Kan2). The latter studies had a mixed longitudinal design, including new cross-sectional cohorts, while former participants were followed up at the individual level. Among other things, this gave us the opportunity to study both secular and longitudinal trends in physical activity levels in the population.

Furthermore, the group has succeeded in obtaining research funding from the Research Council of Norway (NFR) in collaboration with the University of Oslo for the implementation of the project *Determinants of Diet and Physical aCtivity* (DEDIPAC) within the framework of the European Union's Joint Programming Initiative Healthy Diet for a Healthy Life. The group has income related to both commissioned and contributory research. The Norwegian Directorate of Health and the Research Council of Norway have been the main sources of funding during the period.

The various projects mentioned above are carried out in close collaboration with other researchers both internally at NIH and at other institutions, such as NIH. Ullevål University Hospital, Sogn og Fjordane University College, Institute of Nutrition Research (UiO), Institute of Preventive Medicine (UiO), Voksentoppen Centre for Asthma and Allergy (Rikshospitalet) and the Norwegian Institute of Public Health. There are eight PhD fellows associated with the various projects.

Main supervisors in this area are Associate Professor Trine Stensrud, Professor Ulf Ekelund, Professor Sigmund Anderssen, Associate Professor Elin Kolle, Adjunct Professor Lars Bo Andersen and Professor Emiritus Ingar Holme.

2) WOMEN, FITNESS AND HEALTH

The objective for the period 2011-2015 was to maintain an international top level in the two main areas: 1) Research on the effect of specific and adapted training for women, controlled training and treatment studies and testing of preventive measures as well as the effect of exercise aimed at promoting health and quality of life with particular focus on pregnancy and postpartum, and 2) Research on the harmful effects of sport on female athletes mainly on the female athlete triad. The objective was achieved through the implementation and implementation of the research projects mentioned below.

Research area 1: The following projects; An interdisciplinary pelvic centre was established at Ahus (Professor Bø in the operating board), STORK Rikshospitalet and STORK Groruddalen where pregnant women with multiethnic background are followed through pregnancy until 6 months after childbirth, the Pelvic organ prolapse (POP) study; A cohort study and a randomised trial on pelvic floor alteration and postpartum injuries as well as effect of postpartum exercise, "Intensive lifestyle intervention on morbid obese", "Motives for and effect of physical activity in female long-term patients with eating disorders" and "Treatment of women with eating disorders", where the use of supervised physical activity and dietary guidance is tested against CBT.

Research area 2: The following projects; "Rapid and slow weight reduction in elite lean athletes" where we tested the effect of two different interventions, "Is it possible to prevent eating disorders among young elite athletes" and "Low Energy Availability" in female athletes where mechanisms related to LEA were investigated.

Professor Bø and Professor Sundgot-Borgen lead the work on "Women, Exercise and Health", and they have an extensive national and extensive international research collaboration, including countries from almost all continents.

During this period, a total of five NIH and four external PhD candidates graduated. All incidentally externally funded. Main supervisors in this area are Professor Kari Bø, Professor Jorunn Sundgot-Borgen and Associate Professor Lene A H Haakstad.

3) PREVENTION OF SPORTS INJURIES

Oslo Sports Trauma Research Center (The Center) was established at NIH in 2000 as an interdisciplinary research environment in collaboration between SIM and the Department for Orthopaedic Traumatology, Oslo University Hospital. The centre is led by Professor Roald Bahr and Professor Lars Engebretsen. The centre's purpose is to prevent sports injuries and illness through a long-term research programme focusing on risk factors, injury mechanisms and injury prevention measures with particular emphasis on injuries in football, handball and alpine skiing/snowboarding.

Since 2008, the goal has been expanded to include prevention of other health problems in sports such as eating disorders and heart disease.

In the previous planning period (2011-2015), the centre had a relatively stable budget varying from just under NOK 10 million to just over NOK 12.2 million. Basic funding comes in the form of centre/environmental support from the Ministry of Culture (up to and including 2016) and the South-Eastern Norway Regional Health Authority (up to and including 2015), but the centre also has funding from other sources nationally and internationally. Among other things, the IOC has designated the Centre as the IOC Research Center for the Prevention of Injury and Protection of Athlete Health, one of nine such research centres in the world.

The centre is a hub in the development of a national and international research network in the field, with project collaboration with research groups from Qatar, Ireland, Hong Kong, Finland, Japan, Iceland, Denmark, Sweden, the Netherlands, Switzerland, France, Germany, Canada, Australia and the USA. The centre also has a significant dissemination initiative, including through the websites www.skadefri.no and www.klokeavskade.no as well as social media such as Facebook and Twitter.

In the period 2011-2015, 16 candidates have completed their PhD degree, seven internal and nine external. Main supervisors in the prevention of sports injuries are Professor Roald Bahr, Adjunct Professor Lars Engebretsen, Adjunct Professor Lars Nordsletten, Associate Professor Tron Krosshaug, Professor Thor Einar Andersen and Professor Grethe Myklebust.

4) ACTIVE REHABILITATION OF MUSCULOSKELETAL DISORDERS

The Norwegian Centre for Active Rehabilitation (NAR) was established in May 2003 and is led by professor and physiotherapist May Arna Risberg. NAR's main objective is clinical research and translational research in the field of active rehabilitation of patients with musculoskeletal injuries and disorders with emphasis on the thematic areas knee injuries, hip and knee osteoarthritis and osteoporosis. NAR has been established as a formal research collaboration between SIM, the Department of Orthopaedic Medicine, Oslo University Hospital, and NIMI. As of 31.12.15 there were, in addition to the chair, 2 PhD candidates in NAR, a senior researcher, as well as two research coordinators. NAR has funding from the South-Eastern Norway Regional Health Authority (2 PhD candidates and a research coordinator), the National Institutes of Health (senior researcher) and resources for part of a research coordinator position from NIMI.

Focus areas are 1) development and evaluation of the effect of active rehabilitation programs for patients with knee and hip injuries, and knee and hip osteoarthritis 2) evaluation of predictors of outcomes after ACL injury, 3) evaluation of risk factors reinjury and return to sport after ACL injury, 4) implementation of evidence-based guidelines for treatment of knee and hip osteoarthritis, and 5) evaluation of predictors of development and progression of knee and hip osteoarthritis.

NAR has an extensive national and international research collaboration with the following international research environments: University of Delaware by Professor Lynn Snyder-Mackler (Delaware-Oslo ACL Cohort Study), Southern Denmark University by Professor Ewa Roos (OMEX Study), and the final year with LaTrobe University Melbourne by Professor Kay Crossley and Federation University, Australia by postdoc Joanne Kemp (HIPARTI Study).

5) FITNESS

The research field of Fitness is a relatively new focus area at SIM. The area was strengthened through an associate professor position in 2008 that covered 50% of NIH centrally and 50% of revenue on

fitness part-time. In late autumn 2015, a new research project started, "The fitness industry - an arena for public health, who, what and why?". In this prospective, observational cohort study over 12 months with follow-up 5 years after the start of the study, the aim is to generate new knowledge about contributing factors associated with maintaining exercise habits, so that we can be better able to develop interventions that get more people to maintain an active life. The project is an interdisciplinary collaboration between various academic communities and departments at NIH and is financed with surplus funds from NIH Fitness.

Some biomechanical studies have also been conducted - comparison of lifting technique and joint load in different squat variants and the cause of pelvic tilt in squats. This is a collaboration with the Department for Physical Performance (SFP), Ullevål University Hospital and two foreign institutions.

GOAL SETTING & MEASURES - TEACHING

SIM's main objective for the period 2016-2020 is to further develop the profession-oriented programme option at bachelor level in Physical activity and health and the master's programmes that build on this to international top level. SIM also has a goal still to attract talented and motivated students as well as to have the best study program in Norway in the field of Physical Activity and Health. The goal of NIH Fitness part-time is to be the leading educational institution in the field in Norway.

These goals are in line with NIH's Strategic Plan for 2016-2020, which states, among other things, that NIH will further develop a study portfolio with high academic quality and recruit and educate talented and motivated students.

BACHELOR'S DEGREE PROGRAMME IN PHYSICAL ACTIVITY AND HEALTH

The bachelor's programme in FAH was revised in 2011 and two cohorts have completed the programme after the revision. As mentioned under "status studies", the number of applicants to BAFAH has decreased in recent years, this applies to both internal and external applicants. We take this very seriously, and it is essential to evaluate and renew the study portfolio in the coming period, and the necessary measures will be implemented.

Based on input from current and former students, we wish during the plan period to propose and implement various changes to the study plan: Changing the content of the course health psychology with the inclusion of new topics such as cognitive techniques, motivational interviewing and communication will be carried out. It is desirable to introduce more basic physiology, anatomy and pathology. Topics in other existing courses will thus be carefully considered in the next period in order to minimize overlap between courses and to consider topics that are no longer topical. SIM will continue to work to ensure that there is study progression throughout BAFAH and the least amount of repetition. Applications for authorisation as health personnel were rejected by the Norwegian Directorate of Health in June 2015. SIM will, however, during the period work to ensure that the FAH education is approved as an authorised professional education as a health professional education modelled on Australia where such authorisation exists. In this regard, SIM will consider a fourth extension year after BAFAH that incorporates additional basal physiology, pathophysiology, communication and more practice with patients. Here we want a collaboration with the Department for Physical Performance (SFP) so that both FAH and IBI students can apply for authorization as health personnel.

Thirty credits of specialization (elective packages 5 semesters) will be considered, e.g. in nutrition or children and physical activity/exercise etc. This will involve more collaboration with other departments at NIH in terms of both academic content and teaching resources.

When it comes to teaching, the focus will continue to be on the development and introduction of student-active teaching methods, such as problem-based learning, more case-based teaching, e-learning, flipped class room and practice over the next 4 years. The aim is to further develop problem-based learning methods based on real clients, ideally also a number of case reports that can be utilised in several courses.

There is still a need to give students more writing practice in the form of a comprehensive plan of assignments throughout the FAH program. There will also be more emphasis on evaluation in the form of presentations, to give students practice in collecting, evaluating and disseminating research-based knowledge based on principles from evidence-based medicine.

It is a goal, in cooperation with the study department, to strengthen the marketing of the programme to relevant applicants and market graduated candidates to potential employers in the public and private sectors so that they are well acquainted with the candidates' qualifications.

SIM aims to maintain a bachelor's degree graduation rate of over 80% throughout the plan period. In order to retain students throughout their studies, we will initiate measures to strengthen their sense of belonging to the department and to try to catch any dissatisfaction at an early stage.

SIM is among the best in research, and in order to achieve the goals in teaching and supervision, SIM is dependent on increasing the permanent teaching staff. The danger that the total burden on permanent employees will tire them out is imminent. Therefore, an application is again being made to add more permanent employees to the department. For example, it is out of the question to continue with only one permanent employee who teaches methods and statistics.

MASTER'S PROGRAMMES

SIM aims to admit a minimum of 15 and preferably 20 master students in Physical Activity and Health each year, and 20 master students in Sports Physiotherapy every other year. We also aim to maintain a high graduation rate of the Master's programme of over 80% throughout the planning period. There is hardly a need for significant revision of the curriculum or course description, but there is a desire to develop a separate module at master's level; "Women, Fitness, Health and Performance".

The goal is also for several of the master's theses to have a scope and quality that indicates that they can be published in international journals.

INTERNATIONAL EXCHANGE

The department has a desire to make bachelor's and master's programmes attractive to foreign students. There are several steps that can be taken, such as a gradual change of teaching from Norwegian to English, which must be adapted without affecting Norwegian students' application to studies. In particular, teaching in English is relevant for the most central FAH-specific courses, where we have special expertise and which will be of international interest. We also frequently have requests to accept foreign students on internships. However, the capacity of our permanent academic staff is minimal, so this cannot be prioritized in the coming period, unless new positions are added to the department.

FITNESS DELTID

One goal for the next period is to further increase the level of competence among lecturers and examiners, and that lecturers who are used for theoretical teaching should at least hold a master's degree in relevant subject, or equivalent. NIH Fitness also wants to involve even more internal lecturers from across the NIH.

NIH Fitness has a desire to expand the personal trainer education from 30 to 60 credits. An expansion of the programme is a market adaptation that is in line with the demand in the fitness industry and the need for well-trained personal trainers. Academically, the increase includes two new modules: "Exercise and Health" and "Exercise and Performance" totalling 20 credits, as well as teaching within the courses "Diet and exercise" and "Diet and health" (10 credits). This possible expansion must take place in coordination and in accordance with full-time studies so that this is neither an alternative nor a competitor to the full-time studies at BAFAH and BASFP.

Independently of and in parallel with the above process, NIH Fitness and the professional group are in the process of revising the existing personal trainer course (30 credits), including content, distribution of hours and time on various topics, as well as setup and structure.

It is a goal to continue the NIH Fitness Convention and Fitness Professional Day at the same level as before, albeit somewhat reduced during the rehabilitation period. It is also a goal of Fitness part-time to get an increased collaboration with other disciplines at NIH, and to follow the international market through participation in congresses / meetings, as well as through close industry contact with the major chains and VIRKE training.

GOAL SETTING & MEASURES - RESEARCH

For the period 2016-2020, SIM's objective of international excellence in research communities within the four key research areas – "Physical activity and health" (including monitoring of physical activity and fitness), "Women, exercise and health", "Prevention of sports injuries" and "Active rehabilitation of musculoskeletal disorders" – is maintained so that these stand out as international leaders in both research and research-based dissemination. The department also aims to develop the research area within "Fitness" to a good level during the next period. The objectives and measures for the key research fields at the department are written by the individual research group, and as will be stated in the following, the research groups' objectives are ambitious. In order to achieve this goal, we need to increase the already significant external funding, while at the same time it would naturally ease the predictability and likelihood of goal attainment if NIH centrally chooses to prioritize permanent positions for SIM.

SIM's objectives are in line with the goals of NIH's Strategic Plan 2016-2020, which states that NIH shall conduct research of high international quality and with clear societal relevance. The strategic plan also states that NIH will, among other things, focus on research in: 1) training and performance development in recreational and elite sports, 2) physical activity and public health in a life-course perspective, and 3) physical education and physical activity in everyday school life. Other objectives of the Strategic Plan are for NIH to increase the scope of externally funded R&D in the priority fields and strengthen the quality of doctoral education and increase throughput. SIM will continue with the spring seminar – so-called "Kleivstuaseminaret" – for all involved employees. The purpose of the seminar is to quality assure the department’s research projects, and to ensure mutual exchange of

information about ongoing projects. Normally, 3-5 foreign and 2-4 Norwegian well-established researchers with relevant expertise have been invited as external critics. The seminars have been very successful and are considered to be a significant success factor in achieving good quality research. The PhD candidates also gain useful experience in presenting and discussing their own projects and results, in English. In addition, the seminars have an important milestone function for each project manager. Such seminars will be an important measure to ensure the quality and progress of the department's research also in the next planning period.

1) PHYSICAL ACTIVITY AND HEALTH

The objective for the period 2011-2015 is to increase the scope of research activity, focus research activity on dose-response ratios and maintain high research quality.

The main objective for the coming five-year period is to establish an internationally leading research centre within the topic of sedentary behaviour, physical activity and health with a special focus on children and adolescents. This will be achieved by producing research of the highest international quality, training young promising researchers and translating research results into practical public health work (e.g. guidelines; population-based interventions). The recent grant of the Toppforsk application for the period 2016-2020 from the Research Council of Norway constitutes a basic prerequisite for this.

Society and young people's living conditions have changed radically in recent decades. This includes increased use of electronic media and today's young people spend the majority of their waking time sedentary. However, it is not clear whether this has negative health effects in the short and long term, regardless of the extent and intensity of physical activity. Furthermore, the detailed dose-response relationship between moderate and higher intensity physical activity and health factors has not been established among young people.

The group will work to increase the knowledge base on the dose-response relationship and causal associations between sedentary time, physical activity, and aerobic work capacity with risk markers for cardio-metabolic diseases, obesity and cognitive function among children and adolescents. Furthermore, during the period, the group will work to increase knowledge about the determinants of sedentary time and physical activity, as well as understand whether physical activity can moderate or modify associations between determinants of ill-health (e.g. developmental factors early in life) and later health outcomes.

The group will also work to conduct a third mapping study of physical activity, sedentary time and health outcomes among Norwegian children and adolescents, follow up ongoing intervention projects and implement and evaluate school-based interventions to increase physical activity associated with the school day among students in lower secondary school.

Specific objectives are to:

- Obtain additional external funding to carry out a new survey of children and adolescents' activity habits, as well as a new corresponding mapping in the adult and older part of the population

- Increase the quality and quantity of research production measured as the number of publications in journals with an impact factor >5 and increase the number of citations of these publications

- Increase research communication with the general public through media, social media and more.

Strategic initiatives

In order to succeed with the overall objective, several strategic measures are needed. Today's research is moving towards open access to research and research data. Even today, primary data from large databases are available free of charge (e.g. NHANES, UK Biobank), and it will probably be a requirement from those who provide research funding that more primary data be made available to researchers who are not primarily involved in data collections.

The group should make use of the databases available to answer questions relevant to the overall objective of the research area physical activity and health, and complement it with new data collection only if the problem cannot be answered with existing databases. This also involves leveraging and developing already established collaborations (e.g. International Children Accelerometer database, MoBa, Pelotas birth cohort etc.). Furthermore, the group shall strategically consider all new proposals for cooperation and enter into new collaborative projects whether they are in accordance with the overall strategy ("fit for purpose"). Priority should be given to strategic collaborations, both nationally and internationally that can generate research support from the EU, Horizon 2020 and the like.

In order to achieve our goals, we are completely dependent on highly skilled employees, and it is essential that the group increases the proportion of graduated doctoral research fellows. During the period, an associate professor and a postdoctoral fellow should be hired in addition to those financed by external funds. It is also a goal to hire seven new PhD candidates during the period. The aim is to increase the level of external research funding compared with the previous period.

2) WOMEN, FITNESS AND HEALTH

In the area of women, exercise and health, the goal is to maintain an international top level in the two main areas:

1) Research on the effects of specific and customized exercise for women; controlled exercise and treatment studies, testing of preventive measures and measures aimed at promoting health and quality of life with particular focus on pregnancy, after birth and (extended from the last period), body perception, weight and eating disorders

2) Research on the harmful effects of/challenges for female elite athletes and research on the effect of interventions that can have a preventive effect on health-related challenges such as weight regulation, eating disorders, menstrual disorders and ailments that can occur during pregnancy and after childbirth.

Ongoing and planned projects that will contribute to the objective

Research area 1; With regard to research area 1, the group will publish data from the project "Effect of pelvic floor exercises after childbirth on primiparous women with and without pelvic floor injuries" (long-term follow-up under planning). Furthermore, the group will conduct a follow-up study of the participants in a randomized controlled trial 6 years after they participated in an exercise intervention during their first pregnancy, and pregnant women's sources of information regarding exercise, weight gain and diet will be mapped, as well as how this might affect their health behavior. In part 2 of this project, it will be mapped whether health personnel in Oslo (doctors and midwives) are familiar with

recommendations for exercise during pregnancy and whether they use these recommendations as a starting point for providing advice and guidance.

The group will also complete an ongoing RCT on women with eating disorders where supervised physical activity and diet therapy (FAKT) will be measured against the gold standard, cognitive therapy.

Body pressure, body dissatisfaction and eating problems contribute negatively to public health. In the autumn of 2016, we will initiate the project "Body experience and quality of life", which is a school-based health-promoting intervention project where the purpose is to test whether it is possible to promote positive body experience and quality of life among students in upper secondary schools.

Research area 2; It is desirable to test the effect of a web-based teaching programme for female practitioners. This is done via an international project initiated by the IOC medical commission: "IOC Female Athlete Health e-learning tool" During this period, the group will also complete a project with the purpose of validating RED-s SCAT (screening of RED-s and Return to Play). There are many unanswered questions related to how the mother and fetus experience training and competition, and also how it is appropriate to facilitate for female athletes to start a family and at the same time continue their sports careers. Some of these questions are sought to be answered in the period via several projects on elite pregnant athletes and the role of young children. Professor Bø is the leader of a major focus on elite athletes and training through pregnancy and after childbirth through the IOC. A consensus opinion will be published in this area in April 2016 and more studies are planned and will be a priority area during this strategic planning period.

As of 2016, there are a total of 5 internal and 3 external research fellows for the ongoing and planned projects. All externally funded.

Strategic measures to achieve the objectives

In order to implement and publish from ongoing projects, we depend on a large number of master's students, PhD candidates and postdoc positions. Specifically, there is a need for 2 PhD positions and 2 postdoc positions for already ongoing projects. For planned projects, 7 research fellowships are needed. There is a need for an adjunct professor position in gynaecology, such as Professor Ingrid Nygaard or Professor Angelica Linden-Hirschberg, in order to provide the group with specialist expertise and strengthen their supervision capacity.

Funding: Strategic measures to achieve the objectives are to apply to Health and Rehabilitation, South-Eastern Norway Regional Health Authority and NOR and RCN for PhD and postdoctoral positions. During the period, it is also on the plan to submit an application to RCN as a Centre of Excellence in collaboration with the Bekken Center at Ahus for a more general research funding in this area. It is also planned to apply for the ERC Advanced Grant again in 2016.

3) PREVENTION OF SPORTS INJURIES

Oslo Sports Trauma Research Center aims for the period 2016-2020 to maintain research activity of high quality and to the current extent.

Injuries and illness constitute an important limitation for training and performance development, both in recreational and elite sports. Since its establishment in 2000, the Oslo Sports Trauma Research Center has generated new and important knowledge about risk factors and mechanisms for sports injuries. The centre has also developed and documented the effect of preventive training programmes on the most common injuries.

However, there are still many unresolved research questions in this area. We know little about which athletes are particularly vulnerable to injuries, and whether athletes at increased risk can be identified through screening tests. Moreover, we still have limited knowledge about specific exercises and the optimal dosage of these exercises for an injury prevention program to have an effect. The measurement methods for testing the effect of specific exercises used in prevention and rehabilitation after injuries are also inadequate and imprecise.

Therefore, the Centre will conduct follow-up studies in the coming period. In cooperation with national and international research communities, we will develop better measurement methods. In order to map and increase insight into why specific exercises and prevention programs work, we will study movement patterns and muscle activation using EMG, Pet-Scan and possibly new technologies. We also want to develop more specific and challenging sports-related tests and map the possibilities for making such measurements in real match situations.

Current methods for registration of injuries primarily capture acute injuries. We know that repetitive strain injuries in some sports can be just as big a problem as acute injuries, but knowledge about their extent is limited. In the previous planning period, we have developed a new method for registering strain injuries that improves registration and more precisely defines and describes the extent of strain injuries than previously. This method has become widely distributed internationally and has been used in several of our ongoing studies within several sports. The purpose is to develop effective programmes for prevention and then test these in larger randomised trials. The same method has also been used in a larger study on strain injuries in young athletes from different sports and on groin injuries in footballers at different levels and of both sexes. We will continue to further develop the method (including the questionnaire/application) that registers strain injuries in sports.

Criteria for when an athlete can safely return to sport are important to identify in order to avoid re-injury (secondary prevention). Within this area, there is little documented knowledge. The Oslo Sports Trauma Research Center aims to develop evidence-based measurement methods and criteria for return to sport after the most common and serious injuries.

There are challenges associated with the implementation of new research results on disease and injury prevention in active sport at all levels. In the coming planning period, we will further develop cooperation with active sports within our focus areas. In this collaboration, we want to get input and ideas from coaches and athletes for new projects that can have a disease and injury prevention effect in active sports. By developing and strengthening this cooperation, we will also improve the possibilities for implementing our research results in sport. In this connection, we are planning studies on implementation strategies using, among other things, RE-AIM methodology. This methodology has been developed to increase the quality, implementation capacity and effect for the groups concerned by translating research results into the field of practice through five steps to achieve better results.

At the same time, the centre will continue to prioritise the dissemination of research-based knowledge on the prevention of sports injuries to sport and the general public, nationally and internationally. In addition to the dissemination channels KLOKEAVSKADE.NO (with primarily researchers as a target group) and SKADEFRI.NO (with primarily coaches and athletes as a target group), Twitter and Facebook, we want the work around coach education at the national level to be expanded to include all individual federations.

The major goal of the Centre's dissemination initiative is to engage both the national and international sports organizations such as the IOC, as well as the 9 "IOC Research Centers of Excellence" to contribute to the development of the world's leading sports medicine digital platform focusing on injury and disease prevention. The feedback from these partners has been exclusively

positive, and formal collaboration agreements are expected to be entered into during the new plan period.

The first step in the development process has been a mobile application for injury prevention training, "Get Set – Train Smarter". The application displays evidence-based injury prevention exercises presented via video readily available on smartphone. During the planning period, the "Get Set" application will be further developed for the Winter Youth Games in Lillehammer in February 2016 and will be made available in 7 languages. In addition to an already large video bank, it will offer new exercises and evidence-based training programs for use by participants and coaches of the Olympic winter sports.

The further development of digital media will take place continuously during the planning period and will also incorporate tools from Norwegian coach education such as the E-learning module "Sport without injuries" and other resources developed for the national coach education. The work on the new SKADEFRI website will be intensified and expanded from 2016, with a working group consisting of people with complementary expertise (researchers, clinicians and linguists/journalists). INJURY-FREE is expected to be re-launched in 2016.

There are epidemiological data suggesting that mental health problems among athletes are the "hidden harm" in sports. Knowledge about which psychological factors are crucial for reducing the risk of illness and injury should therefore be implemented in injury prevention programmes. At the same time, we know that mental factors have an impact on the return to sport after injury and illness. During the planning period, the centre will include mapping of psychological factors that may have a bearing on why injuries occur and which factors are decisive when returning to sport.

Since its establishment, the centre has carried out a number of projects with partly large and complex data sets without having the capacity or expertise to establish good database systems for handling these. SIM has in the previous plan period employed a person with special expertise in databases and with this developed database solutions that make it easier to systematise and process data, and which make it possible to 'reuse' solutions developed for a project for use in later, similar projects. We will further develop this field during the planning period.

During the planning period, we have strengthened our cooperation with international research communities in the form of project collaboration and exchange of personnel. We want to further develop the collaboration with the Aspetar Research Centre in Doha, Qatar, the UEFA Injury Study Group in Linkjøping, FIFA's research unit FMARC and the University of Copenhagen. It is desirable to further develop the cooperation with the Department for Physical Performance and the Department for Coaching and Psychology at the Norwegian School of Sport Sciences.

In order to increase the level of activity throughout the period, the Oslo Sports Trauma Research Center will continue to seek funding for the Centre and individual projects from all relevant sources nationally and internationally. Part of this work will be an application to RCN as a Centre of Excellence in collaboration with NAR and the cartilage research community at Oslo University Hospital. Strategically and financially, it is also important to further develop cooperation with major international sports organisations such as the IOC, UEFA, FIFA and FIS.

4) ACTIVE REHABILITATION (NAR)

The objective of this field of research within active rehabilitation in the period 2016-2020 is to continue with the existing focus areas: 1) development and evaluation of active rehabilitation programs for patients with knee and hip injuries, and knee and hip osteoarthritis, 2) implementation

of AktivA to a national quality registry, 3) development of screening tests for return to sport for patients with ACL injury and for those with femoroacetabular impingment (FAI), and 4) evaluate risk factors for reinjuries, dysfunctions and osteoarthritis for patients with knee and hip injuries.

Furthermore, the aim is to develop the focus areas to: 1) develop interventions for re-injury after ACL injury (secondary preventive measures), 2) evaluate mechanisms underlying why active rehabilitation programmes improve pain and function in patients with knee and hip osteoarthritis (by MRI and other biomarkers), 3) evaluate the effect of hip osteoscopy for patients with FAI, and 4) identify prognostic factors for outcomes in FAI.

Knee injuries (mainly ACL, meniscus and cartilage injuries) currently account for a large proportion of injuries in the musculoskeletal system, and knee injuries are one of the greatest risk factors for the development of knee osteoarthritis. Early rehabilitation of knee injuries appears to be of great importance also for long-term results, particularly for the development of knee osteoarthritis. One of the major knowledge gaps lies in understanding what the various exercises and what dose-response means in the work to regain function after injury and prevent strain injuries. With the development of new measurement methods in both movement analysis and the use of MRI to measure changes in load and changes in cartilage quality, we will in a new way be able to acquire new knowledge about the consequences of exercise and rehabilitation in the short and long term, also as secondary prevention of reinjuries and secondary prevention of progression of osteoarthritis.

A major knowledge gap today is the importance of exercise and rehabilitation for both hip osteoarthritis and knee osteoarthritis patients. Over the next few years, our large, ongoing prospective clinical cohort studies will be able to provide us with new knowledge about predictive factors for the development of knee and hip osteoarthritis. Translational research through the use of movement analysis and specific muscle function measurements (EMG and isokinetic strength) will increase knowledge about mechanisms for changes after injuries and strain injuries and the effect of various rehabilitation programmes.

Measures - studies:

1) Established cohort – publish data on risk factors for re-injury after ACL injury. a) Risk factor study to evaluate outcomes after surgery (ACL reconstruction) and for the unoperated, and b) Identify factors influencing outcomes in operated and unoperated ACL patients

2) New cohort of ACLRs that include specific returns to sports tests and follow-ups with respect to exposure and new injuries

3) Use established injury data as a basis for the development of prevention programs and evaluate mechanisms for change both as primary prevention and secondary prevention of reinjuries after ACL injury (RCT). Mechanisms for which changes occur in relation to the choice of different exercises/training after ACL R compared to mechanisms for change in relation to preventive exercises (biomechanical and biomarkers such as MRI).

4) Implementation of AktivA - National quality registry for osteoarthritis

Measures/resources: This will require 2 PhD candidates, 2 postdoc fellows, a research coordinator, as well as expenses for MRI, X-ray, biomechanic, and any other operating funds for other biomarkers for the 5-year period. Moreover, it will require funds for electronic data collection system. We will continue to seek funding for NAR and individual projects from all relevant sources nationally and internationally.

5) FITNESS

The fitness industry is constantly changing and there is currently very little documentation on the effect of the various forms of training the fitness industry offers its customers, as well as knowledge about what characterizes those who train at a fitness center. For the next period, the goal is to establish research and internal collaboration on a larger scale and that is even more fitness-specific.

NIH Fitness wants to focus on three main areas: demographic research, research focusing on the effects of different activities, and monitoring new forms of activity. We also want to continue our work on biomechanical research on strength training exercises to increase our understanding of how such exercises affect the musculoskeletal system. Under the aforementioned fields, we will have the following academic focus in the next period:

A) The fitness industry is an arena for public health. Who, what and why? As mentioned on page 9, the main purpose of this research project is to conduct a comprehensive mapping of factors associated with health behaviour, activity habits and inactivity. The goal is to understand and explain as many aspects as possible of being physically active/inactive, as well as being able to transfer and use this knowledge in practice. As of 1 June 2015, a research associate has been employed in a 50% position to assist with planning and data collection in this project. During the next period, it is a goal to expand this project with an RCT that "looks" at dropout issues in the fitness industry. The purpose is to study whether goal-oriented and motivating conversations with new members can reduce drop-out and the proportion of people who opt out of the gym. Applicants will apply for research fellowships and research funding both internally and externally (Research Council of Norway, Health and Rehabilitation, Physiotherapy Fund etc.).

B) Effect of various activities offered in the fitness industry. The ongoing research project "BodyPump and Personal Trainer – changes in muscle strength and body composition" is a randomized controlled intervention study, where the main goal is to look at strength effects and changes in body composition in obese women between 18-65 years. All data collection in the project has been completed, and PhD candidate (Anne Mette Rustaden) is in the writing phase. The project is internally funded by NIH.

C) Biomechanical studies of strength training exercises and their dissemination. There is a great lack of description in the literature of how various strength training exercises affect the musculoskeletal system. Such an understanding is necessary to optimize the effect of exercises for different target groups, such as performance improvement, active rehabilitation or injury prevention. Thorough analyses are needed to understand how basic exercises affect the musculoskeletal system and how variations of exercises modify joint load.

We also want to study how new teaching methods such as 3D animations that visualize strength training and biomechanical principles affect students' learning, and how we can use e-learning tools in the best possible way.

In total, the goal is to receive funding for two research fellowships associated with the field of fitness during the period 2016-2020. During the period, efforts will also be made to further develop the research group through increased collaboration with other departments at NIH, other professional groups on SIM and recruitment of bachelor's and master's students.

SIM - ORGANIZATION AND RESOURCES

Organization and resources is a new area for which SIM has chosen to create an action plan and the main goal is for SIM to have a competent and efficient administration that supports and strengthens the organization. In the period 01012011-31122015, SIM has had 18.1 full-time equivalents on internal funding, of which 7 are research fellowships. In addition, we have had 17.5 externally funded positions, of which 14 have been research fellowships. As of 1 January 2016, SIM has 2.8 full-time equivalents in administrative positions. In addition to the administrative staff, SIM has 9.6 100% positions such as professor or associate professor, one postdoctoral fellow, 11 PhD candidates in a 100% position, three researchers in a 100% position, three researchers in a 50% position and six adjunct professors in a 20% position.

We believe that SIM has the right administrative competence in relation to the tasks to be performed, but due to very high activity there is a need to increase this. At the same time, SIM considers there to be a significant improvement potential in the areas of administrative processes and ICT infrastructure. Below are our objectives and measures (in bullet points).

Staff. SIM must be administratively staffed so that the given tasks are normally solved within the standard working hours and have the right competence in relation to the department's tasks.

- Carry out a regular annual assessment of staffing and competence in relation to the administrative tasks at the unit and in this connection assess hiring and competence enhancement.

Work environment. The personnel at SIM should feel valued, be satisfied with the physical working environment in which they normally function and experience a sense of belonging to and well-being at both the department and NIH. The Labour and Climate Survey (ARK) conducted in 2014/15 showed that SIM scores high on this. At the same time, we know that this does not happen by itself. Therefore, the following measures are important to us – in addition to of course following up on the measures we have arrived at after the ARK survey.

- Survey employees' perception of the physical environment and facilitate improvements to it.
- Carry out at least three major social events (preferably combined with academic content) each year.
- Encourage SIM employees to participate in NIH joint events.
- Influence full attendance at the department meeting, and encourage daily joint lunch.

Administrative processes. Administrative procedures for personnel, finances, ordering and procurement shall be carried out in accordance with process descriptions within acceptable deadlines. In situations where appropriate, the academic staff at SIM shall receive support for control and follow-up of budgets, finances and reporting – especially in externally funded projects. In projects with extensive or particularly demanding data, they must also receive support to develop/use databases. To achieve this, the following measures are taken:

- Keep an overview of and document processes where deviations and delays constantly occur.
- Influence the NIH administration to change and/or clarify processes that are not working.
- Provide support as needed and clarify the division of responsibilities.

ICT and infrastructure. When it comes to ICT and infrastructure, we have the following four objectives. 1) SIMs should use NIH support systems and influence their effectiveness. 2) SIM personnel must be familiar with and follow rules for storing research data and handle the data accordingly. Digital data in SIM's portfolio will be backed up and backed up internally by ICT NIH. 3) SIMs must have computer equipment and systems that cover, support and strengthen the areas and tasks for which the department is responsible. 4) SIM's Web pages internally (innersvingen.no) and externally (NIH.no) shall be updated with current and correct information. The following measures apply:

- Follow up the administration's use, treatment, waiting time and feedback in the support systems, and further record the measurement results with the responsible unit.
- Influence NIH to provide guidelines/rules for storage and handling of research data in all phases of the projects.
- Provide support in connection with facilitating the implementation of these guidelines and rules in practice, as well as provide advice and tips regarding information security and information security.
- Map, follow up needs and evaluate solutions.
- Encourage employees to report new and changed personnel and project information.
- Set aside fixed times for review of what is displayed on these web pages.